EARLE M. JORGENSEN COMPANY

REFERENCE BOOK

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SECTION A

COLD FINISHED CARBON BARS

and

COLD ROLLED STRIP

COLD ROLLED STRIP — 1008/1010

UNS G10080 UNS G10100

Temper: Number 2 (Half-Hard)
Finish: Number 2 (Regular Bright)
Edge: 3" and narrower—No. 4 (Round)
Over 3" wide—No. 3 (Square)

Color Marking: Ends painted Blue

This grade is a flat cold rolled carbon steel, processed to give such useful characteristics as dimensional accuracy and improved surface, along with desired mechanical properties. Half-hard, or No. 2 temper, is a moderately stiff product intended for limited bending. It may be bent 90º across the direction of rolling around a radius equal to the thickness.

ANALYSIS

Carbon	Manganese	Phosphorus	Sulphur
.08/.13	.30/.60	.04 Max.	.05 Max.

APPLICATIONS — This grade of Cold Rolled Strip is suitable for many general applications where dimensional accuracy and stiffness are required. Bending and forming may be performed to a limited degree.

MECHANICAL PROPERTIES — The following values are average and may be considered as representative of the grade but are not generally reported:

Tensile Strength (psi)	Rockwell Hardness B Scale
60,000/78,000	70/85

WELDABILITY —This grade is easily welded by all the welding processes, and the resultant welds and joints are of extremely high quality. The grade of welding rod to be used depends on the thickness of section, design, service requirements, etc.

COLD ROLLED STRIP

Stock Lengths 12'

Thickness In Inches	Estimated Weight, Lbs. Per Foot	12-Ft. Bar	Thickness In Inches	Estimated Weight, Lbs. Per Foot	12-Ft. Bar
1/16 x			3/32 x		
1/4	.0532	.6381	2	.6381	7.657
3/8	.0798	.9572	2 1/2	.7976	9.572
1/2	.1064	1.276	3	.9572	11.49
5/8	.1329	1.595	4	1.276	15.31
3/4	.1595	1.914	1/8 x		
7/8	.1861	2.233	3/16	.0798	.9572
1	.2127	2.552	1/4	.1064	1.276
1 1/8	.2393	2.871	3/8	.1595	1.914
1 1/4	.2659	3.191	1/2	.2127	2.552
1 1/2	.3191	3.829	5/8	.2659	3.191
1 3/4	.3722	4.467	3/4	.3191	3.829
2	.4254	5.105	7/8	.3722	4.467
2 1/2	.5318	6.381	1	.4254	5.105
3	.6381	7.657	1 1/8	.4786	5.743
3/32 x			1 1/4	.5318	6.381
3/8	.1196	1.436	1 1/2	.6381	7.657
1/2	.1595	1.914	1 3/4	.7445	8.933
5/8	.1994	2.393	2	.8508	10.21
3/4	.2393	2.871	2 1/2	1.064	12.76
7/8	.2792	3.350	3	1.276	15.31
1	.3191	3.829	4	1.702	20.42
1 1/8	.3589	4.307	4 1/2	1.914	22.97
1 1/4	.3988	4.786	5	2.127	25.52
1 1/2	.4786	5.743	6	2.552	30.63
1 3/4	.5583	6.700			

1018 COLD FINISHED BARS

ASTM A 108 UNS G10180

Color Marking: Ends painted Black

A low-carbon steel, having higher manganese content than certain other low-carbon steels, such as 1020. Being richer in manganese, 1018 is a better steel for carburized parts, since it produces a harder and more uniform case. It also has higher mechanical properties and better machining characteristics. The hot rolled bars used in the manufacture of this product are of special quality.

Most cold finished bars are produced by cold drawing. In this process, oversize hot rolled bars, which have been cleaned to remove scale, are drawn through dies to the required size. The larger sizes are generally turned and polished, the hot rolled bars having been machine turned, rather than drawn, followed by abrasive polishing. Turned and polished bars tend to have a somewhat brighter finish than cold drawn bars.

A greater degree of dimensional accuracy and straightness in round bars is obtained by grinding and polishing. The product resulting from this process is known as Precision Shafting. For description and listing of stock sizes of PRECISION SHAFTING, refer to Pages 11 and 12 of this section.

ANALYSIS

Carbon	Manganese	Phosphorus	Sulphur
.15/.20	.60/.90	.04 Max.	.05 Max.

APPLICATIONS — Suitable for parts requiring cold forming, such as crimping, swaging or bending. However, for severe bends, stress relieving may be necessary to prevent cracking. Especially suitable for carburized parts requiring soft core and high surface hardness, such as gears, pinions, worms, king pins, chain pins, ratchets, dogs, etc.

MECHANICAL PROPERTIES — The following values are average and may be considered as representative of the grade:

	Tensile Strength (psi)	Yield Strength (psi)	Elongation in 2"	Reduction of Area	Brinell Hardness
1" rd., cold drawn	85,000	70,000	28%	55%	167
7" rd., turned & polished	70,000	45,000	36%	58%	143

MACHINABILITY — 1018 has a machinability rating of 78%, based on 1212 as 100%. Average surface cutting speed is 130 feet per minute.

WELDABILITY — This grade is easily welded by all the welding processes, and the resultant welds and joints are of extremely high quality. The grade of welding rod to be used depends on the thickness of section, design, service requirements, etc.

HARDENING — This grade will respond to any of the standard carburizing methods and subsequent heat treatments. For a hard case and tough core, the following heat treatment is suggested: Carburize at 1650º-1700ºF for approximately eight hours, cool in box and reheat to 1400º-1450ºF. Quench in water and draw at 300º-350ºF.

1018 COLD FINISHED ROUNDS

Stock Lengths: 12' and 20' Approx.

Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 20-Ft. Bar
1/8	.0418	.8353
5/32	.0653	1.305
3/16	.0940	1.879
7/32	.1279	2.558
1/4	.1671	3.341
9/32	.2114	4.229
5/16	.2610	5.220
11/32	.3158	6.317
3/8	.3759	7.517
13/32	.4411	8.822
7/16	.5116	10.23
15/32	.5873	11.75
1/2	.6682	13.26
17/32	.7544	15.09
9/16	.8457	16.91
19/32	.9425	18.85
5/8	1.044	20.88
11/16	1.263	25.27
23/32	1.381	27.62
3/4	1.504	30.07
49/64	1.567	31.34
13/16	1.765	35.29
7/8	2.046	40.93
15/16	2.349	46.98
1	2.673	53.46
1/64	2.757	55.14
1/32	2.843	56.85
1/16	3.017	60.35
1/8	3.383	67.66
3/16	3.769	75.38
1/4	4.176	83.53
5/16	4.604	92.09
3/8	5.053	101.1
7/16	5.523	110.5
1/2	6.014	120.3
9/16	6.526	130.5
5/8	7.058	141.2
11/16	7.612	152.2
3/4	8.186	163.7
13/16	8.781	175.6
7/8	9.397	187.9
1 15/16	10.03	200.7
2	10.69	213.8
1/16	11.37	227.4
1/8	12.07	241.4
3/16	12.79	255.8
1/4	13.53	270.6
5/6	14.29	285.9
3/8	15.08	301.5
7/16	15.88	317.6
1/2	16.71	334.1
9/16	17.55	351.0
5/8	18.42	368.4
11/16	19.31	386.1
3/4	20.21	404.3
13/16	21.14	422.9
7/8	22.09	441.9
15/16	23.06	461.3
3	24.06	481.1
1/16	25.07	501.4
1/8	26.10	522.0
3/16	27.16	543.1
1/4	28.23	564.6
5/16	29.33	586.6
3/8	30.45	608.9
7/16	31.58	631.7
1/2	32.74	654.8
9/16	33.92	678.4
5/8	35.12	702.5
11/16	36.35	726.9
3/4	37.59	751.7
7/8	40.14	802.7
15/16	41.44	828.8
4	42.77	855.3
1/8	45.48	909.6
3/16	46.87	937.4
1/4	48.28	965.6
5/16	49.71	994.2
4 3/8	51.16	1023
7/16	52.63	1053
1/2	54.13	1083
9/16	55.64	1113
5/8	57.18	1143
11/16	58.73	1175
3/4	60.31	1206
7/8	63.52	1270
15/16	65.16	1303
5	66.82	1336
1/8	70.21	1404
1/4	73.67	1473
5/16	75.44	1509
3/8	77.22	1544
7/16	79.03	1581
1/2	80.86	1617
5/8	84.57	1691
3/4	88.37	1767
7/8	92.26	1845
15/16	94.23	1885
6	96.22	1924
1/8	100.3	2005
1/4	104.4	2088
3/8	108.6	2172
1/2	112.9	2259
3/4	121.8	2436
7	131.0	2619
1/4	140.5	2810
1/2	150.4	3007
3/4	160.5	3211
8	171.1	3421
1/2	193.1	3862
9	216.5	4330
1/2	241.2	4824
10	267.3	5346
1/2	294.7	5894
11	323.4	6468
1/2	353.5	7070
12	384.9	7698

1018 COLD DRAWN HEXAGONS

Stock Lengths 10' to 12'

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

1018 COLD FINISHED SQUARES

KEY STOCK

Stock Lengths 12'

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

1018 COLD DRAWN FLATS

Stock Lengths 10' and 12'

Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 20-Ft. Bar
1/8 x		
3/16	.0798	.9576
1/4	.1064	1.276
5/16	.1329	1.595
3/8	.1595	1.914
7/16	.1861	2.233
1/2	.2127	2.552
9/16	.2393	2.872
5/8	.2659	3.191
11/16	.2925	3.510
3/4	.3191	3.829
7/8	.3722	4.467
1	.4254	5.105
1 1/8	.4786	5.743
1 1/4	.5318	6.381
1 3/8	.5849	7.019
1 1/2	.6381	7.657
1 3/4	.7445	8.933
2	.8508	10.21
2 1/4	.9572	11.49
2 1/2	1.064	12.76
2 3/4	1.170	14.04
3	1.276	15.31
3 1/2	1.489	17.87
4	1.702	20.42
4 1/2	1.914	22.97
5	2.127	25.52
6	2.552	30.63
8	3.403	40.84
10	4.254	51.05
12	5.105	61.26
3/16 x		
1/4	.1595	1.914
5/16	.1994	2.393
3/8	.2393	2.871
7/16	.2792	3.350
1/2	.3191	3.829
5/8	.3988	4.786
3/4	.4786	5.743
7/8	.5583	6.700
1	.6381	7.657
1 1/8	.7179	8.614
1 1/4	.7976	9.572
1 3/8	.8774	10.53
1 1/2	.9572	11.49
1 3/4	1.117	13.40
1 7/8	1.196	14.35
2	1.276	15.31
2 1/4	1.436	17.23
2 1/2	1.595	19.14
2 3/4	1.755	21.06
3	1.914	22.97
3 1/4	2.074	24.89
3 1/2	2.233	26.80
3 3/4	2.393	28.71
4	2.552	30.63
4 1/2	2.871	34.46
5	3.191	38.29
6	3.829	45.94

Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 20-Ft. Bar
3/16 x		
8	5.105	61.26
9	5.743	68.91
10	6.381	76.57
12	7.657	91.89
1/4 x		
5/16	.2659	3.191
3/8	.3191	3.829
7/16	.3722	4.467
1/2	.4254	5.105
9/16	.4786	5.743
5/8	.5318	6.381
3/4	.6381	7.657
7/8	.7445	8.933
1	.8508	10.21
1 1/8	.9572	11.49
1 1/4	1.064	12.76
1 3/8	1.170	14.04
1 1/2	1.276	15.31
1 5/8	1.383	16.59
1 3/4	1.489	17.87
1 7/8	1.595	19.14
2	1.702	20.42
2 1/4	1.914	22.97
2 1/2	2.127	25.52
2 3/4	2.340	28.08
3	2.552	30.63
3 1/4	2.765	33.18
3 1/2	2.978	35.73
3 3/4	3.191	38.29
4	3.403	40.84
4 1/4	3.616	43.39
4 1/2	3.829	45.94
4 3/4	4.041	48.50
5	4.254	51.05
5 1/4	4.467	53.60
5 1/2	4.679	56.15
5 3/4	4.892	58.70
6	5.105	61.26
6 1/2	5.530	66.36
7	5.956	71.47
8	6.806	81.68
9	7.657	91.89
10	8.508	102.1
11	9.359	112.3
12	10.21	122.5
14 5/8	12.44	149.3
5/16 x		
3/8	.3988	4.786
7/16	.4653	5.583
1/2	.5318	6.381
9/16	.5982	7.179
5/8	.6647	7.976
3/4	.7976	9.572
7/8	.9306	11.17
1	1.064	12.76
1 1/8	1.196	14.36
1 1/4	1.329	15.95
1 3/8	1.462	17.55

Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 20-Ft. Bar
5/16 x		
1 1/2	1.595	19.14
1 5/8	1.729	20.74
1 3/4	1.861	22.33
2	2.127	25.52
2 1/4	2.393	28.71
2 1/2	2.659	31.91
2 3/4	2.925	35.10
3	3.191	38.29
3 1/2	3.722	44.68
4	4.254	51.05
4 1/2	4.786	57.43
5	5.318	63.81
5 1/2	5.849	70.19
6	6.381	76.57
8	8.508	102.1
10	10.64	127.6
12	12.76	153.1
3/8 x		
7/16	.5583	6.700
1/2	.6381	7.657
9/16	.7179	8.615
5/8	.7976	9.572
3/4	.9572	11.49
7/8	1.117	13.40
1	1.276	15.31
1 1/8	1.436	17.23
1 1/4	1.595	19.14
1 3/8	1.755	21.06
1 1/2	1.914	22.97
1 5/8	2.074	24.89
1 3/4	2.233	26.80
1 7/8	2.393	28.72
2	2.552	30.63
2 1/4	2.871	34.46
2 1/2	3.191	38.29
2 3/4	3.510	42.11
3	3.829	45.94
3 1/4	4.148	49.77
3 1/2	4.467	53.60
3 3/4	4.786	57.43
4	5.105	61.26
4 1/4	5.424	65.09
4 1/2	5.743	68.91
4 3/4	6.062	72.74
5	6.381	76.57
5 1/4	6.700	80.40
5 1/2	7.019	84.23
5 3/4	7.338	88.06
6	7.657	91.89
6 1/2	8.295	99.54
7	8.933	107.2
8	10.21	122.5
9	11.49	137.8
10	12.76	153.1
11	14.04	168.5
12	15.31	183.8
13 1/2	17.23	206.7
14 5/8	18.66	224.0

1018 COLD DRAWN FLATS (Continued)

Stock Lengths 10' and 12'

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

1018 COLD DRAWN FLATS (Continued)

Stock Lengths 10' and 12'

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

1040/42/45 COLD FINISHED BARS

ASTM A 108 UNS G10400 G10420 G10450

Color Marking: Ends painted Red

This is medium-carbon steel. The higher carbon content imparts higher strength properties than 1018. The hot rolled bars used in the manufacture of this product are of special quality. Most bars are cold drawn, although some larger sizes are turned and polished.

When higher degrees of dimensional accuracy and straightness are required, we recommend the use of PRECISION SHAFTING, which is produced by grinding and polishing. Refer to Pages 11 and 12 of this section.

ANALYSIS

	Carbon	Manganese	Phosphorus	Sulphur
1040	.37/.44	.60/.90	.04 Max.	.05 Max.
1042	.40/.47	.60/.90	.04 Max.	.05 Max.
1045	.43/.50	.60/.90	.04 Max	.05 Max.

APPLICATIONS — This material is used where greater strength is required than can be obtained from the lower carbon steels. It responds to heat treatment, and a wide range of properties can be obtained. Applications include shafts, machinery parts, bolts, pinions, gears, etc.

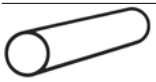
MECHANICAL PROPERTIES — The following values are average and may be considered as representative:

	Tensile Strength (psi)	Yield Strength (psi)	Elongation in 2"	Reduction of Area	Brinell Hardness
1" rd., cold drawn	110,000	85,000	19%	32%	223
5" rd., turned & polished	90,000	55,000	26%	50%	187

MACHINABILITY — Machinability rating is approximately 64% based on 1212 as 100%. Average surface cutting speed is between 95 and 105 feet per minute.

WELDABILITY — Due to higher carbon content, this material is not readily welded. With thin sections and flexible design, gas or arc welding may be used without preheating, but in joints over 1/2" to 3/4" thick preheating is necessary. To develop equivalent strength in a weld, a low alloy filler is recommended. Stress relieving after welding is also recommended. The grade of welding rod to be used depends thickness of section, design, service requirement, etc.

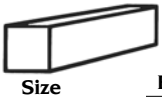
HARDENING — This steel is essentially water-hardening, but it may be quenched in oil. The recommended quenching temperatures are 1550ºF for water and 1575ºF for oil. A wide range of mechanical properties can be obtained by tempering at different temperatures between 700ºF and 1300ºF. Tempering in the range from 500ºF to 700ºF should be avoided.



1040/42/45 COLD FINISHED ROUNDS

Stock Lengths: 20' Approx.

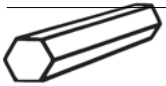
Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 20-Ft. Bar
1/4	.1671	3.341
5/16	.2610	5.220
3/8	.3759	7.517
7/16	.5116	10.23
1/2	.6682	13.36
9/16	.8457	16.91
5/8	1.044	20.88
11/16	1.263	25.27
3/4	1.504	30.07
13/16	1.765	35.29
7/8	2.046	40.93
15/16	2.349	46.98
1	2.673	53.46
1/16	3.017	60.35
1/8	3.383	67.66
3/16	3.769	75.38
1/4	4.176	83.53
5/16	4.604	92.09
3/8	5.053	101.1
7/16	5.523	110.5
1/2	6.014	120.3
9/16	6.526	130.5
5/8	7.058	141.2
1 11/16	7.612	152.2
3/4	8.186	163.7
13/16	8.781	175.6
7/8	9.397	187.9
15/16	10.03	200.7
2	10.69	213.8
1/16	11.37	227.4
1/8	12.07	241.4
3/16	12.79	255.8
1/4	13.53	270.6
5/16	14.29	285.9
3/8	15.08	301.5
7/16	15.88	317.6
1/2	16.71	334.1
9/16	17.55	351.0
5/8	18.42	368.4
11/16	19.31	386.1
3/4	20.21	404.3
7/8	22.09	441.9
15/16	23.06	461.3
3	24.06	481.1
1/8	26.10	522.0
1/4	28.23	564.6
3 3/8	30.45	608.9
7/16	31.58	631.7
1/2	32.74	654.8
5/8	35.12	702.5
3/4	37.59	751.7
15/16	41.44	828.8
4	42.77	855.3
1/4	48.28	965.6
3/8	51.16	1023
7/16	52.63	1053
1/2	54.13	1083
5/8	57.18	1143
3/4	60.31	1206
5	66.82	1336
1/4	73.67	1473
7/16	79.03	1581
1/2	80.86	1617
3/4	88.37	1767
6	96.22	1924
1/4	104.4	2088
1/2	112.9	2259
7	131.0	2619



1040/42/45 COLD DRAWN SQUARES

Stock Lengths: 12' Approx.

Size In Inches	Estimated Weight, Lbs. Per Foot	Estimated Weight, Lbs. 12-Ft. Bar
1/4	.2127	2.552
5/16	.3323	3.988
3/8	.4786	5.743
1/2	.8508	10.21
5/8	1.329	15.95
3/4	1.914	22.97
7/8	2.606	31.27
1	3.403	40.84
1 1/8	4.307	51.69
3/16	4.799	57.59
1/4	5.318	63.81
1/2	7.657	91.89
3/4	10.42	125.1
2	13.61	163.4
1/4	17.23	206.7
1/2	21.27	255.2
3	30.63	367.5



1040/42/45 COLD DRAWN HEXAGONS

Stock Lengths: 12' Approx.

Size In Inches	Estimated Weight, Lbs. Per Foot	Estimated Weight, Lbs. 12-Ft. Bar
3/4	1.658	19.89
7/8	2.257	27.08
15/16	2.590	31.08
1	2.947	35.37
1/8	3.730	44.76
3/16	4.156	49.87
1/4	4.605	55.26
1 5/16	5.077	60.93
3/8	5.572	66.87
1/2	6.631	79.56
3/4	9.026	108.3
7/8	10.36	124.3
2	11.79	141.5
1/2	18.42	221.0

1045 PRECISION SHAFTING

ASTM A 108 UNS G10450

Color Marking: Ends painted Olive

Precision Shafting represents the highest degree of over-all accuracy, concentricity, straightness, and surface perfection attainable in commercial practice. After being ground on centerless grinders, bars are polished to a high finish and carefully straightened.

The general RMS finish for 1045 Precision Shafting is 20 RMS maximum.

ANALYSIS

Carbon	Manganese	Phosphorus	Sulphur
.43/.50	.60/.90	.04 Max.	.05 Max.

APPLICATIONS — This product is often referred to as pump shafting or pump rod, due to its high degree of straightness, which is so important in high-speed shafting applications. This special straightness serves to prevent vibration and wear on packings and bearings, which must be avoided in deep well pump work. Precision Shafting is also used for motor shafts and similar applications where high-speed work necessitates straightness and accuracy along with the ability to be machined unsymmetrically with practically no danger of warpage.

TOLERANCE — 1½" & Under: Plus .000", Minus .001"

Over 1½" to Under 2½": Plus .000", Minus .0015"

2 ½" to 3" inclusive: Plus .000", Minus .002"

Over 3" to 4": Plus .000", Minus .003"

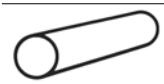
Over 4" to 6": Plus .000", Minus .006"

MECHANICAL PROPERTIES — The following are average and may be considered as representative:

	Tensile Strength (psi)	Yield Strength (psi)	Elongation in 2"	Reduction of Area	Brinell Hardness
1", cold drawn ground & polished	100,000	85,000	19%	32%	223
7", turned ground & polished	95,000	60,000	24%	48%	197

MACHINABILITY — Machinability rating is approximately 64% based on 1212 as 100%. Average surface cutting speed is 95 to 105 feet per minute.

WELDABILITY — Due to higher carbon content, this material is not readily welded. With thin sections and flexible design, gas or arc welding may be used without preheating, but in joints over ½" to ¾" thick preheating is necessary. To develop equivalent strength in a weld, a low alloy filler is recommended. Stress relieving after welding is also recommended. The grade of welding rod to be used depends on thickness of section, design, service requirements, etc.



1045 PRECISION SHAFTING

Stock Lengths 20' -0 1/4" and 21'- 24'

Size In Inches	Estimated Weight, Lbs. Per Foot	20' - 0 1/4" Bar	Size In Inches	Estimated Weight, Lbs. Per Foot	20' - 0 1/4" Bar
1/2	.6682	13.38	2 1/2	16.71	334.5
9/16	.8457	16.93	5/8	18.42	368.8
5/8	1.044	20.90	11/16	19.31	386.6
11/16	1.263	25.29	3/4	20.21	404.6
3/4	1.504	30.11	7/8	22.09	442.3
13/16	1.765	35.34	15/16	23.06	461.7
7/8	2.046	40.96	3	24.06	481.7
15/16	2.349	47.03	3/16	27.16	543.8
1	2.673	53.52	1/4	28.23	565.1
1/16	3.017	60.40	3/8	30.45	609.6
1/8	3.383	67.73	7/16	31.58	632.3
3/16	3.769	75.46	1/2	32.74	655.5
1/4	4.176	83.61	11/16	36.35	727.8
5/16	4.604	92.18	3/4	37.59	752.6
3/8	5.053	101.2	15/16	41.44	829.7
7/16	5.523	110.6	4	42.77	856.3
1/2	6.014	120.4	1/4	48.28	966.6
9/16	6.526	130.7	7/16	52.63	1054
5/8	7.058	141.3	1/2	54.13	1084
11/16	7.612	152.4	3/4	60.31	1207
3/4	8.186	163.9	15/16	65.16	1305
13/16	8.781	175.8	5	66.82	1338
7/8	9.397	188.1	1/4	73.67	1475
15/16	10.03	200.8	7/16	79.03	1582
2	10.69	214.0	1/2	80.86	1619
1/8	12.07	241.7	3/4	88.37	1769
3/16	12.79	256.1	15/16	94.23	1887
1/4	13.53	270.9	6	96.22	1926
3/8	15.08	301.9	1/2	112.9	2260
7/16	15.88	317.9	7	131.0	2623

1213/15 FREE MACHINING COLD FINISHED BARS

(SCREW MACHINE STOCK)

ASTM A 108 UNS G12130

Color Marking: Ends painted Orange

1213 and 1215 are resulphurized and rephosphorized free machining steels, commonly referred to as Screw Stock. They are improved free-cutting steels that have replaced the Bessemer B-1113 grade. They are especially suited for automatic screw machine operations where the major requirement is exceptional free-cutting quality with a good finish.

ANALYSIS

	Carbon	Manganese	Phosphorus	Sulphur
1213	.13 Max.	.70/1.00	.07/.12	.24/.33
1215	.09 Max.	.75/1.05	.04/.09	.26/.35

APPLICATIONS — This Screw Stock was developed for manufacturing numerous parts requiring considerable machining, close finish tolerances, and a bright smooth finish. Beyond ordinary machining, it will respond to roll threading, nibbing, and some minor bending without cracking. It is not recommended for forming, ordinary bending, or upsetting, nor for parts subject to severe fatigue stresses.

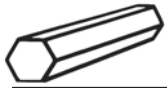
MECHANICAL PROPERTIES — The following are average values for 1" round and may be considered as representative:

Tensile Strength (psi)	Yield Strength (psi)	Elongation in 2"	Reduction of Area	Brinell Hardness
87,500	75,000	15%	42%	187

MACHINABILITY — Machinability rating is 136%, based on 1212 as 100%. Average surface cutting speed is 225 feet per minute.

WELDABILITY — Due to their very high sulphur, these grades are not considered as weldable.

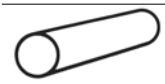
HARDENING — Although this analysis will respond to conventional treatments, it is not considered a case-hardening steel. Better results can be obtained from 1117 or 1018.



1213 — 1215 COLD DRAWN HEXAGONS

Stock Lengths 10' to 12'

Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 12-Ft. Bar	Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 12-Ft. Bar	Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 12-Ft. Bar
1/8	.0461	.5526	13/16	1.946	23.35	1 11/16	8.393	100.7
5/32	.0720	.8635	7/8	2.257	27.08	3/4	9.026	108.3
3/16	.1036	1.243	15/16	2.590	31.08	13/16	9.682	116.2
7/32	.1410	1.692	1	2.947	35.37	7/8	10.36	124.3
1/4	.1842	2.210	1/16	3.327	39.93	2	11.79	141.5
5/16	.2878	3.454	1/8	3.730	44.76	1/8	13.31	159.7
11/32	.3483	4.179	3/16	4.156	49.87	3/16	14.10	169.2
3/8	.4145	4.973	1/4	4.605	55.26	1/4	14.92	179.0
7/15	.5641	6.769	5/16	5.077	60.93	3/8	16.62	199.5
1/2	.7368	8.842	3/8	5.572	66.87	7/16	17.51	210.1
9/16	.9325	11.19	7/16	6.090	73.08	1/2	18.42	221.0
5/8	1.151	13.82	1/2	6.631	79.56	5/8	20.31	243.7
11/16	1.393	16.72	9/16	7.196	86.35	3/4	22.29	267.5
3/4	1.658	19.89	5/8	7.783	93.39	3	26.53	318.3
						1/2	36.10	433.2



1213 — 1215 COLD DRAWN or GROUND & POLISHED ROUNDS

Stock Lengths: 12' Approx.

Size In Inches	Estimated Weight, Lbs. Per Foot	12 Ft. Bar	Size In Inches	Estimated Weight, Lbs. Per Foot	12 Ft. Bar
3/32	.0235	.2820	1 5/8	7.058	84.70
1/8	.0418	.5012	11/16	7.612	91.34
9/64	.0529	.6343	3/4	8.186	98.23
5/32	.0653	.7831	13/16	8.781	105.4
11/64	.0790	.9475	7/8	9.397	112.8
3/16	.0940	1.128	15/16	10.03	120.4
13/64	.1103	1.323	2	10.69	128.3
7/32	.1279	1.535	1/16	11.37	136.4
1/4	.1671	2.005	1/8	12.07	144.8
17/64	.1886	2.263	3/16	12.79	153.5
9/32	.2114	2.537	1/4	13.53	162.4
5/16	.2610	3.132	5/16	14.29	171.5
21/64	.2878	3.453	3/8	15.08	180.9
11/32	.3158	3.790	7/16	15.88	190.6
3/8	.3759	4.510	1/2	16.71	200.5
25/64	.4079	4.894	9/16	17.55	210.6
13/32	.4411	5.293	5/8	18.42	221.0
7/16	.5116	7.048	11/16	19.31	231.7
15/32	.5873	7.048	3/4	20.21	242.6
1/2	.6682	8.019	13/16	21.14	253.7
17/32	.7544	9.052	7/8	22.09	265.1
9/16	.8457	10.15	15/16	23.06	276.8
19/32	.9423	11.31	3	24.06	288.7
5/8	1.044	12.53	1/8	26.10	313.2
21/32	1.151	13.81	1/4	28.23	338.8
11/16	1.263	15.16	3/8	30.45	365.3
23/32	1.381	16.57	1/2	32.74	392.9
3/4	1.504	18.04	5/8	35.12	421.5
49/64	1.567	18.80	3/4	37.59	451.0
25/32	1.631	19.58	7/8	40.14	481.6
13/16	1.765	21.17	4	42.77	513.2
27/32	1.903	22.83	1/8	45.48	545.8
7/8	2.046	24.56	1/4	48.28	579.3
57/64	2.120	25.44	3/8	51.16	613.9
15/16	2.349	28.19	1/2	54.13	649.5
31/32	2.508	30.10	3/4	60.31	723.7
1	2.673	32.07	5	66.82	801.9
1/16	3.017	36.21	1/4	73.67	884.0
1/8	3.383	40.59	3/8	77.22	926.6
3/16	3.769	45.23	1/2	80.86	970.2
1/4	4.176	50.12	3/4	88.37	1060
5/16	4.604	55.25	6	96.22	1155
3/8	5.053	60.64	1/2	112.9	1355
7/16	5.523	66.28	7	131.0	1572
1/2	6.014	72.17	1/2	150.4	1805
9/16	6.526	78.31			

1213 — 1215 COLD DRAWN SQUARES

Stock Lengths 11' to 12'

Size In Inches	Estimated Weight, Lbs. Per Foot	12 Ft. Bar	Size In Inches	Estimated Weight, Lbs. Per Foot	12 Ft. Bar
1/8	.0531	.6381	1	3.403	40.84
3/16	.1196	1.436	1/8	4.307	51.69
1/4	.2127	2.552	1/4	5.318	63.81
5/16	.3323	3.988	3/8	6.434	77.21
3/8	.4786	5.743	1/2	7.657	91.89
7/16	.6514	7.817	5/8	8.987	107.8
1/2	.8508	10.21	3/4	10.42	125.1
9/16	1.077	12.92	2	13.61	163.4
5/8	1.329	15.95	1/8	15.37	184.4
11/16	1.609	19.30	3/8	19.20	230.4
3/4	1.914	22.97	1/2	21.27	255.2
7/8	2.606	31.27	3	30.63	367.5
15/16	2.991	35.89			

SUPER FREE MACHINING STEELS—LEADED

12L14

ASTM A 108 as applicable UNS G12144

Color Marking

12L14: Ends painted Brown and White
12L14Te: Ends painted Pink and Purple

These products represent the latest developments in the field of free machining carbon steels available.

ANALYSIS

	Carbon	Man-ganese	Phos-phorus	Sulphur	Lead	Other
12L14	.15 Max.	.85/1.15	.04/.09	.26/.35	.15/.35	—
12L14Te	.15 Max.	.85/1.15	.04/.09	.26/.35	.15/.35	Tellurium

APPLICATIONS — Used to maximum advantage for parts where considerable machining is required, such as bushings, inserts, couplings, and hydraulic hose fittings. With good ductility, these grades are suitable for parts involving bending, crimping, or riveting.

MECHANICAL PROPERTIES — The following are average and may be considered as representative:

Tensile Strength	Yield Strength	Elongation in 2″	Reduction of Area	Brinell Hardness
78,000 PSI	70,000 PSI	15%	50%	163 BHN

MACHINABILITY — Average surface cutting speeds and machinability ratings based on 1212 as 100% are as follows:

12L14 325 feet per minute—193%
12L14Te 420 feet per minute—250%

WELDABILITY — Due to high sulphur content, these grades are not considered as weldable.

HARDENING — Although these grades will respond to conventional treatments, they are not considered case-hardening steels. Better results can be obtained from 1117 or 1018.

For more complete data on these steels, ask for special literature.

ROUNDS

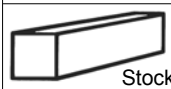
Stock Lengths: 11' to 13'

Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 12-Ft. Bar
1/8	.0418	.5012
9/64	.0529	.6548
5/32	.0653	.7831
3/16	.0940	1.128
7/32	.1279	1.535
1/4	.1671	2.005
9/32	.2114	2.537
19/64	.2356	2.827
5/16	.2610	3.132
21/64	.2877	3.452
11/32	.3158	3.790
3/8	.3759	4.510
25/64	.4078	4.894
13/32	.4411	5.293
27/64	.4758	5.710
7/16	.5116	6.139
29/64	.5488	6.586
15/32	.5873	7.048
1/2	.6682	8.019
33/64	.7106	8.527
17/32	.7544	9.052
35/64	.7994	9.593
9/16	.8457	10.15
37/64	.8934	10.72
19/32	.9425	11.31
5/8	1.044	12.53
41/64	1.097	13.16
21/32	1.151	13.81
43/64	1.207	14.48
11/16	1.263	15.16
23/32	1.381	16.57
47/64	1.442	17.30
3/4	1.504	18.04
49/64	1.567	18.80
25/32	1.631	19.58
13/16	1.765	21.17
27/32	1.903	22.83
7/8	2.046	24.56
57/64	2.120	25.44
29/32	2.195	26.34
15/16	2.349	28.19
31/32	2.508	30.10
1	2.673	32.07
1/64	2.757	33.08
1/16	3.017	36.21
1/8	3.383	40.59
9/64	3.477	41.72
3/16	3.769	45.23
1/4	4.176	50.12
1 5/16	4.604	55.25
3/8	5.053	60.64
7/16	5.523	66.28
1/2	6.014	72.17
9/16	6.526	78.31
5/8	7.058	84.70
11/16	7.612	91.34
3/4	8.186	98.23
13/16	8.781	105.4
7/8	9.397	112.8
15/16	10.03	120.4
2	10.69	128.3
1/16	11.37	136.4
1/8	12.07	144.8
3/16	12.79	153.5
1/4	13.53	162.4
5/16	14.29	171.5
3/8	15.08	180.9
7/16	15.88	190.6
1/2	16.71	200.5
9/16	17.55	210.6
5/8	18.42	221.0
11/16	19.31	231.7
3/4	20.21	242.6
13/16	21.14	253.7
7/8	22.09	265.1
15/16	23.06	276.8
3	24.06	288.7
1/16	25.07	300.1
1/8	26.10	313.2
1/4	28.23	338.8
3/8	30.45	365.3
1/2	32.74	392.9
9/16	33.92	407.0
5/8	35.12	421.5
3/4	37.59	451.0
7/8	40.14	481.6
4	42.77	513.2
1/8	45.48	545.8
1/4	48.28	579.3
3/8	51.16	613.9
1/2	54.13	649.5
3/4	60.31	723.7
7/8	63.52	762.3
5	66.82	801.9
1/4	73.76	884.0
1/2	80.86	970.2
3/4	88.37	1060
6	96.22	1155

HEXAGONS

Stock Lengths: 11' to 13'

Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 12-Ft. Bar
1/4	.1842	2.210
5/16	.2878	3.454
3/8	.4145	4.973
7/16	.5641	6.769
1/2	.7368	8.842
9/16	.9325	11.19
5/8	1.151	13.82
11/16	1.393	16.72
3/4	1.658	19.89
13/16	1.946	23.35
7/8	2.257	27.08
15/16	2.590	31.08
1	2.947	35.37
1/16	3.327	39.93
1/8	3.730	44.76
3/16	4.156	49.87
1/4	4.605	55.26
5/16	5.077	60.93
3/8	5.572	66.87
1 7/16	6.090	73.08
1/2	6.631	79.56
9/16	7.196	86.35
5/8	7.783	93.39
11/16	8.393	100.7
3/4	9.026	108.3
13/16	9.682	116.2
7/8	10.36	124.3
2	11.79	141.5
1/4	14.92	179.0
3/8	16.62	199.5
1/2	18.42	221.0
5/8	20.31	243.7
3/4	22.29	267.5
7/8	24.36	292.3
3	26.53	318.3
1/4	31.13	373.6
1/2	36.10	433.2
4	47.16	565.9



SQUARES

Stock Lengths: 11' to 13'

Size In Inches	Est. Wt., Lbs. Per Foot	Est. Wt., Lbs. 12-Ft. Bar
1/4	.2127	2.552
5/16	.3323	3.988
3/8	.4786	5.743
7/16	.6514	7.817
1/2	.8508	10.21
9/16	1.077	12.92
5/8	1.329	15.95
11/16	1.609	19.30
3/4	1.914	22.97
13/16	2.247	26.96
7/8	2.606	31.27
15/16	2.991	35.89
1	3.403	40.84
1/16	3.842	46.10
1/8	4.307	51.69
13/64	4.803	57.64
1/4	5.318	63.81
3/8	6.434	77.21
1/2	7.657	91.89
5/8	8.987	107.8
3/4	10.42	125.1
2	13.61	163.4
1/4	17.23	206.7

1117 AND 11L17 (Leaded)

COLD FINISHED BARS

ASTM A 108 UNS G 11170

Color Marking

1117: Ends painted Aluminum with Red Stripe
11L17: Ends painted Aluminum with Orange Stripe

This grade is low-carbon high-manganese steel. It possesses much of the machining quality of 1212 Screw Stock but with improved mechanical properties. This grade also has excellent carburizing properties. Bars are produced from special quality hot rolled bars.

1117 is available as a leaded steel (11L17) in certain sizes. The addition of .15/.35 per cent lead improves free-machining characteristics without sacrificing carburizing properties.

ANALYSIS

Carbon	Manganese	Phosphorus	Sulphur
.14/.20	1.00/1.30	.04 Max.	.08/.13

APPLICATIONS — This steel is used in automatic screw machines for manufacturing numerous parts requiring considerable machining and close tolerances, along with a smooth finish. It may be bent or formed where such cold working operations are not too severe. It is especially suitable for carburized parts requiring soft core and high surface hardness, such as gears, pinions, worms, king pins, ratchets, dogs, etc.

MECHANICAL PROPERTIES — The following are average values for 1" cold drawn round and may be considered as representative of the grade:

Tensile Strength (psi)	Yield Strength (psi)	Elongation in 2"	Reduction of Area	Brinell Hardness
80,000	70,000	16%	50%	156

MACHINABILITY — 1117 has a machinability rating of 91%, based on 1212 as 100%. Average surface cutting speed is 150 feet per minute. 11L17 will machine at approximately 170 surface feet per minute.

WELDABILITY — This grade is not readily welded due to high sulphur content. Gas or arc welding may be used providing joints are preheated. To develop equivalent strength in a weld, a low alloy filler is recommended. Stress relieving after welding is also recommended. The grade of welding rod to be used depends on the thickness of section, design, service requirements, etc.

HARDENING — This grade will respond to any of the standard carburizing methods and subsequent heat treatments. For a hard case and a tough core, the following heat treatment is suggested: Carburize at 1650º-1700ºF for approximately eight hours. Cool in box and reheat to 1400º-1450ºF. Quench in water and draw at 300º-350ºF.

1117 COLD DRAWN SQUARES

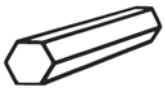
Stock Lengths: 12' Approx.

Size In Inches	Estimated Weight, Lbs. Per Foot	12 Ft. Bar	Size In Inches	Estimated Weight, Lbs. Per Foot	12 Ft. Bar
1	3.403	40.84	2 1/2	21.27	255.2
1/8	4.307	51.69	3	30.63	367.5
1/4	5.318	63.81	1/2	41.69	500.3
3/8	6.434	77.21	3/4	47.86	574.3
1/2	7.657	91.89	4 1/2	68.91	827.0
2	13.61	163.4	5	85.08	1021

1117 AND 11L17 (Leaded) COLD FINISHED ROUNDS

Stock Lengths: 12' and 20', Approx.

Size In Inches	Estimated Weight, Lbs. Per Foot	12-Ft. Bar	20-Ft. Bar
1/8	.0418	.5012	—
3/16	.0940	1.128	—
7/32	.1279	1.535	—
1/4	.1671	2.005	—
9/32	.2114	2.537	—
5/16	.2610	3.132	—
11/32	.3158	3.790	—
3/8	.3759	4.510	—
13/32	.4411	5.293	—
7/16	.5116	6.139	—
15/32	.5873	7.048	—
1/2	.6682	8.019	—
17/32	.7544	9.052	—
9/16	.8457	10.15	—
5/8	1.044	12.53	—
21/32	1.151	13.81	23.02
11/16	1.263	15.16	25.27
3/4	1.504	18.04	30.07
13/16	1.765	21.17	35.29
7/8	2.046	24.56	40.93
15/16	2.349	28.19	46.98
31/32	2.508	30.10	50.17
1	2.673	32.07	53.46
1/64	2.757	33.08	55.14
1/16	3.017	36.21	60.35
1/8	3.383	40.59	67.66
3/16	3.769	45.23	75.38
1/4	4.176	50.12	83.53
5/16	4.604	55.25	92.09
3/8	5.053	60.64	101.1
7/16	5.523	66.28	110.5
1/2	6.014	72.17	120.3
9/16	6.526	78.31	130.5
5/8	7.058	84.70	141.2
11/16	7.612	91.34	152.2
3/4	8.186	98.23	163.7
13/16	8.781	105.4	175.6
7/8	9.397	112.8	187.9
15/16	10.03	120.4	200.7
2	10.69	128.3	213.8
1/16	11.37	136.4	227.4
1/8	12.07	144.8	241.4
3/16	12.79	153.5	255.8
1/4	13.53	162.4	270.6
5/16	14.29	171.5	285.9
3/8	15.08	180.9	301.5
7/16	15.88	190.6	317.6
1/2	16.71	200.5	334.1
9/16	17.55	210.6	351.0
5/8	18.42	221.0	368.4
11/16	19.31	213.7	386.1
3/4	20.21	242.6	404.3
13/16	21.14	253.7	422.9
7/8	22.09	265.1	441.9
15/16	23.06	276.8	461.3
3	24.06	288.7	481.1
1/8	26.10	313.2	522.0
1/4	28.23	338.8	564.6
3/8	30.45	365.3	608.9
1/2	32.74	392.9	654.8
5/8	35.12	421.5	702.5
3/4	37.59	451.0	751.7
7/8	40.14	481.6	802.7
4	42.77	513.2	855.3
1/8	45.48	545.8	909.6
1/4	48.28	579.3	965.6
3/8	51.16	613.9	1023
1/2	54.13	649.5	1083
3/4	60.31	723.7	1206
7/8	63.52	762.3	1270
5	66.82	801.9	1336
1/4	73.67	884.0	1473
1/2	80.86	970.2	1617
3/4	88.37	1060	1767
6	96.22	1155	1924



1117 COLD DRAWN HEXAGONS

Stock Lengths 11' to 13'

Size In Inches	Est. Wt., Lbs. Per Foot	12-Ft. Bar
1/4	.1842	2.210
5/16	.2878	3.454
3/8	.4145	4.973
7/16	.5641	6.769
1/2	.7368	8.842
9/16	.9325	11.19
5/8	1.151	13.82
11/16	1.393	16.72
3/4	1.658	19.89
13/16	1.946	23.35
7/8	2.257	27.08
15/16	2.590	31.08
1	2.947	35.37
1/16	3.327	39.93
1/8	3.730	44.76
3/16	4.156	49.87
1/4	4.605	55.26
5/16	5.077	60.93
3/8	5.572	66.87
7/16	6.090	73.08
1/2	6.631	79.56
5/8	7.783	93.39
11/16	8.393	100.7
3/4	9.026	108.3
13/16	9.682	116.2
7/8	10.36	124.3
2	11.79	141.5
1/8	13.31	159.7
1/4	14.92	179.0
3/8	16.62	199.5
7/16	17.51	210.1
1/2	18.42	221.0
5/8	20.31	243.7
3/4	22.29	267.5
3	26.53	318.3

11L17 (LEADED) COLD DRAWN FLATS

Stock Lengths 10' and 12'

Size In Inches		Estimated Weight, Lbs. Per Foot	12-Ft. Bar
5/16 x	1	1.064	12.76
3/8 x	1 1/4	1.595	19.14
	1 1/2	1.914	22.97
	2	2.552	30.63
	2 1/2	3.191	38.29
	3	3.829	45.94
	3 1/4	4.148	49.77
1/2 x	3/4	1.276	15.31
	7/8	1.489	17.87
	1	1.702	20.42
	1 1/2	2.552	30.63
	1 3/4	2.978	35.73
	2	3.403	40.84
	2 1/2	4.254	51.05
5/8 x	1	2.127	25.52
	1 1/2	3.191	38.29
	2	4.254	51.05
	3	6.381	76.57
	3 1/2	7.445	89.33
	3 3/4	7.976	95.72
	4 1/2	9.572	114.9
	5 1/2	11.70	140.4
3/4 x	1 1/4	3.191	38.29
	1 1/2	3.829	45.94
	2	5.105	61.26
	2 1/2	6.381	76.57
	3	7.657	91.89
	4 1/2	11.49	137.8
	5	12.76	153.1
	6	15.31	183.8
	6 1/2	16.59	199.1
7/8 x	5	14.89	178.7
	6 1/2	19.36	232.3
1 x	1 1/4	4.254	51.05
	1 1/2	5.105	61.26
	1 5/8	5.530	66.36
	1 3/4	5.956	71.47
	2	6.806	81.68
	2 1/4	7.657	91.89
	2 1/2	8.508	102.1
	2 3/4	9.359	112.3
	3	10.21	122.5
	4	13.61	163.4
	4 1/2	15.31	183.8
	7 1/2	25.52	306.3
	8 1/2	28.93	347.2
1 1/8 x	2	7.657	91.89
	2 1/2	9.572	114.9
	3	11.49	137.8
1 1/4 x	1 3/8	5.264	63.17
	1 1/2	6.381	76.57
	1 3/4	7.445	89.33
	2 1/2	10.64	127.6
	3 3/4	15.95	191.4
	4	17.02	204.2
	4	19.14	229.7
	5	21.27	255.2
	5 1/2	23.40	280.8

Size In Inches		Estimated Weight, Lbs. Per Foot	12-Ft. Bar
1 3/8 x	4 1/2	21.05	252.7
	5 1/2	25.73	308.8
1 1/2 x	1 3/4	8.933	107.2
	2	10.21	122.5
	2 1/2	12.76	153.1
	3	15.31	183.8
	3 1/2	17.87	214.4
	4	20.42	245.0
	4 1/2	22.97	275.7
	5	25.52	306.3
	6	30.63	367.5
	6 1/2	33.18	398.2
	7	35.73	428.8
	8 1/2	43.39	520.7
1 5/8 x	2 1/2	13.83	165.9
	3	16.59	199.1
	3 1/2	19.36	232.3
1 3/4 x	2 1/2	14.89	178.7
	3	17.87	214.4
	3 1/2	20.84	250.1
	3 3/4	22.33	268.0
	4	23.82	285.9
	4 1/2	26.80	321.6
	5	29.78	357.3
	5 1/2	32.76	393.1
	6 1/2	38.71	464.5
1 7/8 x	3 3/4	23.93	287.1
	4 1/2	28.71	344.5
2 x	2 1/2	17.02	204.2
	3	20.42	245.0
	4	27.23	326.7
	4 1/2	30.63	367.5
	5	34.03	408.4
	5 1/2	37.44	449.2
	6	40.84	490.1
	6 1/2	44.24	530.9
	8	54.45	653.4
	8 1/2	57.85	694.3
2 1/8 x	6 1/2	47.01	564.1
2 1/4 x	2 1/2	19.14	229.7
	3 3/4	28.71	344.5
	5	38.29	459.4
	7 1/2	57.43	689.2
2 1/2 x	3	25.52	306.3
	3 1/2	29.78	357.3
	6 1/2	55.30	663.6
3 x	4	40.84	490.1

1137 AND 1141 COLD FINISHED BARS

ASTM A 108
UNS G 11370 UNS G 11410

Color Marking

1137: Ends Painted Gold

1141: Ends Painted Purple

These grades are medium-carbon steels processing higher mechanical properties than other medium carbon steels, as well as free machining properties.

ANALYSIS

	Carbon	Manganese	Phosphorus	Sulphur
1137	.32/.39	1.35/1.65	.04 Max.	.08/.13
1141	.37/.45	1.35/1.65	.04 Max.	.08/.13

APPLICATIONS — These grades, because of their free machining properties, are usually processed in automatic screw machines. They are recommended for studs, axles, pins, bolts, and various machinery parts requiring considerable machining, close finish tolerances, bright finish, and high mechanical properties.

MECHANICAL PROPERTIES — The following values are average for 1" round, and may be considered as representative of these grades:

	Tensile Strength (psi)	Yield Strength (psi)	Elongation in 2"	Reduction of Area	Brinell Hardness
1137	95,000	85,000	11%	30%	187
1141	100,000	90,000	10%	30%	197

MACHINABILITY — 1137 has a machinability rating of 72%, based on 1212 as 100%. Average surface cutting speed is 120 feet per minute. 1141 has a machinability rating of 70%, based on 1212 as 100%. Average surface cutting speed is 115 feet per minute.

WELDABILITY — These grades are not readily welded due to the higher carbon and sulphur content. Gas of arc welding may be used providing joints are preheated. To develop equivalent strength in a weld, a low alloy filler is recommended. Stress relieving after welding is also recommended. The grade of welding rod to be used depends on the thickness of section, design, service requirements, etc.

HARDENING — Although primarily oil hardening steels, these grades can be water quenched, but great care should be exercised when this is done. The quenching temperature is 1500º-1600ºF, with the temperature being 25ºF lower for water quench. Temper to required hardness.

1137 AND 1141 COLD FINISHED ROUNDS

Stock Lengths: 12' Approx.

Size In Inches	Estimated Weight, Lbs. Per Foot	12-Ft. Bar	Size In Inches	Estimated Weight, Lbs. Per Foot	12-Ft. Bar
3/16	.0940	1.128	1 11/16	7.612	91.34
1/4	.1671	2.005	3/4	8.186	98.23
5/16	.2610	3.132	13/16	8.781	105.4
3/8	.3759	4.510	7/8	9.397	112.8
7/16	.5116	6.139	15/16	10.03	120.4
1/2	.6682	8.019	2	10.69	128.3
9/16	.8457	10.15	1/16	11.37	136.4
5/8	1.044	12.53	1/8	12.07	144.8
41/64	1.097	13.16	3/16	12.79	153.5
21/32	1.151	13.81	1/4	13.53	162.4
11/16	1.263	15.16	5/16	14.29	171.5
3/4	1.504	18.04	3/8	15.08	180.9
49/64	1.567	18.80	7/16	15.88	190.6
25/32	1.631	19.58	1/2	16.71	200.5
13/16	1.765	21.17	5/8	18.42	221.0
7/8	2.046	24.56	3/4	20.21	242.6
29/32	2.195	26.34	7/8	22.09	265.1
15/16	2.349	28.19	3	24.06	288.7
31/32	2.508	30.10	1/8	26.10	313.2
1	2.673	32.07	3/16	27.16	325.9
1/16	3.017	36.21	1/4	28.23	338.8
1/8	3.383	40.59	3/8	30.45	365.3
3/16	3.769	45.23	1/2	32.74	392.9
1/4	4.176	50.12	5/8	35.12	421.5
5/16	4.604	55.25	3/4	37.59	451.0
3/8	5.053	60.64	4	42.77	513.2
7/16	5.523	66.28	1/4	48.28	579.3
1/2	6.014	72.17	1/2	54.13	649.5
9/16	6.526	78.31	3/4	60.31	723.7
5/8	7.058	84.70	5	66.82	801.9
			1/2	80.86	970.2

STRESSPROOF® AND 1144 HI STRESS
COLD FINISHED BARS
ASTM A 311 Class B UNS G11440

Color Marking: Ends painted Gray

These are carbon-manganese free machining grades which have been severely cold worked to produce high tensile properties. The bars are specially treated to relieve the stresses set up by the cold working, thus minimizing the tendency toward warpage after machining which is common in ordinary cold-drawn bars.

These steels have built-in high strength hardness, and wearability, without the necessity of heat treatment. Thus they are often used for parts requiring mechanical properties ordinarily obtained by heat treating an alloy grade to the Rockwell C hardness range of 23-30 after machining.

Both grades are available as Cold Drawn Bars or Ground and Polished Bars. The latter possess the close tolerances and fine finish normally found in ground and polished bars, plus the combination of free machinability, minimum warpage, high strength, and wearability not found in ordinary steels.

ANALYSIS

	Carbon	Manganese	Phosphorus	Sulphur
STRESSPROOF®	.40/.48	1.35/1.65	.040 Max.	.24/.33
1144 Hi Stress	.40/.48	1.35/1.65	.040 Max.	.24/.33

APPLICATIONS — Arbors, keyed shafts, spindles, gears, pinions, piston rods, sleeves, lead screws, racks, motor shafts, splined shafts, link pins, mandrels, boring bars, collets, bushings, drive-shafts, armature shafts, rotary pump shafts, gusher pump shafts, king pins, oil and water pump shafts, wrist pins, etc.

MECHANICAL PROPERTIES — The following are minimum properties per ASTM A311 Class B:

	Yield Strength (psi)	Tensile Strength (psi)	Elongation in 2"	Reduction of Area	Typical Rockwell "C" Hardness
Thru 2"	100,000	115,000	8%	25%	26
Over 2" thru 3"	100,000	115,000	8%	20%	25
Over 3"	100,000	115,000	7%	20%	24

MACHINABILITY — Machinability ratings are based on 1212 as 100%.
STRESSPROOF® — 83%, cutting speed 140 surface feet per minute.
1144 Hi Stress — 79%, cutting speed 130 surface feet per minute.

WELDABILITY — Welding of these grades is not recommended.

For more complete data on this steel, ask for special literature.

STRESSPROOF® and 1144 HI STRESS HEXAGONS
Cold Drawn
Stock Lengths: 20' Approx.

Size In Inches	Estimated Weight, Lbs. Per Foot	12-Ft. Bar	Size In Inches	Estimated Weight, Lbs. Per Foot	12-Ft. Bar
3/8	.4145	4.973	1	2.947	35.37
7/16	.5641	6.769	1 1/16	3.327	39.93
1/2	.7368	8.842	1 1/8	3.730	44.76
9/16	.9325	11.19	1 1/4	4.605	55.26
5/8	1.151	13.82	1 3/8	5.572	66.87
11/16	1.393	16.72	1 1/2	6.631	79.56
3/4	1.658	19.89	1 5/8	7.783	93.39
13/16	1.946	23.35	1 3/4	9.026	108.3
7/8	2.257	27.08	2	11.79	141.5
15/16	2.590	31.08			

STRESSPROOF® AND 1144 HI STRESS ROUNDS

Cold Drawn
Stock Lengths: 12' Approx.

Size In Inches	Est. Wt., Lbs. Per Foot	12-Ft. Bar
7/32	.1280	1.540
1/4	.1671	2.005
17/64	.1886	2.263
9/32	.2114	2.537
5/16	.2610	3.132
21/64	.2878	3.453
3/8	.3759	4.510
25/64	.4078	4.894
27/64	.4758	5.710
7/16	.5116	6.139
1/2	.6682	8.019
33/64	.7106	8.527
17/32	.7544	9.052
9/16	.8457	10.15
5/8	1.044	12.53
41/64	1.097	13.16
11/16	1.263	15.16
3/4	1.504	18.04
49/64	1.567	18.80
13/16	1.765	21.17
7/8	2.046	24.56
57/64	2.120	25.44
15/16	2.349	28.19
1	2.673	32.07
1/64	2.757	33.08
1/16	3.017	36.21
1/8	3.383	40.59
5/32	3.573	42.88
3/16	3.769	45.23
1/4	4.176	50.12
5/16	4.604	55.25
11/32	4.826	57.91
3/8	5.053	60.64
7/16	5.523	66.28
1/2	6.014	72.17
9/16	6.526	78.31
5/8	7.058	84.70
11/16	7.612	91.34
1 3/4	8.186	98.23
13/16	8.781	105.4
7/8	9.397	112.8
15/16	10.03	120.4
2	10.69	128.3
1/16	11.37	136.4
1/8	12.07	144.8
3/16	12.79	153.5
1/4	13.53	162.4
5/16	14.29	171.5
3/8	15.08	180.9
7/16	15.88	190.6
1/2	16.71	200.5
9/16	17.55	210.6
5/8	18.42	221.0
11/16	19.31	231.7
3/4	20.21	242.6
13/16	21.14	253.7
7/8	22.09	265.1
15/16	23.06	276.8
3	24.06	288.7
1/16	25.07	300.8
1/8	26.10	313.2
1/4	28.23	338.8
5/16	29.33	351.9
3/8	30.45	365.3
7/16	31.58	379.0
1/2	32.74	392.9
5/8	35.12	421.5
3/4	37.59	451.0
7/8	40.14	481.6
15/16	41.44	497.3
4	42.77	513.2
1/8	45.48	545.8
1/4	48.28	579.3
3/8	51.16	613.9
1/2	54.13	649.5

Ground & Polished
Stock Lengths: 20' Approx.

Size In Inches	Est. Wt., Lbs. Per Foot	20-Ft. Bar
5/16	.2610	5.220
3/8	.3759	7.517
7/16	.5116	10.23
1/2	.6682	13.36
9/16	.8457	16.91
5/8	1.044	20.88
11/16	1.263	25.27
3/4	1.504	30.07
13/16	1.765	35.29
7/8	2.046	40.93
15/16	2.349	46.98
1	2.673	53.46
1/16	3.017	60.35
1/8	3.383	67.66
3/16	3.769	75.38
1/4	4.176	83.53
5/16	4.604	92.09
3/8	5.053	101.1
7/16	5.523	110.5
1/2	6.014	120.3
5/8	7.058	141.2
1 11/16	7.612	152.2
3/4	8.186	163.7
7/8	9.397	187.9
15/16	10.03	207.2
2	10.69	213.8
1/8	12.07	241.4
3/16	12.79	255.8
1/4	13.53	270.6
3/8	15.08	301.5
7/16	15.88	317.6
1/2	16.71	334.1
5/8	18.42	368.4
3/4	20.21	404.3
15/16	23.06	461.2
3	24.06	481.1
1/4	28.23	564.6
1/2	32.74	654.8
3/4	37.59	751.7
15/16	41.44	828.8
4	42.77	855.3
1/4	48.28	965.6
1/2	54.13	1083

FATIGUE-PROOF®
COLD FINISHED BARS
ASTM A 108 UNS G11440

Color Marking: Ends painted Red and White

FATIGUE-PROOF® is a medium-carbon free-machining steel with higher mechanical properties than its companion product, STRESSPROOF®. These properties are produced by a process of drawing steel at elevated temperatures, developed and patented by LaSalle Steel Co. The result is a steel with high tensile strength, uniformity of properties, and excellent machinability.

This product possesses high strength as it is received from the mill, and no subsequent heat treatment is required. The strength is remarkably uniform from the surface to the center of the bar and from end to end. Properties are not adversely affected by exposure to temperatures up to 600ºF. Where higher hardness is required, material may be selectively hardened by induction heating. Water quenching will produce Rockwell "C" 60, and oil quenching will yield Rockwell "C" 50-55.

FATIGUE-PROOF® has excellent machinability for a material of its strength. In standard practice, it will machine up to 25% faster than annealed alloy steels and up to 75% faster than heat-treated alloy steels. Excellent dimensional stability is maintained. Tool use as well as surface finish is better.

ANALYSIS

Carbon	Manganese	Phosphorus	Sulphur	Silicon
.40/.48	1.35/1.65	.040 Max.	.24/.33	.15/.35

APPLICATIONS — Shafts, spindles, gears, arbors, pinions, lead screws, wrist pins, milling machine spindles, splined power take-off shafts, pump shafts, etc.

MECHANICAL PROPERTIES—FATIGUE-PROOF® possesses the minimum tensile, yield, and hardness values shown below. Other properties shown are typical of the grade.

Tensile Strength (psi)	Yield Strength (psi)	Elongation in 2"	Reduction of Area	Brinell Hardness
140,000	125,000	5-15%	15-30%	280

MACHINABILITY—FATIGUE-PROOF® machines approximately 80% as fast as 1212. Average surface cutting speed is 134 feet per minute.

WELDABILITY — Welding of this grade is not recommended. However, it can be welded using a coated low hydrogen rod. Amperage and penetration must be kept low.

FATIGUE-PROOF® ROUNDS
Cold Drawn
Stock Lengths 12'

Size In Inches	Estimated Weight, Lbs. Per Foot	Estimated Weight, Lbs. 12-Ft. Bar	Size In Inches	Estimated Weight, Lbs. Per Foot	Estimated Weight, Lbs. 12-Ft. Bar
1/4	.1671	2.005	1 5/16	4.604	55.25
5/16	.2610	3.132	3/8	5.053	60.64
3/8	.3759	4.510	7/16	5.523	66.28
7/16	.5120	6.144	1/2	6.014	72.17
1/2	.6682	8.019	9/16	6.526	78.31
9/16	.8457	10.15	5/8	7.058	84.70
5/8	1.044	12.53	11/16	7.612	91.34
21/32	1.151	13.81	3/4	8.186	98.23
11/16	1.263	15.16	13/16	8.781	105.4
3/4	1.504	18.04	7/8	9.397	112.8
13/16	1.765	21.17	15/16	10.03	120.4
7/8	2.046	24.56	2	10.69	128.3
15/16	2.349	28.19	1/8	12.07	144.8
1	2.673	32.07	3/16	12.79	153.5
1/16	3.017	36.21	1/4	13.53	162.4
1/8	3.383	40.59	3/8	15.08	180.9
3/16	3.769	45.23	1/2	16.71	200.5
1/4	4.176	50.12	5/8	18.42	221.0

CHROME PLATED CARBON STEEL BARS
C1045, C1050, 1045 MICROALLOY
ASTM B117 Salt Spray Tested
UNS G10450, G10500

This material is intended for use primarily as cylinder piston rods.

ANALYSIS

	C	Mn	P	S	Si	V
C1045	.43/.50	.60/.90	.04 Max	.05 Max		
C1050	.45/.55	.70/1.00	.04 Max	.05 Max		
1045 Microalloy	.44	.80	.014	.27	.31	.105

MECHANICAL PROPERTIES (Typical)

C1045 Microalloy	100 ksi Tensile, 75 ksi Yield, 20% Elongation
C1045 Hot Rolled	60 ksi Tensile, 50 ksi Yield, 26% Elongation
C1045/C1050 Cold Drawn	113 ksi Tensile, 100 ksi Yield, 20% Elongation
C1045/C1050 Cold Drawn Induction Hardened	115 ksi Tensile, 100 ksi Yield, 20% Elongation

Chrome Thickness:	.0005" Minimum except 1 1/2" from each end not plated.
Chrome Hardness:	HRC 68-72
Surface Finish:	16 RMS Max.
Induction Hardened Case Depth:	.050" Minimum except 1 1/2" from each end is not hardened.
Induction Hardened Surface:	HRC 50 Minimum

SIZES AND WEIGHTS — Round

OD	Wt/Ft	50	75	100	100 IH
0.313	.0262		x	x	
0.375	.0376		x	x	
0.500	0.668		x	x	x
0.625	1.044		x	x	x
0.750	1.504		x	x	x
0.875	2.046		x	x	
1.000	2.673		x	x	x
1.250	4.176		x	x	x
1.375	5.053		x	x	x
1.500	6.014		x	x	x
1.625	7.058		x	x	x
1.750	8.186		x	x	x
1.875	9.397		x	x	x
2.000	10.692		x	x	x
2.250	13.532		x	x	x
2.500	16.706		x	x	x
2.750	20.214		x	x	x
3.000	24.056		x	x	x
3.250	28.233		x	x	x
3.500	32.743		x	x	x
3.750	37.588		x	x	x
4.000	42.766		x	x	x
4.250	48.279		x	x	
4.500	54.126	x			
4.750	60.307	x			
5.000	66.823	x			
5.500	80.855	x			
6.000	96.224	x			
7.000	130.972	x			

1050 CARBON BAR FOR TIE-ROD APPLICATION

ASTM A 108 UNS G10500

1050 heavy draft cold drawn bar has a modified stress relief anneal to provide a 100 ksi minimum yield. Material is used where greater strength is required.

BRITISH STANDARD SPECIFICATIONS — 060 A 47, 080 M 46

APPLICATIONS — Primary used is for tie-rods for high pressure hydraulic cylinders.

SIZE RANGE — .236" - 1.250" (6mm - 32mm). Sizes are produced under nominal size to allow roll threading up to standard nut sizes.

TYPICAL CHEMICAL ANALYSIS

Carbon	Manganese	Phosphorus	Sulphur
.48/.55	.70/.100	.04 Max	.05 Max

TYPICAL MECHANICAL PROPERTIES

Tensile Strength (psi)	Yield Point (psi)	Elongation (in 2")
115,000	100,000 min.	19% -26%

AVERAGE CUTTING SPEED — 95-105 ft./min.

WELDABILITY — Not readily welded due to higher carbon content.

HARDENING — This steel is essentially water-hardening but may be quenched in oil.

HEAT TREATING — Responds to heat treatment. A wide range of properties can be obtained.

SIZES AND WEIGHTS — Round

Size(in.)	Lb/ft.
.225/.222	.1353
.284/.21	.2155
.346/.343	.3199
.466/.463	.5804
.587/.584	.9209
.706/.703	1.3322
.827/.824	1.8280
.951/.948	2.4173
1.069/1.065	3.0544
1.194/1.190	3.8105

Note: For all cold finished carbon bars, mechanical properties are not generally reported on our test reports.

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