Chapin & Bangs

Steel Service Center

- STRUCTURAL STEEL
- PLATE – CARBON & ALLOY
- SHEET PRODUCTS
- EXPANDED METAL & GRATING
- TUBING
- CARBON STEEL BARS
- ALLOY STEEL BARS
- STAINLESS PRODUCTS
- WATERJET CUTTING
- LASER CUTTING
- PLASMA CUTTING
- FLAME CUTTING
- SAWING
- SHEARING
- CAD INTEGRATION
- JIT SERVICE

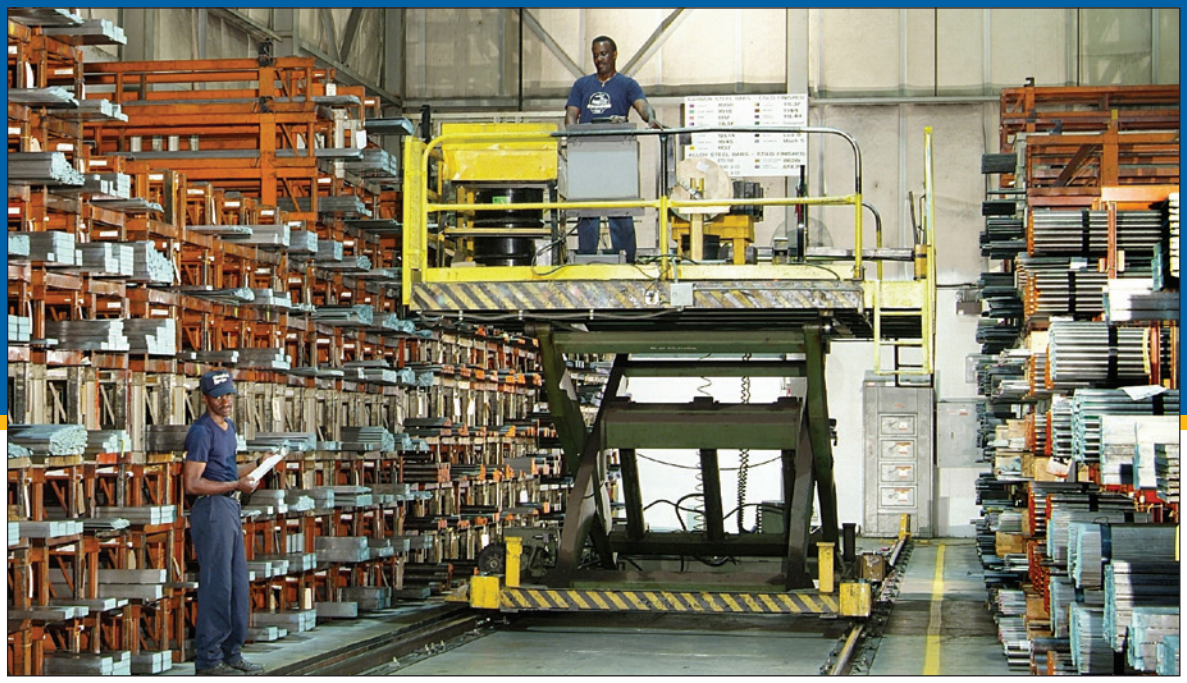
1-800-972-9615

www.cbsteel.com

A Tradition of Excellence

Established in 1888, The Chapin & Bangs Company is a premier steel service center. We have an extensive inventory and the ability to process your custom orders quickly and efficiently. We operate three shifts and provide special stocking programs and JIT services. Over the past century, Chapin & Bangs has expanded its product line, embraced new technology and built a reputation for dependable customer service.

TABLE OF CONTENTS



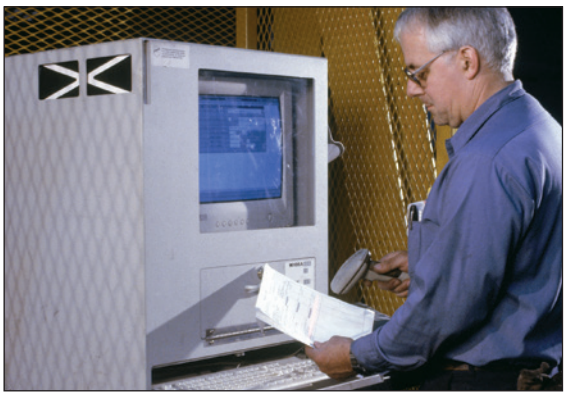
The lift allows us to move our extensive inventory of cold rolled bars quickly and efficiently.

Extensive Inventory

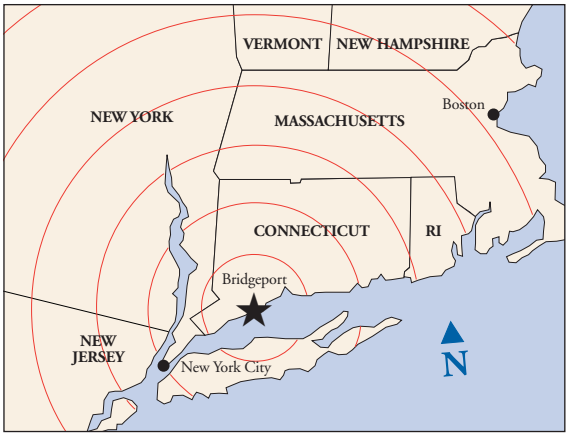
With thousands of tons of carbon, alloy and stainless steel, we are one of the finest service centers in the Northeast. We feature an extensive inventory of bars and plates, as well as structural materials, sheets, tubes, expanded metal and grating, and stainless steel. Our inventory is available in various thicknesses and grades.

Our custom racking system provides fast handling of our hot rolled inventory.

We carry a full line of structural steel including angles, channels and beams.



All products, work orders and shipping tags are bar coded and tracked through our monitoring system.



We deliver throughout New England and the Tri-State area.

Electronic Tracking

Our custom tracking system allows us to monitor every aspect of your job from initial order to delivery. Our products, work orders and shipping tags are bar coded to provide real-time monitoring as they move through the preparation and loading process. This ensures quality, accuracy and timely delivery.

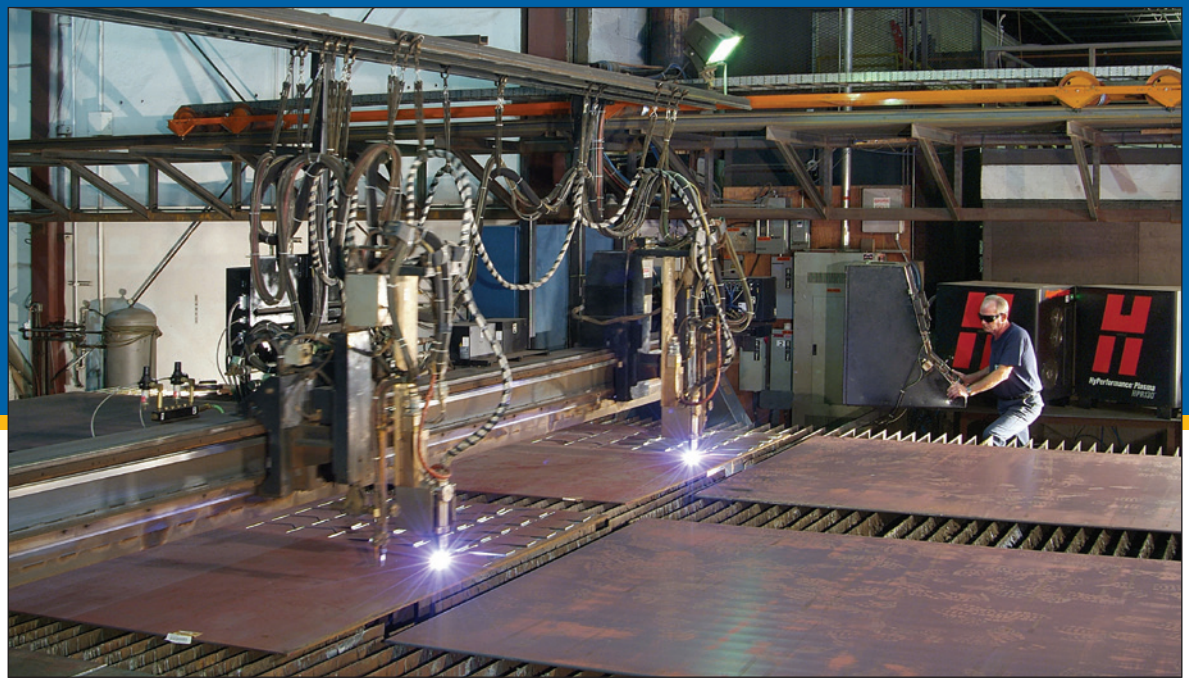
Just-In-Time Service

Our JIT service is driven by an experienced sales force, skilled shop personnel and an extensive trucking fleet that provide flexibility and on-time service.

Special Stocking Programs

We offer custom stocking programs to ensure the products our customers need, are available for immediate delivery.

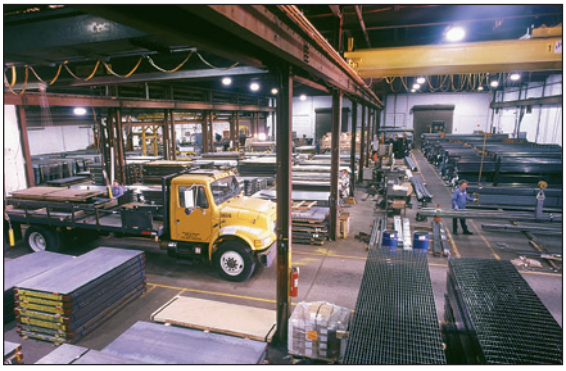
Our delivery trucks utilize GPS tracking to provide up-to-the minute customer notification.



The hy-definition plasma torches provide a fast, accurate and clean method to custom finish steel plates.

Facilities

Our 150,000 square foot full overhead crane facility has round the clock operation with three shifts. We also feature custom racking systems to provide fast material handling. Our offices are attached to the facility, allowing our sales staff to directly monitor the processing of your order.



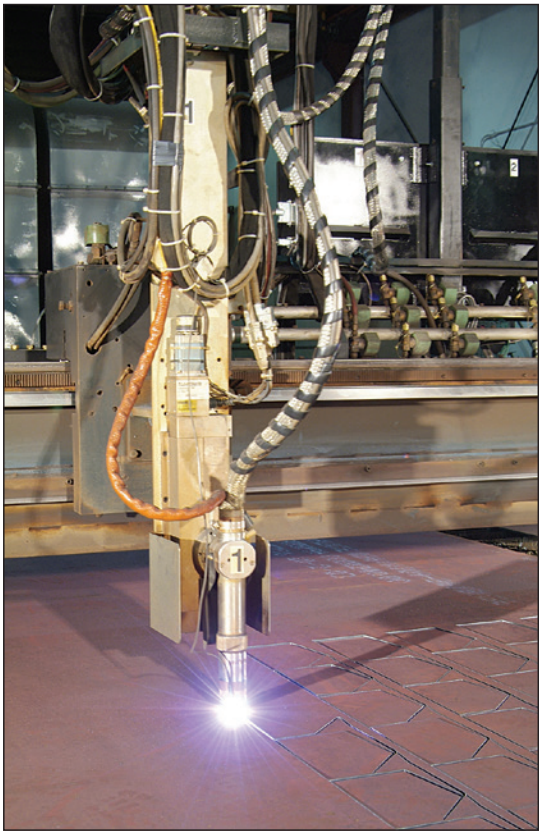
Two of the eight large bays that make up our warehouse and production facilities.

Services

We provide a wide array of value added fabrication and finishing services to ensure your product requirements are met to exacting detail.

- Laser Cutting
- Waterjet Cutting
- Plasma Cutting
- Flame Cutting
- Sawing
- Shearing
- Full CAD System Integration
- Kitting
- ISO 9001:2015 Certified

One of our many shears.



The plasma torch has accuracy to ± 1/32" and can cut a 1-1/2" thick plate.

Plasma Burning

Our Hypertherm - HPR 260 hy-definition plasma burning torches provide close tolerances and hold the edge bevel to 2˚ or less. The plasma cutter has accuracy to +/- 1/32 (.03125) that produces a better-edge quality on materials up to 1-1/2" thick.

Fast, Flexible and Precise Lasers

Our 4000 watt lasers produce a finished or near finished product in less than 1/3 the time. Offering tolerances to within +/- .004 and cutting a variety of materials, including steel, stainless and aluminum, the lasers eliminate most finishing operations. Integration with our CAD system and large dual transfer tables ensures quality and increases overall productivity.

See page 22 for more laser information.

The lasers provide flexibility, fast turnaround and eliminate the need for most finishing operations.

The dual Dynamic XD Waterjets cut any material with virtually zero taper (.001).

Dynamic XD Waterjet

We understand that not all cutting needs and production requirements are identical. That's why to better serve our customers, we've purchased the new Flow Mach 4 Dynamic XD Waterjet which provides for up to 60 degrees of motion while cutting any material with virtually zero taper. The Waterjet has no heat affected zone and eliminates the need for costly secondary finishing while delivering a lower per part cost.

Dynamic XD Waterjet is the only 3-dimensional cutting system that utilizes SmartStream™ technology providing higher accuracy, faster cutting and virtually no taper.

All Waterjet functions are controlled from the digital console.

The powerful 94,000 psi (100 HP) HyperJet intensifier pump reduces cutting time by half.

Dynamic XD Waterjet Advantages

- Cuts any material including steel, alloys, stainless, and carbon
- Large 6’6”’ x 13’ cutting area
- 94,000 psi (100 HP) HyperJet intensifier pump reduces cutting time by half, thereby reducing costs
- Virtually zero taper (reduced to .001”)
- Narrow kerf and no heat affected zone
- Eliminates need for costly secondary finishing
- 3-Dimensional capabilities
- Software controlled robotic motion system
- Full 60 degrees of motion and five axis
- Active Tolerance Control
- Exceptional quality and speed

The powerful 94,000 psi (100 HP) HyperJet intensifier pump reduces cutting time by half.

A few examples of some of the zero taper intricate parts that can be achieved with the Dynamic XD Waterjet.

Our southern Connecticut facility is centrally located for quick turnaround.

It's About the People

Chapin & Bangs owes its success to one simple philosophy, treat people as we would like them to treat us. That's the secret to how we've built lasting customer relationships, quality supplier partnerships and a work force that raises service to the highest levels.

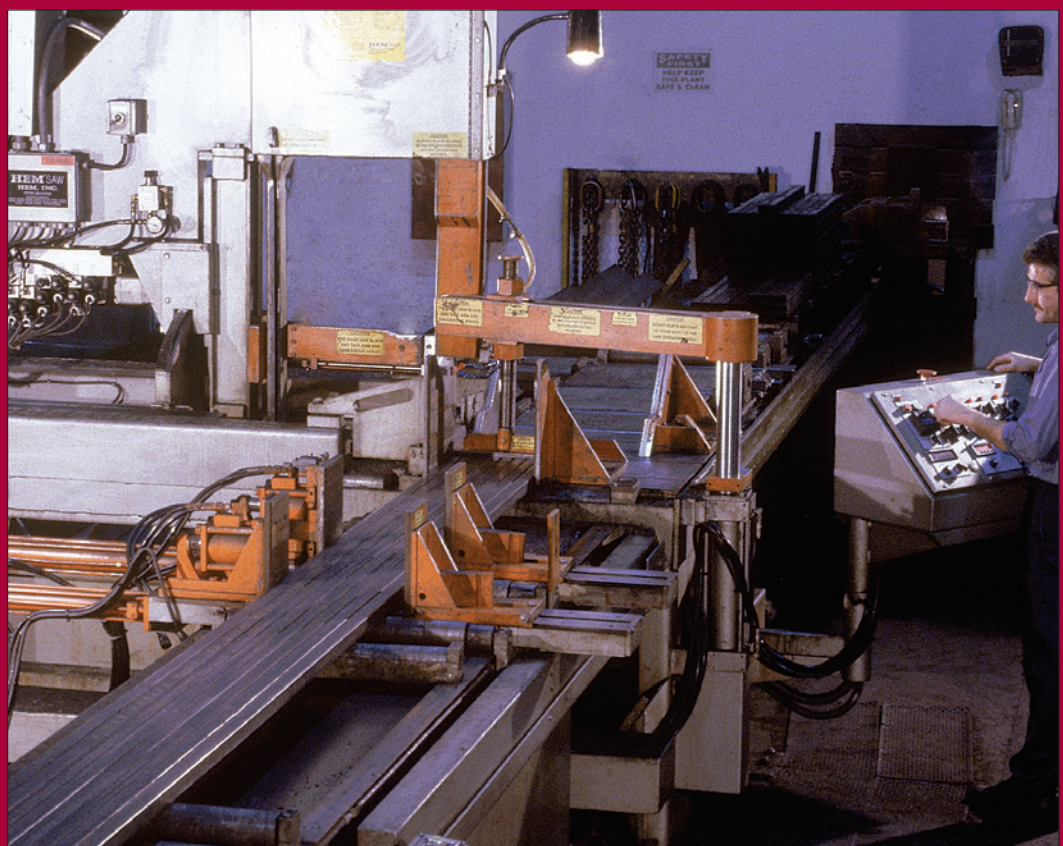
Our employees are the cornerstone of the business. We strive to hire individuals who share our commitment to providing quality products and unparalleled customer service, and treat everyone with dignity and respect. It makes a difference. In fact, our employees average a remarkable 19.7 years of service. That's invaluable in a service industry.

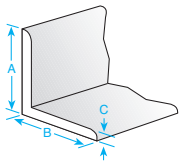
Our experienced staff understands the steel industry and meets your needs in a timely fashion.

We understand the steel service center business and draw upon more than a century of experience to provide quality, cost-effective steel products.

Give us a call at **1-800-972-9615** to speak with one of our representatives.

STRUCTURAL





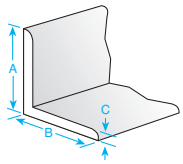
Angles – Bar Size

Available as ASTM A36, A709
Stock Lengths 20 Ft.

Sizes

Leg (A)	Leg (B)	Thick. (C)	Weight Per Ft.in Lbs.
1/2	1/2	1/8	.380
5/8	5/8	1/8	.480
3/4	3/4	1/8	.590
7/8	7/8	1/8	.700
1	5/8	1/8	.640
1	3/4	1/8	.700
1	1	1/8	.800
		3/16	1.160
		1/4	1.490
1 1/8	1 1/8	1/8	.900
1 1/4	1 1/4	1/8	1.010
		3/16	1.480
		1/4	1.920
1 3/8	7/8	1/8	.910
		3/16	1.320
1 1/2	1 1/4	3/16	1.640
1 1/2	1 1/2	1/8	1.230
		3/16	1.800
		1/4	2.340
		3/8	3.350
1 3/4	1 1/4	1/8	1.230
		3/16	1.800
		1/4	2.340
1 3/4	1 3/4	1/8	1.440
		3/16	2.120

Leg (A)	Leg (B)	Thick. (C)	Weight Per Ft.in Lbs.
1 3/4	1 3/4	1/4	2.770
2	1 1/4	3/16	1.960
		1/4	2.550
2	1 1/2	1/8	1.440
		3/16	2.120
		1/4	2.770
2	2	1/8	1.650
		3/16	2.440
		1/4	3.190
		5/16	3.920
		3/8	4.700
2 1/4	1 1/2	3/16	2.280
2 1/2	2 1/8	3/16	2.440
		1/4	3.190
		5/16	3.920
2 1/2	2	3/16	2.750
		1/4	3.620
		5/16	4.500
		3/8	5.300
2 1/2	2 1/2	3/16	3.070
		1/4	4.100
		5/16	5.000
		3/8	5.900
		1/2	7.700



L Angles – Structural

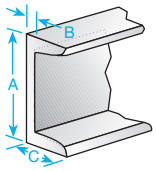
Available as ASTM A36, A709,
572 GR 50, 992 GR 50, CAS 44W,
& CAS 50W
Stock Lengths 20 and 40 Ft.

Sizes

Leg (A)	Leg (B)	Thick. (C)	Weight Per Ft.in Lbs.
L3	2	3/16	3.070
		1/4	4.100
		5/16	5.000
		3/8	5.900
		1/2	7.700
L3	2 1/2	3/16	3.350
		1/4	4.500
		5/16	5.600
		3/8	6.600
		1/2	8.500
L3	3	3/16	3.710
		1/4	4.900
		5/16	6.100
		3/8	7.200
		1/2	9.400
L3 1/2	2 1/2	1/4	4.900
		5/16	6.100
		3/8	7.200
		1/2	9.400
L3 1/2	3	1/4	5.400
		5/16	6.600
		3/8	7.900
		1/2	10.200
L3 1/2	3 1/2	1/4	5.800
		5/16	7.200
		3/8	8.500
		1/2	11.100
L4	3	1/4	5.800
L4	3	5/16	7.200
		3/8	8.500
		1/2	11.100
L4	3 1/2	1/4	6.200
		5/16	7.700
		3/8	9.100
		1/2	11.900
L4	4	1/4	6.600
		5/16	8.200
		3/8	9.800
		1/2	12.800
		5/8	15.700
		3/4	18.500
L5	3	1/4	6.600

Leg (A)	Leg (B)	Thick. (C)	Weight Per Ft.in Lbs.
L5	3	5/16	8.200
		3/8	9.800
		1/2	12.800
L5	3 1/2	1/4	7.000
		5/16	8.700
		3/8	10.400
		1/2	13.600
		5/8	16.800
		3/4	19.800
L5	5	5/16	10.300
		3/8	12.300
		1/2	16.200
		5/8	20.000
		3/4	23.600
L6	3 1/2	1/4	7.900
		5/16	9.800
		3/8	11.700
		1/2	15.300
L6	4	5/16	10.300
		3/8	12.300
		1/2	16.200
		5/8	20.000
		3/4	23.600
L6	6	5/16	12.400
		3/8	14.900
		1/2	19.600
		5/8	24.200
		3/4	28.700
L6	6	1	37.400
L7	4	3/8	13.600
		1/2	17.900
		3/4	26.200
L8	4	1/2	19.600
		3/4	28.700
L8	6	1/2	23.000
		3/4	33.800
		1	44.200
L8	8	1/2	26.400
		5/8	32.700
		3/4	38.900
		1	51.000

All items can be galvanized.

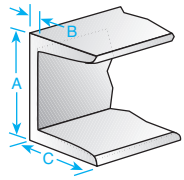


Channels – Bar Size

Available as ASTM A-36.
Stock Lengths: 20 Ft.

Sizes

Depth in Inches (A)		Web Thick. in Inches (B)		Flange Width in Inches (C)	Weight per Ft. in Lbs.
3/4	x	1/8	x	3/8	.560
1	x	1/8	x	3/8	.680
1	x	1/8	x	1/2	.840
1 1/8	x	3/16	x	9/16	1.160
1 1/4	x	1/8	x	1/2	1.010
1 1/2	x	1/8	x	1/2	1.120
1 1/2	x	3/16	x	9/16	1.440
1 1/2	x	1/8	x	3/4	1.170
2	x	1/8	x	1/2	1.430
2	x	3/16	x	9/16	1.860
2	x	1/4	x	5/8	2.280
2	x	1/8	x	1	1.780
2	x	3/16	x	1	2.570
2 1/2	x	5/8	x	3/16	2.270



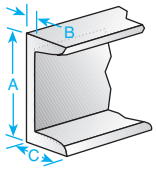
MC Channels – Ship & Car

Available in ASTM A-36, A709, 572 Gr. 50, 992 Gr. 50, CAS 44W, CAS 50W.
Stock Lengths: 20 and 40 Ft

Sizes

Depth in Inches Wt./Ft./ Lbs. (A)	Web Thick. in Inches (B)	Flange Width in Inches (C)
MC 3 x 7.1	.312	1.938
MC 4 x 13.8	.500	2.500
MC 6 x 12.0	.310	2.497
15.1	.316	2.941
15.3	.340	3.500
16.3	.375	3.000
18.0	.379	3.504
MC 7 x 19.1	.352	3.452
22.7	.503	3.603
MC 8 x 18.7	.353	2.978
20.0	.400	3.025
21.4	.375	3.450
22.8	.427	3.502
MC 9 x 23.9	.400	3.450
25.4	.450	3.500

Depth in Inches Wt./Ft./ Lbs. (A)	Web Thick. in Inches (B)	Flange Width in Inches (C)
MC 10 x 22.0	.312	3.315
25.0	.380	3.405
28.5	.425	3.950
33.6	.575	4.100
41.1	.796	4.321
MC 12 x 31.0	.370	3.670
35.0	.467	3.767
40.0	.590	3.890
45.0	.712	4.012
50.0	.835	4.135
MC 13 x 31.8	.375	4.000
50.0	.787	4.412
MC 18 x 42.7	.450	3.950
45.8	.500	4.000
51.9	.600	4.100
58.0	.700	4.200



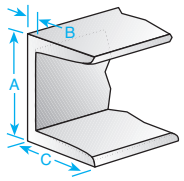
C Channels – Standard

Available as ASTM A-36, A709, 572 Gr.50, 992 Gr.50, CAS 44W, CAS 50W.
Stock Lengths: 20 and 40 Ft

Sizes

Depth in Inches Wt./Ft./ Lbs. (A)	Web Thick. in Inches (B)	Flange Width in Inches (C)
C3 x 4.1	.170	1.410
5.0	.258	1.498
6.0	.356	1.596
C4 x 5.4	.184	1.584
6.25	.247	1.647
7.25	.321	1.721
C5 x 6.7	.190	1.750
9.0	.325	1.885
C6 x 8.2	.200	1.920
10.5	.314	2.034
13.0	.437	2.157
C7 x 9.8	.210	2.090
12.25	.314	2.194
14.75	.419	2.299
C8 x 11.5	.220	2.260

Depth in Inches Wt./Ft./ Lbs. (A)	Web Thick. in Inches (B)	Flange Width in Inches (C)
C8 x 13.75	.303	2.343
18.75	.487	2.527
C9 x 13.4	.233	2.433
15.0	.285	2.485
20.0	.448	2.648
C10 x 15.3	.240	2.600
20.0	.379	2.739
25.0	.526	2.886
30.0	.673	3.033
C12 x 20.7	.282	2.942
25.0	.387	3.047
30.0	.510	3.170
C15 x 33.9	.400	3.400
40.0	.520	3.520
50.0	.716	3.716

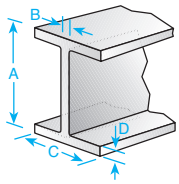


MC Channels – Jr. Channels

Available in ASTM A-36, A709, 572 Gr. 50, 992 Gr. 50, CAS 44W, CAS 50W.
Stock Lengths: 20 and 40 Ft

Sizes

Depth in Inches Wt./Ft./Lbs. (A)	Web Thick. in Inches (B)	Flange Width in Inches (C)
MC 8 x 8.5	.180	1.875
MC 10 x 6.5	.152	1.127
8.4	.170	1.500
MC 12 x 10.6	.190	1.500



W Beams – Wide Flange

Available in ASTM A36, A709, 572 Gr. 50, 992 Gr. 50, CAS 44W CAS 50W.
Stock Lengths: 20 and 40 Ft.

Sizes

Nom. Depth In Inches Wt./Ft./Lbs.		Depth In Inches (A)	Web Thick. In Inches (B)	Flange Width (C)	Flange Thick. (D)	Area Sq. Inch
W4 x	13.0	4.16	.280	4.060	.345	3.83
W5 x	16.0	5.01	.240	5.000	.360	4.71
	19.0	5.15	.270	5.030	.430	5.56
W6 x	9.0	5.90	.170	3.940	.215	2.68
	12.0	6.03	.230	4.000	.280	3.55
	15.0	5.99	.230	5.990	.260	4.43
	16.0	6.28	.260	4.030	.405	4.74
	20.0	6.20	.260	6.020	.365	5.87
	25.0	6.38	.320	6.080	.455	7.34
W8 x	10.0	7.89	.170	3.940	.205	2.96
	13.0	7.99	.230	4.000	.255	3.84
	15.0	8.11	.245	4.015	.315	4.44
	18.0	8.14	.230	5.250	.330	5.26
	21.0	8.28	.250	5.270	.400	6.16
	24.0	7.93	.245	6.495	.400	7.08
	28.0	8.06	.285	6.535	.465	8.25
	31.0	8.00	.285	7.995	.435	9.13
	35.0	8.12	.310	8.020	.495	10.30
	40.0	8.25	.360	8.070	.560	11.70
	48.0	8.50	.400	8.110	.685	14.10
	58.0	8.75	.510	8.220	.810	17.10
	67.0	9.00	.570	8.280	.935	19.70
W10 x	12.0	9.87	.190	3.960	.210	3.54
	15.0	9.99	.230	4.000	.270	4.41
	17.0	10.11	.240	4.010	.330	4.99
	19.0	10.24	.250	4.020	.395	5.62
	22.0	10.17	.240	5.750	.360	6.49
	26.0	10.33	.260	5.770	.440	7.61
	30.0	10.47	.300	5.810	.510	8.84
	33.0	9.73	.290	7.960	.435	9.71
	39.0	9.92	.315	7.985	.530	11.50
	45.0	10.10	.350	8.020	.620	13.30

Continued

Sizes

Nom. Depth In Inches Wt./Ft./Lbs.		Depth In Inches (A)	Web Thick. In Inches (B)	Flange Width (C)	Flange Thick. (D)	Area Sq. Inch
W10 x	49.0	9.98	.340	10.000	.560	14.40
	54.0	10.09	.370	10.030	.615	15.80
	60.0	10.22	.420	10.080	.680	17.60
	68.0	10.40	.470	10.130	.770	20.00
	77.0	10.40	.530	10.190	.870	22.80
	88.0	10.84	.605	10.265	.990	25.60
	100.0	11.10	.680	10.340	1.120	29.40
	112.0	11.36	.755	10.415	1.250	32.90
W12 x	14.0	11.91	.200	3.970	.225	4.16
	16.0	11.99	.220	3.990	.265	4.71
	19.0	12.16	.235	4.005	.350	5.57
	22.0	12.31	.260	4.030	.425	6.48
	26.0	12.22	.230	6.490	.380	7.65
	30.0	12.34	.260	6.520	.440	8.79
	35.0	12.50	.300	6.560	.520	10.30
	40.0	11.94	.295	8.005	.515	11.80
	45.0	12.06	.335	8.045	.575	13.20
	50.0	12.19	.370	8.080	.640	14.70
	53.0	12.06	.345	9.995	.575	15.60
	58.0	12.19	.360	10.010	.640	17.00
	65.0	12.12	.390	12.000	.605	19.10
	72.0	12.25	.430	12.040	.670	21.10
	79.0	12.38	.470	12.080	.735	23.20
	87.0	12.53	.515	12.125	.810	25.60
	96.0	12.71	.550	12.160	.900	28.20
	106.0	12.89	.610	12.220	.990	31.20
W14 x	22.0	13.74	.230	5.000	.335	6.49
	26.0	13.91	.255	5.025	.420	7.69
	30.0	13.84	.270	6.730	.385	8.85
	34.0	13.98	.285	6.745	.455	10.00
	38.0	14.10	.310	6.770	.515	11.20
	43.0	13.66	.305	7.995	.530	12.60

Continued on Next Page

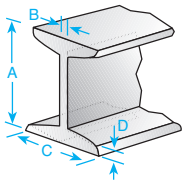
Sizes

Nom. Depth In Inches Wt./Ft./Lbs.		Depth In Inches (A)	Web Thick. In Inches (B)	Flange Width (C)	Flange Thick. (D)	Area Sq. Inch
W14 x	48.0	13.79	.340	8.030	.595	14.10
	53.0	13.92	.370	8.060	.660	15.60
	61.0	13.89	.375	9.995	.645	17.90
	74.0	14.17	.450	10.070	.785	21.80
	82.0	14.31	.510	10.130	.855	24.10
	90.0	14.02	.440	14.520	.710	26.50
	99.0	14.16	.485	14.565	.780	29.10
W16 x	26.0	15.69	.250	5.500	.345	7.68
	31.0	15.88	.275	5.525	.440	9.12
	36.0	15.86	.295	6.985	.430	10.60
	40.0	16.01	.305	6.995	.505	11.80
	45.0	16.13	.345	7.035	.565	13.30
	50.0	16.26	.380	7.070	.630	14.70
	57.0	16.43	.430	7.120	.715	16.80
	67.0	16.33	.395	10.235	.665	19.70
	77.0	16.52	.455	10.295	.760	22.60
	89.0	16.75	.525	10.365	.875	26.20
W18 x	35.0	17.70	.300	6.000	.425	10.30
	40.0	17.90	.315	6.015	.525	11.80
	46.0	18.06	.360	6.060	.605	13.50
	50.0	17.99	.355	7.495	.570	14.70
	55.0	18.11	.390	7.530	.630	16.20
	60.0	18.24	.415	7.555	.695	17.60
	65.0	18.35	.450	7.590	.750	19.10
	71.0	18.47	.495	7.635	.810	20.80
	76.0	18.21	.430	11.04	.680	22.30
	86.0	18.39	.480	11.090	.770	25.30
	97.0	18.59	.535	11.145	.870	28.50
W21 x	44.0	20.66	.350	6.500	.450	13.00
	50.0	20.83	.380	6.530	.535	14.70
	57.0	21.06	.405	6.555	.650	16.70
	62.0	20.99	.400	8.240	.615	18.30

Continued

Sizes

Nom. Depth In Inches Wt./Ft./Lbs.		Depth In Inches (A)	Web Thick. In Inches (B)	Flange Width (C)	Flange Thick. (D)	Area Sq. Inch
W21 x	68.0	21.13	.430	8.270	.685	20.00
	73.0	21.24	.455	8.295	.740	21.50
	83.0	21.43	.515	8.355	.835	24.30
	101.0	21.36	.500	12.290	.800	29.80
	111.0	21.51	.550	12.340	.875	32.70
W24 x	55.0	23.57	.395	7.005	.505	16.20
	62.0	23.74	.430	7.040	.590	18.20
	68.0	23.73	.415	8.965	.585	20.10
	76.0	23.92	.440	8.990	.680	22.40
	84.0	24.10	.470	9.020	.770	24.70
	94.0	24.31	.515	9.065	.875	27.70
	104.0	24.06	.500	12.750	.750	30.60
W27 x	84.0	26.71	.460	9.960	.640	24.80
	94.0	26.92	.490	9.990	.745	27.70
W30 x	99.0	29.65	.520	10.450	.670	29.10

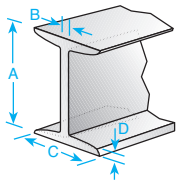


S Beams – Standard

Available in ASTM A36, A709, 572 Gr. 50, 992 Gr. 50 CAS 44W, CAS 50W.
Stock Lengths: 20 and 40 Ft.

Sizes

Depth In Inches Wt./Ft./Lbs. (A)			Web Thick In Inches (B)	Flange Width (C)	Flange Thick. (D)	Area Sq. Inch
S3	x	5.7	.170	2.330	.260	1.67
		7.5	.349	2.509	.260	2.21
S4	x	7.7	.193	2.663	.293	2.26
		9.5	.326	2.796	.293	2.79
S5	x	10.0	.214	3.004	.326	2.94
		14.75	.494	3.284	.326	4.34
S6	x	12.5	.232	3.332	.359	3.67
		17.25	.465	3.565	.359	5.07
S7	x	15.3	.252	3.662	.392	4.50
		20.0	.450	3.860	.392	5.88
S8	x	18.4	.271	4.001	.425	5.41
		23.0	.441	4.171	.425	6.77
S10	x	25.4	.311	4.661	.491	7.46
		35.0	.594	4.944	.491	10.30
S12	x	31.8	.350	5.000	.544	9.35
		35.0	.428	5.078	.544	10.30
		40.8	.472	5.252	.659	12.00
		50.0	.687	5.477	.659	14.70
S15	x	42.9	.411	5.501	.622	12.60
		50.0	.550	5.640	.622	14.70
S18	x	54.7	.461	6.001	.691	16.10
		70.0	.711	6.251	.691	20.60
S20	x	66.0	.505	6.255	.795	19.40
		86.0	.660	7.060	.920	25.30
S24	x	80.0	.500	7.000	.870	23.50
		100.0	.745	7.245	.870	29.30
		106.0	.620	7.870	1.090	31.20



M Beams – Jr., H or Light Beams

Available in ASTM A36.
Stock Lengths: 20 and 40 Ft.

Sizes

Nom. Depth In Inches Wt./Ft./Lbs. (A)			Also Called	Web Thick. In Inches (B)	Flange Width (C)	Flange Thick. (D)	Area Sq. Inch
M5	x	18.9	H	.316	5.003	.416	5.55
M6	x	4.4	JR. BEAM	.114	1.844	.171	1.29
M8	x	6.5	JR. BEAM	.135	2.281	.189	1.92
M10	x	9.0	JR. BEAM	.157	2.690	.206	2.65
M12	x	11.8	JR. BEAM	1.77	3.065	.225	3.47

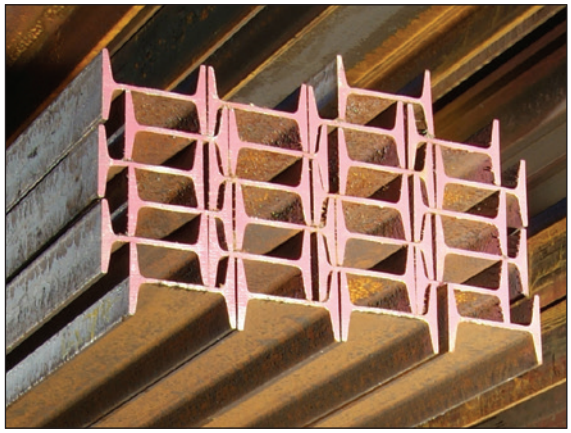
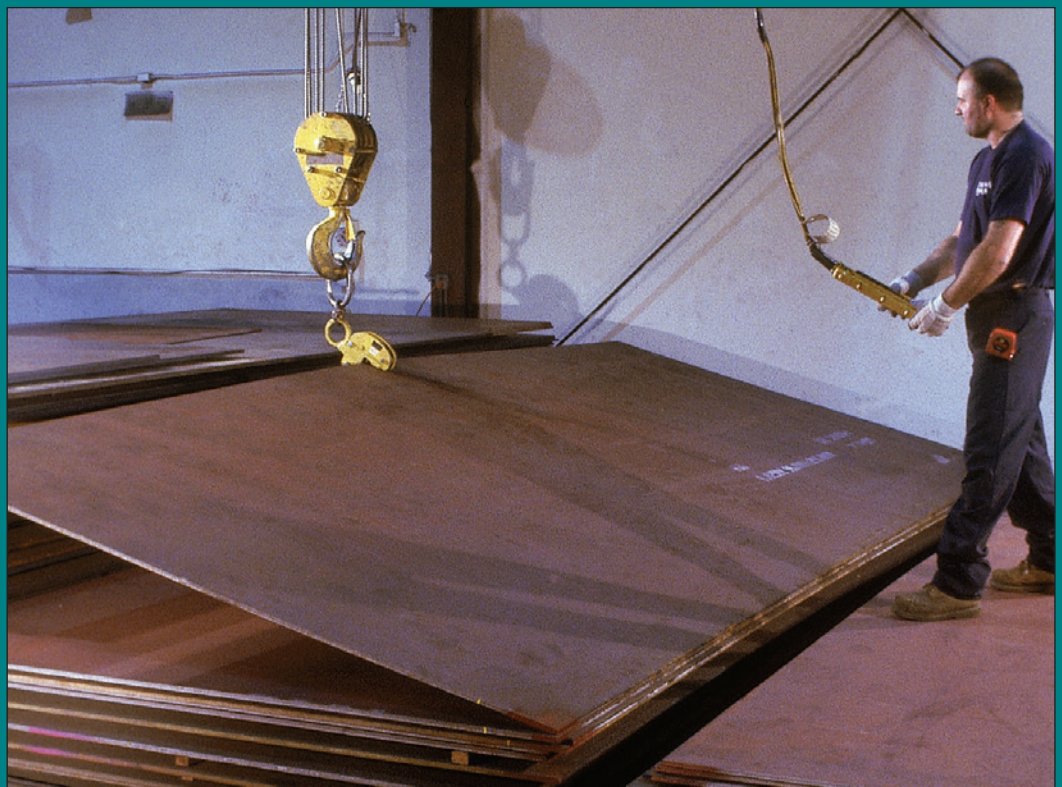


PLATE - CARBON & ALLOY



ASTM A36

A structural quality carbon steel for general structural purposes. Engineered with a minimum yield point of 36 KSI. A36 plates can be used to create lighter weight structures and equipment and provides good weldability.

Mechanical Properties

	Minimum Yield Point ksi	Tensile Strength ksi	Elongation in 2" Min.	Carbon Maximum
A36	36	58 to 80	21%	.25/.29

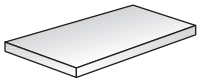


Plate – Structural Quality

Hot Rolled – Carbon Steel
ASTM A36, ASME SA36 ASTM A709 Gr. 36.

Size In Inches	Weight per Sq. Ft. in Lbs.
3/16 x 36	7.660
48	7.660
60	7.660
72	7.660
84	7.660
96	7.660
1/4 x 36	10.21
48	10.21
60	10.21
72	10.21
84	10.21
96	10.21
5/16 x 36	12.76
48	12.76
60	12.76
72	12.76
96	12.76
3/8 x 36	15.32
48	15.32
60	15.32
72	15.32
84	15.32
96	15.32
7/16 x 84	17.87
96	17.87

Continued

Size In Inches	Weight per Sq. Ft. in Lbs.
1/2 x 48	20.42
60	20.42
72	20.42
84	20.42
96	20.42
9/16 x 84	22.97
96	22.97
5/8 x 48	25.53
60	25.53
72	25.53
84	25.53
96	25.53
3/4 x 48	30.63
60	30.63
72	30.63
84	30.63
96	30.63
7/8 x 72	35.74
84	35.74
96	35.74
1 x 48	40.84
60	40.84
72	40.84
84	40.84
96	40.84

Continued

Size In Inches	Weight per Sq. Ft. in Lbs.
1 1/8 x 60	45.95
84	45.95
96	45.95
1 1/4 x 48	51.05
60	51.05
72	51.05
84	51.05
96	51.05
1 3/8 x 84	56.16
96	56.16
1 1/2 x 48	61.26
60	61.26
72	61.26
84	61.26
96	61.26
1 5/8 x 84	66.37
96	66.37
1 3/4 x 72	71.47
1 3/4 x 84	71.47
96	71.47
2 x 48	81.68
60	81.68
72	81.68
84	81.68
96	81.68
2 1/8 x 96	86.79
2 1/4 x 72	91.89
84	91.89
96	91.89
2 1/2 x 60	102.1
72	102.1
84	102.1
96	102.1
2 3/4 x 72	112.3
84	112.3
96	112.3
3 x 72	122.5
84	122.5
96	122.5
3 1/4 x 84	132.7
96	132.7
3 1/2 x 72	142.9

Continued

Size In Inches	Weight per Sq. Ft. in Lbs.
3 1/2 x 84	142.9
96	142.9
3 3/4 x 84	153.2
96	153.2
4 x 72	163.4
84	163.4
96	163.4
4 1/4 x 72	173.6
84	173.6
96	173.6
4 1/2 x 72	183.8
84	183.8
96	183.8
4 3/4 x 96	194.0
5 x 60	204.2
72	204.2
84	204.2
96	204.2
5 1/2 x 60	224.6
72	224.6
84	224.6
96	224.6
6 x 72	245.0
84	245.0
96	245.0
6 1/2 x 60	265.5
84	265.5
96	265.5
7 x 84	285.9
96	285.9
7 1/2 x 84	306.3
96	306.3
8 x 72	326.7
84	326.7
96	326.7
9 x 60	367.6
84	367.6
96	367.6
10 x 60	408.4
84	408.4
96	408.4
12 x 84	490.1

Medium Carbon Steel Plate

SAG 1045 — Silicon killed with higher carbon content for greater strength.

High Strength/Low Alloy Plates

High Strength Low Alloy plates offer higher strength than plain carbon steel plates and provide ductility, weldability, formability, toughness and fatigue strength.

ASTM A572(50) are available at a strength level of 50 KSI minimum. Provides high strength, good workability and weldability. Corrosion resistance is the same as that of plain carbon steel. Conforms to ASTM A572, SAE J1442 Grade 050X. Also available in Grades 42, 45, 55, 60, and 65.

COR-TEN® A, COR-TEN B provides high strength, outstanding resistance to corrosion and can be easily cold formed and welded. Thickness to 1/2" including (Cor-Ten A) conform to ASTM A242 (Type 1). Over 1/2" (Cor-Ten B) conforms to ASTM A588 (Gr. A).

Minimum Mechanical Properties

Type and Thickness	Yield Point, KSI	Tensile Strength, KSI	Elong. in 8"
A572 Gr. 50	50	65	18
Cor-Ten A (A242)	50	70	19
Cor-Ten B (A588)	50	70	19

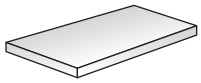


Plate – High Strength Low Alloy

Hot Rolled – Grade 50
A572; A242 and A588

Size In Inches			Weight per Sq. Ft. in Lbs.
3/16	x	36	7.660
		48	7.660
		60	7.660
		72	7.660
		84	7.660
		96	7.660
1/4	x	36	10.21
		48	10.21
		60	10.21
		72	10.21
		84	10.21
		96	10.21
5/16	x	48	12.76
		60	12.76
		72	12.76
		84	12.76
		96	12.76
3/8	x	48	15.32
		60	15.32
		72	15.32
		84	15.32
		96	15.32
		96	19.29
1/2	x	48	20.42
		60	20.42
		72	20.42
		84	20.42
		96	20.42
5/8	x	60	25.53
		72	25.53
		84	25.53
		96	25.53

Continued

Size In Inches			Weight per Sq. Ft. in Lbs.
3/4	x	60	30.63
		72	30.63
		84	30.63
		96	30.63
		96	32.16
7/8	x	84	35.74
1	x	72	40.84
	x	84	40.84
		96	40.84
1 1/8	x	84	45.95
1 1/4	x	84	51.05
		96	51.05
1 3/8	x	96	56.16
		96	56.28
1 1/2	x	84	61.26
		96	61.26
1 3/4	x	84	71.47
		96	71.47
2	x	72	81.68
		84	81.68
		96	81.68
2 1/4	x	96	91.89
2 1/2	x	84	102.10
		96	102.10
2 3/4	x	96	112.30
3	x	96	122.50
3 1/2	x	72	142.90
4	x	96	163.40
4 1/4	x	96	173.60
4 1/2	x	96	183.80
5	x	96	204.20
5 1/2	x	96	224.62

Abrasion Resistant Plate

AR - A medium carbon-manganese steel providing a moderate hardness of 212 to 255 BHN. Both 400 and 500 plates exhibit an excellent combination of hardness, abrasion resistance, formability, weldability, toughness and flatness. Designed for through-thickness hardness while maintaining minimum carbon, alloy and carbon equivalent contents to improve weldability. These plates are used in the original fabrication, repair and modification of heavy equipment in such applications as truck body liners, chutes, bucket lips, hopper and crusher liners and conveyor troughs. Available in thicknesses from 3/16 to 2 inches.

Chemical Composition & Mechanical Properties

	AR Medium Hard	T-1 Type A 321 Min. BHN
C	.35/.50	.12/.21
Mn	1.2/2.0	.70/1.00
Cr	--	.40/.65
Mo	--	.15/.25
B	--	.0005 min.
BHN	212/255	321 min.

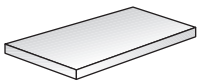


Plate – Abrasion Resistant

Hot Rolled
400 and 500

Sizes in Stock

Size In Inches	Weight per Sq. Ft. in Lbs.
3/16 x 72	7.660
96	7.660
1/4 x 48	10.21
72	10.21
84	10.21
96	10.21
5/16 x 48	12.76
72	12.76
96	12.76
3/8 x 72	15.32
Continued	

Size In Inches	Weight per Sq. Ft. in Lbs.
3/8 x 84	15.32
96	15.32
1/2 x 72	20.42
96	20.42
5/8 x 96	25.53
3/4 x 96	30.63
1 x 96	40.84
1 1/4 x 84	51.05
96	51.05
1 1/2 x 96	61.26
2 x 96	81.68

Construction Alloys

With a yield strength nearly 3 times that of A36 structural steel, construction alloys are quenched and tempered high strength alloy steels. This material combines high strength and good workability, weldability and exceptional toughness at low atmospheric temperatures (to -50˚ F). Used in construction equipment liners, mining machinery, truck fabrication, chutes and troughs.

T-1 Type A (ASTM A514 Grade B) — Available in thicknesses through 1 1/4". Has a lower alloy content than the original T-1 with the same strength.

T-1 Type B (ASTM A514 Grade H) – Available 1 3/8" through 2" with an alloy content between Type A and the original T-1. Maintains the same strength as original T-1.

T-1 Structural Quality (ASTM A514 Grade F) Available over 2 1/4" through 2 1/2".

T-1 Type C (ASTM A514 Grade Q) Available thicknesses over 2 1/2" with slightly lower strength.

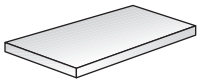


Plate – T1 Alloy Steel

ASTM A514
Quenched and Tempered

Size In Inches	Weight per Sq. Ft. in Lbs.
3/16 x 96	7.660
1/4 x 96	10.21
5/16 x 96	12.76
3/8 x 96	15.32
1/2 x 96	20.42
5/8 x 96	25.53
3/4 x 96	30.63
1 x 96	40.84
1 1/8 x 96	45.95
Continued	

Size In Inches	Weight per Sq. Ft. in Lbs.
1 1/4 x 96	51.05
1 3/8 x 96	56.16
1 1/2 x 96	61.26
2 x 96	81.68
2 1/4 x 96	91.89
2 1/2 x 96	102.1
2 3/4 x 96	112.3
3 x 96	122.5
3 1/2 x 96	142.9
4 x 96	163.4

Pressure Vessel Quality Plates

ASTM A285 (ASM SA285) — A moderate strength steel available up to 2" thick. Provides excellent formability and weldability. Used for vessels and boilers. Available in Grade C.

ASTM A516 (ASME SA516) Silicon killed with a fine grain structure for use in low temperatures where improved notch toughness is required. Grade 70, available in the as rolled or normalized condition.

Mechanical Properties

ASTM Specification	Minimum Yield, KSI	Tensile Strength, KSI	Carbon Maximum
A285 – Gr.C	30	55 to 65	28
A516 – Gr.60	32	60 to 80	.21/.27
A516 – Gr.65	35	65 to 80	.24/.29
A516 – Gr.70	38	70 to 90	.27/.31

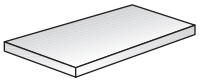


Plate – Pressure Vessel Quality

Hot Rolled – Carbon Steel
ASTM A285 Gr. C and
ASME SA285 Gr. C

Size In Inches	Weight per Sq. Ft. in Lbs.
3/16 x 72	7.660
84	7.660
72	10.21
84	10.21
96	10.21
5/16 x 72	12.76
84	12.76
96	12.76
3/8 x 60	15.32
72	15.32
84	15.32
96	15.32
1/2 x 72	20.42
84	20.42
96	20.42
5/8 x 72	25.53
84	25.53

Continued

Size In Inches	Weight per Sq. Ft. in Lbs.
5/8 x 96	25.53
3/4 x 60	30.63
72	30.63
84	30.63
96	30.63
1 x 72	40.84
84	40.84
96	40.84
1 1/8 x 84	45.95
1 1/4 x 72	51.05
84	51.05
1 3/8 x 96	56.16
1 1/2 x 72	61.26
84	61.26
1 3/4 x 72	71.47
84	71.47
2 x 60	81.68
96	81.68

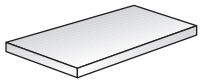


Plate – Pressure Vessel Quality

Hot Rolled – Carbon Steel
ASTM A516 Gr. 70 and
ASME SA516 Gr. 70

Sizes in Stock

Size In Inches	Weight per Sq. Ft. in Lbs.
3/16 x 84	7.660
96	7.660
1/4 x 72	10.21
96	10.21
5/16 x 70	12.76
72	12.76
84	12.76
96	12.76
3/8 x 70	15.32
72	15.32
84	15.32
96	15.32
7/16 x 96	17.87
1/2 x 54	20.42
84	20.42
96	20.42
5/8 x 84	25.53
96	25.53
3/4 x 60	30.63
96	30.63
7/8 x 96	35.74
1 x 60	40.84
96	40.84
1 1/8 x 96	45.95

Continued

Size In Inches	Weight per Sq. Ft. in Lbs.
1 1/4 x 60	51.05
96	51.05
1 3/8 x 96	56.16
1 1/2 x 60	61.26
96	61.26
1 5/8 x 96	66.37
1 3/4 x 60	71.47
x 96	71.47
2 x 96	81.68
2 1/4 x 96	91.89
2 3/8 x 96	97.00
2 1/2 x 96	102.1
2 3/4 x 96	112.3
3 x 96	122.5
3 1/4 x 96	132.7
3 1/2 x 96	142.9
4 x 96	163.4
4 1/2 x 96	183.8
96	183.8
5 x 96	204.2
5 1/2 x 96	224.6
6 x 96	245.0
7 x 96	285.9
8 x 96	326.7

Free Machining Steels

Case Hardening Grades

C1119 is a high manganese, low carbon steel with a controlled sulphur addition. It provides time savings when machining compared to low carbon steel plate. Used for jigs, rubber molds and die bases.

Through Hardening Grades

C1144 is a resulphurized medium carbon, steel that polishes to plating smoothness, responds to heat treating, welds easily and machines faster than 1045.

Alloy Steel Plates

4140 Stress-Relieved Annealed plate has superior cleanliness from vacuum degassing. 4140 provides uniform response to heat treatment, internal soundness and improved service life for machined parts.

8620 features a more uniform case depth, improved hardness, wear characteristics, higher core properties and less distortion than ordinary carbon steel. Used in applications requiring a hard case and high core property.

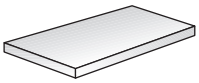


Plate – Free Machining

Hot Rolled- Carbon Steel

Size In Inches	Weight per Sq. Ft. in Lbs.
1/4 x 96	10.21
5/16 x 96	12.76
3/8 x 96	15.32
1/2 x 84	20.42
96	20.42
5/8 x 84	25.53
96	25.53
11/16 x 96	28.08
3/4 x 84	30.63
96	30.63
7/8 x 84	35.74
96	35.74
1 x 84	40.84
96	40.84
1 1/8 x 84	45.95
96	45.95
1 1/4 x 84	51.05
96	51.05
1 3/8 x 84	56.16
96	56.16
1 1/2 x 84	61.26
96	61.26
1 5/8 x 84	66.37
96	66.37

Continued

Size In Inches	Weight per Sq. Ft. in Lbs.
1 3/4 x 84	71.47
96	71.47
2 x 84	81.68
96	81.68
2 1/8 x 96	86.79
2 1/4 x 84	91.89
96	91.89
2 3/8 x 96	97.00
2 1/2 x 84	102.1
96	102.1
2 3/4 x 96	112.3
2 7/8 x 96	
117.4	
3 x 84	122.5
96	122.5
3 1/4 x 96	132.7
3 1/2 x 96	142.9
4 x 96	163.4
4 1/4 x 96	173.6
4 1/2 x 96	183.8
5 x 96	204.2
5 1/4 x 96	214.4
5 1/2 x 96	224.6
6 x 96	245.0
6 1/2 x 96	265.5

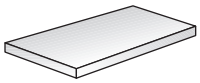


Plate – Alloy Steel 4140 SR/A

4140 SR/A vacuum degassed, fine grain. Material is stress relieved or full annealed Meets ASTM A829.

Size In Inches	Weight per Sq. Ft. in Lbs.
1/4 x 90	10.21
96	10.21
3/8 x 84	15.32
1/2 x 84	20.42
96	20.42
5/8 x 84	25.53
96	25.53
3/4 x 84	30.63
96	30.63
7/8 x 96	35.74
1 x 84	40.84
96	40.84
1 1/4 x 84	51.05
96	51.05
1 1/2 x 84	61.26
96	61.26
1 3/4 x 84	71.47
96	71.47
2 x 84	81.68
96	81.68

Continued

Size In Inches	Weight per Sq. Ft. in Lbs.
2 1/4 x 84	91.89
96	91.89
2 1/2 x 84	102.1
96	102.1
2 3/4 x 84	112.3
96	112.3
3 x 84	122.5
96	122.5
3 1/4 x 96	132.7
3 1/2 x 84	142.9
96	142.9
4 x 96	163.4
4 1/4 x 96	173.6
4 1/2 x 96	183.8
5 x 96	204.2
6 x 84	245.0
96	245.0
8 x 84	326.7
96	326.7
10 x 60	408.4

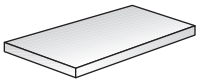


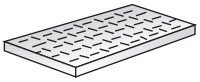
Plate – Alloy Steel

8620 – Case Hardening
As Rolled Meets ASTM A829

Size In Inches	Weight per Sq. Ft. in Lbs.
1/2 x 84	20.42
96	20.42
5/8 x 84	25.53
3/4 x 84	30.63
96	30.63
1 x 96	40.84
1 1/8 x 96	45.95

Continued

Size In Inches	Weight per Sq. Ft. in Lbs.
1 1/4 x 96	51.05
1 1/2 x 96	61.26
1 3/4 x 96	71.47
2 x 96	81.68
2 1/4 x 96	91.89
2 1/2 x 96	102.1
2 3/4 x 96	112.3
3 x 96	122.5



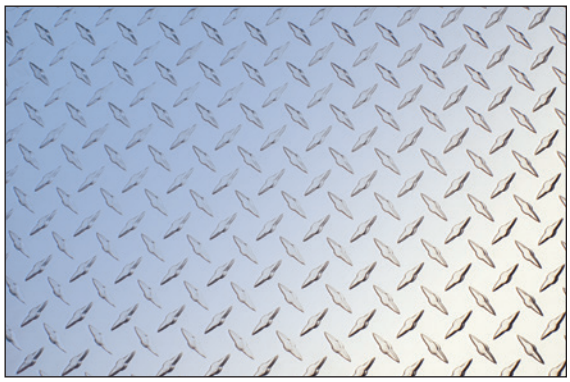
Floor Plate Medium Pattern

Low Carbon Steel
Conforms to ASTM A786

Size In Inches	Weight per Sq. Ft. in Lbs.
16 x 36	3.000
48	3.000
14 x 36	3.750
48	3.750
12 x 48	5.250
60	5.250
1/8 x 36	6.160
48	6.160
60	6.160
72	6.160
3/16 x 36	8.710
48	8.710

Continued

Size In Inches	Weight per Sq. Ft. in Lbs.
3/16 x 60	8.710
72	8.710
96	8.710
1/4 x 36	11.260
48	11.260
60	11.260
72	11.260
5/16 x 48	13.810
60	13.810
72	13.810
3/8 x 48	16.370
60	16.370
72	16.370



Diamond Tread Pattern

Diamond Tread Aluminum Floor Plate

Available in bright reflective finish and mill finish. Raised lugs are on approximately 1" centers.

Stainless Diamond Tread Floor Plates

Type 304 – Available

Our lasers provide flexibility, fast turnaround and eliminate the need for most finishing operations.

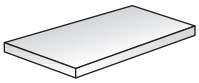


Plate – Chapin Laser Quality Plate

Plate that is specified to facilitate cutting by a Laser. Special attention given to cleanliness and flatness.

ASTM A36, A709-36, ASME SA 36 AASHTO. M270-36

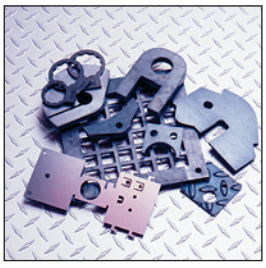
Size In Inches	Weight per Sq. Ft. in Lbs.	Heading Title
.250	10.21	60 X 120
.375	15.32	48 X 96
.375	15.32	60 X 120
.500	20.42	48 X 96
.500	20.42	60 X 120
.625	25.53	48 X 96
.625	25.53	60 X 120

Laser Specifications

- Cuts Steel up to 3/4” Thick
- Cuts Stainless Steel up to 5/8” Thick
- Cuts Aluminum up to 3/8” Thick
- 84” x 240” Transfer Tables
- Capable of Tolerances of +/- .004
- Etch bend lines or other information on parts.
- Integration with CAD, nesting, DXF files, and common line cutting.

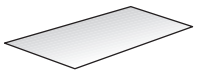
The lasers have full Integration with CAD, nesting, DXF files, and common line cutting.

The lasers are capable of tolerances of +/- .004.



Some examples of the precision finishing the lasers provide.

SHEET PRODUCTS



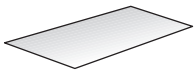
Hot Rolled Sheet

Including Pickled & Oiled
Low Carbon Commercial Steel
1008/1010, SAE J403
ASTM A1011 CS Type B (A569 CQ)

Ga.	Size in Inches	Decimal in Inches	Est. Wt. Per Sq. Ft. in Lbs.	Est. Wt. Per Sheet in Lbs.
7	36 x 96	.1793	7.500	180.0
	36 x 120	.1793	7.500	225.0
	36 x 144	.1793	7.500	270.0
	48 x 96	.1793	7.500	240.0
	48 x 120	.1793	7.500	300.0
	48 x 144	.1793	7.500	360.0
	60 x 96	.1793	7.500	300.0
	60 x 120	.1793	7.500	375.0
	60 x 144	.1793	7.500	450.0
	72 x 96	.1793	7.500	360.0
	72 x 120	.1793	7.500	450.0
	72 x 144	.1793	7.500	540.0
	84 x 120	.1793	7.500	525.0
	96 x 120	.1793	7.500	600.0
8	36 x 120	.1644	6.875	206.3
	48 x 96	.1644	6.875	220.0
	48 x 120	.1644	6.875	275.0
	48 x 144	.1644	6.875	305.5
	60 x 120	.1644	6.875	343.8
	72 x 120	.1644	6.875	412.5
10	36 x 96	.1345	5.625	135.0
	36 x 120	.1345	5.625	168.8
	48 x 96	.1345	5.625	180.0
	48 x 120	.1345	5.625	225.0
	48 x 144	.1345	5.625	270.0
	60 x 96	.1345	5.625	225.0
	60 x 120	.1345	5.625	281.3
	60 x 144	.1345	5.625	337.5
	72 x 96	.1345	5.625	270.0
	72 x 120	.1345	5.625	337.5
	72 x 144	.1345	5.625	405.0
11	36 x 96	.1196	5.000	120.0
	36 x 120	.1196	5.000	150.0
	36 x 144	.1196	5.000	180.0
	48 x 96	.1196	5.000	160.0
	48 x 120	.1196	5.000	200.0
	48 x 144	.1196	5.000	240.0
	60 x 96	.1196	5.000	200.0
	60 x 120	.1196	5.000	250.0

Continued

Ga.	Size in Inches	Decimal in Inches	Est. Wt. Per Sq. Ft. in Lbs.	Est. Wt. Per Sheet in Lbs.
11	60 x 144	.1196	5.000	300.0
	72 x 120	.1196	5.000	300.0
	72 x 144	.1196	5.000	360.0
12	36 x 96	.1046	4.375	105.0
	36 x 120	.1046	4.375	131.3
	36 x 144	.1046	4.375	127.5
	48 x 96	.1046	4.375	140.0
	48 x 120	.1046	4.375	175.0
	48 x 144	.1046	4.375	210.0
	60 x 96	.1046	4.375	175.0
	60 x 120	.1046	4.375	218.8
	60 x 144	.1046	4.375	262.5
	72 x 120	.1046	4.375	262.5
13	36 x 96	.0897	3.750	90.0
	36 x 120	.0897	3.750	112.5
	48 x 96	.0897	3.750	120.0
	48 x 120	.0897	3.750	150.0
	48 x 144	.0897	3.750	180.0
14	36 x 96	.0747	3.125	75.0
	36 x 120	.0747	3.125	93.8
	36 x 144	.0747	3.125	112.5
	48 x 96	.0747	3.125	100.0
	48 x 120	.0747	3.125	125.0
	48 x 144	.0747	3.125	150.0
	60 x 96	.0747	3.125	125.0
	60 x 120	.0747	3.125	156.3
	60 x 144	.0747	3.125	187.5
	72 x 96	.0747	3.125	150.0
	72 x 120	.0747	3.125	187.5
	72 x 144	.0747	3.125	225.0
16	36 x 96	.0598	2.500	60.0
	36 x 120	.0598	2.500	75.0
	36 x 144	.0598	2.500	90.0
	48 x 96	.0598	2.500	80.0
	48 x 120	.0598	2.500	100.0
	48 x 144	.0598	2.500	120.0
	60 x 96	.0598	2.500	100.0
	60 x 120	.0598	2.500	125.0
	60 x 144	.0598	2.500	150.0



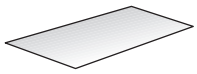
Cold Rolled Sheet

Oiled
ASTM A1008 CS Type B
(A366 CQ)
ASTM A1008 DS Type B
(A620 DQ) (Available)

Ga.	Size in Inches	Decimal in Inches	Est. Wt. Per Sq. Ft. in Lbs.	Est. Wt. Per Sheet in Lbs.
10	36 x 96	.1345	5.65	135.0
11	36 x 96	.1196	5.000	120.0
	36 x 120	.1196	5.000	150.0
	36 x 144	.1196	5.000	180.0
	48 x 96	.1196	5.000	160.0
	48 x 120	.1196	5.000	200.0
	48 x 144	.1196	5.000	240.0
	60 x 96	.1196	5.000	200.0
	60 x 120	.1196	5.000	250.0
12	36 x 96	.1046	4.375	105.0
	36 x 120	.1046	4.375	131.3
	48 x 96	.1046	4.375	140.0
	48 x 120	.1046	4.375	175.0
	48 x 144	.1046	4.375	210.0
	60 x 120	.1046	4.375	218.8
	60 x 144	.1046	4.375	262.5
	72 x 144	.1046	4.375	315.0
13	36 x 96	.0897	3.750	90.0
	36 x 120	.0897	3.750	112.5
	48 x 96	.0897	3.750	120.0
	48 x 120	.0897	3.750	150.0
	48 x 144	.0897	3.750	180.0
	60 x 120	.0897	3.750	187.5
14	36 x 96	.0747	3.125	75.0
	36 x 120	.0747	3.125	93.8
	36 x 144	.0747	3.125	112.5
	48 x 96	.0747	3.125	100.0
	48 x 120	.0747	3.125	125.0
	48 x 144	.0747	3.125	150.0
	60 x 96	.0747	3.125	125.0
	60 x 120	.0747	3.125	156.3
	60 x 144	.0747	3.125	187.5
	72 x 120	.0747	3.125	187.5
	72 x 144	.0747	3.125	225.0
16	36 x 96	.0598	2.500	60.0
	36 x 120	.0598	2.500	75.0
	36 x 144	.0598	2.500	90.0
	48 x 96	.0598	2.500	80.0
	48 x 120	.0598	2.500	100.0

Continued

Ga.	Size in Inches	Decimal in Inches	Est. Wt. Per Sq. Ft. in Lbs.	Est. Wt. Per Sheet in Lbs.
16	48 x 144	.0598	2.500	120.0
	60 x 96	.0598	2.500	100.0
	60 x 120	.0598	2.500	125.0
	60 x 144	.0598	2.500	150.0
	72 x 120	.0598	2.500	150.0
	72 x 144	.0598	2.500	180.0
18	36 x 96	.0478	2.000	48.0
	36 x 120	.0478	2.000	60.0
	36 x 144	.0478	2.000	72.0
	48 x 96	.0478	2.000	64.0
	48 x 120	.0478	2.000	80.0
	48 x 144	.0478	2.000	96.0
	60 x 96	.0478	2.000	80.0
	60 x 120	.0478	2.000	100.0
	60 x 144	.0478	2.000	120.0
20	36 x 96	.0359	1.500	36.0
	36 x 120	.0359	1.500	45.0
	36 x 144	.0359	1.500	54.0
	42 x 120	.0359	1.500	52.5
	48 x 96	.0359	1.500	48.0
	48 x 120	.0359	1.500	60.0
	48 x 144	.0359	1.500	72.0
	60 x 120	.0359	1.500	75.0
	60 x 144	.0359	1.500	90.0
22	36 x 96	.0299	1.250	30.0
	36 x 120	.0299	1.250	37.5
	48 x 96	.0299	1.250	40.0
	48 x 120	.0299	1.250	50.0
24	36 x 96	.0239	1.000	24.0
	36 x 120	.0239	1.000	30.0
	48 x 96	.0239	1.000	32.0
	48 x 120	.0239	1.000	40.0
26	48 x 120	.0179	.750	30.0



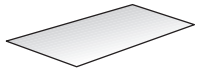
Galvanized Sheet

ASTM A653 CS Type B G 90
(A526/A527 CQ)

Ga.	Size in Inches	Decimal in Inches	Est. Wt. Per Sq. Ft. in Lbs.	Est. Wt. Per Sheet in Lbs.
10	36 x 120	.1382	5.781	173.4
	48 x 96	.1382	5.781	185.0
	48 x 120	.1382	5.781	231.2
	48 x 144	.1382	5.781	277.5
	60 x 120	.1382	5.781	289.1
	60 x 144	.1382	5.781	346.9
11	48 x 96	.1233	5.156	165.0
	48 x 120	.1233	5.156	206.2
12	36 x 96	.1084	4.531	108.7
	36 x 120	.1084	4.531	135.9
	48 x 96	.1084	4.531	145.0
	48 x 120	.1084	4.531	181.2
	48 x 144	.1084	4.531	217.5
	60 x 96	.1084	4.531	181.2
	60 x 120	.1084	4.531	226.6
	60 x 144	.1084	4.531	271.9
14	36 x 96	.0785	3.281	78.7
	36 x 120	.0785	3.281	98.4
	36 x 144	.0785	3.281	118.1
	48 x 96	.0785	3.281	105.0
	48 x 120	.0785	3.281	131.2
	48 x 144	.0785	3.281	157.5
	60 x 120	.0785	3.281	164.1
	60 x 144	.0785	3.281	196.9
	72 x 120	.0785	3.281	196.9
16	36 x 96	.0635	2.656	63.7
	36 x 120	.0635	2.656	79.7
	36 x 144	.0635	2.656	95.6
	48 x 96	.0635	2.656	85.0
	48 x 120	.0635	2.656	106.2
	48 x 144	.0635	2.656	127.5
	60 x 96	.0635	2.656	106.2
	60 x 120	.0635	2.656	132.8
	60 x 144	.0635	2.656	159.4
	72 x 120	.0635	2.656	159.4
	72 x 144	.0635	2.656	191.2
18	36 x 96	.0516	2.156	51.7
	36 x 120	.0516	2.156	64.7
	36 x 144	.0516	2.156	77.6
	48 x 96	.0516	2.156	69.0
	48 x 120	.0516	2.156	86.2
	48 x 144	.0516	2.156	103.5
	60 x 96	.0516	2.156	86.2
	60 x 120	.0516	2.156	107.8
	60 x 144	.0516	2.156	129.4
19	36 x 120	.0456	1.906	57.2
	36 x 144	.0456	1.906	68.6
20	36 x 96	.0396	1.656	39.7
	36 x 120	.0396	1.656	49.7
	48 x 96	.0396	1.656	53.0
	48 x 120	.0396	1.656	66.2
	48 x 144	.0396	1.656	79.5
	60 x 96	.0396	1.656	66.2
	60 x 120	.0396	1.656	82.8

Continued

Ga.	Size in Inches	Decimal in Inches	Est. Wt. Per Sq. Ft. in Lbs.	Est. Wt. Per Sheet in Lbs.
20	60 x 144	.0396	1.656	99.4
22	36 x 96	.0336	1.406	33.7
	36 x 120	.0336	1.406	42.2
	48 x 96	.0336	1.406	45.0
	48 x 120	.0336	1.406	45.0
	60 x 120	.0336	1.406	70.3
24	36 x 96	.0276	1.156	27.7
	36 x 120	.0276	1.156	34.7
	48 x 96	.0276	1.156	37.0
	48 x 120	.0276	1.156	46.2
	60 x 120	.0276	1.156	57.8
26	36 x 96	.0217	.906	21.7
	36 x 120	.0217	.906	27.2
	48 x 96	.0217	.906	29.0
	48 x 120	.0217	.906	36.2
	60 x 120	.0217	.906	45.3
28	36 x 96	.0187	.781	18.7
	36 x 120	.0187	.781	23.4



Galvannealed Sheet

ASTM A653 CS Type B (A526 CQ)

Ga.	Size in Inches	Decimal in Inches	Est. Wt. Per Sq. Ft. in Lbs.	Est. Wt. Per Sheet in Lbs.
10	48 x 120	.1382	5.781	231.2
11	48 x 120	.1233	5.156	206.2
12	36 x 120	.1084	4.531	135.9
	48 x 96	.1084	4.531	145.0
	48 x 120	.1084	4.531	181.2
	48 x 144	.1084	4.531	217.5
	60 x 144	.1084	4.531	271.9
	60 x 192	.1084	4.531	362.4
14	36 x 120	.0785	3.281	98.4
	48 x 96	.0785	3.281	105.0
	48 x 120	.0785	3.281	131.2
	48 x 144	.0785	3.281	157.5
	60 x 120	.0785	3.281	164.1
16	36 x 96	.0635	2.656	63.7
	36 x 120	.0635	2.656	79.7
	36 x 144	.0635	2.656	95.6
	48 x 96	.0635	2.656	85.0
	48 x 120	.0635	2.656	106.2
	48 x 144	.0635	2.656	127.5
	60 x 120	.0635	2.656	132.8
	60 x 144	.0635	2.656	159.3
18	36 x 120	.0516	2.156	64.7
	48 x 96	.0516	2.156	69.0
	48 x 120	.0516	2.156	86.2
	48 x 144	.0516	2.156	103.4
	60 x 96	.0516	2.156	86.2
	60 x 120	.0516	2.156	107.8
20	36 x 120	.0396	1.656	49.7
	48 x 96	.0396	1.656	53.0
	48 x 120	.0396	1.656	66.2
	48 x 144	.0396	1.656	79.5
22	48 x 120	.0336	1.406	56.2
24	48 x 96	.0276	1.156	37.0
	48 x 120	.0276	1.156	46.2

EXPANDED METAL & GRATING

* Available in Aluminum & Stainless Steel

Expanded Metals

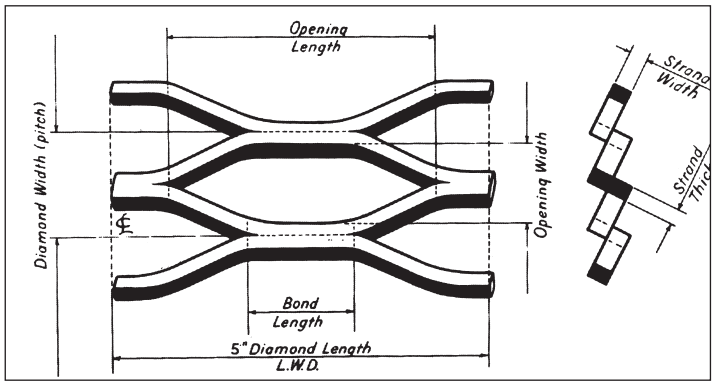
Carbon Steel Regular
Raised

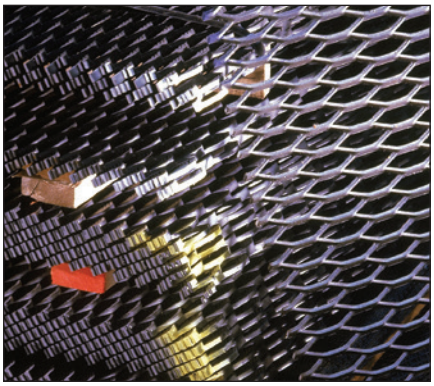
Style Designation	Weight per 100 Sq. Ft.	Stock Sizes in Ft.	Size of Opening in Inches	
			Width	Length
1/4" – No. 20	86	4 x 8	.125	.687
1/4" – No. 18	117	4 x 8	.125	.687
1/2" – No. 20	43	4 x 8	.375	.875
1/2" – No. 18	70	4 & 6 x 8 & 10	.375	.950
1/2" – No. 16	87	4 & 6 x 8 & 10	.375	.890
1/2" – No. 13	146	4 & 6 x 6 & 8	.350	.900
3/4" – No. 16	54	4 & 6 x 6 & 8	.700	1.640
3/4" – No. 13	80	4 & 6 x 8 & 10	.734	1.640
3/4" – No. 10	119	4 x 8	.675	1.563
3/4" – No. 9	180	4 & 6 x 8 & 10	.600	1.450
1" – No. 16	47	4 x 8	.875	1.937
1 1/2" – No. 16	40	4 x 8	1.180	2.600
1 1/2" – No. 13	60	4 & 6 x 8 & 10	1.200	2.600
1 1/2" – No. 10	79	4 & 6 x 8 & 10	1.156	2.520
1 1/2" – No. 9	119	4 & 6 x 8 & 10	1.140	2.430

Specifying - Sheet Size

Width of sheet measure Short Way of Diamond (SWD)
Length of sheet measure Long Way of Diamond (LWD)
Example 1/2" No.18 Expanded Metal SWD x 8' LWD.

Expanded Metal is also available in Aluminum & Stainless Steel.
Detailed engineering information available on request.



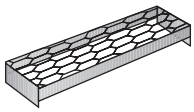


Flattened Expanded Metals

Carbon Steel Regular

Style Designation	Weight per 100 Sq. Ft.	Stock Sizes in Ft.	Size of Opening in Inches	
			Width	Length
1/4" – No. 20	83	4 x 8	.088	.700
1/4" – No. 18	113	4 x 8	.088	.700
1/2" – No. 20	41	3 & 4 x 8	.313	.938
1/2" – No. 18	66	3 & 4 x 8 & 10	.289	.1.000
1/2" – No. 16	82	3 & 4 x 8 &10	.301	.1.000
1/2" – No. 13	138	3 & 4 x 8	.259	.970
3/4" – No. 16	51	3 & 4 x 8 &10	.650	1.750
3/4" – No. 14	64	3 & 4 x 8	.642	1.750
3/4" – No. 13	76	3 & 4 x 8 & 10	.642	1.750
3/4" – No. 9	171	3 & 4 x 8 &10	.529	1.630
1" – No. 16	46	3 & 4 x 8	.780	2.060
1 1/2" – No. 16	29	3 & 4 x 8	1.140	2.680
1 1/2" – No. 14	53	3 & 4 x 8	1.070	2.680
1 1/2" – No. 13	57	3 & 4 x 8 &10	1.070	2.880
1 1/2" – No. 9	113	3 & 4 x 8 & 10	1.000	2.620

Expanded Metal Accessories — U-Edging etc. in stock.
Flattened Expanded Metal is also available in Aluminum & Stainless Steel.



Expanded Metal Grating

Carbon Steel Grate–X

Style (Wt. per Sq. Ft.)	Opening Size in Inches	Strand Size in Inches	Overall Depth in inches	Sheet Size SWD in Ft.	Sheet Size LWD in Ft.
3.0 lb.	1.09 x 3.31	.223 x .23	1/2	6'	8'. 10
4.0 lb.	1.02 x 3.25	.223 x .30	5/8	4, 5, 6*	8'
5.0 lb.	.72 x 2.88	.223 x .31	5/8	4	5', 8',10'
6.25 lb.	.781 x 3.125	.284 x. .380	47/64	4	8'
7.0 lb.	.70 x 2.75	.284 x .40	3/4	4	4' - 2"
					8' - 4"

***** Also Avialiable in 5' wide or 10' long.

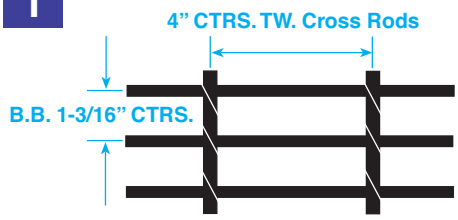
GRATE-X, combining lightweight with unusual strength, is the ideal material for industrial walkways and stair treads. GRATE-X offers many unique advantages. It is higher in unit tensile strength, lighter, has safer tread surfaces and permits maximum passage of light and air.

GRATE-X Stair Tread

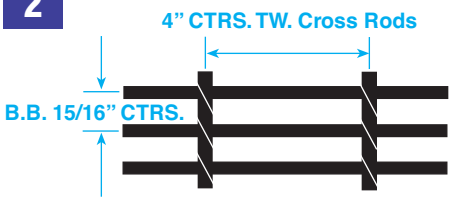
GRATE-X prefabricated Stair Treads are available in two styles, No. 4A (4#) and No. 5A (5#). They are made in lengths from 16" to 48" and in all standard tread widths.

Electroforged Grating

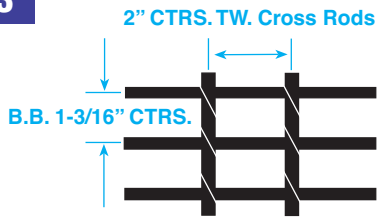
TYPE 1 — 21 Bar – Cross Bars 4" Centers



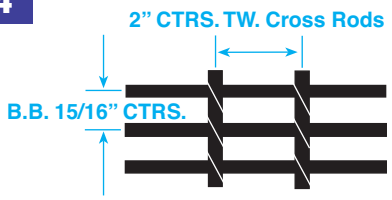
TYPE 2 — 27 Bar – Cross Bars 4" Centers



TYPE 3 — 21 Bar – Cross Bars 2" Centers



TYPE 4 — 27 Bar – Cross Bars 2" Centers

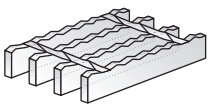


Electroforged Grating Panel Width in Inches

No. of Bars	2	3	4	5	6	7	8	9	10	11	12	13	14
Standard 21 Bar	1 3/8	2 9/16	3 3/4	4 15/16	6 1/8	7 5/16	8 1/2	9 11/16	10 7/8	12 1/16	13 5/16	14 1/2	15 11/16
Close Mesh 27 Bar	1 1/8	2	2 15/16	3 7/8	4 3/4	5 11/16	6 5/8	7 1/2	8 7/16	9 3/8	10 1/4	11 3/16	12 1/8
Special Close Mesh 36 Bar	7/8	1 9/16	2 1/4	2 15/16	3 5/8	4 5/16	5	5 5/8	6 5/16	7	7 11/16	8 3/8	9 1/16

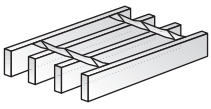
No. of Bars	15	16	17	18	19	20	21	22	23	24	25	26	27
Standard 21 Bar	16 7/8	18 1/16	19 1/4	20 7/16	21 5/8	22 13/16	24	25 3/16	26 3/8	17 9/16	28 3/4	29 15/16	31 1/8
Close Mesh 27 Bar	13	13 15/16	14 13/16	15 3/4	16 11/16	17 9/16	18 1/2	19 7/16	20 5/16	21 1/4	22 3/16	23 1/16	24
Special Close Mesh 36 Bar	9 3/4	10 3/8	11 1/16	11 3/4	12 7/16	13 1/8	13 15/16	14 1/2	15 1/8	15 13/16	16 1/2	17 3/16	17 7/8

No. of Bars	28	29	30	31	32	33	34	35	36	37	38	39	40
Standard 21 Bar	32 5/16	33 1/2	34 11/16	36									
Close Mesh 27 Bar	24 15/16	25 13/16	26 3/4	27 11/16	28 9/16	29 1/2	30 7/16	31 5/16	32 1/4	33 3/16	34 1/16	35	36
Special Close Mesh 36 Bar	18 9/16												



Serrated Bearing Bars

This grating is particularly suited for installations where extreme hazardous conditions, such as oily or slippery surfaces, exist.



Plain Bearing Bars

This grating has proven highly satisfactory for industrial applications. It provides strength, safety and economy.

Electroforged Grating Table of Safe Loads

21 Bar Type Only – Bearing Bars: 1 3/16" Centers
Electroforged 11 Bar (2 3/8" c.c. of Bearing Bar) – Multiply by .52
Electroforged 14 Bar (1 13/16" c.c. of Bearing Bar) – Multiply by .66
Electroforged 27 Bar (15/16" c.c. of Bearing Bar) – Multiply by 1.28
Electroforged 36 Bar (11/16" c.c. of Bearing Bar) – Multiply by 1.71

Bearing Bar Size		2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	8'-0"
8G21	U	386	247	172	126	96	76						
1/4" x 1/8"	D	.095	.151	.216	.295	.374	.486						
Wt. per sq. ft.	C	386	308	258	220	194	171						
4.00 lbs.	D	.076	.119	.173	.234	.308	.389						
G21	U	578	370	258	188	144	115						
3/4" x 3/16"	D	.098	.151	.216	.295	.374	.486						
Wt. per sq. ft.	C	578	462	386	331	289	257						
5.68 lbs.	D	.076	.119	.173	.234	.308	.389						
8J21	U	686	439	304	224	171	135	109	91	76			
1" x 1/8"	D	.072	.111	.159	.219	.288	.366	.451	.547	.673			
Wt. per sq. ft.	C	686	549	457	392	343	305	275	250	228			
5.10 lbs	D	.057	.090	.129	.176	.231	.293	.360	.434	.518			
J21	U	1029	659	459	338	257	203	164	135	114			
1" x 3/16"	D	.072	.111	.159	.219	.288	.366	.451	.547	.673			
Wt. per sq. ft.	C	1029	824	686	587	514	458	412	375	343			
7.36 lbs.	D	.057	.090	.129	.176	.231	.293	.360	.434	.518			
8L21	U	1072	686	476	350	268	212	172	142	119	101	87	
1 1/4" x 1/8"	D	.057	.090	.129	.176	.231	.291	.358	.433	.520	.608	.704	
Wt. per sq. ft.	C	1072	858	716	613	536	477	430	390	358	330	306	
6.20 lbs.	D	.046	.072	.104	.141	.183	.233	.288	.349	.416	.487	.565	
L21	U	1608	1028	716	526	403	318	258	213	179	152	131	
1 1/4" x 3/16"	D	.057	.090	.129	.176	.231	.291	.358	.433	.520	.608	.704	
Wt. per sq. ft.	C	1608	1285	1073	918	803	716	644	585	536	495	459	
9.04 lbs.	D	.046	.072	.104	.141	.183	.233	.288	.349	.416	.487	.565	
8N21	U	1544	987	686	505	387	306	248	205	172	149	128	96
1 1/2" x 1/8"	D	.047	.075	.106	.147	.192	.243	.300	.365	.433	.506	.587	.774
Wt. per sq. ft.	C	1544	1235	1029	883	722	687	619	563	515	475	441	386
7.36 lbs.	D	.038	.059	.087	.117	.154	.195	.241	.289	.347	.406	.470	.614
N21	U	2321	1485	1031	758	581	458	371	307	260	222	191	145
1 1/2" x 3/16"	D	.047	.075	.106	.147	.192	.243	.300	.365	.433	.506	.587	.774
Wt. per sq. ft.	C	2321	1856	1547	1325	1159	1031	928	844	773	714	663	581
11.08 lbs.	D	.038	.059	.087	.117	.154	.195	.241	.289	.347	.406	.470	.614
O21	U	3151	2016	1401	1029	788	622	505	416	351	299	259	197
1 3/4" x 3/16"	D	.042	.064	.092	.126	.165	.208	.258	.310	.371	.435	.506	.664
Wt. per sq. ft.	C	3151	2521	2100	1800	1575	1400	1260	1145	1049	969	899	786
12.76 lbs.	D	.033	.052	.074	.101	.132	.167	.206	.249	.297	.347	.403	.527
P21	U	4116	2633	1829	1344	1029	813	659	546	460	393	339	258
2" x 3/16"	D	.036	.056	.081	.111	.144	.183	.226	.273	.325	.384	.447	.580
Wt. per sq. ft.	C	4116	3292	2745	2351	2058	1828	1646	1496	1370	1266	1175	1027
14.44 lbs.	D	.029	.045	.064	.088	.115	.145	.180	.217	.259	.303	.353	.460
Q21	U	5209	3332	2314	1670	1302	1028	835	689	583	496	428	327
2 1/4" x 3/16"	D	.032	.050	.072	.098	.127	.162	.199	.241	.287	.338	.393	.512
Wt. per sq. ft.	C	5209	4167	3473	2916	2604	2314	2082	1892	1733	1601	1487	1301
16.02 lbs.	D	.026	.039	.057	.079	.102	.129	.160	.194	.230	.270	.314	.410
R21	U	6432	4115	2858	2099	1609	1271	1029	850	720	613	529	405
2 1/2" x 3/16"	D	.028	.044	.064	.088	.116	.145	.180	.217	.260	.305	.354	.465
Wt. per sq. ft.	C	6432	5147	4286	3673	3214	2858	2571	2338	2141	1977	1836	1607
17.69 lbs.	D	.023	.036	.051	.071	.092	.116	.144	.173	.207	.242	.282	.369

U – Safe uniform load in pounds per square foot.
C – Safe concentrated load in pounds per foot of grating width.
D – Deflection in inches.
Loads and deflections given in this table are theoretical, and are based on a unit stress of 18,000 psi.

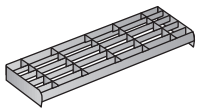
Note: Grating for spans to the left of the heavy line have a deflection less than 1/4" for uniform loads of 100 lbs. per sq. ft. This is the maximum deflection to afford pedestrian comfort and can be exceeded for other types of load at the discretion of the engineer.

Electroforged Grating
Types & Weights

Main Bar Size	Standard 21 Bar Grating				Close Mesh 27 Bar Grating				Special Close Mesh 36 Bar Grating	
	Type 1	Wt. Lbs. Per Sq. Ft.	Type 3	Wt. Lbs. Per Sq. Ft.	Type 2	Wt. Lbs. Per Sq. Ft.	Type 4	Wt. Lbs Per Sq. Ft.	Type 5	Wt. Lbs. Per Sq. Ft.
3/4 x 1/8	8G21	4.00	8GS21	4.64	8G27	4.96	8GS27	5.60	8G36	6.40
3/4 x 3/16	G21	5.68	GS21	6.32	G27	7.12	GS27	7.76	G36	9.28
1 x 1/8	8J21	5.10	8JS21	5.74	8J27	6.38	8JS27	7.02	8J36	8.29
1 x 3/16	J21	7.36	JS21	8.00	J27	9.28	JS27	9.92	J36	12.16
1 1/4 x 1/8	8L21	6.20	8LS21	6.84	8L27	7.79	8LS27	8.43	8L36	10.18
1 1/4 x 3/16	L21	9.04	LS21	9.68	L27	11.44	LS27	12.08	L36	15.04
1 1/2 x 1/8	8N21	7.36	8NS21	8.00	8N27	9.28	8NS27	9.92	8N36	12.16
1 1/2 x 3/16	N21	11.08	NS21	12.07	N27	13.96	NS27	14.95	N36	18.28
1 3/4 x 3/16	O21	12.76	OS21	13.75	O27	16.12	OS27	17.11	O36	21.16
2 x 3/16	P21	14.44	PS21	15.43	P27	18.28	PS27	19.27	P36	24.04
2 1/4 x 3/16	Q21	16.01	QS21	17.01	Q27	20.30	QS27	21.30	Q36	26.74
2 1/2 x 3/16	R21	17.69	RS21	18.69	R27	22.46	RS27	23.46	R36	29.62

Chapin & Bangs has in stock **Type 1 – 3' x 20' panels**

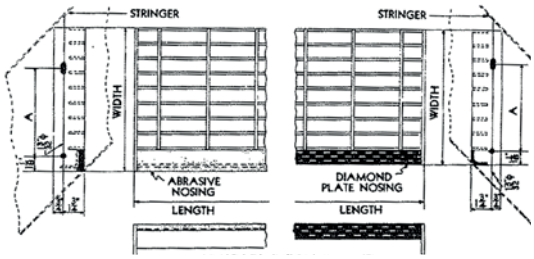
1/8 x 1 ■ 3/16 x 1 ■ 3/16 x 1 1/4 ■ 3/16 x 1 1/2



Electroforged Steel Stair Treads

Electroforged Stair Treads are designed for tremendous strength against impact. They are usually manufactured using a diamond plate nosing. This nosing is made to withstand abuse, particularly that given to treads when buildings are under construction. It defines the edge of each tread because of the very definite contrast between the diamond plate nosing and the grating. For particularly slippery conditions, serrated treads can be furnished.

Electroforged treads can be manufactured in low alloy steels and certain types of stainless steel.



Standard Sizes and Specifications of Stair Treads – 21 Bar Type

Abrasive	Diamond Plate	Type "J" – 13/16" Bars		
Width	Width	Min. Length	Suggested Max. Length	A
6 3/16"	6 1/8"	1'6"	3'0"	2 1/2"
7 3/8"	7 3/8"	1'6"	3'0"	4 1/2"
8 9/16"	8 1/2"	1'6"	3'6"	4 1/2"
9 3/4"	9 11/16"	1'6"	3'6"	7"
10 15/16"	10 7/8"	1'6"	3'6"	7"
7 3/8"	7 5/16"	2'0"	4'0"	4 1/2"
8 9/16"	8 1/2"	2'0"	4'0"	4 1/2"
9 3/4"	9 11/16"	2'0"	4'0"	7"
10 15/16"	10 7/8"	2'0"	4'6"	7"
12 1/8"	12 1/16"	2'0"	4'6"	7"

Chapin & Bangs offers job estimating services and custom fabrication of grating to fit your special requirements.

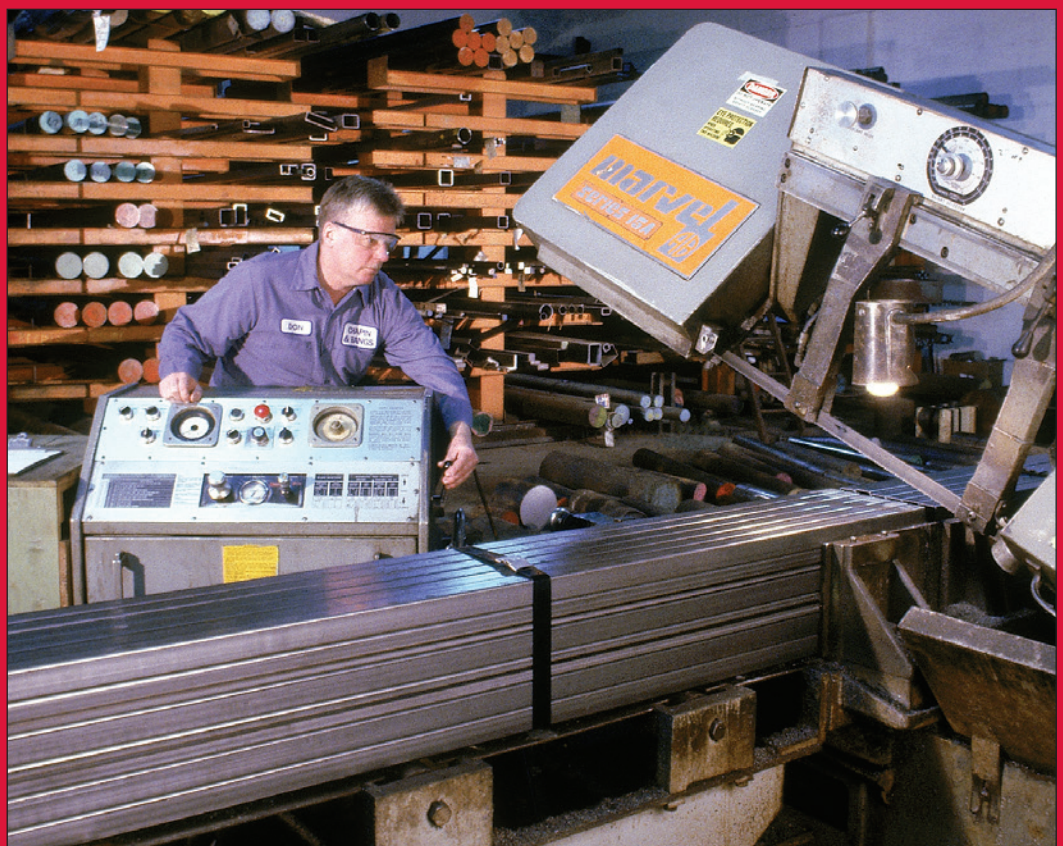
Also available – Aluminum Grating and Stair Treads in standard and close rectangular mesh types.

Serrated Grating Grip Strut®

Code Number	Width in Inches	Depth in Inches	Gauge	Number of Diamonds	Lengths in Ft.
21514	4 3/4	1 1/2	#14	2	10 & 12
31514	7	1 1/2	#14	3	10 & 12
41514	9 1/2	1 1/2	#14	4	10 & 12
41512	9 1/2	1 1/2	#12	4	10 & 12
51514	11 3/4	1 1/2	#14	5	10 & 12
51512	11 3/4	1 1/2	#12	5	10 & 12
52012	11 3/4	2	#12	5	10 & 12
81514	18 3/4	1 1/2	#14	8	10 & 12
81512	18 3/4	1 1/2	#12	8	10 & 12
82012	18 3/4	2	#12	8	10' & 12
102014	24	2	#14	10	10 & 12
102012	24	2	#12	10	10 & 12
103012	24	3	#12	10	10 & 12
104514 U	24	4 1/2	#14	10	10 & 12
104512 U	24	4 1/2	#12	10	10 & 12

Additional Sizes Available – Inquire

TUBING



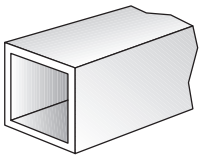
Square & Rectangular Tubing

Structural ASTM A500-Grade B (UNS K03000) cold formed, electric resistance welded tubing. Provides a high strength-to-weight ratio and is easily welded, formed, punched and drilled.

Structural High Strength, Low Alloy (HSLA-70) tubing with 70 KSI minimum yield.

Minimum Mechanical Properties

	Tensile Strength KSI	Yield Strength KSI	% Elong. in 2"
ASTM A500 Grade B	58	46	23
ASTM A500 Grade C	62	50	21
HSLA 70	75	70	14



Square Tubing

Carbon Mechanical & Structural
Lengths: 20', 24' and 40' Ft.

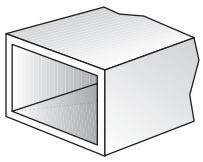
Size in Inches	Wall Gauge	Wall Decimal	Weight per Ft. in Lbs.
3/8 x 3/8	20	.035	.1618
	16	.065	.2740
1/2 x 1/2	20	.035	.2213
	18	.049	.3005
	16	.065	.3845
5/8 x 5/8	18	.049	.3838
	16	.065	.4950
3/4 x 3/4	20	.035	.3403
	18	.049	.4671
	16	.065	.6055
	14	.083	.7529
	13	.095	.8463
	11	.120	1.028
7/8 x 7/8	18	.049	.5504
	16	.065	.6957
	14	.083	.8940
	13	.095	1.008
1 x 1	20	.035	.4533
	18	.049	.6337
	16	.065	.8265

Continued

Size in Inches	Wall Gauge	Wall Decimal	Weight per Ft. in Lbs.
1 x 1	15	.072	.9087
	14	.083	1.035
	13	.095	1.169
	12	.109	1.321
	11	.120	1.436
1 1/8 x 1 1/8	18	.049	.7170
	16	.065	.9167
1 1/4 x 1 1/4	18	.049	.8003
	16	.065	1.048
	14	.083	1.317
	13	.095	1.492
	12	.109	1.691
	11	.120	1.800
	3/16	.188	2.407
1 1/2 x 1 1/2	18	.049	.9669
	16	.065	1.269
	15	.072	1.380
	14	.083	1.600
	13	.095	1.815
	12	.109	1.992
	11	.120	2.210
1 1/2 x	3/16	.188	3.040
	1/4	.250	4.067
1 3/4 x 1 3/4	16	.065	1.469
	14	.083	1.882
	13	.095	2.138
	11	.120	2.582
2 x 2	18	.049	1.300
	16	.065	1.690
	15	.072	1.880
	14	.083	2.135
	13	.095	2.450
	12	.109	2.803
	11	.120	2.940
	1/8	.125	3.050
	10	.134	3.282
	3/16	.188	4.320
	1/4	.250	5.410
2 1/4 x 2 1/4	16	.065	1.932
	1/4	.250	6.800
2 1/2 x 2 1/2	16	.065	2.153
	14	.083	2.728
	12	.109	3.544
	11	.120	3.760
	1/8	.125	3.900
	10	.134	4.193
	3/16	.188	5.590
	1/4	.250	7.110
3 x 3	14	.083	3.263
	11	.120	4.580
	1/8	.125	4.750
	3/16	.188	6.870

Continued on Next Page

Size in Inches	Wall Gauge	Wall Decimal	Weight per Ft. in Lbs.
3 x 3	1/4	.250	8.810
	5/16	.313	10.58
	3/8	.375	12.50
3 1/2 x 3 1/2	1/8	.125	5.610
	3/16	.188	8.150
	1/4	.250	10.51
	5/16	.313	12.70
4 x 4	11	.120	6.220
	1/8	.125	6.460
	3/16	.188	9.420
	1/4	.250	12.21
	5/16	.313	14.83
	3/8	.375	17.27
	1/2	.500	21.63
4 1/2 x 4 1/2	3/16	.188	10.70
	1/4	.250	13.91
5 x 5	11	.120	7.964
	1/8	.125	8.160
	7	.180	11.40
	3/16	.188	11.97
	1/4	.250	15.62
	5/16	.313	19.08
	3/8	.375	22.37
	1/2	.500	28.43
6 x 6	3/16	.188	14.53
	1/4	.250	19.02
	5/16	.313	23.34
	3/8	.375	27.48
	1/2	.500	35.24
7 x 7	3/16	.188	17.08
	1/4	.250	22.42
	5/16	.313	27.59
	3/8	.375	32.58
	1/2	.500	42.05
8 x 8	3/16	.188	19.63
	1/4	.250	25.82
	5/16	.313	31.84
	3/8	.375	37.69
	1/2	.500	48.85
	5/8	.625	59.32
10 x 10	1/4	.250	32.63
	5/16	.313	40.35
	3/8	.375	47.90
	1/2	.500	62.46
	5/8	.625	76.33
12 x 12	1/4	.250	39.43
	5/16	.313	48.86
	3/8	.375	58.10
	1/2	.500	76.07
14 x 14	3/8	.375	69.49
	1/2	.500	89.68
16 x 16	1/2	.500	103.3



Rectangular Tubing

Mechanical & Structural
Carbon Steel
Lengths: 20', 24' and 40' Ft.

Size in Inches	Wall Gauge	Wall Decimal	Weight per Ft. in Lbs.
1 x 1/2	18	.049	.4671
	16	.065	.5852
1 x 3/4	16	.065	.6957
1 1/2 x 1/2	16	.065	.8265
1 1/2 x 3/4	16	.065	.9167
	14	.083	1.176
	11	.120	1.640
1 1/2 x 1	16	.065	1.027
	14	.083	1.317
	11	.120	1.844
2 x 3/4	16	.065	1.158
2 x 1	18	.049	.9669
	16	.065	1.248
	15	.072	1.380
	14	.083	1.600
	12	.109	2.062
	11	.120	2.252
2 x 1 1/4	14	.083	1.741
2 x 1 1/2	14	.083	1.852
	11	.120	2.660
2 1/2 x 1	14	.083	1.882
2 1/2 x 1 1/4	14	.083	2.023
2 1/2 x 1 1/2	14	.083	2.164
	11	.120	2.989
	1/8	.125	3.050
	9	.148	3.728
	3/16	.188	4.320
	1/4	.250	5.410
2 1/2 x 2	11	.120	3.351
3 x 1	16	.065	1.711
	14	.083	2.164
	11	.120	3.068
3 x 1 1/2	14	.083	2.446
	13	.095	2.784
	12	.109	3.104
	11	.120	3.476
	1/8	.125	3.480
	3/16	.188	4.960
	1/4	.250	6.800
3 x 2	16	.065	2.153
	14	.083	2.728
	11	.120	3.760
	1/8	.125	3.900
	3/16	.188	5.590
3 x 2	1/4	.250	7.110
	5/16	.313	8.450
3 1/2 x 2 1/2	3/16	.188	6.880
	1/4	.250	8.810
4 x 1 1/2	11	.120	4.292
4 x 2	14	.083	3.263
	11	.120	4.580

Continued on Next Page

Rectangular Tubing Continued

Size in Inches			Wall Gauge	Wall Decimal	Weight per Ft. in Lbs.
4	x	2	1/8	.125	4.750
			3/16	.188	6.870
			1/4	.250	8.810
			5/16	.313	10.58
			3/8	.375	13.43
4	x	2 1/2	1/8	.125	5.175
4	x	3	11	.120	5.516
			1/8	.125	5.610
			3/16	.188	8.150
			1/4	.250	10.51
			5/16	.313	12.70
			3/8	.375	14.71
4 1/2	x	2 1/2	1/4	.250	10.51
5	x	2	11	.120	5.516
			1/8	.125	5.610
			10	.134	5.980
			3/16	.188	8.150
			1/4	.250	10.51
			5/16	.313	12.70
5	x	2 1/2	1/8	.125	5.924
			3/16	.188	8.880
5	x	3	11	.120	6.220
			1/8	.125	6.460
			3/16	.188	9.420
			1/4	.250	12.21
			5/16	.313	14.83
			3/8	.375	17.27
			1/2	.500	21.63
5	x	4	3/16	.188	10.70
			1/4	.250	13.91
6	x	2	11	.120	6.220
			1/8	.125	6.460
			3/16	.188	9.420
			1/4	.250	12.21
			5/16	.313	14.83
			3/8	.375	17.27
6	x	3	11	.120	7.148
			1/8	.125	7.310
			3/16	.188	10.70
			1/4	.250	13.91
			5/16	.313	16.96
			3/8	.375	19.82
			1/2	.500	25.03
6	x	4	1/8	.125	8.160
			3/16	.188	11.97
			1/4	.250	15.62
			5/16	.313	19.08
			3/8	.375	22.37
			1/2	.500	38.43
7	x	3	3/16	.188	11.97
			1/4	.250	15.62
			3/8	.375	22.37
7	x	4	3/16	.188	13.25
			1/4	.250	17.32
			3/8	.375	24.93
7	x	5	3/16	.188	14.53
			1/4	.250	19.02
			5/16	.313	23.34
			3/8	.375	27.48

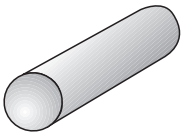
Continued

Size in Inches			Wall Gauge	Wall Decimal	Weight per Ft. in Lbs.
7	x	5	1/2	.500	35.24
8	x	2	3/16	.188	11.97
			1/4	.250	15.62
			3/8	.375	22.37
8	x	3	3/16	.188	13.25
			1/4	.250	17.32
			5/16	.313	21.21
			3/8	.375	24.93
			1/2	.500	31.84
8	x	4	3/16	.188	14.53
			1/4	.250	19.02
			5/16	.313	23.34
			3/8	.375	27.48
			1/2	.500	35.24
8	x	6	3/16	.188	17.08
			1/4	.250	22.42
			5/16	.313	27.59
			3/8	.375	32.58
			1/2	.500	42.05
9	x	5	3/8	.375	35.28
9	x	7	1/4	.250	25.82
			5/16	.313	31.84
10	x	2	3/16	.188	14.53
			1/4	.250	19.02
10	x	3	1/4	.250	20.72
10	x	4	3/16	.188	17.08
			1/4	.250	22.42
			5/16	.313	27.59
			3/8	.375	32.58
			182	.500	42.05
10	x	5	1/4	.250	24.12
10	x	6	3/16	.188	19.63
			1/4	.250	25.82
			5/16	.313	31.84
			3/8	.375	37.69
			1/2	.500	48.85
10	x	8	1/4	.250	29.23
			3/8	.375	42.79
			1/2	.500	55.66
12	x	2	3/16	.188	17.08
			1/4	.250	22.42
12	x	3	1/4	.250	24.12
12	x	4	3/16	.188	19.63
			1/4	.250	25.82
			5/16	.313	31.84
			3/8	.375	37.69
			1/2	.500	48.85
12	x	6	1/4	.250	29.23
			5/16	.313	36.10
			3/8	.375	42.79
			1/2	.500	55.66
12	x	8	1/4	.250	32.63
			3/8	.375	47.90
			1/2	.500	62.46
14	x	4	1/4	.250	29.23
14	x	6	3/8	.375	47.90
14	x	10	3/8	.375	58.10
16	x	8	3/8	.375	58.10
			1/2	.500	76.07

CARBON STEEL BARS

Hot Rolled

Cold Finished



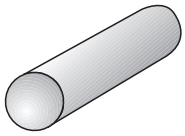
Hot Rolled Rounds

Low Carbon
1020, ASTM A108
ASTM 576 Special Bar Quality
ASTM A36 Structural Quality
Lengths: 20 Ft.

Size In Inches	Weight per Ft. in Lbs.
3/16	.094
1/4	.167
5/16	.216
3/8	.376
7/16	.511
1/2	.668
9/16	.845
5/8	1.043
11/16	1.262
3/4	1.502
13/16	1.763
7/8	2.045
15/16	2.347
1	2.670
1 1/16	3.015
1 1/8	3.380
1 3/16	3.766
1 1/4	4.172
1 5/16	4.600
1 3/8	5.049
1 7/16	5.518
1 1/2	6.008
1 9/16	6.519
1 5/8	7.051
1 11/16	7.604
1 3/4	8.178
1 13/16	8.733
1 7/8	9.388
1 15/16	10.02
2	10.68
2 1/16	11.58
2 1/8	12.06
2 1/4	13.52
2 3/8	15.06
2 1/2	16.69
2 5/8	18.40
2 3/4	20.19
2 7/8	22.07
2 15/16	23.04

Continued

Size In Inches	Weight per Ft. in Lbs.
3	24.03
3 1/8	26.08
3 1/4	28.21
3 3/8	30.42
3 1/2	32.71
3 9/16	33.39
3 5/8	35.09
3 3/4	37.55
4	42.73
4 1/16	44.07
4 1/8	45.44
4 1/4	48.23
4 3/8	51.11
4 1/2	54.08
4 5/8	57.12
4 3/4	60.25
5	66.76
5 1/4	73.60
5 1/2	80.78
5 3/4	88.29
6	96.13
6 1/4	104.30
6 1/2	112.80
6 3/4	121.70
7	130.90
7 1/4	140.40
7 1/2	150.20
7 3/4	160.40
8	170.90
8 1/4	181.80
8 1/2	192.90
8 3/4	204.50
9	216.30
9 1/2	241.00
10	267.00
10 1/2	294.40
11	323.10
12	384.50



Hot Rolled Rounds

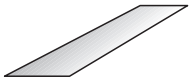
Medium Carbon
ASTM 576, Special Bar Quality
1045/1141
Lengths: 20 Ft.

Size In Inches	Weight per Ft. in Lbs.
1/2	.668
5/8	1.043
3/4	1.502
7/8	2.045
1	2.670
1 1/16	3.015
1 1/8	3.380
1 3/16	3.766
1 1/4	4.172
15/16	4.600
1 3/8	5.049
1 7/16	5.518
1 1/2	6.008
1 9/16	6.519
1 5/8	7.051
1 11/16	7.604
1 3/4	8.178
1 13/16	8.773
1 7/8	9.388
1 15/16	10.02
2	10.68
2 1/16	11.36
2 1/8	12.06
2 3/16	12.78
2 1/4	13.52
2 5/16	14.28
2 3/8	15.06
2 7/16	15.87
2 1/2	16.69
2 9/16	17.53
2 5/8	18.40
2 11/16	19.29
2 3/4	20.19
2 13/16	21.12
2 7/8	22.07
2 15/16	23.04
3	24.03
3 1/8	26.08
3 1/4	28.21

Continued

Size In Inches	Weight per Ft. in Lbs.
3 5/16	29.30
3 3/8	30.42
3 1/2	32.71
3 5/8	35.09
3 3/4	37.55
4	42.73
4 1/8	45.44
4 1/4	48.23
4 1/2	54.08
4 3/4	60.25
5	66.76
5 1/4	73.60
5 1/2	80.78
5 3/4	88.29
6	96.13
6 1/4	104.30
6 1/2	112.80
6 3/4	121.70
7	130.90
7 1/4	140.40
7 1/2	150.20
7 3/4	160.40
8	170.90
8 1/4	181.80
8 1/2	192.90
8 3/4	204.50
9	216.30
9 1/2	241.00
9 3/4	253.90
10	267.00
10 1/2	294.40
11	323.10
12	384.50

Forged and rough turned rounds available.



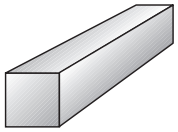
Hot Rolled Strip

Low Carbon AS69 CQ
.15 Max Carbon
Lengths: 20 Ft.

Size In Inches	Weight per Ft. in Lbs.
1/8 x 1/2	.213
5/8	.266
3/4	.319
7/8	.372
1	.425
1 1/8	.478
1 1/4	.531
1 3/8	.584
1 1/2	.638
1 3/4	.744
2	.850
2 1/4	.956
2 1/2	1.063

Continued

Size In Inches	Weight per Ft. in Lbs.
2 3/4	1.169
3	1.275
3 1/4	1.381
3 1/2	1.488
4	1.700
1/8 x 4 1/2	1.913
5	2.125
5 1/2	2.338
6	2.550
7	2.975
8	3.400
10	5.100
12	5.100
3/16 x 1/2	.319



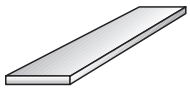
Hot Rolled Squares

Low Carbon A36
ASTM A36, Structural Quality
Lengths: 20 Ft.

Size In Inches	Weight per Ft. in Lbs.
3/8	.478
1/2	.850
5/8	1.328
3/4	1.913
7/8	2.603
1	3.400
1 1/8	4.303

Continued

Size In Inches	Weight per Ft. in Lbs.
1 1/4	5.313
1 1/2	7.650
1 3/4	10.41
2	13.60
2 1/4	17.21
2 1/2	21.25
2 3/4	25.71
3	30.60



Hot Rolled Flats

Low Carbon
A36, M1020
Structural & Merchant Quality
Lengths: 20 Ft.

Size In Inches	Weight per Ft. in Lbs.
3/16 x 1/2	.318
1	.637
1 1/2	.956
1 1/4	.797
1 3/4	1.115
2	1.275
3	1.913
3 1/2	2.231
4	2.550
5	3.188
3/16 x 6	3.83
1/4 x 1/2	.425
5/8	.531
3/4	.638
7/8	.744
1	.850
1 1/8	.956
1 1/4	1.063
1 3/8	1.169
1 1/2	1.275
1 5/8	1.381
1 3/4	1.488
2	1.700
2 1/4	1.913
2 1/2	2.125
2 3/4	2.338
3	2.550
3 1/4	2.763
3 1/2	2.975
3 3/4	3.188
4	3.400
4 1/4	36.130
4 1/2	3.825
5	4.250
5 1/2	4.675
6	5.100
7	5.950
7 1/2	6.375
8	6.800
9	7.650
10	8.500
11	9.350
12	10.200
5/16 x 3/4	.797
7/8	.930
1	1.063
1 1/8	1.195
1 1/4	1.328
1 3/8	1.461

Continued

Size In Inches	Weight per Ft. in Lbs.
5/16 x 1 1/2	1.594
1 3/4	1.859
2	2.125
2 1/4	2.391
2 1/2	2.656
2 3/4	2.922
3	3.188
3 1/4	3.453
3 1/2	3.719
4	4.250
4 1/2	4.781
5	5.313
5 1/2	5.844
6	6.375
7	7.438
8	8.500
9	9.563
10	10.630
12	12.750
3/8 x 1/2	.638
3/4	.956
7/8	1.116
1	1.275
1 1/8	1.434
1 1/4	1.594
1 3/8	1.753
1 1/2	1.913
1 5/8	2.072
1 3/4	2.231
2	2.550
2 1/4	2.869
2 1/2	3.188
2 3/4	3.506
3	3.825
3 1/4	4.144
3 1/2	4.463
3 5/8	4.622
3 3/4	4.781
4	5.100
4 1/2	5.738
5	6.375
5 1/2	7.013
6	7.650
6 1/2	8.288
7	8.925
8	10.200
9	11.480
10	12.750
11	14.030

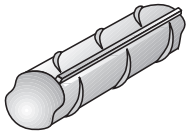
Continued

Size In Inches	Weight per Ft. in Lbs.
3/8 x 12	15.300
7/16 x 1 1/4	1.859
1 1/2	2.231
2	2.975
2 1/2	3.719
3	4.463
5	7.438
1/2 x 3/4	1.275
1	1.700
1 1/8	1.913
1 1/4	2.125
1 3/8	2.338
1 1/2	2.550
1 5/8	2.763
1 3/4	2.975
2	3.400
2 1/4	3.825
2 1/2	4.122
2 3/4	4.675
3	5.100
3 1/4	5.525
3 1/2	5.950
3 3/4	6.375
4	6.800
4 1/2	7.650
5	8.500
5 1/2	9.350
6	10.200
7	11.900
7 1/4	12.330
8	13.600
8 1/2	14.450
9	15.300
9 1/2	16.150
10	17.000
11	18.700
12	20.400
5/8 x 3/4	1.594
1	2.125
1 1/4	2.656
1 3/8	2.922
1 1/2	3.188
1 3/4	3.719
2	4.250
2 1/4	4.781
2 1/2	5.313
2 3/4	5.844
3	6.375
3 1/4	6.906

Contiued

Size In Inches	Weight per Ft. in Lbs.
5/8 x 3 1/2	7.438
4	8.500
4 1/2	9.563
5	10.630
5 1/2	11.690
6	12.750
7	14.880
8	17.000
9	19.130
10	21.250
11	23.380
12	25.500
3/4 x 7/16	1.116
1	2.550
1 1/8	2.869
1 1/4	3.188
1 1/2	3.825
1 5/8	4.144
1 3/4	4.463
1 7/8	4.781
2	5.100
2 1/4	5.738
2 1/2	6.375
2 3/4	7.013
3	7.650
3 1/4	8.288
3 1/2	8.925
4	10.200
4 1/2	11.480
5	12.750
5 1/2	14.030
6	15.300
7	17.850
8	20.400
9	22.950
10	25.500
11	28.050
12	30.600
7/8 x 1 1/4	3.719
1 1/2	4.463
1 3/4	5.206
2	5.950
2 1/4	6.694
2 1/2	7.438
3	8.925
3 1/2	10.410
4	11.900
4 1/2	13.390
5	14.880

Continued on Next Page



Reinforcing Bars

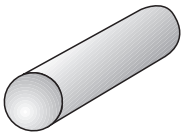
ASTM A615 - Billet Steel
Deformed Bars
Grades 40 & 60 – All Sizes
Lengths: 20 Ft.

Size In Inches	Weight per Ft. in Lbs.
7/8 x 5 1/2	16.360
6	17.850
7	20.830
8	23.800
1 x 1 1/4	4.250
1 1/2	5.100
1 3/4	5.950
2	6.800
2 1/4	7.650
2 1/2	8.500
2 3/4	9.350
3	10.200
3 1/4	11.050
3 1/2	11.900
4	13.600
4 1/2	15.300
5	17.000
5 1/2	18.700
6	20.400
7	23.800
8	27.200
9	30.600
10	34.000
12	40.800
1 1/8 x 2	7.650
2 1/2	9.563
3	11.480
4	15.300
5	19.130
6	22.950
8	30.600
1 1/4 x 1 1/2	6.375
1 3/4	7.440
2	8.500
2 1/4	9.560
2 1/2	10.630
2 3/4	11.690
3	12.750
3 1/4	13.810
3 1/2	14.880
4	17.000
4 1/2	19.130
5	21.250
5 1/2	23.380
6	25.500
7	29.750
8	34.000
1 3/8 x 4	18.700
1 1/2 x 1 3/4	8.930

Continued

Size In Inches	Weight per Ft. in Lbs.
1 1/2 x 2	10.200
2 1/4	11.480
2 1/2	12.750
2 3/4	14.030
3	15.300
3 1/2	17.850
4	20.400
4 1/2	22.950
5	25.500
5 1/2	28.050
6	30.600
7	35.700
8	40.800
1 3/4 x 2	11.900
2 1/2	14.880
3	17.850
3 1/2	20.830
4	23.800
4 1/2	26.780
5	29.750
5 1/2	32.730
6	35.700
2 x 2 1/4	15.300
2 1/2	17.000
3	20.400
3 1/2	23.800
4	27.200
4 1/2	30.600
5	34.000
5 1/2	37.400
6	40.800
7	47.600
8	54.400
2 1/4 x 2 1/2	19.130
3	22.950
3 1/2	26.775
4	30.600
2 1/2 x 3	25.550
3 1/2	29.750
4	34.000
4 1/2	38.250
5	42.500
6	51.000
3 x 4	40.800
4 1/2	45.900
5	51.000
6	61.200

Bar No.	Diameter In Inches	Nominal Dimension Area Sq. Inches	Nominal Dimension Perimeter In Inches	Weight per Ft. In Lbs.
# 3	.3750	.1100	1.1790	.376
# 4	.5000	.2000	1.5110	.668
# 5	.6250	.3100	1.9630	1.043
# 6	.7500	.4400	2.3560	1.502
# 7	.8750	.6000	2.7490	2.044
# 8	1.0000	.7900	3.1420	2.670
# 9	1.1250	1.0000	3.5440	3.380

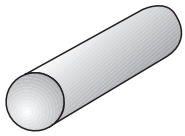


Cold Finished Rounds

Low Carbon
1018, C1117, C11L17,
Lengths: 10 to 12 Ft. Random
ASTM A108

Size In Inches	Weight per Ft. in Lbs.
1/8	.042
5/32	.065
3/16	.094
1/4	.167
5/16	.261
3/8	.376
7/16	.511
1/2	.668
9/16	.845
5/8	1.043
11/16	1.262
3/4	1.502
13/16	1.763
7/8	
2.045 15/16	
2.347	
1	2.670
1 1/16	3.015
1 1/8	3.380
1 3/16	3.766
1 1/4	4.172
1 5/16	4.600
1 3/8	5.049
1 7/16	5.518
1 1/2	6.008
1 9/16	6.519
1 5/8	7.051
1 11/16	7.604
1 3/4	8.178
1 13/16	8.773
1 7/8	9.388
1 15/16	10.02
2	10.68
2 1/16	11.36
2 1/8	12.06
2 3/16	12.78
2 1/4	13.52
2 5/16	14.28
2 3/8	15.06
2 7/16	15.87
2 1/2	16.69
2 9/16	17.53
2 5/8	18.40

Size In Inches	Weight per Ft. in Lbs.
Continued	
2 11/16	19.29
2 3/4	20.19
2 7/8	22.07
3	24.03
3 1/8	26.08
3 3/16	27.13
3 1/4	28.21
3 3/8	30.42
3 7/16	31.55
3 1/2	32.71
3 5/8	35.09
3 3/4	37.55
3 7/8	40.10
4	42.73
4 1/8	45.44
4 1/4	48.23
4 3/8	51.11
4 7/16	52.58
4 1/2	54.08
4 5/8	57.12
4 3/4	60.25
4 7/8	63.46
5	66.76
5 1/8	70.14
5 1/4	73.60
5 3/8	77.15
5 1/2	80.78
5 5/8	84.49
5 3/4	88.29
5 7/8	92.17
6	96.13
6 1/4	104.30
6 1/2	112.80
6 3/4	121.70
7	130.90
7 1/2	150.20
8	170.90
9	216.30
10	267.00
12	384.50

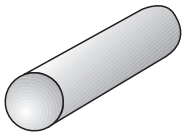


Cold Finished Rounds

Medium Carbon
1045, 1141, 11L41 and 1144
Stressproof®, sizes are cold drawn
Lengths: 10 to 12 Ft. Random
ASTM A108

Size In Inches	Weight per Ft. in Lbs.
1/4	.167
5/16	.261
3/8	.376
7/16	.511
15/32	.587
1/2	.668
17/32	.754
9/16	.845
5/8	1.043
11/16	1.262
3/4	1.502
49/64	1.565
13/16	1.763
7/8	2.045
15/16	2.347
1	2.670
1 1/8	3.015
1 1/8	3.380
1 3/16	3.766
1 7/32	3.966
1 1/4	4.172
1 5/16	4.600
1 3/8	5.049
1 7/16	5.518
1 1/2	6.008
1 9/16	6.519
1 5/8	7.051
1 11/16	7.604
1 3/4	8.178
1 13/16	8.773
Continued	

Size In Inches	Weight per Ft. in Lbs.
1 7/8	9.388
1 15/16	10.02
2	10.68
2 1/16	11.36
2 1/8	12.06
2 3/16	12.78
2 1/4	13.52
2 5/16	14.28
2 3/8	15.06
2 7/16	15.86
2 1/2	16.69
2 9/16	17.53
2 5/8	18.40
2 11/16	19.29
2 3/4	20.19
2 7/8	22.07
2 15/16	23.04
3	24.03
3 1/8	26.08
3 1/4	28.21
3 3/8	30.42
3 1/2	32.71
3 5/8	35.09
3 3/4	37.55
3 7/8	40.10
4	42.73
4 1/8	45.44
4 1/4	48.23
4 3/8	51.11
4 1/2	54.08

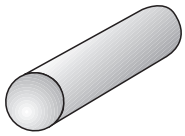


Cold Drawn Rounds

Screw Stock
C1215, 12L14, 1214 + Bi,
12L14 + Se or Te, C12T14
Lengths: 12 Ft. Random
ASTM A108

Size In Inches	Weight per Ft. in Lbs.
5/64	.016
3/32	.024
7/64	.032
1/8	.042
9/64	.053
5/32	.065
11/64	.079
3/16	.094
13/64	.110
7/32	.128
15/64	.147
1/4	.167
17/64	.188
9/32	.211
19/64	.235
5/16	.261
21/64	.288
11/32	.316
23/64	.345
3/8	.376
25/64	.408
13/32	.441
27/64	.475
7/16	.511
29/64	.548
15/32	.587
31/64	.627
1/2	.668
33/64	.710
17/32	.754
9/16	.845
37/64	.893
19/32	.941
39/64	.992
5/8	1.043
41/64	1.096
21/32	1.150
43/64	1.205
11/16	1.262
45/64	1.320
23/32	1.380
47/64	1.440
3/4	1.502
49/64	1.565
25/32	1.630
13/16	1.763
27/32	1.901
7/8	2.045
57/64	2.118
29/32	2.193
15/16	2.347
31/32	2.506
63/64	2.588
1	2.670
1 1/64	2.754
1 1/32	2.840
1 1/16	3.015
Continued	

Size In Inches	Weight per Ft. in Lbs.
1 1/8	3.380
1 3/16	3.766
1 1/4	4.172
1 5/16	4.600
1 3/8	5.049
1 7/16	5.518
1 1/2	6.008
1 9/16	6.519
1 5/8	7.051
1 11/16	7.604
1 3/4	8.178
1 13/16	8.773
1 7/8	9.388
1 15/16	10.02
2	10.68
2 1/16	11.36
2 1/8	12.06
2 3/16	12.78
2 1/4	13.52
2 5/16	14.28
2 3/8	15.06
2 7/16	15.87
2 1/2	16.69
2 9/16	17.53
2 5/8	18.40
2 11/16	19.29
2 3/4	20.19
2 13/16	21.12
2 7/8	22.07
2 15/16	23.04
3	24.03
3 1/16	25.05
3 1/8	26.08
3 1/4	28.21
3 5/16	29.30
3 3/8	30.42
3 7/16	31.55
3 1/2	32.71
3 5/8	35.09
3 3/4	37.55
3 7/8	40.10
4	42.73
4 1/8	45.44
4 1/4	48.23
4 3/8	51.11
4 1/2	54.08
4 5/8	57.12
4 3/4	60.25
5	66.76
5 1/4	73.60
5 1/2	80.78
5 5/8	84.49
5 3/4	88.29
6	96.13
6 1/2	112.80
7	130.90
8	170.90
9	216.30

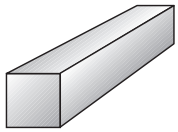


Shafting Rounds

Turned, Ground & Polished
1045, 1141 Stressproof®
Lengths: 20 & 24 Ft.
Niagara LaSalle Stressproof meets **ASTM A311 Class B**. All other grades meet **ASTM A108**

Size In Inches	Weight per Ft. in Lbs.
5/16	.261
3/8	.376
7/16	.511
1/2	.668
9/16	.845
5/8	1.043
3/4	1.502
13/16	1.763
7/8	2.045
15/16	2.347
1	2.670
1 1/8	3.380
1 3/16	3.766
1 1/4	4.172
1 5/16	4.600
1 3/8	5.049
1 7/16	5.518
1 1/2	6.008
1 5/8	7.051
1 11/16	7.604
1 3/4	8.178
1 7/8	9.388
1 15/16	10.02
2	10.68
2 1/8	12.06
2 3/16	12.78
2 1/4	13.52
2 3/8	15.06
2 7/16	15.87
Continued	

Size In Inches	Weight per Ft. in Lbs.
2 1/2	16.69
2 5/8	18.40
2 11/16	19.29
2 3/4	20.19
2 7/8	22.07
2 15/16	23.04
3	24.03
3 3/16	27.13
3 1/4	28.21
3 7/16	31.55
3 1/2	32.71
3 11/16	36.31
3 3/4	37.55
3 15/16	41.40
4	42.73
4 3/16	46.83
4 1/4	48.23
4 3/8	51.11
4 7/16	52.58
4 1/2	54.08
4 3/4	60.25
4 15/16	65.10
5	66.76
5 1/4	73.60
5 7/16	78.95
5 1/2	80.78
5 15/16	94.14
6	96.13
7	130.90
8	170.90

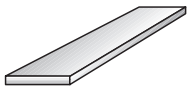


Cold Drawn Squares

Screw Stock
ASTM A108, C1018, C1215
& C12L14
Lengths: 10 to 12 Ft. Random

Size In Inches	Weight per Ft. in Lbs.
1/8	.053
5/32	.083
3/16	.120
7/32	.163
1/4	.213
9/32	.269
5/16	.332
3/8	.478
7/16	.651
1/2	.850
9/16	1.076
5/8	1.328
11/16	1.607
3/4	1.913
Continued	

Size In Inches	Weight per Ft. in Lbs.
13/16	2.245
7/8	2.603
15/16	2.988
1	3.400
1 1/8	4.303
1 1/4	5.313
1 3/8	6.428
1 1/2	7.650
1 5/8	8.978
1 3/4	10.41
2	13.60
2 1/4	17.21
2 1/2	21.25
2 3/4	25.71



Cold Finished Flats

Low Carbon
ASTM A108 & C1018
Lengths: 10 to 12 Ft. Random

Size In Inches	Weight per Ft. in Lbs.
1/8 x 1/4	.106
3/8	.159
1/2	.213
5/8	.266
3/4	.319
7/8	.372
1	.425
1 1/4	.531
1 1/2	.638
1 3/4	.744
2	.850
2 1/2	1.063
3	1.275
3 1/2	1.488
4	1.700
5	2.125
6	2.550
3/16 x 1/4	.159
3/8	.239
1/2	.319
5/8	.398
3/4	.478
7/8	.558
1	.638
1 1/8	.717
1 3/8	.797
1 1/2	.956
1 3/4	1.116
1 7/8	1.195
2	1.275
2 1/4	1.434
2 1/2	1.594
2 3/4	1.753
3	1.913
3 1/2	2.231
4	2.550
5	3.188
6	3.825
10	6.375
1/4 x 5/16	.266
3/8	.319
7/16	.372
1/2	.425
5/8	.531

Continued

Size In Inches	Weight per Ft. in Lbs.
1/4 x 3/4	.638
7/8	.744
1	.850
1 1/8	.956
1 1/4	1.063
1 3/8	1.169
1 1/2	1.275
1 5/8	1.381
1 3/4	1.488
2	1.700
2 1/4	1.913
2 1/2	2.125
2 3/4	2.338
3	2.550
3 1/4	2.763
3 1/2	2.975
3 3/4	3.188
4	3.400
4 1/2	3.825
5	4.250
5 1/2	4.675
6	5.100
7	5.950
8	6.800
9	7.650
10	8.500
12	10.200
5/16 x 3/8	.398
7/16	.465
1/2	.531
9/16	.598
5/8	.664
3/4	.797
7/8	.930
1	1.063
1 1/8	1.195
1 1/4	1.328
1 3/8	1.461
1 1/2	1.594
1 3/4	1.859
2	2.125
2 1/4	2.391
2 1/2	2.656
3	3.188

Continued

Size In Inches	Weight per Ft. in Lbs.
5/16 x 3 1/2	3.719
4	4.250
5	5.313
6	6.375
3/8 x 7/16	.558
1/2	.638
5/8	.797
3/4	.956
7/8	1.116
1	1.275
1 1/8	1.434
1 1/2	1.913
1 3/8	1.753
1 1/2	1.913
1 5/8	2.072
1 3/4	2.231
2	2.550
2 1/4	2.869
2 1/2	3.188
2 3/4	3.506
3	3.825
3 1/4	4.144
3 1/2	4.463
3 3/4	4.781
4	5.100
4 1/2	5.738
5	6.375
5 1/2	7.013
6	7.650
7	8.925
8	10.20
9	11.48
10	12.75
12	15.30
7/16 x 1/2	.744
3/4	1.116
1	1.488
1 1/4	1.859
1 1/2	2.231
2	2.975
2 1/2	3.719
4	5.950
1/2 x 9/16	.956
5/8	1.063

Continued

Size In Inches	Weight per Ft. in Lbs.
1/2 x 3/4	1.275
7/8	1.488
1	1.700
1 1/8	1.913
1 1/4	2.125
1 3/8	2.338
1 1/2	2.550
1 5/8	2.763
1 3/4	2.975
2	3.400
2 1/4	3.825
2 1/2	4.250
2 3/4	4.675
3	5.100
3 1/4	5.525
3 1/2	5.950
4	6.800
4 1/2	7.650
5	8.500
5 1/2	9.350
6	10.20
7	11.90
8	13.60
9	15.30
10	17.00
12	20.40
5/8 x 3/4	1.594
7/8	1.859
1	2.125
1 1/4	2.656
1 1/2	3.188
1 3/4	3.719
2	4.250
2 1/4	4.781
2 1/2	5.313
2 3/4	5.844
3	6.375
3 1/2	7.438
3 3/4	7.969
4	8.500
4 1/2	9.563
5	10.63
5 1/2	11.69
6	12.75

Continued on Next Page

Size In Inches	Weight per Ft. in Lbs.
5/8 x 7	14.88
8	17.00
10	21.25
12	25.50
3/4 x 7/8	2.231
1	2.550
1 1/8	2.869
1 1/4	3.188
1 3/8	3.506
1 1/2	3.825
1 3/4	4.463
2	5.100
2 1/4	5.738
2 1/2	6.375
2 3/4	7.013
3	7.650
3 1/4	8.288
3 1/2	8.925
4	10.20
4 1/2	11.48
5	12.75
5 1/2	14.03
6	15.30
6 1/2	16.58
7	17.85
8	20.40
9	22.95
10	25.50
11	28.05
12	30.60
7/8 x 1	2.975
1 1/8	3.347
1 1/4	3.719
1 3/8	4.091
1 1/2	4.463
1 3/4	5.206
2	5.950
2 1/2	7.438
2 3/4	8.181
3	8.925
3 1/2	10.41
4	11.90
5	14.88
6	17.85

Continued

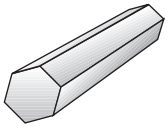
Size In Inches	Weight per Ft. in Lbs.
7/8 x 8	23.80
1 x 1 1/8	3.825
1 1/4	4.250
1 3/8	4.675
1 1/2	5.100
1 5/8	5.525
1 3/4	5.950
2	6.800
2 1/4	7.650
2 1/2	8.500
2 3/4	9.350
3	10.20
3 1/2	11.90
4	13.60
4 1/2	15.30
5	17.00
5 1/2	18.70
6	20.40
6 1/2	22.12
7	23.80
8	27.20
9	30.60
10	34.00
12	40.80
1 1/8 x 1 1/4	4.781
2	7.650
2 1/2	9.563
3	11.48
4	15.30
1 1/4 x 1 3/8	5.844
1 1/2	6.375
1 5/8	6.906
1 3/4	7.438
2	8.500
2 1/4	9.563
2 1/2	10.63
2 3/4	11.69
3	12.75
3 1/4	13.81
3 1/2	14.88
3 3/4	15.94
4	17.00
4 1/2	19.13
5	21.25

Continued

Size In Inches	Weight per Ft. in Lbs.
1 1/4 x 5 1/2	23.38
6	25.50
8	34.00
10	42.50
12	51.00
1 3/8 x 2	9.350
3	14.03
1 1/2 x 1 3/4	8.925
2	10.20
2 1/4	11.48
2 1/2	12.75
2 3/4	14.03
3	15.30
3 1/2	17.85
4	20.40
4 1/2	22.95
5	25.50
5 1/2	28.05
6	30.60
6 1/2	33.15
8	40.80
8 1/2	43.35
10	51.00
12	61.20
1 3/4 x 2	11.90
2 1/4	13.39
2 1/2	14.88
2 3/4	16.36
3	17.85
3 1/2	20.83
3 3/4	22.31
4	23.80
4 1/2	26.78
5	29.75
5 1/2	32.73
6	35.70
6 1/2	38.68
2 x 2 1/4	15.30
2 1/2	17.00
2 3/4	18.70
3	20.40
3 1/2	23.80
4	27.20
4 1/2	30.60

Continued

Size In Inches	Weight per Ft. in Lbs.
2 x 5	34.00
5 1/2	37.40
6	40.80
6 1/2	44.20
7	47.60
8	54.40
10	68.00
12	81.60
2 1/4 x 2 1/2	19.13
2 3/4	21.04
3	22.95
3 1/4	24.86
3 1/2	26.78
4	30.60
5	38.25
6	45.90
2 1/2 x 3	25.50
3 1/2	29.75
4	34.00
4 1/2	38.25
5	42.50
6	51.00
8	68.00
10	85.00
3 x 3 1/2	35.70
4	40.80
4 1/2	45.90
5	51.00
6	61.20
8	81.60
10	102.00
4 x 5	68.00
6	81.60



Cold Drawn Hexagons

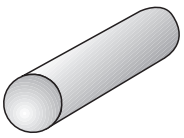
ASTM A108, C1018 & C12L14
Lengths: 10 to 12 Ft. Random

Size In Inches	Weight per Ft. in Lbs.
1/8	.046
5/32	.072
3/16	.104
7/32	.140
15/64	.162
1/4	.184
9/32	.233
5/16	.288
11/32	.348
3/8	.414
7/16	.564
1/2	.736
9/16	.932
5/8	1.150
11/16	1.392
3/4	1.656
13/16	1.944
7/8	2.254
15/16	2.588
1	2.945
1 1/16	3.324
1 1/8	3.727
1 3/16	4.152
Continued	

Size In Inches	Weight per Ft. in Lbs.
1 1/4	4.601
1 5/16	5.072
1 3/8	5.567
1 7/16	6.085
1 1/2	6.625
1 9/16	7.189
1 5/8	7.775
1 11/16	8.385
1 3/4	9.018
1 13/16	9.673
1 7/8	10.35
2	11.78
2 1/8	13.30
2 3/16	14.09
2 1/4	14.91
2 3/8	16.61
2 1/2	18.40
2 5/8	20.30
2 3/4	22.27
2 7/8	24.34
3	26.50
3 1/4	31.10
3 1/2	36.08
4	47.12

ALLOY STEEL BARS

Hot Rolled and Cold Finished



Alloy Steel Rounds

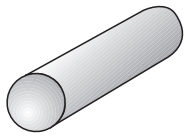
Hot Rolled & Cold Finished
Low Carbon – Case Hardening
8620, 86L20, 4140, 41L40,
4150 & 41L50
Lengths: HR – 20 Ft.
CF – 10 to 12 Ft. Random
ASTM A322 HR & ASTM A331 CF

Size In Inches	Weight per Ft. in Lbs.
1/4	.167
3/8	.376
7/16	.511
1/2	.668
9/16	.845
5/8	1.043
11/16	1.262
3/4	1.502
13/16	1.763
7/8	2.045
15/16	2.347
1	2.670
1 1/16	3.015
1 1/8	3.380
1 3/16	3.766
1 1/4	4.172
1 5/16	4.600
1 3/8	5.049
1 1/2	6.008
1 9/16	6.519
1 5/8	7.051
1 3/4	8.178
1 7/8	9.388
1 15/16	10.02
2	10.68
2 1/8	12.06
2 1/4	13.52
2 3/8	15.06
2 1/2	16.69
2 5/8	18.40
2 3/4	20.19
2 7/8	22.07
3	24.03
3 1/8	26.08

Continued

Size In Inches	Weight per Ft. in Lbs.
3 1/4	28.21
3 1/2	32.71
3 5/8	35.09
3 3/4	37.55
3 7/8	40.10
4	42.73
4 1/16	44.07
4 1/4	48.23
4 3/8	51.11
4 1/2	54.08
4 5/8	57.12
4 3/4	60.25
5	66.76
5 1/8	70.13
5 1/4	73.60
5 1/2	80.78
5 3/4	88.29
6	96.13
6 1/4	104.30
6 1/2	112.80
6 3/4	121.70
7	130.90
7 1/4	140.40
7 1/2	150.20
7 3/4	160.40
8	170.90
8 1/4	181.80
8 1/2	192.90
9	216.30
9 1/2	241.00
10	267.00
10 1/2	294.40
11	323.10
12	384.50

Forged and rough turned bars available.



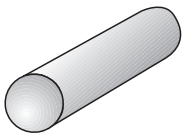
Alloy Steel Rounds

Medium Carbon – Heat Treated –
Elevated Temperature Drawn
CR ETD 150™
Lengths: 10 to 15 Ft. Random
ETD 150 meets ASTM A321

Size In Inches	Weight per Ft. in Lbs.
7/16	.511
1/2	.668
5/8	1.043
3/4	1.502
7/8	2.045
1	2.670
1 1/8	3.380
1 3/16	3.766
1 1/4	4.172
1 3/8	5.049
1 7/16	5.518
1 1/2	6.008
1 5/8	7.051
1 3/4	8.178

Continued

Size In Inches	Weight per Ft. in Lbs.
1 13/16	8.733
1 7/8	9.388
2	10.68
2 1/8	12.06
2 1/4	13.52
2 3/8	15.06
2 1/2	16.69
2 5/8	18.40
2 3/4	20.19
2 7/8	22.07
3	24.03
3 1/8	26.07
3 1/4	28.21
3 1/2	32.71



Alloy Steel Rounds Annealed

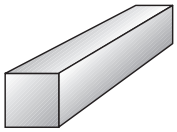
Medium Carbon – Heat Treated Quenched, Tempered, Machine Special Staightened & SR
Lengths: HR – 20 Ft.
CF – 10 to 12 Ft. Random
4140, 41L40, 4150, 41L50 conforms to ASTM A322 HR & ASTM A331 CF

Size In Inches	Weight per Ft. in Lbs.
3/8	.376
7/16	.511
1/2	.688
9/16	.845
5/8	1.043
11/16	1.262
3/4	1.502
13/16	1.763
7/8	2.045
15/16	2.347
1	2.670
1 1/16	3.015
1 1/8	3.380
1 1/4	4.172
1 3/8	5.049
1 1/2	6.008
1 9/16	6.519
1 5/8	7.051
1 3/4	8.178
1 7/8	9.388
2	10.68
2 1/8	12.06
2 1/4	13.52
2 3/8	15.06
2 1/2	16.69
2 5/8	18.40
2 3/4	20.19
2 7/8	22.07
2 15/16	23.04
3	24.03

Continued

Size In Inches	Weight per Ft. in Lbs.
3 1/8	26.08
3 1/4	28.21
3 3/8	30.42
3 4	32.71
3 5/8	35.09
3 3/4	37.55
4	42.73
4 1/8	45.44
4 1/4	48.23
4 1/2	54.08
4 3/4	60.25
5	66.76
5 1/4	73.60
5 1/2	80.78
5 3/4	88.29
6	96.13
6 1/4	104.3
6 1/2	112.8
6 3/4	121.7
7	130.9
7 1/4	140.4
7 1/2	150.2
7 3/4	160.4
8	170.9
8 1/4	181.8
8 1/2	192.9
8 3/4	204.4
9	216.3
9 1/4	228.5
9 1/2	245.7

Forged and rough turned bars available.



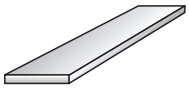
Alloy Steel Squares

Hot Rolled & Cold Finished
Lengths: HR – 20 Ft.
CF – 10 to 12 Ft. Random

Size In Inches	Weight per Ft. in Lbs.
1/4	.213
5/16	.332
3/8	.478
1/2	.850
5/8	1.328
3/4	1.913
7/8	2.603
1	3.400
1 1/8	4.303
1 1/4	5.313
1 3/8	6.482

Continued

Size In Inches	Weight per Ft. in Lbs.
1 1/2	7.650
1 3/4	10.41
2	13.60
2 1/2	21.25
3	30.60
3 1/2	41.65
4	54.40
4 1/2	68.85
5	85.00
5 1/2	102.9
6	122.4

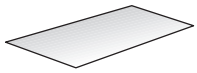


Alloy Steel Flats

Hot Rolled
Available from saw cut plate.


CHAPIN
&
BANGS

STAINLESS PRODUCTS



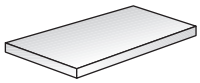
Stainless Sheet

304, 304L, 316 & 316L
Cold Rolled, Annealed and Pickled
304 conforms to A240, SA240 & AMS 5513
304L conforms to A240, SA240 & AMS 5511
316 conforms to ASTM A240, ASME SA240 & AMS 5524
316L conforms to ASTM A240, ASME SA240 & AMS 5507

Ga.	Size in Inches			Thickness in Inches	Est. Wt. Per Sq. Ft. in Lbs.
7	36	x	120	.1874	7.871
	48	x	120	.1874	7.871
	48	x	144	.1874	7.871
	60	x	120	.1874	7.871
	60	x	144	.1874	7.871
8	36	x	120	.1650	6.930
	48	x	120	.1650	6.930
	48	x	144	.1650	6.930
	60	x	120	.1650	6.930
	60	x	144	.1650	6.930
	72	x	120	.1650	6.930
10	36	x	96	.1350	5.670
	36	x	120	.1350	5.670
	36	x	144	.1350	5.670
	42	x	120	.1350	5.670
	48	x	96	.1350	5.670
	48	x	120	.1350	5.670
	48	x	144	.1350	5.670
	60	x	96	.1350	5.670
	60	x	120	.1350	5.670
	60	x	144	.1350	5.670
	72	x	120	.1350	5.670
	72	x	144	.1350	5.670
11	36	x	96	.1200	5.040
	36	x	120	.1200	5.040
	36	x	144	.1200	5.040
	42	x	120	.1200	5.040
	48	x	96	.1200	5.040
	48	x	120	.1200	5.040
	48	x	96	.1200	5.040
	48	x	120	.1200	5.040
	48	x	144	.1200	5.040
	60	x	96	.1200	5.040
	60	x	120	.1200	5.040
	60	x	144	.1200	5.040
	72	x	120	.1200	5.040
	72	x	144	.1200	5.040
12	36	x	96	.1054	4.427
	36	x	120	.1054	4.427
	36	x	144	.1054	4.427
	48	x	96	.1054	4.427
	48	x	120	.1054	4.427
	48	x	144	.1054	4.427
	60	x	96	.1054	4.427
	60	x	120	.1054	4.427
	60	x	144	.1054	4.427
	72	x	120	.1054	4.427
	72	x	144	.1054	4.427
13	36	x	96	.0900	3.780
	36	x	120	.0900	3.780
	48	x	120	.0900	3.780
14	36	x	96	.0751	3.154
	36	x	120	.0751	3.154
	36	x	144	.0751	3.154
	48	x	96	.0751	3.154

Continued

Ga.	Size in Inches			Thickness in Inches	Est. Wt. Per Sq. Ft. in Lbs.
14	48	x	120	.0751	3.154
	48	x	144	.0751	3.154
	60	x	96	.0751	3.154
	60	x	120	.0751	3.154
	60	x	144	.0751	3.154
	72	x	120	.0751	3.154
	72	x	144	.0751	3.154
16	30	x	120	.0595	2.499
	30	x	144	.0595	2.499
	36	x	96	.0595	2.499
	36	x	120	.0595	2.499
	36	x	144	.0595	2.499
	48	x	96	.0595	2.499
	48	x	120	.0595	2.499
	48	x	144	.0595	2.499
	60	x	96	.0595	2.499
	60	x	120	.0595	2.499
	60	x	144	.0595	2.499
	72	x	120	.0595	2.499
	72	x	144	.0595	2.499
18	36	x	96	.0480	2.016
	36	x	120	.0480	2.016
	36	x	144	.0480	2.016
	48	x	96	.0480	2.016
	48	x	120	.0480	2.016
	48	x	144	.0480	2.016
	60	x	96	.0480	2.016
	60	x	120	.0480	2.016
	60	x	144	.0480	2.016
19	48	x	120	.0480	1.764
20	36	x	96	.0355	1.491
	36	x	120	.0355	1.491
	36	x	144	.0355	1.491
	48	x	96	.0355	1.491
	48	x	120	.0355	1.491
	48	x	144	.0355	1.491
	60	x	96	.0355	1.491
	60	x	120	.0355	1.491
	60	x	144	.0355	1.491
22	36	x	96	.0293	1.231
	36	x	120	.0293	1.231
	36	x	144	.0293	1.231
	48	x	96	.0293	1.231
	48	x	120	.0293	1.231
	48	x	144	.0293	1.231
24	36	x	96	.0235	.9870
	36	x	120	.0235	.9870
	36	x	144	.0235	.9870
	48	x	96	.0235	.9870
	48	x	120	.0235	.9870
	48	x	144	.0235	.9870
26	36	x	96	.0178	.7476
	36	x	120	.0178	.7476
	48	x	120	.0178	.7476
28	36	x	120	.0151	.6342

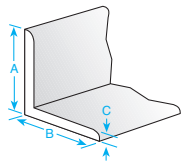


Stainless Plates

304, 304L, 316, 316L
Hot Rolled, Annealed & Pickled
ASTM A240

Size In Inches			Weight per Sq. Ft. in Lbs.
3/16	x	36	8.579
		48	8.579
		60	8.579
		72	8.579
		96	8.579
1/4	x	36	11.16
		48	11.16
		60	11.16
		72	11.16
		96	11.16
5/16	x	48	13.75
		60	13.75
		72	13.75
		96	13.75
3/8	x	48	16.50
		60	16.50
		72	16.50
		96	16.50
1/2	x	48	21.66
		60	21.66
		72	21.66
		84	21.66
		96	21.66
		120	21.66
5/8	x	72	26.83
Continued			

Size In Inches			Weight per Sq. Ft. in Lbs.
5/8	x	96	26.83
3/4	x	48	32.12
		72	32.12
		96	32.12
7/8	x	72	37.29
	x	96	37.29
1	x	48	42.67
		72	42.67
		96	42.67
1 1/8	x	96	47.83
1 1/4	x	72	53.00
		96	53.00
1 1/2	x	72	63.34
		96	63.34
1 3/4	x	72	73.67
		96	73.67
2	x	48	84.01
		96	84.01
2 1/2	x	96	105.1
3	x	96	126.3
3 1/4	x	96	136.6
3 1/2	x	96	147.0
3 3/4	x	96	157.3
4	x	96	167.6

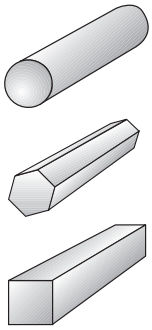


Stainless Angles

304, 316 and 316L
Hot Rolled, Annealed and Pickled or Extruded, Annealed and Pickled
Machine or Stretcher Straightened
ASTM A276, ASTM A479,
ASME SA479,QQ-S-763
Lengths 20 Ft.

Leg (A)		Leg (B)		Thick. (C)	Est. Per Ft. in Lbs.
3/4	x	3/4	x	1/8	.590
1	x	1	x	1/8	.800
1	X	1	x	3/16	1.160
				1/4	1.490
1 1/4	x	1 1/4	x	1/8	1.010
				3/16	1.480
				1/4	1.920
1 1/2	x	1 1/2	x	1/8	1.230
				3/16	1.800
				1/4	2.340
2	x	2	x	1/8	1.650
				3/16	2.440
				1/4	3.190
				3/8	4.700
2 1/2	x	2 1/2	x	3/16	3.070
				1/4	4.100
Continued					

Leg (A)		Leg (B)		Thick. (C)	Est. Per Ft. in Lbs.
2 1/2	x	2 1/2	x	3/8	5.900
3	x	2	x	3/16	3.070
				1/4	4.100
3	x	3	x	1/4	4.900
				5/16	6.100
				3/16	7.200
3 1/2	x	3 1/2	x	1/4	5.800
4	x	3	x	1/4	5.800
				3/8	8.500
4	x	4	x	1/4	6.600
				3/8	9.800
5	x	3	x	3/8	9.850
5	x	5	x	3/8	12.30
6	x	3	x	3/8	11.02
6	x	4	x	1/4	9.210
				3/8	12.30
6	x	6	x	3/8	14.90



Stainless Rounds, Hexagons & Squares

304/304L, 316/316L, 303, 416, 17-4
Annealed and Cold Finished
303 conforms to A314, A588 & A484
304 conforms to A314, A276, A479, A182 & A484
316 conforms to A314, A276, A479, A182 & A484
416 conforms to A314, A582 & A484
17-4 conforms to A564, A484
Lengths: 12 Ft. Random

Rounds In Inches	Weight per Ft. in Lbs.
1/8	.042
3/16	.094
1/4	.167
5/16	.261
3/8	.376
7/16	.511
1/2	.668
9/16	.845
5/8	1.043
11/16	1.262
3/4	1.502
13/16	1.763
7/8	2.045
15/16	2.347
1	2.670
1 1/16	3.015
1 1/8	3.380
1 3/16	3.766
1 1/4	4.172
1 5/16	4.600
1 3/8	5.049
1 7/16	5.518
1 1/2	6.008
1 9/16	6.519

Continued

Rounds In Inches	Weight per Ft. in Lbs.
1 5/8	7.051
1 11/16	7.604
1 3/4	8.178
1 13/16	8.770
1 7/8	9.388
1 15/16	10.02
2	10.68
2 1/8	12.06
2 3/16	12.79
2 1/4	13.52
2 3/8	15.06
2 1/2	16.69
2 5/8	18.40
2 3/4	20.19
2 7/8	22.07
3	24.03
3 1/8	26.08
3 1/4	28.21
3 3/8	30.42
3 1/2	32.71
3 3/4	37.55
3 7/8	40.10
4	42.73
5	66.73
6	96.13

DATA SECTION

Chemical Compositions

Mechanical Properties

Tolerances

Useful Formulas & Conversions

SAE Bar Compositions

Reference ASTM A29 & SAE J403
Nonresulferized Carbon Steels

SAE No.	C	Mn	P Max.	S Max.
1005	0.06 max	0.35 max	.040	.050
1006	0.08 max	0.25-0.40	.040	.050
1008	0.10 max	0.30-0.50	.040	.050
1010	0.08-0.13	0.30-0.60	.040	.050
1011	0.08-0.13	0.60-0.90	.040	.050
1012	0.10-0.15	0.30-0.60	.040	.050
1013	0.11-0.16	0.50-0.80	.040	.050
1015	0.13-0.18	0.30-0.60	.040	.050
1016	0.13-0.18	0.60-0.90	.040	.050
1017	0.15-0.20	0.30-0.60	.040	.050
1018	0.15-0.20	0.60-0.90	.040	.050
1019	0.15-0.20	0.70-1.00	.040	.050
1020	0.18-0.23	0.30-0.60	.040	.050
M1020	0.17-0.24	0.25-0.60	.040	.050
1021	0.18-0.23	0.60-0.90	.040	.050
1022	0.18-0.23	0.70-1.00	.040	.050
1023	0.20-0.25	0.30-0.60	.040	.050
1025	0.22-0.28	0.30-0.60	.040	.050
1026	0.22-0.28	0.60-0.90	.040	.050
1029	0.25-0.31	0.60-0.90	.040	.050
1030	0.28-0.34	0.60-0.90	.040	.050
1034	0.32-0.38	0.50-0.80	.040	.050
1035	0.32-0.38	0.60-0.90	.040	.050
1037	0.32-0.38	0.70-1.00	.040	.050
1038	0.35-0.42	0.60-0.90	.040	.050
1039	0.37-0.44	0.70-1.00	.040	.050
1040	0.37-0.44	0.60-0.90	.040	.050
1042	0.40-0.47	0.60-0.90	.040	.050
1043	0.40-0.47	0.70-1.00	.040	.050
1044	0.43-0.50	0.30-0.60	.040	.050
M1044	0.40-0.50	0.25-0.60	.040	.050
1045	0.43-0.50	0.60-0.90	.040	.050
1046	0.43-0.50	0.70-1.00	.040	.050
1049	0.46-0.53	0.60-0.90	.040	.050
1050	0.48-0.55	0.60-0.90	.040	.050
1053	0.48-0.55	0.70-1.00	.040	.050
1055	0.50-0.60	0.60-0.90	.040	.050
1059	0.55-0.65	0.50-0.80	.040	.050
1060	0.55-0.65	0.60-0.90	.040	.050
1064	0.60-0.70	0.50-0.80	.040	.050
1065	0.60-0.70	0.60-0.90	.040	.050
1069	0.65-0.75	0.40-0.70	.040	.050
1070	0.65-0.75	0.60-0.90	.040	.050
1071	0.65-0.75	0.75-1.05	.040	.050
1074	0.70-0.80	0.50-0.80	.040	.050
1075	0.70-0.80	0.40-0.70	.040	.050
1078	0.72-0.85	0.30-0.60	.040	.050
1080	0.75-0.88	0.60-0.90	.040	.050
1084	0.80-0.93	0.60-0.90	.040	.050
1086	0.80-0.93	0.30-0.50	.040	.050
1090	0.85-0.93	0.60-0.90	.040	.050
1095	0.90-1.03	0.30-0.50	.040	.050

Continued

SAE No.	C	Mn	P Max.	S Max.
1513	0.10-0.16	1.10-1.40	.040	.050
1518	0.15-0.21	1.10-1.40	.040	.050
1522	0.18-0.24	1.10-1.40	.040	.050
1524	0.19-0.25	1.35-1.65	.040	.050
1525	0.23-0.29	0.80-1.10	.040	.050
1526	0.22-0.29	1.10-1.40	.040	.050
1527	0.22-0.29	1.20-1.50	.040	.050
1536	0.30-0.37	1.20-1.50	.040	.050
1541	0.36-0.44	1.35-1.65	.040	.050
1547	0.43-0.51	1.35-1.65	.040	.050
1548	0.44-0.52	1.10-1.40	.040	.050
1551	0.45-0.56	0.85-1.15	.040	.050
1552	0.47-0.55	1.20-1.50	.040	.050
1561	0.55-0.65	0.75-1.05	.040	.050
1566	0.60-0.71	0.85-1.15	.040	.050
1572	0.65-0.76	1.00-1.30	.040	.050

SAE Bar Compositions

Resulferized Carbon Steels

SAE No.	C	Mn	P Max.	S Max.
1108	0.08-0.13	0.60-0.80	.040	.08-.13
1110	0.08-0.13	0.30-0.60	.040	.08-.13
1117	0.14-0.20	1.00-1.30	.040	.08-.13
1116	0.14-0.20	1.10-1.40	.040	.16-.23
1118	0.14-0.20	1.30-1.60	.040	.08-.13
1119	0.14-0.20	1.00-1.30	.040	.24-.33
1137	0.32-0.39	1.35-1.65	.040	.08-.13
1139	0.35-.430	1.35-1.65	.040	.13-.20
1140	0.37-.440	0.70-1.00	.040	.08-.13
1141	0.37-.450	1.35-1.65	.040	.08-.13
1144	0.40-.480	1.35-1.65	.040	.24-.33
1145	0.42-.490	0.70-1.00	.040	.04-.07
1146	0.42-.490	0.70-1.00	.040	.08-.13
1151	0.48-.550	0.70-1.00	.040	.08-.13

SAE Bar Compositions

Rephosphorized and Resulferized Carbon Steels

SAE No.	C	Mn	P	S	Pb
1211	0.13 max.	0.60-0.90	.07-.12	.10-.15	–
1212	0.13 max.	0.70-1.00	.07-.12	.16-.23	–
1213	0.13 max.	0.70-1.00	.07-.12	.24-.33	–
12L13	0.13 max.	0.70-1.00	.07-.12	.24-.33	.15-.35
1215	0.09 max.	0.75-1.05	.04-.09	.26-.35	–
12L14	0.15 max.	0.85-.1.15	.04-.09	.26-.35	.15-.35
12L15	0.09 max.	0.75-1.05	.04-.09	.26-.35	.15-.35

SAE Bar Compositions

Standard Alloy Steel

SAE No.	C	Mn	Ni	Cr	Mo
MOLYBDENUM STEELS					
4012	.09-0.14	0.75-1.00	–	–	.15-.25
4023	.20-0.25	0.70-0.90	–	–	.20-.30
4024	.20-0.25	0.70-0.90	–	–	.20-.30
4027	.25-0.30	0.70-0.90	–	–	.20-.30
4028	.25-0.30	0.70-0.90	–	–	.20-.30
4032	.30-0.35	0.70-0.90	–	–	20-.30
4037	.35-0.40	0.70-0.90	–	–	.20-.30
4042	.40-0.45	0.70-0.90	–	–	.20-.30
4047	.45-0.50	0.70-0.90	–	–	.20-.30
4118	.18-0.23	0.70-0.90	–	0.40-0.60	.08-.15
4130	.28-0.33	0.40-0.60	–	0.80-1.10	.15-.25
4135	.33-0.38	0.70-0.90	–	0.80-1.10	.15-.25
4137	.35-0.40	0.70-0.90	–	0.80-1.10	.15-.25
4140	.38-0.43	0.75-1.00	–	0.80-1.10	.15-.25
4142	.40-0.45	0.75-1.00	–	0.80-1.10	.15-.25
4145	.43-0.48	0.75-1.00	–	0.80-1.10	.15-.25
4147	.45-0.50	0.75-1.00	–	0.80-1.10	.15-.25
4150	.48-0.53	0.75-1.00	–	0.80-1.10	.15-.25
4161	.56-0.64	0.75-1.00	–	0.70-0.90	.25-.35
NICKEL—CHROMIUM—MOLYBDENUM STEELS					
4320	.17-0.22	0.45-0.65	1.65-2.00	0.40-0.60	.20-.30
4340	.38-0.43	0.60-0.80	1.65-2.00	0.70-0.90	.20-.30
E4340	.38-0.43	0.65-0.85	1.65-2.00	0.70-0.90	.20-.30
NICKEL 1.75%—MOLYBDENUM 0.25% STEEL					
4615	.13-0.18	0.45-0.65	1.65-2.00	–	.20-.30
4620	.17-0.22	0.45-0.65	1.65-2.00	–	.20-.30
4621	.18-0.23	0.70-0.90	1.65-2.00	–	.20-.30
4626	.24-0.29	0.45-0.65	0.70-1.00	–	.15-.25
NICKEL 1.05%—CHROMIUM 0.45% MOLYBDENUM 0.20%					
4718	.16-0.21	0.70-0.90	0.90-1.20	0.35-0.55	.30-.40
4720	.17-0.22	0.50-0.70	0.90-1.20	0.35-0.55	.15-.25
NICKEL 3.50%—MOLYBDENUM 0.25%					
4815	.13-0.18	0.40-0.60	3.25-3.75	–	.20-.30
4817	.15-0.20	0.40-0.60	3.25-3.75	–	.20-.30
4820	.18-0.23	0.50-0.70	3.25-3.75	–	.20-.30
CHROMIUM STEEL					
5017	.12-0.17	0.30-0.50	–	0.30-0.50	–
5046	.43-0.48	0.75-1.00	–	0.20-0.35	–
5115	.13-0.18	0.70-0.90	–	0.70-0.90	–
5117	.15-0.20	0.70-0.90	–	0.70-0.90	–
5120	.17-0.22	0.70-0.90	–	0.70-0.90	–
5130	.28-0.33	0.70-0.90	–	0.80-1.10	–
5132	.30-0.35	0.60-0.80	–	0.75-1.00	–
5135	.33-0.38	0.60-0.80	–	0.80-1.05	–
5140	.38-0.43	0.70-0.90	–	0.70-0.90	–
5145	.43-0.48	0.70-0.90	–	0.70-0.90	–
5147	.46-0.51	0.70-0.95	–	0.85-1.15	–
5150	.48-0.53	0.70-0.90	–	0.70-0.90	–
5155	.51-0.59	0.70-0.90	–	0.70-0.90	–
5160	.56-0.64	0.75-1.00	–	0.70-0.90	–
E50100	.98-1.10	0.25-0.45	–	0.40-0.60	–
E51100	.98-1.10	0.25-0.45	–	0.90-1.15	–
E52100	.98-1.10	0.25-0.45	–	1.30-1.60	–

SAE No.	C	Mn	Ni	Cr	Mo
CHROMIUM—VANADIUM STEELS					
6118	.16-0.21	0.50-0.70	–	0.50-0.70	.10-.15V
6150	.48-0.53	0.70-0.90	–	0.80-1.10	.15min.V
NICKEL 0.55%--CHROMIUM 0.50% MOLYBDENUM 0.20%-0.30%					
8615	.13-0.18	0.70-0.90	0.40-0.70	0.40-0.60	.15-.25
8617	.15-0.20	0.70-0.90	0.40-0.70	0.40-0.60	.15-.25
8620	.18-0.23	0.70-0.90	0.40-0.70	0.40-0.60	.15-.25
8622	.20-0.25	0.70-0.90	0.40-0.70	0.40-0.60	.15-.25
8625	.23-0.28	0.70-0.90	0.40-0.70	0.40-0.60	.15-.25
8627	.25-0.30	0.70-0.90	0.40-0.70	0.40-0.60	.15-.25
8630	.28-0.33	0.70-0.90	0.40-0.70	0.40-0.60	.15-.25
8637	.35-0.40	0.75-1.00	0.40-0.70	0.40-0.60	.15-.25
8640	.38-0.43	0.75-1.00	0.40-0.70	0.40-0.60	.15-.25
8642	.40-0.45	0.75-1.00	0.40-0.70	0.40-0.60	.15-.25
8645	.48-0.48	0.75-1.00	0.40-0.70	0.40-0.60	.15-.25
8650	.48-0.53	0.75-1.00	0.40-0.70	0.40-0.60	.15-.25
8655	.51-0.59	0.75-1.00	0.40-0.70	0.40-0.60	.15-.25
8660	.56-0.64	0.75-1.00	0.40-0.70	0.40-0.60	.15-.25
8720	.18-0.23	0.70-0.90	0.40-0.70	0.40-0.60	.20-.30
8740	.38-0.43	0.75-1.00	0.40-0.70	0.40-0.60	.20-.30
8822	.20-0.25	0.75-1.00	0.40-0.70	0.40-0.60	.30-.40
9260	.56-0.64	0.75-1.00	_	_	_

STANDARD BORON STEELS
Boron content of 0.0005% to 0.003%

SAE No.	C	Mn	Si	Ni	Cr	Mo
50B40	.38-0.43	0.75-1.00	.15.35	–	.40-.60	–
50B44	.43-0.48	0.75-1.00	.15-.35	–	.40-.60	–
50B46	.44-0.49	0.75-1.00	.15-.35	–	.20-.35	–
50B50	.48-0.53	0.75-1.00	.15-.35	–	.40-.60	–
50B60	.56-0.64	0.75-1.00	.15-.35	–	.40-.60	–
51B60	.56-0.64	0.75-1.00	.15-.35	–	.70-.90	–
81B45	.43-0.48	0.75-1.00	.15-.35	.20-.40	.35-.55	.08-.15
86B45	.43-0.48	0.75-1.00	.15-.35	.40-.70	.40-.60	.15-.25
94B15	.13-0.18	0.75-1.00	.15-.35	.30-.60	.30-.50	.08-.15
94B17	.15-0.20	0.75-1.00	.15-.35	.30-.60	.30-.50	.08-.15
94B30	.28-0.33	0.75-1.00	.15-.35	.30-.60	.30-.60	.08-.15

NOTE: Phosphorous is 0.35% max., sulfur, 0.040% max.

SAE Plate Compositions

Standard Alloy Steels

SAE No.	C	Mn	Ni	Cr	Mo
4130	.27-0.34	.35-0.60	–	.80-1.15	.15-0.25
4140	.36-0.44	.70-1.00	–	.80-1.15	.15-0.25
E4150	.46-0.54	.75-1.10	–	.80-1.15	.15-0.25
4340	.36-0.44	.55-0.80	1.65-2.00	.60-0.90	.20-0.30
6150	.46-0.54	.60-0.90	–	.80-1.15	_
8615	.12-0.18	.60-0.90	.40-0.70	.35-0.60	.15-0.25
8617	.15-0.21	.60-0.90	.40-0.70	.35-0.60	.15-0.25
8620	.17-0.23	.60-0.90	.40-0.70	.35-0.60	.15-0.25

Mechanical Properties of Steel

The mechanical properties shown below are for general information purposes and are for steels in the as-rolled condition.

Case Hardening or Low Carbon Bars (as rolled)

SAE	Cond. of Steel	Tensile Str. KSI	Yield Str. KSI	% Elong in 2"	% Red. of Area	Hardness Br.	Hardness R	Machinability Rating (C1212 =100)
M1020	Hot R'd.	55	30	25	50	111	B62	50
1018	Hot R'd.	58	32	25	50	116	B65	52
	Cold Dr.	64	54	15	40	126	B70	70
Core Props: carburized at 1700˚F., cooled, reheated to 1425˚, 350˚ Q&T.								
		92.00	56	27	48	195	B92	–
10L18	Cold Dr.	64	54	15	40	126	B70	80
1020	Hot R'd.	55	30	25	50	111	B62	52
12L14	Cold Dr.	78	60	10	35	165	B85	180
12L14+Te	Cold Dr.	78	60	10	35	165	B85	250
1215	Cold Dr.	78	60	10	35	165	B85	136
1117	Hot R'd.	62	34	23	47	121	B68	90
	Cold Dr.	69	58	15	40	137	B75	90
Core Props: carburized at 1700˚F., cooled, reheated to 1450˚, 350˚ Q&T.								
		96.5	59	23	53	195	B92	–
11L17	Hot R'd.	62	34	23	47	121	B68	100
	Cold Dr.	69	58	15	40	137	B75	125
Core Props: carburized at 1700˚F., cooled, reheated to 1450˚, 350˚ Q&T.								
		97	60	23	52	197	B92	–
86L20	Hot R'd.	91	66	25	64	185	B90	88
	Cold Dr.	103	86	23	58	210	B95	92
Core Props: carburized at 1700˚F., cooled, reheated to 1550˚, 300˚ Q&T.								
		135	105	21	54	262	C26	–
E4320	Hot R'd.	84	61	29	58	165	B85	55
	Cold Dr.	98	81	18	54	205	B94	60
Core Props: carburized at 1700˚F., cooled, reheated to 1500˚, 300˚ oil Q&T.								
		218	178	14	48	429	–	–
4615-17	Hot R'd.	82	62	28	65	185	B90	58
	Cold Dr.	99	84.6	19	61	210	B95	64
Core Props: carburized at 1700˚F., cooled, reheated to 1550˚, 300˚ oil Q&T.								
		110	80	25	61	229	C20	–
4620	Hot R'd.	85	63	28	64	185	B90	58
E4620	Cold Dr.	101	85	22	60	207	B94	64
Core Props: carburized at 1700˚F., cooled, reheated to 1550˚, 300˚ oil Q&T.								
		120	89	22	55	2448	C24	–
8620	Hot R'd.	89	65	25	63	190	B91	60
	Cold Dr.	102	85	22	58	210	B95	63
Core Props: carburized at 1700˚F., cooled, reheated to 1550˚, 300˚ oil Q&T.								
		129	99	21	52	255	C25	–

Medium Carbon or Direct Hardening Bars

SAE	Cond. of Steel	Tensile Str. KSI	Yield Str. KSI	% Elong in 2"	% Red. of Area	Hardness Br.	Hardness R	Machinability Rating (C1212 =100)
1035	Hot R'd.	72	39.5	18	40	143	B90	65
Water Quenched, 1550˚F.—Tempered 1000˚F.								
		103	72	23	59	201	B94	–
M1044	Hot R'd.	80	44	16	40	166	B86	65
1045	Hot R'd.	82	45	16	40	162	B84	56
	Cold Dr.	91	77	12	35	180	B89	65
Water Quenched, 1550˚F.—Tempered 1000˚F.								
		120	90	18	52	240	C22	–
1045	TG&P	82	45	16	40	162	B84	56
1137	Cold Dr.	88	48	15	35	180	B89	70
Oil Quenched, 1550˚F.—Tempered 1000˚F.								
		112	88	21	56	255	C25	–
1141	Hot R'd.	94	51.5	15	35	190	B91	65
	Cold Dr.	105	88	10	30	210	B95	70
Oil Quenched, 1550˚F.—Tempered 1000˚F.								
		126	100	19	54	277	C29	–
1141	TG&P	94	51.5	15	35	190	B91	65
1141	Drawn, G&P	105	88	10	30	205	B94	70
11L41	Hot R'd.	94	51.5	15	35	185	B90	95
	Cold Dr.	105	88	10	30	205	B94	100
Oil Quenched, 1550˚F.—Tempered 1000˚F.								
		126	101	20	54	277	C29	–
1144	Hot R'd.	97	53	15	35	210	B95	64
	Cold Dr.	108	90	10	30	217	C22	80
Oil Quenched, 1550˚F.—Tempered 1000˚F.								
		129	100.5	18	53	278	C30	–
E4130	Hot R'd.	86	56	29	57	185	B90	65
	Cold Dr.	98	87	21	52	200	B93	70
Water Quenched, 1575˚F.—Tempered 1000˚F.								
		146	133	17	50	293	C31	–
4140	Hot R'd.	89	62	26	58	190	B91	57
	Cold Dr.	102	90	18	50	228	B98	66
Oil Quenched, 1550˚F.—Tempered 1000˚F.								
		153	131	16	45	302	C32	–
4147-50	Hot R'd.	100	66	21	51	195	B92	54
Oil Quenched, 1550˚F.—Tempered 1000˚F.								
		158	134	14	42	311	C33	–
41L40-42	Hot R'd.	91	63	27	58	185	B90	87
	Cold Dr.	103	93	19	51	228	B98	90
Oil Quenched, 1550˚F.—Tempered 1000˚F.								
		156	133	16	44	311	C33	–

Continued on Next Page

Mechanical Properties of Steel

Medium Carbon or Direct Hardening Bars (Cont.)

SAE	Cond. of Steel	Tensile Str. KSI	Yield Str. KSI	% Elong in 2"	% Red. of Area	Hardness Br.	Hardness R	Machinability Rating (C1212 =100)
41L47/50	Hot R'd.	103	69	23	51	205	B94	80
Rounds	Cold Dr.	112	95	16	43	228	B98	85
	Oil Quenched, 1550˚F.—Tempered 1000˚F.							
		162	138	14	40	311	C33	–
4150 Mod. RS	Hot R'd.	103	69	23	51	205	B94	73
Flats, Sqs.	Oil Quenched, 1550˚F.—Tempered 1000˚F.							
		160	135	14	41	311	C33	–
4340 C4340	Hot R'd.	101	69	21	45	210	B95	45
	Cold Dr.	111	99	16	42	228	B98	55
	Oil Quenched, 1550˚F.—Tempered 1000˚F.							
		182	162	15	40	363	C39	–
E6150	Hot R'd.	91	58	22	53	185	B90	50
	Oil Quenched, 1550˚F.—Tempered 1000˚F.							
		155	132	15	44	302	C32	–
E8740	Cold Dr.	107	96	17	48	228	B98	66
	Oil Quenched, 1550˚F.—Tempered 1000˚F.							
		152	129	15	44	302	C32	–

High Carbon or Direct Hardening Bars

SAE	Cond. of Steel	Tensile Str. KSI	Yield Str. KSI	% Elong in 2"	% Red. of Area	Hardness Br.	Hardness R	Machinability Rating (C1212 =100)
1095	Hot R'd.	120	66	10	25	271	C28	–
	Water Quenched, 1450˚F.—Tempered 800˚F.							
		200	138	12	37	390	C42	–
52100	Hot R'd.	100	81	25	57	192	–	39
	Cold Dr.	107	87.5	17	54	229	–	41
	SP. Ann							

Mechanical Properties of Steel

Heat Treated Bars/Minimum Mechanical Properties

Properties area at center of bars up to 1 1/2", and at mid-radius of bars over 1 1/2",.
Yield Strength – 0.2% or .02% offset as indicated per ASTM E8.

Grade	Thermal Condition	Tensile Strength (KSI) Range or Min.			Min. Yield Strength (KSI)	Min. % Elong in 2"	Min. % Red. of Area	Surface Hardness Brinell	Surface Hardness HRC	Machinability Rating (C1212 =100)
4140/42	HR	Over	7-9 1/2"	105	80	15	40	269/321	28/34	55
ASTM A434	QTSR	Over	9 1/2"	–	–	–	–	–	–	–
CL. BC	CF DGP	Thru	1"	110	130	16	50	269/321	28/34	55
4340 ASTM A434	QTSR	Thru	1 1/2"	155	130	14	35	302/363	32/39	52
CL. BD	TGP	Over	1 1/2-2 1/2"	150	120	14	35	302/363	32/39	52
		Over	2 1/2-4"	140	110	14	35	302/363	32/39	52
		Over	4-7"	135	105	14	35	302/363	32/39	52
		Over	7-9 1/2"	130	100	14	35	302/363	32/39	52
		Over	9 1/2"	130	100	14	35	302/363	32/39	52
Stressproof	CD	Thru	2"	115	100	8	25	–	–	83
ASTM A311	As Drawn	Over	2-3"	115	100	8	20	–	–	83
CL.B	Heavy	Over	3-4 1/2"	115	100	8	20	–	–	83
SAE 1144	Draft									
Fatigue-Proof	Elevated		140		125	5	15	280 Min.	30 Min.	80
SAE 1144	Temp									
	Drawn									
e.t.d. 150	Elevated		150		130	10 (Mean)	37 (Mean)	302 Min.	32 Min.	–
	Temp									
	Drawn									
41L40/42/47	HR & CF		125		100	15	45	269/321	27/34	70
	QTSR									
4150 Mod. RS	Norm &		–		–	–	–	241/302	23/32	62
HR Square	SR									
	Thru 6"									
4150 Mod. RS	QTSR	Thru	1 1/2"	130	110	16	50	262/311	27/33	62
HR Rounds		Over	1 1/2-2 1/2"	125	110	16	50	262/311	27/33	62
		Over	2 1/2-4"	115	95	16	45	262/311	27/33	62
		Over	4-7"	110	85	16	45	262/311	27/33	62
			7-9 1/2"	105	80	15	40	262/321	27/34	62
		Over	9 1/2"	–	–	–	–	–	–	–

Mechanical Properties of Steel

Plates

Grade	Condition of Steel	Tensile Strength KSI	Yield Strength KSI	% Elong. in 2"	% Elong. in 8"	Approx. Brinell Hard-ness
Structural Quality ALLOY						
ASTM A36, ASME SA36	As Rolled	58 to 80	36 Min.	23	20	137
EX-TEN 50 ASTM A572(50)	As Rolled	65 Min.	50 Min.	21	18	143
Cor-Ten A ASTM A242	As Rolled	70 Min.	50 Min.	–	16	156
Cor-Ten B ASTM A588(A)	As Rolled	70 Min.	50 Min.	19	16	156
ASTM A656 Gr. 50	As Rolled	60 Min.	50 Min.	–	20	123/159
ASTM A656 Gr. 80	As Rolled	95 Min.	80 Min.	18	12	212/255
T-1 Type A ASTM A514 Gr. B	Q&T	110 to 130	100 Min.	16	–	235/293
T-1 Type B ASTM A514 Gr. H	Q&T	110 to 130	100 Min.	16	–	235/293
T-1 ASTM A514 Gr. F	Q&T	110 to 130	100 Min.	16	–	235/293
T-1 Type C ASTM A514 Gr. Q	Q&T	110 to 130	90 Min.	14	–	235/293
Pressure Vessel Quality Carbon						
ASTM A285, ASME SA285 Grade C	As Rolled	55 to 75	30 Min.	27	23	137
ASTM A516, ASME SA516 Grade 70 Norm--	As Rolled	70 to 90	38 Min.	21	17	163
ASTM A387, ASME SA387 Grade II	Ann.	60 to 85	35 Min.	22	19	135/174
ASTM A387, ASME SA387 Grade 22	N&T	75 to 100	45 Min.	18	–	149/207
Intermediate Carbon						
AISI 1045	As Rolled	90	50	–	–	187
Improved Machining Carbon						
C1119	As Rolled	68 to 78	37 to 40	20/40%	15/35%	140/150
Abrasion Resisting						
AR Carbon	As Rolled	–	–	–	–	212/255
T-1 Type A 321 Min. BHN	Q&T	–	–	–	–	321 Min
Through Hardening						
4130	As Rolled	90	52	28	–	179
4140	Annealed	95	54	25	–	197
4340 MTS	Annealed	100	58	21	–	229
E6150	Annealed	97	55	23	–	197
E4150	Norm & Temp.	145	115	14	–	262/321

Stainless Steel

Austenitic/Chrome-Nickle (Non-Hardening)

	303	304	304L	309	310	316	316L	321
Chemical Comp.(%)								
Chromium	17.-19.	18.-20.	18.-20.	22.-24.	24.-26.	16.-18.	16.-18.	17.-19.
Nickel	8.-10.	8.-11.	8.-11.	12.-15.	19.-22	10.-14	10.-14	9.-12.
Other elements (a)	5.15-4.0	–	–	–	–	Mo.2.-3.	Mo 2.-3.	T15XCmm
Carbon	15 max	.08 max	.03 max	.20 max	.25 max	.25max	.03 max	.08 max
Manganese	2. max	2.max	2.max	2.max	2.max	2.max	2.max	2.max
Silicon	1.max	1.max	1.max	1.max	1.5max	1.max	1.max	1.max
Machinability rating	70	48	48	–	–	45	45	50
Physical Data								
Melting—˚F	2550	2550	2550	2550	2550	2550	2550	2550
Density—lb./in.3	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Specific heat—								
Blu ˚F/lb(32-212F)	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Thermal Conductivity—								
BTU/ft2/hr/˚F/ft:								
212 F	9.4	9.4	9.4	9.0	8.0	9.4	9.4	9.3
932 F	12.4	12.4	12.4	10.8	10.8	12.4	12.4	12.8
Mean Coeffi. Of exp.—								
In/in/˚F X 106								
68.212F	9.2	9.2	9.2	8.7	8.0	92	9.2	8.3
68 lo indicated—F	11.0	11.0	11.0	10.9	10.9	10.7	10.7	10.6
(1600)	(1600)	(1600)	(2100)	(2100)	(1600)	(1600)	(1700)	
Electrical Prop.								
Magnetic Perm	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Electrical resistivity—								
68F	72.0	72.0	72.0	78.0	78.0	74.0	72.0	72.0
1200 F	116.0	116.0	116.0	114.8	–	116.0	116.0	–
Heat Resist.								
Max. operating ˚F:								
Intermittent	1400	1600	1600	1800	1900	1600	1600	1600
Continuous	1700	1700	1700	2000	2100	1700	1700	1700
Temperatures—˚F								
Forging—start	2250	2200	2200	2150	2150	2200	2200	2200
Forging—finish	1700	1700	1700	1800	1800	1700	1700	1700
Annealing—Ranges	1800-2000	1800-1950	1800-1950	2050-2150	2050-2150	1975-2150	1800-2000	1800-2000
Annealing—cooling (b)	WQ	WQ(AC)	AC	WQ(AC)	WQ(AC)	WQ(AC)	AC	WQ(AC)
Hardening—ranges				Hardenable only by cold working				
Quenching (0) Oil, (A) Air								
Tempering—for hardness								
Drawing—for stress relieving								
Mech. Prop (nominal) anld.								
Structure annealed(C)	A	A	A	A	A	A	A	A
Yield strength-KSI-min	35	35	30	40	30	35	30	35
Ultimate strength								
KSI—min	90	85	80	95	75	85	75	85
Elong--%								
In 2 inches—min	50	55	55	45	40	60	60	55
Red. In area--% min	55	70	70	65	50	70	70	65
Mod. Of elast. –								
Lb/in.2 X 106	29	29	29	29	30	29	29	29
Hardness—Brinell(max	160mm	180	180	200	180	200	180	200
Hardness-Rockwell(max)	B80mm	B90	B90	895	B90	B95	890	B95
Impact values—Izod								
–ft.lb (min)	60	85	80	80	80	70	80	80

Stainless Steel

	Martensitic/ Chrome (Hardenable)		Ferritic (Non-Hardenable)	
	410	**416**	**440C**	**430**
Mech. Prop. –anld.				
Structure annealed	FC	FC	FC	FC
Yield strength KSI-min	40	40	65	45
Ultimate strength KSI-min	75	75	110	75
Elongation— % in 2 inches—min	35.0	30.0	14.0	30.0
Red. In area % min	70.0	65.0	25.0	65.0
Mod of elast. Lb.in.2 X 103	29.0	29.0	30.0	29.0
Hardness—Brinell (max)	200	180	260	200
Hardness-Rockwell (max)	B95	B90	B105	B95
Impact values—Izod –ft.lb (min)	85	–	Low	3-85
Mech. Prop. –HT:				
Yield Strength –KSI	38-180	500-115	60-275	–
Ultimate Strength –KSI	60-200	900-1400	100-285	–
Elongation— % in 2 inches	25-2	25-15	8-1	–
Hardness—Brinell	120-400	180-280	200-600	–
Hardness—Rockwell	B70-C45	B90-C30	B95-C58	–
Creep strength KSI at 1000 F:				
1 % Flow on 10,000 hr	12	–	–	8.5
1 % Flow on 100,000 hr	11	–	–	6.5

(a) Phosphorus and Sulfur are present
(b) Thin sections of the 300 Series, marked WQ(AC) are usually air cooled; heavy sections, water quenched, AC=Air Cool. FC= Furnace Cool. SFC = Slow Furnace Cool. WQ = Water Quench. C=Carbide, A=Austenite.

Stainless Steel

Precpitation Hardening

	17-4 Ann (Aisi 630)	17-4 H1150
Mech. Prop. –anld.		
Yield strength KSI – min	–	105
Ultimate strength KSI-min	–	135
Elongation— % in 2 inches –min	–	16
Reduction of area % min	–	50
Hardness	363 BHN MAX	28 MIN HRC
Machinability Rating	45	50

Plate Tolerances

Carbon & Alloy Plate

Permissible Variations in Thickness for Rectangular Carbon, High-Strength, Low Alloy, and Alloy- Steel Plates, When Ordered to Thickness

NOTE 1 – Permissible variation under Specified thickness, 0.01 in.
NOTE 2 – Thickness to be measured at 3/8 to 3/4 in. From the longitudinal edge.
NOTE 3 – For Thickness measured at any location other than that specified in Note 2, the permissible maximum over tolerance shall be increased by 75%, rounded to the nearest 0.01 in.

Specified Thickness, in.	Tolerance Over Specified Thickness for Widths Given, in. 48 & Under	Over 48-60, excl	60-72, excl	72-84, excl	84-96, excl	96-108, excl	108-120, excl	120-132, excl
To 1/4, excl	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
1/4 to 15/16, excl	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04
15/16 to 3/8, excl	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04
3/8 to 7/16, excl	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04
7/16 to 1/2, excl	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04
1/2 to 5/8, excl	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04
5/8 to 3/4, excl	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04
3/4 to 1, excl	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.05
1 to 2, excl	0.06	0.06	0.06	0.06	0.06	0.07	0.08	0.10
2 to 3, excl	0.09	0.09	0.09	0.10	0.10	0.11	0.12	0.13
3 to 4, excl	0.11	0.11	0.11	0.11	0.11	0.13	0.14	0.15
4 to 6, excl	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
6 to 10, excl	0.23	0.24	0.24	0.24	0.24	0.24	0.24	0.24
10 to 12, excl	0.29	0.29	0.33	0.33	0.33	0.33	0.33	0.33
12 to 15, incl	0.29	0.29	0.35	0.35	0.35	0.35	0.35	0.35

Permissible Variations in Width & Length for Sheared Plates 1 1/2 in. and Under in Thickness

Specified Dimensions, in.		Variations over Specified Width & Length* for Thicknesses, in., & Equivalent Weights, lb/ft2, Given							
		To 3/8, excl		3/8-5/8 excl		5/8-1, excl		1-2, excl	
Length	Width	W	L	W	L	W	L	W	L
To 120, excl	To 60, excl	3/8	1/2	7/16	5/8	1/2	3/4	5/8	1
	60 to 84, excl	7/16	5/8	1/2	11/16	5/8	7/8	3/4	1
	84 to 108, excl	1/2	3/4	5/8	7/8	3/4	1	1	1 7/8
	108 and over	5/8	7/8	3/4	1	7/8	1 1/8	1 1/8	1 1/4
120 to 240, excl	To 60, excl	3/8	3/4	1/2	7/8	5/8	1	3/4	1 1/8
	60 to 84, excl	1/2	3/4	5/8	7/8	3/4	1	7/8	1 1/4
	84 to 108, excl	9/16	7/8	11/16	5/16	13/16	1 1/8	1	1 3/8
	108 and over	5/8	1	3/4	1 1/8	7/8	1 1/4	1 1/8	1 3/8
240 to 360, excl	To 60, excl	3/8	1	1/2	1 1/8	5/8	1 1/4	3/4	1 1/2
	60 to 84, excl	1/2	1	5/8	1 1/8	3/8	1 1/4	7/8	1 1/2
	84 to 108, excl	9/16	1	11/16	1 1/8	7/8	1 3/8	1	1 1/2
	108 and over	11/16	1 7/8	7/8	1 1/4	1	1 3/8	1 1/4	1 3/4
360 to 480, excl	To 60, excl	7/16	1 7/8	1/2	1 1/4	5/8	1 3/8	3/4	1 5/8
	60 to 84, excl	1/2	1 1/4	5/8	1 3/8	3/4	1 1/2	7/8	1 5/8
	84 to 108, excl	9/16	1 1/4	3/4	1 3/8	7/8	1 1/2	1	1 7/8
	108 and over	3/4	1 3/8	7/8	1 1/2	1	1 5/8	1 1/4	1 7/8

* Permissible variation under specified width and length, 1/4 in.

Permissible Variations in Width & Length for Rectangular Plates When Gas Cutting is Specified or Required

NOTE 1 – These variations may be taken all under or divided over and under, if so specified

Specified Thickness, in.	ALLOY Variations Over for All Specified Widths or Lengths, In.	CARBON Variations Over for All Specified Widths or Lengths, In.
To 2, excl	3/4	1/2
2 to 4, excl	1	5/8
4 to 6, excl	1 1/8	3/4
6 to 8, excl	1 5/16	7/8
8 to 15, mcl	1 1/2	1

Sheet Thickness Tolerances

Hot Rolled HR P & O Cold Rolled Galvanized

Gage No.	Hot Rolled, HR P & O, Cold Rolled: Dec. Equiv.	Toler, Range HR, P&O	Toler, Range CR	Lbs. Per Sq. Ft.	Galvanized: Dec. Equiv.	Toler Range	Lbs.Per Sq. Ft.
4	.2242	.2332 .2152		9.375			
5	.2092	.2182 .2002		8.750			
6	.1943	.2033 .1853		8.125			
7	.1793	.1873 .1713	.1873 .1713	7.500			
8	.1644	.1724 .1564	.1724 .1564	6.875	.1681	.1771 .1591	7.031
9	.1495	.1575 .1415	.1575 .1415	6.250	.1532	.1622 .1442	6.406
10	.1345	.1425 .1265	.1405 .1285	5.625	.1382	.1472 .1292	5.781
11	.1196	.1276 .1116	.1256 .1136	5.000	.1233	.1323 .1143	5.156
12	.1046	.1126 .0966	.1106 .0986	4.375	.1084	.1174 .0994	4.531
13	.0897	.0967 .0827	.0947 .0847	3.750	.0934	.1014 .0854	3.906
14	.0747	.0817 .0677	.0797 .0697	3.125	.0785	.0865 .0705	3.281
15	.0673	.0733 .0613	.0723 .0623	2.813	.0710	.0770 .0650	2.969
16	.0598	.0658 .0538	.0648 .0548	2.500	0.635	.0695 .0575	2.656
17	.0538	.0598 .0478	.0578 .0498	2.250	.0575	.0625 .0525	2.406
18	.0478	.0528 .0428	.0518 .0438	2.000	.0516	.0566 .0466	2.156
19	.0418		.0458 .0378	1.750	.0456	.0506 .0406	1.906
20	.0359		.0389 .0329	1.500	.0396	.0436 .0356	1.656
21	.0329		.0359 .0299	1.375	.0366	.0406 .0326	1.531
22	.0299		.0329 .0269	1.250	.0336	.0376 .0296	1.406
23	.0269		.0299 .0239	1.125	.0306	.0346 .0266	1.281
24	.0239		.0269 .0209	1.000	.0276	.0316 .0236	1.156
25	.0209		.0239 .0179	.875	.0247	.0287 .0207	1.031
26	.0179		.0199 .0159	.750	.0217	.0247 .0187	.906
27	.0164		.0184 .0144	.688	.0202	.0232 .0172	.844
28	.0149		.0169 .0129	.625	.0187	.0217 .0157	.781
29					.0172	.0202 .0142	.719
30					.0157	.0187 .0127	.656

Bar Tolerances

HR Carbon & Alloy Bars

Specified Width, in.	Permitted Variations Over or Under Specified Thickness, for Thicknesses Given in inches, in.							Permitted Variations From Specified Widths, in	
	0.203 to 0.230, excl	0.230 to 1/4, excl	1/4 to 1/2, incl..	Over 1/2 to 1, incl..	Over 1 to 2, incl..	Over 2 to 3, incl..	Over 3	Over	Under
To 1, incl..	0.007	0.007	0.008	0.010	–	–	–	1/64	1/64
Over 1 to 2, incl..	0.007	0.007	0.012	0.015	1/32	–	–	1/32	1/32
Over 2 to 4, incl..	0.008	0.008	0.015	0.020	1/32	3/64	3/64	1/16	1/32
Over 4 to 6, incl..	0.009	0.009	0.015	0.020	1/32	3/64	3/64	3/32	1/16
Over 6 to 8, incl..	[A]	0.015	0.016	0.025	1/32	3/64	1/16	1/8	3/32[B]

A Flats over 6 to 8 in, incl., in width are not available as hot-rolled carbon steel bars in thickness under 0.230 in.

B For flats over 6 to 8 in, in width, and to 3 in. incl in thickness.

Bar Tolerances

Permitted Variations in Sectional Dimensions for Round and Square Bars and Round-Cornered Squares

Specified Size, in.	Permitted Variations from Specified Size, in.		Permitted Out-of-Round or out-of-Square, in.[A]
	Over	Under	
To 5/16	0.005	0.005	0.008
Over 5/16 to 7/16, incl..	0.006	0.006	0.009
Over 7/16 to 5/8, incl..	0.007	0.007	0.010
Over 5/8 to 7/8, incl..	0.008	0.008	0.012
Over 7/8 to 1, incl..	0.009	0.009	0.013
Over 1 to 1 1/8, incl..	0.010	0.010	0.015
Over 1 1/8 to 1 1/4 , incl..	0.011	0.011	0.016
Over 1 1/4 to 1 3/8, incl..	0.012	0.012	0.018
Over 1 3/8 to 1 1/2, incl..	0.014	0.014	0.021
Over 1 1/2 to 2, incl..	1/64	1/64	0.023
Over 2 to 2 1/2, incl..	1/32	0	0.023
Over 2 1/2 to 3 1/2, incl..	3/64	0	0.035
Over 3 1/2 to 4 1/2, incl..	1/16	0	0.046
Over 4 1/2 to 5 1/2, incl..	5/64	0	0.058
Over 5 1/2 to 6 1/2, incl..	1/8	0	0.070
Over 6 1/2 to 8 1/4, incl..	5/32	0	0.085
Over 8 1/2 to 9 1/2, incl..	3/16	0	0.100
Over 9 1/2 to 10, incl..	1/4	0	0.120

A Out-of-round is the difference between the maximum and minimum diameters of the bar, measured at the same transverse cross section. Out-of-square section is the difference is perpendicular distance between opposite faces, measured at the same transverse cross section.

Bar Tolerances

Permitted Variations in Sectional Dimensions for Hexagons

Specified Size Between Opposite Sides, in.	Permitted Variations from Specified Size, in.		Permitted Out-of-Hexagon section, Three Measurements in.[A]
	Over	Under	
1/2 and under	0.007	0.007	0.011
Over 1/2 to 1, incl..	0.010	0.010	0.015
Over 1 to 1 1/2 incl..	0.021	0.013	0.025
Over 1 1/2 to 2, incl..	1/32	1/64	1/32
Over 2 to 2 1/2 incl..	3/64	1/64	3/64
Over 2 1/2 to 3 1/2, incl..	1/16	1/64	1/16

A Out-of-hexagon section is the greatest difference in distance between any two opposite faces measured at the same transverse cross section.

Bar Tolerances

CF Carbon Bars

Cold Drawn or Tuned & Polished

Size Range In Inches	Undersize Variations in Inches: Max. Carbon Range .28% or less	Max. Carbon Range Over .28% to .55% incl.	Max. Carbon Range to 0.55% Incl. Stress Relieved or Annealed After Cold Finishing	Max. Carbon Range Over 55% or all all Grades Quenched & Tempered or Normalized And Tempered Before Cold Finishing
1 1/2 or Under	.002	.003	.004	.005
Over 1 1/2 to 2 1/2, incl.	.003	.004	.005	.006
Over 2 1/2 to 4, incl.	.004	.005	.006	.007
Over 4 to 6, incl.	.005	.006	.007	.008
Over 6 to 8, incl.	.006	.007	.008	.009
Over 8 to 9, incl.	.007	.008	.009	.010
Over 9	.008	.009	.010	.011
Cold Drawn Hexagons				
3/4 or under	.002	.003	.004	.006
Over 3/4 to 1 1/2, incl.	.003	.004	.005	.007
Over 1 1/2 to 2 1/2, incl.	.004	.005	.006	.008
Over 2 1/2 to 3 1/8, incl.	.005	.006	.007	.009
Over 3 1/8 to 4, incl.	.005	.006	–	–
Cold Drawn Squares				
3/4 or under	.002	.004	.005	.007
Over 3/4 to 1 1/2, incl.	.003	.005	.006	.008
Over 1 1/2 to 2 1/2, incl.	.004	.006	.007	.009
Over 2 1/2 to 4, incl.	.006	.008	.009	.011
Over 4 to 5, incl.	.010	–	–	–
Over 5 to 6, incl.	.014	–	–	–
Cold Drawn Flats Tolerances for flats apply to thickness as well as width				
Width in Inches				
To 3/4, incl.	.003	.004	.006	.008
Over 4 to 1 1/2, incl.	.004	.005	.008	.010
Over 1 1/2 to 3 incl.	.005	.006	.010	.012
Over 3 to 4 incl.	.006	.008	.011	.016
Over 4 to 6, incl.,	.008	.010	.012	.020
Over 6	.013	.015	–	–

Turned, Ground and Polished Rounds
Cold Drawn, Ground and Polished Rounds

Size Range In Inches	Undersize Variations in Inches: Turned, Ground and Polished Rounds	Cold Drawn, Ground and Polished Rounds
1 1/2 and Under	-.0005 to -.0015	.001
Over 1 1/2 to less than 2 1/2	-.0005 to -.0020	.0015
2 1/2 to 3, incl..	-.0005 to -.0025	.002
Over 3 to 4, incl..	-.0005 to -.0035	.003
Over 4 to 6, incl.	-.0005 to -.0045	.004
Over 6	-.0005 to -.0055	.005

* All tolerances are on the minus side +.000.

Bar Tolerances

CF Alloy Bars

Cold Drawn or Tuned & Polished

Specified Size In Inches	Undersize Variations in Inches: Max. Carbon Range .28% or less	Max. Carbon Range over .28 to .55% incl.	Annld. or Stress Relieved after C.F. Max. carb. tp .55%	Max. Carbon Range Over 0.55% with or without stress relieving or annealing after cold finishing. Also all carbons heat Tr. or Norm. & Temp, before cold Finishing
To 1 incl. (in coils)	.002	.003	.004	.005
To 1 1/2 incl.	.003	.004	.005	.006
Over 1 1/2 to 2 1/2	.004	.005	.006	.007
Over 2 1/2 to 4	.005	.006	.007	.008
Over 4 to 6	.006	.007	.008	.009
Over 6 to 8	.007	.008	.009	.010
Over 8 t0 9	.008	.009	.010	.011
Over 9	.009	.010	.011	.012
Cold Drawn Hexagons				
To 3/4, incl.	.003	.004	.005	.007
Over 3/4 to 1 1/2	.004	.005	.006	.008
Over 1 1/2 to 2 1/2	.005	.006	.007	.009
Over 2 1/2 to 3 1/8	.006	.007	.008	.010
Cold Drawn Squares				
To 3/4, Incl.	.003	.005	.006	.008
Over 3/4 to 1 1/2	.004	.006	.007	.009
Over 1 1/2 to 2 1/2	.005	.007	.008	.010
Over 2 1/2 to 4	.007	.009	.010	.012
Over 4 to 5	.011	–	–	–
Cold Drawn Flats Tolerances for flats apply to thickness as well as width				
Width in Inches				
To 3/4, incl.	.004	.005	.007	.009
Over 3/4 to 1 1/2	.005	.006	.009	.011
Over 1 1/2 to 3	.006	.007	.011	.013
Over 3 to 4	.007	.009	.012	.017
Over 4 to 6	.009	.011	.013	.021
Over 6	.014	–	–	–

Cold Drawn Ground and Polished Rounds
Turned, Ground and Polished Rounds

Diameter In Inches	Cold Drawn, Ground & Polished: All Carbons with or without thermal treatment before Cold Drawing		Turned, Ground & Polished: Not Heat Treated All Crab.	Turned, Ground & Polished: Heat* Treated All Crab.
To 1 1/2 incl.	.001	.0005	.0015	.0015
Over 1 1/2 to 2 1/2, excl.	.0015	.0005	.0020	.0020
2 1/2 to 3, incl.	.002	.0005	.0025	.0025
Over 3 to 4, incl.	.003	.0005	.0035	.0035
Over 4 to 6, incl.	–	.0005	.0045	.0045
Over 6	–	.0005	.0055	.0055

* All tolerances are on the minus side +.000.

Structural Tolerances

Shape	Section Nominal Sizes In.	Depth, in. Over Theoretical	Depth, in. Under Theoretical	Flange Width, In. Over Theoretical	Flange Width, In. Under Theoretical	Flanges Out-of Square max.In.* †
W and HP	Up to 12. incl.	1/8	1/8	1/4	3/16	1/4
	Over 12	1/8	1/8	1/4	3/16	5/16
S and M	3 to 7, incl.	3/32	1/16	1/8	1/8	1/32
	Over 7 to 14, incl.	1/8	3/32	5/32	5/32	1/32
	Over 14 to 24, incl.	3/16	1/8	3/16	3/16	1/32
C and MC	1 1/2 and Under	1/32	1/32	1/32	1/32	1/32
	Over 1 1/2 to 3, excl	1/16	1/16	1/16	1/16	1/32
	3 to 7, incl.	3/32	1/16	1/8	1/8	1/32
	Over 7 to 14, incl.	1/8	3/32	1/8	5/32	1/32
	Over 14	3/16	1/8	1/8	3/16	1/32

*Applies when flanges of channels are toed in or out. For channels 5/8 in. and under in depth, the permissible out-of-square is 3/64 in./in. of depth.
†Tolerance is per inch of flange width for S, M, C, and MC shapes.

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

Section	Nominal Size, in.	Depth, In, Over Theoretical	Depth, In, Under Theoretical	Flange Width or Length of Leg.in. Over Theoretical	Flange Width or Length of Leg.in. Under Theoretical	Out of Sq. per Inch, in.	Variations from Thickness for Thickness Given, Over and Under, in. 3/16 and under	Over 3/16 to 3/8 incl.	Over 3/8
Angles* (L Shapes)	1 and under	–	–	1/32	1/32	3/128†	0.008	0.010	--
	Over 1 to 2, incl.	–	–	3/64	3/64	3/128†	0.010	0.010	0.012
	Over 2 to 3, excl	–	–	1/16	1/16	3/128†	0.012	0.015	0.015
	3 to 4, incl.	–	–	1/8	3/32	3/128†	–	--	--
	Over 4 to 6, incl.	–	–	1/8	1/8	3/128†	--	--	--
	Over 6	–	–	3/16	1/8	3/128†	--	--	--
Zees	3 to 4, incl.	1/8	1/16	1/8	3/32	3/128†	--	--	--
	Over 4 to 6, incl.	1/8	1/16	1/8	1/8	3/128†	--	--	--

* For unequal leg angles, longer leg determines classification.
† 3/128 in./in. =1 1/2 deg.

Permissible Variations in Straightness for S, M, C, MC, L, T, Z, Shapes

Variable	Nominal Size, in.	Permissible Variation, In.
Camber	Under 3	1/4 in. in any 5 ft, or 1/4 X (number of feet of total length/5)
	3 and over	1/8 X (number of feel of total length/5)
Sweep	all	Due to the extreme variations in flexibility of these shapes, straightness tolerances for sweep are subject to negotiations between the manufacturer and the purchaser for the individual sections involved.

Permissible Variations in Straightness for W Shapes

	Permissible Variation, In.
Camber and sweep	1/8 in. X (number of feet of total length*/10)

* Sections with a flange width less than 6 in. tolerance for sweep = 1/8 in. X (number of feet of total length/5).
69 in. X (number of feet of total length/5).

Stainless Tolerances

Stainless Cold Finished Rounds

Drawn, Ground or Ground & Polished

Size, Inches	Over, Inches	Under, Inches
.044 to 5/16 excl.	.001	.001
5/16 to 1/2 excl.	.0015	.0015
1/2 to 1 excl.	.002	.002
1 to 1 1/2 excl.	.0025	.0025
1 1/2 to 4 incl.	.003	.003
Stainless Hexagons & Squares		
.125 to .3125 excl.	.000	-.002
.3125 to .500 excl.	.000	-.003
.500 to 1.000 incl.	.000	-.004
Over 1 to 2 incl.	.000	-.006
Over 2 to 3 incl.	.000	-.008
Over 3	.000	-.010

Stainless Hot Finished Flats

Width, Inches	Thickness, Inches, Over & Under Thru 1/2"	Over 1/2" thru 1"	Over 1 thru 2"	Width, Inches Over	Width, Inches Under
To 1 incl.	.008	.010	–	1/64	1/64
Over 1 to 2 incl.	.012	.015	1/32	1/32	1/32
Over 2 to 4 incl.	.015	.020	1/32	1/16	1/32
Over 4 to 6 incl.	.015	.020	1/32	3/32	1/16
Over 6 to 8 incl.	.016	.025	1/32	1/8	5/32
Over 8 to 10 incl.	.021	.031	1/32	5/32	3/16

Stainless Bar Straightness

Measurement is taken on the concave side of the bar with a straight edge.

Hot Finished
1/8 inch in any 5 feet; but may not exceed $\frac{1}{8} \times \frac{\text{no. of feet in length}}{5}$ inches.

Cold Finished
1/16 inch in any 5 feet; but may not exceed $\frac{1}{16} \times \frac{\text{no. of feet in length}}{5}$ inches.

Stainless Sheet/Gauge

Thickness, In. Under, Incl.	Ga.	Sheet Width, Inches 48 max.	Sheet Width, Inches Handmill 48-60	Sheet Width, Inches Handmill Over 60
.1875 to .146	8&9	.007	.0105	.014
.146 to .131	10	.006	.009	.012
.131 to .115	11	.005	.0075	.010
.115 to .099	12	.005	.007	.009
.099 to .084	13	.004	.006	.008
.084 to .073	14	.004	.0055	.007
.073 to .059	15 & 16	.003	.0045	.006
.059 to .041	17 & 19	.003	.004	–
.041 to .030	20 to 22	.002	.003	–
.030 to .017	23 to 27	.0015	–	–
.017 to .008	28 to 34	.0015	–	–
.008 to .006	35 to 38	.0015	–	–
.006	39	.001	–	–

WIDTH & LENGTH/Nothing under size

Widths through 48"—1/16" over. Widths over 48"—1/8" over.
Lengths through 120"— 1/4" over. Lengths over 120"—1/2" over.

CAMBER/Roller leveled, not resquared

Widths through 36": 1/8" every 8 Ft. Widths over 36":3/32" every 8 Ft.

Stainless Tolerances

Stainless Sheet/Flatness

Thickness in Inches	Width in Inches	Flatness Tolerance (maximum deviation from a horizontal flat surface), Inches
.062 & over	To 60 incl.	1/2
	Over 60 to 72 incl.	3/4
	Over 72	1
Under .062	To 36 incl.	1/2
	Over 36 to 60 incl.	3/4
	Over 60	1

Stainless Plate Thickness

	Thickness Tolerance Over Variation* in Inches			
Thickness In Inches	Widths to 84" Incl.	Widths Over 84" to 120" Incl.	Widths Over 120" to 144" Incl.	Widths Over 144" Incl.
3/16 to 3/8 excl,	.045	.050	–	–
3/8 to 3/4 excl.	.055	.060	.075	.090
3/4 to 1 excl.	.060	.065	.085	.100
1 to 2 incl.	.070	.075	.095	.115
Over 2	OA	OA	OA	OA

* No plate shall vary more than .01 inch under the thickness ordered.
OA = On application.
Spot grinding not to exceed .01 inch under the specified thickness is permitted to remove surface imperfections.

Stainless Sheared Mill Plates

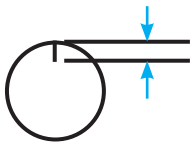
		Tolerances, in Inches over specified width & length for given width, length and thickness					
		Under 3/8" Thick		3/8* to 1/2* Thick, Incl.		Over 1/2* to 1" Thick, Incl.	
Width In Inches	Length in inches	Width	Length	Width	Length	Width	Length
48 and Under	Over	1/4	1/2	5/16	5/8	3/8	3/4
Over 48 to 60 incl.	240	5/16	5/8	3/8	3/4	1/2	3/4
Over 60 to 84 incl.	to	7/16	11/16	1/2	3/4	5/8	7/8
Over 84 to 108 incl.	360	9/16	3/4	5/8	7/8	3/4	1
Over 108		5/8	7/8	11/16	1	7/8	1
60 and Under	Over	7/16	11/8	1/2	11/4	5/8	13/8
Over 60 to 84 incl.	360	1/2	11/4	5/8	11/4	3/4	11/2
Over 84 to 108 incl.	to	9/16	11/4	3/4	13/8	7/8	11/2
Over 108	480	3/4	13/8	7/8	11/2	1	15/8
60 and Under	Over	7/16	11/4	1/2	11/2	5/8	15/8
Over 60 to 84 incl.	480	1/2	13/8	5/8	11/2	3/4	15/8
Over 84 to 108 incl.	to	5/8	13/8	3/4	11/2	7/8	15/8
Over 108	600	3/4	11/2	7/8	15/8	1	13/4
60 and Under		1/2	13/4	5/8	17/8	3/4	7/8
Over 60 to 84 incl.	Over	5/8	13/4	3/4	17/8	7/8	17/8
Over 84 to 108 incl.	600	5/8	13/4	3/4	17/8	7/8	17/8
Over 108		7/8	13/4	1	2	11/8	21/4

The tolerance under specified width and length is 1/4 incl.

Cold Finish Bar Machining Allowance

Resulfurized: 1100 and 1200 Series
Straight Carbon: Series 1000, Stressproof and Fatigue-Proof

Formula for Calculating Allowable Seam Depth



.0015" Per Side for Each 1/16" of Diameter

.001 Per Side for Each 1/16" of Diameter

This is the generally accepted industry allowance for seam depth in carbon and alloy steels. The removal of the indicated amounts of stock should minimize seams.

Size	Resulfurized	Non-Resulfurized	Size	Resulfurized	Non-Resulfurized	Size	Resulfurized	Non-Resulfurized
5/8 & under	.015	.010	1 1/2	.036	.024	2 11/16	.064	.043
21/32	.016	.010	19/16	.037	.025	2 3/4	.066	.044
11/16	.016	.011	1 5/8	.039	.026	2 13/16	.067	.045
23/32	.017	.011	1 11/16	.040	.027	2 7/8	.069	.046
3/4	.018	.012	1 3/4	.042	.028	2 15/16	.070	.047
25/32	.019	.012	1 25/32	.043	.028	2 63/64	.072	.048
13/16	.019	.013	1 13/16	.043	.029	3	.072	.048
27/32	.020	.013	1 27/32	.044	.029	3 1/16	.073	.049
55/64	.021	.014	1 55/64	.045	.030	3 1/8	.075	.050
7/8	.021	.014	1 7/8	.045	.030	3 3/16	.076	.051
29/32	.022	.014	1 15/16	.046	.031	3 1/4	.078	.052
15/16	.022	.015	1 31/32	.047	.031	3 5/16	.079	.053
31/32	.023	.015	1 63/64	.048	.032	3 3/8	.081	.054
1	.024	.016	2	.048	.032	3 7/16	.082	.055
1 1/32	.025	.016	2 1/32	.049	.032	3 1/2	.084	.056
13/64	.025	.017	2 1/16	.049	.033	3 9/16	.085	.057
1 1/16	.025	.017	2 1/8	.051	.034	3 5/8	.087	.058
15/64	.026	.017	2 3/16	.052	.035	3 11/16	.088	.059
13/32	.026	.017	2 7/32	.053	.035	3 3/4	.090	.060
17/64	.027	.017	2 1/4	.054	.036	3 13/16	.091	.061
1 1/8	.027	.018	2 9/32	.055	.036	3 7/8	.093	.062
15/32	.028	.018	2 5/16	.055	.037	3 15/16	.094	.063
13/16	.028	.018	2 11/32	.056	.037	4	.096	.064
17/32	.029	.019	2 3/8	.057	.038	4 1/8	.099	.066
1 15/64	.030	.020	2 13/32	.058	.038	4 1/4	.102	.068
1 1/4	.030	.020	2 7/16	.058	.039	4 3/8	.105	.070
1 17/64	.030	.020	2 15/32	.059	.039	4 1/2	.108	.072
19/32	.031	.020	2 1/2	.060	.040	4 5/8	.111	.074
1 19/64	.031	.021	2 17/32	.061	.040	4 3/4	.114	.076
15/16	.031	.021	2 9/16	.061	.041	4 7/8	.117	.078
1 23/64	.033	.022	2 19/32	.062	.041	5	.120	.080
1 3/8	.033	.022	2 5/8	.063	.042			
1 7/16	.034	.022	2 21/32	.064	.042			

Machinability Ratings for Cold Drawn Steel Bar

Based on 1018 & 1212 as 100%

Grade Designation	Average Mach. Rating 1018	Average Mach. Rating 1212	Condition of Product	Grade Designation	Average Mach. Rating 1018	Average Mach. Rating 1212	Condition of Product
1008	71	66	Cold Drawn	1212	149	100	Cold Drawn
1010	73	68	Cold Drawn	1213	235	136	Cold Drawn
1012	73	68	Cold Drawn	12L14	334	180	Cold Drawn
1015	86	72	Cold Drawn	12L14 + Te	422	250	Cold Drawn
1016	100	78	Cold Drawn	Incut 100	334	185	Cold Drawn
1017	86	72	Cold Drawn	Incut 200	422	250	Cold Drawn
1018	100	70	Cold Drawn	Ledloy AX	422	250	Cold Drawn
10L18	126	92	Cold Drawn	1215	235	136	Cold Drawn
1020	86	72	Cold Drawn	1330	61	60	Annealed & CD
1021	100	78	Cold Drawn	1335	61	60	Annealed & CD
1022	100	78	Cold Drawn	1340	53	65	Annealed & CD
1023	95	76	Cold Drawn	4047	71	65	Annealed & CD
1025	86	72	Cold Drawn	4118	100	70	Cold Drawn
1030	80	70	Cold Drawn	4130	86	70	Annealed & CD
1035	80	70	Cold Drawn	4137	80	70	Annealed & CD
1038	66	64	Cold Drawn	4140	91	66	Annealed & CD
1040	66	64	Cold Drawn	4142	71	65	Annealed & CD
1042	66	64	Cold Drawn	4145	66	64	Annealed & CD
1043	53	65	Cold Drawn	4147	66	64	Annealed & CD
1044	53	65	Cold Drawn	4150	61	62	Annealed & CD
1045	53	65	Cold Drawn	4320	61	60	Annealed & CD
1045	86	72	Annealed & CD	4340	53	55	Annealed & CD
10L45	91	84	Annealed &CD	4620	71	64	Cold Drawn
1050	50	54	Cold Drawn	52100	28	41	Annealed & CD
1055	46	85	Annealed & CD	6150	61	60	Annealed & CD
1060	46	85	Annealed & CD	8615	80	70	Cold Drawn
1065	40	80	Annealed & CD	8617	71	63	Cold Drawn
1070	40	80	Annealed & CD	8620	71	63	Cold Drawn
1074	40	75	Annealed & CD	8622	71	63	Cold Drawn
1078	40	75	Annealed & CD				
1080	32	70	Annealed & CD				
1090	32	70	Annealed & CD				
1095	32	70	Annealed & CD				
1541	53	65	Cold Drawn				
1110	109	81	Cold Drawn				
1117	122	91	Cold Drawn				
11L17	152	125					
1118	122	90	Cold Drawn				
1137	86	72	Cold Drawn				
1140	86	72	Cold Drawn				
1141	80	70	Cold Drawn				
1141	109	81	Annealed & CD				
11L41	133	94	Annealed & CD				
1144	95	80	Cold Drawn				
1144	114	85	Annealed & CD				
11L44	119	87	Cold Drawn				
11L44	142	98	Annealed & CD				
1146	80	70	Cold Drawn				
1151	80	70	Cold Drawn				

Approximate Hardness Conversion Numbers for Steel

Based on Brinell Hardness Numbers

Brinell Indentation Diam. mm	Brinell Hardness No. 10-mm Tungston Carbide Ball, 3,000 Kg Load	ROCKWELL HARDNESS NO. C-Scale, 150-Kg Load, Brale Penetrato	B-Scale, 100-Kg Load, 1/16-in. Diam. Ball	A-Scale, 60-Kg Load, Brale Penetrator	Diamond Pyramid Hardness No. Vickers	Shore Scleroscope Hardness No.	Tensile Strength (approximate) in 1,000 psi
2.25	745	65.3	–	84.1	840	91	–
2.30	712	–	–	–	–	–	–
2.35	682	61.7	–	82.2	737	84	–
2.40	653	60.0	–	81.2	697	81	–
2.45	627	58.7	–	80.5	667	79	–
2.50	601	57.3	–	79.8	640	77	–
2.55	578	56.0	–	79.1	615	75	–
2.60	555	54.7	–	78.4	591	73	298
2.65	534	53.5	–	77.8	569	71	288
2.70	514	52.1	–	76.9	547	70	274
2.75	495	51.0	–	76.3	528	68	264
2.80	477	49.6	–	75.6	508	66	252
2.85	461	48.5	–	74.9	491	65	242
2.90	444	47.1	–	74.2	472	63	230
2.95	429	45.7	–	73.4	455	61	219
3.00	415	44.5	–	72.8	440	59	212
3.05	401	43.1	–	72.0	425	58	202
3.10	388	41.8	–	71.4	410	56	193
3.15	375	40.4	–	70.6	396	54	184
3.20	363	39.1	–	70.0	383	52	177
3.25	352	37.9	(110.0)	69.3	372	51	171
3.30	341	36.6	(109.0)	68.7	360	50	164
3.35	331	35.5	(108.5)	68.1	350	48	159
3.40	321	34.3	(108.0)	67.5	339	47	154
3.45	311	33.1	(107.5)	66.9	328	46	149
3.50	302	32.1	(107.0)	66.3	319	45	146
3.55	293	30.9	(106.0)	65.7	309	43	141
3.60	285	29.9	(105.5)	65.3	301	–	138
3.65	277	28.8	(104.5)	64.6	292	41	134
3.70	269	27.6	(104.0)	64.1	284	40	130
3.75	262	26.6	(103.0)	63.6	276	39	127
3.80	255	25.4	(102.0)	63.0	269	38	123
3.85	248	24.2	(101.0)	62.5	261	37	120
3.90	241	22.8	100.0	61.8	253	36	116
3.95	235	21.7	99.0	61.4	247	35	114
4.00	229	20.5	98.2	60.8	241	34	111
4.05	223	(18.8)	97.3	–	234	–	–
4.10	217	(17.5)	96.4	–	228	33	105
4.15	212	(16.0)	95.5	–	222	–	102
4.20	207	(15.2)	94.6	–	218	32	100
4.25	201	(13.8)	93.8	–	212	31	98
4.30	197	(12.7)	92.8	–	207	30	95
4.35	192	(11.5)	91.9	–	202	29	93
4.40	187	(10.0)	90.7	–	196	–	90
4.45	183	(9.0)	90.0	–	192	28	89
4.50	79	(8.0)	89.0	–	188	27	87
4.55	174	(6.4)	87.8	–	182	–	85
4.60	170	(5.4)	86.8	–	178	26	83
4.65	167	(4.4)	86.0	–	175	–	81
4.70	163	(3.3)	85.0	–	171	25	79
4.80	156	(0.9)	82.9	–	163	–	76
4.90	149	–	80.8	–	156	23	73
5.00	143	–	78.7	–	150	22	71
5.10	137	–	76.4	–	143	21	67
5.20	131	–	74.0	–	137	–	65

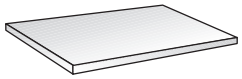
Circumference & Area of Circles/Inches

Diamameter Frac.	Decimal	Circ.	Area	Diam.	Circ.	Area	Diam.	Circ.	Area
1/64	.015625	.04909	.00019	1	3.1416	.7854	64	201.06	3216.99
1/32	.03125	.09818	.00077	2	6.2832	3.1416	65	204.20	3318.31
3/64	.046875	.14726	.00173	3	9.4248	7.0686	66	207.34	3421.19
1/16	.0625	.19635	.00307	4	12.5664	12.5664	67	210.49	3525.65
5/64	.078125	.24545	.00479	5	15.7080	19.635	68	213.63	3631.68
3/32	.09375	.29452	.00690	6	18.850	28.274	69	216.77	3739.28
7/64	.109375	.34363	.00939	7	21.991	38.485	70	219.91	3848.45
1/8	.125	.39270	.01227	8	25.133	50.266	71	223.05	3959.19
9/64	.140625	.44181	.01553	9	28.274	63.617	72	226.19	4071.50
5/32	.15626	.49087	.01917	10	31.416	78.540	73	229.34	4185.39
11/64	.171875	.53999	.02320	11	34.558	95.033	74	232.48	4300.84
3/16	.1875	.58905	.02761	12	37.699	113.10	75	235.62	4417.86
13/64	.203125	.63817	.03241	13	40.841	132.73	76	238.76	4536.46
7/32	.21875	.68722	.03758	14	43.982	153.94	77	241.90	4656.63
15/64	.234375	.73635	.04314	15	47.124	176.72	78	245.04	4778.36
1/4	.25	.78540	.04909	16	50.265	201.06	79	248.19	4901.67
17/64	.265625	.83453	.05542	17	53.407	226.98	80	251.33	5026.55
9/32	.28125	.88357	.06213	18	56.549	254.47	81	254.47	5153.00
19/64	.296875	.93271	.06922	19	59.690	283.53	82	257.61	5281.02
5/16	.3125	.98175	.07670	20	62.832	314.16	83	260.75	5410.61
21/64	.328125	1.0309	.08456	21	65.973	346.36	84	263.89	5541.77
11/32	.34375	1.0799	.09281	22	69.115	380.13	85	267.04	5674.50
23/64	.359375	1.1291	.10144	23	72.257	415.48	86	270.18	5808.80
3/8	.375	1.1781	.11045	24	75.398	452.39	87	273.32	5944.68
25/64	.390625	1.2273	.11984	25	78.540	490.87	88	276.46	6082.12
13/32	.40625	1.2763	.12962	2681681		530.93	89	279.60	6221.14
27/64	.421875	1.3254	.13979	27	84.823	572.56	90	282.74	6361.73
7/16	.4375	1.3744	.15033	28	87.965	615.75	91	285.88	6503.88
29/64	.453125	1.4236	.16126	29	91.106	660.52	92	289.03	6647.61
15/32	.46875	1.4726	.17257	30	94.248	706.86	93	292.17	6792.91
31/64	.484375	1.5218	.18427	31	97.389	754.77	94	295.31	6939.78
1/2	.5	1.5708	.19635	32	100.53	804.25	95	298.45	7088.22
33/64	.515625	1.6199	.20880	33	103.67	855.30	96	301.59	7238.23
17/32	.53125	1.6690	.22166	34	106.81	907.92	97	304.73	7339.81
35/64	.546875	1.7181	.23489	35	109.96	962.11	98	307.88	7542.96
9/16	.5625	1.7671	.24850	36	113.10	1017.88	99	311.02	7697.69
37/64	.578125	1.8163	.26248	37	116.24	1075.21	100	314.16	7853.98
19/32	.59375	1.8653	.27688	38	119.38	1134.11	101	317.30	8011.85
39/64	.609375	1.1945	.29164	39	122.52	1194.59	102	320.44	8171.28
5/8	.625	1.9365	.30680	40	125.66	1256.64	103	323.58	8332.29
41/64	.640625	2.0127	.32232	41	128.81	1320.25	104	326.73	8494.87
21/32	.65625	2.0617	.33824	42	131.95	1385.44	105	329.87	8659.01
43/64	.671875	2.1108	.35453	43	135.09	1452.20	106	333.01	8824.73
11/16	.6875	2.1598	.37122	44	138.23	1520.53	107	336.15	8992.02
45/64	.703125	2.2090	.38828	45	141.37	1590.43	108	339.29	9160.88
23/64	.71875	2.2580	.40574	46	144.51	1661.90	109	342.43	9331.32
47/64	.734375	2.3072	.42356	47	147.65	1734.94	110	345.58	9503.32
3/4	.75	2.3562	.44179	48	150.80	1809.56	111	348.72	9676.89
49/64	.765625	2.4054	.45253	49	153.94	1885.74	112	351.86	9852.03
25/32	.78125	2.4544	.47937	50	157.08	1963.50	113	355.00	10028.75
51/64	.796875	2.5036	.49872	51	160.22	2042.82	114	358.14	10207.03
13/16	.8125	2.5525	.51849	52	163.36	2123.72	115	361.28	10386.89
53/64	.828125	2.6017	.53862	53	166.50	2206.18	116	364.42	10568.32
27/32	.84375	2.6507	.55914	54	169.65	2290.22	117	367.57	10751.32
55/64	.859375	2.6999	.58003	55	172.79	2375.83	118	370.71	10935.88
7/8	.875	2.7489	.60132	56	175.93	2463.01	119	373.85	11122.02
57/64	.890625	2.7981	.62298	57	179.07	2551.76	120	376.99	11309.73
29/32	.90625	2.8471	.64504	58	182.21	2642.08	121	380.13	11499.01
59/64	.921875	2.8963	.66746	59	185.35	2733.97	122	383.27	11689.87
15/16	.9375	2.9452	.69029	60	188.50	2827.43	123	386.42	11882.29
61/64	.953125	2.9945	.71349	61	191.64	2922.07	124	389.56	12076.28
31/32	.96875	3.0434	.73708	62	194.78	3019.07	125	392.70	12271.85
63/64	.984375	3.0928	.76097	63	197.92	3117.25	126	395.84	12468.98

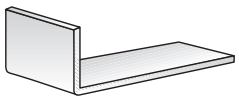
Cold Rolled Steel Strip

Tempers

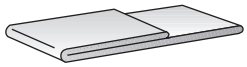
No. 1 – Hard
Carbon 0.25% max.
Thickness: 0.070" and thicker – RB 84 min.
Under 0.070" – RB 90 min.



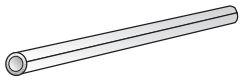
No. 2 – Half Hard
Carbon 0.25% max.
Thickness: 0.040" and thicker – RB 70 min.



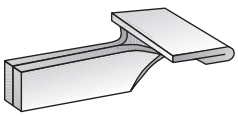
No. 3 – Quarter Hard
Carbon 0.25% max.
Thickness: 0.040" and thicker – RB 60 min. to RB 75 approx. max.



No. 4 – Pinch Pass or Skin Rolled
Carbon 0.25% max.
Thickness: 0.040" and thicker – RB 65 max.



No. 5 – Dead Soft
Carbon 0.15% max.
Thickness: 0.040" and thicker – RB 55 max.



NOTE: For these tempers, it's customary not to exceed 0.60% manganese by ladle analysis. If manganese is specified above 0.60% by ladle analysis or in the case of temper Nos. 4 and 5, the carbon is specified above 0.15% by ladle analysis, these Rockwell Hardness values don't apply.

Cold Rolled Steel Strip

Edges

No.1
Perfect square or round edge.

No. 2
Natural mill edge.

No. 3
Approx. square edge by slitting, not filed.

No. 4
Round edge produced by edge rolling.

No. 5
Approx. sq. edge by rolling or filling after slitting.

No. 6
Square edge produced by edge rolling

Metric System of Measurement

In the metric system of measurements, the principal unit for length is the meter; the principal unit for capacity, the liter; and the principal unit for weight, the gram. The following prefixes are used for sub-divisions and multiples: milli = 1/1000; centi = 1/mlli; deci = 1/10; deca = 10; hecto = 100; kilo = 1000. In abbreviations, the sub-divisions are frequently used with a small letter and the multiples with a capital letter, although this practice is not universally followed everywhere where the metric system is used.

All the multiples and sub-divisions are not used commercially. Those ordinarily used for length are kilometer, meter, centimeter and millimeter; for capacity, square meter, square centimeter and square millimeter; for cubic measures, cubic meter, cubic decimeter (liter), cubic centimeter, and cubic millimeter. The most commonly used weights are the kilogram and gram. The metric system was legalized in the United States by an Act of Congress in 1866.

Measures of Length

10 millimeters (mm.)	=	1 centimeter (cm.)
10 centimeters	=	1 decimeter (dm.)
10 decimeters	=	1 meter (m.)
1000 meters	=	1 kilometer (km.)

Square Measure

100 square millimeters (mm.2)	=	1 square centimeter (cm.2).
100 square centimeters	=	1 square decimeter (dm.2).
100 square decimeters	=	1 square meter (m.2).

Surveyor's Square Measure

100 square meters (m.2)	=	1 are (ar.).
100 ares	=	1 hectare (har.).
100 hectares	=	1 square kilometer (km.2).

Cubic Measure

1000 cubic millimeters (mm.3)	=	1 cubic centimeter (cm.3).
1000 cubic centimeters	=	1 cubic decimeter (dm.3).
1000 cubic decimeters	=	1 cubic meter (m.3).

Dry and Liquid Measure

10 milliliters (ml.)	=	1 centiliter (cl.).
10 centiliters	=	1 deciliter (dl.).
10 deciliters	=	1 liter (l.).
100 liters	=	1 hectoliter (Hl.).

1 liter = 1 cubic decimeter = the volume of 1 kilogram of pure water at a temperature of 39.2 degress F.

Measures of Weight

10 milligrams (mg.)	=	1 centigram (cg.).
10 centigrams	=	1 decigram (dg.).
10 decigrams	=	1 gram (g.).
10 grams	=	1 decagram (Dg.).
10 decagrams	=	1 hectogram (Hg.).
10 hectograms	=	1 kilogram (Kg.).
1000 kilograms	=	1 (metric) ton (T.).

Metric and English Conversion Table

Linear Measure

1 kilometer =	0.6214 mile.	1 mile = 1.609 kilometer.
1 meter =	39.37 inches.	1 yard = 0.9144 meter.
	3.2808 feet.	1 foot = 0.3048 meter.
	1.0936 yard.	1 foot = 304.8 millimeters.
1 centimeter =	0.3937 inch.	1 inch = 2.542 centimeters.
1 millimeter =	0.03937	1 inch = 25.4 millimeters.

Square Measure

1 square kilometer = 0.3861 square mile = 247.1 acres.
1 hectare = 2.471 acre = 107, 640 square feet.
1 are = 0.0247 acre = 1076.4 square feet.
1 square meter = 10.764 square feet = 1/196 square yard.
1 square centimeter = 0.155 square inch.
1 square millimeter = 0.00155 square inch.

1 square mile = 2.5899 square kilometers.
1 acre = 0.4047 hectare = 40.47 ares.
1 square yard = 0.836 square meter.
1 square foot = 0.0920 square meter = 929 square centimeters.
1 square inch = 6.452 square centimeters = 645.2 square millimeters.

Cubic Measure

1 cubic meter = 25.314 cubic feet = 1.308 cubic yard
1 cubic meter = 264.2 U.S. gallons.
1 cubic centimeter = 0.061 cubic inch.
1 liter (cubic decimeter) = 0.0353 cubic foot = 61.023 cubic inches.
1 liter = 0.2642 U.S. gallon = 1.0567 U.S. quart.

1 cubic yard = 0.7645 cubic meter.
1 cubic foot = 0.02832 cubic meter = 28.317 liters.
1 cubic inch = 16.38716 cubic centimeters.
1 U.S. gallon = 3.785 liters.
1 U.S. quart = 0.946 liter.

Weight

1 metric ton = 0.9842 ton (of 2240 pounds) = 2204.6 pounds.
1 kilogram = 2.2046 pounds = 35.274 ounces avoirdupois.
1 gram = 0.03215 ounce troy = 0.03527 ounce avoirdupois
1 gram = 15.432 grains.

1 ton (of 2240 pounds) = 1.016 metric ton = 1016 kilograms.
1 pound = 0.4536 kilogram = 453.6 grams.
1 ounce avoirdupois = 28.35 grams.
1 ounce troy = 31.103 grams.
1 grain = 0.0648 gram.

1 kilogram per square millimeter = 1422.32 pounds per square inch.
1 kilogram per square centimeter = 14.223 pounds per square inch.
1 kilogram-meter = 7.233 foot-pounds.
1 pound per square inch = 0.0703 kilogram per square centimeter.
1 calorie (kilogram calorie) = 3.968 B.T.U. (British thermal unit.).

Inches to Millimeters

Fraction	Inches	M/M	Fraction	Inches	M/M
1/64	.01563	.397	33/64	.51563	13.097
1/32	.03125	.794	17/32	.53125	13.494
3/64	.04688	1.191	35/64	.54688	13.891
1/16	.06250	1.587	9/16	.56250	14.287
5/64	.07813	1.984	37/64	.57813	14.684
3/32	.09375	2.381	19/32	.59375	15.081
7/64	.10938	2.778	39/64	.60938	15.478
1/8	.12500	3.175	5/8	.62500	15.875
9/64	.14063	3.572	41/64	.64063	16.272
5/32	.15625	3.969	21/32	.65625	16.669
11/64	.17188	4.366	43/64	.67188	17.066
3/16	.18750	4.762	11/16	.68750	17.462
13/64	.20313	5.159	45/64	.70313	17.859
7/32	.21875	5.556	23/32	.71875	18.256
15/64	.23438	5.953	47/64	.73438	18.653
1/4	.25000	6.350	3/4	.75000	19.050
17/64	.26563	6.747	49/64	.76563	19.447
9/32	.28125	7.144	25/32	.78125	19.844
19/64	.29688	7.541	51/64	.79688	20.241
5/16	.31250	7.937	13/16	.81250	20.637
21/64	.32813	8.334	53/64	.82813	21.034
11/32	.34375	8.731	27/32	.84375	21.431
23/64	.35938	9.128	55/64	.85938	.21828
3/8	.37500	9.525	7/8	.87500	22.225
25/64	.39063	9.922	57/64	.89063	22.622
13/32	.40625	10.319	29/32	.90625	23.019
27/64	.42188	10.716	59/64	.92188	23.416
7/16	.23750	11.113	15/16	.93750	23.812
29/64	.45313	11.509	61/64	.95313	24.209
15/32	.46875	11.906	31/32	.96875	24.606
31/64	.48438	12.303	63/64	.98438	25.003
1/2	.50000	12.700		1.00000	25.400

To Convert Inches to Millimeters Multiply By 25.4

10' to mm ÷ 3048
12' to mm ÷ 3658
20' to mm ÷ 6096

Millimeters to Inches

M/M	Inches	M/M	Inches	M/M	Inches
1	.0394	34	1.3396	67	2.6398
2	.0788	35	1.3790	68	2.6792
3	.1182	36	1.4184	69	2.7186
4	.1576	37	1.4578	70	2.7580
5	.1979	38	1.4972	71	2.7974
6	.2364	39	1.5366	72	2.8368
7	.2758	40	1.5760	73	2.8762
8	.3152	41	1.6154	74	2.9156
9	.3546	42	1.6548	75	2.9550
10	.3940	43	1.6942	76	2.9944
11	.4334	44	1.7336	77	3.0338
12	.4728	45	1.7730	78	3.0732
13	.5122	46	1.8124	79	3.1126
14	.5516	47	1.8518	80	3.1520
15	.5910	48	1.8912	81	3.1914
16	.6304	49	1.9306	82	3.2308
17	.6698	50	1.9700	83	3.2702
18	.7092	51	2.0094	84	3.3096
19	.7486	52	2.0488	85	3.3490
20	.7880	53	2.0882	86	3.3884
21	.8274	54	2.1276	87	3.4278
22	.8668	55	2.1670	88	3.4672
23	.9062	56	2.2064	89	3.5066
24	.9456	57	2.2458	90	3.5460
25	.9850	58	2.2852	91	3.5854
26	1.0244	59	2.3246	92	3.6248
27	1.0638	60	2.3640	93	3.6642
28	1.1032	61	2.4034	94	3.7036
29	1.1426	62	2.4428	95	3.7430
30	1.1820	63	2.4822	96	3.7824
31	1.2214	64	2.5216	97	3.8218
32	1.2608	65	2.5610	98	3.8612
33	1.3002	66	2.6004	99	3.9066

To Convert Millimeters to Inches Multiply By 0394 .03937

Useful Information

To find the circumference of a circle:
Multiply the radius by 6.2832, or
Multiply the diameter by 3.1416, or
Multiply the square root of the area by 3.3449

To find the radius of a circle:
Multiply the diameter by .5, or
Multiply the circumference by .15913, or
Multiply the square root of the area by .56419

To find the diameter of a circle:
Multiply the radius by 2, or
Multiply the circumference by .31831, or
Multiply the square root of the area by 1.1284

To find the area of a circle:
Multiply the square of the radius by 3.1416, or
Multiply the square of the diameter by .7854, or
Multiply the square of the circumference by .07958

To find the area of a hexagon:
Multiply the square of the distance across by .86603, or
Multiply the area of the inscribed circle by 1.1027

To find the area of an octagon:
Multiply the square of the distance across by .82843, or
Multiply the area of the inscribed circle by 1.0348

To find the area of a rectangle:
Multiply the length by the width

To find the area of a triangle:
Multiply the base by one-half the perpendicular height

To find the side of an inscribed square:
Multiply the diameter by .7071, or
Multiply the circumference by .2251

To find the side of an equal square:
Multiply the diameter by .8862

To find the diameter of the circumscribing circle of a square:
Multiply a side by 1.4142

To find the circumference of the circumscribing circle of a square:
Multiply a side by 4.443

To find the cubic contents of a cons:
Multiply the area of the base by one-third the altitude

To find the area of an ellipse:
Multiply the product of its axes by .7854

To find the area of a parallelogram:
Multiply the base times the perpendicular height

To find the volume of a parallelogram:
Multiply the area of cross section times the length

To find the area of a cylinder:
Multiply the length times the circumference of the body plus the area of both ends.

To find the volume of a cylinder:
Multiply the area of the base by the perpendicular height

To find the area of a sphere:
Multiply the square of the diameter by 3.1416, or
Multiply the diameter times the circumference

To find the volume of a sphere:
Multiply the cube of the diameter by .5236

To find the capacity of a tank in gallons:
All measurements must be reduced to inches

For cylindrical lanks, multiply the length by the square of the diameter by .0034.

For rectangular lanks, multiply the length by the width by the depth and divide by 231.

For elliptical lanks, multiply the length by the short diameter by the long diameter by .0034

To convert Brinell hardness to tensile strength:
Divide the Brinell Hardness number by two to get the approximate tensile strength in thousands of pounds per square inch.

Example: Assume Brinell Hardness of 248.
248÷ 2 = 124,000 p.s.i. (approx. tensile strength.).

Conversely, drop the last three figures of the tensile strength and multiplying by two to get the approximate Brinell Hardness number.

Example: Assume tensile strength of 122,000 p.s.i.
122 X 2 = 244 (approximate Brinell Hardness).

To estimate the weight of a round steel bar:
Multiply the diameter by 4, square the product, and divide by 6. The result is the approximate weight in pounds per foot of length.

To estimate the weight of a square steel bar:
Square the size, add a zero and divide by 3. The result is the approximate weight in pounds per foot of length.

To estimate the weight of a flat steel bar:
Multiply the width by the thickness, add a zero and divide by 3.
The result is the approximate weight in pounds per foot of length.

To calculate sheet weight
Sheet Weight = Width x Length x Decimal thickness

Fractions & Decimal Equivalents

Fraction	Decimal	Fraction	Decimal
1/64	.01563	33/64	.51563
1/32	.03125	17/32	.53125
3/64	.04688	35/64	.54688
1/16	.06250	9/16	.56250
5/64	.07813	37/64	.57813
3/32	.09375	19/32	.59375
7/64	.10938	39/64	.60938
1/8	.12500	5/8	.62500
9/64	.14063	41/64	.64063
5/32	.15625	21/32	.65625
11/64	.17188	43/64	.67188
3/16	.18750	11/16	.68750
13/64	.20313	45/64	.70313
7/32	.21875	23/32	.71875
15/64	.23438	47/64	.73438
1/4	.25000	3/4	.75000
17/64	.26563	49/64	.76563
9/32	.28125	25/32	.78125
19/64	.29688	51/64	.79688
5/16	.31250	13/16	.81250
21/64	.32813	53/64	.82813
11/32	.34375	27/32	.84375
23/64	.35938	55/64	.85938
3/8	.37500	7/8	.87500
25/64	.39063	57/64	.89063
13/32	.40625	29/32	.90625
27/64	.42188	59/64	.92188
7/16	.23750	15/16	.93750
29/64	.45313	61/64	.95313
15/32	.46875	31/32	.96875
31/64	.48438	63/64	.98438
1/2	.50000	1	1.00000

IMPORTANT

To the best of our knowledge, the information in this book is accurate. However, Chapin & Bangs does not assume any liability for the accuracy or completeness of the data, specifications or illustrations. The characteristics implied here may not apply in all situations.

Notes

Notes

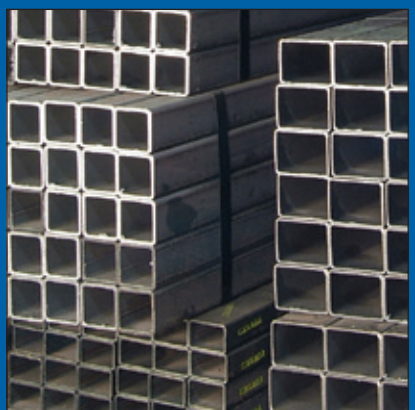
Notes

For Additional Information

Contact a representative at:
1-800-972-9615

Visit us on the web at:
www.cbsteel.com

E-mail us at:
sales@cbsteel.com



Chapin & Bangs

165 River Street
Bridgeport, CT 06604
Tel: 203-333-4183
Fax: 855-348-4268

1-800-972-9615

www.cbsteel.com

sales@cbsteel.com

ISO 9001:2015

STRUCTURAL STEEL

PLATE – CARBON & ALLOY

SHEET PRODUCTS

EXPANDED METAL & GRATING

TUBING

CARBON STEEL BARS

ALLOY STEEL BARS

STAINLESS PRODUCTS

WATERJET CUTTING

LASER CUTTING

PLASMA CUTTING

FLAME CUTTING

SAWING

SHEARING

CAD INTEGRATION

JIT SERVICE