



COLD DRAWN

- 1018
- 1045
- 1045 TG&P
- 1215
- 12L14
- 1117, 11L17
- 1141
- 1144
- FATIGUE PROOF®
- Tolerances

1018 COLD FINISHED BARS

ATSM A108

1018 (CF) - A low carbon steel with a medium manganese content. It has good hardening properties and fair machinability. Suitable for shafting and for applications that do not require the greater strength of high carbon and alloy steels.

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 that require 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 & pol.	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 license, 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 1650°F – 1700°F for approximately eight hours, cool in box and reheat to 1400°F – 1450°F. Quench in water and draw at 300°F – 350°F.

1018 COLD FINISHED ROUNDS

STOCK LENGTHS: 12' & 20' RANDOM

Size In Inches	Est. Wt. Lbs		Size In Inches	Est. Wt. Lbs		Size In Inches	Est. Wt. Lbs	
	Per Foot	20ft Bar		Per Foot	20ft Bar		Per Foot	20ft Bar
1/8	0.0418	0.8353	7/8	9.397	187.9	3/8	51.16	1023
5/32	0.0653	1.305	15/16	10.03	200.7	7/16	52.63	1053
3/16	.0940	1.879	2"	10.69	213.8	1/2	54.13	1083
7/32	0.1279	2.558	1/16	11.37	227.4	9/16	55.64	1113
1/4	0.1671	3.341	1/8	12.07	241.4	5/8	57.18	1143
9/32	0.2114	4.229	3/16	12.79	255.8	11/16	58.73	1175
5/16	0.2610	5.220	1/4	13.53	270.6	3/4	60.31	1206
11/32	0.3158	6.317	5/16	14.29	285.9	7/8	63.52	1270
3/8	0.3759	7.517	3/8	15.08	301.5	15/16	65.16	1303
13/32	0.4411	8.822	7/16	15.88	317.6	5"	66.82	1336
7/16	0.5116	10.23	1/2	16.71	334.1	1/8	70.21	1404
15/32	0.5873	11.75	9/16	17.55	351.0	1/4	73.67	1473
1/2	0.6682	13.36	5/8	18.42	368.4	5/16	75.44	1509
17/32	0.7544	15.09	11/16	19.31	386.1	3/8	77.22	1544
9/16	0.8457	16.91	3/4	20.21	404.3	7/16	79.03	1581
5/8	1.044	20.88	13/16	21.14	422.9	1/2	80.86	1617
11/16	1.263	25.27	7/8	22.09	441.9	5/8	84.57	1691
23/32	1.381	27.62	15/16	23.06	461.3	3/4	88.37	1767
3/4	1.504	30.07	3"	24.06	481.1	7/8	92.26	1845
13/16	1.765	35.29	1/16	25.07	501.4	15/16	94.23	1885
7/8	2.046	40.93	1/8	26.10	522.0	6"	96.22	1924
15/16	2.349	46.98	3/16	27.16	543.1	1/8	100.3	2005
1"	2.673	53.46	1/4	28.23	564.6	1/4	104.4	2088
1/64	2.757	55.14	5/16	29.33	586.6	1/2	112.9	2259
1/32	2.843	56.85	3/8	30.45	608.9	3/4	121.8	2436
1/16	3.017	60.35	7/16	31.58	631.7	7"	131.0	2619
1/8	3.383	67.66	1/2	32.74	654.8	1/4	140.5	2810
3/16	3.769	75.38	9/16	33.92	678.4	1/2	150.4	3007
1/4	4.176	83.53	5/8	35.12	702.5	3/4	160.5	3211
5/16	4.604	92.09	11/16	36.35	726.9	8"	171.1	3421
3/8	5.053	101.1	3/4	37.59	751.7	1/2	193.1	3862
7/16	5.523	110.5	7/8	40.14	802.7	9"	216.5	4330
1/2	6.014	120.3	15/16	41.44	828.8	1/2	241.2	4824
9/16	6.526	130.5	4"	42.77	855.3	10"	267.3	5346
5/8	7.058	141.2	1/8	45.48	909.6	1/2	294.7	5894
11/16	7.612	152.2	3/16	46.87	937.4	11"	323.4	6468
3/4	8.186	163.7	1/4	48.28	965.6	1/2	353.5	7070
13/16	8.781	175.6	5/16	49.71	994.2	12"	384.9	7698

1018 COLD DRAWN HEXAGONS

STOCK LENGTHS 12' RANDOM

Size In Inches	Est. Wt. Lbs		Size In Inches	Est. Wt. Lbs		Size In Inches	Est. Wt. Lbs	
	Per Ft.	12Ft. Bar		Per Ft.	12Ft. Bar		Per Ft.	12Ft. Bar
3/16	0.1036	1.243	1"	2.947	35.37	2"	11.79	141.5
1/4	0.1842	2.210	1/16	3.327	39.93	1/8	13.31	159.7
5/16	0.2878	3.454	1/8	3.730	44.76	1/4	14.92	179.0
3/8	0.4145	4.973	3/16	4.156	49.87	3/8	16.62	199.5
7/16	0.5641	6.769	1/4	4.605	55.26	7/16	17.51	210.1
1/2	0.7368	8.842	5/16	5.077	60.93	1/2	18.42	221.0
9/16	0.9325	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

STOCK LENGTHS 12' RANDOM

Size In Inches	Est. Wt. Lbs		Size In Inches	Est. Wt. Lbs		Size In Inches	Est. Wt. Lbs	
	Per Ft.	12Ft. Bar		Per Ft.	12Ft. Bar		Per Ft.	12Ft. Bar
1/8	0.0531	0.6381	1"	3.403	40.84	2-1/4	17.23	206.7
3/16	0.1196	1.436	1/16	3.842	46.10	3/8	19.20	230.4
1/4	0.2127	2.552	1/8	4.307	51.69	1/2	21.27	255.2
5/16	0.3323	3.988	3/16	4.799	57.59	5/8	23.45	281.4
3/8	0.4786	5.743	1/4	5.318	63.81	3/4	25.74	308.8
7/16	0.6514	7.817	5/16	5.863	70.35	3"	30.63	367.5
1/2	0.8508	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 12' RANDOM

Size In Inches	Est. Wt. Lbs		Size In Inches	Est. Wt. Lbs		Size In Inches	Est. Wt. Lbs	
	Per Ft.	12Ft. Bar		Per Ft.	12Ft. Bar		Per Ft.	12Ft. Bar
1/8 x			3/16 x			5/16 x		
3/16	0.0798	0.9576	8"	5.105	61.26	1-1/2	1.595	19.14
1/4	0.1064	1.276	9"	5.743	68.91	1-5/8	1.729	20.74
5/16	0.1329	1.595	10"	6.381	76.57	1-3/4	1.861	22.33
3/8	0.1595	1.914	12"	7.657	91.89	2"	2.127	25.52
7/16	0.1861	2.233	1/4 x			2-1/4	2.393	28.71
1/2	0.2127	2.552	5/16	0.2659	3.191	2-1/2	2.659	31.91
9/16	0.2393	2.872	3/8	0.3191	3.829	2-3/4	2.925	35.10
5/8	0.2659	3.191	7/16	0.3722	4.467	3"	3.191	38.29
11/16	0.2925	3.510	1/2	0.4254	5.105	3-1/2	3.722	44.68
3/4	0.3191	3.829	9/16	0.4786	5.743	4"	4.254	51.05
7/8	0.3722	4.467	5/8	0.5318	6.381	4-1/2	4.786	57.43
1"	0.4254	5.105	3/4	0.6381	7.657	5"	5.318	63.81
1-1/8	0.4786	5.743	7/8	0.7445	8.933	5-1/2	5.849	70.19
1-1/4	0.5318	6.381	1"	0.8508	10.21	6"	6.381	76.57
1-3/8	0.5849	7.019	1-1/8	0.9572	11.49	8"	8.508	102.1
1-1/2	0.6381	7.657	1-1/4	1.064	12.76	10"	10.64	127.6
1-3/4	0.7445	8.933	1-3/8	1.170	14.04	12"	12.76	153.1
2"	0.8508	10.21	1-1/2	1.276	15.31	3/8 x		
2-1/4	0.9572	11.49	1-5/8	1.383	16.59	7/16	0.5583	6.700
2-1/2	1.064	12.76	1-3/4	1.489	17.87	1/2	0.6381	7.657
2-3/4	1.170	14.04	1-7/8	1.595	19.14	9/16	0.7179	8.615
3"	1.276	15.31	2"	1.702	20.42	5/8	0.7976	9.572
3-1/2	1.489	17.87	2-1/4	1.914	22.97	3/4	0.9572	11.49
4"	1.702	20.42	2-1/2	2.127	25.52	7/8	1.117	13.40
4-1/2	1.914	22.97	2-3/4	2.340	28.08	1"	1.276	15.31
5"	2.127	25.52	3"	2.552	30.63	1-1/8	1.436	17.23
6"	2.552	30.63	3-1/4	2.765	33.18	1-1/4	1.595	19.14
8"	3.403	40.84	3-1/2	2.978	35.73	1-3/8	1.755	21.06
10"	4.254	51.05	3-3/4	3.191	38.29	1-1/2	1.914	22.97
12"	5.105	61.26	4"	3.403	40.84	1-5/8	2.074	24.89
3/16 x			4-1/4	3.616	43.39	1-3/4	2.233	26.80
1/4	0.1595	1.914	4-1/2	3.829	45.94	1-7/8	2.393	28.72
5/16	0.1994	2.393	4-3/4	4.041	48.50	2"	2.552	30.63
3/8	0.2393	2.871	5"	4.254	51.05	2-1/4	2.871	34.46
7/16	0.2792	3.350	5-1/4	4.467	53.60	2-1/2	3.191	38.29
1/2	0.3191	3.829	5-1/2	4.679	56.15	2-3/4	3.510	42.11
5/8	0.3988	4.786	5-3/4	4.892	58.70	3"	3.829	45.94
3/4	0.4786	5.743	6"	5.105	61.26	3-1/4	4.148	49.77
7/8	0.5583	6.700	6-1/2	5.530	66.36	3-1/2	4.467	53.60
1"	0.6381	7.657	7"	5.956	71.47	3-3/4	4.786	57.43
1-1/8	0.7179	8.614	8"	6.806	81.68	4"	5.105	61.26
1-1/4	0.7976	9.572	9"	7.657	91.89	4-1/4	5.424	65.09
1-3/8	0.8774	10.53	10"	8.508	102.1	4-1/2	5.743	68.91
1-1/2	0.9572	11.49	11"	9.359	112.3	4-3/4	6.062	72.74
1-3/4	1.117	13.40	12"	10.21	122.5	5"	6.381	76.57
1-7/8	1.196	14.35	14-5/8	12.44	149.3	5-1/4	6.700	80.40
2"	1.276	15.31	5/16 x			5-1/2	7.019	84.23
2-1/4	1.436	17.23	3/8	0.3988	4.786	5-3/4	7.338	88.06
2-1/2	1.595	19.14	7/16	0.4653	5.583	6"	7.657	91.89
2-3/4	1.755	21.06	1/2	0.5318	6.381	6-1/2	8.295	99.54
3"	1.914	22.97	9/16	0.5982	7.179	7"	8.933	107.2
3-1/4	2.074	24.89	5/8	0.6647	7.976	8"	10.21	122.5
3-1/2	2.233	26.80	3/4	0.7976	9.572	9"	11.49	137.8
3-3/4	2.393	28.71	7/8	0.9306	11.17	10"	12.76	153.1
4"	2.552	30.63	1"	1.064	12.76	11"	14.04	168.5
4-1/2	2.871	34.46	1-1/8	1.196	14.36	12"	15.31	183.8
5"	3.191	38.29	1-1/4	1.329	15.95	13-1/2	17.23	206.7
6"	3.829	45.94	1-3/8	1.462	17.55	14-5/8	18.66	224.0

1018 COLD DRAWN FLATS

STOCK LENGTHS 12' RANDOM

Size In Inches	Est. Wt. Lbs		Size In Inches	Est. Wt. Lbs		Size In Inches	Est. Wt. Lbs	
	Per Ft.	12Ft. Bar		Per Ft.	12Ft. Bar		Per Ft.	12Ft. Bar
7/16 x			9/16 x			3/4 x		
1/2	0.7445	8.933	5/8	1.196	14.35	2-3/4	7.019	84.23
5/8	0.9306	11.17	3/4	1.436	17.23	3"	7.657	91.89
3/4	1.117	13.40	7/8	1.675	20.10	3-1/4	8.295	99.54
7/8	1.303	15.63	1"	1.914	22.97	3-1/2	8.933	107.2
1"	1.489	17.87	1-1/4	2.393	28.72	3-3/4	9.572	114.9
1-1/8	1.675	20.10	1-1/2	2.871	34.46	4"	10.21	122.5
1-1/4	1.861	22.33	1-3/4	3.350	40.20	4-1/4	10.85	130.2
1-1/2	2.233	26.80	2"	3.829	45.95	4-1/2	11.49	137.8
1-3/4	2.606	31.27	2-1/2	4.786	57.43	4-3/4	12.12	145.4
2"	2.978	35.73	5/8 x			5"	12.76	153.1
2-1/4	3.350	40.20	11/16	1.462	17.54	5-1/2	14.04	168.5
2-1/2	3.722	44.67	3/4	1.595	19.14	6"	15.31	183.8
2-3/4	4.094	49.13	7/8	1.861	22.33	6-1/2	16.59	199.1
3"	4.467	53.60	1"	2.127	25.52	7"	17.87	214.4
4"	5.956	71.47	1-1/8	2.393	28.71	8"	20.42	245.0
4-1/2	6.700	80.40	1-1/4	2.659	31.91	9"	22.97	275.7
5"	7.445	89.33	1-3/8	2.925	35.10	10"	25.52	306.3
6"	8.933	107.2	1-1/2	3.191	38.29	11"	28.08	337.0
1/2 x			1-5/8	3.456	41.48	12"	30.63	367.5
9/16	0.9572	11.49	1-3/4	3.722	44.67	14"	35.73	428.8
5/8	1.064	12.76	2"	4.254	51.05	14-5/8	37.33	448.0
3/4	1.276	15.31	2-1/4	4.786	57.43	7/8 x		
7/8	1.489	17.87	2-1/2	5.318	63.81	1"	2.978	35.73
1"	1.702	20.42	2-3/4	5.849	70.19	1-1/8	3.350	40.20
1-1/8	1.914	22.97	3"	6.381	76.57	1-1/4	3.722	44.67
1-1/4	2.127	25.52	3-1/4	6.913	82.95	1-3/8	4.094	49.13
1-3/8	2.340	28.08	3-1/2	7.445	89.33	1-1/2	4.467	53.60
1-1/2	2.552	30.63	4"	8.508	102.1	1-3/4	5.211	62.53
1-5/8	2.765	33.18	4-1/4	9.040	108.5	2"	5.956	71.47
1-3/4	2.978	35.73	4-1/2	9.572	114.9	2-1/4	6.700	80.40
2"	3.403	40.84	4-3/4	10.10	121.2	2-1/2	7.445	89.33
2-1/4	3.829	45.94	5"	10.64	127.6	2-3/4	8.189	98.27
2-1/2	4.254	51.05	5-1/2	11.70	140.4	3"	8.933	107.2
2-3/4	4.679	56.15	6"	12.76	153.1	3-1/2	10.42	125.1
3"	5.105	61.26	6-1/2	13.83	166.0	4"	11.91	142.9
3-1/4	5.530	66.36	7"	14.89	178.7	4-1/2	13.40	160.8
3-1/2	5.956	71.47	8"	17.02	204.2	5"	14.89	178.7
3-3/4	6.381	76.57	9"	19.14	229.7	5-1/2	16.38	196.6
4"	6.806	81.68	10"	21.27	255.2	6"	17.87	214.4
4-1/4	7.232	86.78	11"	23.40	280.8	8"	23.82	285.9
4-1/2	7.657	91.89	12"	25.52	306.3	10"	29.78	357.3
4-3/4	8.083	96.99	14"	29.78	357.4	11"	32.76	393.1
5"	8.508	102.1	14-5/8	31.11	373.3	12"	35.73	428.8
5-1/4	8.933	107.2	11/16 x			1" x		
5-1/2	9.359	112.3	3/4	1.755	21.06	1-1/8	3.829	45.94
5-3/4	9.784	117.4	1"	2.340	28.08	1-1/4	4.254	51.05
6"	10.21	122.5	3/4 x			1-3/8	4.679	56.15
6-1/2	11.06	132.7	7/8	2.233	26.80	1-1/2	5.105	61.26
7"	11.91	142.9	1"	2.552	30.63	1-5/8	5.530	66.36
8"	13.61	163.4	1-1/8	2.871	34.46	1-3/4	5.956	71.47
9"	15.31	183.8	1-1/4	3.191	38.29	2"	6.806	81.68
10"	17.02	204.2	1-3/8	3.510	42.11	2-1/4	7.657	91.89
11"	18.72	224.6	1-1/2	3.829	45.94	2-1/2	8.508	102.1
12"	20.42	245.0	1-5/8	4.148	49.77	2-3/4	9.359	112.3
14"	23.82	285.8	1-3/4	4.467	53.60	3"	10.21	122.5
14-5/8	24.89	298.7	2"	5.105	61.26	3-1/4	11.06	132.7
			2-1/4	5.743	68.91	3-1/2	11.91	142.9
			2-1/2	6.381	76.57	3-3/4	12.76	153.1

1018 COLD DRAWN FLATS

STOCK LENGTHS 12' RANDOM

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

1045 COLD FINISHED BARS

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.

ANALYSIS

	Carbon	Manganese	Phosphorus	Sulphur
1045	0.43/ .50	0.60/ .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 & pol.	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 on 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 1550°F for water and 1575°F for oil. A wide range of mechanical properties can be obtained by tempering at different temperatures between 700°F and 1300°F. Tempering in the range from 500°F to 700°F should be avoided.

1045 COLD FINISHED BARS - Continued

1045 COLD FINISHED ROUNDS - STOCK LENGTHS: 12' RANDOM

Size In Inches	Est. Wt. Lbs		Size In Inches	Est. Wt. Lbs		Size In Inches	Est. Wt. Lbs	
	Per Ft.	12Ft. Bar		Per Ft.	12Ft. Bar		Per Ft.	12Ft. Bar
1/4	.1671	3.341	1-11/16	7.612	152.2	3-3/8	30.45	608.9
5/16	.2610	5.220	3/4	8.186	163.7	7/16	31.58	631.7
3/8	.3759	7.517	13/16	8.781	175.6	1/2	32.74	654.8
7/16	.5116	10.23	7/8	9.397	187.9	5/8	35.12	702.5
1/2	.6682	13.36	15/16	10.03	200.7	3/4	37.59	751.7
9/16	.8457	16.91	2"	10.69	213.8	15/16	41.44	828.8
5/8	1.044	20.88	1/16	11.37	227.4	4"	42.77	855.3
11/16	1.263	25.27	1/8	12.07	241.4	1/4	48.28	965.6
3/4	1.504	30.07	3/16	12.79	255.8	3/8	51.16	1023
13/16	1.765	35.29	1/4	13.53	270.6	7/16	52.63	1053
7/8	2.046	40.93	5/16	14.29	285.9	1/2	54.13	1083
15/16	2.349	46.98	3/8	15.08	301.5	5/8	57.18	1143
1"	2.673	53.46	7/16	15.88	317.6	3/4	60.31	1206
1/16	3.017	60.35	1/2	16.71	334.1	5"	66.82	1336
1/8	3.383	67.66	9/16	17.55	351.0	1/4	73.67	1473
3/16	3.769	75.38	5/8	18.42	368.4	7/16	79.03	1581
1/4	4.176	83.53	11/16	19.31	386.1	1/2	80.86	1617
5/16	4.604	92.09	3/4	20.21	404.3	3/4	88.37	1767
3/8	5.053	101.1	7/8	22.09	441.9	6"	96.22	1924
7/16	5.523	110.5	15/16	23.06	461.3	1/4	104.4	2088
1/2	6.014	120.3	3"	24.06	481.1	1/2	112.9	2259
9/16	6.526	130.5	1/8	26.10	522.0	7"	131.0	2619
5/8	7.058	141.2	1/4	28.23	564.6			

1045 COLD DRAWN SQUARES

STOCK LENGTHS: 12' RANDOM

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

1045 COLD DRAWN HEXAGONS

STOCK LENGTHS: 12' RANDOM

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

1045 TURNED, GROUND AND POLISHED

TG&P 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.

ANALYSIS

Carbon	Manganese	Phosphorus	Sulphur
0.43/ .50	0.60/ 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.

TOLERANCES -
 1-1/2 & Under: Plus .000", Minus .001"
 Over 1-1/2 to Under 2-1/2: Plus .000", Minus .0015"
 2-1/2 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 grd & polished	110,000	85,000	19%	32%	223
7", turned grd & 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 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 on thickness of section, design, service, requirements, etc.

PRECISION SHAFTING

STOCK LENGTHS 20'- 0-1/4" AND 21'- 24'

Size In Inches	Est. Wt. Lbs		Size In Inches	Est. Wt. Lbs	
	Per Ft.	20'- 0-1/4" Bar		Per Ft.	20'- 0-1/4" Bar
1/2	0.6682	13.38	2-1/2	16.71	334.5
9/16	0.8457	16.93	2-5/8	18.42	368.8
5/8	1.044	20.90	2-11/16	19.31	386.6
11/16	1.263	25.29	2-3/4	20.21	404.6
3/4	1.504	30.11	2-7/8	22.09	442.3
13/16	1.765	35.34	2-15/16	23.06	461.7
7/8	2.046	40.96	3"	24.06	481.7
15/16	2.349	47.03	3-3/16	27.16	543.8
1"	2.673	53.52	3-1/4	28.23	565.1
1-1/16	3.017	60.40	3-3/8	30.45	609.6
1-1/8	3.383	67.73	3-7/16	31.58	632.3
1-3/16	3.769	75.46	3-1/2	32.74	655.5
1-1/4	4.176	83.61	3-11/16	36.35	727.8
1-5/16	4.604	92.18	3-3/4	37.59	752.6
1-3/8	5.053	101.2	3-15/16	41.44	829.7
1-7/16	5.523	110.6	4"	42.77	856.3
1-1/2	6.014	120.4	4-1/4	48.28	966.6
1-9/16	6.526	130.7	4-7/16	52.63	1054
1-5/8	7.058	141.3	4-1/2	54.13	1084
1-11/16	7.612	152.4	4-3/4	60.31	1207
1-3/4	8.186	163.9	4-15/16	65.16	1305
1-13/16	8.781	175.8	5"	66.82	1338
1-7/8	9.397	188.1	5-1/4	73.67	1475
1-15/16	10.03	200.8	5-7/16	79.03	1582
2"	10.69	214.0	5-1/2	80.86	1619
2-1/8	12.07	241.7	5-3/4	88.37	1769
2-3/16	12.79	256.1	5-15/16	94.23	1887
2-1/4	13.53	270.9	6"	96.22	1926
2-3/8	15.08	301.9	6-1/2	112.9	2260
2-7/16	15.88	317.9	7"	131.0	2623

TOLERANCES

	1018 & 1045	1141
5/8" to 1" Incl.	- 0.0010 to + 0000	
1-1/8 to 1-1/2 Incl.	- 0.0005 to - 0.0015	- 0.0005 to - 0.0015
1-9/16 to 2-7/16 Incl.	- 0.0005 to - 0.0020	- 0.0005 to - 0.0020
2-1/2 to 3" Incl.	- 0.0005 to - 0.0025	- 0.0005 to - 0.0025
3-1/16 to 4" Incl.	- 0.0005 to - 0.0035	- 0.0005 to - 0.0035
4-1/16 to 6" Incl.	- 0.0005 to - 0.0055	- 0.0005 to - 0.0045
6-1/16 to 8" Incl.	- 0.0005 to - 0.0065	

1215 FREE MACHINING COLD FINISHED BARS

(SCREW MACHINE STOCK) ATSM A108

1215 is resulfurized and rephosphorized free machining steel, 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
1215	.09 Max.	0.75/ 1.05	0.04/ .09	0.26/ .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.

1215 COLD DRAWN HEXAGONS

STOCK LENGTHS 12' RANDOM

Size In Inches	Est. Wt. Lbs		Size In Inches	Est. Wt. Lbs		Size In Inches	Est. Wt. Lbs	
	Per Ft.	12Ft. Bar		Per Ft.	12Ft. Bar		Per Ft.	12Ft. Bar
1/8	0.0461	0.5526	13/16	1.946	23.35	1-11/16	8.393	100.7
5/32	0.0720	0.8635	7/8	2.257	27.08	3/4	9.026	108.3
3/16	0.1036	1.243	15/16	2.590	31.08	13/16	9.682	116.2
7/32	0.1410	1.692	1"	2.947	35.37	7/8	10.36	124.3
1/4	0.1842	2.210	1/16	3.327	39.93	2"	11.79	141.5
5/16	0.2878	3.454	1/8	3.730	44.76	1/8	13.31	159.7
11/32	0.3483	4.179	3/16	4.156	49.87	3/16	14.10	169.2
3/8	0.4145	4.973	1/4	4.605	55.26	1/4	14.92	179.0
7/16	0.5641	6.769	5/16	5.077	60.93	3/8	16.62	199.5
1/2	0.7368	8.842	3/8	5.572	66.87	7/16	17.51	210.1
9/16	0.9325	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

1215 COLD FINISHED ROUNDS

STOCK LENGTHS - 12' & 20' RANDOM

Size In Inches	Est. Wt. Lbs			Size In Inches	Est. Wt. Lbs		
	Per Ft.	12Ft. Bar	20Ft. Bar		Per Ft.	12Ft. Bar	20Ft. Bar
3/32	0.0235	0.2820	-	1-5/8	7.058	84.70	141.2
1/8	0.0418	0.5012	-	11/16	7.612	91.34	152.2
9/64	0.0529	0.6343	-	3/4	8.186	98.23	163.7
5/32	0.0653	0.7831	-	13/16	8.781	105.4	175.6
11/64	0.0790	0.9475	-	7/8	9.397	112.8	187.9
3/16	0.0940	1.128	-	15/16	10.03	120.4	200.7
13/64	0.1103	1.323	-	2"	10.69	128.3	213.8
7/32	0.1279	1.535	-	1/16	11.37	136.4	227.4
1/4	0.1671	2.005	-	1/8	12.07	144.8	241.4
17/64	0.1886	2.263	-	3/16	12.79	153.5	255.8
9/32	0.2114	2.537	-	1/4	13.53	162.4	270.6
5/16	0.2610	3.132	5.220	5/16	14.29	171.5	285.9
21/64	0.2878	3.453	5.756	3/8	15.08	180.9	301.5
11/32	0.3158	3.790	6.317	7/16	15.88	190.6	317.6
3/8	0.3759	4.510	7.517	1/2	16.71	200.5	334.1
25/64	0.4079	4.894	8.157	9/16	17.55	210.6	351.0
13/32	0.4411	5.293	8.822	5/8	18.42	221.0	368.4
7/16	0.5116	6.139	10.23	11/16	19.31	231.7	386.1
15/32	0.5873	7.048	11.75	3/4	20.21	242.6	404.3
1/2	0.6682	8.019	13.36	13/16	21.14	253.7	422.9
17/32	0.7544	9.052	15.09	7/8	22.09	265.1	441.9
9/16	0.8457	10.15	16.91	15/16	23.06	276.8	461.3
19/32	0.9423	11.31	18.85	3"	24.06	288.7	481.1
5/8	1.044	12.53	20.88	1/8	26.10	313.2	522.0
21/32	1.151	13.81	23.02	1/4	28.23	338.8	564.6
11/16	1.263	15.16	25.27	3/8	30.45	365.3	608.9
23/32	1.381	16.57	27.62	1/2	32.74	392.9	654.8
3/4	1.504	18.04	30.07	5/8	35.12	421.5	702.5
49/64	1.567	18.80	31.34	3/4	37.59	451.0	751.7
25/32	1.631	19.58	32.63	7/8	40.14	481.6	802.7
13/16	1.765	21.17	35.29	4"	42.77	513.2	855.3
27/32	1.903	22.83	38.06	1/8	45.48	545.8	909.6
7/8	2.046	24.56	40.93	1/4	48.28	579.3	965.6
57/64	2.120	25.44	42.40	3/8	51.16	613.9	1023
15/16	2.349	28.19	46.98	1/2	54.13	649.5	1083
31/32	2.508	30.10	50.17	3/4	60.31	723.7	1206
1"	2.673	32.07	53.46	5"	66.82	801.9	1336
1/16	3.017	36.21	60.35	1/4	73.67	884.0	1473
1/8	3.383	40.59	67.66	3/8	77.22	926.6	1544
3/16	3.769	45.23	75.38	1/2	80.86	970.2	1617
1/4	4.176	50.12	83.53	3/4	88.37	1060	1767
5/16	4.604	55.25	92.09	6"	96.22	1155	1924
3/8	5.053	60.64	101.1	1/2	112.9	1355	2259
7/16	5.523	66.28	110.5	7"	131.0	1572	2619
1/2	6.014	72.17	120.3	1/2	150.4	1805	3008
9/16	6.526	78.31	130.5				

1215 COLD DRAWN SQUARES

STOCK LENGTHS - 12' RANDOM

Size In Inches	Est. Wt. Lbs		Size In Inches	Est. Wt. Lbs	
	Per Ft.	12Ft. Bar		Per Ft.	12Ft. Bar
1/8	0.0531	0.6381	1"	3.403	40.84
3/16	0.1196	1.436	1/8	4.307	51.69
1/4	0.2127	2.552	1/4	5.318	63.81
5/16	0.3323	3.988	3/8	6.434	77.21
3/8	0.4786	5.743	1/2	7.657	91.89
7/16	0.6514	7.817	5/8	8.987	107.8
1/2	0.8508	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

LEADED GRADE A (12L14) is essentially resulphurized and rephosphorized screw machine stock to which lead has been added.

ANALYSIS

	Carbon	Manganese	Phosphorus	Sulphur
Leaded Grade A	.15 Max.	0.85/ 1.15	0.04/ .09	0.26/ .35

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 values for 1" round and may be considered as representative:

Tensile Strength (psi)	Yield Strength (psi)	Elongation in 2"	Reduction of Area	Brinell Hardness
78,000	70,000	15%	50%	163

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

LEADED GRADE A (12L14) 325 feet per minute-193%

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.

SUPER FREE MACHINING 12L14 - LEADED

ROUNDS STOCK LENGTHS - 12' RANDOM

Size In Inches	Est. Wt. Lbs		Size In Inches	Est. Wt. Lbs	
	Per Ft.	12Ft. Bar		Per Ft.	12Ft. Bar
1/8	0.0418	0.5012	1-5/16	4.604	55.25
9/64	0.0529	0.6548	3/8	5.053	60.64
5/32	0.0653	0.7831	7/16	5.523	66.28
3/16	0.0940	1.128	1/2	6.014	72.17
7/32	0.1279	1.535	9/16	6.526	78.31
1/4	0.1671	2.005	5/8	7.058	84.70
9/32	0.2114	2.537	11/16	7.612	91.34
19/64	0.2356	2.827	3/4	8.186	98.23
5/16	0.2610	3.132	13/16	8.781	105.4
21/64	0.2877	3.452	7/8	9.397	112.8
11/32	0.3158	3.790	15/16	10.03	120.4
3/8	0.3759	4.510	2"	10.69	128.3
25/64	0.4078	4.894	1/6	11.37	136.4
13/32	0.4411	5.293	1/8	12.07	144.8
27/64	0.4758	5.710	3/16	12.79	153.5
7/16	0.5116	6.139	1/4	13.53	162.4
29/64	0.5488	6.586	5/16	14.29	171.5
15/32	0.5873	7.048	3/8	15.08	180.9
1/2	0.6682	8.019	7/16	15.88	190.6
33/64	0.7106	8.527	1/2	16.71	200.5
17/32	0.7544	9.052	9/16	17.55	210.6
35/64	0.7994	9.593	5/8	18.42	221.0
9/16	0.8457	10.15	11/16	19.31	231.7
37/64	0.8934	10.72	3/4	20.21	242.6
19/32	0.9425	11.31	13/16	21.14	253.7
5/8	1.044	12.53	7/8	22.09	265.1
41/64	1.097	13.16	15/16	23.06	276.8
21/32	1.151	13.81	3"	24.06	288.7
43/64	1.207	14.48	1/6	25.07	300.1
11/16	1.263	15.16	1/8	26.10	313.2
23/32	1.381	16.57	1/4	28.23	338.8
47/64	1.442	17.30	3/8	30.45	365.3
3/4	1.504	18.04	1/2	32.74	392.9
49/64	1.567	18.80	9/16	33.92	407.0
25/32	1.631	19.58	5/8	35.12	421.5
13/16	1.765	21.17	3/4	37.59	451.0
27/32	1.903	22.83	7/8	40.14	481.6
7/8	2.046	24.56	4"	42.77	513.2
57/64	2.120	25.44	1/8	45.48	545.8
29/32	2.195	26.34	1/4	48.28	579.3
15/16	2.349	28.19	3/8	51.16	613.9
31/32	2.508	30.10	1/2	54.13	649.5
1"	2.673	32.07	3/4	60.31	723.7
1/64	2.757	33.08	7/8	63.52	762.3
1/16	3.017	36.21	5"	66.82	801.9
1/8	3.383	40.59	1/4	73.76	884.0
9/64	3.477	41.72	1/2	80.86	970.2
3/16	3.769	45.23	3/4	88.37	1060
1/4	4.176	50.12	6"	96.22	1155

SUPER FREE MACHINING 12L14 - LEADED

HEXAGONS - STOCK LENGTHS - 12' RANDOM

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

12L14 SQUARES - LEADED

STOCK LENGTHS - 12' RANDOM

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

1117 AND 11L17 (LEADED)

COLD FINISHED BARS

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 percent lead improves free-machining characteristics without sacrificing carburizing properties.

ANALYSIS

Carbon	Manganese	Phosphorus	Sulphur
0.14/ 20	1.00 / 1.30	0.04 Max.	0.08/ .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 and hardening service requirements.

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

1117 COLD DRAWN SQUARES

STOCK LENGTHS: 12' APPROX.

Size In Inches	Est. Wt. Lbs		Size In Inches	Est. Wt. Lbs	
	Per Ft.	12Ft. Bar		Per Ft.	12Ft. 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	102.1

COLD FINISHED ROUNDS

1117 AND 11L17 (LEADED)

Size In Inches	Est. Wt. Lbs			Size In Inches	Est. Wt. Lbs		
	Per Ft.	12Ft. Bar	20Ft. Bar		Per Ft.	12Ft. Bar	20Ft. Bar
1/8	.0418	.5012	-	2"	10.69	128.3	213.8
3/16	.0940	1.128	-	1/16	11.37	136.4	227.4
7/32	.1279	1.535	-	1/8	12.07	144.8	241.4
1/4	.1671	2.005	-	3/16	12.79	153.5	255.8
9/32	.2114	2.537	-	1/4	13.53	162.4	270.6
5/16	.2610	3.132	-	5/16	14.29	171.5	285.9
11/32	.3158	3.790	-	3/8	15.08	180.9	301.5
3/8	.3759	4.510	-	7/16	15.88	190.6	317.6
13/32	.4411	5.293	-	1/2	16.71	200.5	334.1
7/16	.5116	6.139	-	9/16	17.55	210.6	351.0
15/32	.5873	7.048	-	5/8	18.42	221.0	368.4
1/2	.6682	8.019	-	11/16	19.31	231.7	386.1
17/32	.7544	9.052	-	3/4	20.21	242.6	404.3
9/16	.8457	10.15	-	13/16	21.14	253.7	422.9
5/8	1.044	12.53	-	7/8	22.09	265.1	441.9
21/32	1.151	13.81	23.02	15/16	23.06	276.8	461.3
11/16	1.263	15.16	25.27	3"	24.06	288.7	481.1
3/4	1.504	18.04	30.07	1/8	26.10	313.2	522.0
13/16	1.765	21.17	35.29	1/4	28.23	338.8	564.6
7/8	2.046	24.56	40.93	3/8	30.45	365.3	608.9
15/16	2.349	28.19	46.98	1/2	32.74	392.9	654.8
31/32	2.508	30.10	50.17	5/8	35.12	421.5	702.5
1"	2.673	32.07	53.46	3/4	37.59	451.0	751.7
1/64	2.757	33.08	55.14	7/8	40.14	481.6	802.7
1/16	3.017	36.21	60.35	4"	42.77	513.2	855.3
1/8	3.383	40.59	67.66	1/4	48.28	579.3	965.6
3/16	3.769	45.23	75.38	3/8	51.16	613.9	1023
1/4	4.176	50.12	83.53	1/2	54.13	649.5	1083.5
5/16	4.604	55.25	92.09	3/4	60.31	723.7	1206
3/8	5.053	60.64	101.1	7/8	63.52	762.3	1270
7/16	5.523	66.28	110.5	5"	66.82	801.9	1336
1/2	6.014	72.17	120.3	1/4	73.67	884.0	1473
9/16	6.526	78.31	130.5	1/2	80.86	970.2	1617
5/8	7.058	84.70	141.2	3/4	88.37	1060	1767
11/16	7.612	91.34	152.2	6"	96.22	1155	1924
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				

1117 and 11L17 (LEADED) COLD DRAWN HEXAGONS - 12' Random

Size In Inches	Est. Wt. Lbs		Size In Inches	Est. Wt. Lbs		Size In Inches	Est. Wt. Lbs	
	Per Ft.	12Ft. Bar		Per Ft.	12Ft. Bar		Per Ft.	12Ft. Bar
1/4	.1842	2.210	1"	2.947	35.37	1-13/16	9.682	116.2
5/16	.2878	3.454	1/16	3.327	39.93	7/8	10.36	124.3
3/8	.4145	4.973	1/8	3.730	44.76	2"	11.79	141.5
7/16	.5641	6.769	3/16	4.156	49.87	1/8	13.31	159.7
1/2	.7368	8.842	1/4	4.605	55.26	1/4	14.92	179.0
9/16	.9325	11.19	5/16	5.077	60.93	3/8	16.62	199.5
5/8	1.151	13.82	3/8	5.572	66.87	7/16	17.51	210.1
11/16	1.393	16.72	7/16	6.090	73.08	1/2	18.42	221.0
3/4	1.658	19.89	1/2	6.631	79.56	5/8	20.31	243.7
13/16	1.946	23.35	5/8	7.783	93.39	3/4	22.29	267.5
7/8	2.257	27.08	11/16	8.393	100.7	3"	26.53	318.3
15/16	2.590	31.08	3/4	9.026	108.3	1/8	28.78	345.4

11L17 (LEADED) COLD DRAWN FLATS

STOCK LENGTHS 12' RANDOM

Size In Inches	Size In Inches	Est. Wt. Lbs		Size In Inches	Size In Inches	Est. Wt. Lbs	
		Per Ft.	12Ft. Bar			Per Ft.	12Ft. Bar
3/8 x	1-1/4	1.595	19.14	1-3/8 x	4-1/2	21.05	252.7
	1-1/2	1.914	22.97		5-1/2	25.73	308.8
	2"	2.552	30.63	1-1/2 x	1-3/4	8.933	107.2
	2-1/2	3.191	38.29		2"	10.21	122.5
	3"	3.829	45.94		2-1/2	12.76	153.1
	3-1/4	4.148	49.77		3"	15.31	183.8
1/2 x	3/4	1.276	15.31		3-1/2	17.87	214.4
	7/8	1.489	17.87		4"	20.42	245.0
	1"	1.702	20.42		4-1/2	22.97	275.7
	1-1/2	2.552	30.63		5"	25.52	306.3
	2"	3.403	40.84		6"	30.63	367.5
	2-1/2	4.254	51.05		6-1/2	33.18	398.2
5/8 x	1"	2.127	25.52		7"	35.73	428.8
	1-1/2	3.191	38.29		8-1/2	43.39	520.7
	2"	4.254	51.05	1-5/8 x	2-1/2	13.83	165.9
	3"	6.381	76.57		3"	16.59	199.1
	3-1/2	7.445	89.33		3-1/2	19.36	232.3
	3-3/4	7.976	95.72	1-3/4 x	2-1/2	14.89	178.7
	4-1/2	9.572	114.9		3"	17.87	214.4
	5-1/2	11.70	140.4		3-1/2	20.84	250.1
3/4 x	1-1/4	3.191	38.29		3-3/4	22.33	268.0
	1-1/2	3.829	45.94		4"	23.82	285.9
	2"	5.105	61.26		4-1/2	26.80	321.6
	2-1/2	6.381	76.57		5"	29.78	357.3
	3"	7.657	91.89		5-1/2	32.76	393.1
	4-1/2	11.49	137.8		6-1/2	38.71	464.5
	5"	12.76	153.1	1-7/8 x	3-3/4	23.93	287.1
	6"	15.31	183.8	2 x	2-1/2	17.02	204.2
	6-1/2	16.59	199.1		3"	20.42	245.0
7/8 x	5"	14.89	178.7		4"	27.23	326.7
	6-1/2	19.36	232.3		4-1/2	30.63	367.5
1 x	1-1/4	4.254	51.05		5"	34.03	408.4
	1-1/2	5.105	61.26		5-1/2	37.44	449.2
	1-5/8	5.530	66.36		6"	40.84	490.1
	1-3/4	5.956	71.47		6-1/2	44.24	530.9
	2"	6.806	81.68		8"	54.45	653.4
	2-1/4	7.657	91.89		8-1/2	57.85	694.3
	2-1/2	8.508	102.1	2-1/8 x	5"	36.16	433.9
	2-3/4	9.359	112.3	2-1/4 x	2-1/2	19.14	229.7
	3"	10.21	122.5		2-1/2	28.71	344.5
	4"	13.61	163.4		3-3/4	28.71	344.5
	4-1/2	15.31	183.8		5"	38.29	459.4
1-1/8 x	2"	7.657	91.89		7-1/2	57.43	689.2
	2-1/2	9.572	114.9	2-1/2 x	3"	25.52	306.3
	3"	11.49	137.8		3-1/2	29.78	357.3
1-1/4 x	1-1/2	6.381	76.57	3 x	6-1/2	55.30	663.6
	1-3/4	7.445	89.33		4"	40.84	490.1
	2-1/2	10.64	127.6				
	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				

1141 COLD FINISHED BAR

This is medium-carbon steel that possesses higher mechanical properties than other medium carbon steels, as well as free machining properties.

ANALYSIS

	Carbon	Manganese	Phosphorus	Sulphur
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
1141	100,000	90,000	10%	30%	197

MACHINABILITY - 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 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 - Although primarily oil hardening steel, this grade can be water quenched, but great care should be exercised when this is done. The quenching temperature is 1500°F to 1600°F with the temperature being 25°F lower for water quench. Temper to required hardness.

1141 COLD FINISHED ROUNDS

STOCK LENGTHS - 12' & 20' RANDOM

Size In Inches	Est. Wt. Lbs			Size In Inches	Est. Wt. Lbs		
	Per Ft.	12Ft. Bar	20Ft. Bar		Per Ft.	12Ft. Bar	20Ft. Bar
3/16	0.0940	1.128	1.879	1-11/16	7.612	91.34	152.2
1/4	0.1671	2.005	3.341	3/4	8.186	98.23	163.7
5/16	0.2610	3.132	5.220	13/16	8.781	105.4	175.6
3/8	0.3759	4.510	7.517	7/8	9.397	112.8	187.9
7/16	0.5116	6.139	10.23	15/16	10.03	120.4	220.7
1/2	0.6682	8.019	13.36	2"	10.69	128.3	213.8
9/16	0.8457	10.15	16.91	1/16	11.37	136.4	227.4
5/8	1.044	12.53	20.88	1/8	12.07	144.8	241.4
41/64	1.097	13.16	21.94	3/16	12.79	153.5	255.8
21/32	1.151	13.81	23.02	1/4	13.53	162.4	270.6
11/16	1.263	15.16	25.27	5/16	14.29	171.5	285.9
3/4	1.504	18.04	30.07	3/8	15.08	180.9	301.5
49/64	1.567	18.80	31.34	7/16	15.88	190.6	317.6
25/32	1.631	19.58	32.63	1/2	16.71	200.5	334.1
13/16	1.765	21.17	35.29	5/8	18.42	221.0	368.4
7/8	2.046	24.56	40.93	3/4	20.21	242.6	404.3
29/32	2.195	26.34	43.90	7/8	22.09	265.1	441.9
15/16	2.349	28.19	46.98	3"	24.06	288.7	481.1
31/32	2.508	30.10	50.17	1/8	26.10	313.2	522.0
1"	2.673	32.07	53.46	3/16	27.16	325.9	543.1
1/16	3.017	36.21	60.35	1/4	28.23	338.8	564.6
1/8	3.383	40.59	67.66	3/8	30.45	365.3	608.9
3/16	3.769	45.23	75.38	1/2	32.74	392.9	654.8
1/4	4.176	50.12	83.53	5/8	35.12	421.5	702.5
5/16	4.604	55.25	92.09	3/4	37.59	451.0	751.7
3/8	5.053	60.64	101.1	4"	42.77	513.2	855.3
7/16	5.523	66.28	110.5	1/4	48.28	579.3	965.6
1/2	6.014	72.17	120.3	1/2	54.13	649.5	1083
9/16	6.526	78.31	130.5	3/4	60.31	723.7	1206
5/8	7.058	84.70	141.2	5"	66.82	801.9	1336
				1/2	80.86	970.2	1617

COLD FINISHED BARS

1144 STRESSPROOF

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 line 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	0.40/ .48	1.35/ 1.65	.040 Max.	0.24/ .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"	100,000	115,000	8%	20%	25
Thru 3"					
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.

WELDABILITY - Welding of these grades is not recommended.

STRESSPROOF is a registered Trademark of the Niagara Lasalle Corp., producers of the material.

1144 STRESSPROOF ROUNDS

GROUND & POLISHED - STOCK LENGTHS: 20' RANDOM

Size In Inches	Est. Wt. Lbs		Size In Inches	Est. Wt. Lbs	
	Per Ft.	20Ft. Bar		Per Ft.	20Ft. Bar
5/16	0.2610	5.220	1-11/16	7.612	152.2
3/8	0.3759	7.517	3/4	8.186	163.7
7/16	0.5116	10.23	7/8	9.397	187.9
1/2	0.6682	13.36	15/16	10.03	207.2
9/16	0.8457	16.91	2"	10.69	213.8
5/8	1.044	20.88	1/8	12.07	241.4
11/16	1.263	25.27	3/16	12.79	255.8
3/4	1.504	30.07	1/4	13.53	270.6
13/16	1.765	35.29	3/8	15.08	301.5
7/8	2.046	40.93	7/16	15.88	317.6
15/16	2.349	46.98	1/2	16.71	334.1
1"	2.673	53.46	5/8	18.42	368.4
1/16	3.017	60.35	3/4	20.21	404.3
1/8	3.383	67.66	15/16	23.06	461.2
3/16	3.769	75.38	3"	24.06	481.1
1/4	4.176	83.53	1/4	28.23	564.6
5/16	4.604	92.09	1/2	32.74	654.8
3/8	5.053	101.1	3/4	37.59	751.7
7/16	5.523	110.5	15/16	41.44	828.8
1/2	6.014	120.3	4"	42.77	855.3
5/8	7.058	141.2	1/4	48.28	965.6
			1/2	54.13	1083

1144 STRESSPROOF HEXAGONS

COLD DRAWN • STOCK LENGTHS 12' RANDOM

Size In Inches	Est. Wt. Lbs		Size In Inches	Est. Wt. Lbs	
	Per Ft.	12Ft. Bar		Per Ft.	12Ft. Bar
3/8	0.4145	4.973	1"	2.947	35.37
7/16	0.5641	6.769	1/16	3.327	39.93
1/2	0.7368	8.842	1/8	3.730	44.76
9/16	0.9325	11.19	1/4	4.605	55.26
5/8	1.151	13.82	3/8	5.572	66.87
11/16	1.393	16.72	1/2	6.631	79.56
3/4	1.658	19.89	5/8	7.783	93.39
13/16	1.946	23.35	3/4	9.026	108.3
7/8	2.257	27.08	2"	11.79	141.5
15/16	2.590	31.08			

1144 STRESSPROOF ROUNDS

COLD DRAWN - STOCK LENGTHS: 12' RANDOM

Size In Inches	Est. Wt. Lbs		Size In Inches	Est. Wt. Lbs	
	Per Ft.	12Ft. Bar		Per Ft.	12Ft. Bar
7/32	0.1280	1.540	1-3/4	8.186	98.23
1/4	0.1671	2.005	13/16	8.781	105.4
17/64	0.1886	2.263	7/8	9.397	112.8
9/32	0.2114	2.537	15/16	10.03	120.4
5/16	0.2610	3.132	2"	10.69	128.3
21/64	0.2878	3.453	1/16	11.37	136.4
3/8	0.3759	4.510	1/8	12.07	144.8
25/64	0.4078	4.894	3/16	12.79	153.5
27/64	0.4758	5.710	1/4	13.53	162.4
7/16	0.5116	6.139	5/16	14.29	171.5
1/2	0.6682	8.019	3/8	15.08	180.9
33/64	0.7106	8.527	7/16	15.88	190.6
17/32	0.7544	9.052	1/2	16.71	200.5
9/16	0.8457	10.15	9/16	17.55	210.6
5/8	1.044	12.53	5/8	18.42	221.0
41/64	1.097	13.16	11/16	19.31	231.7
11/16	1.263	15.16	3/4	20.21	242.6
3/4	1.504	18.04	13/16	21.14	253.71
49/64	1.567	18.80	7/8	22.09	265.1
13/16	1.765	21.17	15/16	23.06	276.8
7/8	2.046	24.56	3"	24.06	288.7
57/64	2.120	25.44	1/16	25.07	300.8
15/16	2.349	28.19	1/8	26.10	313.2
1"	2.673	32.07	1/4	28.23	338.8
1/64	2.757	33.08	5/16	29.33	351.9
1/16	3.017	36.21	3/8	30.45	365.3
1/8	3.383	40.59	7/16	31.58	379.0
5/32	3.573	42.88	1/2	32.74	392.9
3/16	3.769	45.23	5/8	35.12	421.5
1/4	4.176	50.12	3/4	37.59	451.0
5/16	4.604	55.25	7/8	40.14	481.6
11/32	4.826	57.91	15/16	41.44	497.3
3/8	5.053	60.64	4"	42.77	513.2
7/16	5.523	66.28	1/8	45.48	545.8
1/2	6.014	72.17	1/4	48.28	579.3
9/16	6.526	78.31	3/8	51.16	613.9
5/8	7.058	84.70	1/2	54.13	649.5
11/16	7.612	91.34			

FATIGUE-PROOF COLD FINISHED BARS

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 Niagra LaSalle Corp. 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 600°F. 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 is a registered Trademark of the Niagra LaSalle Corp. producers of the material.

FATIGUE-PROOF ROUNDS

COLD DRAWN • STOCK LENGTHS 12' RANDOM

Size In Inches	Est. Wt. Lbs		Size In Inches	Est. Wt. Lbs	
	Per Ft.	12Ft. Bar		Per Ft.	12Ft. Bar
1/4	0.1671	2.005	1-5/16	4.604	55.25
5/16	0.2610	3.132	3/8	5.053	60.64
3/8	0.3759	4.510	7/16	5.523	66.28
7/16	0.5120	6.144	1/2	6.014	72.17
1/2	0.6882	8.019	9/16	6.526	78.31
9/16	0.8457	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

COLD FINISHED CARBON STEEL BARS STANDARD MANUFACTURING TOLERANCES

Undersize variation in inches

Size & Shape (inches)	Carbon to .28% Max	Max. Carbon Over .28% to 55%	*Stressproof [®]	Max. Carbon Over .55% or All Carbon Heat Treated	Fatigue-proof [®]	E.T.D. 150
ROUNDS (Cold Drawn or Turned & Polished)						
Up thru 1-1/2	0.002	0.003	0.004	0.005	0.005	0.005
Over 1-1/2 thru 2-1/2	0.003	0.004	0.005	0.006	0.006	0.006
Over 2-1/2 thru 4"	0.004	0.005	0.006	0.007	0.006	0.007
Over 4" thru 6"	0.005	0.006	...	0.008		
Over 6" thru 8"	0.006	0.007	...	0.009		
Over 8" thru 9"	0.007	0.008	...	0.010		
HEXAGONS						
Up thru 3/4	0.002	0.003	0.004	0.006		
Over 3/4 thru 1-1/2	0.003	0.004	0.005	0.007		
Over 1-1/2 thru 2-1/2	0.004	0.005	0.006	0.008		
Over 2-1/2 thru 3-1/8	0.005	0.006	...	0.009		
SQUARES						
Up thru 3/4	0.002	0.004	...	0.007		
Over 3/4 thru 1-1/2	0.003	0.005	...	0.008		
Over 1-1/2 thru 2-1/2	0.004	0.006	...	0.009		
Over 2-1/2 thru 3-1/8	0.006	0.008	...	0.011		
FLATS (Width)						
Up thru 3/4	0.003	0.004	...	0.008		
Over 3/4 thru 1-1/2	0.004	0.005	...	0.010		
Over 1-1/2 thru 3"	0.005	0.006	...	0.012		
Over 3" thru 4"	0.006	0.008	...	0.016		
Over 4" thru 6"	0.008	0.010	...	0.020		
Over 6"	0.013		

• Tolerances for Flats apply to thickness as well as to width and include 16", 18", & 20" wide flats.

* For Cold Drawn, Ground and Polished or Turned, Ground and Polished tolerances for Stressproof[®] see below.

* Rough turned 1018 rounds are produced to an oversize tolerance of +1/8" to 3/16" oversize.

Size & Shape (inches)	Cold Drawn, Ground & Polished Stressproof [®]	Turned, Ground & Polished Stressproof [®]
ROUNDS		
Up thru 1-1/2	0.001	0.001
Over 1-1/2 thru 2-1/2	0.0015	0.0015
Over 2-1/2 thru 3	0.002	0.002
Over 3 thru 4	0.003	0.003
Over 4 thru 6004*
Over 6005*

* For nonresulfurized steels (steels specified to maximum sulfur limits under 0.08%) or for steels thermally treated, the tolerance is increased by .001"