

PRODUCTS

CATALOG

6605 W. FULLERTON • CHICAGO 35, ILLINOIS

OTHER WAREHOUSES

3400 S. HANSON

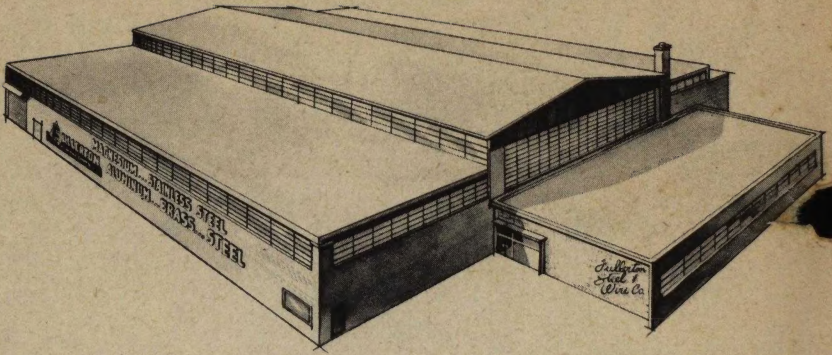
MILWAUKEE 7, WISCONSIN

915 WEST 20th STREET

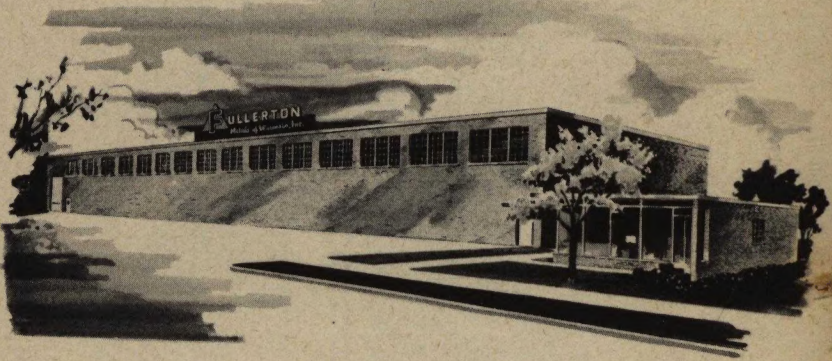
HIALEAH, FLORIDA

CATALOG

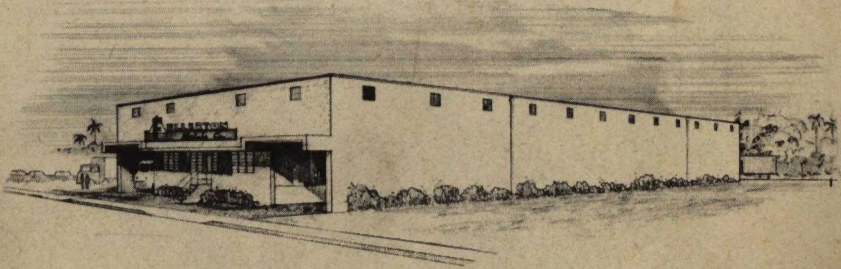
**FULLERTON
PRODUCTS CATALOG**



Sketch of Chicago Warehouse



Sketch of Milwaukee Warehouse



Sketch of Hialeah Warehouse



6605 W. FULLERTON AVENUE, CHICAGO 35, ILLINOIS
Chicago Phone: MErimac 7-2700

Call toll free from:

East Moline, Moline, and Rockford, Illinois
Elkhart, Fort Wayne, Indianapolis
and South Bend, Indiana
Bettendorf, Cedar Rapids, Davenport
and Des Moines, Iowa
Grand Rapids, Michigan

} ENTERPRISE
6605

Milwaukee, Wisconsin

ENTERPRISE 8-6605

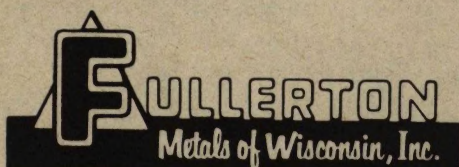
Minneapolis and St. Paul, Minnesota

ZENITH 6605

Sales Office:

Minneapolis, Minnesota
5009 Excelsior Boulevard

WAlnut 6-7629



3400 S. HANSON • MILWAUKEE 7, WISCONSIN
HUMboldt 1-6900

*Greenfield
68438*



915 WEST 20th STREET • HIALEAH, FLORIDA
PLaza 7-2531

This catalog has been printed for our customers to give them a ready guide to check our warehouse stocks of basic raw materials. You will notice that we have what we consider the most complete array of metals located anywhere in the country. With our complete stocks of carbon steel, stainless steel, brass, aluminum and magnesium mill products, we can offer our customers the type of attention they deserve for any of their fabricating needs.

We are completely geared to service stamping shops, screw machine shops and general products manufacturers with our normal stocks. In addition to the material listed in our book, of course, we are able to supply special requirements where different alloys, tempers and tolerances are needed. We earnestly solicit your inquiries on these items since we are ready to be of service to you on these hard to get items, as well as the stock items which are listed in this catalog.

You will notice that this catalog is designed to help you in your daily activities. We feel that this book has been arranged to service the various calls of industry, as well as to the general manufacturing company who use all types of raw materials. It was our desire to include as many informative charts and descriptive data as possible in order to give you a complete source for any of your questions. It is our very sincere desire to continue growing and building our business up to be of better and better service to you.

If you have any questions regarding any of the items listed in this catalog, or any special item, please call our office and give us a chance to demonstrate our service. Remember . . . Fullerton . . . a warehouse of metals . . . and service . . . for you.

IMPORTANT NOTICE!

For your convenience, this Fullerton catalog has been divided into two parts. We've noticed that some customers use the sheet, plate and coil section of a catalog exclusively; others use the rod, bar and wire section only. In order to accommodate our customers, we separated this book of data to simplify its usage, in this manner.

An index will be found at the beginning of each individual section which will help you find the information you are seeking—easily and speedily.



A section of the telephone order department, where experienced personnel process your order so efficiently, it is in the warehouse ten minutes after you have issued an order number. In that time it has been written up by the phone salesman, cleared inventory, been priced and double-checked, and 17 copies run off the duplicating machine which supplies all forms from work orders to invoices.

CUSTOMS OF THE TRADE

QUOTATIONS: All quotations made by this corporation or its agents are subject to change without notice, subject to prior sale and unless otherwise agreed are binding only for immediate acceptance. All sales are made subject to strikes, accidents or other causes beyond our control. We reserve the privilege to cancel contracts upon which full specifications have not been given within the time agreed.

Cancellation of orders for special materials will not be accepted without our written consent.

CONFIRMATION ORDERS: Confirmation orders should be plainly marked across the face with the word "Confirmation" in large letters. Unless they are so marked, confirmation orders may be treated as originals and filled in duplicate. In such instances we will not be responsible for the expense and inconvenience involved.

TERMS: Net terms are 30 days and in many cases depending on the commodity discount for cash within 10 days is allowed.

DELIVERIES: As a rule material is shipped the day the order is received.

Telephone orders are accepted at the risk of the sender and shipments made before the receipt of confirmation are for the special convenience of the customer.

Promises of delivery on special orders are estimated as carefully as possible and although we do our best to ship within the time mentioned, we cannot guarantee to do so.

CLAIMS: Claims for errors, deficiencies or imperfections will not be entertained by seller unless made within 30 days after receipt of goods.

Any metal proving defective in the hands of the buyer when used for the purpose specified, will be replaced, ordinary shop loss excepted, but no claims for labor or damage will be allowed.

In case any shipment of metal proves unsuitable, it is understood that the buyer will immediately discontinue its use and advise the seller of the facts, that the seller may have the opportunity of deciding what shall be done under the circumstances, so that possible loss or damage to either party shall be prevented or minimized.

RESPONSIBILITY OF CARRIERS: A clear receipt from the railroad, truck companies or express company places the responsibility for damage or shortage upon the carrier. In case of shortage or damaged goods the carrier should note the shortage or damage on the receipt at time of delivery so a claim may be filed with the carrier.

If by special request goods are shipped via carriers whose charges do not include insurance on goods, we will not insure the shipment unless instructed to do so.

Claims on the railroads, trucking companies and express companies must be made within 9 months of receipt of shipment. Unless filed within these periods transportation companies cannot legally pay claims.

HOW TO ORDER

To assist you in making out your orders, and to eliminate correspondence, unnecessary delays and possible errors, here are 14 points which should be included in every order for metal products, to have it filled promptly.

1. **Quantity, Total**—Order in units such as pounds, pieces, total feet.
2. **Alloy**—Give name, alloy grade or type, or nominal composition.
3. **Cross Section**—Designate shape such as round, hexagonal, square, rectangular, etc.
4. **Products**—Mention form, such as sheet, strip, plate, bar, rod, shape, wire, pipe, tube.
5. **Nominal Dimensions**—Give the dimensions such as width, thickness, length, distance across the flats, diameter (O.D. or I.D. for tube) wall thickness, type of water tube or pipe. Use decimals instead of gauge numbers.
6. **How Furnished**—Specify how the material is to be furnished, such as straight lengths, rolls or coils.
7. **Length Classification**—Give length classification, such as specific, specific with ends or multiple.
8. **Dimensional Tolerances**—Published schedules will apply unless special values are stated.
9. **Temper**—Give the temper, such as nominal anneal or hardness.
10. **Finish**—Give the finish, if other than commercial.
11. **Specifications**—Include the specifications, if any, such as ASTM SAE, Military.
12. **Packing Instructions**—Give packing instructions, if any.
13. **Shipping Date and Instructions**—Give requested date stating whether or not material would be accepted before that date. Where a definite routing is preferred, specify it on the order.
14. **Special Information**—To aid in proper processing, furnish information such as use of product, drawing showing item to be fabricated, sample of fabricated products or previously used material, type of edges, coating and any other requirements not covered by the above schedule.

**CUTTING SPEED IN RPM FOR VARIOUS
SURFACE SPEEDS
Surface Feet Per Minute**

Stock Diameter	50	100	150	200	250	300	325	350	375	400	425	450	475
1/8	1530	3060	4580	6120	7649	9190	9930	10700	11450	12220	13000	13750	14505
1/4	765	1527	2292	3059	3820	4597	4960	5350	5725	6105	6495	6875	7250
3/8	510	1020	1530	2040	2545	3059	3319	3565	3820	4075	4335	4590	4845
1/2	382	765	1145	1530	1910	2295	2485	2678	2865	3060	3250	3441	3630
5/8	306	612	916	1225	1530	1839	1990	2142	2297	2450	2600	2755	2910
3/4	254	509	764	1015	1272	1525	1652	1778	1905	2035	2163	2290	2419
7/8	218	437	654	874	1092	1310	1420	1525	1640	1748	1855	1965	2074
1	195	382	573	763	953	1145	1240	1335	1430	1530	1620	1720	1810
1 1/4	153	306	459	612	765	919	993	1070	1145	1222	1300	1375	1451
1 1/2	125	255	381	509	638	765	829	892	957	1020	1083	1148	1210
1 3/4	109	219	324	438	548	654	711	766	820	875	929	985	1038
2	96	191	284	382	477	574	622	668	717	764	813	860	907
2 1/4	85	170	255	340	425	510	552	594	637	680	722	765	807
2 1/2	76	153	228	306	383	460	497	535	575	612	650	689	727
2 3/4	70	139	204	278	348	418	452	487	522	556	591	625	660
3	64	127	192	255	319	382	415	446	478	510	542	575	606
3 1/4	59	117	177	235	294	353	382	412	441	470	499	528	557
3 1/2	55	109	164	218	273	328	355	382	410	436	464	491	517
3 3/4	51	102	153	204	255	307	332	358	383	408	435	460	486
4	48	96	144	191	238	287	310	334	358	382	407	430	454
4 1/4	45	90	135	180	225	270	292	314	338	360	382	405	427
4 1/2	43	85	128	170	214	255	276	297	318	340	361	382	405
4 3/4	40	81	123	161	201	241	261	281	301	321	342	362	382
5	38	77	117	153	191	229	248	268	286	306	324	344	362

FULLERTON—A WAREHOUSE OF METALS AND SERVICE

**CUTTING SPEED IN RPM FOR VARIOUS
SURFACE SPEEDS**
Surface Feet Per Minute

Stock Diameter	500	525	550	575	600	650	700	750	800	850	900	950	1000
$\frac{1}{8}$	15590	16000	16810	17590	18320	19890	21420	22880	24450	25980	27450	29000	30560
$\frac{1}{4}$	7645	8010	8400	8753	9150	9910	10609	11450	12210	12980	13750	14500	15280
$\frac{3}{8}$	5100	5350	5610	5860	6120	6630	7140	7650	8160	8657	9200	9700	10200
$\frac{1}{2}$	3819	4016	4207	4400	4590	4970	5350	5738	6120	6480	6870	7250	7640
$\frac{5}{8}$	3061	3213	3331	3510	3672	3979	4280	4599	4900	5200	5500	5802	6110
$\frac{3}{4}$	2542	2669	2800	2929	3055	3310	3565	3820	4072	4330	4557	4840	5090
$\frac{7}{8}$	2185	2298	2405	2517	2625	2840	3060	3280	3498	3713	3922	4149	4370
1	1909	2010	2100	2199	2295	2482	2679	2865	3060	3245	3429	3625	3820
$1\frac{1}{4}$	1559	1600	1681	1759	1832	1989	2142	2288	2445	2610	2748	2910	3060
$1\frac{1}{2}$	1273	1339	1402	1468	1530	1659	1785	1915	2040	2162	2290	2421	2550
$1\frac{3}{4}$	1092	1147	1200	1255	1310	1420	1529	1637	1745	1849	1950	2071	2180
2	955	1004	1050	1098	1146	1240	1338	1432	1530	1621	1720	1812	1910
$2\frac{1}{4}$	850	893	935	976	1020	1103	1190	1275	1360	1443	1532	1618	1700
$2\frac{1}{2}$	765	808	842	880	918	995	1071	1149	1225	1300	1358	1451	1530
$2\frac{3}{4}$	695	729	765	799	833	903	973	1041	1111	1181	1251	1320	1390
3	638	668	700	733	764	828	892	955	1019	1090	1151	1210	1280
$3\frac{1}{4}$	587	616	646	675	704	763	823	880	940	1003	1060	1120	1180
$3\frac{1}{2}$	545	572	599	627	654	707	763	817	872	916	981	1035	1090
$3\frac{3}{4}$	510	535	560	586	612	663	714	765	816	866	916	969	1020
4	477	503	526	550	574	622	670	718	766	816	865	913	960
$4\frac{1}{4}$	450	473	495	517	540	585	630	674	719	765	810	855	900
$4\frac{1}{2}$	425	447	468	488	510	553	595	637	681	723	765	807	850
$4\frac{3}{4}$	402	423	443	463	483	523	563	603	644	687	729	769	810
5	382	402	421	440	458	496	535	573	612	655	694	732	770

APPROXIMATE MACHINABILITY RATINGS
 (cut off)
OF VARIOUS METAL RODS
 (using free cutting brass as 100)

ALUMINUM

1100-F.....	50
2011-T3.....	100
2017-T4.....	60
2024-T4.....	58
6061-T6.....	55
7075-T6.....	58

BRASS

Commercial Bronze.....	50
Copper.....	20
Free Cutting Brass.....	100
Naval Brass Leaded.....	67
Nickel Silver Leaded.....	50
Phosphor Bronze 88-4-4.....	80
Phosphor Bronze, Grade B.....	50
Red Brass Leaded.....	80

STAINLESS STEEL

TYPE 303.....	20
TYPE 416.....	25

STEEL

Leaded 1113.....	57
MX B1113-1213.....	51
B-1113-C1213.....	42
B-1112-C1212.....	37
C-1117-1118.....	29
C-1137.....	25
C-1018.....	24

STANDARD VARIATIONS IN SHEARING & CUTTING

Bars and Bar Shapes	Over	Under
Rounds and Squares up to 2 inch.....	$\frac{1}{4}$ inch	$\frac{1}{4}$ inch
Rounds and Squares 2 inch to $7\frac{1}{4}$ inch.....	$\frac{1}{4}$ inch	$\frac{1}{4}$ inch
Flats, $\frac{1}{4}$ inch to $\frac{5}{8}$ inch thick.....	$\frac{1}{8}$ inch	$\frac{1}{8}$ inch
Flats over $\frac{5}{8}$ inch thick.....	$\frac{1}{4}$ inch	$\frac{1}{4}$ inch
Channels up to but not including 3 inch.....	$\frac{1}{4}$ inch	$\frac{1}{4}$ inch
Bar Angles, up to but not including 3 inch.....	$\frac{1}{8}$ inch	$\frac{1}{8}$ inch

FULLERTON—A WAREHOUSE OF METALS AND SERVICE

—APPROXIMATE STOCK REQUIRED TO MAKE
1000 PIECES

Allowance has been made for bar end loss.

Lgth. of Fin. Piece Plus Cut-off In.	No. of Feet Per 1000 Pieces	Lgth. of Fin. Piece Plus Cut-off In.	No. of Feet Per 1000 Pieces	Lgth. of Fin. Piece Plus Cut-off In.	No. of Feet Per 1000 Pieces	Lgth. of Fin. Piece Plus Cut-off In.	No. of Feet Per 1000 Pieces	Lgth. of Fin. Piece Plus Cut-off In.	No. of Feet Per 1000 Pieces	Lgth. of Fin. Piece Plus Cut-off In.	No. of Feet Per 1000 Pieces
1/64	.....	1/64	53.7	1 1/64	106.3	1 5/64	160.1	2 3/64	211.4	3 3/64	265.7
1/32	.....	1/32	55.0	1 1/32	107.3	1 1/32	160.6	2 1/32	214.4	3 1/32	266.7
3/64	.....	3/64	56.3	1 1/64	109.2	1 5/64	161.9	2 3/64	214.8	3 1/64	267.0
1/16	5.2	1/16	57.6	1 1/16	110.2	1 1/16	162.2	2 1/16	214.9	3 1/16	267.2
5/64	6.5	5/64	58.9	1 1/64	111.3	1 1/64	164.6	2 3/64	218.1	3 3/64	271.9
3/32	7.8	3/32	60.2	1 1/32	113.0	1 1/32	167.9	2 1/32	218.3	3 1/32	272.6
7/64	9.1	7/64	61.5	1 1/64	114.1	1 1/64	168.0	2 3/64	218.6	3 1/64	272.9
1/8	10.5	3/4	62.8	1 3/8	115.5	2.000	169.0	2 3/8	222.1	3 3/4	273.0
9/64	11.8	9/64	64.1	1 2/64	116.8	2 1/64	169.2	2 1/64	222.3	3 1/64	276.9
5/32	13.1	5/32	65.4	1 1/32	117.7	2 1/32	171.2	2 1/32	222.6	3 1/32	278.6
11/64	14.4	5 1/64	66.7	1 2 1/64	119.0	2 3/64	171.4	2 4 1/64	224.9	3 1 1/64	279.1
3/16	15.7	1 1/16	68.0	1 1/16	121.1	2 1/16	173.8	2 1/16	226.5	3 3/16	279.3
1 3/64	17.0	5 3/64	69.3	1 2 3/64	122.5	2 3/64	174.0	2 2 3/64	227.5	3 2 3/64	279.6
7/32	18.3	2 7/32	70.7	1 1 7/32	123.8	2 7/32	176.4	2 2 7/32	227.8	3 1 7/32	283.8
1 5/64	19.6	5 5/64	72.0	1 2 5/64	125.1	2 5/64	176.6	2 2 5/64	230.2	3 2 5/64	284.1
1/4	20.9	7/8	73.3	1 1/2	126.4	2 1/8	178.9	2 3/4	230.8	3 3/8	285.4
1 1/64	22.2	5 1/64	74.6	1 2 1/64	127.7	2 1/64	179.2	2 2 1/64	232.8	3 2 1/64	285.7
9/32	23.6	2 9/32	75.9	1 1 9/32	129.0	2 9/32	181.5	2 2 9/32	234.9	3 1 9/32	285.9
1 1/64	24.9	5 1/64	77.2	1 2 1/64	130.5	2 1 1/64	181.8	2 2 1/64	235.6	3 2 1/64	290.4
5/16	26.2	1 5/16	78.5	1 1/16	131.8	2 1/16	184.3	2 1/16	235.9	3 1/16	292.3
2 1/64	27.5	6 1/64	79.8	1 2 1/64	132.0	2 1 1/64	184.6	2 2 1/64	239.8	3 2 1/64	292.7
1 1/32	28.8	3 1/32	81.1	1 1 1/32	133.4	2 1/32	187.5	2 2 1/32	240.0	3 1 1/32	292.9
2 3/64	30.1	6 3/64	82.4	1 2 3/64	135.1	2 3/64	187.9	2 2 3/64	240.2	3 2 3/64	295.7
3/8	31.4	1.000	83.8	1 3/8	136.4	2 3/8	190.3	2 3/8	244.0	3 3/8	297.1
2 5/64	32.7	1 1/64	85.3	1 1 1/64	137.7	2 1 1/64	190.8	2 2 1/64	244.4	3 2 1/64	298.4
1 1/32	34.0	1 1/32	86.6	1 2 1/32	139.6	2 1/32	193.3	2 2 1/32	244.8	3 1 1/32	299.7
2 7/64	35.3	1 3/64	87.9	1 2 7/64	140.9	2 1 7/64	193.7	2 2 7/64	245.2	3 2 7/64	300.4
7/16	36.7	1 1/16	89.2	1 1 1/16	141.2	2 3/16	193.9	2 3/16	249.8	3 7/16	300.6
2 9/64	38.0	1 5/64	90.5	1 4 5/64	143.0	2 2 9/64	196.2	2 2 9/64	250.1	3 2 9/64	300.8
1 1/32	39.3	1 1/32	91.8	1 2 1/32	144.8	2 1 1/32	196.8	2 2 1/32	250.4	3 1 1/32	304.9
3 1/64	40.6	1 3/64	93.2	1 4 1/64	146.2	2 3 1/64	199.0	2 4 1/64	251.2	3 3 1/64	307.2
1/2	41.9	1 1/2	94.5	1 3/4	146.9	2 3/4	201.0	3.000	252.5	3 3/4	307.6
3 3/64	43.2	1 3/64	95.8	1 4 3/64	148.2	2 3 3/64	201.3	3 1/64	255.1	3 4 1/64	307.9
1 1/32	44.5	1 1/32	97.1	1 2 1/32	150.2	2 1 1/32	203.8	3 1/32	255.4	3 1 1/32	308.0
3 5/64	45.8	1 1 1/64	98.4	1 5 1/64	151.5	1 7/64	203.9	3 3/64	256.5	3 4 3/64	308.4
9/16	47.1	1 3/16	99.2	1 1 3/16	152.2	2 7/16	205.9	3 1/16	259.9	3 1 1/16	311.6
3 7/64	48.4	1 1 1/64	101.0	1 5 1/64	154.1	2 3 7/64	206.7	3 3/64	260.9	3 4 7/64	315.1
1 1/32	49.7	1 1/32	102.6	1 2 1/32	155.4	2 1 1/32	207.3	3 1/32	261.0	3 2 1/32	315.6
3 5/64	51.0	1 1 5/64	103.6	1 5 5/64	156.1	2 3 5/64	210.5	3 5/64	261.2	3 4 5/64	315.8
5/8	52.4	1 1/4	105.2	1 3/8	158.4	2 1/2	211.3	3 1/4	263.3	3 3/4	316.0

DECIMAL EQUIVALENTS OF WIRE AND SHEET METAL GAUGES

Name of Gauge	American or Browne & Sharpe	Birmingham or Stubs Iron Wire	United States Standard	Manufacturers Standard ¹	Steel Wire or Washburn & Moen
No. (2)	A	B	C	D	E
Thickness or Diameter—Inches					
7/0			.500		.4900
6/0	.5800		.46875		.4615
5/0	.5165		.4375		.4305
4/0	.4600	.454	.40625		.3938
3/0	.4096	.425	.375		.3625
2/0	.3648	.380	.34375		.3310
0	.3249	.340	.3125		.3065
1	.2893	.300	.28125		.2830
2	.2576	.284	.265625		.2625
3	.2294	.259	.25	.2391	.2437
4	.2043	.238	.234375	.2242	.2253
5	.1819	.220	.21875	.2092	.2070
6	.1620	.203	.203125	.1943	.1920
7	.1443	.180	.1875	.1793	.1770
8	.1285	.165	.171875	.1644	.1620
9	.1144	.148	.15625	.1495	.1483
10	.1019	.134	.140625	.1345	.1350
11	.09074	.120	.125	.1196	.1205
12	.08081	.109	.109375	.1046	.1055
13	.07196	.096	.09375	.0897	.0915
14	.06408	.083	.078125	.0747	.0800
15	.05707	.072	.0703125	.0673	.0720
16	.05082	.065	.0625	.0598	.0625
17	.04526	.058	.05625	.0538	.0540
18	.04030	.049	.05	.0478	.0475
19	.03589	.042	.04375	.0418	.0410
20	.03196	.035	.0375	.0359	.0348
21	.02846	.032	.034375	.0329	.03175
22	.02535	.028	.03125	.0299	.0286
23	.02257	.025	.028125	.0269	.0258
24	.02010	.022	.025	.0239	.0230
25	.01790	.020	.021875	.0209	.0204
26	.01594	.018	.01875	.0179	.0181
27	.01420	.016	.0171875	.0164	.0173
28	.01264	.014	.015625	.0149	.0162
29	.01126	.013	.0140625	.0135	.0150
30	.01003	.012	.0125	.0120	.0140
31	.008928	.010	.0109375	.0105	.0132
32	.007950	.009	.01015625	.0097	.0128
33	.007080	.008	.009375	.0090	.0118
34	.006305	.007	.00859375	.0082	.0104
35	.005615	.005	.0078125	.0075	.0095
				.0067	.0090
36	.005000	.004	.00703125		
37	.004453		.006640625	.0064	.0085
38	.003965		.00625	.0060	.0080
39	.003531				.0075
40	.003145				.0070

(1) Recently adopted by the American Iron and Steel Institute as a modification of United States Standard Gauge to reflect present average unit weights of sheet steel.

(2) Designation of size in decimals of an inch instead of gauge numbers is recommended. If gauge numbers are used, the name of the gauge referred to must be specified.

This table shows the standard wire gauges and the names of major commodities for which each is used.

- A. ALUMINUM, BRASS TUBING (smaller than $\frac{3}{8}$ " o.d.), BRASS SHEETS, BRASS STRIPS, BRASS WIRE, COPPER SHEETS and WIRE, NICKEL SILVER SHEETS and WIRE, PHOSPHOR BRONZE STRIP.
- B. ALUMINUM TUBING, BRASS TUBING $\frac{3}{8}$ " or larger o.d.), STEEL TUBING seamless or welded, STRIP STEEL, STAINLESS STEEL STRIP.
- C. STAINLESS STEEL SHEET. D. STEEL SHEETS. E. STEEL WIRE

**FRACTIONAL INCHES INTO DECIMALS
AND MILLIMETERS**

Inch	Decimal Inch	Millimeter	Inch	Decimal Inch	Millimeter
$\frac{1}{64}$	0.015625	0.396785	$\frac{33}{64}$	0.515625	13.890625
$\frac{1}{32}$	0.03125	0.79375	$\frac{17}{32}$	0.53125	13.49375
$\frac{3}{64}$	0.046875	1.190625	$\frac{35}{64}$	0.546875	13.890625
$\frac{1}{16}$	0.0625	1.5875	$\frac{9}{16}$	0.5625	14.2875
$\frac{5}{64}$	0.078125	1.984375	$\frac{37}{64}$	0.578125	14.684375
$\frac{3}{32}$	0.09375	2.38125	$\frac{19}{32}$	0.59375	15.08125
$\frac{7}{64}$	0.109375	2.778125	$\frac{39}{64}$	0.609375	15.478125
$\frac{1}{8}$	0.125	3.175	$\frac{5}{8}$	0.625	15.875
$\frac{9}{64}$	0.140625	3.571875	$\frac{41}{64}$	0.640625	16.271875
$\frac{5}{32}$	0.15625	3.96875	$\frac{21}{32}$	0.65625	16.66875
$\frac{11}{64}$	0.171875	4.365625	$\frac{43}{64}$	0.671875	17.065625
$\frac{3}{16}$	0.1875	4.7625	$\frac{11}{16}$	0.6875	17.4625
$\frac{13}{64}$	0.203125	5.159375	$\frac{45}{64}$	0.703125	17.859375
$\frac{7}{32}$	0.21875	5.55625	$\frac{23}{32}$	0.71875	18.25625
$\frac{15}{64}$	0.234375	5.953125	$\frac{47}{64}$	0.734375	18.653125
$\frac{1}{4}$	0.25	6.5	$\frac{3}{4}$	0.75	19.05
$\frac{17}{64}$	0.265625	6.746875	$\frac{49}{64}$	0.765625	19.446875
$\frac{9}{32}$	0.28125	7.14375	$\frac{25}{32}$	0.78125	19.84375
$\frac{19}{64}$	0.296875	7.540625	$\frac{51}{64}$	0.796875	20.240625
$\frac{5}{16}$	0.3125	7.9375	$\frac{13}{16}$	0.8125	20.6375
$\frac{21}{64}$	0.328125	8.334375	$\frac{53}{64}$	0.828125	21.034375
$\frac{11}{32}$	0.34375	8.73125	$\frac{27}{32}$	0.84375	21.43125
$\frac{23}{64}$	0.359375	9.128125	$\frac{55}{64}$	0.859375	21.828125
$\frac{3}{8}$	0.375	9.525	$\frac{7}{8}$	0.875	22.225
$\frac{25}{64}$	0.390625	9.921875	$\frac{57}{64}$	0.890625	22.621875
$\frac{13}{32}$	0.40625	10.31875	$\frac{29}{32}$	0.90625	23.01875
$\frac{27}{64}$	0.421875	10.715625	$\frac{59}{64}$	0.921875	23.415625
$\frac{7}{16}$	0.4375	11.1125	$\frac{15}{16}$	0.9375	23.8125
$\frac{29}{64}$	0.453125	11.509375	$\frac{61}{64}$	0.953125	24.209375
$\frac{15}{32}$	0.46875	11.90625	$\frac{31}{32}$	0.96875	24.60625
$\frac{31}{64}$	0.484375	12.303125	$\frac{63}{64}$	0.984375	25.003125
$\frac{1}{2}$	0.50	12.7	1	1.00000	25.4





ALUMINUM

FLAT SHEET
COILED SHEET
PLATE

INDEX

Description of Alloys	Page 17
Alloy Designation Code	Page 17
Sheet Finishes	Page 19
Gauge Charts	Page 20
Weight Conversion Factors	Page 21
Metric Conversion Factors	Page 22
Temper Designations	Page 23
Weights—	
Strip—per Lineal Foot	Page 25
Sheet—per Square Foot	Page 26
Areas of Circles	Page 28
Physical Properties	Page 30
Mechanical Properties	Page 31
High Temperature Properties	Page 33
Thermal Treatments	Page 34
Weights—	
Sheet—Standard Sizes	Page 36
Cold Bend Data—	
90 Degrees	Page 38
180 Degrees	Page 40
Tolerances—	
Commercial Thickness	Page 41
Length	Page 43
Width	Page 43
Camber	Page 44
Circle Diameter	Page 45
Squareness	Page 46
Sawed Plate	Page 46
Corrosion Resistance Data	Page 47
Chemical Composition	Page 49
Government Specifications	Page 50
Standard Warehouse Sizes—	
Flat Sheet and Plate	Page 52
Coiled Sheet	Page 54
Coiled Sheet Circles	Page 56
Embossed Sheet	Page 57
Utility Sheet	Page 57

ALUMINUM—Aluminum is a metal with a great variety of commercial applications and in most instances, can be fabricated on existing equipment used to fabricate other ferrous and non-ferrous metals with little or no modification. Aluminum's advantages are light weight (approximately $\frac{1}{3}$ as much as steel, copper, etc.), ease of fabrication, pleasing appearance, corrosion resistance, and excellent heat and electrical conductivity. These desirable properties make it an economical metal for an endless variety of industrial and everyday household articles. Below are listed some of the major fields in which aluminum is constantly making greater progress.

**TRANSPORTATION • BUILDING PRODUCTS • FOOD CONTAINERS
MATERIAL HANDLING EQUIPMENT • RADIO AND APPLIANCE PARTS •
TOYS • DECORATIVE MOLDINGS • HOUSEHOLD ALUMINUM WARE
FURNITURE AND CABINETS**

Aluminum is one of the easiest metals to fabricate. This metal can be punched, drawn, roll formed, spun, and press broken. It is commonly fabricated on such types of equipment as:

**HYDRAULIC AND MECHANICAL PRESSES • POWER AND HAND
BRAKES • ROLL FORMING MILLS • SPINNING LATHES • STRETCH
FORMING EQUIPMENT**

ALUMINUM ASSOCIATION ALLOY DESIGNATION SYSTEM—Effective October 1, 1954 aluminum alloys have been designated by a four digit system: The first digit indicates the alloy group, the second the modifications of the original alloying element or impurity limits, and the last two digits identify the alloy or indicate the aluminum purity. In the table below are shown the various aluminum alloy groups.

ALUMINUM ALLOY GROUP DESIGNATIONS:

Aluminum 99% minimum or greater	1xxx
Copper	2xxx
Manganese	3xxx
Silicon	4xxx
Magnesium	5xxx
Magnesium and Silicon	6xxx
Zinc	7xxx
Other Element	8xxx
Unused Series	9xxx

HEAT TREATABLE AND COMMON ALLOYS—Aluminum alloys may be classified into two general groups—those whose physical properties may be raised by thermal treatment and those whose physical properties can be raised by cold working only. Alloys falling into the first classification are called "heat-treatable alloys" and those in the latter group are called either "common alloys" or "non-heat-treatable alloys." In the following explanation of Temper Designations the various alloys have been divided into these two major groups.

ALUMINUM SHEET AND PLATE ALLOYS

DESCRIPTION—Fullerton carries a complete line of aluminum flat rolled products in stock which are available for immediate delivery. Due to the continual development of newer and better alloys which is going on constantly in the industry, this list may not be complete. We solicit your inquiries whether or not we have listed your requirement below. See page 32 for physical properties.

1100 Aluminum Flat Sheet, Coiled Sheet and Plate

This grade (99% pure aluminum) is sometimes called "commercially pure aluminum". It is relatively soft and ductile with excellent workability. It is the most weldable aluminum alloy by any method and is readily brazed. The melting point (1190° F) and the electrical and thermal conductivity of 1100 are somewhat higher than the other commercial alloys. Corrosion resistance is excellent, and this metal responds well to anodizing.

3003 Aluminum Flat Sheet, Coiled Sheet and Plate

This is the best known of all of the aluminum sheet alloys. 3003 is approximately 20% stronger than 1100 due to 1.2% manganese which is its principal alloying constituent. This alloy has the same melting point as 1100 but lower electrical and thermal conductivity. It is readily formed and can be welded and brazed by all methods. It also has excellent corrosion resistance.

5005 Aluminum Flat Sheet and Coiled Sheet

This grade of aluminum, although priced the same as 3003, has superior finishability. It has more uniform grain structure resulting in less costly finishing and polishing operations, and it is well suited for anodizing, since it has less tendency to streak or discolor than many other alloys. This grade has a tendency to work harden during cold forming at a slightly higher rate than 3003, hence, this results in a slightly stronger product.

5050 Aluminum Flat Sheet and Coiled Sheet

This alloy was developed by Kaiser Aluminum as an intermediate strength sheet alloy. It fills the gap between 3003 and 5052 and combines many of their important characteristics. 5050 has better than average electrical and thermal conductivity plus excellent corrosion resistance, which is characteristic of other magnesium alloys as well. This alloy etches and anodizes well, and its fine finishing characteristics make it a desirable alloy for decorative applications.

5052 Aluminum Flat Sheet, Coiled Sheet and Plate

This alloy has a reputation for being a durable and serviceable grade of aluminum. The alloying elements, 2.5% magnesium plus a small addition of chromium, give it a good combination of workability, strength, and toughness. This alloy is widely used for marine applications because it is especially resistant to salt water corrosion and marine atmosphere. It also is used widely in the chemical industry because of these same corrosion resistant characteristics. Resistance welding characteristics are equal with 3003 and 1100. Though it may be fusion welded, different techniques may be required than with other non-heat-treatable alloys. It can be torch brazed easily, but furnace brazing requires special precautions, so this method is not generally employed.

2024 Aluminum Flat Sheet, Colled Sheet and Plate

This alloy is used where maximum strength is required and corrosion is not a problem; however this material is also available in the clad condition with a layer of high purity aluminum on both surfaces to improve corrosion resistance. This material is not recommended for welding.

6061 Aluminum Flat Sheet and Plate

This is the most versatile of the heat-treatable alloys. It can be readily welded by all methods. It is the only heat-treatable alloy that is commonly fusion welded. It can be torch and furnace brazed as well. In addition this alloy has good resistance to corrosion.

7075 Aluminum Flat Sheet and Plate

This is the strongest and hardest commercial aluminum alloy and consequently is used extensively in airframe construction. It is ideally suited for the fabrication of highly stressed parts where light weight is essential. This alloy can be resistance and spot welded, but fusion welding is not generally recommended.

Aluminum Sheet Finishes

MILL FINISH—Normal commercial surface produced on sheet—characteristic of the ground finish of the rolls used in fabrication.

ONE SIDE BRIGHT MILL FINISH—Sheet having moderate degree of brightness on one side. The reverse side is uncontrolled and may have a dull, non-uniform appearance.

STANDARD ONE SIDE BRIGHT FINISH—Sheet having a uniformly bright and lustrous surface on one side. The reverse side is uncontrolled and may have a dull, non-uniform appearance.

STANDARD BRIGHT FINISH—Sheet having a relatively bright finish on both sides—but somewhat less lustrous than the Standard One Side Bright material.

ALUMINUM UTILITY SHEET—No specific guarantees are made about this product other than it will take pittsburgh lock seaming. However it is an economical grade widely used for sheet metal work, ducts, flashing, awnings, gravel stops, etc. This material is available both in sheet and coil.

GAUGES
COMPARATIVE—PLATE AND SHEET

GAUGE NUMBER	BROWN & SHARPE	UNITED STATES STANDARD	ALUMINUM* INDUSTRY STANDARD
		NON- FERROUS SHEET, WIRE, AND ROD	FERROUS SHEET AND PLATE	ALUMINUM SHEET
0	0.3249	0.312	....
1	0.2893	0.281	....
2	0.2576	0.266	....
3	0.2294	0.250	....
4	0.2043	0.234	....
5	0.1819	0.219	....
6	0.1620	0.203	0.190(¾)
7	0.1443	0.188	....
8	0.1285	0.172	0.125(½)
9	0.1144	0.156	....
10	0.1019	0.141	0.100
11	0.0907	0.125	0.090
12	0.0808	0.109	0.080
13	0.0720	0.0938	....
14	0.0641	0.0781	0.063
15	0.0571	0.0703	....
16	0.0508	0.0625	0.050
17	0.0453	0.0562	....
18	0.0403	0.0500	0.040
19	0.0359	0.0438	....
20	0.0320	0.0375	0.032
21	0.0285	0.0344	....
22	0.0253	0.0312	0.025
23	0.0226	0.0281	....
24	0.0201	0.0250	0.020
25	0.0179	0.0219	....
26	0.0159	0.0188	0.016
27	0.0142	0.0172	....
28	0.0126	0.0156	0.012
29	0.0113	0.0141	....
30	0.0100	0.0125	0.010

***ALUMINUM INDUSTRY STANDARD GAUGE**

Effective January 1, 1957, the Aluminum Industry in cooperation with the Aircraft Industry adopted this new mean gauge as a standard on thicknesses. After January 1, 1957, all Fullerton stocks will be carried in and ordered to this gauge. Commercial thickness tolerances shown on page 41 apply.

CONVERSION FACTORS

Tables of weights of wrought aluminum products are based on weights of commercially pure aluminum (1100) having a density of 2.71 and weighing 0.0979 pounds per cubic inch.

ALUMINUM

1.01 x wt. of 1100=wt. of 3003	1.00 x wt. of 1100=wt. of 6061
0.99 x wt. of 1100=wt. of 5050	1.02 x wt. of 1100=wt. of 2024
0.98 x wt. of 1100=wt. of 5052	1.03 x wt. of 1100=wt. of 7075

OTHERS

3.1 x wt. of 1100=wt. of brass	2.89 x wt. of 1100=wt. of steel
3.3 x wt. of 1100=wt. of copper	2.6 x wt. of 1100=wt. of zinc
3.26 x wt. of 1100=wt. of nickel	2.69 x wt. of 1100=wt. of tin
3.3 x wt. of 1100=wt. of monel	



Aluminum flat sheet is stocked in original mill crates in 16-foot high racks especially designed and built for Fullerton. Any box or skid—even the bottom one—can be removed quickly by Fork-lift and shipped the same day your order is placed. This racking releases more floor space for larger stocks of flat aluminum sheet in all standard sizes, gauges, tempers and alloys.

CONVERSION TABLES
WEIGHTS AND MEASURES

ENGLISH TO METRIC			METRIC TO ENGLISH		
1 inch =	25.4	mm.	1 mm. =	0.03937	in.
	= 2.54	cm.		= 0.003281	ft.
	= 0.0254	m.		= 0.001094	yd.
1 foot =	304.800	mm.	1 cm. =	0.03937	in.
	= 30.480	cm.		= 0.03281	ft.
	= 0.3048	m.		= 0.01094	yd.
1 yard =	91.4402	cm.	1 meter =	39.37	in.
	= 0.9144	m.		= 3.2808	ft.
	= 0.0,914	km.		= 1.0936	yd.
1 mile =	1609.344	m.		= 0.6,6214	mi.
	= 1.6093	km.	1 kilometer =	3280.833	ft.
				= 1093.611	yd.
				= 0.6214	mi.

ENGLISH TO METRIC			METRIC TO ENGLISH		
1 cir. mil =	0.0,5067	sq. mm.	1 sq. mm. =	1,973.55	cir. mils
1 sq. in. =	645.163	sq. mm.		= 0.001550	sq. in.
	= 6.4516	sq. cm.		= 0.0,10764	sq. ft.
	= 0.0,6452	sq. m.		= 0.0,1196	sq. yd.
1 sq. ft. =	92,903.41	sq. mm.	1 sq. cm. =	0.1550	sq. in.
	= 929.0341	sq. cm.		= 0.001076	sq. ft.
	= 0.0929	sq. m.		= 0.0,1196	sq. yd.
	= 0.0,929	sq. km.	1 sq. m. =	1,549.9969	sq. in.
1 sq. yd. =	836,130.74	sq. mm.		= 10.7639	sq. ft.
	= 8,361.307	sq. cm.		= 1.1960	sq. yd.
	= 0.83613	sq. m.		= 0.0,3861	sq. mi.
	= 0.0,836	sq. km.	1 sq. km. =	10,763,867.36	sq. ft.
1 sq. mile =	2,589,998	sq. m.		= 1,195,985.26	sq. yd.
	= 2.590	sq. km.		= 0.3861	sq. mi.

ENGLISH TO METRIC			METRIC TO ENGLISH		
1 cu. in. =	16,387.17	cu. mm.	1 cu. mm. =	0.0,6102	cu. in.
	= 16.3872	cu. cm.	1 cu. cm. =	0.06102	cu. in.
	= 0.0,16387	cu. m.		= 0.0,3531	cu. ft.
1 cu. ft. =	28,317.08	cu. cm.		= 0.0,1308	cu. yd.
	= 0.02832	cu. m.		= 0.0,1308	cu. yd.
1 cu. yd. =	764,559.5	cu. cm.		= 35.3133	cu. ft.
	= 0.7646	cu. m.		= 1.3079	cu. yd.

ENGLISH TO METRIC			METRIC TO ENGLISH		
1 grain =	64.797	mg.	1 milligram =	0.01543	grain
	= 0.0648	gm.		= 0.0,3527	oz. avoird.
1 oz. avoird. =	28,349.5	mg.	1 gram =	15.4324	grains
	= 28.3495	gm.		= 0.03527	oz. avoird.
	= 0.02835	kg.		= 0.0,2205	lb. avoird.
1 lb. avoird. =	453.5925	gm.	1 kilogram =	35.2740	oz. avoird.
	= 0.4536	kg.		= 2.2046	lb. avoird.
	= 0.0,4536	metric ton		= 0.0,1102	short ton
1 short ton =	907.2	kg.		= 0.0,9842	long ton
	= 0.9072	metric ton	1 metric ton =	2,204.62	lb. avoird.
1 long ton =	1,016.06	kg.		= 1.1023	short tons
	= 1.0161	metric ton		= 0.9842	long ton

NOTE: 0.0z4 = 0.0004—subscript number is number of zeros after decimal.

TEMPER DESIGNATIONS
NON-HEAT-TREATABLE ALLOYS

TEMPER DESIGNATION				
ALLOY	STRAIN HARDENED ONLY	STRAIN HARDENED Then PARTIAL ANNEALED	STRAIN HARDENED Then STABILIZED	FORMER TEMPER DESIGNATION
1100, 3003 and Clad 3003	} —H12 —H14 —H16 —H18	} —H22 —H24 —H26 —	} — — — —	} ¼H ½H ¾H H
5050 (1) Clad 5050 (1) and 5052	} — — — —H19	} —H22 — — —	} —H32 —H34 —H36 —H38	} ¼H ½H ¾H H

1) Only 5050 and Clad 5050 are produced in H19 and H22 tempers.

—F As Fabricated. This designation applies to products which acquire some temper qualities in the shaping processes but are not subsequently thermally treated or intentionally strain hardened.

—O Annealed, Recrystallized. This designation applies to the softest temper of wrought alloy products.

—H Strain Hardened. This designation applies to those products which have their strength increased by strain hardening with or without supplementary thermal treatments to produce partial softening. The **—H** is always followed by two or more digits. The first digit indicates the specific combination of basic operations and the following digit or digits the final degree of strain hardening.

Sub-Division of the —H Tempers:

—H1 Strain Hardened only. The digit following this designation indicates the degree of strain hardening. Thus, 1100-¼H (strain hardened only) becomes 1100-H12; a temper intermediate between —¼H and —½H would be designated —H13.

—H2 Strain Hardened and then Partial Annealed. The digit following this designation indicates the degree of strain hardening remaining after the product has been partial annealed. Thus, 1100-½H (strain hardened and partial annealed) becomes 1100-H24.

—H3 Strain Hardened and then Stabilized. The digit following this designation indicates the degree of strain hardening remaining after the product has been strain hardened a specific amount and then stabilized. Thus, 5052-½H (strain hardened and stabilized) becomes 5052-H34.

TEMPER DESIGNATIONS

HEAT-TREATABLE ALLOYS

ALLOY	TEMPER DESIGNATION				
	HEAT TREATED BY MILL			HEAT TREATED BY USER ALL FORMS	FORMER TEMPER DESIGNATION
	FLAT SHEET	COILED SHEET	PLATE		
2024 and Clad 2024 } }	-T3 -T36	-T4	-T4 -T36	-T4	-T -RT
6061 and Clad 6061 } }	-T4 -T6	-T4 -T6	-T4 -T6	-T4 -T6	-W -T
7075 and Clad 7075 } }	-W -T6	-W -T6	-W -T6	-W -T6	-W -T
Clad 2014	-T3 -T6	-T4 -T6	-T4 -T6	-T4 -T6	-W -T

-T Treated to Produce Stable Tempers Other than -F, -O, or -H. This designation applies to products thermally treated to produce stable tempers with or without supplementary strain hardening. The -T followed by numerals designates one specific combination of basic operations (6061-T6). Should some other variation of the same basic operations be applied to the same alloy, resulting in different characteristics, then other digits are added to the basic designation (6061-T61 or 6061-T62). It should be understood that a period of natural aging at room temperature may occur between or after the operations listed. Control of this period is exercised when it is metallurgically important.

-W The Unstable Condition Following Solution Heat Treatment. This designation, because of natural aging, is specific only when the period of aging is indicated, e. g., 2024W ($\frac{1}{2}$ hr.); 7075W (2 mo.).

Sub-Divisions of the -T Temper:

-T3 Solution Heat Treated and then Cold Worked. This designation applies to those products where cold work is performed for the primary purpose of improving the strength (e. g. 2024-T36), and also applies to those products in which the effect of cold work, such as flattening or straightening, is recognized in applicable specifications. (2024 flat sheet heat treated by a producer is designated 2024-T3.)

-T4 Solution Heat Treated and Naturally Aged to a Substantially Stable Condition. This designation applies when the product is not cold worked after heat treatment (2024 sheet heat treated by producer is designated 2024-T4), and also when applicable specifications do not recognize the effect of cold work in flattening and straightening operations. (6061 flat sheet heat treated by the producer is designated 6061-T4.)

-T6 Solution Heat Treated and then Artificially Aged. This designation applies to products which are not cold worked after solution heat treatment and in which the effect, if any, of flattening or straightening is not recognized in applicable specifications. (Whether flattened or not, 6061 becomes 6061-T6, and 2014 becomes 2014-T6.)

-T8 Solution Heat Treated, Cold Worked, and then Artificially Aged. This designation applies when the cold working is done for the purpose of improving strength (Clad 2024-T86), and also when the cold working effect of flattening or straightening is recognized in applicable specifications. (Clad 2024-T81 flat sheet.)

WEIGHTS PER LINEAL FOOT (1100, 5005, 6061)
POUNDS

INCH	B. & S. GAUGE	WIDTH IN INCHES										FACTOR					
		1/16	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4						
0.1285	8	0.0094	0.0189	0.0378	0.0566	0.0753	0.1133	0.1511	0.3023	0.4534	0.6044	0.7556	0.9067	1.058	1.209	1.360	1.511
0.1144	9	0.0084	0.0168	0.0336	0.0504	0.0672	0.1009	0.1345	0.2690	0.4034	0.5379	0.6724	0.8069	0.9414	1.076	1.210	1.345
0.1019	10	0.0075	0.0150	0.0299	0.0449	0.0599	0.0898	0.1198	0.2396	0.3593	0.4791	0.5989	0.7187	0.8385	0.9582	1.078	1.198
0.0907	11	0.0067	0.0133	0.0267	0.0400	0.0533	0.0800	0.1066	0.2132	0.3199	0.4265	0.5331	0.6397	0.7464	0.8530	0.9596	1.066
0.0808	12	0.0059	0.0119	0.0237	0.0356	0.0475	0.0712	0.0950	0.1900	0.2849	0.3799	0.4749	0.5699	0.6649	0.7598	0.8548	0.9498
0.0720	13	0.0053	0.0106	0.0212	0.0318	0.0423	0.0635	0.0846	0.1693	0.2539	0.3385	0.4232	0.5078	0.5924	0.6771	0.7617	0.8463
0.0641	14	0.0047	0.0094	0.0188	0.0283	0.0377	0.0565	0.0754	0.1507	0.2261	0.3014	0.3768	0.4521	0.5275	0.6028	0.6782	0.7535
0.0571	15	0.0042	0.0084	0.0168	0.0252	0.0336	0.0503	0.0671	0.1342	0.2014	0.2685	0.3356	0.4027	0.4699	0.5370	0.6041	0.6712
0.0508	16	0.0037	0.0075	0.0149	0.0224	0.0299	0.0448	0.0597	0.1194	0.1792	0.2389	0.2986	0.3583	0.4180	0.4777	0.5375	0.5972
0.0453	17	0.0033	0.0067	0.0133	0.0200	0.0266	0.0399	0.0533	0.1065	0.1598	0.2130	0.2663	0.3195	0.3728	0.4260	0.4793	0.5325
0.0403	18	0.0030	0.0059	0.0118	0.0178	0.0237	0.0355	0.0474	0.0947	0.1421	0.1895	0.2369	0.2842	0.3316	0.3790	0.4264	0.4737
0.0359	19	0.0026	0.0053	0.0106	0.0158	0.0211	0.0317	0.0422	0.0844	0.1266	0.1688	0.2110	0.2532	0.2954	0.3376	0.3798	0.4220
0.0320	20	0.0024	0.0047	0.0094	0.0141	0.0188	0.0282	0.0376	0.0752	0.1128	0.1505	0.1881	0.2257	0.2633	0.3009	0.3385	0.3762
0.0285	21	0.0021	0.0042	0.0084	0.0126	0.0168	0.0251	0.0335	0.0670	0.1005	0.1340	0.1675	0.2010	0.2345	0.2680	0.3015	0.3350
0.0254	22	0.0019	0.0037	0.0075	0.0112	0.0149	0.0224	0.0299	0.0597	0.0896	0.1194	0.1493	0.1791	0.2090	0.2389	0.2687	0.2986
0.0226	23	0.0017	0.0033	0.0066	0.0100	0.0133	0.0199	0.0266	0.0531	0.0797	0.1063	0.1328	0.1594	0.1860	0.2125	0.2391	0.2656
0.0201	24	0.0015	0.0030	0.0059	0.0080	0.0118	0.0185	0.0236	0.0473	0.0709	0.0945	0.1181	0.1418	0.1654	0.1890	0.2127	0.2363
0.0179	25	0.0013	0.0026	0.0053	0.0070	0.0105	0.0158	0.0210	0.0421	0.0631	0.0842	0.1052	0.1262	0.1473	0.1683	0.1894	0.2104
0.0159	26	0.0012	0.0023	0.0047	0.0070	0.0093	0.0140	0.0187	0.0374	0.0561	0.0748	0.0935	0.1121	0.1308	0.1495	0.1682	0.1869
0.0142	27	0.0010	0.0021	0.0042	0.0063	0.0083	0.0125	0.0167	0.0334	0.0501	0.0668	0.0835	0.1001	0.1168	0.1335	0.1502	0.1669
0.0126	28	0.00083	0.0019	0.0037	0.0056	0.0074	0.0111	0.0148	0.0296	0.0444	0.0592	0.0741	0.0889	0.1037	0.1185	0.1333	0.1481
0.0113	29	0.00083	0.0017	0.0033	0.0050	0.0066	0.0100	0.0133	0.0266	0.0398	0.0531	0.0664	0.0797	0.0930	0.1063	0.1195	0.1328
0.0100	30	0.00073	0.0015	0.0029	0.0044	0.0059	0.0088	0.0118	0.0235	0.0353	0.0470	0.0588	0.0705	0.0823	0.0940	0.1058	0.1176
0.0089	31	0.00065	0.0013	0.0026	0.0039	0.0052	0.0078	0.0105	0.0209	0.0314	0.0418	0.0523	0.0628	0.0732	0.0837	0.0942	0.1046
0.0080	32	0.00059	0.0012	0.0024	0.0035	0.0047	0.0071	0.0094	0.0188	0.0282	0.0376	0.0470	0.0564	0.0658	0.0752	0.0846	0.0940
0.0071	33	0.00052	0.0010	0.0021	0.0031	0.0042	0.0063	0.0083	0.0167	0.0250	0.0334	0.0417	0.0501	0.0584	0.0668	0.0751	0.0835
0.0063	34	0.00046	0.00093	0.0019	0.0028	0.0037	0.0056	0.0074	0.0148	0.0222	0.0296	0.0370	0.0444	0.0518	0.0592	0.0666	0.0741

NOTE: Other alloys, multiply weight by following factors:

ALLOY	FACTOR
3003	1.01
5050	0.99
2024	1.02
2014	1.03

WEIGHT TABLES

ALLOY	DENSITY, LB./CU. IN.					WEIGHT IN POUNDS PER SQUARE FOOT				
	1100	3003	5050 & 3052	5005 & 6061	2024	2014 & 7075	2024	2014 & 7075	2024	2014 & 7075
THICKNESS	A. I. S. GAUGE									
.006	.085	.086	.084	.085	.086	.085	.086	.087	.086	.087
.007	.099	.100	.098	.099	.101	.099	.101	.102	.101	.102
.008	.113	.114	.112	.113	.115	.113	.115	.116	.115	.116
.009	.127	.128	.126	.127	.130	.127	.130	.131	.130	.131
.010	.141	.142	.140	.141	.144	.141	.144	.145	.144	.145
.011	.155	.157	.154	.155	.158	.155	.158	.160	.158	.160
.012	.169	.171	.168	.169	.173	.169	.173	.174	.173	.174
.014	.198	.200	.196	.198	.202	.198	.202	.204	.202	.204
.016	.226	.228	.224	.226	.230	.226	.230	.233	.230	.233
.018	.254	.257	.252	.254	.259	.254	.259	.262	.259	.262
.020	.282	.285	.280	.282	.288	.282	.288	.291	.288	.291
.023	.324	.328	.324	.324	.331	.324	.331	.334	.331	.334
.025	.353	.356	.350	.353	.360	.353	.360	.363	.360	.363
.028	.395	.399	.392	.395	.403	.395	.403	.407	.403	.407
.031	.437	.442	.434	.437	.446	.437	.446	.451	.446	.451
.032	.452	.456	.448	.452	.461	.452	.461	.465	.461	.465
.036	.508	.513	.504	.508	.518	.508	.518	.524	.518	.524
.040	.564	.570	.560	.564	.576	.564	.576	.582	.576	.582
.045	.635	.642	.630	.635	.648	.635	.648	.654	.648	.654
.047	.663	.670	.657	.663	.677	.663	.677	.683	.677	.683
.050	.706	.713	.698	.706	.720	.706	.720	.727	.720	.727
.057	.804	.812	.797	.804	.821	.804	.821	.828	.821	.828
.062	.875	.884	.867	.875	.893	.875	.893	.901	.893	.901
.063	.889	.898	.880	.889	.907	.889	.907	.916	.907	.916
.072	1.02	1.03	1.01	1.02	1.04	1.02	1.04	1.05	1.04	1.05

FULLERTON—A WAREHOUSE OF METALS AND SERVICE

.078	1.10	1.11	1.09	1.10	1.12	1.13	1.11
.080	1.13	1.14	1.14	1.14	1.15	1.16	1.13
.090	1.27	1.28	1.26	1.27	1.30	1.31	1.16
.094	1.33	1.34	1.32	1.33	1.35	1.37	1.31
.100	1.41	1.43	1.40	1.41	1.44	1.45	1.37
.109	1.54	1.55	1.53	1.54	1.57	1.58	1.45
.114	1.61	1.62	1.60	1.61	1.64	1.66	1.58
.125	1.76	1.78	1.75	1.76	1.80	1.82	1.66
.128	1.81	1.82	1.79	1.81	1.84	1.86	1.80
.141	1.99	2.01	1.96	1.99	2.03	2.02	1.84
.144	2.03	2.05	2.02	2.03	2.07	2.05	2.03
.156	2.20	2.22	2.18	2.20	2.25	2.27	2.07
.162	2.29	2.31	2.27	2.29	2.33	2.36	2.25
.172	2.43	2.45	2.41	2.43	2.48	2.50	2.27
.190	2.68	2.71	2.65	2.68	2.74	2.76	2.33
.203	2.86	2.89	2.84	2.86	2.92	2.95	2.43
.219	3.09	3.12	3.06	3.09	3.15	3.08	2.48
.234	3.30	3.34	3.27	3.30	3.37	3.40	2.74
.250	3.53	3.56	3.50	3.53	3.60	3.64	2.86
.266	3.75	3.79	3.72	3.75	3.83	3.86	3.37
.281	3.96	4.00	3.93	3.96	4.05	4.08	3.60
.297	4.19	4.23	4.15	4.19	4.28	4.32	3.75
.312	4.40	4.45	4.36	4.40	4.49	4.54	4.05
.328	4.63	4.68	4.58	4.63	4.72	4.76	4.28
.344	4.85	4.90	4.81	4.85	4.95	5.00	4.49
.359	5.07	5.12	5.03	5.07	5.17	5.12	4.72
.375	5.29	5.35	5.25	5.29	5.40	5.45	4.85
.391	5.52	5.57	5.46	5.52	5.63	5.68	5.17
.406	5.73	5.79	5.68	5.73	5.85	5.90	5.40
.422	5.96	6.02	5.90	5.96	6.08	6.12	5.63
.438	6.18	6.24	6.14	6.18	6.31	6.37	5.85
.453	6.39	6.46	6.34	6.39	6.52	6.58	6.08
.469	6.62	6.69	6.57	6.62	6.75	6.81	6.31
.484	6.83	6.90	6.77	6.83	6.97	7.03	6.52
.500	7.06	7.13	7.00	7.06	7.20	7.27	6.75

CIRCLES—AREAS*

DIAMETER FRACTION (IN.)	DIAMETER WHOLE NO. (IN.)	AREA— SQUARE FEET														
		0	1/16	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8
1	.0055	.0069	.0077	.0085	.0094	.0103	.0113	.0123	.0133	.0144	.0155	.0167	.0179	.0192	.0205	
2	.0218	.0232	.0246	.0261	.0276	.0292	.0308	.0324	.0341	.0358	.0376	.0394	.0412	.0431	.0451	
3	.0491	.0521	.0533	.0554	.0576	.0598	.0621	.0644	.0668	.0692	.0717	.0742	.0767	.0793	.0819	
4	.0873	.0900	.0928	.0956	.0985	.1014	.1044	.1074	.1104	.1135	.1167	.1198	.1231	.1263	.1296	
5	.1364	.1398	.1433	.1468	.1503	.1539	.1576	.1613	.1650	.1688	.1726	.1764	.1803	.1843	.1883	
6	.1963	.2005	.2046	.2088	.2131	.2173	.2217	.2260	.2304	.2349	.2394	.2439	.2485	.2531	.2578	
7	.2673	.2720	.2769	.2818	.2867	.2916	.2967	.3017	.3068	.3119	.3171	.3223	.3276	.3329	.3382	
8	.3491	.3545	.3600	.3656	.3712	.3768	.3826	.3883	.3941	.3998	.4057	.4116	.4176	.4236	.4296	
9	.4418	.4479	.4541	.4604	.4667	.4730	.4794	.4858	.4922	.4987	.5052	.5118	.5185	.5251	.5319	
10	.5454	.5523	.5591	.5660	.5730	.5800	.5871	.5942	.6013	.6085	.6158	.6230	.6303	.6377	.6450	
11	.6600	.6675	.6751	.6827	.6903	.6980	.7057	.7135	.7213	.7292	.7371	.7450	.7530	.7611	.7691	
12	.7854	.7933	.8019	.8103	.8185	.8270	.8357	.8435	.8522	.8608	.8694	.8781	.8867	.8954	.9040	
13	.9217	.9307	.9393	.9488	.9576	.9668	.9755	.9849	.9940	1.003	1.012	1.022	1.031	1.041	1.050	
14	1.069	1.078	1.089	1.098	1.108	1.118	1.127	1.137	1.147	1.157	1.166	1.177	1.187	1.197	1.207	
15	1.227	1.237	1.248	1.258	1.268	1.279	1.290	1.300	1.310	1.321	1.331	1.342	1.353	1.363	1.374	
16	1.396	1.407	1.418	1.429	1.440	1.451	1.462	1.473	1.485	1.496	1.507	1.519	1.530	1.542	1.552	
17	1.576	1.588	1.598	1.612	1.623	1.634	1.646	1.659	1.670	1.682	1.694	1.707	1.718	1.730	1.743	
18	1.767	1.780	1.791	1.804	1.817	1.829	1.842	1.854	1.867	1.879	1.892	1.905	1.918	1.931	1.943	
19	1.969	1.982	1.995	2.008	2.021	2.034	2.048	2.061	2.074	2.088	2.101	2.114	2.127	2.141	2.154	
20	2.182	2.195	2.209	2.223	2.237	2.250	2.264	2.278	2.292	2.306	2.320	2.334	2.348	2.362	2.377	
21	2.405	2.420	2.434	2.448	2.463	2.477	2.492	2.506	2.521	2.536	2.551	2.565	2.580	2.595	2.610	
22	2.640	2.655	2.670	2.685	2.700	2.716	2.730	2.746	2.761	2.777	2.792	2.807	2.823	2.838	2.854	
23	2.885	2.900	2.917	2.932	2.948	2.964	2.980	2.996	3.012	3.028	3.044	3.060	3.076	3.093	3.109	
24	3.142	3.158	3.174	3.191	3.207	3.224	3.241	3.257	3.274	3.290	3.307	3.324	3.341	3.358	3.375	
25	3.409	3.426	3.443	3.460	3.477	3.495	3.512	3.529	3.547	3.564	3.581	3.599	3.616	3.634	3.651	
26	3.687	3.705	3.724	3.743	3.758	3.776	3.794	3.812	3.830	3.848	3.867	3.885	3.903	3.921	3.939	
27	3.976	3.994	4.013	4.031	4.050	4.069	4.087	4.016	4.125	4.143	4.162	4.181	4.200	4.219	4.238	
28	4.276	4.295	4.314	4.334	4.353	4.372	4.391	4.411	4.430	4.450	4.469	4.489	4.508	4.528	4.547	
29	4.587	4.606	4.627	4.646	4.666	4.687	4.706	4.727	4.746	4.767	4.787	4.807	4.827	4.848	4.868	
30	4.909	4.927	4.950	4.970	4.991	5.011	5.032	5.053	5.074	5.094	5.115	5.136	5.157	5.179	5.199	

FULLERTON—A WAREHOUSE OF METALS AND SERVICE

31	5.241	5.263	5.284	5.305	5.326	5.348	5.369	5.390	5.412	5.433	5.455	5.476	5.498	5.520	5.541	5.563
32	5.585	5.607	5.629	5.650	5.673	5.695	5.717	5.739	5.761	5.783	5.806	5.828	5.850	5.872	5.895	5.917
33	5.940	5.962	5.985	6.007	6.030	6.052	6.075	6.098	6.121	6.143	6.167	6.189	6.213	6.236	6.259	6.282
34	6.305	6.328	6.351	6.375	6.398	6.422	6.444	6.468	6.492	6.515	6.539	6.562	6.586	6.610	6.633	6.657
35	6.681	6.705	6.729	6.753	6.777	6.802	6.825	6.850	6.874	6.898	6.922	6.947	6.971	6.995	7.020	7.044
36	7.069	7.093	7.118	7.142	7.167	7.192	7.216	7.241	7.266	7.291	7.316	7.341	7.366	7.392	7.416	7.442
37	7.467	7.492	7.517	7.543	7.568	7.594	7.619	7.644	7.670	7.695	7.721	7.747	7.772	7.798	7.824	7.850
38	7.876	7.901	7.928	7.953	7.980	8.006	8.032	8.059	8.085	8.111	8.137	8.164	8.190	8.216	8.243	8.269
39	8.296	8.322	8.349	8.376	8.403	8.429	8.456	8.483	8.510	8.536	8.564	8.590	8.618	8.646	8.672	8.700
40	8.726	8.754	8.781	8.809	8.836	8.864	8.891	8.919	8.946	8.974	9.001	9.029	9.057	9.085	9.112	9.140
41	9.169	9.196	9.225	9.252	9.281	9.309	9.337	9.366	9.394	9.422	9.450	9.479	9.507	9.536	9.564	9.593
42	9.621	9.650	9.678	9.707	9.736	9.765	9.793	9.822	9.851	9.880	9.910	9.938	9.968	9.998	10.03	10.06
43	10.08	10.11	10.14	10.17	10.20	10.23	10.26	10.29	10.32	10.35	10.38	10.41	10.44	10.47	10.50	10.53
44	10.56	10.59	10.62	10.65	10.68	10.71	10.74	10.77	10.80	10.83	10.86	10.89	10.92	10.95	10.98	11.01
45	11.04	11.08	11.11	11.14	11.17	11.20	11.23	11.26	11.29	11.32	11.35	11.38	11.42	11.45	11.48	11.51
46	11.54	11.57	11.60	11.64	11.67	11.70	11.73	11.76	11.79	11.82	11.86	11.89	11.92	11.95	11.98	12.02
47	12.05	12.08	12.11	12.14	12.18	12.21	12.24	12.27	12.31	12.34	12.37	12.40	12.44	12.47	12.50	12.53
48	12.57	12.60	12.63	12.66	12.70	12.73	12.76	12.80	12.83	12.86	12.90	12.93	12.96	13.00	13.03	13.06
49	13.10	13.13	13.16	13.20	13.23	13.26	13.30	13.33	13.36	13.40	13.43	13.46	13.50	13.53	13.57	13.60
50	13.64	13.67	13.70	13.74	13.77	13.81	13.84	13.88	13.91	13.94	13.98	14.01	14.05	14.08	14.12	14.15
51	14.19	14.22	14.26	14.29	14.33	14.36	14.40	14.43	14.47	14.50	14.54	14.57	14.61	14.64	14.68	14.71
52	14.75	14.78	14.82	14.86	14.89	14.93	14.96	15.00	15.03	15.07	15.10	15.14	15.18	15.21	15.25	15.28
53	15.32	15.36	15.39	15.43	15.47	15.50	15.54	15.58	15.61	15.65	15.68	15.72	15.76	15.79	15.83	15.87
54	15.90	15.94	15.98	16.02	16.05	16.09	16.13	16.16	16.20	16.24	16.28	16.31	16.35	16.39	16.42	16.46
55	16.50	16.54	16.57	16.61	16.65	16.69	16.72	16.76	16.80	16.84	16.88	16.91	16.95	16.99	17.03	17.07
56	17.10	17.14	17.18	17.22	17.26	17.30	17.33	17.37	17.41	17.45	17.49	17.53	17.57	17.60	17.64	17.68
57	17.72	17.76	17.80	17.84	17.88	17.92	17.95	17.99	18.03	18.07	18.11	18.15	18.19	18.23	18.27	18.31
58	18.35	18.39	18.43	18.47	18.51	18.55	18.59	18.63	18.67	18.70	18.74	18.78	18.83	18.86	18.90	18.94
59	18.99	19.03	19.07	19.11	19.15	19.19	19.23	19.27	19.31	19.35	19.39	19.43	19.47	19.51	19.55	19.59
60	19.63	19.68	19.72	19.76	19.80	19.84	19.88	19.93	19.96	20.00	20.05	20.09	20.13	20.17	20.21	20.25

*Circle weights are found by multiplying the circle area obtained by the weight-per-square-foot, shown on Pages 26-27.

TYPICAL PHYSICAL PROPERTIES NON-HEAT-TREATABLE ALLOYS

ALLOY AND TEMPER	ELECTRICAL CONDUCTIVITY % OF IACS (68°F)		ELECTRICAL RESISTIVITY AT 20°C (68°F)		THERMAL CONDUCTIVITY		Ave. Coef. of Thermal Expansion(°) 68°F-212°F	Specific Gravity	DENSITY		MELTING RANGE OF (APPROX.)	SPECIFIC HEAT AT 212°F (100°C) CAL./G.M.	ALLOY AND TEMPER		
	Equal Vol.	Equal Wt.	Micro-ohm /Cu. Cm.	Ohms/ Mil. Ft.	at 77°F (°F)	at 25°C C. G. S.			Lbs./Cu. In.	Lbs./Cu. Fl.				Density	
														Lbs./Cu. In.	Lbs./Cu. Fl.
1100-O	59	194	2.9	17	1540	0.53	13.1	2.71	0.98	169	1190- 1215	0.2297	25-O		
1100-H18	57	187	3.0	18	1510	0.52	—	—	—	—	1215	—	25-H18		
3003-O	50	163	3.4	21	1340	0.46	12.9	2.73	.099	170	1190- 1210	0.23	35-O		
3003-18	40	130	4.3	26	1070	0.37	—	—	—	—	1160- 1205	0.23	35-H18		
5050-O	49	167	3.4	21	1340	0.46	13.2	2.69	.097	168	1160- 1205	0.23	50S-O		
5050-H38	48	163	3.4	22	1250	0.44	—	—	—	—	1165- 1205	—	50S-H38		
2004-O	42	137	4.1	25	1130	0.39	13.3	2.72	.098	170	1165- 1205	—	4S-O		
2004-H38	42	137	4.1	25	1130	0.39	—	—	—	—	1100- 1200	0.23	4S-H38		
5052-O	35	116	4.9	30	960	0.33	13.2	2.68	.097	167	1100- 1200	0.23	52S-O		
5052-H38	35	116	4.9	30	960	0.33	—	—	—	—	—	—	52S-H38		

HEAT-TREATABLE ALLOYS

6061-O	45	148	3.8	23	1190	0.41	13.1	2.70	.098	169	1080- 1200	0.23	61S-O
6061-T4 & T6	40	132	4.3	26	1070	0.37	—	—	—	—	1200	—	61S-T4 & T6
2014-O	50	159	3.4	21	1340	0.46	12.8	2.80	.101	175	950- 1180	—	14S-O
2014-T4	30	95	5.7	35	840	0.29	—	—	—	—	—	—	14S-T4
2014-T6	40	127	4.3	26	1070	0.37	—	—	—	—	—	—	14S-T6
2024-O	50	160	3.4	21	1310	0.45	12.9	2.77	.100	173	935- 1180	0.23	24S-O
2024-T3	30	96	5.7	35	840	0.29	—	—	—	—	—	—	24S-T3
7075-O	—	—	—	—	—	—	—	—	—	—	—	—	890- 1180
7075-T6	30	95	5.7	35	840	0.29	13.1	2.80	.101	175	890- 1180	0.23	75S-O
													75S-T6

(1) In B. T. U. per inch per square foot.

(2) Values shown are divided by 1 million to obtain coefficient of thermal expansion.

TYPICAL MECHANICAL PROPERTIES¹ NON-HEAT-TREATABLE ALLOYS

ALLOY AND TEMPER	TENSILE PROPERTIES					ELASTIC MODULUS PSI	ULTIMATE SHEARING STRENGTH PSI	ULTIMATE BEARING STRENGTH PSI(2)	FATIGUE STRENGTH PSI(3)	HARDNESS BRINELL 10/500	ALLOY AND TEMPER
	ULTIMATE STRENGTH PSI	YIELD STRENGTH PSI(4)	ELONGATION (%)	ELONGATION (%)	ELONGATION (%)						
1100-O	13,000	5,000	35	10,000,000	9,000	27,000	5,000	23	1100-O		
1100-H12	18,000	17,000	12	—	10,000	28	6,000	28	1100-H12		
1100-H14	18,000	17,000	9	—	11,000	31,000	7,000	32	1100-H14		
1100-H16	21,000	20,000	6	—	12,000	34,000	9,000	38	1100-H16		
1100-H18	24,000	22,000	5	—	13,000	38,000	9,000	44	1100-H18		
3003-O	16,000	6,000	30	10,000,000	11,000	34,000	7,000	28	3003-O		
3003-H12	19,000	18,000	10	—	12,000	36,000	8,000	35	3003-H12		
3003-H14	22,000	21,000	8	—	14,000	38,000	9,000	40	3003-H14		
3003-H16	26,000	25,000	5	—	15,000	42,000	10,000	47	3003-H16		
3003-H18	29,000	27,000	4	—	16,000	46,000	10,000	55	3003-H18		
5050-O	21,000	8,000	24	10,000,000	15,000	39,000	12,000	36	5050-O		
5050-H22	23,000	16,000	14	—	—	44,000	13,000	43	5050-H22		
5050-H32	25,000	21,000	9	—	17,000	47,000	13,000	46	5050-H32		
5050-H34	28,000	24,000	8	—	18,000	52,000	13,000	53	5050-H34		
5050-H36	30,000	26,000	7	—	18,000	56,000	14,000	58	5050-H36		
5050-H38	32,000	29,000	6	—	20,000	59,000	14,000	63	5050-H38		
5050-H19	36,000	33,000	4	—	—	—	—	—	5050-H19		
5005-O	18,000	6,000	30	10,000,000	11,000	—	—	28	5005-O		
5005-H32	20,000	17,000	11	—	14,000	—	—	36	5005-H32		
5005-H34	23,000	20,000	8	—	14,000	—	—	41	5005-H34		
5005-H36	26,000	24,000	6	—	15,000	—	—	46	5005-H36		
5005-H38	29,000	27,000	5	—	16,000	—	—	51	5005-H38		
5052-O	28,000	13,000	25	10,200,000	18,000	61,000	17,000	45	5052-O		
5052-H32	35,000	28,000	12	—	20,000	71,000	18,000	62	5052-H32		
5052-H34	38,000	31,000	10	—	21,000	78,000	18,000	67	5052-H34		
5052-H36	40,000	35,000	8	—	23,000	82,000	19,000	74	5052-H36		
5052-H38	42,000	37,000	7	—	24,000	86,000	19,000	85	5052-H38		

(1) Properties listed are for information only and are not guaranteed. Properties of Clad 3003, Clad 5050 and Clad 3004 are substantially the same as those of the base material.
 (2) Stress to produce 0.2% permanent set.
 (3) Per cent in 2 inches for .064" thickness.
 (4) Ultimate bearing strength with edge distance 2.0 times rivet diameter.
 (5) Values are for round specimens and 500 million cycles.

TYPICAL MECHANICAL PROPERTIES¹ HEAT-TREATABLE ALLOYS

TENSILE PROPERTIES							HARDNESS BRINELL 10/300	ALLOY AND TEMPER	
ALLOY AND TEMPER	ULTIMATE STRENGTH PSI	YIELD STRENGTH PSI(2)	ELONGATION (%)	ELASTIC MODULUS PSI(4)	ULTIMATE SHEAR STRENGTH PSI	ULTIMATE BENDING STRENGTH PSI(5)			FATIGUE STRENGTH PSI(6)
6061-O	18,000	8,000	25	10,000,000	12,000	—	9,000	30	6061-O
6061-T4	35,000	21,000	22	—	24,000	73,000	14,000	65	6061-T4
6061-T6	45,000	40,000	12	—	30,000	94,000	14,000	95	6061-T6
Clad 6061-O	17,000	7,000	22	10,000,000	11,000	—	9,000	30	Clad 6061-O
Clad 6061-T4	33,000	19,000	22	—	22,000	73,000	14,000	65	Clad 6061-T4
Clad 6061-T6	42,000	37,000	12	—	27,000	94,000	14,000	95	Clad 6061-T6
2014-O	27,000	14,000	—	10,600,000	18,000	—	13,000	45	2014-O
2014-T4	62,000	42,000	—	—	38,000	—	20,000	105	2014-T4
2014-T6	70,000	60,000	—	—	42,000	—	18,000	135	2014-T6
Clad 2014-O	25,000	10,000	21	10,500,000	18,000	—	—	—	Clad 2014-O
Clad 2014-T3	63,000	40,000	20	—	37,000	—	—	—	Clad 2014-T3
Clad 2014-T4	61,000	37,000	22	—	37,000	—	—	—	Clad 2014-T4
Clad 2014-T6	68,000	60,000	10	—	41,000	129,000	—	—	Clad 2014-T6
2024-O	27,000	11,000	20	10,600,000	18,000	—	13,000	47	2024-O
2024-T3	70,000	50,000	18	—	41,000	179,000	20,000	120	2024-T3
2024-T4	68,000	47,000	20	—	41,000	—	20,000	120	2024-T4
2024-T36	72,000	57,000	13	—	42,000	139,000	18,000	130	2024-T36
Clad 2024-O	26,000	11,000	20	10,600,000	18,000	—	—	—	Clad 2024-O
Clad 2024-T3	63,000	45,000	18	—	40,000	122,000	—	—	Clad 2024-T3
Clad 2024-T4	64,000	42,000	19	—	40,000	—	—	—	Clad 2024-T4
Clad 2024-T36	67,000	53,000	11	—	41,000	127,000	—	—	Clad 2024-T36
Clad 2024-T86	70,000	66,000	6	—	—	—	—	—	Clad 2024-T86
7075-O	33,000	15,000	17	10,400,000	22,000	—	—	60	7075-O
7075-T6	83,000	73,000	11	—	48,000	156,000	23,000	150	7075-T6
Clad 7075-O	32,000	14,000	17	—	22,000	—	—	—	Clad 7075-O
Clad 7075-T6	76,000	67,000	11	10,400,000	46,000	144,000	—	—	Clad 7075-T6

(1) Properties listed are for information only and are not guaranteed.

(2) Stress to produce 0.2% permanent set.

(3) Per cent elongation in 2 inches, for .064" thickness.

(4) Average tensile strength with edge distance 2.0 times rivet diameter.

(5) Ultimate bearing strength with edge distance 2.0 times rivet diameter.

(6) Values are for round specimens and 500 million cycles.

TYPICAL HIGH TEMPERATURE TENSILE PROPERTIES

ALLOY	TESTING TEMPERATURE OF	ULTIMATE STRENGTH PSI	YIELD STRENGTH PSI	ELONGATION PER CENT	ALLOY	TESTING TEMPERATURE OF	ULTIMATE STRENGTH PSI	YIELD STRENGTH PSI	ELONGATION PER CENT
1100-0	75	13,000	5,000	45	5052-0	75	29,000	14,000	30
	300	7,500	3,500	65		300	23,000	13,500	55
	400	6,000	3,000	70		400	18,000	11,000	65
	500	3,500	2,000	85		500	12,000	8,000	100
	600	2,500	1,500	90		600	7,500	4,000	105
	700	1,500	1,000	95		700	5,000	2,500	120
1100-H14	75	17,000	14,000	20	5052-H36	75	39,000	34,000	10
	300	13,000	10,000	22		300	32,000	27,000	16
	400	9,500	6,500	25		400	25,000	11,000	35
	500	3,500	2,000	85		500	12,000	8,000	80
	600	2,500	1,500	90		600	8,000	4,500	100
	700	1,500	1,000	95		700	5,000	2,500	120
1100-H18	75	24,000	21,000	15	6061-T6	75	45,000	40,000	17
	300	17,500	14,000	16		300	31,000	29,000	18
	400	6,000	3,000	70		400	19,000	15,000	25
	500	3,500	2,000	85		500	7,500	5,000	55
	600	2,500	1,500	90		600	3,500	2,500	90
	700	1,500	1,000	95		700	3,000	2,000	105
3003-0	75	16,000	6,000	40	2024-T3	75	68,000	46,000	22
	300	11,000	5,000	47		300	42,000	37,000	20
	400	8,000	4,500	50		400	20,000	16,000	26
	500	5,500	3,500	60		500	12,000	10,000	40
	600	4,000	2,500	60		600	7,000	5,500	70
	700	3,000	2,000	60		700	5,000	3,500	100
3003-H14	75	21,000	18,000	16	7075-T6	75	82,000	72,000	11
	300	18,000	15,000	17		300	28,000	22,000	32
	400	14,000	9,000	22		400	14,000	11,000	55
	500	10,500	5,000	25		500	11,000	8,000	60
	600	6,000	3,000	40		600	8,000	6,000	68
	700	3,000	2,000	60		700	6,000	4,000	75

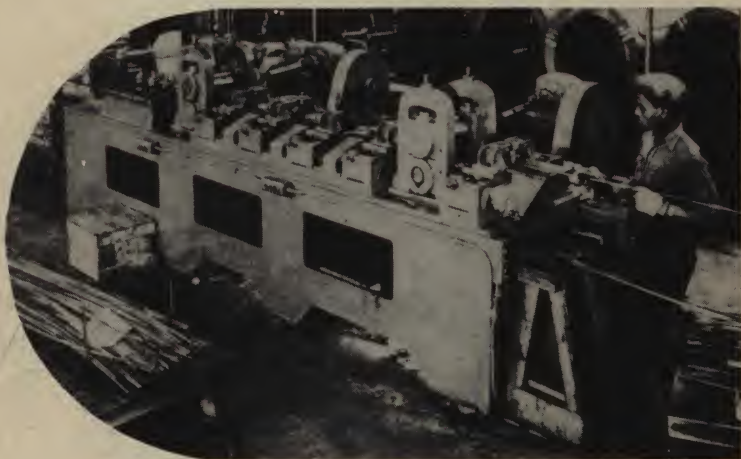
*After prolonged heating at the testing temperature.

TYPICAL THERMAL TREATMENTS SHEET AND PLATE

ALLOY	ANNEALING(1)		SOLUTION HEAT TREATMENT				AGING (PRECIPITATION HT. TR.)		
	Metal Temperature	Time Hours	Metal Temperature	Time(2) Minutes	(Quench)(3)	Resulting Temper	Metal Temperature	Time Hours	Resulting Temper
1100	650	(4)							
3003	760	(4)							
3004	650	(4)							
5050	650	(4)							
5052	650	(4)							
6061 Clad 2014	750-800 775-800	2 3	960-980 930-950	10-60 10-60	Cold water Cold water	6061-T4(5) Clad 2014-T4(5)	315-325 335-345	16-20 8-12	6061-T6 Clad 2014-T6
2024 and Clad 2024	750-800	2	910-930	10-60	Cold water	2024-T4 and Clad 2024-T4(5)			
7075S and Clad 7075	775-800 followed by 450	2 4	860-925	10-60	Cold water	7075-W and Clad 7075-W	245-255	22-26	7075-T6 and Clad 7075-T6

NOTES

1. Heat treatable alloys must be slowly cooled (50°F./hr. to at least 500°F), to avoid heat treating effects.
2. Solution heat treatment times depend on the section thickness. Thin sheet requires shorter times. Salt bath heating allows shorter heat treating times. The minimum heating time should be used for clad alloys.
3. The transfer from the furnace to the quench water should be as rapid as possible.
4. Time should be sufficient to bring entire section to temperature.
5. After aging at room temperature for approximately 4 days.



Fullerton's edging and deburring machines. Sheared from sheet, round edged and roller levelled to give you a quality product, and save you money. This equipment allows round edging of metal up to $\frac{1}{4}$ inch thickness.

WEIGHT TABLES

MILL STANDARD SIZES

THICKNESS	ALLOY	WEIGHT IN POUNDS PER SHEET					THICKNESS	ALLOY	SIZE
		1100, 5005 & 6061	3003	5050 & 5052	2024	7075			
.016	24 x 72	2.71	8.28016	24 x 72	
	36 x 144	8.39		36 x 144	
	24 x 72	3.38	3.42		24 x 72	
	30 x 96	5.70		30 x 96	
	36 x 96	6.77	6.84	6.72	6.91	6.98		36 x 96	
	36 x 120	8.46	8.55	8.40	8.64	8.73		36 x 120	
.025	36 x 144	.....	.....	10.08	10.37	10.48	36 x 144
	24 x 72	4.24	.....	.....	.....	.....	24 x 72
	30 x 96	.....	7.12	.....	.....	.....	30 x 96
	36 x 96	8.47	8.54	8.40	.....	8.71	36 x 96	
	36 x 120	10.59	10.68	10.50	.....	10.89	36 x 120	
	36 x 144	12.71	12.82	12.60	.....	13.07	36 x 144	
.032	48 x 96	11.30	.....	.....	.....	.....	48 x 96
	48 x 120	14.12	.....	.....	11.52	.....	48 x 120
	48 x 144	16.94	.....	.....	14.40	.....	48 x 144
	24 x 72	5.42	.....	.....	.....	.....	24 x 72
	36 x 96	10.85	10.94	10.75	.....	.....	36 x 96
	36 x 120	13.56	13.68	13.44	.....	.....	36 x 120
.040	36 x 144	16.27	16.42	16.13	.....	.....	36 x 144
	48 x 96	14.46	14.59	14.34	14.75	14.88	48 x 96		
	48 x 120	18.08	18.24	17.92	18.44	18.60	48 x 120		
	48 x 144	21.70	21.89	21.50	22.13	22.32	48 x 144		
	24 x 72	6.77	.....	.....	.....	.....	24 x 72
	36 x 96	13.54	13.68	13.44	.....	.....	36 x 96
.040	36 x 120	16.92	17.10	16.80	.....	.....	36 x 120
	48 x 96	18.05	18.24	17.92	18.43	18.62	48 x 96		
	48 x 120	22.56	22.80	22.40	23.04	23.28	48 x 120		
	48 x 144	27.07	27.36	26.88	27.65	27.94	48 x 144		
	60 x 144	.....	34.20	.....	.....	.....	60 x 144

FULLERTON—A WAREHOUSE OF METALS AND SERVICE

.050	24 x 72	8.47	17.11	16.75	.....	.....	.050	24 x 72
	36 x 96	16.94	21.39	20.94	.....	.....		36 x 96
	36 x 120	21.18	22.82	22.34	23.04	23.26		36 x 120
	48 x 96	22.59	28.24	27.92	28.80	29.08		48 x 96
	48 x 120	28.24	34.22	33.50	34.56	34.90		48 x 120
	48 x 144	33.89	42.78	41.88	.....	.....		48 x 144
	60 x 144	42.36	.....	.....	.....	.....	.063	60 x 144
.063	24 x 72	10.69	21.55	21.12	.....	.....		24 x 72
	36 x 96	21.34	26.94	.....	.....	.....		36 x 96
	36 x 120	.....	28.74	28.16	29.02	29.31		36 x 120
	48 x 96	28.45	35.92	35.20	36.28	36.64		48 x 96
	48 x 120	35.56	43.10	42.24	43.54	43.97		48 x 120
	48 x 144	42.67	53.88	.....	.....	.....		48 x 144
	60 x 144	53.34	.....	48.48	49.92	50.40	.071	60 x 144
.071	48 x 144	48.96	27.36	26.88	.....	.....		48 x 144
.080	36 x 96	27.12	54.72	35.84	55.20	55.68	.080	36 x 96
	48 x 96	.....	30.72	30.24	.....	.....		48 x 96
.090	48 x 144	54.24	61.44	40.32	.....	.....	.090	48 x 144
	36 x 96	30.48	67.68	60.48	62.40	62.88		36 x 96
	48 x 96	.....	68.64	67.20	69.12	69.60		48 x 96
	48 x 144	60.96	42.72	42.00	86.40	87.36	.100	48 x 144
.100	48 x 144	67.68	85.44	84.00	110.40	111.84	.100	48 x 144
.125	36 x 96	42.24	109.44	107.04	131.52	132.48	.125	36 x 96
	48 x 144	84.48	65.04	63.60	.....	.....		48 x 144
.160	48 x 144	108.48	130.08	127.20	.....	.....	.160	48 x 144
.190	36 x 96	64.32	85.44	86.40	172.80	174.72	.190	36 x 96
	48 x 144	128.64	170.88	168.00	.....	.....		48 x 144
.250	36 x 96	84.72	128.40	.....	.....	.....	.250	36 x 96
	48 x 144	169.44	256.80	252.00	299.20	299.20		48 x 144
.313	36 x 96	126.96	.....	.....	.....	.....	.313	36 x 96
.375	48 x 144	253.92	.....	.....	.....	.....	.375	48 x 144
.500	36 x 96	169.44	.....	.....	.....	.....	.500	36 x 96
.750	36 x 96	.....	.....	.....	.....	.....	.750	36 x 96
1.000	36 x 96	.....	.....	.....	.....	.....	1.000	36 x 96

90 Degrees Cold Bending Data

Recommended Minimum Inside Radii

These radii represent average values for forming on conventional equipment with tools of good design and condition. The minimum permissible radii are subject to several variables and can only be determined by actual forming under shop conditions.

For gages not shown use the radii listed for the next heavier gage.

New Alloy	Old Alloy	Temper	Thickness of Sheet—Inches					
			.016	.025	.032	.040	.051	
1100	25		Bend Radii in 32nds of an Inch					
		-O	0	0	0	0	0	
		-H12	0	0	0	0	0	
		-H14	0	0	0	0	0	
		-H16	0	0	0	0	1	
		-H18	1	1	2	2	3	
			.064	Bend Radii in 32nds of an Inch			.250	
			-O	0	0	0	0	
			-H12	0	0	3	6	
			-H14	0	0	3	6	
			-H16	2	3	4	8	
			-H18	4	6	8	16	
							32	
	3003	35		Bend Radii in 32nds of an Inch				
			-O	0	0	0	0	0
			-H12	0	0	0	0	0
			-H14	0	0	0	0	0
			-H16	0	0	1	2	2
-H18			1	2	3	4	5	
			.064	Bend Radii in 32nds of an Inch			.250	
			-O	0	0	0	0	
			-H12	0	0	3	6	
			-H14	0	1	2	4	
			-H16	3	5	6	12	
			-H18	6	9	12	24	
							40	
3004		45 & Alclad 45		Bend Radii in 32nds of an Inch				
			-O	0	0	0	0	0
			-H32	0	0	0	1	1
			-H34	1	1	1	2	2
			-H36	1	2	3	4	5
	-H38		2	3	4	5	7	
			.064	Bend Radii in 32nds of an Inch			.250	
			-O	0	0	2	4	
			-H32	2	3	4	8	
			-H34	3	5	6	12	
			-H36	6	9	12	24	
			-H38	8	12	16	32	
							48	
	5050	50S		Bend Radii in 32nds of an Inch				
			-O	0	0	0	0	0
			-H32	0	0	0	0	0
			-H34	0	0	0	0	0
			-H36	0	1	1	2	2
-H38			1	2	3	4	5	

90 Degrees Cold Bending Data

Recommended Minimum Inside Radii

Continued

New Alloy	Old Alloy	Temper	Thickness of Sheet—Inches						
			.064	.091	.125	.187	.250		
5050	50S	-O	0	0	0	0	0		
		-H32	0	0	0	3	6		
		-H34	0	1	2	4	8		
		-H36	3	5	6	12	24		
		-H38	6	9	12	24	40		
		Bend Radii in 32nds of an Inch							
5052	52S	-O	0	0	0	0	0		
		-H32	0	0	0	0	0		
		-H34	0	0	0	1	1		
		-H36	1	2	2	2	3		
		-H38	1	2	3	4	5		
		Bend Radii in 32nds of an Inch							
2024	24S & Alclad 24S	-O	0	0	0	0	0		
		-T3	1	3	4	5	7		
		Bend Radii in 32nds of an Inch							
		-O	0	0	0	2	4		
		-T3	8	12	16	32	48		
		Bend Radii in 32nds of an Inch							
	6061	61S	-O	0	0	0	0	0	
			-T4	1	2	2	2	3	
			-T6	1	2	2	2	3	
			Bend Radii in 32nds of an Inch						
			-O	0	0	0	2	4	
			-T4	4	6	8	16	32	
-T6	4	6	8	16	32				
7075	75S & Alclad 75S	-O	0	0	0	1	1		
		-T6	2	4	6	8	10		
		Bend Radii in 32nds of an Inch							
		-O	1	3	4	8	16		
		-T6	12	18	24	40	64		
		Bend Radii in 32nds of an Inch							
2014	R301	-O	0	0	0	0	0		
		-T3	1	2	3	4	5		
		-T6	2	4	6	8	10		
		Bend Radii in 32nds of an Inch							
		-O	0	0	0	2	4		
		-T3	6	9	12	24	40		
-T6	12	18	24	40	64				

180 Degrees Cold Bending Data

Metal to Metal

New Alloy	Old Alloy	Temper	Max. Thick. Inches	New Alloy	Old Alloy	Temper	Max. Thick. Inches
1100	2S	-O to-H14	.250	5052	52S	-O	.125
		-H16	.016			-H32	.032
3003	3S	-O to-H12	.250	2024	24S and Alclad -O 24S	-H34	.016
		-H14	.125				.032
3004	4S and Alclad 4S	-O	.064	6061	61S	-O	.064
		-H32	.016				
5050	50S	-O	.250	2014	R301	-O	.032
		-H32	.125				
		-H32	.064				

SPECIFICATIONS

COMMERCIAL THICKNESS TOLERANCES

(Inch—plus or minus)

Flat Sheet, Coiled Sheet, and Plate Alloys: 2004, Clad 2004, Clad 2014, 2024, Clad 2024, 5052, 6061, 7075, and Clad 7075

THICKNESS*	WIDTH UP TO 18" INCL.	WIDTH OVER 18" TO 36" INCL.	WIDTH OVER 36" TO 48" INCL.	WIDTH OVER 48" TO 54" INCL.	WIDTH OVER 54" TO 60" INCL.	WIDTH OVER 60" TO 66" INCL.	WIDTH OVER 66" TO 72" INCL.
0.006—0.010	.001	.0015	....	....	....	....	....
0.011—0.017	.0015	.0015	....	....	....	....	....
0.018—0.028	.0015	.002	.0025	....	....	....	....
0.029—0.036	.002	.002	.0025	....	....	....	....
0.037—0.045	.002	.0025	.003	.004	.005	....	....
0.046—0.068	.0025	.003	.004	.005	.006	.006	.007
0.069—0.076	.003	.003	.004	.005	.006	.008	.010
0.077—0.096	.0035	.0035	.004	.005	.006	.008	.010
0.097—0.108	.004	.004	.005	.005	.007	.010	.012
0.109—0.140	.0045	.0045	.005	.005	.007	.010	.012
0.141—0.172	.006	.006	.008	.008	.009	.012	.014
0.173—0.203	.007	.007	.010	.010	.011	.014	.016
0.204—0.249	.009	.009	.011	.011	.013	.016	.018
0.250—0.320	.013	.013	.013	.013	.015	.018	.020
0.321—0.438	.019	.019	.019	.019	.020	.020	.023
0.439—0.625	.025	.025	.025	.025	.025	.025	.025
0.626—0.875	.030	.030	.030	.030	.030	.030	.030
0.876—1.125	.035	.035	.035	.035	.035	.035	.035
1.126—1.375	.040	.040	.040	.040	.040	.040	.040
1.376—1.625	.045	.045	.045	.045	.045	.045	.045
1.626—1.875	.052	.052	.052	.052	.052	.052	.052
1.876—2.250	.060	.060	.060	.060	.060	.060	.060
2.251—2.500	.075	.075	.075	.075	.075	.075	.075

COMMERCIAL THICKNESS TOLERANCES

(Inch—plus or minus)

Flat Sheet, Coiled Sheet, and Plate Alloys: 1100, 3003, Clad 3003, 5005, 5050, and Clad 5050

THICKNESS*	WIDTH UP TO 18" INCL.	WIDTH OVER 18" TO 36" INCL.	WIDTH OVER 36" TO 54" INCL.	WIDTH OVER 54" TO 72" INCL.	WIDTH OVER 72" TO 90" INCL.	WIDTH OVER 90" TO 102" INCL.
0.006-0.007	.001	.001	....	....	....	....
0.008-0.010	.001	.0015	....	....	....	....
0.011-0.017	.0015	.0015	.002	....	....	....
0.018-0.028	.0015	.002	.0025	....	....	....
0.029-0.036	.002	.002	.0025	.0035	....	....
0.037-0.045	.002	.0025	.003	.004	....	....
0.046-0.068	.0025	.003	.004	.005	.007	....
0.069-0.076	.0025	.003	.004	.006	.008	....
0.077-0.096	.003	.003	.004	.006	.008	....
0.097-0.108	.0035	.004	.005	.007	.009	.010
0.109-0.140	.0045	.0045	.005	.007	.009	.010
0.141-0.172	.006	.006	.008	.009	.011	.012
0.173-0.203	.007	.007	.009	.011	.013	.015
0.204-0.249	.009	.009	.011	.013	.015	.017
0.250-0.320	.013	.013	.013	.015	.017	.020
0.321-0.438	.019	.019	.019	.019	.023	.026
0.439-0.625	.025	.025	.025	.025	.030	.035
0.626-0.875	.030	.030	.030	.030	.037	.045
0.876-1.125	.035	.035	.035	.035	.045	.055
1.126-1.375	.040	.040	.040	.040	.052	.065
1.376-1.625	.045	.045	.045	.045	.060	.075
1.626-1.875	.052	.052	.052	.052	.070	.088
1.876-2.250	.060	.060	.060	.060	.080	.100
2.251-2.500	.075	.075	.075	.075	.100	.125

*For intermediate thicknesses, use tolerance of next heavier thickness tabulated.

I—LENGTH TOLERANCES

FLAT SHEET AND PLATE—SHEARED

THICKNESS (INCH)	LENGTHS OVER 12" TO 18" INCL.		LENGTHS OVER 18" TO 24" INCL.		LENGTHS OVER 24" TO 30" INCL.		LENGTHS OVER 30" TO 36" INCL.		LENGTHS OVER 36" TO 42" INCL.	
	OVER—INCL.	INCH	OVER—INCL.	INCH	OVER—INCL.	INCH	OVER—INCL.	INCH	OVER—INCL.	INCH
1.000—1.250	+ 5/8	+ 3/4	+ 5/8	+ 3/4	+ 5/8	+ 3/4	+ 5/8	+ 3/4	+ 5/8	+ 3/4
.500—1.000	+ 1/2	+ 1/2	+ 1/2	+ 1/2	+ 5/16	+ 3/4	+ 5/16	+ 3/4	+ 5/16	+ 3/4
.249—500	+ 3/8	+ 3/8	+ 3/8	+ 3/8	+ 3/8	+ 3/8	+ 3/8	+ 3/8	+ 3/8	+ 3/8
.006—.249	± 1/16	± 3/32	± 1/8	± 3/16	± 3/16	± 3/16	± 3/16	± 3/16	± 3/16	± 3/16

II—WIDTH TOLERANCES

A. FLAT SHEET AND PLATE—SHEARED

THICKNESS (INCH)	WIDTHS 2" TO 4" INCL.		WIDTHS OVER 4" TO 18" INCL.		WIDTHS OVER 18" TO 36" INCL.		WIDTHS OVER 36" TO 54" INCL.		WIDTHS OVER 54" TO 72" INCL.		WIDTHS OVER 72" TO 96" INCL.	
	OVER—INCL.	INCH	OVER—INCL.	INCH	OVER—INCL.	INCH	OVER—INCL.	INCH	OVER—INCL.	INCH	OVER—INCL.	INCH
1.000—1.250	+ 5/8	+ 5/8	+ 5/8	+ 5/8	+ 5/8	+ 5/8	+ 5/8	+ 5/8	+ 5/8	+ 5/8	+ 5/8
.500—1.000	+ 1/2	+ 1/2	+ 1/2	+ 1/2	+ 1/2	+ 1/2	+ 1/2	+ 1/2	+ 1/2	+ 1/2	+ 1/2
.249—500	+ 3/8	+ 3/8	+ 3/8	+ 3/8	+ 3/8	+ 3/8	+ 3/8	+ 3/8	+ 3/8	+ 3/8	+ 3/8
.102—.249	± 1/16	± 3/32	± 1/8	± 3/16	± 3/16	± 3/16	± 3/16	± 3/16	± 3/16	± 3/16	± 3/16
.006—.102	± 1/32	± 1/16	± 3/32	± 3/16	± 3/16	± 3/16	± 3/16	± 3/16	± 3/16	± 3/16	± 3/16

B. COILED SHEET—SHEARED (SLIT)

THICKNESS (INCH)	WIDTHS 1/4" TO 6" INCL.		WIDTHS OVER 6" TO 12" INCL.		WIDTHS OVER 12" TO 24" INCL.		WIDTHS OVER 24" TO 60" INCL.	
	OVER—INCL.	INCH	OVER—INCL.	INCH	OVER—INCL.	INCH	OVER—INCL.	INCH
.006—.125	± .010	.....	± 1/16	.....	± 3/16	.....	± 3/4

III—CAMBER (LATERAL BOW)* TOLERANCES

*Camber (lateral bow) is defined as the allowable deviation of a side edge from a straight line. Camber for sheet less than 4" wide is same as that for coiled sheet.

A. COMMERCIAL FLAT SHEET IN WIDTHS 4" THROUGH 85"
The data contained in the following table are derived from our basic Camber Tolerance of 1/8 inch in 10 feet.

THICKNESS (INCH)	LENGTHS OVER 30" TO 90" INCL.		LENGTHS OVER 90" TO 120" INCL.		LENGTHS OVER 120" TO 150" INCL.		LENGTHS OVER 150" TO 180" INCL.		LENGTHS OVER 180" TO 210" INCL.		LENGTHS OVER 210" TO 250" INCL.	
	INCH	INCH	INCH	INCH	INCH	INCH	INCH	INCH	INCH	INCH	INCH	INCH
.006—249	1/32	1/16	1/32	1/16	3/64	3/64	5/64	5/64	7/64	7/64	9/64	9/64

B. COMMERCIAL FLAT SHEET IN WIDTHS UNDER 4"
The data contained in the following table are derived from our basic Camber Tolerance of 1 inch in 10 feet.

THICKNESS (INCH)	LENGTHS OVER 30" TO 60" INCL.		LENGTHS OVER 60" TO 90" INCL.		LENGTHS OVER 90" TO 120" INCL.		LENGTHS OVER 120" TO 150" INCL.		LENGTHS OVER 150" TO 180" INCL.		LENGTHS OVER 180" TO 210" INCL.		LENGTHS OVER 210" TO 240" INCL.	
	INCH	INCH	INCH	INCH	INCH	INCH	INCH	INCH	INCH	INCH	INCH	INCH	INCH	INCH
.006—249	1/4	1/4	1/2	1/2	1	1 1/2	2	2	3	3	4	4	4	4

C. COILED SHEET

The data contained in the following table are derived from our basic Camber Tolerance of 1 inch in 10 feet.

THICKNESS (INCH)	LENGTHS OVER 30" TO 60" INCL.		LENGTHS OVER 60" TO 90" INCL.		LENGTHS OVER 90" TO 120" INCL.		LENGTHS OVER 120" TO 150" INCL.		LENGTHS OVER 150" TO 180" INCL.		LENGTHS OVER 180" TO 210" INCL.		LENGTHS OVER 210" TO 240" INCL.	
	INCH	INCH	INCH	INCH	INCH	INCH	INCH	INCH	INCH	INCH	INCH	INCH	INCH	INCH
.006—125	1/4	1/4	1/2	1/2	1	1 1/2	2	2	3	3	4	4	4	4

D. COMMERCIAL FLAT PLATE IN WIDTHS 2" THROUGH 96"

The data contained in the following table are derived from our basic Camber Tolerance of 1/8 inch in 10 feet.

THICKNESS (INCH)	LENGTHS TO 30" INCL.		LENGTHS OVER 30" TO 60" INCL.		LENGTHS OVER 60" TO 90" INCL.		LENGTHS OVER 90" TO 120" INCL.		LENGTHS OVER 120" TO 150" INCL.		LENGTHS OVER 150" TO 180" INCL.		LENGTHS OVER 180" TO 210" INCL.		LENGTHS OVER 210" TO 250" INCL.		LENGTHS OVER 250" TO 280" INCL.		LENGTHS OVER 280" TO 330" INCL.		LENGTHS OVER 330" TO 360" INCL.		
	INCH	INCL.	INCH	INCL.	INCH	INCL.	INCH	INCL.	INCH	INCL.	INCH	INCL.	INCH	INCL.	INCH	INCL.	INCH	INCL.	INCH	INCL.	INCH	INCL.	
.249—2.500	1/2		1/4		3/8		1/2		3/4		5/8		7/8		1 1/8		1 1/4		1 3/8		1 1/2		1

IV—DIAMETER TOLERANCES

SHEET AND PLATE CIRCLES—SHEARED AND BLANKED

THICKNESS (INCH)	METHOD	DIAMETERS TO 18" INCL.		DIAMETERS OVER 18" TO 28 1/2" INCL.		DIAMETERS OVER 28 1/2" TO 36" INCL.		DIAMETERS OVER 36" TO 96" INCL.	
		INCH	INCL.	INCH	INCL.	INCH	INCL.	INCH	INCL.
.249—375	Sheared	.....		± 1/16		± 1/16		± 1/8	
.006—249	Sheared	± 1/32		± 3/64		± 3/64		± 1/16	
.006—249	Blanked	± 1/64		± 1/32		.....		.....

V—SQUARENESS TOLERANCES—

Deviation from squareness is measured as the deviation of an end edge of the sheet from a straight line at right angles to a side and touching one corner.

Commercial Sheet: The maximum deviation from squareness shall not be more than twice the commercial length tolerance for flat sheet.

Resquared Sheet: The maximum deviation from squareness shall not be more than $1/16''$.

VI—SAWED PLATE TOLERANCES (WIDTH AND LENGTH)

THICKNESS (INCH)	DIMENSIONS 10' AND UNDER		DIMENSIONS OVER 10' TO 36' INCL.		DIMENSIONS OVER 36' TO 130' INCL.		DIMENSIONS OVER 130' TO 240' INCL.		DIMENSIONS OVER 240' TO 289' INCL.	
	INCH	INCH	INCH	INCH	INCH	INCH	INCH	INCH	INCH	INCH
INCL.—UNDER										
.250—2.500	$\pm 1/32$	$\pm 1/4$	$\pm 1/4$	$\pm 3/8$	$\pm 3/8$	$\pm 3/2$	$\pm 3/2$	$\pm 3/2$	$\pm 3/4$	$\pm 3/4$

VII—UTILITY SHEET

Utility sheet is guaranteed to successfully take a Pittsburgh lock seam

GENERAL NOTE

When a tolerance is specified which is other than an equal plus or minus tolerance, the dimension should be increased or decreased by half the total tolerance range. For example, a customer specifies plus .008" minus zero gauge tolerance for .097" x 16" 4S coil. The gauge should be increased to .101" and the tolerance should be written plus or minus .004". The same example will hold true for all other types of tolerances except for widths and lengths of plate which are plus tolerances only.

CORROSION RESISTANCE DATA—The following table shows the relative resistance of aluminum to the corrosive action of the materials in question. Chemicals rated "A": Aluminum, etc. Chemicals rated "B": etc.

Chemicals rated "A": Aluminum is not seriously affected by the chemical in question at ordinary temperatures and in the absence of complicating factors, such as corrosive impurities in the chemical or galvanic action resulting from contact with dissimilar metals.

Chemicals rated "B": Aluminum should not be used without further tests or additional data.

Chemicals rated "X": Aluminum will not normally be satisfactory unless there are special circumstances and, in any event, should not be used without rather complete additional testing.

Rating the action of various chemicals on aluminum has certain objections, since minor changes in composition of the chemicals or operating conditions can greatly affect corrosion rates. For example, impurities, known or unknown, in the chemicals involved may cause corrosion. Before any substantial application is undertaken, trial should be made. In some cases, the application of a suitable protective coating permits the use of aluminum in contact with materials which might attack the bare metal.

Where aluminum is recommended for use ("A"), or trial is warranted ("B"), the recommendation applies to 100% concentration of the reagent unless otherwise indicated. Where aluminum is not recommended for use ("X"), the recommendation applies to any concentration of the reagent.

Rating

- A Acetaldehyde
- A Acetic acid, Glacial
- A Acetone (Any concentration)
- A Acetylene
- B Acid Salts
- B Alcohol, Butyl
- B Alcohol, Ethyl
- B Alcohol Methyl (100%)
- B Alcohols, Higher
- A Alkali Metal Bicarbonates
- X Alkali Metal Carbonates
(any concentration)
- X Alkali Metal Hydroxides
(any concentration)
- A Ammonia Gas or Liquid
- B Ammonium Fluoride
(any concentration)
- B Ammonium Hydroxide,
Sp. gr. 0.88
- B Ammonium Salts (most)
- A Ammonium Sulfide
(any concentration)
- X Aniline, Liquid
- B Anthracene
- X Anthranilic Acid

Rating

- B Arsenates
(any concentration)
- A Asphalt
- A Beer, 100%
- B Benzaldehyde
- A Benzene
- X Bleaching Solutions
- B Borax Solutions 1-3%
- A Boric Acid Solutions, 1-5%
- X Bromides
- A Butter, 100%
- B Camphor
- A Carboic Acid (Phenol)
- A Carbon Dioxide
- A Carbon Disulfide
- A Carbon Monoxide
- B Carbon Tetrachloride (dry)
- A Carbonic Acid
(Carbonated Water)
- A Castor Oil
- A Cellulose
- X Chlorides (all)
- X Chloroform
- B Chromates (Most),
any concentration

Continued

Rating

Continued

- B Chromic Acid (Pure),
any concentration
- A Copal
- B Cresol
- B Crude Tar and its Fractions
- B Dyestuffs
(any concentration)
- A Ether
- B Ethyl Acetate (dry)
- A Ethyl Chloride (dry)
- B Ethylene Bromide
- B Ethylene Glycol
- A Fatty Acids
- A Fats (Acid Free)
- X Fluorine
- B Formaldehyde
(any concentration)
- B Fruit Acids
- B Fruit Juices
- X Fulminate of Mercury
- A Gas, Illuminating
- A Gasoline (lead free)
- B Gasoline (leaded)
- A Gelatin (any concentration)
- A Glycerine (CP)
- B Glue (any concentration)
- A Grease (Acid Free)
- X Heavy Metal Salts (most)
- A Hydraulic Brake Fluids
(most)
- X Hydrochloric Acid
- A Hydrocarbons
- X Hydrofluoric Acid, 1-60%
- B Hydrogen Peroxide, 3-30%
- A Hydrogen Sulfide
- X Hydroxides (most)
any concentration
- B Ink (dye)
- B Ink (iron), 100%
- X Iodides
- A Kerosene
- A Linseed Oil
- X Mercury
- X Mercury Salts
- X Methyl Chloride
- A Milk, 100%
- B Naphthalene
- B Nitrates (all)
- B Nitric Acid

Rating

- A Nitroglycerine
- B Nitrous Gases, 100%
- A Oil, Animal (acid free and
chloride free)
- A Oil, Mineral (chloride free)
- A Oil, Vegetable (chloride free)
- B Organic Acids (most)
- A Oxygen
- A Permanganates (most), any
concentration
- A Petroleum Products (chloride
free)
- A Phenol (carbolic acid)
- X Phosphoric Acid
- X Phosphates (most), any
concentration
- X Potassium Hydroxide, any
concentration
- A Potassium Nitride
- B Pyridine (Acid Free)
- B Refrigerants
- A Rubber and Rubber Cements
- B Salt (Sodium Chloride) Sea
Water, 100%
- X Sodium Hydroxide, any
concentration
- B Sodium Silicate (Water
Glass), any concentration
- A Steam, 100%
- A Sugar Solutions (acid free),
any concentration
- A Sulfates
- A Sulfur
- A Sulfur Dioxide
- B Sulfuric Acid
- B Sulfurous Acid
- B Tanning Solutions
- A Tar
- A Toluene
- A Trichlorethylene (dry)
- A Turpentine
- A Urea
- A Vinegar
- A Water (carbonated)
- X Water (Chlorinated)
- A Water (Distilled)
- A Water (rain)
- B Water (tap) 100%
- A Waxes (acid free)
- A Xylene

CHEMICAL COMPOSITION LIMITS

(Percent Composition. Maximum unless indicated as a range)

ALLOY	COPPER	SILICON	IRON	MAN- GANESE	MAG- NESIUM	ZINC	CHRO- MIUM	NICKEL	TITAN- IUM	BISMUTH	LEAD	OTHERS EACH	TOTAL
1100 (1)	0.20	Si+Fe=1.0 max.		0.05	—	0.10	—	—	—	—	—	0.05	0.15
3003	0.20	0.60	0.70	1.0-1.5	—	0.10	—	—	—	—	—	0.05	0.15
2024	3.8-4.9	0.50	0.50	0.3-0.9	1.2-1.8	0.10	0.10	—	—	—	—	0.05	0.15
5005	0.20	0.40	0.7	0.20	0.51-1.1	0.25	0.10	—	—	—	—	0.05	0.15
5050	0.25	0.50	0.8	0.15	1.0-1.8	0.25	0.10	—	—	—	—	0.05	0.15
5052	0.10	Si+Fe=0.45 max.		0.10	2.2-2.8	0.10	0.15-0.35	—	—	—	—	0.05	0.15
6061	0.15-0.40	0.4-0.8	0.70	0.15	0.8-1.2	0.20	0.15-0.35	—	0.15	—	—	0.05	0.05
7075	1.2-2.0	0.50	0.70	0.30	2.1-2.9	5.1-6.1	0.18-0.40	—	0.20	—	—	0.05	0.15

NOTES: (1) The minimum aluminum content is 99.0%.

**GOVERNMENT AND COMMERCIAL SPECIFICATIONS
FOR ALUMINUM ALLOY SHEET AND PLATE**

ALLOY	1100	3003	5050	5052	6061 (1)	2024	CLAD 2024	7075	CLAD 7075
Federal Spec	QQ-A-561	QQ-A-359		QQ-A-318	QQ-A-327	QQ-A-355	QQ-A-362	QQ-A-283	QQ-A-287
Navy Spec	47-A-2	47-A-4		47-A-11	47-A-12	47-A-10			
Aero Material Spec (AMS)(1)	4001(O) 4003(H14)	4006(O) 4008(H14)		4015(O) 4016(H32) 4017(H34)	4025(O) 4026(T4) 4027(T6)	4035(O) 4037(T3) 4037(T4)	4040(O) 4041(T3) 4041(T4) 4042(T36)	4044(O) 4045(T6)	4048(O) 4049(T6)
ASTM(2) Alloy No.	990A	M1A	G1A	GR20A	GS11A	CG42A	Clad CG42A	ZG62A	Clad ZG62A
Spec No.	B209-50T	B209-50T	B209-50T	B209-50T	B209-50T	B209-50T	B209-50T	B209-50T	B209-50T
Spec No. (3)	B178-50T	B178-50T	B178-50T	B178-50T	B178-50T				

(1) Symbol following AMS specification number refers to condition or temper. Government specifications usually include two or more tempers.

(2) American Society for Testing Materials.

(3) ASTM Specification B178-50T covers aluminum for pressure vessels.

(4) Specifications covering Clad 61S are AMS 4021(O), AMS 4022(T4), AMS 4023(T6).

↓ General specifications for the heat treatment of aluminum alloys is MIL-H-6088a.



A long row of high-production Cincinnati shears, only part of which is shown, to give you square sheared and accurately cut aluminum in much less time, and cheaper than you could do it in your own plant. Special shears are assigned to aluminum—equipped with proper blades, gauges and controls. Raised concrete pads under the shears decrease tedious bending for the pickup man working behind the shear, thus increasing productivity.

STANDARD WAREHOUSE SIZES—FLAT

GAUGE	SIZE	1100-O	1100-F	1100-H14	3003-O	3003-F	3003-H14	5052-O	5052-H32	5052-H34	5005-H34
2.000	24 x 72										
1.750	24 x 72										
1.500	24 x 72										
1.250	24 x 72										
1.000	36 x 96										
	24 x 72										
.875	36 x 96										
	24 x 72										
.750	36 x 96		XX								
	24 x 72										
.625	36 x 96										
	24 x 72										
.500	48 x 144										
	36 x 96		XX			XX					
	24 x 72										
.375	48 x 144						XX				
	36 x 96		XX			XX					
	24 x 72										
.313	48 x 144										
	36 x 96										
	24 x 72										
.250	60 x 144						XX				
	48 x 144		XX				XX				
	36 x 96		XX				XX				
	24 x 72										
.190	60 x 144							XX			
	48 x 144			XX			XX	XX	XX	XX	
	36 x 96						XX		XX	XX	
.160	48 x 144										
.125	60 x 144							XX			
	48 x 144	XX		XX	XX		XX	XX	XX	XX	XX
	48 x 120						XX				
	36 x 96	XX		XX	XX		XX		XX	XX	XX
.100	48 x 144			XX	XX		XX	XX	XX	XX	XX
	48 x 120						XX				
	36 x 96	XX					XX				
.090	48 x 144	XX		XX	XX		XX	XX	XX	XX	XX
	48 x 120			XX			XX				
	36 x 96	XX		XX	XX		XX		XX	XX	
.080	48 x 144	XX		XX	XX		XX	XX	XX	XX	XX
	48 x 120						XX				
	36 x 96	XX		XX			XX		XX	XX	

*—Supplied as 2024-T4.

NOTE: 1. All 1100 and 3003 Plate

SHEET AND PLATE—MILL FINISH

5050-0	5050-H34	6061-0	6061-T4	6061-T6	ALCLAD 2024-0	BARE 2024-0	ALCLAD 2024-T3	BARE 2024-T3	ALCLAD 7075-0	ALCLAD 7075-T6	BARE 7075-T6
								XX*			XX
								XX*			
								XX*			XX
								XX*			XX
				XX				XX*			XX
							XX*	XX*			
								XX*			XX
								XX*			
				XX				XX*			XX
								XX			
								XX*			XX
				XX				XX*			
				XX			XX*	XX*			XX
				XX			XX*	XX*			XX
								XX*			
				XX			XX*	XX*			XX
							XX*	XX*			
			XX	XX	XX	XX	XX*	XX*	XX	XX	XX
				XX			XX*	XX*			
								XX*			
			XX	XX	XX	XX	XX	XX	XX	XX	
				XX							
				XX	XX	XX	XX	XX	XX	XX	
				XX							
		XX	XX	XX	XX	XX	XX	XX	XX	XX	
				XX							
				XX	XX	XX	XX	XX	XX	XX	
				XX							
		XX	XX	XX	XX	XX	XX	XX	XX	XX	
		XX	XX	XX	XX	XX	XX	XX	XX	XX	

supplied in "as rolled" temper.

STANDARD WAREHOUSE SIZES—

GAUGE	SIZE	1100-O	1100-F	1100-H14	3003-O	3003-F	3003-H14	5052-O	5052-H32	5052-H34	5005-H34
.071	48 x 144						XX				
.063	60 x 144						XX				
	48 x 144	XX		XX	XX		XX	XX	XX	XX	XX
	48 x 120	XX			XX		XX	XX		XX	XX
	48 x 96						XX		XX		
	36 x 120						XX			XX	XX
	36 x 96	XX		XX	XX		XX	XX	XX	XX	XX
.050	60 x 144						XX				
	48 x 144	XX		XX	XX		XX	XX	XX	XX	XX
	48 x 120			XX	XX		XX	XX	XX		XX
	48 x 96						XX				
	36 x 120			XX			XX			XX	XX
	36 x 96	XX		XX	XX		XX	XX	XX	XX	XX
.040	60 x 144						XX				
	48 x 144	XX		XX	XX		XX	XX	XX	XX	XX
	48 x 120	XX		XX			XX	XX			XX
	48 x 96						XX		XX		XX
	36 x 120				XX		XX		XX		XX
	36 x 96	XX		XX	XX		XX	XX	XX	XX	XX
.032	48 x 144	XX		XX	XX		XX	XX	XX	XX	XX
	48 x 120				XX		XX	XX			XX
	48 x 96						XX				XX
	36 x 144						XX				XX
	36 x 120			XX	XX		XX				
	36 x 96	XX		XX	XX		XX	XX	XX	XX	XX
.025	48 x 144				XX		XX				XX
	48 x 120						XX				XX
	48 x 96						XX				XX
	36 x 144						XX				
	36 x 120				XX		XX				
	36 x 96	XX		XX	XX		XX	XX	XX	XX	XX
.020	36 x 144										
	36 x 120				XX		XX				
	36 x 96	XX		XX	XX		XX	XX	XX	XX	
	24 x 72						XX				
.016	36 x 144										
	36 x 96			XX			XX				
	24 x 72						XX				
.012	36 x 96										

FLAT SHEET AND PLATE—MILL FINISH

5050-0	5050-H34	6061-0	6061-T4	6061-T6	ALCLAD 2024-0	BARE 2024-0	ALCLAD 2024-T3	BARE 2024-T3	ALCLAD 7075-0	ALCLAD 7075-T6	BARE 7075-T6
		XX		XX	XX	XX	XX	XX	XX	XX	
XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	
XX				XX							
				XX							
XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	
							XX				
XX											
	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	
		XX		XX							
	XX										
XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	
							XX				
XX	XX										
				XX	XX	XX	XX	XX	XX	XX	
		XX	XX	XX					XX	XX	
	XX										
					XX		XX	XX	XX	XX	
	XX										
					XX		XX		XX	XX	
							XX				

STANDARD WAREHOUSE SIZES

COILED SHEET—MILL FINISH

1100-0	5050-0	5005-0	5052-0
3003-0	5050-H32	5005-H34	5052-H32
3003-H14	5050-H34		5052-H34

Width in Inches

Gauge (Inch)	48	36	30	24	18	12
.090	X					
.080	X					
.063	X	X	X	X	X	X
.050	X	X	X	*X	X	X
.040	X	X	X	*X	X	X
.032	X	X	X	*X	X	X
.025	X	X	X	*X	X	X
.020		X	X	*X	X	X
.016				X	X	X
.012				X	X	X
.010				X	X	X

*Indicated sizes also available in alloy 5357-H34

COILED SHEET CIRCLES

1100-0

Width in Inches

Gauge (Inch)	18	17	16	15	14	13	12	11	10	9	8	7
.080				X	X		X		X			
.063	X	X	X	X	X	X	X	X	X	X	X	X
.050	X	X	X	X	X	X	X	X	X	X	X	
.040	X	X	X	X	X	X	X	X	X	X	X	
.032				X	X	X	X	X	X	X	X	

STANDARD WAREHOUSE SIZES
EMBOSSED SHEET—3003-H114 AND —H134

GAUGE (Inches)	SIZE	STUCCO	LEATHER GRAIN	DIAMOND and RIBBED	WOOD GRAINED	SQUARE EMBOSSED
.040	36x96	X	X	X	X	X
	36x120	X	X			
	48x144	X			X	
.032	36x96	X	X	X	X	X
	36x120	X	X			
	48x144	X			X	
.025	36x96	X	X	X	X	X
	36x120					
	48x144	X			X	
.020	36x96	X	X	X		X

UTILITY SHEET

Flattened Coiled Sheet
 (Roller Leveled)

Thickness (Inches)	30 x 96	36 x 96 36 x 120	48 x 120 48 x 144
.063	—	X	X
.050	—	X	X
.040	—	X	X
.032	—	X	X
.025	X	X	X
.020	X	X	—
.018	—	X	—
.016	—	X	—

COILED UTILITY SHEET

Thickness (Inches)	24	30	36	48
.063	X	—	X	X
.050	X	—	X	X
.040	X	—	X	X
.032	X	—	X	X
.025	X	X	X	X
.020	X	X	X	—
.018	X	X	X	—
.016	X	X	X	—



BRASS and COPPER

Other Copper Alloys

SHEET and STRIP
Flat Lengths and Coils
PLATE

INDEX

Description.....	Page 61
Weights—	
Brass Coil Soft.....	Page 62
Brass Coil Quarter Hard.....	Page 64
Brass Coil Half Hard.....	Page 65
Brass Coil Full Hard.....	Page 66
Brass Coil Shim Stock.....	Page 66
Brass Coil Spring Temper.....	Page 66
Brass Sheet Soft.....	Page 67
Brass Sheet Quarter Hard.....	Page 69
Brass Sheet Half Hard.....	Page 70
Brass Sheet Full Hard.....	Page 72
Brass Sheet Spring Temper.....	Page 72
Brass Sheet Engraver's Quality.....	Page 73
Muntz Metal Sheet.....	Page 73
Red Brass Coil Soft.....	Page 74
Red Brass Sheet Soft.....	Page 75
Red Brass Sheet Half Hard.....	Page 76
Commercial Bronze Coil Soft.....	Page 76
Commercial Bronze Sheet Soft.....	Page 77
Phosphor Bronze Sheet Spring Temper.....	Page 79
Phosphor Bronze Coil Spring Temper.....	Page 79
Gilding Metal Sheet Soft.....	Page 79
Gilding Metal Coil Soft.....	Page 79
Tinned Brass, Tinned Bronze, Beryllium Copper.....	Page 79
Nickel Silver Coil Soft.....	Page 80
Nickel Silver Sheet Soft.....	Page 80
Nickel Silver Coil Spring Temper.....	Page 80
Cold Rolled Annealed Copper Coil.....	Page 81
Hot Rolled Copper Sheet.....	Page 82
Cold Rolled Copper Sheet.....	Page 83
Weights per Linear Foot—	
Flat Rolled Products.....	Page 86
Tolerances—	
Width—Slit Metal.....	Page 94
Width—Sheared Metal.....	Page 94
Width—Sawed Metal.....	Page 94
Straightness—Slit Metal.....	Page 94
Thickness.....	Page 95
Chemical Composition, Physical Properties, Working and Welding Characteristics.....	
	Page 97
Mechanical Properties.....	
	Page 98
Government Specification.....	
	Page 99
AMPCO METAL—	
Description and Designations.....	Page 100
Chemical, Physical Properties.....	Page 102
Government Specifications.....	Page 102
Weights— Grade 8.....	Page 103
Stock Die Blanks—Grade 24.....	Page 104

Fullerton maintains large stocks of copper base alloys in various gauges, sizes and tempers in both sheet and coil. This huge inventory assures you prompt shipment from stock, when you need it. Of course, our slitting and shearing equipment can turn out your order to your particular specification in width and length.

Special sizes and requirements are available through our mills, and we constantly endeavor to secure the earliest delivery on all mill orders.

Copper sheet and coil, because of their superior properties have many and varied applications. Copper is corrosion resistant and has superior electrical conductivity. It is a ductile metal and can easily be formed, stamped, drawn or spun. Its pleasing color can be used to great advantage in the manufacturing of novelty, household and decorative items.

Copper alloyed with zinc in varying proportions results in brass and alloys such as Jewelers bronze, Commercial bronze, Red brass, Low brass and others. Each differs in composition and physical properties and has many and varied uses. Brass, which is also known as yellow brass or cartridge brass, is probably the most familiar because of its application in cartridges, ash trays, decorative items, household items and a variety of production parts. It, as all other brass alloys, is easy to fabricate by all known production methods.

Phosphor Bronze is a copper-tin alloy. Because of its high elasticity, high tensile, and fatigue resistance it has many applications in assemblies as springs, clips, switch parts, etc. It also has excellent corrosion resistance.

Nickel Silver is an alloy of copper, nickel and zinc in varying proportions. The nickel content improves the corrosion resistance while zinc in varying proportions strengthens the alloy. It has a pleasing silver-white color and can be used as a substitute for silver and as a base metal for silver plating. It also has many other uses in the electrical field, musical instruments, orthopedic and surgical appliances, and optical goods.

Beryllium Copper is a copper-beryllium alloy which can be hardened by heat treatment. It has high mechanical strength and resistance to fatigue. It is available in the solution annealed, quarter hard, half hard, and hard conditions. The choice of temper will depend upon the forming requirements, after which it may be hardened by heat treatment to greater mechanical properties.

YELLOW BRASS IN COILS
SOFT TEMPER

B. & S. Gauge	THICKNESS		WEIGHT Lbs. per Lin. Ft. (Approx.)
	Decimal Equivalent Inches	WIDTH Inches	
No. 11	.0907	12	4.00
No. 12	.0808	12	3.56
No. 13	.0720	6	1.58
No. 13	.0720	12	3.16
No. 14	.0641	6	1.41
No. 14	.0641	8	1.88
No. 14	.0641	10	2.35
No. 14	.0641	12	2.82
No. 16	.0508	6	1.12
No. 16	.0508	8	1.49
No. 16	.0508	10	1.87
No. 16	.0508	12	2.24
No. 17	.0453	6	.998
No. 17	.0453	8	1.34
No. 17	.0453	10	1.66
No. 17	.0453	12	1.99
No. 18	.0403	6	.888
No. 18	.0403	8	1.19
No. 18	.0403	10	1.48
No. 18	.0403	12	1.78
No. 18	.0403	14	2.07
No. 19	.0359	6	.791
No. 19	.0359	8	1.05
No. 19	.0359	10	1.32
No. 19	.0359	12	1.58
No. 19	.0359	16	2.10
No. 20	.0320	6	.705
No. 20	.0320	8	.940
No. 20	.0320	9	1.058
No. 20	.0320	10	1.17
No. 20	.0320	12	1.51
No. 20	.0320	14	1.64
No. 20	.0320	16	1.88
No. 20	.0320	18	2.22
No. 20	.0320	20	2.350
No. 20	.0320	24	2.92
No. 21	.0285	8	.838
No. 21	.0285	10	1.047
No. 21	.0285	12	1.27
No. 22	.0253	6	.557
No. 22	.0253	8	.744
No. 22	.0253	9	.839

Continued

Sizes other than listed may be furnished or may be slit from wider stock.

YELLOW BRASS IN COILS

SOFT TEMPER

Continued

B. & S. Gauge	THICKNESS		WIDTH Inches	WEIGHT Lbs. per Lin. Ft. (Approx.)
	Decimal Equivalent Inches			
No. 22	.0253		10	.929
No. 22	.0253		12	1.11
No. 22	.0253		14	1.305
No. 22	.0253		16	1.492
No. 22	.0253		18	1.683
No. 23	.0226		6	.498
No. 23	.0226		8	.664
No. 23	.0226		10	.892
No. 23	.0226		12	.996
No. 24	.0201		6	.443
No. 24	.0201		8	.590
No. 24	.0201		9	.664
No. 24	.0201		10	.737
No. 24	.0201		12	.885
No. 24	.0201		14	1.032
No. 24	.0201		18	1.33
No. 25	.0179		6	.394
No. 25	.0179		8	.526
No. 25	.0179		10	.657
No. 25	.0179		12	.789
No. 26	.0159		6	.350
No. 26	.0159		8	.467
No. 26	.0159		10	.584
No. 26	.0159		12	.701
No. 27	.0142		12	.625
No. 28	.0126		6	.277
No. 28	.0126		8	.370
No. 28	.0126		10	.462
No. 28	.0126		12	.556
No. 30	.0100		6	.220
No. 30	.0100		8	.294
No. 30	.0100		10	.367
No. 30	.0100		12	.441
No. 32	.0080		6	.176
No. 32	.0080		8	.235
No. 32	.0080		12	.353
No. 34	.0063		12	.277
No. 34	.0063		12	.277
No. 36	.0050		6	.110
No. 36	.0050		12	.220

Sizes other than listed may be furnished or may be slit from wider stock.

YELLOW BRASS IN COILS
QUARTER HARD TEMPER

B. & S. Gauge	THICKNESS		WIDTH Inches	WEIGHT Lbs. per Lin. Ft. (Approx.)
	Decimal Equivalent Inches			
No. 14	.0641		12	2.82
No. 16	.0508		12	2.24
No. 17	.0453		12	1.99
No. 18	.0403		12	1.78
No. 19	.0359		12	1.58
No. 20	.0320		12	1.51
No. 21	.0285		12	1.27
No. 22	.0253		12	1.11
No. 23	.0226		12	.996
No. 24	.0201		8	.590
No. 24	.0201		12	.885
No. 25	.0179		8	.526
No. 25	.0179		12	.789
No. 26	.0159		8	.467
No. 26	.0159		12	.701
No. 27	.0142		12	.625
No. 28	.0126		8	.370
No. 28	.0126		12	.556
No. 30	.0100		8	.294
No. 30	.0100		12	.441

Sizes other than listed may be furnished or may be slit from wider stock.

YELLOW BRASS IN COILS
 HALF HARD TEMPER

B. & S. Gauge	THICKNESS		WEIGHT Lbs. per Lin. Ft. (Approx.)
	Decimal Equivalent Inches	WIDTH Inches	
No. 14	.0641	6	1.41
No. 14	.0641	8	1.88
No. 14	.0641	10	2.354
No. 14	.0641	12	2.825
No. 15	.0571	12	2.516
No. 16	.0508	6	1.12
No. 16	.0508	8	1.49
No. 16	.0508	10	1.865
No. 16	.0508	12	2.24
No. 17	.0453	12	1.99
No. 18	.0403	6	.888
No. 18	.0403	8	1.19
No. 18	.0403	10	1.48
No. 18	.0403	12	1.78
No. 19	.0359	6	.791
No. 19	.0359	8	1.05
No. 19	.0359	10	1.582
No. 19	.0359	12	1.58
No. 20	.0320	6	.705
No. 20	.0320	8	.940
No. 20	.0320	10	1.17
No. 20	.0320	12	1.41
No. 21	.0285	8	.838
No. 21	.0285	10	1.050
No. 21	.0285	12	1.256
No. 22	.0253	6	.558
No. 22	.0253	8	.744
No. 22	.0253	10	.929
No. 22	.0253	12	1.11
No. 23	.0226	12	.995
No. 24	.0201	6	.443
No. 24	.0201	8	.590
No. 24	.0201	10	.737
No. 24	.0201	12	.885
No. 25	.0179	6	.394
No. 25	.0179	8	.526
No. 25	.0179	10	.657
No. 25	.0179	12	.789
No. 26	.0159	8	.467
No. 26	.0159	10	.584
No. 26	.0159	12	.701
No. 27	.0142	12	.626
No. 28	.0126	8	.370
No. 28	.0126	12	.555
No. 30	.0100	8	.294
No. 30	.0100	12	.441
No. 32	.0080	6	.176
No. 34	.0063	6	.138
No. 36	.0050	6	.110
No. 38	.0040	6	.088

Sizes other than listed may be furnished or may be slit from wider stock.

YELLOW BRASS COIL
FULL HARD TEMPER

B. & S. Gauge	THICKNESS	WIDTH Inches	WEIGHT Lbs. per Lin. Ft. (Approx.)
	Decimal Equivalent Inches		
No. 14	.0641	12	2.82
No. 16	.0508	12	2.24
No. 17	.0453	12	1.99
No. 18	.0403	12	1.78
No. 19	.0359	12	1.58
No. 20	.0320	12	1.51
No. 22	.0253	12	1.11
No. 23	.0226	12	.996
No. 24	.0201	12	.885
No. 26	.0159	8	.467
No. 27	.0142	12	.625
No. 28	.0126	12	.556

SHIM BRASS
4 NUMBERS HARD TEMPER

No. 30	.0100	12	.441
No. 32	.0080	6	.176
No. 34	.0063	6	.139
No. 36	.0050	6	.110
No. 38	.004	6	.088
No. 38	.0031	6	.068
No. 44	.0020	6	.044

YELLOW BRASS COIL
SPRING TEMPER

No. 18	.0403	12	1.776
No. 19	.0359	12	1.582
No. 20	.0320	12	1.410
No. 21	.0285	12	1.256
No. 22	.0253	12	1.119
No. 23	.0226	12	.996
No. 24	.0201	8	.590
No. 24	.0201	12	.886
No. 25	.0179	12	.789
No. 26	.0159	12	.700
No. 27	.0142	12	.625
No. 28	.0126	12	.555
No. 30	.0100	8	.293
No. 30	.0100	12	.440
No. 33	.0080	12	.353
No. 34	.0063	12	.278

Sizes other than listed may be furnished or may be slit from wider stock.

YELLOW BRASS FLAT SHEET

SOFT TEMPER

8-FT. STANDARD LENGTHS AND ENDS

B. & S. Gauge	THICKNESS		WEIGHT Lbs. per Lin. Ft. (Approx.)
	Decimal Equivalent Inches	WIDTH Inches	
No. 1/8	.125	8	3.67
No. 1/8	.125	10	4.59
No. 1/8	.125	12	5.51
No. 8	.1285	8	3.775
No. 8	.1285	10	4.719
No. 8	.1285	12	5.662
No. 9	.1144	12	5.041
No. 10	.1019	8	2.99
No. 10	.1019	12	4.99
No. 11	.0907	12	4.00
No. 12	.0808	12	3.56
No. 13	.0720	6	1.58
No. 13	.0720	12	3.16
No. 14	.0641	6	1.41
No. 14	.0641	8	1.88
No. 14	.0641	10	2.35
No. 14	.0641	12	2.82
No. 16	.0508	6	1.12
No. 16	.0508	8	1.49
No. 16	.0508	10	1.87
No. 16	.0508	12	2.24
No. 17	.0453	6	.998
No. 17	.0453	8	1.34
No. 17	.0453	10	1.66
No. 17	.0453	12	1.99
No. 18	.0403	6	.888
No. 18	.0403	8	1.19
No. 18	.0403	10	1.48
No. 18	.0403	12	1.78
No. 18	.0403	14	2.07
No. 19	.0359	6	.791
No. 19	.0359	8	1.05
No. 19	.0359	10	1.32
No. 19	.0359	12	1.58
No. 19	.0359	16	2.10
No. 20	.0320	6	.705
No. 20	.0320	8	.940
No. 20	.0320	9	1.058
No. 20	.0320	10	1.17
No. 20	.0320	12	1.51
No. 20	.0320	14	1.64
No. 20	.0320	16	1.88
No. 20	.0320	18	2.22
No. 20	.0320	20	2.35
No. 20	.0320	24	2.92
No. 21	.0285	8	.838
No. 21	.0285	10	1.047
No. 21	.0285	12	1.27

Sizes other than listed may be furnished or may be slit from wider stock.

YELLOW BRASS FLAT SHEET
SOFT TEMPER
8-FT. STANDARD LENGTHS AND ENDS

B. & S. Gauge	THICKNESS		WIDTH Inches	WEIGHT Lbs. per Lin. Ft. (Approx.)
	Decimal Equivalent Inches			
No. 22	.0253		6	.557
No. 22	.0253		8	.744
No. 22	.0253		9	.839
No. 22	.0253		10	.929
No. 22	.0253		12	1.11
No. 22	.0253		14	1.305
No. 22	.0253		16	1.492
No. 22	.0253		18	1.683
No. 23	.0226		6	.498
No. 23	.0226		8	.664
No. 23	.0226		10	.892
No. 23	.0226		12	.996
No. 24	.0201		6	.443
No. 24	.0201		8	.590
No. 24	.0201		9	.664
No. 24	.0201		10	.737
No. 24	.0201		12	.885
No. 24	.0201		14	1.032
No. 24	.0201		18	1.33
No. 25	.0179		6	.394
No. 25	.0179		8	.526
No. 25	.0179		10	.657
No. 25	.0179		12	.789
No. 26	.0159		6	.350
No. 26	.0159		8	.467
No. 26	.0159		10	.584
No. 26	.0159		12	.701
No. 27	.0142		12	.625
No. 28	.0126		6	.277
No. 28	.0126		8	.370
No. 28	.0126		10	.426
No. 28	.0126		12	.556
No. 30	.0100		6	.220
No. 30	.0100		8	.294
No. 30	.0100		10	.367
No. 30	.0100		12	.441

Sizes other than listed may be furnished or may be slit from wider stock.

YELLOW BRASS FLAT SHEET
 QUARTER HARD TEMPER
 8-FT. STANDARD LENGTHS AND ENDS

B. & S. Gauge	THICKNESS		WEIGHT Lbs. per Lin. Ft. (Approx.)
	Decimal Equivalent Inches	WIDTH Inches	
No. 11	.0907	12	3.997
No. 12	.0808	8	2.370
No. 12	.0808	12	3.560
No. 13	.0720	12	3.173
No. 14	.0641	12	2.82
No. 16	.0508	12	2.24
No. 17	.0453	12	1.99
No. 18	.0403	12	1.78
No. 19	.0359	12	1.58
No. 20	.0320	12	1.51
No. 21	.0285	12	1.27
No. 22	.0253	12	1.11
No. 23	.0226	12	.996
No. 24	.0201	8	.590
No. 24	.0201	12	.885
No. 25	.0179	8	.526
No. 25	.0179	12	.789
No. 26	.0159	8	.467
No. 26	.0159	12	.601
No. 27	.0142	12	.625
No. 28	.0126	8	.370
No. 28	.0126	12	.556
No. 30	.0100	8	.294
No. 30	.0100	12	.441

Sizes other than listed may be furnished or may be slit from wider stock.

YELLOW BRASS FLAT SHEET
HALF HARD TEMPER
8-FT. STANDARD LENGTHS AND ENDS

B. & S. Gauge	THICKNESS		WEIGHT Lbs. per Lin. Ft. (Approx.)
	Decimal Equivalent Inches	WIDTH Inches	
No. ¼	.250	12	11.020
No. ⅜	.1875	12	8.262
No. ½	.156	12	6.880
No. 8	.1285	8	3.775
No. 8	.1285	10	4.719
No. 8	.1285	12	5.662
No. 9	.1144	12	5.041
No. 10	.102	12	4.490
No. 11	.0907	8	2.664
No. 11	.0907	10	3.331
No. 11	.0907	12	3.997
No. 12	.0808	10	2.967
No. 12	.0808	12	3.560
No. 13	.0720	12	3.173
No. 14	.0641	6	1.41
No. 14	.0641	8	1.88
No. 14	.0641	10	2.354
No. 14	.0641	12	2.825
No. 15	.0571	12	2.516
No. 16	.0508	6	1.12
No. 16	.0508	8	1.49
No. 16	.0508	10	1.865
No. 16	.0508	12	2.24
No. 17	.0453	12	1.99
No. 18	.0403	6	.888
No. 18	.0403	8	1.19
No. 18	.0403	10	1.48
No. 18	.0403	12	1.78
No. 19	.0359	6	.791
No. 19	.0359	8	1.05

Sizes other than listed may be furnished or may be slit from wider stock.

YELLOW BRASS FLAT SHEET
 HALF HARD TEMPER
 8-FT. STANDARD LENGTHS AND ENDS

(Continued)

B. & S. Gauge	THICKNESS		WIDTH Inches	WEIGHT Lbs. per Lin. Ft. (Approx.)
	Decimal Equivalent Inches			
No. 19	.0359		10	1.582
No. 19	.0359		12	1.58
No. 20	.0320		6	.705
No. 20	.0320		8	.940
No. 20	.0320		10	1.17
No. 20	.0320		12	1.41
No. 21	.0285		8	.838
No. 21	.0285		10	1.050
No. 21	.0285		12	1.256
No. 22	.0253		6	.558
No. 22	.0253		8	.744
No. 22	.0253		10	.929
No. 22	.0253		12	1.11
No. 23	.0226		12	.995
No. 24	.0201		6	.443
No. 24	.0201		8	.590
No. 24	.0201		10	.737
No. 24	.0201		12	.885
No. 25	.0179		6	.394
No. 25	.0179		8	.526
No. 25	.0179		10	.657
No. 25	.0179		12	.789
No. 26	.0159		8	.467
No. 26	.0159		10	.584
No. 26	.0159		12	.701
No. 27	.0142		12	.626
No. 28	.0126		8	.370
No. 28	.0126		12	.555
No. 30	.0100		8	2.94
No. 30	.0100		12	.441

Sizes other than listed may be furnished or may be slit from wider stock.

YELLOW BRASS FLAT SHEET

4 NUMBERS HARD TEMPER

8 FT. STANDARD LENGTHS

B. & S. Gauge	THICKNESS		WEIGHT Lbs. per Lin. Ft. (Approx.)
	Decimal Equivalent Inches	WIDTH Inches	
No. 3/8	.1875	12	8.262
No. 1/4	.125	12	5.813
No. 11	.0907	12	3.997
No. 12	.0808	12	3.560
No. 13	.0720	12	3.173
No. 14	.0641	12	2.82
No. 16	.0508	12	2.24
No. 17	.0453	12	1.99
No. 18	.0403	12	1.78
No. 19	.0359	12	1.58
No. 20	.0320	12	1.51
No. 22	.0253	12	1.11
No. 23	.0226	12	.996
No. 24	.0201	12	.885
No. 26	.0159	8	.467
No. 27	.0142	12	.625
No. 28	.0126	12	.556

YELLOW BRASS FLAT SHEET

SPRING TEMPER

8 FT. STANDARD LENGTHS

B. & S. Gauge	THICKNESS		WEIGHT Lbs. per Lin. Ft. (Approx.)
	Decimal Equivalent Inches	WIDTH Inches	
No. 8	.1285	12	5.662
No. 10	.102	12	4.490
No. 11	.0907	12	3.997
No. 12	.0808	12	3.560
No. 13	.0720	12	3.173
No. 14	.0641	12	2.825
No. 15	.0571	12	2.516
No. 16	.0508	12	2.238
No. 17	.0453	12	1.996
No. 18	.0403	12	1.776
No. 19	.0359	12	1.582
No. 20	.0320	12	1.410
No. 21	.0285	12	1.256
No. 22	.0253	12	1.119
No. 23	.0226	12	.996
No. 24	.0201	8	.590
No. 24	.0201	12	.886
No. 25	.0179	12	.789
No. 26	.0159	12	.700
No. 27	.0142	12	.625

Sizes other than listed may be furnished or may be slit from wider stock.

YELLOW BRASS FLAT SHEET

ENGRAVERS' QUALITY
LEADED HALF HARD TEMPER
8 FT. STANDARD LENGTHS

B. & S. Gauge	THICKNESS		WIDTH Inches	WEIGHT Lbs. per Lin. Ft. (Approx.)
	Decimal Equivalent Inches			
No. 3/8	.375		12	16.53
No. 7/16	.312		12	13.76
No. 1/2	.250		12	11.02
No. 5/8	.1875		12	8.26

MUNTZ METAL SHEET

COLD ROLLED

In Exact Sizes as Listed

THICKNESS Inches & B. & S. Gauge	Decimal Equivalent Inches	SIZE Inches	WEIGHT Lbs. per Sheet (Approx.)	THICKNESS Inches & B. & S. Gauge	Decimal Equivalent Inches	SIZE Inches	WEIGHT Lbs. per Sheet (Approx.)
1/16	.0625	36x96	55.8	No. 12	.0808	24x48	28.2
3/32	.0938	24x48	33.0	No. 12	.0808	30x96	70.6
3/32	.0938	30x60	51.6	No. 12	.0808	36x96	84.6
3/32	.0938	36x96	99.1	No. 12	.0808	48x96	112.8
3/32	.0938	48x96	132.2	No. 14	.0641	24x48	22.4
1/8	.125	24x48	43.6	No. 14	.0641	24x96	44.7
1/8	.125	24x96	87.2	No. 14	.0641	30x60	34.9
1/8	.125	30x60	68.1	No. 14	.0641	30x96	55.8
1/8	.125	30x96	109.0	No. 14	.0641	36x96	67.0
1/8	.125	36x96	130.8	No. 16	.0508	24x48	17.8
3/16	.188	24x48	65.4	No. 16	.0508	24x96	35.5
3/16	.188	24x96	130.8	No. 16	.0508	30x60	27.8
3/16	.188	30x60	102.4	No. 16	.0508	36x96	53.2
3/16	.188	36x96	196.4	No. 17	.0453	30x60	24.6
1/4	.250	24x48	87.2	No. 18	.0403	24x48	14.0
1/4	.250	24x96	174.5	No. 18	.0403	24x96	28.1
1/4	.250	30x60	136.2	No. 18	.0403	30x60	22.0
1/4	.250	36x96	261.6	No. 20	.0320	24x48	10.2
3/16	.312	24x48	109.3	No. 20	.0320	24x96	20.3
3/16	.312	36x96	328.0	No. 20	.0320	30x60	17.4
3/8	.375	24x48	130.8	No. 20	.0320	30x96	27.8
3/8	.375	24x96	261.6	No. 20	.0320	36x96	35.2
3/8	.375	36x96	392.8	No. 22	.0253	24x48	8.84
1/2	.500	24x48	174.6	No. 22	.0253	24x96	17.7
5/8	.625	30x60	341.8	No. 24	.0201	24x48	7.00
3/4	.750	30x60	408.7				

HOT ROLLED

In Exact Sizes as Listed

3/8	.375	36x96	49.1	3/4	.750	12xRand.	32.7
1/2	.500	36x96	65.4	7/8	.875	12xRand.	38.5
1/2	.500	24x48	43.6	1	1.000	24x96	87.2
5/8	.625	12xRand.	28.9	1	1.000	12xRand.	43.6
3/4	.750	24x96	65.4	1 1/4	1.250	12xRand.	55.1

Sizes other than listed may be furnished or may be slit from wider stock.

RED BRASS IN COILS

85-15

SOFT TEMPER

B. & S. Gauge	THICKNESS		WEIGHT Lbs. per Lin. Ft. (Approx.)
	Decimal Equivalent Inches	WIDTH Inches	
No. 14	.0641	6	1.44
No. 15	.0571	6	1.30
No. 16	.0508	6	1.16
No. 17	.0453	6	1.03
No. 18	.0403	6	.915
No. 18	.0403	10	1.52
No. 19	.0359	6	.814
No. 20	.0320	6	.780
No. 20	.0320	10	1.21
No. 20	.0320	12	1.56
No. 21	.0285	6	.647
No. 22	.0253	6	.574
No. 22	.0253	10	.957
No. 22	.0253	12	1.15
No. 23	.0226	6	.513
No. 23	.0226	12	1.03
No. 24	.0201	6	.458
No. 24	.0201	10	.760
No. 24	.0201	12	.915
No. 24	.0201	14	1.06
No. 25	.0179	6	.406
No. 25	.0179	12	.812
No. 26	.0159	6	.360

Continued

Sizes other than listed may be furnished or may be slit from wider stock.

RED BRASS IN COILS

85-15

SOFT TEMPER

Continued

B. & S. Gauge	THICKNESS		WIDTH Inches	WEIGHT Lbs. per Lin. Ft. (Approx.)
	Decimal Equivalent Inches			
No. 26	.0159		10	.602
No. 26	.0159		12	.720
No. 26	.0159		14	.889
No. 27	.0142		6	.322
No. 27	.0142		12	.645
No. 28	.0126		6	.286
No. 28	.0126		10	.488
No. 28	.0126		14	.673
No. 29	.0113		6	.256
No. 30	.0100		6	.226
No. 30	.0100		10	.378
No. 32	.0080		6	.181
No. 32	.0080		10	.303

Many of the above sizes may be furnished in either quarter hard or half hard temper.

RED BRASS FLAT SHEET

85-15

SOFT TEMPER

Lengths of 8 feet and Ends

B. & S. Gauge	THICKNESS		WIDTH Inches	WEIGHT Lbs. per Lin. Ft. (Approx.)
	Decimal Equivalent Inches			
No. 10	.1019		6	2.31
No. 12	.0808		6	1.84
No. 14	.0641		6	1.44
No. 16	.0508		6	1.16
No. 18	.0403		6	.915
No. 20	.0320		12	1.56

Sizes other than listed may be furnished or may be slit from wider stock.

FULLERTON—A WAREHOUSE OF METALS AND SERVICE

RED BRASS FLAT SHEET

85-15

HALF HARD TEMPER

Lengths of 8 feet and Ends

B. & S. Gauge	THICKNESS		WIDTH Inches	WEIGHT Lbs. per Lin. Ft. (Approx.)
	Decimal Equivalent Inches			
No. 8	.1285		12	5.83
No. 8	.1285		24	11.66
No. 11	.0907		12	4.12
No. 11	.0907		24	8.25
No. 12	.0808		24	7.33
No. 14	.0641		10	2.42
No. 14	.0641		12	2.88
No. 14	.0641		16	3.98
No. 14	.0641		20	4.84
No. 14	.0041		24	5.81
No. 16	.0508		10	1.92
No. 16	.0508		12	2.31
No. 16	.0508		14	2.69
No. 16	.0508		16	3.07
No. 16	.0508		18	3.45
No. 16	.0508		20	3.84
No. 16	.0508		24	4.61
No. 18	.0403		12	1.83
No. 18	.0403		14	2.13
No. 18	.0403		16	2.44
No. 20	.0320		12	1.56
No. 24	.0201		12	.915

COMMERCIAL BRONZE IN COILS

90-10

SOFT TEMPER

B. & S. Gauge	THICKNESS		WIDTH Inches	WEIGHT Lbs. per Lin. Ft. (Approx.)
	Decimal Equivalent Inches			
No. 14	.0641		6	1.44
No. 15	.0571		6	1.30
No. 16	.0508		6	1.16
No. 17	.0453		6	1.03
No. 18	.0403		6	.915
No. 18	.0403		10	1.52
No. 19	.0359		6	.814
No. 20	.0320		6	.780
No. 20	.0320		10	1.21
No. 20	.0320		12	1.56
No. 21	.0285		6	.647
No. 22	.0253		6	.574

Continued

Sizes other than listed may be furnished or may be slit from wider stock.

COMMERCIAL BRONZE IN COILS

90-10
SOFT TEMPER
Continued

B. & S. Gauge	THICKNESS		WIDTH Inches	WEIGHT Lbs. per Lin. Ft. (Approx.)
	Decimal Equivalent Inches			
No. 22	.0253		10	.957
No. 22	.0253		12	1.15
No. 23	.0226		6	.513
No. 23	.0226		12	1.03
No. 24	.0201		6	.458
No. 24	.0201		10	.760
No. 24	.0201		12	.915
No. 24	.0201		14	1.06
No. 25	.0179		6	.406
No. 25	.0179		12	.812
No. 26	.0159		6	.360
No. 26	.0159		10	.602
No. 26	.0159		12	.720
No. 26	.0159		14	.889
No. 27	.0142		6	.322
No. 27	.0142		12	.645
No. 28	.0126		6	.286
No. 28	.0126		10	.488
No. 28	.0126		14	.673
No. 29	.0113		6	.256
No. 30	.0100		6	.226
No. 30	.0100		10	.378
No. 32	.0080		6	.181
No. 32	.0080		10	.303

Many of the above sizes may be furnished in either quarter hard or half hard temper.

COMMERCIAL BRONZE FLAT SHEET

90-10
SOFT TEMPER
Lengths of 8 feet and Ends

B. & S. Gauge	THICKNESS		WIDTH Inches	WEIGHT Lbs. per Lin. Ft. (Approx.)
	Decimal Equivalent Inches			
1/8"	.125		8	3.82
1/8"	.125		10	4.91
1/8"	.125		12	5.73
1/8"	.125		18	8.85
1/8"	.125		24	11.46

Continued

Sizes other than listed may be furnished or may be slit from wider stock.

COMMERCIAL BRONZE FLAT SHEET

90-10

SOFT TEMPER

Continued

Inches & B. & S. Gauge	THICKNESS		WIDTH Inches	WEIGHT Lbs. per Lin. Ft. (Approx.)
	Decimal Equivalent Inches			
3/16"	.188		8	5.73
3/16"	.188		12	8.59
1/4"	.250		12	11.44
No. 10	.1019		24	9.32
No. 11	.0907		8	2.77
No. 11	.0907		12	4.16
No. 11	.0907		24	8.32
No. 12	.0808		14	4.32
No. 12	.0808		18	5.55
No. 12	.0808		24	7.40
No. 14	.0641		6	1.47
No. 14	.0641		8	1.96
No. 14	.0641		10	2.44
No. 14	.0641		12	2.93
No. 14	.0641		14	3.42
No. 14	.0641		16	3.91
No. 14	.0641		20	4.89
No. 14	.0641		24	5.87
No. 14	.0641		30	7.33
No. 16	.0508		6	1.16
No. 16	.0508		8	1.55
No. 16	.0508		10	1.94
No. 16	.0508		12	2.33
No. 16	.0508		14	2.71
No. 16	.0508		16	3.11
No. 16	.0508		18	3.48
No. 16	.0508		20	3.89
No. 16	.0508		24	4.66
No. 16	.0508		30	5.83
No. 18	.0403		8	1.24
No. 18	.0403		10	1.54
No. 18	.0403		12	1.85
No. 18	.0403		14	2.15
No. 18	.0403		16	2.48
No. 18	.0403		18	2.77
No. 18	.0403		24	3.69
No. 20	.0320		12	1.47
No. 20	.0320		16	1.96
No. 20	.0320		18	2.31
No. 20	.0320		24	2.93
No. 22	.0253		12	1.15
No. 22	.0253		14	1.35
No. 22	.0253		16	1.55
No. 24	.0201		12	.920
No. 26	.0159		12	.729

Many of the above sizes may be furnished in either quarter hard or half hard temper.

Sizes other than listed may be furnished or may be slit from wider stock.

PHOSPHOR BRONZE 5% GRADE A SHEET*

SPRING TEMPER

8-FT. STANDARD LENGTHS

THICKNESS			WEIGHT Lbs. per Lin. Ft. (Approx.)	THICKNESS			WEIGHT Lbs. per Lin. Ft. (Approx.)
Inches & B. & S. Gauge	Decimal Equivalent Inches	WIDTH Inches		Inches & B. & S. Gauge	Decimal Equivalent Inches	WIDTH Inches	
1/8	.125	6	2.89	No. 22	.0253	6	.583
No. 10	.1019	6	2.35	No. 24	.0201	6	.465
No. 11	.0907	6	2.10	No. 26	.0159	6	.369
No. 12	.0808	6	1.87	No. 28	.0126	6	.292
No. 14	.0641	6	1.48	No. 30	.0100	6	.231
No. 16	.0508	6	1.18	No. 32	.0080	6	.185
No. 17	.0453	6	1.05	No. 34	.0063	6	.146
No. 18	.0403	6	.932	No. 36	.0050	6	.116
No. 20	.0320	6	.740				

PHOSPHOR BRONZE 5% GRADE A IN COILS*

SPRING TEMPER

No. 18	.0403	6	.932	No. 26	.0159	6	.369
No. 19	.0359	6	.831	No. 27	.0142	6	.328
No. 20	.0320	6	.740	No. 28	.0126	6	.282
No. 21	.0285	6	.667	No. 30	.0100	6	.231
No. 22	.0253	6	.583	No. 32	.0080	6	.185
No. 23	.0226	6	.523	No. 34	.0063	6	.146
No. 24	.0201	6	.465	No. 36	.0050	6	.116
No. 25	.0179	6	.413				

GILDING 95% SHEET

SOFT TEMPER

8-FT. STANDARD LENGTHS

No. 13	.0720	12	3.33	No. 14	.0641	12	2.96
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GILDING 95% IN COIL

SOFT TEMPER

No. 12	.0808	6	1.87	No. 16	.0508	6	1.18
No. 13	.0720	6	1.67	No. 17	.0453	6	1.05
No. 14	.0641	6	1.48	No. 18	.0403	6	.932
No. 15	.0571	6	1.32	No. 20	.0320	6	.740

Sizes other than listed may be furnished or may be slit from wider stock.

*Grade B, C, D, E Phosphor Bronze alloys also available upon application.

TINNED BRASS TINNED PHOSPHOR BRONZE BERYLLIUM COPPER

Available in various gauges, widths and tempers upon application

NICKEL SILVER IN COIL

18% GRADE A*

SOFT TEMPER

B. & S. Gauge	THICKNESS		WIDTH Inches	WEIGHT Lbs. per Lin. Ft. (Approx.)
	Decimal Equivalent Inches			
No. 30	.010		8	.303
No. 28	.0126		8	.381
No. 26	.0159		8	.480
No. 24	.0201		8	.611
No. 22	.0253		8	.765
No. 20	.032		8	1.04

NICKEL SILVER SHEET

18% GRADE A*

SOFT TEMPER

B. & S. Gauge	THICKNESS		WIDTH Inches	WEIGHT Lbs. per Lin. Ft. (Approx.)
	Decimal Equivalent Inches			
No. 14	.0641		8	1.99
No. 16	.0508		8	1.54
No. 18	.0403		8	1.22

NICKEL SILVER IN COILS

18% GRADE A*

SPRING TEMPER

B. & S. Gauge	THICKNESS		WIDTH Inches	WEIGHT Lbs. per Lin. Ft. (Approx.)
	Decimal Equivalent Inches			
No. 20	.032		8	1.04
No. 22	.0253		8	.765
No. 24	.0201		8	.611
No. 26	.0159		8	.480
No. 27	.0142		8	.424
No. 28	.0126		8	.381
No. 30	.010		8	.303
No. 32	.008		8	.242

Sizes other than listed may be furnished or may be slit from wider stock.

10%-12%-15% Nickel Silver alloys also available upon application.

COPPER IN COILS
COLD ROLLED ANNEALED

WEIGHT per Square Foot	THICKNESS in Inches	WIDTH Inches	WEIGHT Lbs. per Lin. Ft. (Approx.)	WEIGHT per Square Foot	THICKNESS in Inches	WIDTH Inches	WEIGHT Lbs. per Lin. Ft. (Approx.)
8 oz.	.0108	12	.500	16 oz.	.0216	15	1.250
10 oz.	.0135	10	.521	16 oz.	.0216	16	1.333
10 oz.	.0135	12	.625	16 oz.	.0216	18	1.500
10 oz.	.0135	14	.729	18 oz.	.0243	12	1.125
12 oz.	.0162	12	.750	20 oz.	.0270	12	1.250
12 oz.	.0162	14	.875	20 oz.	.0270	14	1.458
14 oz.	.0189	8	.583	24 oz.	.0323	8	1.000
14 oz.	.0189	12	.875	24 oz.	.0323	12	1.500
14 oz.	.0189	14	1.021	24 oz.	.0323	14	1.750
14 oz.	.0189	16	1.167	24 oz.	.0323	16	2.000
14 oz.	.0189	18	1.313	24 oz.	.0323	18	2.250
14 oz.	.0189	20	1.560	24 oz.	.0323	20	2.500
16 oz.	.0216	4	.334	32 oz.	.0431	12	2.500
16 oz.	.0216	6	.500	32 oz.	.0431	14	2.917
16 oz.	.0216	7	.583	32 oz.	.0431	18	3.750
16 oz.	.0216	8	.667	32 oz.	.0431	20	4.167
16 oz.	.0216	10	.833	48 oz.	.0647	8	2.000
16 oz.	.0216	12	1.000	48 oz.	.0647	12	3.000
16 oz.	.0216	14	1.167				

B. & S. Gauge	DECIMAL Equivalent Inches	WIDTH Inches	WEIGHT Lbs. per Lin. Ft. (Approx.)	B. & S. Gauge	DECIMAL Equivalent Inches	WIDTH Inches	WEIGHT Lbs. per Lin. Ft. (Approx.)
No. 13	.0720	6	1.667	No. 22	.0253	12	1.170
No. 14	.0641	6	1.485	No. 22	.0253	14	1.365
No. 14	.0641	8	1.980	No. 23	.0226	6	.525
No. 14	.0641	12	2.970	No. 24	.0201	6	.466
No. 16	.0508	6	1.180	No. 24	.0201	12	.932
No. 16	.0508	12	2.360	No. 26	.0159	6	.369
No. 18	.0403	6	.935	No. 26	.0159	12	.737
No. 18	.0403	12	1.870	No. 28	.0126	6	.292
No. 18	.0403	14	2.182	No. 30	.0100	6	.232
No. 18	.0403	18	2.805	No. 30	.0100	12	.464
No. 19	.0359	6	.830	No. 32	.0080	12	.371
No. 19	.0359	12	1.660	No. 36	.0050	6	.116
No. 20	.0320	6	.740	No. 36	.0050	12	.232
No. 20	.0320	10	1.233	No. 36	.0050	8	.155
No. 20	.0320	12	1.480	No. 36	.0050	12	.232
No. 20	.0320	14	1.727	No. 38	.0040	12	.186
No. 21	.0285	6	.660	No. 44	.0020	12	.093
No. 22	.0253	6	.585				

Sizes other than listed can be furnished.

FLAT PLAIN COPPER SHEET

HOT ROLLED (SOFT)

In Exact Sizes as Listed

WEIGHT per Square Foot	THICKNESS in Inches	SIZE of Sheet in Inches	WEIGHT Lbs. per Sheet (Approx.)
8 oz.	.0108	30 x 60	6.25
9 oz.	.0121	30 x 60	7.50
10 oz.	.0135	30 x 60	7.81
10 oz.	.0135	30 x 96	12.52
12 oz.	.0162	30 x 60	9.38
12 oz.	.0162	30 x 96	15.0
12 oz.	.0162	36 x 96	18.0
14 oz.	.0189	24 x 96	14.0
14 oz.	.0189	28 x 96	16.3
14 oz.	.0189	30 x 60	10.9
14 oz.	.0189	30 x 96	17.5
14 oz.	.0189	36 x 96	21.0
16 oz.	.0216	18 x 96	12.0
16 oz.	.0216	20 x 96	13.3
16 oz.	.0216	24 x 96	16.0
16 oz.	.0216	24 x 120	20.0
16 oz.	.0216	28 x 96	18.7
16 oz.	.0216	30 x 60	12.5
16 oz.	.0216	30 x 96	20.0
16 oz.	.0216	30 x 120	25.0
16 oz.	.0216	36 x 96	24.0
16 oz.	.0216	36 x 120	30.0
18 oz.	.0243	24 x 96	18.0
18 oz.	.0243	30 x 60	14.0
18 oz.	.0243	30 x 96	22.5
18 oz.	.0243	36 x 96	27.0
20 oz.	.0270	30 x 60	15.6
20 oz.	.0270	30 x 96	25.0
20 oz.	.0270	36 x 96	30.0
24 oz.	.0323	24 x 96	24.0
24 oz.	.0323	30 x 60	18.8
24 oz.	.0323	30 x 96	30.0
24 oz.	.0323	36 x 72	27.0
24 oz.	.0323	36 x 96	36.0
24 oz.	.0323	36 x 120	45.0
26 oz.	.0350	30 x 60	20.3
28 oz.	.0377	30 x 60	21.9
28 oz.	.0377	36 x 96	42.0
32 oz.	.0431	24 x 96	32.0
32 oz.	.0431	30 x 60	25.0

Continued

Sizes other than listed may be furnished or may be slit from wider stock.

FLAT PLAIN COPPER SHEET

HOT ROLLED (SOFT)
In Exact Sizes as Listed
Continued

WEIGHT per Square Foot	THICKNESS in Inches	SIZE of Sheet in Inches	WEIGHT Lbs. per Sheet (Approx.)
32 oz.	.0431	30 x 72¼	30.1
32 oz.	.0431	30 x 96	40.0
32 oz.	.0431	36 x 96	48.0
32 oz.	.0431	36 x 120	60.0
36 oz.	.0485	30 x 72¼	33.8
36 oz.	.0485	30 x 96	45.0
36 oz.	.0485	36 x 96	54.0
38 oz.	.0512	30 x 60	29.7
40 oz.	.0539	30 x 60	31.3
40 oz.	.0539	30 x 96	50.0
40 oz.	.0539	36 x 96	60.0
48 oz.	.0647	24 x 48	24.0
48 oz.	.0647	30 x 60	37.5
48 oz.	.0647	30 x 96	60.0
48 oz.	.0647	36 x 72	54.0
48 oz.	.0647	36 x 96	72.0
48 oz.	.0647	36 x 120	90.0
4 lb.	.0863	30 x 60	50.0
4 lb.	.0863	30 x 96	80.0
4½ lb.	.0972	30 x 60	56.2
5 lb.	.108	30 x 60	62.5
6 lb.	.129	24 x 48	48.0
6 lb.	.129	30 x 60	75.0

FLAT PLAIN COPPER SHEET

COLD ROLLED
In Exact Sizes as Listed

WEIGHT per Square Foot	THICKNESS in Inches	SIZE of Sheet in Inches	WEIGHT Lbs. per Sheet (Approx.)
10 oz.	.0135	30 x 60	7.81
10 oz.	.0135	30 x 96	12.5
12 oz.	.0162	30 x 60	9.38
12 oz.	.0162	30 x 96	15.0
12 oz.	.0162	36 x 96	18.0

(Continued)

Sizes other than listed may be furnished or may be slit from wider stock.

FLAT PLAIN COPPER SHEET

COLD ROLLED

In Exact Sizes as Listed

Continued

WEIGHT per Square Foot	THICKNESS in Inches	SIZE of Sheet in Inches	WEIGHT Lbs. per Sheet (Approx.)
14 oz.	.0189	24 x 96	14.0
14 oz.	.0189	30 x 96	17.5
14 oz.	.0189	36 x 96	21.0
16 oz.	.0216	18 x 96	12.0
16 oz.	.0216	18 x 120	15.0
16 oz.	.0216	20 x 96	13.33
16 oz.	.0216	20 x 120	16.66
16 oz.	.0216	22 x 96	14.67
16 oz.	.0216	24 x 96	16.0
16 oz.	.0216	24 x 120	20.0
16 oz.	.0216	26 x 96	17.3
16 oz.	.0216	28 x 96	18.7
16 oz.	.0216	30 x 60	12.5
16 oz.	.0316	30 x 96	20.0
16 oz.	.0216	30 x 120	25.0
16 oz.	.0216	36 x 96	24.0
16 oz.	.0216	36 x 120	30.0
18 oz.	.0243	24 x 96	18.0
18 oz.	.0243	30 x 60	14.06
18 oz.	.0243	30 x 96	22.5
18 oz.	.0243	30 x 120	28.13
18 oz.	.0243	36 x 96	27.0
18 oz.	.0243	36 x 120	33.75
20 oz.	.0270	24 x 96	20.0
20 oz.	.0270	30 x 60	15.63
20 oz.	.0270	30 x 96	25.0
20 oz.	.0270	30 x 120	31.25
20 oz.	.0270	34 x 64	22.14
20 oz.	.0270	36 x 96	30.0
20 oz.	.0270	36 x 120	37.5
20 oz.	.0270	42 x 96	35.0
22 oz.	.0297	36 x 96	33.0
24 oz.	.0323	24 x 96	24.0
24 oz.	.0323	24 x 120	30.0
24 oz.	.0323	30 x 60	18.75
24 oz.	.0323	30 x 96	30.0

(Continued)

Sizes other than listed may be furnished or may be slit from wider stock.

FLAT PLAIN COPPER SHEET

COLD ROLLED

In Exact Sizes as Listed

Continued

WEIGHT per Square Foot	THICKNESS in Inches	SIZE of Sheet in Inches	WEIGHT Lbs. per Sheet (Approx.)
24 oz.	.0323	30 x 120	37.5
24 oz.	.0323	36 x 96	36.0
24 oz.	.0323	36 x 120	45.0
26 oz.	.0350	36 x 96	39.0
28 oz.	.0377	30 x 96	35.0
28 oz.	.0377	36 x 96	42.0
32 oz.	.0431	20 x 96	26.7
32 oz.	.0431	24 x 96	32.0
32 oz.	.0431	30 x 60	25.0
32 oz.	.0431	30 x 96	40.0
32 oz.	.0431	30 x 120	50.0
32 oz.	.0431	36 x 96	48.0
32 oz.	.0431	36 x 120	60.0
36 oz.	.0485	30 x 96	45.0
36 oz.	.0485	36 x 96	54.0
36 oz.	.0485	36 x 120	67.5
38 oz.	.0512	30 x 60	29.69
38 oz.	.0512	30 x 96	57.0
40 oz.	.0539	30 x 96	50.0
40 oz.	.0539	36 x 96	60.0
48 oz.	.0647	24 x 96	48.0
48 oz.	.0647	30 x 60	37.5
48 oz.	.0647	30 x 96	60.0
48 oz.	.0647	36 x 96	72.0
48 oz.	.0647	36 x 120	90.0
6 lb.	.129	36 x 96	144.0

Sizes other than listed may be furnished or may be slit from wider stock.

ROLLED FLAT PRODUCTS—BRASS AND COPPER
WEIGHTS—POUNDS PER LINEAR FOOT

Thickness in Inches	WIDTH—IN INCHES					
	$\frac{1}{32}$		$\frac{1}{16}$		$\frac{1}{8}$	
	Yellow Brass	Copper	Yellow Brass	Copper	Yellow Brass	Copper
.001	.000115	.000121	.000230	.000242	.000459	.000484
.002	.000230	.000242	.000459	.000484	.000918	.000969
.003	.000344	.000363	.000688	.000727	.00138	.00145
.004	.000459	.000484	.000918	.000969	.00184	.00194
.005	.000574	.000606	.00115	.00121	.00230	.00242
.006	.000688	.000727	.00138	.00145	.00275	.00291
.007	.000803	.000848	.00161	.00170	.00321	.00339
.008	.000918	.000969	.00184	.00194	.00367	.00388
.009	.00103	.00109	.00207	.00218	.00413	.00436
.01	.00115	.00121	.00230	.00242	.00459	.00484
.02	.00230	.00242	.00459	.00484	.00918	.00969
.03	.00344	.00363	.00688	.00727	.0138	.0145
.04	.00459	.00484	.00918	.00969	.0184	.0194
.05	.00574	.00606	.0115	.0121	.0230	.0242
.06	.00688	.00727	.0138	.0145	.0275	.0291
.07	.00803	.00848	.0161	.0170	.0321	.0339
.08	.00918	.00969	.0184	.0194	.0367	.0388
.09	.0103	.0109	.0207	.0218	.0413	.0436
.1	.0115	.0121	.0230	.0242	.0459	.0484
.2	.0230	.0242	.0459	.0484	.0918	.0969
.3	.0344	.0363	.0688	.0727	.138	.145
.4	.0459	.0484	.0918	.0969	.184	.194
.5	.0574	.0606	.115	.121	.230	.242
.6	.0688	.0727	.138	.145	.265	.291
.7	.0803	.0848	.161	.170	.321	.339
.8	.0918	.0969	.184	.194	.367	.388
.9	.103	.109	.207	.218	.413	.436
$\frac{1}{4}$	.00179	.00189	.00359	.00379	.00717	.00757
$\frac{1}{32}$	.00359	.00379	.00717	.00757	.0143	.0151
$\frac{1}{16}$	.00717	.00757	.0143	.0151	.0287	.0303
$\frac{3}{32}$	.0108	.0114	.0215	.0227	.0430	.0454
$\frac{1}{8}$	.0143	.0151	.0287	.0303	.0574	.0606
$\frac{5}{32}$	.0179	.0189	.0359	.0379	.0717	.0757
$\frac{3}{16}$	.0215	.0227	.0430	.0454	.0861	.0908
$\frac{7}{32}$	.0251	.0265	.0502	.0530	.100	.106
$\frac{1}{4}$	.0287	.0303	.0574	.0606	.115	.121
$\frac{5}{16}$	.0359	.0379	.0717	.0757	.143	.151
$\frac{3}{8}$	.0430	.0454	.0861	.0908	.172	.182
$\frac{7}{16}$	.0502	.0530	.100	.106	.201	.212
$\frac{1}{2}$	.0574	.0606	.155	.121	.230	.242
1	.115	.121	.229	.242	.459	.484

FULLERTON—A WAREHOUSE OF METALS AND SERVICE

ROLLED FLAT PRODUCTS—BRASS AND COPPER
WEIGHTS—POUNDS PER LINEAR FOOT

Thickness in inches	WIDTH—IN INCHES					
	$\frac{3}{16}$		$\frac{1}{4}$		$\frac{5}{16}$	
	Yellow Brass	Copper	Yellow Brass	Copper	Yellow Brass	Copper
.001	.000688	.000727	.000918	.000969	.00115	.00121
.002	.00138	.00145	.00184	.00194	.00230	.00242
.003	.00207	.00218	.00275	.00291	.00344	.00363
.004	.00275	.00291	.00367	.00388	.00459	.00484
.005	.00344	.00363	.00459	.00484	.00574	.00606
.006	.00413	.00436	.00551	.00581	.00688	.00727
.007	.00482	.00509	.00643	.00678	.00803	.00848
.008	.00551	.00581	.00734	.00775	.00918	.00969
.009	.00620	.00654	.00826	.00872	.103	.109
.01	.00688	.00727	.00918	.00969	.0115	.0121
.02	.0138	.0145	.0184	.0194	.0230	.0242
.03	.0207	.0218	.0275	.0291	.0344	.0363
.04	.0275	.0291	.0367	.0388	.0459	.0484
.05	.0344	.0363	.0459	.0384	.0574	.0606
.06	.0413	.0436	.0551	.0581	.0688	.0727
.07	.0482	.0509	.0643	.0678	.0803	.0848
.08	.0551	.0581	.0734	.0775	.0918	.0969
.09	.0620	.0654	.0826	.0872	.103	.109
.1	.0688	.0727	.0918	.0969	.115	.121
.2	.138	.145	.184	.194	.230	.242
.3	.207	.218	.275	.291	.344	.363
.4	.275	.291	.367	.388	.459	.484
.5	.344	.363	.459	.484	.574	.606
.6	.413	.436	.551	.581	.688	.727
.7	.482	.509	.643	.678	.803	.848
.8	.551	.581	.734	.775	.918	.969
.9	.620	.654	.826	.872	1.03	1.09
$\frac{1}{4}$	.0108	.0114	.0143	.0151	.0179	.0189
$\frac{1}{2}$	.0215	.0227	.0287	.0303	.0359	.0379
$\frac{1}{4}$	.0430	.0454	.0574	.0606	.0717	.0757
$\frac{3}{32}$	.0645	.0681	.0861	.0908	.108	.114
$\frac{1}{8}$	.0861	.0908	.115	.121	.143	.151
$\frac{3}{16}$	.108	.114	.143	.151	.179	.189
$\frac{1}{2}$	.129	.136	.172	.182	.215	.227
$\frac{7}{32}$	.151	.159	.201	.212	.251	.265
$\frac{1}{4}$	.172	.182	.230	.242	.287	.303
$\frac{3}{16}$	.215	.227	.287	.303	.359	.379
$\frac{1}{8}$	.258	.273	.344	.363	.430	.454
$\frac{7}{16}$	.301	.318	.402	.424	.502	.530
$\frac{1}{2}$	.344	.363	.459	.484	.574	.606
1	.688	.727	.918	.969	1.15	1.21

ROLLED FLAT PRODUCTS—BRASS AND COPPER
WEIGHTS—POUNDS PER LINEAR FOOT

Thickness in Inches	WIDTH—IN INCHES					
	$\frac{3}{8}$		$\frac{7}{16}$		$\frac{1}{2}$	
	Yellow Brass	Copper	Yellow Brass	Copper	Yellow Brass	Copper
.001	.00138	.00145	.00161	.00170	.00184	.00194
.002	.00275	.00291	.00321	.00339	.00367	.00388
.003	.00413	.00436	.00482	.00509	.00551	.00581
.004	.00551	.00581	.00643	.00678	.00734	.00775
.005	.00688	.00727	.00803	.00848	.00918	.00969
.006	.00826	.00872	.00964	.0102	.0110	.0116
.007	.00964	.0102	.0112	.0119	.0129	.0136
.008	.0110	.0116	.0129	.0136	.0147	.0155
.009	.0124	.0131	.0145	.0153	.0165	.0174
.01	.0138	.0145	.0161	.0170	.0184	.0194
.02	.0275	.0291	.0321	.0339	.0367	.0388
.03	.0413	.0436	.0482	.0509	.0551	.0581
.04	.0551	.0581	.0643	.0678	.0734	.0775
.05	.0688	.0727	.0803	.0848	.0918	.0969
.06	.0826	.0872	.0964	.102	.110	.116
.07	.0964	.102	.112	.119	.129	.136
.08	.110	.116	.129	.136	.147	.155
.09	.124	.131	.145	.153	.165	.174
.1	.138	.145	.161	.170	.184	.194
.2	.275	.291	.321	.339	.367	.388
.3	.413	.436	.482	.509	.551	.581
.4	.551	.581	.643	.678	.734	.775
.5	.688	.727	.803	.848	.918	.969
.6	.826	.872	.964	1.02	1.10	1.16
.7	.964	1.02	1.12	1.19	1.29	1.36
.8	1.10	1.16	1.29	1.36	1.46	1.55
.9	1.24	1.31	1.45	1.53	1.65	1.74
$\frac{1}{4}$	.0215	.0227	.0251	.0265	.0287	.0303
$\frac{1}{2}$	.0430	.0454	.0502	.0530	.0574	.0606
$\frac{3}{8}$	.0861	.0908	.100	.106	.115	.121
$\frac{1}{2}$	.129	.136	.151	.159	.172	.182
$\frac{3}{8}$	.172	.182	.201	.212	.230	.242
$\frac{1}{2}$	.215	.227	.251	.265	.287	.303
$\frac{3}{8}$	.258	.273	.301	.318	.344	.363
$\frac{1}{2}$	.301	.318	.351	.371	.402	.424
$\frac{3}{4}$	.344	.363	.402	.424	.459	.484
$\frac{3}{8}$	.430	.454	.502	.530	.574	.606
$\frac{1}{2}$	.516	.545	.602	.636	.688	.727
$\frac{3}{4}$	.602	.636	.703	.742	.803	.848
$\frac{1}{2}$	.688	.727	.803	.848	.918	.969
1	1.38	1.45	1.61	1.70	1.84	1.94

FULLERTON—A WAREHOUSE OF METALS AND SERVICE

ROLLED FLAT PRODUCTS—BRASS AND COPPER
WEIGHTS—POUNDS PER LINEAR FOOT

Thickness in Inches	WIDTH—IN INCHES					
	3/16		5/16		11/16	
	Yellow Brass	Copper	Yellow Brass	Copper	Yellow Brass	Copper
.001	.00207	.00218	.00230	.00242	.00252	.00266
.002	.00413	.00436	.00459	.00484	.00505	.00533
.003	.00620	.00654	.00688	.00727	.00757	.00799
.004	.00826	.00872	.00918	.00969	.0101	.0107
.005	.0103	.0109	.0115	.0121	.0126	.0133
.006	.0124	.0131	.0138	.0145	.0151	.0160
.007	.0145	.0153	.0161	.0170	.0177	.0187
.008	.0165	.0174	.0184	.0194	.0202	.0213
.009	.0186	.0196	.0207	.0218	.0227	.0240
.01	.0207	.0218	.0230	.0242	.0252	.0266
.02	.0413	.0436	.0459	.0484	.0505	.0533
.03	.0620	.0654	.0688	.0727	.0757	.0799
.04	.0826	.0872	.0918	.0969	.101	.107
.05	.103	.109	.115	.121	.126	.133
.06	.124	.131	.138	.145	.151	.160
.07	.145	.153	.161	.170	.177	.187
.08	.165	.174	.184	.194	.202	.213
.09	.186	.196	.207	.218	.227	.240
.1	.207	.218	.230	.242	.252	.266
.2	.413	.436	.459	.484	.505	.533
.3	.620	.654	.688	.727	.757	.799
.4	.826	.872	.918	.969	1.01	1.07
.5	1.03	1.09	1.15	1.21	1.26	1.33
.6	1.24	1.31	1.38	1.45	1.51	1.60
.7	1.45	1.53	1.61	1.70	1.77	1.87
.8	1.65	1.74	1.84	1.94	2.02	2.13
.9	1.86	1.96	2.07	2.18	2.27	2.40
1/4	.0323	.0341	.0359	.0379	.0394	.0416
1/2	.0645	.0681	.0717	.0757	.0789	.0833
3/4	.129	.136	.143	.151	.158	.167
1/2	.194	.204	.215	.227	.237	.250
3/4	.258	.273	.287	.303	.316	.333
1	.323	.341	.359	.379	.394	.416
3/4	.387	.409	.430	.454	.473	.500
1	.452	.477	.502	.530	.552	.583
1 1/4	.516	.545	.574	.606	.631	.666
3/4	.645	.681	.717	.757	.789	.833
1	.775	.818	.861	.908	.947	.999
1 1/4	.904	.954	1.00	1.06	1.10	1.17
1/2	1.03	1.09	1.15	1.21	1.26	1.33
1	2.07	2.18	2.30	2.42	2.52	2.66

ROLLED FLAT PRODUCTS—BRASS AND COPPER
WEIGHTS—POUNDS PER LINEAR FOOT

Thickness in Inches	WIDTH—IN INCHES					
	$\frac{3}{4}$		$1\frac{1}{4}$		$\frac{7}{8}$	
	Yellow Brass	Copper	Yellow Brass	Copper	Yellow Brass	Copper
.001	.00275	.00291	.00298	.00315	.00321	.00339
.002	.00551	.00581	.00597	.00630	.00643	.00678
.003	.00826	.00872	.00895	.00945	.00964	.0102
.004	.0110	.0116	.0119	.0126	.0129	.0136
.005	.0138	.0145	.0149	.0157	.0161	.0170
.006	.0165	.0174	.0179	.0189	.0193	.0203
.007	.0193	.0203	.0209	.0220	.0225	.0237
.008	.0220	.0233	.0239	.0252	.0257	.0271
.009	.0248	.0262	.0269	.0283	.0289	.0305
.01	.0275	.0291	.0298	.0315	.0321	.0339
.02	.0551	.0581	.0597	.0630	.0643	.0678
.03	.0826	.0872	.0895	.0945	.0964	.102
.04	.110	.116	.119	.126	.129	.136
.05	.138	.145	.149	.157	.161	.170
.06	.165	.174	.179	.189	.193	.203
.07	.193	.203	.209	.220	.225	.237
.08	.220	.233	.239	.252	.257	.271
.09	.248	.262	.269	.283	.289	.305
.1	.275	.291	.298	.315	.321	.339
.2	.551	.581	.597	.630	.643	.678
.3	.826	.872	.895	.945	.964	1.02
.4	1.10	1.16	1.19	1.26	1.29	1.36
.5	1.38	1.45	1.49	1.57	1.61	1.70
.6	1.65	1.74	1.79	1.89	1.93	2.03
.7	1.93	2.03	2.09	2.20	2.25	2.37
.8	2.20	2.33	2.39	2.52	2.57	2.71
.9	2.48	2.62	2.69	2.83	2.89	3.05
$\frac{1}{4}$	.0430	.0454	.0466	.0492	.0502	.0530
$\frac{1}{2}$	.0861	.0908	.0932	.0984	.100	.106
$\frac{3}{8}$	.172	.182	.186	.197	.201	.212
$\frac{1}{2}$	.258	.273	.280	.295	.301	.318
$\frac{5}{8}$	.344	.363	.373	.394	.402	.424
$\frac{3}{4}$	.430	.454	.466	.492	.502	.530
$\frac{7}{8}$	.516	.545	.559	.590	.602	.636
$\frac{1}{2}$	.602	.636	.653	.689	.703	.742
$\frac{3}{4}$	.688	.727	.746	.787	.803	.848
$\frac{7}{8}$	.861	.908	.932	.984	1.00	1.06
$\frac{1}{2}$	1.03	1.09	1.12	1.18	1.20	1.27
$\frac{3}{4}$	1.20	1.27	1.31	1.38	1.41	1.48
$\frac{1}{2}$	1.38	1.45	1.49	1.57	1.61	1.70
1	2.75	2.91	2.98	3.15	3.21	3.39

FULLERTON—A WAREHOUSE OF METALS AND SERVICE

ROLLED FLAT PRODUCTS—BRASS AND COPPER
WEIGHTS—POUNDS PER LINEAR FOOT

Thickness in Inches	WIDTH—IN INCHES					
	1½		1		2	
	Yellow Brass	Copper	Yellow Brass	Copper	Yellow Brass	Copper
.001	.00344	.00363	.00367	.00388	.00734	.00775
.002	.00688	.00727	.00734	.00775	.0147	.0155
.003	.0103	.0109	.0110	.0116	.0220	.0233
.004	.0138	.0145	.0147	.0155	.0294	.0310
.005	.0172	.0182	.0184	.0194	.0367	.0388
.006	.0207	.0218	.0220	.0233	.0441	.0465
.007	.0241	.0254	.0257	.0271	.0514	.0543
.008	.0275	.0291	.0294	.0310	.0588	.0620
.009	.0310	.0327	.0330	.0349	.0661	.0698
.01	.0344	.0363	.0367	.0388	.0734	.0775
.02	.0688	.0727	.0734	.0775	.147	.155
.03	.103	.109	.110	.116	.220	.233
.04	.138	.145	.147	.155	.294	.310
.05	.172	.182	.184	.194	.367	.388
.06	.207	.218	.220	.233	.441	.465
.07	.241	.254	.257	.271	.514	.543
.08	.275	.291	.294	.310	.588	.620
.09	.310	.327	.330	.349	.661	.698
.1	.344	.363	.367	.388	.734	.775
.2	.688	.727	.734	.775	1.47	1.55
.3	1.03	1.09	1.10	1.16	2.20	2.33
.4	1.38	1.45	1.47	1.55	2.94	3.10
.5	1.72	1.82	1.84	1.94	3.67	3.88
.6	2.07	2.18	2.20	2.33	4.41	4.65
.7	2.41	2.54	2.57	2.71	5.14	5.43
.8	2.75	2.91	2.94	3.10	5.88	6.20
.9	3.10	3.27	3.30	3.49	6.61	6.98
¼	.0538	.0568	.0574	.0606	.115	.121
½	.108	.114	.115	.121	.230	.242
¾	.215	.227	.230	.242	.459	.484
¾	.323	.341	.344	.363	.688	.727
⅞	.430	.454	.459	.484	.918	.969
1	.538	.568	.574	.606	1.15	1.21
⅞	.645	.681	.688	.727	1.38	1.45
¾	.753	.795	.803	.848	1.61	1.70
½	.861	.908	.918	.969	1.84	1.94
⅞	1.08	1.14	1.15	1.21	2.30	2.42
¾	1.29	1.36	1.38	1.45	2.75	2.91
⅞	1.51	1.59	1.61	1.70	3.21	3.39
½	1.72	1.82	1.84	1.94	3.67	3.88
1	3.44	3.63	3.67	3.88	7.34	7.75

ROLLED FLAT PRODUCTS—BRASS AND COPPER
WEIGHTS—POUNDS PER LINEAR FOOT

Thickness in Inches	WIDTH—IN INCHES					
	3		4		5	
	Yellow Brass	Copper	Yellow Brass	Copper	Yellow Brass	Copper
.001	.0110	.0116	.0147	.0155	.0184	.0194
.002	.0220	.0223	.0294	.0310	.0367	.0388
.003	.0330	.0349	.0441	.0465	.0551	.0581
.004	.0441	.0465	.0588	.0620	.0734	.0775
.005	.0551	.0581	.0734	.0775	.0918	.0969
.006	.0661	.0698	.0881	.0930	.110	.116
.007	.0771	.0814	.103	.109	.129	.136
.008	.0881	.0930	.118	.124	.147	.155
.009	.0991	.105	.132	.140	.165	.174
.01	.110	.116	.147	.155	.184	.194
.02	.220	.223	.294	.310	.367	.388
.03	.330	.349	.441	.465	.551	.581
.04	.441	.465	.588	.620	.734	.775
.05	.551	.581	.734	.775	.918	.969
.06	.661	.698	.881	.930	1.10	1.16
.07	.771	.814	1.03	1.09	1.29	1.36
.08	.881	.930	1.18	1.24	1.47	1.55
.09	.991	1.05	1.32	1.40	1.65	1.74
.1	1.10	1.16	1.47	1.55	1.84	1.94
.2	2.20	2.23	2.94	3.10	3.67	3.88
.3	3.30	3.49	4.41	4.65	5.51	5.81
.4	4.41	4.65	5.88	6.20	7.34	7.75
.5	5.51	5.81	7.34	7.75	9.18	9.69
.6	6.61	6.98	8.81	9.30	11.0	11.6
.7	7.71	8.14	10.3	10.9	12.9	13.6
.8	8.81	9.30	11.8	12.4	14.7	15.5
.9	9.91	10.5	13.2	14.0	16.5	17.4
¼	.172	.182	.230	.230	.287	.303
½	.344	.363	.459	.484	.574	.606
¾	.688	.727	.918	.969	1.15	1.21
¾	1.03	1.09	1.38	1.45	1.72	1.82
¾	1.38	1.45	1.84	1.94	2.30	2.42
¾	1.72	1.82	2.30	2.42	2.87	3.03
¾	2.07	2.18	2.75	2.91	3.44	3.63
¾	2.41	2.54	3.21	3.39	4.02	4.24
¾	2.75	2.91	3.67	3.88	4.59	4.84
¾	3.44	3.63	4.59	4.84	5.74	6.06
¾	4.13	4.36	5.51	5.81	6.88	7.27
¾	4.82	5.09	6.43	6.78	8.03	8.48
½	5.51	5.81	7.34	7.75	9.18	9.69
1	11.0	11.6	14.7	15.5	18.4	19.4

FULLERTON—A WAREHOUSE OF METALS AND SERVICE

ROLLED FLAT PRODUCTS—BRASS AND COPPER
WEIGHTS—POUNDS PER LINEAR FOOT

Thickness in Inches	WIDTH—IN INCHES					
	6		7		8	
	Yellow Brass	Copper	Yellow Brass	Copper	Yellow Brass	Copper
.001	.0220	.0233	.0257	.0271	.0294	.0310
.002	.0441	.0465	.0514	.0543	.0588	.0620
.003	.0661	.0698	.0771	.0814	.0881	.0930
.004	.0881	.0930	.103	.109	.118	.124
.005	.110	.116	.129	.136	.147	.155
.006	.132	.140	.154	.163	.176	.186
.007	.154	.163	.180	.190	.206	.217
.008	.176	.186	.206	.217	.235	.248
.009	.198	.209	.231	.244	.264	.279
.01	.220	.233	.257	.271	.294	.310
.02	.441	.465	.514	.543	.588	.620
.03	.661	.698	.771	.814	.881	.930
.04	.881	.930	1.03	1.09	1.18	1.24
.05	1.10	1.16	1.29	1.36	1.47	1.55
.06	1.32	1.40	1.54	1.63	1.76	1.86
.07	1.54	1.63	1.80	1.90	2.06	2.17
.08	1.76	1.86	2.06	2.17	2.35	2.48
.09	1.98	2.09	2.31	2.44	2.64	2.79
.1	2.20	2.33	2.57	2.71	2.94	3.10
.2	4.41	4.65	5.14	5.43	5.88	6.20
.3	6.61	6.98	7.71	8.14	8.81	9.30
.4	8.81	9.30	10.3	10.9	11.8	12.4
.5	11.0	11.6	12.9	13.6	14.7	15.5
.6	13.2	14.0	15.4	16.3	17.6	18.6
.7	15.4	16.3	18.0	19.0	20.6	21.7
.8	17.6	18.6	20.6	21.7	23.5	24.8
.9	19.8	20.9	23.1	24.4	26.4	27.9
$\frac{1}{4}$	.344	.363	.402	.424	.459	.484
$\frac{1}{2}$	.688	.727	.803	.848	.918	.969
$\frac{1}{8}$	1.38	1.45	1.61	1.70	1.84	1.94
$\frac{3}{16}$	2.07	2.18	2.41	2.54	2.75	2.91
$\frac{1}{4}$	2.75	2.91	3.21	3.39	3.67	3.88
$\frac{5}{16}$	3.44	3.63	4.02	4.24	4.59	4.84
$\frac{3}{8}$	4.13	4.36	4.82	5.09	5.51	5.81
$\frac{7}{16}$	4.82	5.09	5.62	5.94	6.43	6.78
$\frac{1}{2}$	5.51	5.81	6.43	6.78	7.34	7.75
$\frac{5}{8}$	6.88	7.27	8.03	8.48	9.18	9.69
$\frac{3}{4}$	8.26	8.72	9.64	10.2	11.0	11.6
$\frac{7}{8}$	9.64	10.2	11.2	11.9	12.9	13.6
$\frac{1}{2}$	11.0	11.6	12.9	13.6	14.7	15.5
1	22.0	23.3	25.7	27.1	29.4	31.0

COPPER AND COPPER ALLOY PRODUCTS

COMMERCIAL WIDTH TOLERANCES—SLIT METAL (Flat or Coils)

All Tolerances this page plus and minus—if wanted all plus or minus, double the values given

Width in Inches	For Thicknesses Up to .032" Incl.	For Thicknesses Over .032" to .188" Incl.
Up to 2" Incl.	.005"	.010"
Over 2" to 8" Incl.	.008"	.013"
Over 8" to 14" Incl.	.010"	.015"
Over 14" to 20" Incl.	.013"	.018"

COMMERCIAL WIDTH TOLERANCES—SHEARED METAL

Width or Length	For Thicknesses Up to 1/16" Incl.	For Thicknesses Over 1/16" Incl. 1/8"	For Thickness Over 1/8"
Up to 20" Incl.	.032"	.046"	.0625"
Over 20" to 36" Incl.	.046"	.046"	.0625"
Over 36" to 120" Incl.	.0625"	.0625"	.0625"

COMMERCIAL WIDTH TOLERANCES

SAWED Metal—Lengths Up to 10' Incl.

Width in Inches	For Thicknesses Up to 1 1/2" Incl.	For Thicknesses Over 1 1/2"
Up to 12" Incl.	.032"	.0625"
Over 12"	.0625"	.0625"

STRAIGHTNESS TOLERANCES—SLIT METAL

(Maximum Edgewise Curvature—in any 6 foot portion of total length)

Width in Inches	
Up to 1/2" Incl. 3"	Over 2" to 5" Incl. 3/4"
Over 1/2" to 1" Incl. 1 1/4"	Over 5" 1/2"
Over 1" to 2" Incl. 3/4"	

CHEMICAL COMPOSITION—PHYSICAL PROPERTIES—WORKING AND WELDING CHARACTERISTICS OF ALLOYS

Alloy	Nominal Composition Per Cent		Density lb. per cu. in.	Melting Temperature (Liquidus) Deg. F.	Coefficient of Thermal Expansion Per° F. (Aver. 77° F. to 572° F.) $\times 10^6$	Thermal Conductivity Btu./sq. ft./hr./° F. at 88° F.	Electrical Conductivity % I.A.C.S. (Annealed) (1)	Modulus of Elasticity (Tension) 1,000,000 Psi	Approximate Relative Suitability for Being Worked	
	Copper	Zinc							Cold	Hot
COPPERS										
Oxygen-Free Pitch Copper.....	99.9+	—	0.323	1980	9.8	226	101	17	Excellent	Excellent
Oxygen-Free Copper.....	Substantially Pure Copper	—	0.323	1980	9.8	226	101	17	Excellent	Excellent
BRASSES										
Gliding, 95%.....	95	5	0.320	1950	10.0	135	56	17	Excellent	Good
Commercial Bronze, 90%.....	90	10	0.318	1910	10.2	109	44	17	Excellent	Good
Jewelry Bronze.....	87.5	12.5	0.317	1900	10.3	100	41	17	Excellent	Good
Red Brass, 85%.....	85	15	0.316	1880	10.4	92	37	17	Excellent	Good
Low Brass, 80%.....	80	20	0.313	1830	10.6	81	32	16	Excellent	Fair
Cartridge Brass, 70%.....	70	30	0.308	1750	11.1	70	28	16	Excellent	Fair
Yellow Brass.....	66	34	0.306	1710	11.3	67	27	15	Excellent	Poor
Muntz Metal.....	61	39	0.303	1670	11.6	71	28	15	Fair	Excellent
High-Leaded Brass.....	64	34	0.307	1690	11.3	67	26	15	Fair	Excellent
SPECIAL BRASSES										
Manganese Bronze (A).....	59	38.9	0.302	1630	11.8	61	24	15	Poor	Excellent
Naval Brass.....	60	39.25	0.304	1650	11.8	67	26	15	Fair	Excellent
PHOSPHOR BRONZES										
Phosphor Bronze, 5% (A).....	95	—	0.320	1920	9.9	47	18	16	Excellent	Poor
Leaded Phosphor Bronze (B).....	94	—	0.322	1920	9.9	47	18	16	Fair	Poor
Phosphor Bronze, 8% (C).....	92	—	0.318	1860	10.1	36	13	16	Good	Poor
Phosphor Bronze, 10% (D).....	90	—	0.317	1830	10.2	29	11	16	Good	Poor
444 Bronze.....	88	4	0.321	1850	9.6	47	18	16	Fair	Poor
NICKEL SILVERS										
Nickel Silver, 12%.....	64	24	0.314	1900	9.0	24	7	17	Excellent	Poor
Nickel Silver, 18% (A).....	65	17	0.316	2030	9.0	19	6	18	Excellent	Poor
Nickel Silver, 18% (B).....	55	27	—	—	—	—	—	—	—	—

(1) Listed values of electrical conductivity are average values for the annealed condition and are not to be used for minimum specification requirements. Corresponding values for cold worked tempers are slightly lower.

COPPER ALLOYS
APPLICABLE GOVERNMENT SPECIFICATIONS

Description	A. S. T. M.	S.A.E.	A.M.S.	FEDERAL
SHEETS and COILS				
Copper (Electrolytic)	B152ETP	71	4500C	QQC576
Gilding 95-5	B36 ALLOY 1			
Commercial Bronze 90-10	B36 ALLOY 2			
Jewelry Bronze 88-12				
Red Brass 85-15	B36 ALLOY 3	79 Gr. A		
Low Brass 80-20	B36 ALLOY 4			
Brass 70-30 (Cartridge)	B36 ALLOY 6	70 A & B	4505D	QQ611A Comp E
Brass 65-35 (Yellow)	B36 ALLOY 8	70 Gr. C		QQ611A Comp C
Muntz Metal 60-40				
Engravers (Leaded)	B121 ALLOY 4			
Phosphor Bronze Grade A	B103A ALLOY A	77A	4510C	QQB746A Comp A
Phosphor Bronze Grade C	B103A ALLOY C	77C		
Phosphor Bronze Grade D	B103C ALLOY D			QQB746A Comp D
Phosphor Bronze Grade E	B103D ALLOY E			
Nickel Silver 10%				
Nickel Silver 12%				
Nickel Silver 15%				
Nickel Silver 18%	B122 ALLOYS 2 & 4			QQN321 Comp A*

(* Applicable to Alloy 2 Only.)

AMPCO* METAL

"Ampco Metal" designates a series of aluminum bronze alloys of the high aluminum, high iron type, developed by Ampco Metal, Inc. to meet demands for high strength engineering bronzes possessing unusual properties. Available in several different grades, some of which have one or more heat-treated variations, these alloys cover a wide range of physical properties and offer a maximum flexibility of selection for any particular application. Ampco Metal possesses an inherent resistance to wear and performs well under excessive loads and other unfavorable conditions where other bronzes fail. The ability of Ampco alloys to resist corrosion, erosion and abrasion is being continually demonstrated in the chemical process, marine and other industries where such problems exist.

*Reg. U. S Pat. Off.

AMPCO METAL GRADE 8 SHEET AND PLATE

Ampco Metal, Grade 8 Sheet and Plate possess excellent resistance to corrosion which makes them ideally suited for fabrication, structural members, piping, fittings and essential counterparts employed primarily in the process and marine industries. Its inherent wear resistance properties make it well adapted for wear strips, ways, slides, gibs, wear plates and pedestal liners. This material combines toughness and ductility with the ability to "heal itself" under abrasive conditions.

For availability, see page 103.

Fullerton can shear or saw the above plates to your exact production or maintenance requirements. All plate $\frac{3}{8}$ " and over must be saw cut and will have sawed edges. Material $\frac{3}{8}$ " or thinner can be saw cut or sheared.

AMPCO METAL GRADE 24 STOCK DIE BLANKS

Ampco Metal, Grade 24 was first used exclusively as a forming and drawing die material. The phenomenal success of this alloy in these capacities led to its use as forming rolls, bending and wiping blocks. Having the good bearing properties and the ability to dissipate heat, characteristic of copper base alloys, combined with a unique intermetallic structure give this alloy the advantage of smooth, easy action when applied to dissimilar metals under great stresses and extreme pressures so prevalent in metal forming. Dies made of Ampco Metal, Grade 24 will allow clearances to remain more constant considerably longer. Scratching and galling are usually eliminated excluding the necessity of costly buffing and refinishing operations.

For availability, see page 104.

AMPCO METAL GRADE 22

The field of service of Ampco Grade 22 with few exceptions is limited to forming and/or drawing stainless steel, especially when runs are long or gauge is heavy, and it is essential that tolerances be maintained.

Availability upon application.

CHEMICAL PROPERTIES

	GRADE 8	GRADE 22
Copper	Balance	Balance
Aluminum	6.0—8.0	13.60—14.60
Iron	1.5—3.0	4.00— 5.25
Others	0.5 Max.	0.5 Max.

PHYSICAL PROPERTIES*

	GRADE 8	GRADE 22
Tensile Strength PSI**	71— 82	85
Yield Strength PSI**	30— 45	70
Elong. % in 2"	40	.5
Brinell Hardness (3000 KG)	140—159	331

*Average Values for rolled grades and cast grades 22.


**In thousands of pounds.

GOVERNMENT SPECIFICATIONS

Ampco Metal, Grade 8 Sheet and Plate: ASTM-B-169 Alloy D, Soft Temper;
MIL-B-15939, Comp. 5—Soft

AMPCO METAL GRADE 8 SHEET AND PLATE

THICKNESS	LBS. PER SQ. FT.	THICKNESS	LBS. PER SQ. FT.
$\frac{1}{32}$	1.33	$\frac{3}{4}$	30.25
$\frac{1}{16}$	2.53	$\frac{7}{8}$	35.31
.083	3.37	1	40.37
$\frac{3}{32}$	3.93	$1\frac{1}{8}$	45.37
.109	4.40	$1\frac{1}{4}$	50.53
$\frac{1}{8}$	5.10	$1\frac{3}{8}$	55.46
$\frac{5}{16}$	7.57	$1\frac{1}{2}$	60.50
$\frac{3}{8}$	10.09	$1\frac{3}{4}$	70.60
$\frac{7}{16}$	12.71	2	80.65
$\frac{1}{2}$	15.14	$2\frac{1}{4}$	90.75
$\frac{9}{16}$	17.71	$2\frac{1}{2}$	100.8
$\frac{5}{8}$	20.33	$2\frac{3}{4}$	110.9
$\frac{11}{16}$	22.76	3	121.0
$\frac{3}{4}$	25.20	$3\frac{1}{2}$	141.2



MAGNESIUM

**FLAT SHEET
TOOLING PLATE
TREAD PLATE**

INDEX

Description.....	Page 107
New Alloy Designations.....	Page 109
Physical and Chemical Properties.....	Page 110
Chemical Composition.....	Page 110
Forms of Rolled Magnesium.....	Page 112
Weight and Properties—	
Tooling Plate and Tread Plate.....	Page 113
Sheet and Plate.....	Page 114
Tolerances—	
Thickness.....	Page 116
Width.....	Page 116
Length.....	Page 116
Government Specifications.....	Page 118
Comparatives—Magnesium and Other Structural Materials—	
Weights and Properties.....	Page 120
Strength and Stiffness.....	Page 121
Machineability.....	Page 122
Sawing Processing.....	Page 123
Milling and Drilling.....	Page 124
Forming—Sheet and Extrusions.....	Page 125
Welding.....	Page 126
Magnesium in Contact with Various Chemicals.....	Page 128
Tooling Plate Applications.....	Page 130

MAGNESIUM, the world's lightest structural metal, is now stocked at Fullerton in the flat rolled forms of sheet, tread plate and tooling plate, as well as the extruded forms of rounds, squares, rectangles, tubing, angles, channels, I-Beams and welding rod.

Magnesium is only two-thirds the weight of aluminum, one-fourth the weight of steel and one-fifth the weight of brass, yet magnesium parts can be designed with a strength equal to or better than that of other metals with still a substantial saving in weight.

The production of magnesium is unique in that it is obtained from sea water, which is an inexhaustible source for the metal as opposed to a steady depletion of high grade ores of other structural metals. The vast quantities of magnesium in the ocean can be visualized by noting that the removal of one hundred million tons per year for a million years would only reduce the magnesium content from 0.13 to 0.12 percent.

Probably the best known characteristics of magnesium are its light weight, high strength to weight ratio and outstanding workability and machinability. Rolled magnesium can be formed by most of the common methods of metal working, including deep and shallow drawing, spinning, bending and pressing. This forming is usually carried out at elevated temperatures as it has several advantages over cold working. Parts can be formed in one operation without repeated annealing and redrawing steps thus reducing the time required to make a part and eliminating the need for more than one set of dies. Hot forming also greatly reduces or eliminates entirely the allowance for springback. Blanking and punching can be accomplished by conventional cold working methods and, in most cases, sawing can be done with standard woodworking tools and blades.

Magnesium's unsurpassed machinability warrants the metal's use where weight saving is not a factor but where a large amount of costly machining is required. Heavier depth of cuts and higher rates of feed are possible with longer tool life, than with other metals. Magnesium does not tear or drag during machining with resultant excellent surface finish and well broken chips which do not constrict the cutting tool or machine. The good machining characteristics of magnesium are evident in the fact that less power is required to remove a given amount of material than for any other structural metal.

Magnesium shows good stability to atmospheric exposure and resistance to attack by alkalis, chromic and hydrofluoric acids and many organic chemicals including hydrocarbons, aldehydes, alcohols, phenolic amines, esters and most oils. Magnesium is non-toxic. A characteristic important to workers processing the metal and to users considering applications involving contact with foodstuffs.

Magnesium sheet $\frac{1}{4}$ " and thinner is stocked in AZ31C-O and AZ31C-H24 tempers, annealed and hard rolled respectively, the temper selected is based on the type of forming to be applied and the strength and rigidity required in the final part.

AZ31B magnesium tooling plate is stocked in thicknesses ranging from $\frac{1}{4}$ " through 3". The growth of this product in industry as a tooling material has been outstanding. A full third lighter than aluminum and only one-fourth the weight of steel, it is ideally suited for jigs and fixtures where economy and ease of handling is a factor. This plate will not distort during machining as all the rolled-in stresses have been removed by oven flattening. This process also results in a guaranteed flatness of .005" in any one foot on material 1" and thinner and .010" on material over 1". The ease of welding of magnesium makes it particularly suitable for jigs and fixtures and the fine grain structure, free from porosity, makes a machined surface smooth enough for use without subsequent grinding or polishing operations. Typical applications for magnesium tooling plate include welding fixtures, tool holders, stretch forming dies, rubber pad form blocks, checking fixtures and gauges, vibration test fixtures, plastic dies and molds, and mechanical engraving plates.

Magnesium tread plate is rolled to the famous Inland "4-Way" safety design. The light weight of this product reduces worker fatigue, increases productivity and decreases hazards in handling heavy units. There is a place in every plant for magnesium tread plate. It is now being utilized for dockboards, loading ramps, scaffolding, removable decking, and platform trucks. The material is readily available from Fullerton stocks in thicknesses from $\frac{1}{8}$ " through 2", to six feet in width and sixteen feet in length.

Thus, the machinability, light weight, rigidity, impact resistance, high strength to weight ratio, and weldability, all have contributed to the growth of magnesium in commercial applications. Land and air transportation, material handling, industrial and business machines, portable tools, optical instruments, sporting goods, are all fields in which this metal has proven to be an unsurpassed engineering material. Magnesium is now well known in everyday life and the industry has a future of continued high expansion rate in both commercial and military uses.

We at Fullerton are proud to be associated with The Dow Chemical Company in this expansion and we are prepared to offer the services of ourselves and Dow in furnishing you with any information and technical assistance required to reap the benefits of this outstanding, light weight metal . . . **MAGNESIUM.**

NEW MAGNESIUM ALLOY DESIGNATIONS

Effective October 1, 1956

MILL PRODUCTS	NEW DESIGNATIONS	FORMER DESIGNATIONS
	AZ31B	FS1
	AZ31C	FS
	AZ61A	J1
	AZ80A	O1
	HK31A	Same
	M1A	M
	ZK60A	Same

These newly adopted magnesium alloy designations conform to American Society for Testing materials nomenclature. In the designation, the first two letters refer to the major alloying elements and the next two numerals refer to the percentage of the element in the alloy. As in the case of AZ31B; Aluminum and Zinc; 3% Aluminum and 1% Zinc.

PROPERTIES AND FORMS

nominal composition—per cent								physical properties					
form	Dow-metal	condition ¹	aluminum	zinc	manganese	rare earths	zirconium	magnesium	specific gravity (75°F)	density lb/cu in	melting point°F	thermal conductivity C.G.S. units (212-570°F)	electrical resistivity microhm-centimeters (68°F)
sheet ⁴	AZ31B & AZ31C	—F —H24 —O	3.0	1.0	—	—	—	re- main- der	1.77	0.064	1160	0.23	10.0
	M1A	—F —H24 —O	—	—	1.2	—	—	re- main- der	1.76	0.064	1200	0.30	5.0
	AZ31B-AZ31C	—F	3.0	1.0	—	—	—	re- main- der	1.77	0.064	1160	0.23	10.0
extruded bars, rods and solid shapes ⁵	AZ61A	—F	6.5	1.0	—	—	—	re- main- der	1.80	0.065	1145	0.19	12.5
	M1A	—F	—	—	1.2	—	—	re- main- der	1.76	0.064	1200	0.30	5.0
	AZ80A	—F —T5	8.5	0.5	—	—	—	re- main- der	1.80	0.065	1130	0.18	14.5
	ZK60A	—F —T5	—	5.7	—	—	0.55	re- main- der	1.83	0.066	1175	—	—
	AZ31B-AZ31C	—F	3.0	1.0	—	—	—	re- main- der	1.77	0.064	1160	0.23	10.0
extruded hollow shapes and tubing	AZ61A	—F	6.5	1.0	—	—	—	re- main- der	1.80	0.065	1145	0.19	12.5
	M1A	—F	—	—	1.2	—	—	re- main- der	1.76	0.064	1200	0.30	5.0
	ZK60A	—F —T5	—	5.7	—	—	0.55	re- main- der	1.83	0.066	1175	—	—

¹ Condition —T4=solution heat treated. —T6; —T61=solution heat treated and artificially aged. —O=annealed. —H24=hard rolled. —F=as fabricated. —T5=artificially aged.

² Unless otherwise indicated, values are typical.

³ Yield strength is defined as the stress at which the stress-strain curve deviates 0.2% from the modulus line.

CHEMICAL COMPOSITION

Dow-metal	Aluminum	Manganese min.	Zinc.	Zirconium	Rare Earths
AZ81A	7.0-8.1	0.13	0.4-1.0	—	—
AZ91C	8.1-9.3	0.13	0.4-1.0	—	—
C	8.3-9.7	0.10	1.6-2.4	—	—
EK30A	—	—	0.3 max.	0.2 min.	2.5-4.4
EK41A	—	—	0.3 max.	0.40-1.0	3.0-5.0
EZ33A	—	—	2.0-3.5	0.5 min.	2.5-4.0
AZ31C	2.5-3.5	0.20	0.6-1.4	—	—
AZ31B	2.5-3.5	0.20	0.7-1.3	—	—
H	5.3-6.7	0.15	2.5-3.5	—	—
AZ61A	5.8-7.2	0.15	0.4-1.5	—	—
M1A	—	1.20	—	—	—
AZ80A	7.8-9.2	0.15	0.2-0.8	—	—
R	8.3-9.7	0.13	0.4-1.0	—	—
RC	8.3-9.7	0.13	0.4-1.0	—	—
ZK60A	—	—	4.8-6.2	0.45 min.	—

OF MAGNESIUM ALLOYS

mechanical properties ²													
tensile strength 1000 psi		tensile yield strength ¹ 1000 psi		elongation in 2"—%		compressive yield strength 1000 psi		shear 1000 psi	bearing strength 1000 psi		hardness	condition ¹	
typ.	min.	typ.	min.	typ.	min.	typ.	min.		ult.	yield	Brinell	Rockwell E	
37	32	22	—	21	12	13	—	21	—	—	—	—	—F
42	39	32	29	15	4	26	24	23	72	47	73	83	—H24
37	32	22	15	21	12	16	12 ⁷	21	70	42	56	67	—O
33	28	—	—	—	8	—	—	—	—	—	—	—	—F
36	32	27	22	7	3	18	—	17	—	—	56	67	—H24
34	28	17	—	16	12	11	—	18	56	28	48	55	—O
38	35	29	22	15	10	14	12	19	56	33	49	57	—F
45	40	33	24	16	10	19	14	20	68	41	60	72	—F
37	32	26	—	11	3	12	—	18	51	28	44	45	—F
49	43	36	28	11	9	—	17	22	68	48	60	77	—F
55	48	40	33	7	4	35	28	24	—	—	82	88	—T5
49	13	38	31	14	5	33	27	27	80	57	75	84	—F
53	45	44	36	11	4	36	30	26	83	60	82	88	—T5
36	32	24	16	16	8	12	10	—	—	—	46	51	—F
41	36	24	16	14	7	16	11	—	—	—	50	60	—F
35	28	21	—	10	2	9	—	—	—	—	42	41	—F
46	40	34	28	12	5	25	20	—	—	—	75	84	—F
50	46	40	38	11	4	29	26	—	—	—	82	88	—T5

⁴ Properties apply to following thickness ranges: FSI-F and M-F=0.080—0.500"; FSI-H24=0.065—0.250"; FSI-O=0.064—0.250"; M-H24 and M-O=0.020—0.250".

⁵ The properties for bars, rods and solid shapes apply to extrusions with a minimum dimension of 1/4" to a 1 1/2" maximum. ZK60A properties are based on sections less than 2 sq. in. in cross-sectional area.

⁶ Permanent mold casting alloy only.

⁷ FSIW has minimum CYS of 10,000 psi.

OF MAGNESIUM ALLOYS

Calcium	Silicon max.	Copper max.	Nickel max.	Iron max.	Other Imp. Max.	Magnesium
—	0.3	0.10	0.01	—	0.3	Bal.
—	0.3	0.10	0.01	—	0.3	Bal.
—	0.3	0.10	0.01	—	0.3	Bal.
—	—	—	—	—	0.3	Bal.
—	—	—	—	—	0.3	Bal.
0.04 max.	0.3	0.10	0.03	—	0.3	Bal.
0.04 max.	0.3	0.05	0.005	0.005	0.3	Bal.
—	0.3	0.10	0.01	—	0.3	Bal.
—	0.3	0.05	0.005	0.005	0.3	Bal.
0.08-0.14	0.3	0.05	0.01	—	0.3	Bal.
—	0.3	0.05	0.005	0.005	0.3	Bal.
—	0.5	0.10	0.01	—	0.3	Bal.
—	0.5	0.3	0.01	—	0.3	Bal.
—	—	—	—	—	0.3	Bal.

FORMS OF ROLLED MAGNESIUM

Form	Size Range—Inches			Temper	Finish	Remarks
	Width	Length	Thickness			
Sheet	6 thru 48	60 thru 144	0.016 to 0.250 incl.	annealed, hard rolled, hot rolled	oiled, Chrome Pickled, acetic nitrate pickled	
Plate	24 thru 48	60 thru 144	0.251 and over	hot rolled, and hard rolled	oiled, Chrome Pickled, acetic nitrate pickled	
Tread plate	6 thru 48	36 thru 144	0.125 thru 0.625	annealed	Chrome Pickled, acetic nitrate pickled	Inland 4-way small pattern design
Coiled sheet	½ thru 12	35 ft. to 140 ft.	0.014 thru 0.064	hot rolled	as rolled or wire brushed	furnished in primary magnesium or Dowmetal FS1
Circles	12 to 48 diam- eter	—	all gauges up to 0.750	annealed, hard rolled, hot rolled	plain, oiled, Chrome Pickled, acetic nitrate pickled	sections cut from mill size squares of magnesium sheet and plate

COMMERCIAL GRADE—The compositions meet Dow standards for Commercial Grade materials. Mechanical properties of Commercial Grade sheet meet the minimum values of Specification Grade, but will not be reported.

ALLOYS—Dowmetal AZ31B, AZ31C and M1A are available as rolled magnesium products. Dowmetal AZ31B is given the "1" suffix to indicate controlled purity chemical composition. Dowmetal AZ31C is similar in composition to AZ31B except that it has a lower calcium content than AZ31B. The low Ca content gives the alloy better welding characteristics than AZ31B, but less cold formability and toughness.

FULLERTON—A WAREHOUSE OF METALS AND SERVICE

AZ31B MAGNESIUM TOOLING PLATE

Low Cost, Light Weight, Unsurpassed Machinability

AVAILABLE SIZES

Thickness— <i>inches</i>	Width— <i>inches</i>	Length— <i>inches</i>
0.250-2.000	24 thru 72	72 thru 288
2.001-3.000	24; 30 thru 60	72 thru 288

Maximum weight per single piece is 1800 lbs.

GUARANTEED FLATNESS

Thickness— <i>inches</i>	Deviation from flat— <i>inch</i>	
	In any 1 foot	In any 3 feet
0.250-1.000	0.005	0.015
1.001-3.000	0.010	0.030

TYPICAL MECHANICAL PROPERTIES

Thickness	TS— <i>psi</i>	TYS— <i>psi</i>	CYS— <i>psi</i>	Elong.— <i>%</i>
All gauges	35,000	19,000	10,000	12

COMPARATIVE WEIGHTS OF TOOLING MATERIALS

Lbs. Sq. Ft. in 1" Thickness

Magnesium.....	9.22
Aluminum.....	14.75
Cast Iron.....	36.87
Kirkosite.....	37.50

AZ31C MAGNESIUM TREAD PLATE

COMPARATIVE WEIGHTS
OF ALUMINUM, MAGNESIUM AND STEEL TREAD PLATE

Thickness (<i>inches</i>)	Approximate Weight per Sq. FT.— <i>LB</i>		Steel
	Magnesium	Aluminum	
1/8	1.3	1.9	6.2
3/16	1.9	2.8	8.7
1/4	2.5	3.7	11.2
5/16	3.1	4.6	13.8
3/8	3.6	5.5	16.4
1/2	4.8	7.3	21.5
5/8	6.0	9.2	29.9
3/4	7.2	10.0	29.4
2	19.2	29.2	85.5

**WEIGHTS FOR VARIOUS SIZES OF MAGNESIUM
SHEET AND PLATE**

	.016	.020	.025	.032	.040	.051	.064	.072	.081	.091
48x144	—	8.84	11.05*	14.15*	17.68*	22.56*	28.31*	31.84	35.83*	40.25*
48x120	—	7.37	9.21	11.79	14.73	18.80	23.59	26.54	29.85	33.54
48x96	—	5.89	7.37	9.43	11.78	15.04	18.87	21.23	23.88	26.83
48x72	—	4.42	5.52	7.07	8.84	11.28	14.15	15.92	17.91	20.12
48x60	—	3.68	4.60	5.89	7.36	9.40	11.79	13.27	14.92	16.77
42x144	—	7.74	9.67	12.30	15.40	19.70	24.8	27.4	31.3	35.2
42x120	—	6.45	8.06	10.30	12.90	16.40	20.6	22.9	26.1	29.3
42x96	—	5.16	6.45	8.25	10.30	13.20	16.5	18.3	20.9	23.5
42x72	—	3.87	4.83	6.19	7.74	9.87	12.4	13.7	15.7	17.6
42x60	—	3.22	4.03	5.16	6.45	8.22	10.3	11.4	13.0	14.7
36x144	—	6.63*	8.29	10.61	13.27	16.92	21.23	23.88	26.87	30.19
36x120	—	5.52	6.91	8.84	11.05	14.10	17.69	19.90	22.39	25.15
36x96	—	4.42	5.52	7.07	8.84	11.28	14.15	16.92	17.91	20.12
36x72	—	3.31	4.14	5.30	6.63	8.46	10.61	11.94	13.43	15.09
36x60	—	2.76	3.45	4.42	5.52	7.05	8.84	9.95	11.19	12.57
30x144	—	5.52	6.91	8.84	11.05	14.10	17.69	19.90	22.39	25.15
30x120	—	4.60	5.76	7.37	9.21	11.75	14.74	16.58	18.66	20.96
30x96	—	3.68	4.60	5.89	7.37	9.40	11.79	13.27	14.92	16.77
30x72	—	2.76	3.45	4.42	5.52	7.05	8.84	9.95	11.19	12.57
30x60	—	2.30	2.88	3.68	4.60	5.87	7.37	8.29	9.33	10.48
24x144	3.53	4.42	5.52	7.07	8.84	11.27	14.15	15.91	17.91	20.12
24x120	2.94	3.68	4.60	5.89	7.37	9.39	11.79	13.26	14.92	16.77
24x96	2.35*	2.94	3.68	4.71	5.89	7.51	9.43	10.60	11.94	13.41
24x72	1.76	2.21	2.76	3.53	4.42	5.63	7.07	7.95	8.95	10.06
24x60	1.47	1.84	2.30	2.94	3.68	4.69	5.89	6.63	7.46	8.38

*Mill Standard Sizes and Gauges normally carried in stock in our warehouse.

.102	.125	.156	.188	.250	.312	.375	.437	.500	.625	.750
45.12*	55.29*	69.00*	82.94*	110.59*	—	—	—	—	—	—
37.60	46.08	57.50	69.12	92.16	115.00	—	—	—	—	—
30.08	36.86	46.00	55.29	73.72	92.00	110.50	—	—	—	—
22.56	27.64	34.50	41.47	55.29	69.00	82.90	96.6	110.5	—	—
18.80	23.04	28.75	34.56	46.08	57.50	69.10	80.5	92.1	115.2	—
39.4	49.5	60.5	72.6	96.6	120.7	—	—	—	—	—
32.9	41.3	50.4	60.5	80.5	100.6	120.9	—	—	—	—
26.3	33.0	40.3	48.4	64.4	80.5	96.7	112.7	—	—	—
19.7	24.8	30.2	36.4	48.3	60.3	72.5	84.5	96.7	120.9	—
16.4	20.6	25.2	30.3	40.3	50.3	60.4	70.4	80.64	100.8	120.9
33.84	41.47	51.75	62.20	82.94	103.5	—	—	—	—	—
28.20	34.56	43.12	51.84	69.12	86.2	103.6	120.8	—	—	—
22.56	27.64	34.50	41.47	55.29	69.0	82.9	96.6	110.5	—	—
16.92	20.73	25.87	31.10	41.47	51.7	62.2	72.49	82.9	103.6	—
14.10	17.28	21.56	25.92	34.56	43.1	51.8	60.41	69.1	86.4	103.6
28.20	35.4	43.2	51.9	69.0	86.2	103.6	120.8	—	—	—
23.50	29.4	36.0	43.3	54.5	71.8	86.4	100.6	115.2	—	—
18.80	23.6	28.8	34.6	46.0	57.5	69.1	80.54	92.1	115.2	—
14.10	17.7	21.6	25.9	34.5	43.1	51.8	60.4	69.1	86.4	103.6
11.75	14.7	18.0	21.6	28.8	35.9	43.2	50.34	57.6	72.0	86.4
22.55	28.3	34.6	41.5	55.2	69.0	82.9	96.6	110.5	—	—
18.79	23.6	28.8	34.6	46.0	57.5	69.1	80.5	92.1	115.2	—
15.03	18.4	23.1	27.7	36.8	46.0	55.2	64.4	73.7	92.1	110.5
11.27	14.2	17.3	20.8	27.6	34.5	41.4	48.3	55.2	69.1	82.9
9.39	11.8	14.4	17.3	23.0	28.7	34.5	40.2	46.0	57.6	69.1

MAGNESIUM

THICKNESS TOLERANCES—SHEET AND PLATE

Specified Thickness Inches	Thickness Tolerance, Plus or Minus—Inch	
	Up to 36" Wide	36" Wide and Up
0.015-0.036	0.002	0.0025
0.037-0.050	0.0025	0.003
0.051-0.080	0.003	0.004
0.081-0.250	5% of sheet thickness	5% of sheet thickness
0.251-0.500	4% of sheet thickness	4% of sheet thickness
0.501-2.000	3% of sheet thickness	3% of sheet thickness

WIDTH TOLERANCES—SHEET AND PLATE

Thickness —Inches	Width Tolerance, Plus or Minus—Inch			
	18" Wide and Under	Over 18" Through 36" Wide	Over 36" Through 54" Wide	Over 54" Through 72" Wide
0.015-0.102	$\frac{1}{16}$	$\frac{3}{32}$	$\frac{1}{8}$	$\frac{3}{16}$
0.103-0.250	$\frac{3}{32}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{3}{16}$
0.251-0.500	$\frac{1}{8}$	$\frac{3}{32}$	$\frac{3}{16}$	$\frac{3}{8}$ (1)
0.501-1.000	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$ (1)
1.001-2.000	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{4}$ (1)

(1) Plus tolerance only.

For circular sections, width tolerances given above will apply to the diameter.

LENGTH TOLERANCES—SHEET AND PLATE

Thickness —Inches	Specification Grade Length Tolerance, Plus or Minus—Inches				
	18" Long and Under	Over 18" Through 48" Long	Over 48" Through 120" Long	Over 120" Through 180" Long	Over 180" Long
0.015-0.250	$\frac{1}{16}$	$\frac{3}{32}$	$\frac{1}{8}$	$\frac{3}{32}$	$\frac{1}{4}$
0.251-0.500	$\frac{1}{8}$	$\frac{3}{32}$	$\frac{3}{16}$	$\frac{7}{32}$	$\frac{1}{4}$
0.501-2.000	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$

Thickness —Inches	Standard Grade Length Tolerance, Plus—Inches				
	18" Long and Under	Over 18" Through 48" Long	Over 48" Through 72" Long	Over 72" Through 120" Long	Over 120" Long
0.015-2.000	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{2}$

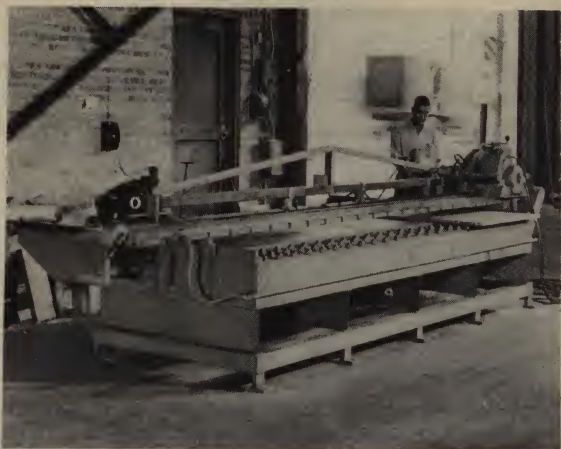


PLATE SAW



SAWING MAGNESIUM PLATE

MAGNESIUM SPECIFICATIONS

Government and various national society specifications pertaining to magnesium and its alloys are shown below. Letter or numerical suffixes designating revisions are omitted since the latest revision in effect at the time should always be used. The following abbreviations are used in the table:

Form	Dow-metal	MIL	Alloy	AMS	Alloy	SAE	ASTM	Alloy	Federal	Alloy
magnesium ingot and stick		MIL-M-20161					B92-52			
magnesium alloy ingot	A C G H M R AZ91B AZ91C						B93-52T B93-52T B93-52T B93-52T B93-52T B93-52T B93-52T B93-52T	AM80A AZ92A AM100A AZ63A M1B AZ91A AZ91B AZ91C		
sand castings	A C G H M AZ91C	MIL-M-8213	ZK51	4434 4420 ¹	AZ92 AZ63	500 50	B80-51T B80-51T B80-51T B80-51T B80-51T B80-51T	AM80A AZ92A AM100A AZ63A M1B AZ91C	QQ-M-56 QQ-M-56 QQ-M-56 QQ-M-56	AZ92 AZ63 M1 AZ91
permanent mold castings	C G			4484	AZ92	503 502	B199-51T B199-51T	AZ92A AM100A	QQ-M-55 QQ-M-55	AZ92 A10
die castings	R RC			4490	AZ91	501 501A	B94-52 B94-52	AZ91A AZ91B	QQ-M-38	
extruded round rods, bars and solid shapes	AZ31B AZ61A M1A AZ80A ZK60A	MIL-M-5354	ZK60A	4350 4352	AZ61A ZK60A	52 520 522 523	B107-49T B107-49T B107-49T B107-49T	AZ31B AZ61A M1A AZ80A	QQ-M-31 QQ-M-31 QQ-M-31 QQ-M-31	AZ31B AZ61A M1 AZ80A
extruded tubing	AZ31B AZ61A M1A					52 520 522	B217-49T B217-49T B217-49T	AZ31B AZ61A M1A	WW-T-825 WW-T-825 WW-T-825	
sheet	AZ31B M1A			4375 ² 4376 ² 4370	AZ31X AZ31X M1A	510 51	B90-51T B90-51T	AZ31A M1A	QQ-M-44 QQ-M-54	
forgings ³	AZ31B AZ61A M1A AZ80A			4358 4360	AZ61X AZ80A	53 531 533 532	B91-49T B91-49T B91-49T	TA54A AZ31B AZ61A AZ80A	QQ-M-40 QQ-M-40 QQ-M-40 QQ-M-40	TA54A AZ61A M1A AZ80A
welding rod	C AZ61A M1A	MIL-R-6944 MIL-R-6944 MIL-R-6944	B C A							

¹AMS4420—as cast, AMS4422—heat treated, AMS4424—heat treated and aged.

²AMS4376—annealed, AMS4376—strain hardened and partially annealed.

³Forgings should be made the subject of special inquiry.

MAGNESIUM

Federal—Federal Specifications, U. S. Govt. Bur. of Federal Supply Specifications.

MIL —Military Specifications, previously issued as Army-Navy Aeronautical, USAF, U. S. Army or U. S. Navy Specifications.

AMS —Aeronautical Material Specifications (of the Society of Automotive Engineers, Inc.)

SAE —Society of Automotive Engineers, Inc.

ASTM —American Society for Testing Materials

Process	MIL	U.S. Navy Bureau of Aeronautics	AMS	Federal
finishing and painting Aircraft and Parts, Cleaning Chemical Treatments Finishes and Coatings Materials: Enamel for Aircraft Lacquer Primer, Zinc Chromate Varnish, Spar for Aircraft	MIL-S-5002 MIL-M-3171 MIL-F-7179 MIL-E-7729 or MIL-E-5557 MIL-L-6805 or MIL-L-7178 MIL-P-6889 MIL-V-6894 or MIL-V-6893		2475	
heat treatment Sand Castings	MIL-H-6857			
impregnation—Aluminum and Magnesium Alloy Castings —Impregnants for —Process for Inspection Castings, Aircraft Structural Certification of X-Ray Labs. Fluorescent Penetrant Insp. Gen. Specs. for Insp. of Metals Identification—Castings Identification—Forgings Qual. Control of Aircraft and Assoc. Equip. X-Ray Inspection tolerances Extrusions—Bars, Rods, Shapes Extrusions—Tubing Sheet and Plate Sheet and Plate	MIL-I-6869 MIL-I-7878 MIL-C-6021 MIL-X-6141 MIL-I-6866 MIL-Q-5923 MIL-I-6865		2804 2808 2205 and 2211 2204 2212	QQ-M-151 QQ-M-31 WW-T-825 QQ-M-44 QQ-M-54
welding Arc Welding Gas Welding Qualif. of Welders Seam and Spot Welding Welding Flux	MIL-T-5021 MIL-W-6860 MIL-F-6943	PW-5 PW-5		

RELATIVE WEIGHTS OF STRUCTURAL METALS

Material	Specific gravity	Relative weight	Lb./cu. in.	Weight Lb./cu. in.
Magnesium alloys	1.8	1.0	0.065	112
Aluminum alloys	2.8	1.6	0.101	175
Zinc	7.1	3.9	0.256	443
Cast Iron	7.2	4.0	0.260	450
Tin	7.3	4.1	0.264	456
Steel	7.9	4.4	0.285	493
Brass	8.5	4.7	0.307	531
Bronze	8.8	4.9	0.318	550
Nickel	8.9	4.9	0.322	556
Copper	8.9	4.9	0.322	556
Lead	11.3	6.3	0.408	706

TYPICAL MECHANICAL PROPERTIES OF SOME STRUCTURAL METALS

Material	Tensile strength psi	Tensile yield strength psi	Elongation % in 2"
High strength low alloy steel	70,000	50,000	22
Magnesium AZ31B extrusions	38,000	26,000	15
6061-T5 aluminum extrusions	31,000	24,000	14
6061-T6 aluminum extrusions	45,000	39,000	15
Magnesium AZ31B sheet	37,000	22,000	21
3003-H14 aluminum sheet	21,000	18,000	16

COMPARATIVE STRENGTH AND STIFFNESS IN BENDING OF SOME STRUCTURAL METALS*

Comparison	Material	Thickness	(Bending) Strength**	Stiffness	Weight
for equal thickness	High strength low alloy steel	100	100	100	100
	Magnesium AZ31B extrusions	100	41	22	22.8
	6063—T5 aluminum extrusions	100	48	35	35.5
	6061—T6 aluminum extrusions	100	78	35	35.5
	Magnesium AZ31B sheet	100	38	22	22.8
	3003—H14 aluminum sheet	100	36	35	35.5
for equal strength	High strength low alloy steel	100	100	100	100
	Magnesium AZ31B extrusions	156	100	83.6	35.6
	6063—T5 aluminum extrusions	144	100	105	51.1
	6061—T6 aluminum extrusions	113	100	50.7	40.1
	Magnesium AZ31B sheet	162	100	93.5	37.0
	3003—H14 aluminum sheet	167	100	163	59.2
for equal stiffness	High strength low alloy steel	100	100	100	100
	Magnesium AZ31B extrusions	166	113	100	37.6
	6063—T5 aluminum extrusions	142	96.7	100	50.4
	6061—T6 aluminum extrusions	142	157	100	50.4
	Magnesium AZ31B sheet	166	104.8	100	37.6
	3003—H14 aluminum sheet	142	72.5	100	50.4
for equal weight	High strength low alloy steel	100	100	100	100
	Magnesium AZ31B extrusions	440	794	1878	100
	5063—T5 aluminum extrusions	282	382	782	100
	6061—T6 aluminum extrusions	282	620	782	100
	Magnesium AZ31B sheet	440	735	1878	100
	3003—H14 aluminum sheet	282	286	782	100

*Rectangular beams of constant width using high tensile low alloy steel (70,000 psi tensile strength—50,000 psi yield) as a basis of comparison.

**Based on the average of the tension and compression yield strength.

MAGNESIUM MACHINABILITY

Magnesium is free machining metal in the wrought as well as the cast form, allowing heavier depths of cut and higher rates of feed than other metals.

MACHINABILITY OF METALS

(Horsepower Per Cubic Inch of Metal Removed Per Minute)

Material	Drilling	Milling	Planing
Magnesium Alloy	0.20	0.28	0.13
Aluminum Alloy	0.31	0.40	0.27
Red Brass	0.40	0.44	0.30
Cast Iron (Hard)	0.52	0.70	0.52
Malleable Iron	0.60	1.01	0.60
SAE1020 Forged	1.18	1.25	0.88
Tool Steel (1.03% Carbon)	1.4	1.7	1.2
Nickel	2.3	1.9	1.6
Monel	1.5	1.8	1.7

Note: Same tool used for each metal in above tests. By proper design of tools, power for machining magnesium and aluminum can be considerably reduced.

SPEEDS, FEEDS AND DEPTHS OF CUT FOR TURNING AND BORING MAGNESIUM

Operation	Speed fpm	Feed ipr	Maximum depth of cut inches
roughing	300 to 600	0.030 to 0.100	0.500
	600 to 1000	0.020 to 0.080	0.400
	1000 to 1500	0.010 to 0.060	0.300
	1500 to 2000	0.010 to 0.040	0.200
	2000 to 5000	0.010 to 0.030	0.150
finishing	300 to 600	0.005 to 0.025	0.100
	600 to 1000	0.005 to 0.020	0.080
	1000 to 1500	0.003 to 0.015	0.050
	1500 to 2000	0.003 to 0.015	0.050
	2000 to 5000	0.003 to 0.015	0.050

MAGNESIUM SAWING

Magnesium is readily cut with band or circular saws as well as with hand or power hacksaws. Because of the low cutting pressure, larger cuts can be taken per tooth than are possible with other metals. This fact requires larger chip spaces to permit saws to remain free cutting. Too small a tooth pitch or chip space causes the saw to ride over the work and rapidly dulls the teeth. The set of the teeth on band and hacksaws must be relatively large, but no set is recommended for circular saw teeth. The relief angles on circular saw teeth must be adequate to minimize friction. Special teeth profiles developed to give better cutting action to circular saws work satisfactorily on magnesium. Recommendations for tooth spacing, set and angles for various types of saws are given in the table below.

SAWS FOR USE ON MAGNESIUM

SAW ELEMENT	Type of saw				
	circular saw		band saw	power hacksaw	hand hacksaw
	straight teeth	beveled teeth			
pitch-in teeth/inch	½-4	½-4	4-6	2-6	12-18
tooth set inches	NONE	NONE	0.02-0.05	0.015-0.03	—
end relief angle	9-11°	9-11°	10-12°	—	—
side relief angles	1-1½°	1-1½°	—	—	—
clearance angle	20-30°	20-30°	20-30°	20-30°	20-30°
rake angle	15-20°	15-20°	—	—	—

SPEEDS, FEEDS AND DEPTHS OF CUT FOR MILLING MAGNESIUM

A wide variety of feeds and depths of cut are possible, therefore, only general recommendations based on industrial experience can be made. Recommended feeds and depths of cut are listed below. Heating of the work can be minimized by heavy roughing cuts followed by fine finish cuts at maximum speed. Mirror-like finishes can be obtained on milled magnesium surfaces.

Operation	Speed fpm	Feed		Depth of cut inches
		in./min.	in./tooth	
roughing	up to 900	10 to 50	0.005 to 0.025	up to 0.500
	900 to 1500	10 to 50	0.005 to 0.020	up to 0.375
	1500 to 3000	15 to 75	0.005 to 0.010	up to 0.200
finishing	up to 900	10 to 50	0.005 to 0.015	up to 0.075
	1000 to 3000	10 to 70	0.004 to 0.008	0.005 to 0.050
	3000 to 5000	10 to 90	0.003 to 0.006	0.003 to 0.030
	5000 to 9000	10 to 120	0.002 to 0.005	0.003 to 0.030

SPEEDS AND FEEDS FOR DRILLING MAGNESIUM

The feeds used in drilling magnesium should be heavier than those for other metals in order to secure proper chip formation. Small drills work best with light feeds, as they give slightly coiled or ribbon-like chips which feed out through the drill flutes without jamming. Heavier feeds should be used on large drills to prevent jamming of the chips. The table below lists the approximate feeds to be used with various diameter drills. Chips formed at these feeds have a minimum bulk and are removed easily even from deep holes. Wide deviations from the recommended feeds are allowable when drilling shallow holes, but the recommendations for deep hole drilling should be closely followed for best results.

Drill diameter inches	Speed fpm	Feed—ipr		
		sheet	shallow holes	deep holes
¼	300	0.005 to 0.030	0.004 to 0.030	0.004 to 0.008
½	to	0.010 to 0.030	0.015 to 0.040	0.012 to 0.020
1	2000	0.010 to 0.030	0.020 to 0.050	0.015 to 0.030

MAGNESIUM
SUGGESTED EXTRUSION FORMABILITY LIMITS

Alloy*	Typ. Bend Rad. Room Temp.	SUGGESTED LIMITS	
		Time & Temp.	Typ. Bend Rad.
AZ61A-F	1.9t	1 hr. at 550°F	1t
AZ80A-F	2.4t	½ hr. at 550°F	.7t
AZ31B-F	2.4t	1 hr. at 550°F	1.5t
M1A-F	4.8t	1 hr. at 700°F	2t
AZ80A-T5	8.3t	1 hr. at 380°F	1.7t
ZK60A-F	12t	½ hr. at 550°F	2t
ZK60A-T5	12t	½ hr. at 400°F	6.6t

*0.090" x 0.875" Extruded Flat Strip.

SUGGESTED LIMITS FOR PRODUCTION TUBE BENDING

Alloy	Forming Temp.	Bend* Radius	Alloy	Forming Temp.	Bend Radius
AZ31B	Room	4D	M	Room	6D
AZ31B	200°F	3D	M	400°F	4D
AZ61A	Room	4D	ZK60A-F	Room	5D
AZ61A	200°F	3D			

D = Tube O.D.

*Bend radius to axis of tube.

**SUGGESTED MAXIMUM FORMING TEMPERATURES
FOR WROUGHT MAGNESIUM**

Sheet			Extrusions		
Alloy	Temperature	Time	Alloy	Temperature	Time
AZ31B-0	550°F	1 hr.	J1-F	550°F	1 hr.
AZ31B-H24	325°F	1 hr.	FS1-F	550°F	1 hr.
M1A-0	700°F	1 hr.	M-F	700°F	1 hr.
			01-F	550°F	½ hr.
			01-T5	380°F	1 hr.
			ZK-60A-F	550°F	½ hr.
			ZK60A-T5	400°F	½ hr.

DATA FOR MANUAL ARC WELDING OF MAGNESIUM

Material Thickness (Inches)	Number of Passes	Welding Current* In Amperes		Electrode Diameter (Inches)		Welding Rod Diameter (Inches)	Gas Flow (cu. ft./min.)	
		Dowmetal FS1	Dowmetal M	AC	DC		Argon	Helium
0.040	1	35	45	3/32	3/32	1/8	0.2	0.4
0.064	1	50	60	3/32	1/8	1/8	0.2	0.4
0.081	1	65	80	1/8	1/8	1/8	0.2	0.4
0.102	1	85	100	1/8	3/16	1/8	0.3	0.5
0.128	1	100	115	1/8	3/16	3/32	0.3	0.6
0.188	1	140	160	3/16	5/16	3/32	0.3	0.6
0.188	2	100	100	1/8	3/16	3/32	0.3	0.6
0.250	1	180	200	3/16	3/8	3/16	0.3	0.8
0.250	2	115	125	1/8	1/4	3/32	0.3	0.6
0.375	1	250	270	3/16	—	3/16	0.4	0.8
0.375	2	140	160	3/16	3/16	3/16	0.3	0.8
0.500	2	310	330	1/4	—	3/16	0.4	0.8
0.750	2	420	450	3/8	—	1/4	0.6	1.2

*current values given for welding with a backing plate and for making fillet welds. Slightly lower current values used for welding without a backing plate and for making corner or edge joints.

MAGNESIUM WELDING ROD.

Dow-Metal	Melting Point °F.	Color Identification	Uses		
			Sheet and Plate	Extrusions	Castings
C1	1110	Orange	FS1	01	H, C, AZ91C
H1	1135	Green	—	—	H
J1	1145	Gray	—	FS1, J1	—
M	1200	Yellow	M	M	—

Available Sizes: Straight Rods—36" long

Coiled Rods —Coil weight is approximately 7 pounds up to and including 1/8". Coils of larger diameter wire weigh about 14 pounds. Coil I.D. is about 10".

Diameters —1/16", 3/32", 1/8", 3/16", 1/4".

DATA FOR MACHINE ARC WELDING ¹

Material Thickness (Inches)	Welding ² Current (Amperes)	Welding ² Speed (In./Min.)	Electrode Diameter ² (Inches)		Welding Rod Diameter (Inches)	Welding Rod Speed (In./ Min.)
			AC	DC		
0.040	55	20	3/32	1/8	3/32	12
0.064	75	18	3/32	1/8	3/16	20
0.081	95	17	1/8	3/16	3/32	24
0.102	115	16	1/8	3/16	1/8	14
0.128 ³	150	14	1/8	1/4	1/8	17
0.188	250	12	3/16	—	1/8	24
0.250	350	10	1/4	—	1/8	28
0.375	450	8	1/4	—	3/32	28
0.500	550	6	3/16	—	3/32	24

(1) data for machine welds made on square butt joints with backing plates and hold down bars, gas flow slightly greater than that used for manual welding of equivalent material thicknesses because of faster welding speeds.

(2) approximate current values and welding speeds only. Lower welding currents and slower speeds may be more desirable when welding with dc.

(3) maximum thickness recommended for welding with dc.

MAGNESIUM IN CONTACT WITH VARIOUS CHEMICALS

Column A gives the concentration of the chemical in per cent. Concentrations of less than 100% refer to aqueous solutions.

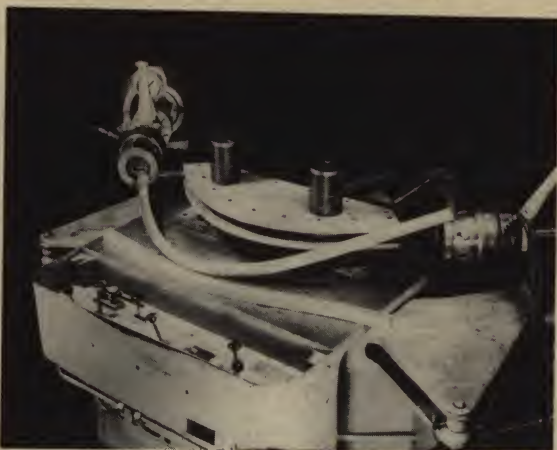
Column B indicates whether or not trial under actual operating conditions is warranted. A "yes" in this column does not mean that magnesium is recommended for use in contact with a particular substance, but rather that laboratory tests showed enough promise to warrant a service test.

Chemical	A	B	Chemical	A	B
Acetaldehyde	Any	No	Coumarin	100	Yes
Acetic Acid	Any	No	Cresol	100	Yes
Acetone	Any	Yes	Cyanides (Most)	Any	Yes
Acetylene	100	Yes	Dichlorhydrin	100	Yes
Acid Salts	Any	No	Dichlorphenol	100	Yes
Alcohol, Butyl	100	Yes	Dichromates (See Bichromates)		
Alcohol, Ethyl	100	Yes	Diethanolamine	100	Yes
Alcohol, Isopropyl	100	Yes	Diethyl Aniline	100	Yes
Alcohol, Methyl	100	No	Diethyl Benzene	100	Yes
Alcohol, Propyl	100	Yes	Diethylene Glycol Solutions	Any	Yes
Alum	Any	No			inhibitors
Ammonia (Gas or Liquid)	100	Yes			may be
Ammonium Salts (Most)	Any	No			required
Ammonium Hydroxide	Any	Yes	Diphenyl	100	Yes
Aniline	100	Yes	Diphenylamine	100	Yes
Anthracene	100	Yes	Diphenylmethane	100	Yes
Arsenates (Most)	Any	Yes	Diphenyl Oxide	100	Yes
Asphaltum	100	Yes	Dipropylene Glycol	100	Yes
Beer	100	No	Dry Cleaning Fluids	100	Yes
Beeswax	100	Yes	Ethers	100	Yes
Benzaldehyde	Any	No	Ethanolamine (mono)	100	Yes
Benzene	100	Yes	Ethyl Acetate	100	Yes
Bichromates	Any	Yes	Ethyl Benzene	100	Yes
Bleaching Solutions	Any	No	Ethyl Bromide	100	Yes
Borax Solutions	1-3	Yes	Ethyl Chloride	100	Yes
Boric Acid	1-5	No	Ethyl Salicylate	100	Yes
Brake Fluids (Most)	100	Yes	Ethylene Bromide	100	Yes
Bromides	Any	No	Ethylene Glycol Solutions	Any	Yes
Butter	100	No			inhibitors
Calcium Arsenate	Any	Yes			may be
Calcium Hydroxide	100	Yes			required
Camphor	100	Yes	Fats, Cooking (Acid free)	100	Yes
Carbon Bisulphide	100	Yes	Fatty Acids	Any	No
Carbon Dioxide (Dry)	100	Yes	Fluorides (Most)	Any	Yes
Carbon Monoxide	100	Yes	Fluorine	100	Yes
Carbon Tetrachloride	100	Yes	Fluosilicic Acid	Any	No
Carbonated Water	Any	No	Formaldehyde	Any	Yes
Castor Oil	100	Yes	Fruit Juices and Acids	Any	No
Cellulose	100	Yes	Gas (Natural)	100	Yes
Cement	100	Yes	Gasoline (Lead Free)	100	Yes
Chloral	Any	No			if inhibited
Chlorides (Most)	Any	No	Gasoline (Leaded)	100	Yes
Chloroform	100	Yes			if inhibited
Chromates (Most)	Any	Yes	Gelatine	Any	Yes
Chromic Acid (Pure)	Any	Yes	Glue (Casein)	Any	Yes
Citronella Oil	100	Yes	Glycerine C.P.	100	Yes
Cod Liver Oil (Crude)	—	Yes	Grease (Acid Free)	100	Yes
Copal	100	Yes	Heavy Metal Salts (Most)	Any	No

**MAGNESIUM IN CONTACT WITH
VARIOUS CHEMICALS (Continued)**

Chemical	A	B	Chemical	A	B
Hexamine	3	Yes	Phosphoric Acid	Any	No
Hydrocarbons	100	Yes	Potassium Fluoride	Any	Yes
Hydrochloric Acid	Any	No	Potassium Hydroxide	Any	Yes
Hydrofluoric Acid	5-60	Yes	Potassium Nitrite	Any	No
Hydrogen Peroxide	Any	No	Potassium Permanganate	Any	Yes
Hydrogen Sulfide	100	Yes	Pyridine (Acid free)	100	Yes
Ink, Dye	100	Yes	Pyrogallol	Any	No
Ink, Iron	100	No	Refrigerants (Dry)	100	Yes
Iodides	Any	No	Rubber & Rubber Cements	100	Yes
Iodine Crystals (Dry)	100	Yes	Sea Water	100	No
Isopropyl Acetate	100	Yes	Soda Lime	3	Yes
Isopropyl Benzene	100	Yes	Sodium Carbonate	Any	Yes
Kerosene	100	Yes	Sodium Chloride	Any	No
Lanolin	100	Yes	Sodium Cyanide	Any	Yes
Lard	100	Yes	Sodium Dichromate	Any	Yes
Lead Arsenate	Any	Yes	Sodium Fluoride	Any	Yes
Lead Oxide	Any	No	Sodium Hydroxide (Pure)	Any	Yes
Linseed Oil	100	Yes	Sodium Phosphate (Tribasic)	Any	Yes
Magnesium Arsenate	Any	Yes	Sodium Silicate (Water Glass)	Any	Yes
Mercury Salts	Any	No	Sodium Sulfide	3	Yes
Methyl Bromide (Dry)	100	Yes	Sodium Tetraborate (Borax)	3	Yes
Methyl Chloride	100	Yes	Steam	100	No
Methylene Chloride	100	Yes	Stearic Acid (Dry)	100	Yes
Milk (Fresh & Sour)	100	No	Styrene Polymer	100	Yes
Mineral Acids	Any	No	Sugar Solutions (Acid free)	Any	Yes
Monobrom Benzene	100	Yes	Sulphates (Most)	Any	No
Monochlorobenzene	100	Yes	Sulphur	100	Yes
Naphtha	100	Yes	Sulphur Dioxide (Dry)	100	Yes
Naphthalene	100	Yes	Sulphuric Acid	Any	No
Nicotine Sulphate	40	Yes	Sulphurous Acid	Any	No
Nitrates (All)	Any	No	Tannic Acid	3	No
Nitrous Gases	100	No	Tanning Solutions	Any	No
Nitric Acid	Any	No	Tar	100	Yes
Nitroglycerin	Any	No	Tar, Crude & Its Fractions	100	Yes
Oil, Animal— (Acid & Chloride free)	Any	Yes	Tartaric Acid	Any	No
Oil, Mineral—(Chloride free)	100	Yes	Tetrahydronaphthalene	100	Yes
Oil, Vegetable—(Chloride free)	100	Yes	Titanium Tetrachloride	100	Yes
Oleic Acid	100	Yes	Toluene (Toluol)	100	Yes
Olive Oil	100	Yes	Trichlorobenzene	100	Yes
Organic Acids (Most)	Any	No	Trichlorethylene	100	Yes
Orthochlorphenol	100	No	Tung Oil	100	Yes
Orthodichlorobenzene	100	Yes	Turpentine	100	Yes
Orthophenyl Phenol	100	Yes	Urea	100	Yes
Oxygen	100	Yes	Urea in Aqueous Solution—(Cold)	Any	Yes
Para Phenyl Phenol	100	Yes	Urea in Aqueous Solution—(Warm)	Any	No
Paradichlorobenzene	100	Yes	Vinegar	Any	No
Perchloroethylene	100	Yes	Vinylidene Chloride	100	Yes
Permanganates (Most)	Any	Yes	Water, Boiling	100	No
Petroleum Products—(Chloride free)	100	Yes	Water, Distilled	100	Yes
Phenol (Carbolic Acid)	100	Yes	Water, Rain	100	Yes
Phenols	100	Yes	Water, Tap	100	No
Phenyl Ethyl Acetate	100	Yes	Waxes—(Acid Free)	100	Yes
Phosphates (Most)	Any	Yes	Xylol	100	Yes

TOOLING PLATE APPLICATIONS



Laminated Stretch Die

This is stretch die of laminated magnesium tooling plate, which is being used here in a fabricating plant to form a 635 channel extrusion for a van trailer. Tooling plate is sufficiently flat without machining. The easy sawing and machining makes the cheapest of metal dies. Aluminum extrusions stretched on aluminum plate dies results in galling, but none occurs when stretched on magnesium.



Radar Parabola Check Fixture

This is typical of the type of inspection equipment used in the military electronic plants. Easy machinability, dimensional stability, and lightness are advantages which make magnesium a desirable material for such fixtures.



Spotwelding Fixture

Spotwelding fixtures hold the parts to be spotwelded in position until joined. The operator must pick up the fixture and parts and hold them in position at the machine, therefore the lightest weight possible is desired to reduce labor costs. Magnesium's weldability and machinability makes it an economical material for use in such fixtures.



Base for Arc Welding Fixture

The as-rolled surface flatness supplied on magnesium tooling plate has been more than adequate to allow its use as a base surface from which to build welding fixtures such as this one in Dow's fabrication plant. It is used to weld up a frame sub-assembly for a large electronic cabinet. This eliminates costly planing operations necessary to obtain the required flatness on other metal base plates. Faster permissible drilling and the use of air driven taps saves approximately three-fourths of the time required to do the operations on steel bases. Such large fixtures are also easier to move around in fabrication and in use.



STAINLESS STEEL

**FLAT SHEET
STRIP
PLATE**

INDEX

Description and Usage	Page 135
Size, finish, temper and tolerances	Page 136
Chemical Composition	Page 137
Weights—	
Type 302 and 304 Sheet	Page 138
Type 316 Sheet	Page 140
Type 430 Sheet	Page 140
Theoretical Weights—Sheet	Page 141
Stainless Steel Strip—Description	Page 141
Theoretical Weights—Plate	Page 142
Cold Rolled Strip—Thickness Tolerances	Page 142
Physical Properties	Page 143
Mechanical Properties	Page 144
Government Specifications	Page 145
Corrosion Resistance Data	Page 146

STAINLESS STEEL SHEET and STRIP

Stainless steels cover a wide range of chemical compositions and alloys; however, they may be divided broadly into three groups according to chemical compositions and metallurgical characteristics: austenitic, ferritic and martensitic.

AUSTENITIC: Contains nickel exceeding about 7% and chromium exceeding about 17%. Non-magnetic, non-heat-treatable. Hardened by cold working. Typical types: 201, 202, 301, 302, 304, 309, 310, 321, 347.

FERRITIC: Contains chromium in excess of 14%. Magnetic. Hardens only slightly by quenching and only moderately by cold working. Typical types: 405, 430, 446.

MARTENSITIC: Contains chromium to 14% maximum. Ferritic in annealed condition but martensitic after heating and cooling through critical range. Magnetic. Hardenable by heat treatment. Typical types: 410, 420.

USES OF STAINLESS STEEL SHEET and STRIP

Types 201 & 202: Recently developed alloys designed to conserve the use of nickel. The mechanical, physical and corrosion-resisting properties closely parallel those of Types 301 and 302, resulting in similar end usage.

Type 301: High strength alloy slightly less corrosion resistant than 302. Used for automotive trim, cooking utensils, ash trays, refrigeration units, transportation.

Type 302: All purpose alloy. Used for dairy, chemical, paper and textile industry equipment. Wide range of other uses in commercial, industrial and architectural applications.

Type 304: Lower in carbon content than 302, reducing intergranular corrosion after heating to 800° to 1650° F. Used for welded construction in dairy, chemical and paper industries.

Types 309 & 310: Heat resistant grades. Used for high temperature service in furnace parts, annealing boxes, and jet engines.

Type 316: Improved corrosion resistant grade. Wide usage in chemical, paper and textile industries. Also in industries where resistance to corrosion of sea water and brine solutions is required.

Types 321 & 347: Stabilized grades for use where continuous use at high temperatures is required or where post welding annealing is not feasible. Used in jet engine, aircraft parts, guided missiles and high temperature industrial applications.

Type 430: Straight chrome grade. Most economical of all stainless grades. Used for automotive trim, architectural applications, flatware and bar and restaurant equipment components.

STAINLESS STEEL SHEET

Definitions

Sizes: .010" to .1874" in thickness, 24" to 84" in width, up to 260" in length.

Finishes:

- No. 1** — Hot rolled, annealed and pickled.
- No. 2D** — Dull cold rolled.
- No. 2B** — Bright cold rolled.
- No. 4** — Standard polish—one or both sides.
- No. 6** — Tampico brushed. Soft, velvety lustre.
- No. 7** — High lustre polish.
- No. 8** — Mirror finish.

Temper: Fully annealed condition for maximum formability.

Availability: Warehouse stocks of types 302, 304, 316 and 430. All other types available on mill order basis.

Tolerances:

Thickness—	Ordered Thickness, Inch	Tolerance Plus or Minus, Inch	Ordered Thickness, Inch	Tolerance Plus or Minus, Inch
	.005.....	.001	.073 to .083.....	.007
	.006 to .007...	.0015	.084 to .098.....	.008
	.008 to .0160...	.002	.099 to .114.....	.009
	.0161 to .026...	.003	.115 to .130.....	.010
	.027 to .040...	.004	.131 to .145.....	.012
	.041 to .058...	.005	.146 to .176.....	.014
	.059 to .072...	.006		

Width:—48" and under..... $+1/16"$, -0"
 Over 48"..... $+1/8"$, -0"

Length:—120" and under..... $+1/16"$, -0"
 Over 120"..... $+1/8"$, -0"

Widths &

Lengths— .131" and thicker, regardless of size, may be $+1/4"$, -0".

TYPE NUMBERS AND ANALYSES (in %)

TYPE NO.	CARBON	CHROMIUM	NICKEL	OTHER ELEMENTS
201	0.15 Max.	16.0-18.0	3.5-5.5	Mn 5.5-7.5, N .25 Max.
202	0.15 Max.	17.0-19.0	4.0-6.0	Mn 7.5-10.0, N .25 Max.
301	0.15 Max.	16.0-18.0	6.0-8.0	
302	0.15 Max.	17.0-19.0	8.0-10.0	
304	0.08 Max.	18.0-20.0	8.0-12.0	
304L	0.03 Max.	18.0-20.0	8.0-12.0	
305	0.12 Max.	17.0-19.0	10.0-13.0	
308	0.08 Max.	19.0-21.0	10.0-12.0	
309	0.20 Max.	22.0-24.0	12.0-15.0	
309S	0.08 Max.	22.0-24.0	12.0-15.0	
310	0.25 Max.	24.0-26.0	19.0-22.0	
314	0.25 Max.	23.0-26.0	19.0-22.0	
316	0.08 Max.	16.0-18.0	10.0-14.0	Mo 2.0-3.0
316L	0.03 Max.	16.0-18.0	10.0-14.0	Mo 2.0-3.0
318	0.08 Max.	17.0-19.0	13.0-15.0	Mo 2.0-3.0 CbTa Min 10xC
321	0.08 Max.	17.0-19.0	9.0-12.0	Ti Min 5XC
330	0.25 Max.	14.0-16.0	33.0-36.0	
347	0.08 Max.	17.0-19.0	9.0-13.0	CbTa Min 10 x C
348	0.08 Max.	17.0-19.0	9.0-13.0	Cb Min 10xC
405	0.08 Max.	11.5-14.5		Al 0.10-0.30
410	0.15 Max.	11.5-13.5		
420	Over 0.15	12.0-14.0		
430	0.12 Max.	14.0-18.0		
442	0.25 Max.	18.0-23.0		
446	0.20 Max.	23.0-27.0		N .25 Max.
501	Over 0.10	4.0-6.0		Mo 0.40-0.65
502	0.10 Max.	4.0-6.0		Mo 0.40-0.65

TYPE 302 AND 304 18-8 STAINLESS STEEL SHEETS

2B Finish*

U. S. Ga.	Stock Size and Gauge	Wt. Per Sq. Ft.	Wt. Per Sheet
28	.015 x 30 x 96	.6562	13.1
	.015 x 36 x 96	.6562	15.7
	.015 x 36 x 120	.6562	19.7
26	.018 x 30 x 96	.7875	15.8
	.018 x 36 x 96	.7875	18.9
	.018 x 36 x 120	.7875	23.6
25	.021 x 30 x 96	.8160	16.3
24	.025 x 30 x 96	1.050	21.0
	.025 x 36 x 96	1.050	25.2
	.025 x 30 x 120	1.050	26.3
	.025 x 36 x 120	1.050	31.5
	.025 x 48 x 120	1.050	42.0
22	.031 x 30 x 96	1.3125	26.2
	.031 x 36 x 96	1.3125	31.5
	.031 x 30 x 120	1.3125	32.8
	.031 x 36 x 120	1.3125	39.4
	.031 x 48 x 120	1.3125	52.5
20	.037 x 30 x 96	1.575	31.5
	.037 x 36 x 96	1.575	37.8
	.037 x 30 x 120	1.575	39.4
	.037 x 36 x 120	1.575	47.9
	.037 x 48 x 120	1.575	63.0
18	.050 x 30 x 96	2.100	42.0
	.050 x 36 x 96	2.100	50.4
	.050 x 30 x 120	2.100	52.5
	.050 x 36 x 120	2.100	63.0
	.050 x 48 x 120	2.100	84.0
16	.062 x 30 x 96	2.625	53.5
	.062 x 36 x 96	2.625	63.0
	.062 x 30 x 120	2.625	65.6
	.062 x 36 x 120	2.625	78.7
	.062 x 48 x 120	2.625	105.0
14	.078 x 30 x 96	3.2812	65.6
	.078 x 36 x 96	3.2812	78.7
	.078 x 36 x 120	3.2812	98.4
	.078 x 48 x 120	3.2812	131.2
	.078 x 60 x 120	3.2812	164.
13	.093 x 30 x 96	3.9375	78.7
	.093 x 36 x 96	3.9375	94.5
	.093 x 36 x 120	3.9375	118.1
	.093 x 48 x 120	3.9375	157.5
12	.109 x 30 x 96	4.5937	91.8
	.109 x 36 x 96	4.5937	110.2
	.109 x 36 x 120	4.5937	137.8
	.109 x 48 x 120	4.5937	183.7
11	.125 x 30 x 96	5.250	105.0
	.125 x 36 x 96	5.250	126.0
	.125 x 36 x 120	5.250	157.5
	.125 x 48 x 120	5.250	210.0
10	.140 x 30 x 96	5.9062	118.1
	.140 x 36 x 96	5.9062	141.7
	.140 x 36 x 120	5.9062	177.1
	.140 x 48 x 120	5.9062	236.2

*All stock size 2B finish sheets can be furnished polished to No. 3, 4D and 4 Dairy finish. No. 6 and No. 7 finish can be supplied upon special application.

FULLERTON—A WAREHOUSE OF METALS AND SERVICE

TYPE 302 AND 304 18-8 STAINLESS STEEL SHEET

No. 4 Polished One Side*

U. S. Ga.	Stock Size and Gauge	Wt. Per Sq. Ft.	Wt. Per Sheet
26	.018 x 30 x 96	.7875	15.8
	.018 x 36 x 96	.7875	18.9
	.018 x 24 x 120	.7875	15.7
	.018 x 30 x 120	.7875	19.7
	.018 x 36 x 120	.7875	23.6
24	.025 x 30 x 96	1.050	21.0
	.025 x 36 x 96	1.050	25.2
	.025 x 24 x 120	1.050	21.0
	.025 x 30 x 120	1.050	26.2
	.025 x 36 x 120	1.050	31.5
	.025 x 42 x 120	1.050	36.7
22	.031 x 30 x 96	1.3125	26.2
	.031 x 36 x 96	1.3125	31.5
	.031 x 24 x 120	1.3125	26.2
	.031 x 30 x 120	1.3125	32.8
	.031 x 36 x 120	1.3125	39.4
20	.037 x 30 x 96	1.575	31.5
	.037 x 36 x 96	1.575	37.8
	.037 x 24 x 120	1.575	31.5
	.037 x 30 x 120	1.575	39.4
	.037 x 36 x 120	1.575	47.2
18	.050 x 30 x 96	2.100	42.0
	.050 x 36 x 96	2.100	50.4
	.050 x 30 x 120	2.100	52.5
	.050 x 36 x 120	2.100	63.0
	.050 x 42 x 120	2.100	73.5
16	.062 x 30 x 96	2.625	53.5
	.062 x 36 x 96	2.625	63.0
	.062 x 30 x 120	2.625	65.6
	.062 x 36 x 120	2.625	78.7
	.062 x 42 x 120	2.625	91.9
14	.078 x 30 x 96	3.2812	65.6
	.078 x 36 x 96	3.2812	78.7
	.078 x 30 x 120	3.2812	82.0
	.078 x 36 x 120	3.2812	98.4
	.078 x 42 x 120	3.2812	114.8
13	.093 x 30 x 96	3.9375	78.7
	.093 x 36 x 96	3.9375	94.5
	.093 x 36 x 120	3.9375	118.1
	.093 x 48 x 120	3.9375	157.5
	12	.109 x 30 x 96	4.5937	91.8
.109 x 36 x 96		4.5937	110.2
.109 x 30 x 120		4.5937	114.8
.109 x 42 x 120		4.5937	160.8
.109 x 48 x 120		4.5937	183.7
11	.125 x 30 x 96	5.250	105.0
	.125 x 36 x 96	5.250	126.0
	.125 x 36 x 120	5.250	157.5
	.125 x 48 x 120	5.250	210.0
10	.140 x 30 x 96	5.9062	118.1
	.140 x 36 x 96	5.9062	141.7
	.140 x 36 x 120	5.9062	177.1
	.140 x 48 x 120	5.9062	236.2

*All stock size 2B finish sheets can be furnished polished to No. 3, 4D and 4Dairy finish. No. 6 and No. 7 finish can be supplied upon special application.

TYPE 316 STAINLESS STEEL SHEET

No. 2B Finish*

U. S. Ga.	Stock Size and Gauge	Wt. Per Sq. Ft.	Wt. Per Sheet
26	.018 x 36 x 96	.788	18.9
	.018 x 36 x 120	.788	23.6
24	.025 x 36 x 96	1.05	25.2
	.025 x 36 x 120	1.05	31.5
	.025 x 48 x 120	1.05	42.0
22	.031 x 36 x 120	1.313	39.4
	.031 x 48 x 120	1.313	52.5
20	.037 x 36 x 120	1.575	47.3
	.037 x 48 x 120	1.575	63.0
18	.050 x 36 x 120	2.10	63.0
	.050 x 36 x 120	2.10	84.0
16	.062 x 36 x 120	2.625	78.8
	.062 x 48 x 120	2.625	105.0
	.062 x 60 x 144	2.625	157.5
14	.078 x 36 x 120	3.281	98.4
	.078 x 48 x 120	3.281	131.2
	.078 x 60 x 144	3.281	196.9
14	.078 x 30 x 120	3.219	80.5
	.078 x 36 x 120	3.219	96.6
	.078 x 48 x 120	3.219	128.8
12	.109 x 36 x 120	4.594	137.8
	.109 x 48 x 120	4.594	183.7
	.109 x 60 x 144	4.594	275.6
12	.109 x 30 x 120	4.506	112.7
	.109 x 36 x 120	4.506	135.2
	.109 x 48 x 120	4.506	180.3
11	.125 x 36 x 120	5.25	157.5
	.125 x 48 x 120	5.25	210.0
10	.140 x 36 x 120	5.906	177.2
	.140 x 36 x 120	5.906	236.2
8	.172 x 48 x 120	7.219	288.7

*All stock size 2B finish sheets can be furnished polished to No. 3, 4D and 4Dairy finish. No. 6 and No. 7 finish can be supplied upon special application.

TYPE 430 STAINLESS STEEL SHEET

No. 2B Finish*

U.S. Ga.	Stock Size and Gauge	Wt. Per Sq. Ft.	Wt. Per Sheet
28	.015 x 36 x 120	.644	19.3
26	.018 x 36 x 96	.773	18.5
	.018 x 36 x 120	.773	23.2
24	.025 x 36 x 96	1.03	24.7
	.025 x 36 x 120	1.03	30.9
	.025 x 48 x 96	1.03	33.0
22	.031 x 36 x 96	1.288	30.9
	.031 x 36 x 120	1.288	38.6
	.031 x 48 x 120	1.288	51.5
20	.037 x 36 x 96	1.545	37.1
	.037 x 36 x 120	1.545	46.4
	.037 x 48 x 120	1.545	61.8
18	.050 x 30 x 120	2.06	51.5
	.050 x 36 x 96	2.06	49.4
	.050 x 36 x 120	2.06	61.8
	.050 x 48 x 120	2.06	82.4
16	.062 x 36 x 120	2.575	77.3
	.062 x 42 x 120	2.575	90.1
	.062 x 48 x 120	2.575	103.0

*All stock size 2B finish sheets can be furnished polished to No. 3, 4D and 4 finish. No. 6 and No. 7 finish can be supplied upon special application.

STAINLESS STEEL SHEETS

Theoretical Weights shown below are based on Chromium Nickel Stainless Steel Sheets. 42.0 lb. per sq. ft. per inch thickness. Straight Chromium Stainless Steel Sheets. 41.2 lb. per sq. ft. per inch thickness.

Thickness		Average Weight per Sq. Ft. in Lbs.	Average Weight per Sq. Ft. in Lbs.
Based on U. S. Std. Gauge Number	Decimal Inches	Chromium Nickel	Straight Chromium
8	.171875	7.2187	7.0813
9	.15625	6.5625	6.4375
10	.140625	5.9062	5.7937
11	.125	5.2500	5.15
12	.109375	4.5937	4.5063
13	.09375	3.9375	3.8625
14	.078125	3.2812	3.2187
15	.0703125	2.9531	2.8968
16	.0625	2.6250	2.575
17	.05625	2.3625	2.3175
18	.050	2.1000	2.06
19	.04375	1.8375	1.8025
20	.0375	1.5750	1.545
21	.034375	1.4437	1.416
22	.03125	1.3125	1.2875
23	.028125	1.1813	1.1587
24	.025	1.0500	1.03
25	.021875	.9187	.9013
26	.01875	.7875	.7725
27	.0171875	.7218	.7081
28	.015625	.6562	.6438
29	.0140625	.5906	.5794
30	.0125	.5250	.515
31	.0109375	.4594	.4506
32	.01015625	.4265	.4184

STAINLESS STEEL STRIP

Available on direct mill shipment basis.

Specifications: Maximum width—23¹/₄"

Coils or Straight Lengths

Finishes—No. 1—Cold Rolled, Annealed, Pickled

No. 2—Cold Rolled, Annealed, Pickled, Re-rolled

Tempers (For 300 Series)

Annealed

¼ Hard 125,000 psi. min.

½ Hard 150,000 psi. min.

¾ Hard 175,000 psi. min.

Full Hard 185,000 psi. min.

STAINLESS STEEL PLATES

Theoretical Weights shown below are based on
Chromium Nickel Alloys. .2871 lb. per cu. in.
Straight Chromium Alloys. .2811 lb. per cu. in.

U. S. Std. Gage	Thickness		Approximate Weight per Sq. Ft. in Lbs.	
	Approximate Decimal Parts of an Inch	Approximate Fractions of an Inch	Straight Chromium Alloys	Chromium Nickel Alloys
	1.0000	1	40.478	41.342
	.9375	15/16	37.949	38.759
	.8750	7/8	35.419	36.175
	.8125	13/16	32.889	33.591
	.7500	3/4	30.359	31.007
	.6875	11/16	27.829	28.423
	.6250	5/8	25.299	25.839
	.5625	9/16	22.769	23.255
	.5000	1/2	20.239	20.671
	.46875	15/32	18.974	19.379
	.4375	7/16	17.709	18.087
	.40625	13/32	16.444	16.795
	.3750	3/8	15.179	15.503
	.34375	11/32	13.914	14.211
0	.3125	5/16	12.650	12.920
1	.28125	9/32	11.385	11.628
2	.265625	17/64	10.752	10.981
3	.2500	1/4	10.120	10.336
4	.234375	15/64	9.487	9.690
5	.21875	7/32	8.855	9.044
6	.203125	13/64	8.222	8.398
7	.1875	3/16	7.590	7.752

STAINLESS COLD ROLLED STRIP

THICKNESS TOLERANCES

Measured 3/8 inch in from edge of 1 inch or wider; and on narrower than 1 inch at any place on the strip.

Tolerances are given in inches

From	Ordered Thickness, Inch	Width Range										
		to and incl.	Under 3/8" to 5/16" incl. + & -	Under 1" to 3/4" incl. + & -	Under 1 1/2" to 1" incl. + & -	Under 3" to 1 1/2" incl. + & -	3" to 6" incl. + & -	Over 6" to 9" incl. + & -	Over 9" to 12" incl. + & -	Over 12" to 16" incl. + & -	Over 16" to 20" incl. + & -	Over 20" to 23 1/2" incl. + & -
.249	.161	.002	.002	.003	.003	.004	.004	.004	.004	.005	.006	.006
.160	.100	.002	.002	.002	.002	.003	.003	.003	.003	.004	.005	.005
.099	.069	.002	.002	.002	.002	.003	.003	.003	.003	.004	.004	.004
.068	.050	.002	.002	.002	.002	.003	.003	.003	.003	.004	.004	.004
.049	.040	.002	.002	.002	.002	.0025	.003	.003	.003	.004	.004	.004
.039	.035	.002	.002	.002	.002	.0025	.003	.003	.003	.003	.003	.003
.034	.032	.0015	.0015	.0015	.0015	.002	.0025	.0025	.0025	.003	.003	.003
.031	.029	.0015	.0015	.0015	.0015	.002	.0025	.0025	.0025	.003	.003	.003
.028	.026	.001	.001	.0015	.0015	.0015	.002	.002	.002	.0025	.003	.003
.025	.023	.001	.001	.001	.001	.0015	.002	.002	.002	.002	.0025	.0025
.022	.020	.001	.001	.001	.001	.0015	.002	.002	.002	.002	.0025	.0025
.019	.017	.001	.001	.001	.001	.001	.0015	.0015	.0015	.002	.002	.002
.016	.015	.001	.001	.001	.001	.001	.0015	.0015	.0015	.0015	.002	.002
.014	.013	.001	.001	.001	.001	.001	.0015	.0015	.0015	.0015	.002	.002
.012	.....	.001	.001	.001	.001	.001	.001	.0015	.0015	.0015	.0015	.0015
.011	.....	.001	.001	.001	.001	.001	.001	.001	.0015	.0015	.0015	.0015
.010	.....	.001	.001	.001	.001	.001	.001	.001	.001	.0015	.0015	.0015

.009" to .006" + or - .0075" } apply only to 6" and narrower
Under .006" + or - .00050" }

Table 1 **PHYSICAL PROPERTIES OF STAINLESS STEELS**

Type No.	Density Lb./Cu. In.	Modulus of Elasticity (times 10 ⁶)	Spec. Elec. Res. at 70° F Microhms/ Sq. Cm./Cm.	Spec. Heat BTU/LB./°F. 32-212° F.	Thermal Conductivity BTU/Hr./Sq. Ft./ Ft./° F/212° F	Mean Coefficient Thermal Expans./ °F. 32-212° F (times 10 ⁶)	Melting Range ° F
301	.29	28	72	.12	9.4	9.4	2550-2590
302	.29	28	72	.12	9.4	9.6	2550-2590
302B	.20	28	72	.12	9.2	9.0	2500-2550
303	.29	28	72	.12	9.4	9.6	2550-2590
304	.29	28	72	.12	9.4	9.6	2550-2650
308	.29	28	72	.12	8.8	9.6	2550-2650
309	.29	29	78	.12	8.0	8.3	2550-2590
310	.29	29	78	.12	8.0	8.0	2550-2650
316	.29	28	74	.12	9.4	8.9	2550-2650
321	.29	28	72	.12	9.3	9.3	2500-2550
347	.29	28	73	.12	9.3	9.3	2550-2600
403	.28	29	57	.11	14.4	5.5	2700-2790
405	.28	29	60	.11		6.0	2700-2790
410	.28	29	57	.11	14.4	5.5	2700-2790
414	.28	29	70	.11	14.4	5.8	2700-2790
416	.28	29	57	.11	14.4	5.5	2700-2790
420	.28	29	55	.11	14.4	5.7	2650-2750
430	.28	29	60	.11	15.1	5.0	2600-2750
430F	.28	29	60	.11	15.1	5.0	2600-2750
431	.28	29	72	.11	11.7	6.5	
440A	.28	29	60	.11	14.0	5.6	2500-2750
440B	.28	29	60	.11	14.0	5.6	2500-2750
440C	.28	29	60	.11	14.0	5.6	2500-2700
442	.28	29	64	.11	12.5	4.9	2600-2750
446	.27	29	67	.12	12.1	5.9	2600-2750

TYPICAL MECHANICAL PROPERTIES—SHEETS, STRIP AND PLATES

(Not to be used in specifications as min. values)

Type	Condition	SHEETS AND STRIPS				PLATES			
		Ultimate Tensile Strength Psi	Yield Strength 0.2% Offset Psi	Elongation—2" %	Rockwell Hardness	Ultimate Tensile Strength Psi	Yield Strength 0.2% Offset Psi	Elongation—2" %	Rockwell Hardness
301	Annealed	110,000	40,000	60	B85	105,000	40,000	55	B85
	Cold Rolled								
	1/4 Hard	125,000 min.	75,000 min.	25 min.	C25				
	1/2 Hard	150,000 min.	110,000 min.	15-18 min.	C32				
	3/4 Hard	175,000 min.	135,000 min.	10-12 min.	C37				
302	Hard	185,000 min.	140,000 min.	8-9 min.	C41				
	Annealed	90,000	40,000	55	C80	90,000	35,000	60	B80
	Cold Rolled								
	1/4 Hard	125,000 min.	75,000 min.	12 min.	C25				
	Annealed	95,000	40,000	50	B85	90,000	40,000	50	B85
304	Annealed	85,000	35,000	55	B80	85,000	35,000	60	B80
304L	Annealed	80,000	30,000	55	B75	80,000	30,000	60	B75
305	Annealed	85,000	35,000	55	B80	85,000	35,000	55	B80
308	Annealed	85,000	35,000	50	B80	85,000	30,000	55	B80
309	Annealed	90,000	40,000	45	B80	90,000	35,000	50	B80
310	Annealed	85,000	30,000	45	B75	85,000	30,000	60	B75
316	Annealed	85,000	35,000	50	B80	80,000	35,000	55	B80
316L	Annealed	75,000	30,000	50	B75	75,000	30,000	55	B75
321	Annealed	90,000	35,000	55	B80	85,000	30,000	55	B85
347	Annealed	95,000	40,000	50	B85	90,000	35,000	50	B85
410	Annealed	65,000	40,000	25	B80	65,000	40,000	30	B80
430	Annealed	70,000	45,000	25	B80	70,000	40,000	30	B80
446	Annealed	80,000	50,000	20	B83	85,000	55,000	25	B84

GOVERNMENT SPECIFICATIONS

FEDERAL SPECIFICATIONS

SPEC. NO.	MATERIAL	CLASS	TYPE	AISI GRADE	CONDITION OR FINISH
QQ-S-766a	Plates, sheets, strip, structurals	1		304	{ a—annealed b—Temper 1 (1/4 hard) c—Temper 2 (1/2 hard) d—Temper 3 (3/4 hard) e—Temper 4 (Full hard)
		2		302	
		3		410	
		4		302	
		5		316	
		6		321-347	
		7		430	

AERONAUTICAL MATERIAL SPECIFICATIONS

AMS SPEC. NO.	AISI NO.	MATERIAL	CONDITION OR FINISH
5504-B	410	Plate, Sheet, Strip	Annealed
5510-E	321	Plate, Sheet, Strip	Annealed
5511-A	304L	Plate, Sheet, Strip	Annealed
5512-B	347	Plate, Sheet, Strip	Annealed
5514-A	305	Plate, Sheet, Strip	Annealed
5515-C	302	Plate, Sheet, Strip	Annealed
5516-C	302	Plate, Sheet, Strip	Annealed
5517-D	302 HT	Plate, Sheet, Strip	125,000-150,000 PSI Tensile
5518-C	302 HT	Plate, Sheet, Strip	150,000 Min. PSI Tensile
5519-E	302 HT	Plate, Sheet, Strip	185,000 Min. PSI Tensile
5521-A	310	Plate, Sheet, Strip	Annealed
5524-A	316	Plate, Sheet, Strip	Annealed

MILITARY SPECIFICATIONS

SPEC. NO.	AISI	CONDITION OR FINISH		
MIL-S-854 (Ships)—Plates, sheets, strip, structurals (Supersedes 47-S-20 INT)	Class 1	304		
		302		
		410		
		430		
		321 or 347		
		316		
		310		
		304L		
		MIL-S-4043 Amend 1		Sheet—No. 1 or 2 D
				Strip—No. 1
				Plate—H.R.A.P.
MIL-S-5059A—Plates, sheets, strip (ASG) (Supersedes AN-QQ-772a and MIL-S-5059)		301		
		302		
		316		
MIL-S-6721A—Plates, sheets, strip (Aircraft application) (Supersedes AN-S-757)	Comp Cb	347		
		321		
		347		
		347		
		Sheet—Annealed, pickled, cold rolled		
		Plate—Annealed, pickled		
		Strip—Annealed, pickled, cold rolled		

LABORATORY CORROSION RESISTANCE DATA

Fully Resistant—A Less than .00035 inches penetration per month
 Satisfactorily Resistant—B .00035—.0035 inches penetration per month
 Fairly Resistant—C .0035—.010 inches penetration per month
 Slightly Resistant—D .010—.035 inches penetration per month
 Not Resistant—E Over .035 inches penetration per month

Substance and Condition	Temp. F.	Type 302	Type 316	Type 430	Type 410
Acetic Acid					
5% Agitated	70°	A	A	..	A
5% Aerated	70°	A	A	..	A
10% Agitated	70°	A	A	..	A
10% Aerated	70°	A	A	..	A
20% Agitated	70°	A	A	..	C
20% Aerated	70°	A	A	..	C
50%	70°	A	A	..	..
50%	Boiling	C	B	..	..
80%	70°	A	A	..	..
80%	Boiling	D	B	..	..
100%	70°	A	A	..	..
100%	Boiling	C	B	..	..
100%—150 lbs. Pressure	400°	E	C	..	..
Acetic Anhydride					
.....	Boiling	A	A	..	..
.....	70°	A	A	E	..
Acetic Vapors					
100%	Hot	E	C	..	..
30%	Hot	C	B	..	..
Acetone					
.....	Boiling	A	A	..	..
.....	70°	A	A	B	..
Acetylene					
.....	70°	..	..	..	B
Concentrated	70°	A	..	..	..
Commercially pure	70°	..	..	A	..
Alcohol, Ethyl					
.....	70°	A	A	A	..
.....	Boiling	A	A	A	..
Alcohol, Methyl					
.....	70°	A	A	A	..
.....	150°	*C	B	C	..
.....	70°	A	A	..	..
Alum (Chrome) 5%					
.....	70°	A	A	..	..
Aluminum Acetate					
Saturated .....	.....	A	A	..	..
Aluminum Chloride					
.....	70°	D	C	D	..
Aluminum Fluoride					
.....	70°	D	C	D	..
Aluminum Hydroxide					
Saturated .....	.....	A	A	A	..
Aluminum					
.....	Molten	E	E	E	..
Aluminum Potassium					
Sulphate 2% (Alum.)					
.....	70°	A	A	A	..
.....	70°	A	A	B	..
.....	Boiling	B	A	C	..
.....	Boiling	C	B	D	..
Aluminum Sulphate					
10%	70°	A	A	D	..
.....	Boiling	B	A	E	..
Saturated	70°	A	A	D	..
.....	Boiling	B	A	E	..
Ammonia					
All concentrations	70°	A	A	A	..
Gas	Hot	D	..	D	..
Ammonia Liquor					
.....	70°	A	A	A	..
.....	Boiling	A	A	..	..

*Subject to pitting at air line or when allowed to dry.

LABORATORY CORROSION RESISTANCE DATA

Substance and Condition	Temp. F.	Type 302	Type 316	Type 430	Type 410
Ammonium Bicarbonate	70°	A	A	..	..
	Hot	A	A	..	..
Ammonium Carbonate					
1% & 5% Still	70°	A	A	A	A
Aerated	70°	A	A	A	A
Agitated	70°	A	A	A	A
Ammonium Chloride					
1% Still	70°	A	A	A	A
Aerated	70°	A	A	A	A
Agitated	70°	A	A	A	A
10% Solution	Boiling	*A	*A	A	..
28% Solution	Boiling	*B	*A	..	..
50% Solution	Boiling	*B	*A	..	..
Ammonium Nitrate					
All Concentrations Agitated \	70°	A	A	A	A
Aerated)					
Saturated	Boiling	A	A	A	A
Ammonium Oxalate 5%	70°	A	A	A	..
Ammonium Persulphate 5%	70°	A	A	A	..
Ammonium Phosphate 5 %	70°	A	A	A	..
Ammonium Sulphate					
1% & 5% Agitated	70°	A	A	A	B
Aerated	70°	A	A	A	B
10%	Boiling	*B	*A	..	..
Saturated	Boiling	*B	*A	..	..
Ammonium Sulphite	Cold	A	A	..	..
	Boiling	A	A	..	..
Amyl Acetate					
Concentrated Solution	70°	A	..	A	A
Amyl Chloride	70°	A	..	B	B
Aniline 3%	70°	A	A	A	..
Concentrated Crude	70°	A	A	A	..
Aniline Hydrochloride	70°	E	D	E	..
Antimony Trichloride	70°	E	D	E	..
Barium Carbonate	70°	A	A	A	..
Barium Chloride 5%	70°	A	A	A	..
Saturated	70°	A	A	A	..
Aqueous Solution	Hot	*B	*A	..	..
Barium Nitrate					
Aqueous Solution	Hot	A	A	..	..
Barium Sulphate					
Barytes-Blanc Fixe	70°	A	A	A	..
Barium Sulphide					
Saturated Solution	70°	A	..	..	..
Solution	70°	..	A	A	A
Beer	70°	A	A	..	..
Benzene	70°	A	A	A	..
Benzoic Acid	70°	A	A	A	..
Benzol	Hot	A	A	A	..
Blood (Meat Juices)	Cold	*A	A	A	..
Borax 5%	Hot	A	A	A	A
Boric Acid					
5% Solution	70°	A	A	A	*A
5% Solution Hot .....	..	..	..	A	..
5% Solution Boiling .....	..	..	*A	..	..
Saturated Solution	70°	*A	*A	..	..
Boiling .....	..	..	*A	*A	*A

*Subject to pitting at air line or when allowed to dry.

LABORATORY CORROSION RESISTANCE DATA

Substance and Condition	Temp. F.	Type 302	Type 316	Type 430	Type 410
Bromine,					
Bromine Water	70°	E	D	E	..
Buttermilk	70°	A	A	A	B
Butyl Acetate.....		..	A	A	A
Butyric Acid 5%.....	70°	A	A	A	A
5%.....	150°	A	A	A	..
Aqueous Solution					
Sp. G. .964.....	Boiling	A	A	A	..
Calcium Carbonate.....	70°	A	A	A	..
Calcium Chlorate					
Dilute Solution	70°	A	A	..	..
Dilute Solution	Hot	A	A	..	..
Calcium Chloride					
Dilute Solution	70°	**B	*A	C	..
Concentrated Solution	70°	**B	*A	C	..
Calcium Hydroxide					
10%.....	Boiling	A	A	..	..
20%.....	Boiling	A	A	..	..
50%.....	Boiling	C	B	..	..
Calcium Hypochlorite 2%.....	70°	*B	*A	*B	..
Calcium Sulphate					
Saturated	70°	A	A	A	..
Carbolic Acid C.P.	Boiling	A	A	..	..
Crude.....	Boiling	A	A	..	..
C.P.....	70°	A	A	A	..
Carbonated Water.....		A	A	A	..
Carbonic Acid					
Saturated Solution	70°	A	..	A	B
Carbon Bisulphide.....	70°	A	A	A	..
Carbon Monoxide Gas	870°C.	A	A	A	..
	760°C.	A	A	A	A
Carbon Tetrachloride					
Pure	70°	A	A	A	A
Aqueous Solution					
5-10%.....	70°	*C	..	*C	D
Chloroacetic Acid	70°	D	C	E	E
Chlorbenzol Concentrated Pure	70°	A	A	A	..
Chloric Acid.....	70°	E	D	E	..
Chlorinated Water					
Saturated	70°	*C	*B	*D	..
Chlorine Gas—Dry.....	70°	C	B	C	..
Gas—Moist.....	70°	C	C	C	..
Gas.....	100°C.	E	D	E	..
Chloroform.....	70°	A	A	A	..
Chromium Alum					
See Alum (Chromium)					
Chromic Acid					
5%.....	70°	A	A	B	..
10% C.P.....	Boiling	C	B	D	..
50% Commercial (cont. SO)	Boiling	*D	C	D	..
Chromium Plating Bath.....	70°	A	A	..	..
Cider.....	70°	A	A	A	..

*Subject to pitting at air line or when allowed to dry.

**Keep solutions alkaline.

LABORATORY CORROSION RESISTANCE DATA

Substance and Condition	Temp. F.	Type 302	Type 316	Type 430	Type 410
Citric Acid					
5% Still	70°	A	A	A	A
5% Still	150°	A	A	A	A
15%	70°	A	A	..	..
15%	Boiling	B	A	A	..
Concentrated	Boiling	C	B	..	..
Coca Cola Syrup (Pure)	70°	A	A	A	..
Coffee	Boiling	A	A	A	..
Copper Acetate					
Saturated Solution	70°	A	A	A	..
Coppers					
See Ferrous Sulphate					
Copper Carbonate					
Sat. Sol. in 50% NH ₄ OH		A	A	A	..
Copper Chloride					
1% Agitated	70°	*B	*A	*B	*B
1% Aerated	70°	*B	*A	*B	*B
5% Agitated	70°	*C	*B	*B	*B
5% Aerated	70°	*E	*D	*E	*E
Copper Cyanide					
Saturated Solution	Boiling	A	A	A	..
Copper Nitrate					
1% Still	70°	A	A	A	A
1% Agitated	70°	A	A	A	A
1% Aerated	70°	A	A	A	A
5% Still	70°	A	A	A	A
5% Agitated	70°	A	A	A	A
5% Aerated	70°	A	A	A	A
50% Aqueous Solution	Hot	A	A	..	..
Copper Sulphate					
5% Agitated Still	70°	A	A	A	A
5% Aerated	70°	A	A	A	A
Saturated Solution	Boiling	A	A	..	..
Creosote (Coal Tar)	Hot	A	A	..	..
Creosote Oil	Hot	A	A	..	..
Cyanogen Gas	70°	A	A	..	..
Denitrochlorbenzol					
Melted and Solidified	70°	A	A	A	..
Developing Solutions	70°	A	A	A	..
Dyewood Liquor	70°	†A	A	..	..
Epsom Salt	Hot & Cold	A	A	A	..
Ether	70°	A	A	A	..
Ethyl Acetate					
Concentrated Solution	70°	A	..	..	B
Ethyl Chloride	70°	A	A	A	..
Ethylene Chloride	70°	A	A	..	..
Ethylene Glycol					
Concentrated	70°	A	..	..	B
Ferric Chloride					
1% Solution Still	70°	††*B	*A	*B	*C
	Boiling	††*D	*C	*D	..

*Subject to pitting at air line or when allowed to dry.

†May attack when sulphuric acid is present.

††May attack when hydrochloric acid is present.

LABORATORY CORROSION RESISTANCE DATA

Substance and Condition	Temp. F.	Type 302	Type 316	Type 430	Type 410
Ferric Chloride—Continued					
5% Solution Still	70°	†*D	*C	*D	*D
5% Agitated	70°	†*C	*C	*C	*C
5% Aerated	70°	†*C	*C	*D	*D
Ferric Hydroxide (Hydrated Iron Oxide)					
	70°	A	A	..	..
Ferric Nitrate					
1% Still	70°	A	A	A	A
5% Still	70°	A	A	A	A
1% Agitated	70°	A	A	A	A
5% Agitated	70°	A	A	A	A
1% Aerated	70°	A	A	A	A
5% Aerated	70°	A	A	A	A
Ferric Sulphate					
1 and 5% Still	70°	*A	A	A	A
Aerated or Agitated	70°	*A	A	A	A
Ferrous Chloride					
Saturated Solution	70°	..	A	..	..
Ferrous Sulphate					
Dilute Solution	70°	A	A	A	..
Fluorine					
	70°	E	E	E	E
Formaldehyde					
40% Solution		*A	*A	*A	*B
Formic Acid					
5% Still	70°	B	A	C	D
5% Still	150°	B	A	C	D
Fruit Juices					
	70°	A	A	A	A
Fuel Oil					
	Hot	A	A	..	..
Containing Sulphuric		C	B	..	..
Furfural	70°	A	A	..	..
Gallic Acid					
5% Solution	70°	A	A	A	A
	150°	A	A	A	A
Gasoline					
	70°	A	A	A	A
Gelatine					
		..	A	A	A
Glue—Dry					
	70°	A	A	A	..
Solution—Acid	70°	*B	A	..	..
Solution—Acid	140°	*B	A	..	..
Glycerine					
	70°	A	A	A	..
Hydrochloric Acid					
All Concentrations	70°	E	E	E	E
Hydrocyanic Acid					
		A	A	C	..
Hydrofluosilicic Acid					
	70°	E	D	..	..
Hydrogen Peroxide					
	70°	†A	A	†A	..
	Boiling	†B	A	†B	..
Hydrogen Sulphide					
Dry		A	A	†A	..
Wet		†B	†A	†C	..
Ink					
		†B	A	..	..
Iodine					
		E	D	E	..
Iodoform					
		A	A	..	..

*Subject to pitting at air line or when allowed to dry.
 †May attack when sulphuric acid is present.

LABORATORY CORROSION RESISTANCE DATA

Substance and Condition	Temp. F.	Type 302	Type 316	Type 430	Type 410
Kerosene	70°	A	A	A	..
Ketchup	70°	*A	A	*A	*A
Lactic Acid					
5%	70°	A	A	B	C
Lactic Acid—Continued					
5%	150°	B	A	B	D
10%	Boiling	D	B	..	..
10%	150°	C	B	..	..
Lard	70°	A	A	A	..
Lead	Molten	B	B	B	..
Linseed Oil	70°	A	A	A	..
Magnesium Chloride					
1 & 5% Still	70°	*A	A	*A	..
Hot	Hot	*C	*B	..	..
Magnesium Sulphate	Cold & Hot	A	A	A	..
Malic Acid	Cold & Hot	B	A	B	C
Mayonnaise	70°	*A	A	..	..
Mercuric Chloride					
Dilute Solutions .....	.....	*E	*D	*E	..
Mercury .....	.....	A	A	A	..
Methanol (Methyl Alcohol) .....	.....	A	A	A	..
Milk, Fresh or Sour	Hot & Cold	A	A	A	B
Mixed Acids					
53% H ₂ SO ₄	Cold	A	A	A	A
45% HNO ₃	Cold	A	A	A	A
Molasses .....	.....	A	A	A	..
Muriatic Acid	70°	E	E	E	E
Mustard	70°	*A	*A	*C	..
Naphtha	70°	A	A	A	..
Naphtha—Crude	70°	A	A	..	..
Nickel Chloride Solution	70°	*A	*A	..	..
Nickel Sulphate	Hot & Cold	A	A	..	..
Niter Cake	Fused	B	A	B	..
Nitric Acid					
5% Solution	70°	A	A	A	A
20% Solution	70°	A	A	A	A
50% Solution	70°	A	A	A	..
50% Solution	Boiling	A	A	A	..
65% Solution	Boiling	B	B	C	E
Concentrated	70°	A	A	A	A
Concentrated	Boiling	D	D	D	E
Nitrous Acid					
5% Solution	70°	A	A	A	..
Oils, Crude	Hot & Cold	†A	†A	†A	..
Oils, Vegetable, Mineral	Hot & Cold	†A	A	†A	..
Oleic Acid	70°	*A	A	*B	..
Oxalic Acid					
5%	Hot & Cold	A	A	A	B
10%	70°	A	A	..	..
10%	Boiling	D	C	..	..

*Subject to pitting at air line or when allowed to dry.
 †May attack when sulphuric acid is present.

LABORATORY CORROSION RESISTANCE DATA

Substance and Condition	Temp. F.	Type 302	Type 316	Type 430	Type 410
Paraffine.....	Hot & Cold	A	A	A	A
Petroleum Ether.....		A	A	A	A
Phenol.....		A	A	A	A
Phosphoric Acid					
1%.....	70°	††A	††A	††A	A
5% Still.....	70°	A	A	A	A
5% Agitated.....	70°	A	A	A	A
5% Aerated.....	70°	A	A	A	A
10% Still.....	70°	C	A	D	D
Phosphoric Acid—Continued					
10% Agitated.....	70°	C	B	C	D
10% Aerated.....	70°	C	B	C	D
Picric Acid.....	70°	A	A	A	..
Potassium Bichromate.....	70°	A	A	A	..
Potassium Bromide.....	70°	*B	*A	..	..
Potassium Carbonate					
1% Still					
Agitated.....	70°	A	A	A	A
Aerated.....					
Potassium Carbonate.....	Hot	A	A	..	..
Potassium Chlorate.....		A	A	A	..
Potassium Chloride					
1% Still.....	70°	*A	*A	*A	*A
Agitated.....	70°	A	A	A	A
Aerated.....	70°	A	A	A	A
5% Still.....	70°	*A	*A	*A	*A
Agitated.....	70°	A	A	A	A
Aerated.....	70°	A	A	A	A
	Boiling	A	A	..	..
Potassium Ferricyanide					
5%.....	70°	A	A	A	..
Potassium Ferrocyanide					
5%.....	70°	A	A	A	..
Potassium Hydroxide					
5% Still					
Agitated.....	70°	A	A	A	A
Aerated.....					
27%.....	Boiling	A	A	..	..
50%.....	Boiling	B	A	..	..
Potassium Nitrate					
1% Still					
Agitated.....	70°	A	A	A	A
Aerated.....					
5% Aerated.....	70°	A	A	A	A
5% Still & Agitated.....	70°	A	A	A	A
Potassium Nitrate.....	Hot	A	A	..	..
Potassium Oxalate.....		A	A	A	..
Potassium Permanganate					
5%.....	70°	A	A	A	..
Potassium Sulphate					
1% Still.....	70°	A	A	A	A
1% Agitated.....	70°	A	A	A	A
1% Aerated.....	70°	A	A	A	A
5% Still.....	70°	A	A	A	A
5% Agitated.....	70°	A	A	A	A
5% Aerated.....	70°	A	A	A	A
	Hot	A	A	..	..

*Subject to pitting at air line or when allowed to dry.

††May attack when hydrochloric acid is present.

LABORATORY CORROSION RESISTANCE DATA

Substance and Condition	Temp. F.	Type 302	Type 316	Type 430	Type 410
Potassium Sulphide (Salt)		A	A	..	..
Pyrogallic Acid		A	A	A	..
Quinine Bisulphate Dry		B	A	B	..
Quinine Sulphate Dry		A	A	B	..
Rosin	Molten	A	A	A	..
Sea Water		*A	*A	*C	..
Sewage		†A	†A	..	..
Silver Bromide		*B	*A	*C	..
Silver Chloride		E	E	E	..
Silver Nitrate		A	A	A	..
Soap	70°	A	A	A	..
Sodium Acetate—Moist		*A	A	A	..
Sodium Bicarbonate					
All Concentrations	70°	A	A	A	A
5% Still	150°	A	A	A	A
Sodium Bisulphate					
Solution	70°	A	A	..	..
Saturated Solution	70°	E	..	..	E
2+ $\frac{1}{2}$ H ₂ SO ₄ per liter	68°	..	..	..	..
	212°	..	B	..	..
Sodium Carbonate					
5%	70°	A	A	A	A
5%	150°	A	A	A	A
Sodium Chloride					
5% Still	70°	*A	A	*B	*B
5% Still	150°	*A	A	*B	*B
20% Aerated	70°	*A	A	..	..
Saturated	70°	*A	A	..	..
Saturated	Boiling	*B	A	..	..
Sodium Fluoride					
5% Solution		*B	*A	*C	..
Sodium Hydroxide		A	A	A	..
Sodium Hypochlorite					
5% Still		*B	*A	*C	..
Sodium Hyposulphite	70°	†A	A	B	..
Sodium Nitrate	Fused	C	B	C	..
Sodium Sulphate					
5% Still	70°	A	A	A	..
Sodium Sulphate					
All Concentrations	70°	A	A	C	..
Sodium Sulphide					
Saturated		*B	A	*B	..
Sodium Sulphite					
5%	70°	A	A	C	..
10%	150°	A	A	..	..
Sodium Thiosulphate					
Saturated Solution	70°	A	†A	..	B
Acid Fixing Bath (Hypo)	70°	..	A	..	..
25% Sol	70°	..	†A	..	..
	Boil	..	†A	..	..
Stannic Chloride					
Spec. Gravity 1.21	Boiling	E	E	..	..

*Subject to pitting at air line or when allowed to dry.

†May attack when sulphuric acid is present.

LABORATORY CORROSION RESISTANCE DATA

Substance and Condition	Temp. F	Type 302	Type 316	Type 430	Type 410
Stannic Chloride Solution	70°	D	C	..	..
Stannous Chloride					
Saturated		C	A	C	..
Stearic Acid		A	A	A	..
Sugar Juice		A	A	A	..
Sulphur Chloride		E	D	..	..
Sulphur Dioxide					
Gas—Moist	70°	B	A	C	..
Gas	575°	A	A	A	..
Sulphur—Dry	Molten	A	A	A	..
Wet		*B	*A	*B	..
Sulphuric Acid					
5%	70°	C	B	C	..
5%	Boiling	E	C	E	..
10%	70°	C	B	C	..
10%	Boiling	E	D	E	..
50%	70°	D	C	..	..
Sulphuric Acid—Continued					
50%	Boiling	E	D	E	..
Concentrated	70°	A	A	A	..
Concentrated	Boiling	D	D	D	..
Concentrated	300°	E	E	E	..
Fuming	70°	C	B	..	..
Sulphurous Acid					
Saturated	70°	C	B	C	..
Saturated 60 lbs. Pressure	250°	C	B	C	..
Sulphurous Acid					
Saturated 70/125 lbs. Pressure	310°	C	B	C	..
150 lbs. Pressure	375°	C	B	C	..
Sulphurous Spray	70°	*D	*D	..	..
Tannic Acid	70°	A	A	A	B
	150°	B	A	B	C
Tartaric Acid	70°	A	A	C	C
	150°	B	A	D	D
Tin	Molten	C	C	C	..
Trichloroacetic Acid	70°	E	E	E	..
Trichlorethylene	70°	*A	..	A	A
Varnish	70°	A	A	A	A
	Hot	A	A	..	..
Vegetable Juices		A	A	..	..
Vinegar Fumes		B	A	B	..
Vinegar—Still	70°	A	A	A	A
Agitated		A	A	A	B
Aerated	70°	A	A	A	A
Zinc	Molten	E	E	E	..
Zinc Chloride					
5% Still	70°	*A	*A	*A	..
Boiling		*B	*B	*B	..
Zinc Sulphate					
5%	70°	A	A	A	..
Saturated	70°	A	A	A	..
25%	Boiling	A	A	..	..

*Subject to pitting at air line or when allowed to dry.



STEEL

**FLAT SHEET
COILED SHEET
COLD ROLLED STRIP**

INDEX

Description of types and qualities	Page 157
Processing Facilities	Page 158
Glossary of Terms	Page 159
Thickness Tolerances—Cold Rolled and Hot Rolled Sheet	Page 162
Weights—Sheet	
Hot Rolled Low Carbon	Page 164
Hot Rolled Pickled & Oiled Low Carbon	Page 166
Cold Rolled—Commercial Quality, Stretcher Leveled and Drawing Quality	Page 167
Cold Rolled In Coils—Soft, Quarter Hard and Half Hard	Page 170
Cold Rolled—Bright Finish	Page 171
Cold Rolled Strip—	
Definition and Description of Edges and Finishes	Page 172
Tempers	Page 173
Thickness Tolerances	Page 174
Weights	Page 175
Gauge Weight, Gauge Thickness and Ordering Limits—	
Low Carbon Sheet	Page 180
Circumference and Area—Steel Circles	Page 181
Weight in Pounds per Lineal Foot	Page 185
Sheet Shearing Charges	Page 199

HOT ROLLED LOW CARBON STEEL SHEETS—meet the requirements of many manufacturers where oxide does not present a problem and where surface finish is not of great importance. Plain hot rolled sheets naturally have a greater degree of porosity than a cold rolled product and therefore are not recommended for exterior parts, especially when appearance is a factor. Hot rolled sheet products will suffice on parts where a rough enameled finish is required.

HOT ROLLED PICKLED AND OILED SHEET STEEL—is used mainly where scale or oxide on the surface of a plain hot rolled sheet would be objectionable. Pickling is accomplished by an acid bath which removes all rust and scale, and the sheets are oiled then to prevent further oxidation. Pickled and oiled sheets are especially applicable for manufacturers using the material in stamping operations or any other process where dies are used, in order to prevent scoring of the dies.

Hot rolled or hot rolled pickled and oiled sheets are produced primarily in the heavier gauges.

COLD ROLLED STEEL SHEETS—are processed to obtain a surface finish superior to a hot rolled pickled finish. This is accomplished by the cold reducing of hot rolled pickled coils, an annealing process, temper or skin rolling, followed by a roller leveling process.

COLD ROLLED COMMERCIAL QUALITY—a commodity ordinarily produced in a low carbon grade of steel and is suitable for exposed parts requiring a good surface finish. This quality is produced with a dull surface texture intended for the application of various finishes such as paints, enamels or lacquers. Commercial quality is designed to be suitable for moderate forming operations. Users requiring a finish suitable for polishing or bright plating should not specify commercial quality, but should instead specify Luster Finish Sheet Steel.

DRAWING QUALITY COLD ROLLED SHEETS—are produced for fabricating identified parts requiring severe forming or drawing operations where commercial quality would not be applicable. This quality is produced with a dull surface texture suitable for the application of various finishes such as paints, enamels and lacquers but is not suitable for electroplating where surface uniformity in the finished product is essential. Drawing quality sheets should produce identified parts too difficult for the drawing properties of any other quality within the breakage allowances as negotiated between the purchaser and the producer. Proper identification of parts should include visual examination, prints, or description or a combination of these.

SPECIAL KILLED STEEL—is generally a low carbon aluminum killed steel and is intended for application where cold rolled sheets are to be essentially free from significant changes in mechanical properties over a period of time or where these sheets are to be essentially free from surface disturbances such as stretcher strains without roller leading.

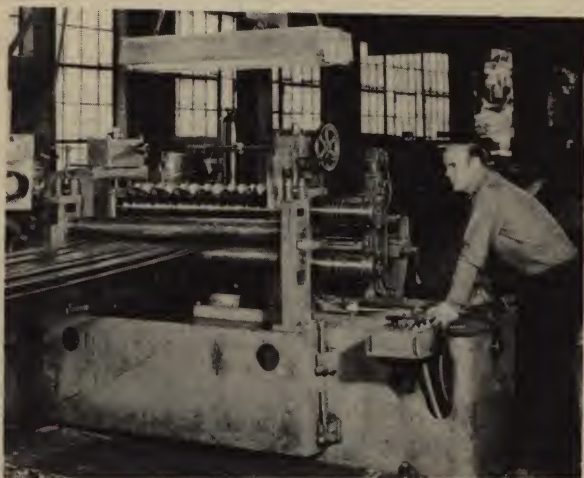
STOCKS OF LOW CARBON SHEET: Fullerton Steel and Wire carries a complete stock of hot rolled, hot rolled pickled and oiled, cold rolled commercial quality sheets together with certain popular items of cold rolled drawing quality sheets. These commodities are stocked in prime quality and in non-standard size production sheets to fit the needs of many manufacturers having odd size blanks, etc. All of the above items are carried in a wide range of gauges and sizes. Additional stocks are carried in certain gauges in Lustre Finish, Intermediate Temper and Aluminum Killed Quality Sheets.

PROCESSING FACILITIES

SHEARING—Fullerton Steel offers shearing facilities to cover a wide range of customers' needs. This includes material up to and including $\frac{1}{4}$ in. thick with 12-ft. length capacity. Fullerton's skilled shearing personnel are experienced in tailoring materials to individual manufacturer's needs including blanks, strips, etc.

SLITTING—Fullerton Steel's coil slitting facilities will accommodate material up to a maximum of 48 in. wide and up to $\frac{1}{8}$ in. thickness, and a minimum of $\frac{1}{4}$ in. width and a plus or minus .005 in. thickness.

EDGE ROLLING—Fullerton's edge rolling equipment is designed to meet the needs of most manufacturers requiring an edge rolled product on straight lengths. Our facilities cover a range from $\frac{1}{16}$ in. to $\frac{3}{16}$ in. thickness and from $\frac{1}{2}$ in. to 6 in. width.



A—GLOSSARY OF TERMS

ACID STEEL—Steel melted under a slag that has an acid reaction and in a furnace with an acid bottom or lining.

ALLOY—A material having metallic properties and consisting of two or more elements, at least one of which is a metal.

ANNEALING—This is a heating and cooling operation of steel in the solid state.

BASIC STEEL—Steel melted under a slag having a basic reaction and in a furnace with a basic bottom or lining.

BESSEMER PROCESS—A process of making steel by blowing air through molten pig iron contained in a suitable vessel, referred to as a converter, thus removing the impurities by oxidation and increasing the metal's nitrogen content by absorption from the air.

BLOWHOLE—A hole produced during the solidification of steel by evolved gas, which in failing to escape, is held in little pockets.

BRINELL HARDNESS—The number obtained from the ratio of the load applied on a steel ball and the spherical area of the impression made by a steel ball, forced into the surface of the material tested. In case of steel, a 10 mm. ball and a pressure of 3000 kilograms are ordinarily used.

CARBON STEEL—Steel is classed as carbon steel when no minimum content is specified or guaranteed for aluminum, chromium, columbium, molybdenum, nickel, titanium, tungsten, vanadium or zirconium; and when the minimum content of copper which is specified or guaranteed does not exceed 0.40 per cent; or when the maximum content which is specified or guaranteed for any of the following elements does not exceed the respective percentages hereinafter stated: manganese 1.65 per cent, silicon 0.60 per cent, copper 0.60 per cent.

CARBURIZING—adding carbon to iron base alloys by heating the metal below its melting point in contact with a carbonaceous material. The carbonaceous material may be gas, solid or liquid.

CASE—That portion of a carburized steel article in which the carbon content has been substantially increased. The term "case" also is used to define the hardened surface of a cyanided or nitrided part.

- (a) Hypoeutectoid case: That portion of the case that contains less carbon than approximately .86%.
- (b) Hypereutectoid case: That portion of the case that contains more carbon than approximately .86%.
- (c) Eutectoid case: That portion of the case that contains approximately .86% carbon.

CASE HARDENING—Carburizing and subsequently hardening by suitable heat treatment all or part of the surface portions of a piece of steel.

COLD DRAWING—The sizing of a properly prepared bar by drawing it through a die.

COLD WORKING—The operation of forming a metal without the application of heat, by rolling, hammering, drawing, spinning, pressing or other means to obtain accurate size, intricate shape, fine finish or increased strength.

CYANIDING—Surface hardening of a steel article or portion of it by heating at a suitable temperature in contact with a cyanide salt, followed by quenching in some medium such as water, oil, brine, etc.

DECARBURIZATION—The removal of carbon. Usually refers to the surface of steel.

ELASTIC LIMIT—The greatest load per square inch of the original cross sectional area which when removed has not caused a permanent deformation.

ELONGATION—The amount of permanent stretch before rupture and expressed as a percentage of the original length, the length usually involved being 2 inches, or in the small sizes, four times the diameter or $4 \times \sqrt{\text{Area}}$.

HARDENING—Heating and quenching certain iron base alloys from a temperature within or slightly above the critical temperature range.

HEAT TREATING—An operation or series of operations involving the heating and cooling of a metal or alloy in the solid state for the purpose of obtaining certain desired conditions or properties.

INCLUSIONS—Particles of slag and dirt occurring in metal which were mechanically held during solidification.

KILLED STEEL—Steel is known as *killed* steel when it solidifies in the ingot quietly and with little or no evolution of gas, because of the addition of deoxidizers in sufficient quantity to effect complete deoxidization. Such steel is characterized by a relatively high degree of chemical homogeneity.

LAP—A surface defect, appearing as a seam, caused by folding over hot metal, fins or sharp corners in rolling or forging.

MACHINABILITY—Machinability is the relative ultimate cost of metal removal consistent with a satisfactory and accurately machined finish. This is a rather indefinite term, varying according to the results which are desired and the basis of judgment. It therefore must be defined as broadly as possible.

MODULUS OF ELASTICITY—The ratio within the limits of elasticity of the stress to the corresponding strain.

NORMALIZING—Heating iron base alloys approximately 100 deg. F. above the critical temperature range, followed by cooling to below that range in still air at room temperature.

PICKLING—Removing mill scale by immersion in a dilute acid bath.

PIT—A depression in the surface of metal.

PROOF STRESS—The load per square inch of the original cross-sectional area which when removed has caused a permanent deformation, not exceeding a specified limit.

PROPORTIONAL LIMIT—The greatest load per square inch of original cross-sectional area for which the elongation is proportional to the load.

QUENCHING—Rapid cooling by immersion in liquids or gases or by contact with metal.

SEMI-KILLED STEEL—When the process of deoxidation is not carried to completion a type of steel results which is known as semi-killed. Such steel is less homogeneous than killed steel.

SPHEROIDIZING—Process of heating and cooling which produces a globular form of carbide. See Chapter IV for typical structure.

TEMPERING—This is sometimes termed draw or drawback. Reheating after hardening to some temperature below the critical temperature range, followed by any rate of cooling.

WORK HARDNESS—Hardness developed in a metal, resulting from mechanical working, particularly cold working.

YIELD POINT—The load per unit of original cross-section at which a marked increase in the deformation of the specimen occurs without increase of load. It is usually calculated from the load determined by the drop of the beam of the testing machine or by use of dividers.

YIELD STRENGTH—The load per square inch of original cross-sectional area determined from the stress-strain curve at some predetermined stretch under load or at some definite elongation after release of the load. When this term is used as a part of any specification the method of determining should be defined.

COLD ROLLED SHEETS

Thickness Tolerances

(Coils and Cut Lengths)

Specified Width, inches	Thickness Tolerances for Specified Widths and Thicknesses—Over or Under, inch.													
	.1875 and thicker	.1874 .1420	.1419 .0972	.0971 .0822	.0821 .0710	.0709 .0568	.0567 .0509	.0508 .0389	.0388 .0314	.0313 .0255	.0254 .0195	.0194 .0142	.0141 .0113	.0112 and thinner
Up to 15 incl.....	.007	.006	.006	.006	.005	.005	.005	.004	.003	.003	.003	.002	—	—
Over 15 to 20 incl.....	.007	.007	.007	.006	.005	.005	.004	.003	.003	.003	.003	.002	—	—
Over 20 to 24 incl.....	.007	.007	.007	.006	.005	.005	.004	.003	.003	.003	.003	.002	—	—
Over 24 to 32 incl.....	.008	.008	.008	.006	.006	.005	.004	.003	.003	.003	.003	.002	—	—
Over 32 to 40 incl.....	.009	.009	.009	.007	.006	.005	.004	.0035	.003	.003	.003	.002	.002	.0015
Over 40 to 48 incl.....	.010	.010	.009	.007	.006	.005	.004	.0035	.003	.003	.003	.002	.002	—
Over 48 to 60 incl.....	.011	.010	.010	.008	.007	.006	.004	.0035	.0035	.0035	.003	.002	—	—
Over 60 to 70 incl.....	.012	.011	.010	.009	.007	.006	.005	.004	.004	.004	—	—	—	—
Over 70 to 80 incl.....	.013	.012	.011	.009	.007	.006	.005	.004	.004	.004	—	—	—	—
Over 80 to 90 incl.....	.014	.012	.012	—	—	—	—	—	—	—	—	—	—	—
Over 90 .....	.015	.012	.012	—	—	—	—	—	—	—	—	—	—	—

Thickness is measured at any point on the sheet not less than $\frac{3}{8}$ inch from an edge.

HOT ROLLED AND HOT ROLLED ANNEALED SHEETS

Thickness Tolerances

(Coils and Cut Lengths, including Pickled Sheets)

Specified Width, inches	Specified Thickness Tolerances for Widths and Thicknesses—Over or Under, inch														
	.2299 .1875	.1874 .1800	.1799 .1420	.1419 .0972	.0971 .0822	.0821 .0710	.0709 .0568	.0667 .0509	.0508 .0389	.0388 .0344	.0343 .0314	.0313 .0295	.0294 .0195	.0194 .0142	.0141 & thinner
To 3½ incl.....	—	—	—	—	—	—	—	—	—	—	—	—	.003	.002	.002
Over 3½ to 6 incl..	—	—	—	—	—	—	—	—	—	—	.004	.003	.003	.002	.002
Over 6 to 12 incl..	—	—	—	—	—	—	.005	.005	.004	.004	.004	.003	.003	.002	.002
Over 12 to 15 incl..	.008	.007	.007	.007	.006	.006	.006	.005	.004	.004	.004	.003	.003	.002	—
Over 15 to 20 incl..	.008	.008	.008	.008	.007	.007	.006	.005	.004	.004	.003	.003	.003	.002	—
Over 20 to 32 incl..	.009	.009	.009	.008	.007	.007	.006	.005	.004	.004	.003	.003	.003	.002	—
Over 32 to 40 incl..	.009	.009	.009	.009	.008	.007	.006	.005	.004	.004	.003	.003	.003	.002	—
Over 40 to 48 incl..	.010	.010	.010	.010	.008	.007	.006	.005	.004	.004	.003	.003	.003	.002	—
Over 48 to 60 incl..	—	—	.010	.010	.008	.007	.006	.005	.004	.004	.003	.003	.003	.002	—
Over 60 to 70 incl..	—	—	.011	.011	.009	.008	.007	.006	.005	.005	.005	.004	.003	.002	—
Over 70 to 80 incl..	—	—	.012	.012	.009	.008	—	—	—	—	—	—	—	—	—
Over 80 to 90 incl..	—	—	.012	.012	.010	—	—	—	—	—	—	—	—	—	—
Over 90	—	—	.012	.012	—	—	—	—	—	—	—	—	—	—	—

Thickness is measured at any point on the sheet not less than ⅜ in. from a cut edge and not less than ¾ in. from a mill edge. The above table does not apply to the uncropped ends of mill edge coils.

HOT ROLLED SHEET STEEL

Low Carbon Steel

COMMERCIAL QUALITY—OPEN HEARTH

(Manufacturers Standard Gauge)

Gauge & Size in Inches	Est. Wt. per Sheet	Gauge & Size in Inches	Est. Wt. per Sheet	Gauge & Size in Inches	Est. Wt. per Sheet
No. 7 ($\frac{3}{16}$"		No. 10 (.1345")		No. 12 (.1046")	
Wt. per Sq. Ft. 7.50		Wt. per Sq. Ft. 5.625		Wt. per Sq. Ft. 4.375	
14	} 5 to 16 ft.	24x 96	90.0	24x 96	70.0
15		24x120	112.5	24x120	87.5
16		26x 96	97.5	28x 96	81.7
18		26x120	121.9	28x120	102.1
20		28x 96	105.0	30x 96	87.5
22		28x120	131.2	30x120	109.4
24x 96	120.0	30x 96	112.5	36x 96	105.0
24x120	150.0	30x120	140.6	36x120	131.3
24x192	240.0	36x 96	135.0	36x144	157.5
28x 96	139.9	36x108	151.9	40x 96	116.7
28x120	174.9	36x120	168.8	40x120	145.8
28x192	280.0	36x144	202.5	42x 96	122.5
30x 96	150.0	40x 96	150.0	42x120	153.1
30x120	187.5	40x120	187.5	42x144	183.8
30x192	300.0	42x 96	157.5	48x 96	140.0
36x 96	180.0	42x120	196.9	48x120	175.0
36x120	225.0	42x144	236.3	48x144	210.0
36x192	360.0	48x 96	180.0	54x 96	157.5
42x 96	210.0	48x120	225.0	54x120	196.9
42x120	262.5	48x144	270.0	60x 96	175.0
42x192	420.0	54x 96	202.5	60x120	218.8
48x 96	240.0	54x120	253.1	60x144	262.5
48x120	300.0	60x 96	225.0	72x 96	210.0
48x192	480.0	60x120	281.3	72x120	262.5
		60x144	337.5	72x144	315.0
		72x 96	270.0		
		72x120	337.5		
		72x144	405.0		
No. 8 (.1644")		No. 11 (.1196")		No. 14 (.0747")	
Wt. per Sq. Ft. 6.875		Wt. per Sq. Ft. 5.00		Wt. per Sq. Ft. 3.125	
30x 96	137.5	24x120	100.0	24x 96	50.0
30x120	171.9	24x144	120.0	24x120	62.5
30x144	206.3	30x120	125.0	26x 96	54.2
36x 96	165.0	30x144	150.0	26x120	67.7
36x120	206.3	36x 96	120.0	28x 96	58.3
36x144	247.5	36x120	150.0	28x120	72.9
42x 96	192.5	36x144	180.0	30x 96	62.5
42x120	240.6	42x 96	140.0	30x120	78.1
42x144	288.8	42x120	175.0	30x144	93.8
48x 96	220.0	42x144	210.0	36x 96	75.0
48x120	275.0	48x 96	160.0	36x120	93.8
48x144	333.0	48x120	200.0	36x144	112.5
54x 96	247.5	48x144	240.0	40x 96	83.3
54x120	309.4	54x144	270.0	40x120	104.2
54x144	371.3	60x 96	200.0	42x 96	87.5
60x 96	275.0	60x120	250.0	42x120	109.4
60x120	343.8	60x144	300.0	42x144	131.3
60x144	412.5	72x120	300.0	48x 96	100.0
72x 96	330.0	72x144	360.0	48x120	125.0
72x120	412.5			48x144	150.0
72x144	495.0			48x156	162.5
				54x 96	112.5

(Continued on following page)

$\frac{3}{16}$ " sheets cut on plate, cutting schedule, pages 199-200.
Cutting extras, pages 199-200.

HOT ROLLED SHEET STEEL

Low Carbon Steel

COMMERCIAL QUALITY—OPEN HEARTH

(Manufacturers Standard Gauge)

(Continued from preceding page)

Gauge & Size in Inches	Est. Wt. -per Sheet	Gauge & Size in Inches	Est. Wt. per Sheet	Gauge & Size in Inches	Est. Wt. per Sheet
No. 14 (.0747")		No. 16 (.0598")		No. 18 (.0478")	
Wt. per Sq. Ft. 3.125		Wt. per Sq. Ft. 2.50		Wt. per Sq. Ft. 2.00	
54x120	140.6	30x120	62.5	24x 96	32.0
60x 96	125.0	36x 96	60.0	24x120	40.0
60x120	156.3	36x120	75.0	26x 96	34.7
60x144	187.5	36x144	90.0	26x120	43.3
72x 96	150.0	40x 96	66.7	28x 96	37.3
72x120	187.5	40x120	83.3	28x120	46.7
72x144	225.0	42x 96	70.0	30x 96	40.0
		42x120	87.5	30x120	50.0
		42x144	105.0	36x 96	48.0
No. 16 (.0598")		48x 96	80.0	36x120	60.0
Wt. per Sq. Ft. 2.50		48x120	100.0	42x 96	56.0
24x 96	40.0	48x144	120.0	42x120	70.0
24x120	50.0	54x 96	90.0	48x 96	64.0
26x 96	43.3	54x120	112.5	48x120	80.0
26x120	54.2	60x 96	100.0	48x144	96.0
28x 96	46.7	60x120	125.0		
28x120	58.3	60x144	150.0		
30x 96	50.0				

Shearing extras, pages 199-200.



Looking down the oversize center bay from the catwalk of Fullerton's 80-foot overhead crane. This crane is equipped with an electronic scale which automatically weight-stamps each load. Ample floor spaces allow fast, efficient movement of stock to shears or shipping dock.

HOT ROLLED SHEET STEEL—PICKLED AND OILED

Low Carbon Steel

COMMERCIAL QUALITY—OPEN HEARTH

(Manufacturers Standard Gauge)

Gauge & Size in Inches	Est. Wt. per Sheet	Gauge & Size in Inches	Est. Wt. per Sheet	Gauge & Size in Inches	Est. Wt. per Sheet
No. 7 (3/16")		No. 11 (.1196")		No. 14 (.0747")	
Wt. per Sq. Ft. 7.50		Wt. per Sq. Ft. 5.00		Wt. per Sq. Ft. 3.125	
30x 96	150.0	30x 96	100.0	30x 96	62.5
36x 96	180.0	36x 96	120.0	30x120	78.1
36x120	225.0	36x120	150.0	36x 96	75.0
48x 96	240.0	48x120	200.0	36x120	93.8
48x120	300.0	48x144	240.0	48x 96	100.0
48x144	360.0	60x144	300.0	48x120	125.0
				48x144	150.0
				No. 16 (.0598")	
				Wt. per Sq. Ft. 2.50	
				24x 96	40.0
				30x 96	50.0
				30x120	62.5
				36x 96	60.0
				36x120	75.0
				36x144	90.0
				42x 96	70.0
				48x 96	80.0
				48x120	100.0
				48x144	120.0
				60x144	150.0
				No. 18 (.0478")	
				Wt. per Sq. Ft. 2.00	
				24x 96	32.0
				30x 96	40.0
				36x 96	48.0
				36x120	60.0
				48x 96	64.0
				48x120	80.0
No. 9 (.1495")		No. 12 (.1046")			
Wt. per Sq. Ft. 6.25		Wt. per Sq. Ft. 4.375			
36x120	187.5	30x 96	87.5		
48x120	250.0	36x 96	105.0		
		36x120	131.3		
		48x 96	140.0		
		48x120	175.0		
No. 10 (.1345")		No. 13 (.0897")			
Wt. per Sq. Ft. 5.625		Wt. per Sq. Ft. 3.75			
36x 96	135.0	30x 96	75.0		
36x120	168.8	36x 96	90.0		
48x120	225.0	36x120	112.5		
48x144	270.0	48x120	150.0		

3/16" sheets cut on plate, cutting schedule, pages 199-200.
Shearing extras, pages 199-200.

COLD ROLLED SHEET STEEL—OILED

Low Carbon Steel

COMMERCIAL QUALITY—OPEN HEARTH

Gauge & Size in Inches	Est. Wt. per Sheet	Gauge & Size in Inches	Est. Wt. per Sheet	Gauge & Size in Inches	Est. Wt. per Sheet
No. 7 (3/16")		No. 14 (.0747")		No. 20 (.0359")	
Wt. per Sq. Ft. 7.50		Wt. per Sq. Ft. 3.125		Wt. per Sq. Ft. 1.50	
24x 96	120.0	24x 96	50.0	24x 96	24.0
36x 96	180.0	30x 96	62.5	30x 96	30.0
36x120	225.0	30x120	78.1	36x 96	36.0
		36x 96	75.0	36x120	45.0
		36x120	93.8	48x 96	48.0
		48x120	125.0	48x120	60.0
		48x144	150.0	48x144	72.0
No. 9 (.1494")		No. 15 (.0673")		No. 21 (.0329")	
Wt. per Sq. Ft. 6.25		Wt. per Sq. Ft. 2.812		Wt. per Sq. Ft. 1.375	
24x 96	100.0	24x 96	45.0	24x 96	22.0
36x120	187.5	30x 96	56.2		
		36x 96	67.5		
No. 10 (.1345")		No. 16 (.0598")		No. 22 (.0299")	
Wt. per Sq. Ft. 5.625		Wt. per Sq. Ft. 2.50		Wt. per Sq. Ft. 1.25	
24x 96	90.0	24x 96	40.0	24x 96	20.0
30x 96	112.5	30x 96	50.0	30x 96	25.0
36x 96	135.0	36x 96	60.0	36x 96	30.0
36x120	168.8	36x120	75.0	36x120	37.5
48x120	225.0	42x120	87.5	48x 96	40.0
48x144	270.0	48x 96	80.0	48x120	50.0
		48x120	100.0		
No. 11 (.1196")		No. 16 (.0598")		No. 23 (.0269")	
Wt. per Sq. Ft. 5.00		Wt. per Sq. Ft. 2.50		Wt. per Sq. Ft. 1.125	
24x 96	80.0	48x144	120.0	24x 96	18.0
30x 96	100.0	50x120	104.0		
36x 96	120.0				
36x120	150.0	No. 17 (.0538")		No. 24 (.0239")	
48x 96	160.0	Wt. per Sq. Ft. 2.25		Wt. per Sq. Ft. 1.00	
48x120	200.0	24x 96		24x 96	
		36.0		30x 96	
				36x 96	
				36x120	
				48x120	
				40.0	
No. 12 (.1046")		No. 18 (.0478")		No. 25 (.0209")	
Wt. per Sq. Ft. 4.375		Wt. per Sq. Ft. 2.00		Wt. per Sq. Ft. .875	
24x 96	70.0	24x 96		36x 96	
30x 96	87.5	32.0		21.5	
36x 96	105.0	30x 96			
36x120	131.3	40.0			
48x 96	140.0	36x 96			
48x120	175.0	48.0			
		36x120			
		60.0			
		48x 96			
		64.0			
		48x120			
		80.0			
No. 12 (.109")		No. 19 (.0418")		No. 26 (.0179")	
Wt. per Sq. Ft. 4.447		Wt. per Sq. Ft. 1.75		Wt. per Sq. Ft. .75	
36x120	133.4	24x 96		24x 96	
		28.0		30x 96	
		30x 96		36x 96	
		35.0		36x 96	
		36x 96		36x120	
		42.0		22.5	
		36x120			
		52.5			
No. 13 (.0897")		No. 30 (.0120")		No. 28 (.0149")	
Wt. per Sq. Ft. 3.75		Wt. per Sq. Ft. .50		Wt. per Sq. Ft. .625	
24x 96	60.0	36x 96		30x 96	
30x 96	75.0	12.0		12.5	
36x 96	90.0	36x120			
36x120	112.5	15.0			
		48x 96			
		18.0			
		48x120			
		22.5			
		36x 96			
		12.0			

Shearing extras, pages 199-200.

COLD ROLLED SHEET STEEL STRETCHER LEVELLED OILED

Low Carbon Steel

COMMERCIAL QUALITY—OPEN HEARTH

(Manufacturers Standard Gauge)

Suitable for panels, metal furniture, and purposes requiring a perfectly flat sheet.
Smooth finish intended for enameling, lacquering.

Gauge & Size in Inches	Est. Wt. per Sheet	Gauge & Size in Inches	Est. Wt. per Sheet	Gauge & Size in Inches	Est. Wt. per Sheet
No. 10 (.1345")		No. 16 (.0598")		No. 20 (.0359")	
Wt. per Sq. Ft. 5.625		Wt. per Sq. Ft. 2.50		Wt. per Sq. Ft. 1.50	
36x 96	135.0	30x 96	50.0	30x 96	30.0
36x120	168.8	30x120	62.5	30x120	37.5
48x 96	180.0	36x 96	60.0	36x 96	36.0
48x120	225.0	36x120	75.0	36x120	45.0
48x144	270.0	36x144	90.0	36x144	54.0
		48x120	100.0	42x 96	42.0
		48x144	120.0	42x120	52.5
		54x120	112.5	42x144	63.0
		60x144	150.0	48x 96	48.0
		72x144	180.0	48x120	60.0
				48x144	72.0
				48x156	78.0
No. 11 (.1196")		No. 18 (.0478")		No. 22 (.0299")	
Wt. per Sq. Ft. 5.00		Wt. per Sq. Ft. 2.00		Wt. per Sq. Ft. 1.25	
36x 96	120.0	30x 96	40.0	30x 96	25.0
36x120	150.0	30x120	50.0	30x120	31.3
48x120	200.0	36x 96	48.0	36x 96	30.0
60x144	300.0	36x120	60.0	36x120	37.5
				36x144	45.0
				42x144	52.5
				48x 96	40.0
				48x120	50.0
				48x144	60.0
				No. 24 (.0239")	
				Wt. per Sq. Ft. 1.00	
				30x 96	20.0
				30x120	25.0
				36x 96	24.0
				36x120	30.0
				No. 26 (.0179")	
				Wt. per Sq. Ft. .75	
				30x 96	15.0
				36x 96	18.0
No. 12 (.1046")		No. 18 (.0478")		No. 24 (.0239")	
Wt. per Sq. Ft. 4.375		Wt. per Sq. Ft. 2.00		Wt. per Sq. Ft. 1.00	
36x 96	105.0	30x 96	40.0	30x 96	20.0
36x120	131.3	30x120	50.0	30x120	25.0
42x120	153.1	36x 96	48.0	36x 96	24.0
48x120	175.0	36x120	60.0	36x120	30.0
				No. 26 (.0179")	
				Wt. per Sq. Ft. .75	
				30x 96	15.0
				36x 96	18.0
No. 14 (.0747")		No. 18 (.0478")		No. 24 (.0239")	
Wt. per Sq. Ft. 3.125		Wt. per Sq. Ft. 2.00		Wt. per Sq. Ft. 1.00	
30x 96	62.5	36x144	72.0	30x 96	20.0
30x120	78.1	42x144	84.0	30x120	25.0
36x 96	75.0	48x 96	64.0	36x 96	24.0
36x120	93.8	48x120	80.0	36x120	30.0
48x120	125.0	48x144	96.0		
48x144	150.0	54x156	117.0		

Shearing extras, pages 199-200.

COLD ROLLED SHEET STEEL—OILED*

Low Carbon Steel

DRAWING QUALITY—OPEN HEARTH

(Manufacturers Standard Gauge)

Intended for difficult drawing, spinning, and forming operations.

Gauge & Size in Inches	Est. Wt. per Sheet	Gauge & Size in Inches	Est. Wt. per Sheet	Gauge & Size in Inches	Est. Wt. per Sheet
7 Ga. (3/16") Wt. per Sq. Ft. 7.50		14 Ga. (.0747") Wt. per Sq. Ft. 3.125		20 Ga. (.0359") Wt. per Sq. Ft. 1.50	
36x 96	180.0	30x 96	62.5	30x 96	30.0
36x120	225.0	30x120	78.1	36x 96	36.0
		36x 96	75.0	36x120	45.0
9 Ga. (.1494") Wt. per Sq. Ft. 6.25		36x120	93.8	48x120	60.0
36x120	187.5	48x120	125.0		
		48x144	150.0	22 Ga. (.0299") Wt. per Sq. Ft. 1.25	
10 Ga. (.1345") Wt. per Sq. Ft. 5.625		15 Ga. (.0673") Wt. per Sq. Ft. 2.812		30x 96	25.0
36x 96	135.0	30x 96	56.2	36x 96	30.0
36x120	168.8	36x 96	67.5	36x120	37.5
48x120	225.0			24 Ga. (.0239") Wt. per Sq. Ft. 1.00	
48x144	270.0	16 Ga. (.0598") Wt. per Sq. Ft. 2.50		30x 96	20.0
11 Ga. (.1196") Wt. per Sq. Ft. 5.00		30x 96	50.0	36x 96	24.0
30x 96	100.0	36x 96	60.0	36x120	30.0
36x 96	120.0	36x120	75.0	25 Ga. (.0209") Wt. per Sq. Ft. .875	
36x120	150.0	48x120	100.0	36x 96	21.5
48x120	200.0			26 Ga. (.0179") Wt. per Sq. Ft. .75	
12 Ga. (.1046") Wt. per Sq. Ft. 4.375		18 Ga. (.0478") Wt. per Sq. Ft. 2.00		30x 96	15.0
30x 96	87.5	30x 96	40.0	36x 96	18.0
36x 96	105.0	36x 96	48.0	36x120	22.5
36x120	131.3	36x120	60.0		
48x 96	140.0	48x120	80.0	28 Ga. (.0149") Wt. per Sq. Ft. .625	
48x120	175.0			30x 96	12.5
13 Ga. (.0897") Wt. per Sq. Ft. 3.75		19 Ga. (.0418") Wt. per Sq. Ft. 1.75		30 Ga. (.0120") Wt. per Sq. Ft. .50	
30x 96	75.0	30x 96	35.0	36x 96	12.0
36x 96	90.0	36x 96	42.0		
36x120	112.5	36x120	52.5		

Shearing extras, pages 199-200.

*Aluminum killed can be furnished in many of the above gauges and sheet sizes, subject to inquiry.

COLD ROLLED SHEET STEEL IN COILS

COMMERCIAL QUALITY OILED

SOFT TEMPER

Rockwell 60 B Max.

Decimal Thickness Inches	Max. Width Inches	Stock Carried	Decimal Thickness Inches	Max. Width Inches	Stock Carried
.018	36	Coils	.042	36	Coils
.020	36	Coils	.050	36	Coils
.025	36	Coils	.062	36	Coils
.031	36	Coils	.075	36	Coils
.035	36	Coils	.083	36	Coils
			.089	36	Coils

Material can be slit to any width, or flattened and cut to length on mill type flattening equipment.

COLD ROLLED BRIGHT FINISH SHEET STEEL IN COILS

SOFT TEMPER

Rockwell 60 B Max.

Decimal Thickness Inches	Max. Width Inches	Stock Carried	Decimal Thickness Inches	Max. Width Inches	Stock Carried
.018	36	Coils	.042	36	Coils
.025	36	Coils	.050	36	Coils
.031	36	Coils	.062	36	Coils
.035	36	Coils			

Material can be slit to any width, or flattened and cut to length on mill type flattening equipment.

COLD ROLLED SHEET STEEL IN COILS

QUARTER HARD TEMPER

Rockwell 60-75 B

Decimal Thickness Inches	Max. Width Inches	Stock Carried	Decimal Thickness Inches	Max. Width Inches	Stock Carried
.018	30	Coils	.035	30	Coils
.020	30	Coils	.042	30	Coils
.025	30	Coils	.050	30	Coils
.031	30	Coils	.062	30	Coils

Material can be slit to any width, or flattened and cut to length on mill type flattening equipment.

COLD ROLLED SHEET STEEL IN COILS

HALF HARD TEMPER

Rockwell 70-85 B

Decimal Thickness Inches	Max. Width Inches	Stock Carried	Decimal Thickness Inches	Max. Width Inches	Stock Carried
.018	30	Coils	.035	30	Coils
.020	30	Coils	.042	30	Coils
.025	30	Coils	.050	30	Coils
.031	30	Coils	.062	30	Coils

Material can be slit to any width, or flattened and cut to length on mill type flattening equipment.

COLD ROLLED BRIGHT FINISH SHEET STEEL

SOFT TEMPER

Rockwell 60 B Max.

Gauge and Size in Inches	Est. Wt. per Sheet	Gauge and Size in Inches	Est. Wt. per Sheet
.018x36x96	18.1	.035x36x96	35.1
.020x36x96	20.1	.042x36x96	42.1
.025x36x96	25.1	.050x36x96	50.2
.031x36x96	31.1	.062x36x96	62.2

Shearing extras, pages 000-000.

COLD ROLLED SHEET STEEL

QUARTER HARD TEMPER

Rockwell 60-75 B

Gauge and Size in Inches	Est. Wt. per Sheet	Gauge and Size in Inches	Est. Wt. per Sheet
.018x30x84	13.2	.035x30x84	25.6
.020x30x84	14.6	.042x30x84	30.7
.025x30x84	18.3	.050x30x84	36.6
.031x30x84	22.7	.062x30x84	45.4

Shearing extras, pages 000-000.

COLD ROLLED SHEET STEEL

HALF HARD TEMPER

Rockwell 70-85 B

Gauge and Size in Inches	Est. Wt. per Sheet	Gauge and Size in Inches	Est. Wt. per Sheet
.018x30x96	15.1	.035x30x96	29.3
.020x30x96	16.7	.042x30x96	35.1
.025x30x96	21.0	.050x30x96	41.8
.031x30x96	25.9	.062x30x96	51.9

Shearing extras, pages 000-000.

COLD ROLLED SHEET STEEL

HARD TEMPER

Rockwell 80-95 B

Gauge and Size in Inches	Est. Wt. per Sheet	Gauge and Size in Inches	Est. Wt. per Sheet
.018x30x72	11.3	.035x30x72	22.0
.020x30x72	12.5	.040x30x72	26.3
.025x30x72	15.7	.050x30x72	31.4
.031x30x72	19.4	.062x30x72	38.9

Shearing extras, pages 199-200.

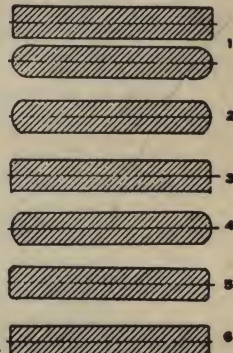
COLD ROLLED STRIP STEEL

Cold rolled strip steel is produced from hot rolled strip which has had the mill scale removed. Cold rolled strip is commonly produced in a variety of tempers, edges, finishes and qualities to meet the demanding requirements of almost any fabricated steel product. Certain thickness, size, edge, finish and temper requirements necessitate additional metallurgical production and inspection procedures. These additional finishing procedures impart to the product the characteristics which make it acceptable for various applications requiring special tolerances, surfaces and drawing and forming qualities.

Fullerton Steel and Wire stocks cold rolled strip steel in coil and cut lengths in an almost endless variety of gauges and tempers. We can slit or shear to your exact production requirements from stock size widths.

DESCRIPTION OF EDGES

The edge desired is usually designated by the trade in accordance with the following list:



No. 1 Edge—a perfect round or square smooth edge.

No. 2 Natural Round Edge.

No. 3 Square, produced by slitting not filed.

No. 4 Round Rolled Edge.

No. 5 Square, produced by rolling or filing after slitting.

No. 6 Square Edge rolled.

Illustrations shown only to indicate approximate shape of edges.

DESCRIPTION OF FINISHES

No. 1 or Dull Finish is a finish without luster, produced by rolling on rolls roughened by mechanical or chemical means. This finish is especially suitable for lacquer or paint adhesion, and is beneficial in aiding drawing operations by reducing the contact friction between the die and the strip.

No. 2 or Regular Bright is a luster finish produced by rolling on rolls having a moderately high finish. It is suitable for many requirements, but not generally applicable to plating, unless ground and buffed.

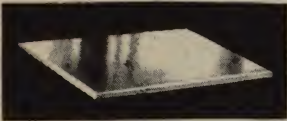
No. 3 or Best Bright Finish is generally of high luster produced by selective rolling practices, including the use of specially prepared rolls for final rolling. The production of this finish requires extremely careful and extensive inspection. No. 3 Finish is the highest quality finish produced and is particularly suited for electroplating.

COLD ROLLED STRIP STEEL

DESCRIPTION OF TEMPERS

Standard Tempers

The following is generally accepted by all manufacturers as standard for number of tempers and definition of each:



No. 1—Hard

No. 1 (Hard Temper) is a very stiff, springy, cold rolled strip intended for flat work only.

Hard temper on .25 per cent carbon or under, shall be defined as Cold-Rolled Strip Steel having a minimum Rockwell of B-84 excepting on gauges .069 or thinner on which the minimum Rockwell shall be B-90.

Hard temper on over .25 per cent carbon, up to and including 1.35 per cent carbon shall be defined as Cold-Rolled Spring Steel having a minimum Rockwell of B-98.

Any Steel Strip having lower Rockwells than shown above shall be sold at soft extra.



No. 2— $\frac{1}{2}$ Hard

No. 2 (Half Hard Temper) is a moderately stiff cold rolled strip suitable for limited bending. Strip of this temper may be bent 90 degrees across the direction of rolling around a radius equal to the thickness.

Soft temper carbon .25 max. Rockwell B-70 Min. B-85 max. approx.



No. 3— $\frac{1}{4}$ Hard

No. 3 (Quarter Hard Temper) is a medium soft, cold rolled strip suitable for limited bending and forming and drawing. Strip of this temper may be bent 180 degrees across the direction of rolling and 90 degrees in the direction of rolling around a radius equal to the thickness.

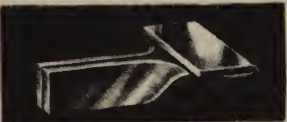
Soft temper .25 carbon max. Rockwell B-60 Min. B-75 max. approx.



No. 4—Pinch Pass
or Skin Roll

No. 4 (Skin Rolled Temper) is a soft, ductile, cold rolled strip, suitable for fairly deep drawing where surface disturbances such as stretcher strains are objectionable. It is capable of being bent flat upon itself in any direction. Skin-rolled, planish rolled, and pinch passed are equivalent terms with respect to temper.

Soft temper .15 carbon max. Rockwell B-65 max. approx.



No. 5—Dead Soft

No. 5 (Dead Soft Temper) is a soft, ductile, cold rolled strip produced without definite control of stretcher straining and fluting. It is suitable for difficult drawing applications where such surface disturbances are not objectionable. It is suitable for bending flat upon itself in any direction.

Soft temper .15 carbon max. Rockwell B-55 max. approx.

COLD ROLLED CARBON STEEL STRIP

Thickness Tolerances

Table of Pounds per Lineal Foot

Measured $\frac{3}{8}$ inch in from edge on 1 in. or wider; and on narrower than 1 in. at any place on the strip.

Over	Specified Thickness, Inch	Tolerances for Specified Thickness, Plus or Minus, Inch									
		To and Incl.	Over $\frac{1}{2}$ to less than 1	1 to less than 3	3 to 6 Incl.	Over 6 to 9 Incl.	Over 9 to 12 Incl.	Over 12 to 16 Incl.	Over 16 to 20 Incl.	Over 20 to 23-15/16 Incl.	
0.160	0.2499	0.002	0.003	0.0035	0.0035	0.0035	0.0035	0.0045	0.005	0.005	
.099	.160	.002	.002	.003	.003	.003	.0035	.0045	.005	.005	
.068	.099	.002	.002	.0025	.003	.003	.0035	.0035	.0035	.0035	
.049	.068	.002	.002	.0025	.0025	.0025	.003	.0035	.0035	.0035	
.039	.049	.002	.002	.0025	.0025	.0025	.003	.003	.003	.003	
.034	.039	.002	.002	.002	.002	.002	.002	.002	.002	.002	
.031	.034	.0015	.0015	.002	.002	.002	.002	.002	.002	.002	
.028	.031	.0015	.0015	.0015	.0015	.002	.002	.002	.002	.002	
.025	.028	.001	.0015	.0015	.0015	.002	.002	.002	.002	.002	
.019	.025	.001	.001	.0015	.0015	.0015	.0015	.002	.002	.002	
.012	.019	.001	.001	.001	.0015	.0015	.0015	.0015	.0015	.0015	
.011	.012	.001	.001	.001	.001	.001	.0015	.0015	.0015	.0015	
.009	.011	.001	.001	.001	.001	.001	.001	.001	.001	.001	
.005	.009	.00075	.00075	.00075	.00075	.001	.001	.001	.001	.001	
—	.005	.0005	.0005	.0005	.0005	.001	.001	.001	.001	.001	

COLD ROLLED STRIP STEEL

No. 1 TEMPER

FULL HARD

MEAN TENSILE 80,000 P. S. I.

ROCKWELL B84 MIN. .070 and THICKER

ROCKWELL B90 MIN. .069 and THINNER

Decimal Thickness	Maximum Width, Inches	Weight Per Square Foot
.010	Coils and Cut Lengths 23 ¹ / ₁₆	.4080
.012	Coils and Cut Lengths 23 ¹ / ₁₆	.4896
.0135	Coils and Cut Lengths 23 ¹ / ₁₆	.5508
.015	Coils and Cut Lengths 23 ¹ / ₁₆	.6120
.0165	Coils and Cut Lengths 23 ¹ / ₁₆	.6732
.018	Coils and Cut Lengths 23 ¹ / ₁₆	.7344
.020	Coils and Cut Lengths 23 ¹ / ₁₆	.8160
.022	Coils and Cut Lengths 23 ¹ / ₁₆	.8976
.023	Coils and Cut Lengths 23 ¹ / ₁₆	.9384
.025	Coils and Cut Lengths 23 ¹ / ₁₆	1.0200
.028	Coils and Cut Lengths 23 ¹ / ₁₆	1.1424
.031	Coils and Cut Lengths 23 ¹ / ₁₆	1.2648
.035	Coils and Cut Lengths 23 ¹ / ₁₆	1.4280
.040	Coils and Cut Lengths 23 ¹ / ₁₆	1.6320
.042	Coils and Cut Lengths 23 ¹ / ₁₆	1.7136
.045	Coils and Cut Lengths 23 ¹ / ₁₆	1.8360
.048	Coils and Cut Lengths 23 ¹ / ₁₆	1.9584
.050	Coils and Cut Lengths 23 ¹ / ₁₆	2.0400
.058	Coils and Cut Lengths 23 ¹ / ₁₆	2.3664
.062	Coils and Cut Lengths 23 ¹ / ₁₆	2.5296
.065	Coils and Cut Lengths 23 ¹ / ₁₆	2.6520
.072	Coils and Cut Lengths 18	2.9376
.078	Coils and Cut Lengths 18	3.1824
.083	Coils and Cut Lengths 18	3.3864
.093	Coils 18	3.7944
.109	Cut Lengths only 18	4.4472
.125	Cut Lengths only 18	5.1000
.134	Cut Lengths only 16	5.4672
.156	Cut Lengths only 16	6.3648
.187	Cut Lengths only 16	7.6296

*Standard for Cut Lengths: 96 Inches.

COLD ROLLED STRIP STEEL

No. 2 TEMPER

HALF HARD

MEAN TENSILE 64,000 P. S. I.

ROCKWELL B75/85

Decimal Thickness	Maximum Width, Inches	Weight Per Square Foot
.010	Coils and Cut Lengths 23 ¹ / ₁₆	.4080
.012	Coils and Cut Lengths 23 ¹ / ₁₆	.4896
.0135	Coils and Cut Lengths 23 ¹ / ₁₆	.5508
.015	Coils and Cut Lengths 23 ¹ / ₁₆	.6120
.0165	Coils and Cut Lengths 23 ¹ / ₁₆	.6732
.018	Coils and Cut Lengths 23 ¹ / ₁₆	.7344
.020	Coils and Cut Lengths 23 ¹ / ₁₆	.8160
.022	Coils and Cut Lengths 23 ¹ / ₁₆	.8976
.025	Coils and Cut Lengths 23 ¹ / ₁₆	1.0200
.028	Coils and Cut Lengths 23 ¹ / ₁₆	1.4124
.032	Coils and Cut Lengths 23 ¹ / ₁₆	1.3056
.035	Coils and Cut Lengths 23 ¹ / ₁₆	1.4280
.040	Coils and Cut Lengths 23 ¹ / ₁₆	1.6320
.042	Coils and Cut Lengths 23 ¹ / ₁₆	1.7136
.048	Coils and Cut Lengths 23 ¹ / ₁₆	1.9584
.050	Coils and Cut Lengths 23 ¹ / ₁₆	2.0400
.058	Coils and Cut Lengths 23 ¹ / ₁₆	2.3664
.062	Coils and Cut Lengths 16	2.5296
.065	Coils and Cut Lengths 23 ¹ / ₁₆	2.6520
.072	Coils and Cut Lengths 18	2.9376
.078	Coils and Cut Lengths 18	3.1824
.083	Coils and Cut Lengths 18	3.3864
.093	Coils 18	3.7944
.109	Cut Lengths only 18	4.4472
.125	Cut Lengths only 18	5.1000
.134	Cut Lengths only 16	5.4672
.156	Cut Lengths only 16	6.3648
.187	Cut Lengths only 16	7.6296

*Standard for Cut Lengths: 96 Inches.

COLD ROLLED STRIP STEEL**No. 3 TEMPER****QUARTER HARD****MEAN TENSILE 54,000 P. S. I.****ROCKWELL B60/75**

Decimal Thickness	Maximum Width, Inches	Weight Per Square Foot
.010	Coils and Cut Lengths 23 ¹ / ₁₆	.4080
.012	Coils and Cut Lengths 23 ¹ / ₁₆	.4896
.0135	Coils and Cut Lengths 23 ¹ / ₁₆	.5508
.015	Coils and Cut Lengths 23 ¹ / ₁₆	.6120
.0165	Coils and Cut Lengths 23 ¹ / ₁₆	.6732
.018	Coils and Cut Lengths 23 ¹ / ₁₆	.7344
.020	Coils and Cut Lengths 23 ¹ / ₁₆	.8160
.022	Coils and Cut Lengths 23 ¹ / ₁₆	.8976
.025	Coils and Cut Lengths 23 ¹ / ₁₆	1.0200
.028	Coils and Cut Lengths 23 ¹ / ₁₆	1.1424
.032	Coils and Cut Lengths 23 ¹ / ₁₆	1.3056
.035	Coils and Cut Lengths 23 ¹ / ₁₆	1.4280
.042	Coils and Cut Lengths 23 ¹ / ₁₆	1.7136
.048	Coils and Cut Lengths 23 ¹ / ₁₆	1.9584
.050	Coils and Cut Lengths 23 ¹ / ₁₆	2.0400
.058	Coils and Cut Lengths 23 ¹ / ₁₆	2.3664
.062	Coils and Cut Lengths 23 ¹ / ₁₆	2.5296
.065	Coils and Cut Lengths 23 ¹ / ₁₆	2.6520
.072	Coils and Cut Lengths 18	2.9376
.078	Coils and Cut Lengths 18	3.1824
.083	Coils and Cut Lengths 18	3.3864
.093	Coils 18	3.7944
.109	Cut Lengths only 18	4.4472
.125	Cut Lengths only 18	5.1000

*Standard for Cut Lengths: 96 Inches.

COLD ROLLED STRIP STEEL

No. 4 TEMPER

SKIN ROLLED

LOW CARBON COLD ROLLED

MEAN TENSILE 48,000 P. S. I.

ROCKWELL B52/64

Decimal Thickness	Maximum Width, Inches	Weight Per Square Foot
.010	Coils and Cut Lengths 23 ¹ / ₁₆	.4080
.012	Coils and Cut Lengths 23 ¹ / ₁₆	.4896
.0135	Coils and Cut Lengths 23 ¹ / ₁₆	.5508
.015	Coils and Cut Lengths 23 ¹ / ₁₆	.6210
.0165	Coils and Cut Lengths 23 ¹ / ₁₆	.6732
.018	Coils and Cut Lengths 23 ¹ / ₁₆	.7344
.020	Coils and Cut Lengths 23 ¹ / ₁₆	.8160
.022	Coils and Cut Lengths 23 ¹ / ₁₆	.8976
.025	Coils and Cut Lengths 23 ¹ / ₁₆	1.0200
.028	Coils and Cut Lengths 23 ¹ / ₁₆	1.1424
.030	Coils and Cut Lengths 23 ¹ / ₁₆	1.2240
.032	Coils and Cut Lengths 23 ¹ / ₁₆	1.3056
.035	Coils and Cut Lengths 23 ¹ / ₁₆	1.4280
.040	Coils and Cut Lengths 23 ¹ / ₁₆	1.6320
.042	Coils and Cut Lengths 23 ¹ / ₁₆	1.7136
.045	Coils and Cut Lengths 23 ¹ / ₁₆	1.8360
.048	Coils and Cut Lengths 23 ¹ / ₁₆	1.9584
.050	Coils and Cut Lengths 23 ¹ / ₁₆	2.0400
.058	Coils and Cut Lengths 23 ¹ / ₁₆	2.3664
.062	Coils and Cut Lengths 23 ¹ / ₁₆	2.5296
.065	Coils and Cut Lengths 23 ¹ / ₁₆	2.6520
.072	Coils and Cut Lengths 18	2.9376
.078	Coils and Cut Lengths 18	3.1824
.083	Coils and Cut Lengths 18	3.3864
.093	Coils 18	3.7944
.109	Cut Lengths only 18	4.4472
.125	Cut Lengths only 18	5.1000
.134	Cut Lengths only 16	5.4672
.156	Cut Lengths only 16	6.3648
.187	Cut Lengths only 16	7.6296

*Standard for Cut Lengths: 96 Inches.

COLD ROLLED STRIP STEEL

No. 5 TEMPER

SKIN ROLLED

LOW CARBON COLD ROLLED

MEAN TENSILE 48,000 P. S. I.

ROCKWELL B52/64

Decimal Thickness	Maximum Width, Inches	Weight Per Square Foot
.010	Coils and Cut Lengths 23 ¹ / ₁₆	.4080
.012	Coils and Cut Lengths 23 ¹ / ₁₆	.4896
.0135	Coils and Cut Lengths 23 ¹ / ₁₆	.5508
.015	Coils and Cut Lengths 23 ¹ / ₁₆	.6210
.0165	Coils and Cut Lengths 23 ¹ / ₁₆	.6732
.018	Coils and Cut Lengths 23 ¹ / ₁₆	.7344
.020	Coils and Cut Lengths 23 ¹ / ₁₆	.8160
.022	Coils and Cut Lengths 23 ¹ / ₁₆	.8976
.025	Coils and Cut Lengths 23 ¹ / ₁₆	1.0200
.028	Coils and Cut Lengths 23 ¹ / ₁₆	1.1424
.030	Coils and Cut Lengths 23 ¹ / ₁₆	1.2240
.032	Coils and Cut Lengths 23 ¹ / ₁₆	1.3056
.035	Coils and Cut Lengths 23 ¹ / ₁₆	1.4280
.040	Coils and Cut Lengths 23 ¹ / ₁₆	1.6320
.042	Coils and Cut Lengths 23 ¹ / ₁₆	1.7136
.045	Coils and Cut Lengths 23 ¹ / ₁₆	1.8360
.048	Coils and Cut Lengths 23 ¹ / ₁₆	1.9584
.050	Coils and Cut Lengths 23 ¹ / ₁₆	2.0400
.058	Coils and Cut Lengths 23 ¹ / ₁₆	2.3664
.062	Coils and Cut Lengths 23 ¹ / ₁₆	2.5296
.065	Coils and Cut Lengths 23 ¹ / ₁₆	2.6520
.072	Coils and Cut Lengths 18	2.9376
.078	Coils and Cut Lengths 18	3.1824
.083	Coils and Cut Lengths 18	3.3864
.093	Coils 18	3.7944
.109	Cut Lengths only 18	4.4472
.125	Cut Lengths only 18	5.1000
.134	Cut Lengths only 16	5.4672
.156	Cut Lengths only 16	6.3648
.187	Cut Lengths only 16	7.6296

*Standard for Cut Lengths: 96 Inches.

*NOTE—Indicates Soft No. 5 Temper (Dead Soft)—Rockwell B 38/62. Mean tensile 44000 P.S.I. Has had a final annealing after leaving the finishing rolls. Suitable for severe forming and difficult drawing. Will bend down flat on itself both ways of the grain. Not recommended where surface strains are apt to develop which would be objectionable.

LOW CARBON SHEET STEEL
GAUGE WEIGHT—GAUGE THICKNESS AND ORDERING LIMITS

Gauge No.	Thickness In.		Lbs. Sq. Ft.	
	Dec. Equiv.	Order Limits	Wght. Equiv.	Order Limits
2	*	.2499 .2466	*	10.451 10.313
3	.2391	.2465 .2317	10.	10.312 9.688
4	.2242	.2316 .2168	9.375	9.687 9.063
5	.2092	.2167 .2018	8.75	9.062 8.438
6	.1943	.2017 .1869	8.125	8.437 7.813
7	.1793	.1868 .1719	7.5	7.812 7.188
8	.1644	.1718 .1570	6.875	7.187 6.563
9	.1495	.1569 .1420	6.25	6.562 5.938
10	.1345	.1419 .1271	5.625	5.937 5.313
11	.1196	.1270 .1121	5.	5.312 4.688
12	.1046	.1120 .0972	4.375	4.687 4.063
13	.0897	.0971 .0822	3.75	4.062 3.438
14	.0747	.0821 .0710	3.125	3.437 2.969
15	.0673	.0709 .0636	2.812	2.968 2.657
16	.0598	.0635 .0568	2.5	2.656 2.375
17	.0538	.0567 .0509	2.25	2.374 2.125
18	.0478	.0508 .0449	2.	2.124 1.875
19	.0418	.0448 .0389	1.75	1.874 1.625
20	.0359	.0388 .0344	1.5	1.624 1.438
21	.0329	.0343 .0314	1.375	1.437 1.313
22	.0299	.0313 .0284	1.25	1.312 1.188
23	.0269	.0283 .0255	1.125	1.187 1.063
24	.0239	.0254 .0225	1.	1.062 .938
25	.0209	.0224 .0195	.875	.937 .813
26	.0179	.0194 .0172	.75	.812 .719
27	.0164	.0171 .0157	.688	.718 .657
28	.0149	.0156 .0142	.625	.656 .594
29	.0135	.0141 .0128	.562	.593 .532
30	.0120	.0127 .0113	.5	.531 .469

CIRCUMFERENCE AND AREA OF STEEL CIRCLES

Diameter in Inches		Circumference in		Area Sq. Ft.	Diameter in Inches		Circumference in		Area Sq. Ft.
		Ft.	In.		Ft.	In.	Ft.	In.	
1/16			13/64		8 3/8	2	2 1/4	38.26	
1/8			25/64		8 1/2		2 11/16	39.41	
3/16			19/32		8 5/8		3 1/16	40.57	
1/4			25/32		8 3/4		3 3/8	41.76	
5/16			63/64		8 7/8		3 5/8	42.96	
3/8			11 1/64		9		4 1/4	44.18	
7/16			1 3/8		9 1/8		4 5/8	45.41	
1/2			1 37/64		9 1/4		5	46.67	
9/16			1 49/64		9 3/8		5 5/8	47.94	
5/8			1 15/16		9 1/2		5 13/16	49.22	
11/16			2 7/32		9 5/8		6 1/16	50.53	
3/4			2 23/64		9 3/4		6 5/8	51.85	
13/16			2 3/4		9 7/8		7	53.19	
7/8			2 3/4		10		7 3/8	54.54	
15/16			2 15/16		10 1/8		7 3/4	55.91	
1			3 3/4	.0055	10 1/4		8 1/16	57.30	
1 1/8			3 1/2	.0069	10 3/8		8 3/8	58.71	
1 1/4			3 7/8	.0085	10 1/2		8 11/16	60.13	
1 3/8			4 1/16	.0103	10 5/8		9 3/16	61.57	
1 1/2			4 1/4	.0123	10 3/4		9 3/4	63.03	
1 5/8			5 1/16	.0144	10 7/8		10 1/8	64.50	
1 3/4			5 1/8	.0167	11		10 1/2	66.00	
1 7/8			5 3/8	.0192	11 1/8		10 5/8	67.50	
2			6 1/4	.0218	11 1/4		11 1/16	69.02	
2 1/8			6 3/8	.0246	11 3/8		11 3/8	70.57	
2 1/4			7	.0276	11 1/2		11 7/8	72.13	
2 3/8			7 1/8	.0308	11 5/8		12 1/8	73.71	
2 1/2			7 1/4	.0341	11 3/4		12 1/2	75.30	
2 5/8			8 1/16	.0376	11 7/8		1 1/4	76.90	
2 3/4			8 3/8	.0412	12		1 1/8	78.54	
2 7/8			9	.0451	12 1/8		1 1/4	80.19	
3			9 3/8	.0491	12 1/4		2 1/16	81.85	
3 1/8			9 13/16	.0533	12 3/8		2 1/8	83.53	
3 1/4			10 3/16	.0576	12 1/2		2 3/4	85.23	
3 3/8			10 9/16	.0621	12 5/8		3 1/8	86.94	
3 1/2			10 13/16	.0668	12 3/4		3 3/8	88.67	
3 5/8			11 3/8	.0717	12 7/8		4	90.41	
3 3/4			11 1/4	.0767	13		4 1/8	92.18	
3 7/8			11 3/8	.0819	13 1/8		4 1/4	93.96	
4			11 7/8	.0873	13 1/4		4 5/8	95.76	
4 1/8			12 1/16	.0928	13 3/8		5 1/8	97.57	
4 1/4			12 1/8	.0985	13 1/2		6	99.40	
4 3/8			12 1/4	.1044	13 5/8		6 3/8	101.3	
4 1/2			12 3/8	.1104	13 3/4		6 5/8	103.1	
4 5/8			12 1/2	.1167	13 7/8		7 1/16	105.0	
4 3/4			12 5/8	.1230	14		7 1/4	106.9	
4 7/8			13 1/16	.1297	14 1/8		7 3/8	108.8	
5			13 1/4	.1364	14 1/4		8 1/8	110.8	
5 1/8			13 3/8	.1433	14 3/8		8 3/4	112.7	
5 1/4			13 7/8	.1503	14 1/2		9 1/8	114.7	
5 3/8			14 1/8	.1575	14 5/8		9 1/2	116.7	
5 1/2			14 1/4	.1650	14 3/4		9 3/4	118.7	
5 5/8			14 3/8	.1726	14 7/8		10 1/16	120.7	
5 3/4			14 7/8	.1803	15		10 1/2	122.7	
5 7/8			15 1/8	.1883	15 1/8		11 1/16	124.8	
6			15 1/4	.1964	15 1/4		11 1/2	126.8	
6 1/8			15 3/8	.2046	15 3/8		11 3/8	128.9	
6 1/4			15 7/8	.2131	15 1/2		11 7/8	131.0	
6 3/8			16 1/16	.2217	15 5/8		12 1/8	133.2	
6 1/2			16 1/8	.2304	15 3/4		12 3/8	135.3	
6 5/8			16 1/4	.2394	15 7/8		12 1/2	137.5	
6 3/4			16 3/8	.2485	16		13 1/8	139.6	
6 7/8			16 7/8	.2578	16 1/8		13 3/8	141.8	
7			17 1/16	.2673	16 1/4		14	144.0	
7 1/8			17 1/8	.2763	16 3/8		14 1/4	146.3	
7 1/4			17 1/4	.2867	16 1/2		14 1/2	148.5	
7 3/8			17 3/8	.2966	16 5/8		14 3/4	150.8	
7 1/2			17 1/2	.3068	16 3/4		15 1/8	153.0	
7 5/8			17 5/8	.3164	16 7/8		15 3/8	155.3	
7 3/4			17 7/8	.3275	17		15 7/8	157.6	
7 7/8			18 1/16	.3382	17 1/8		16 1/8	159.9	
8			18 1/8	.3491	17 1/4		16 1/4	162.3	
8 1/8			18 1/4	.3601	17 3/8		16 3/8	164.7	
8 1/4			18 1/2	.3712	17 1/2		16 1/2	167.0	

(Continued on following page)

*Note: To obtain weight of circle, multiply area per sq. ft. x weight per sq. ft. of gauge of steel circle used. See page 180 for weight per sq. ft.

CIRCUMFERENCE AND AREA OF STEEL CIRCLES

Diameter in Inches	Circumference in		Area Sq. Ft.	Diameter in Inches	Circumference in		Area Sq. Ft.
	Ft.	In.			Ft.	In.	
17 $\frac{5}{8}$	4	7 $\frac{5}{16}$	1.694	29 $\frac{3}{4}$	7	97 $\frac{1}{16}$	4.827
17 $\frac{3}{4}$	4	7 $\frac{3}{4}$	1.712	30	7	10 $\frac{3}{16}$	4.908
17 $\frac{1}{2}$	4	8 $\frac{1}{8}$	1.743	30 $\frac{1}{4}$	7	11	4.990
18	4	8 $\frac{1}{2}$	1.767	30 $\frac{1}{2}$	7	11 $\frac{3}{16}$	5.073
18 $\frac{1}{8}$	4	8 $\frac{1}{4}$	1.792	30 $\frac{3}{4}$	8	11 $\frac{1}{2}$	5.157
18 $\frac{1}{4}$	4	9 $\frac{1}{16}$	1.817	31	8	1 $\frac{3}{8}$	5.241
18 $\frac{3}{8}$	4	9 $\frac{1}{4}$	1.842	31 $\frac{1}{4}$	8	2 $\frac{1}{8}$	5.326
18 $\frac{1}{2}$	4	10 $\frac{1}{16}$	1.866	31 $\frac{1}{2}$	8	2 $\frac{1}{4}$	5.412
18 $\frac{3}{4}$	4	10 $\frac{1}{2}$	1.892	31 $\frac{3}{4}$	8	3 $\frac{1}{16}$	5.498
18 $\frac{7}{8}$	4	10 $\frac{3}{8}$	1.918	32	8	4 $\frac{1}{2}$	5.585
19	4	11 $\frac{1}{4}$	1.943	32 $\frac{1}{4}$	8	5 $\frac{1}{8}$	5.672
19 $\frac{1}{8}$	4	11 $\frac{1}{8}$	1.968	32 $\frac{1}{2}$	8	6 $\frac{1}{16}$	5.760
19 $\frac{1}{4}$	5	1 $\frac{1}{16}$	1.995	32 $\frac{3}{4}$	8	6 $\frac{3}{8}$	5.849
19 $\frac{3}{8}$	5	1 $\frac{1}{8}$	2.021	33	8	7 $\frac{1}{8}$	5.939
19 $\frac{1}{2}$	5	1 $\frac{1}{4}$	2.047	33 $\frac{1}{4}$	8	8 $\frac{1}{16}$	6.029
19 $\frac{3}{4}$	5	1 $\frac{3}{8}$	2.074	33 $\frac{1}{2}$	8	9 $\frac{1}{16}$	6.121
19 $\frac{7}{8}$	5	1 $\frac{7}{8}$	2.100	33 $\frac{3}{4}$	8	10	6.212
20	5	2	2.127	34	8	10 $\frac{3}{16}$	6.305
20 $\frac{1}{8}$	5	2 $\frac{1}{16}$	2.154	34 $\frac{1}{4}$	8	11 $\frac{1}{16}$	6.398
20 $\frac{1}{4}$	5	2 $\frac{1}{8}$	2.181	34 $\frac{1}{2}$	9	1 $\frac{3}{8}$	6.490
20 $\frac{3}{8}$	5	2 $\frac{1}{4}$	2.209	34 $\frac{3}{4}$	9	1 $\frac{7}{8}$	6.581
20 $\frac{1}{2}$	5	2 $\frac{3}{8}$	2.237	35	9	2 $\frac{1}{16}$	6.681
20 $\frac{3}{4}$	5	2 $\frac{7}{8}$	2.264	35 $\frac{1}{4}$	9	2 $\frac{1}{8}$	6.771
20 $\frac{7}{8}$	5	3	2.292	35 $\frac{1}{2}$	9	3 $\frac{1}{16}$	6.873
21	5	3 $\frac{1}{8}$	2.320	35 $\frac{3}{4}$	9	4 $\frac{1}{8}$	6.970
21 $\frac{1}{8}$	5	3 $\frac{1}{4}$	2.348	36	9	5 $\frac{1}{16}$	7.068
21 $\frac{1}{4}$	5	3 $\frac{3}{8}$	2.377	36 $\frac{1}{4}$	9	5 $\frac{3}{8}$	7.167
21 $\frac{3}{8}$	5	3 $\frac{7}{8}$	2.405	36 $\frac{1}{2}$	9	6 $\frac{1}{16}$	7.266
21 $\frac{1}{2}$	5	4	2.434	36 $\frac{3}{4}$	9	7 $\frac{1}{8}$	7.361
21 $\frac{3}{4}$	5	4 $\frac{1}{8}$	2.463	37	9	8 $\frac{1}{16}$	7.466
21 $\frac{7}{8}$	5	4 $\frac{1}{4}$	2.492	37 $\frac{1}{4}$	9	9	7.568
22	5	4 $\frac{1}{2}$	2.521	37 $\frac{1}{2}$	9	9 $\frac{3}{8}$	7.670
22 $\frac{1}{8}$	5	4 $\frac{3}{4}$	2.551	37 $\frac{3}{4}$	9	10 $\frac{1}{16}$	7.770
22 $\frac{1}{4}$	5	5	2.580	38	9	11 $\frac{1}{8}$	7.875
22 $\frac{3}{8}$	5	5 $\frac{1}{8}$	2.607	38 $\frac{1}{4}$	10	1 $\frac{1}{4}$	7.979
22 $\frac{1}{2}$	5	5 $\frac{1}{4}$	2.639	38 $\frac{1}{2}$	10	1 $\frac{3}{8}$	8.081
22 $\frac{3}{4}$	5	5 $\frac{3}{8}$	2.670	38 $\frac{3}{4}$	10	1 $\frac{7}{8}$	8.189
23	5	5 $\frac{7}{8}$	2.700	39	10	2 $\frac{1}{16}$	8.295
23 $\frac{1}{8}$	5	6	2.730	39 $\frac{1}{4}$	10	3 $\frac{1}{16}$	8.403
23 $\frac{1}{4}$	5	6 $\frac{1}{8}$	2.761	39 $\frac{1}{2}$	10	4 $\frac{1}{16}$	8.509
23 $\frac{3}{8}$	5	6 $\frac{1}{4}$	2.792	39 $\frac{3}{4}$	10	4 $\frac{3}{8}$	8.618
23 $\frac{1}{2}$	5	6 $\frac{3}{8}$	2.823	40	10	5 $\frac{1}{16}$	8.726
23 $\frac{3}{4}$	5	6 $\frac{7}{8}$	2.854	40 $\frac{1}{4}$	10	5 $\frac{3}{8}$	8.831
24	6	7	2.885	40 $\frac{1}{2}$	10	6 $\frac{1}{16}$	8.941
24 $\frac{1}{8}$	6	7 $\frac{1}{8}$	2.917	40 $\frac{3}{4}$	10	7	9.051
24 $\frac{1}{4}$	6	7 $\frac{1}{4}$	2.948	41	10	8 $\frac{1}{16}$	9.168
24 $\frac{3}{8}$	6	7 $\frac{3}{8}$	2.980	41 $\frac{1}{4}$	10	9 $\frac{1}{16}$	9.280
24 $\frac{1}{2}$	6	7 $\frac{1}{2}$	3.012	41 $\frac{1}{2}$	10	10 $\frac{1}{16}$	9.391
24 $\frac{3}{4}$	6	8	3.044	41 $\frac{3}{4}$	10	11 $\frac{1}{16}$	9.501
25	6	8 $\frac{1}{8}$	3.076	42	10	11 $\frac{3}{16}$	9.621
25 $\frac{1}{8}$	6	8 $\frac{1}{4}$	3.109	42 $\frac{1}{4}$	11	1 $\frac{1}{2}$	9.736
25 $\frac{1}{4}$	6	8 $\frac{1}{2}$	3.141	42 $\frac{1}{2}$	11	2 $\frac{1}{4}$	9.851
25 $\frac{3}{8}$	6	8 $\frac{3}{4}$	3.174	42 $\frac{3}{4}$	11	2 $\frac{3}{8}$	9.948
25 $\frac{1}{2}$	6	9	3.207	43	11	3 $\frac{1}{16}$	10.084
25 $\frac{3}{4}$	6	9 $\frac{1}{8}$	3.241	43 $\frac{1}{4}$	11	3 $\frac{3}{8}$	10.202
26	6	9 $\frac{1}{4}$	3.274	43 $\frac{1}{2}$	11	4 $\frac{1}{16}$	10.320
26 $\frac{1}{8}$	6	9 $\frac{3}{8}$	3.307	43 $\frac{3}{4}$	11	4 $\frac{3}{8}$	10.439
26 $\frac{1}{4}$	6	9 $\frac{1}{2}$	3.341	44	11	5 $\frac{1}{16}$	10.559
26 $\frac{3}{8}$	6	9 $\frac{5}{8}$	3.374	44 $\frac{1}{4}$	11	6 $\frac{1}{16}$	10.679
26 $\frac{1}{2}$	6	10	3.408	44 $\frac{1}{2}$	11	7 $\frac{3}{8}$	10.800
26 $\frac{3}{4}$	6	10 $\frac{1}{8}$	3.442	44 $\frac{3}{4}$	11	8 $\frac{1}{16}$	10.922
27	7	10 $\frac{1}{4}$	3.477	45	11	9 $\frac{1}{8}$	11.044
27 $\frac{1}{8}$	7	10 $\frac{3}{8}$	3.511	45 $\frac{1}{4}$	11	10 $\frac{1}{16}$	11.161
27 $\frac{1}{4}$	7	10 $\frac{1}{2}$	3.545	45 $\frac{1}{2}$	11	10 $\frac{3}{8}$	11.290
27 $\frac{3}{8}$	7	10 $\frac{3}{4}$	3.579	45 $\frac{3}{4}$	11	11 $\frac{1}{16}$	11.415
27 $\frac{1}{2}$	7	11	3.613	46	12	1 $\frac{1}{2}$	11.540
28	7	11 $\frac{1}{8}$	3.647	46 $\frac{1}{4}$	12	1 $\frac{7}{8}$	11.666
28 $\frac{1}{8}$	7	11 $\frac{1}{4}$	3.681	46 $\frac{1}{2}$	12	2 $\frac{1}{16}$	11.793
28 $\frac{1}{4}$	7	11 $\frac{3}{8}$	3.715	46 $\frac{3}{4}$	12	2 $\frac{1}{8}$	11.920
28 $\frac{3}{8}$	7	11 $\frac{1}{2}$	3.749	47	12	3 $\frac{1}{16}$	12.048
28 $\frac{1}{2}$	7	11 $\frac{5}{8}$	3.783	47 $\frac{1}{4}$	12	3 $\frac{3}{8}$	12.177
28 $\frac{3}{4}$	7	12	3.817	47 $\frac{1}{2}$	12	4 $\frac{1}{16}$	12.306
29	7	12 $\frac{1}{8}$	3.851	47 $\frac{3}{4}$	12	5 $\frac{1}{16}$	12.436
29 $\frac{1}{8}$	7	12 $\frac{1}{4}$	3.885	48			
29 $\frac{1}{4}$	7	12 $\frac{3}{8}$	3.919				
29 $\frac{3}{8}$	7	12 $\frac{1}{2}$	3.953				
29 $\frac{1}{2}$	7	12 $\frac{5}{8}$	3.987				
		13	4.021				
		13 $\frac{1}{8}$	4.055				
		13 $\frac{1}{4}$	4.089				
		13 $\frac{3}{8}$	4.123				
		13 $\frac{1}{2}$	4.157				
		13 $\frac{5}{8}$	4.191				
		14	4.225				
		14 $\frac{1}{8}$	4.259				
		14 $\frac{1}{4}$	4.293				
		14 $\frac{3}{8}$	4.327				
		14 $\frac{1}{2}$	4.361				
		14 $\frac{5}{8}$	4.395				
		15	4.429				
		15 $\frac{1}{8}$	4.463				
		15 $\frac{1}{4}$	4.497				
		15 $\frac{3}{8}$	4.531				
		15 $\frac{1}{2}$	4.565				
		15 $\frac{5}{8}$	4.599				
		16	4.633				
		16 $\frac{1}{8}$	4.667				
		16 $\frac{1}{4}$	4.701				
		16 $\frac{3}{8}$	4.735				
		16 $\frac{1}{2}$	4.769				
		16 $\frac{5}{8}$	4.803				
		17	4.837				

(Continued on following page)

*Note: To obtain weight of circle, multiply area per sq. ft. x weight per sq. ft. of gauge of steel circle used. See page 180 for weight per sq. ft.

CIRCUMFERENCE AND AREA OF STEEL CIRCLES

Diameter in Inches	Circumference in		Area Sq. Ft.	Diameter in Inches	Circumference in		Area Sq. Ft.
	Ft.	In.			Ft.	In.	
48 1/4	12	6 3/4	12.566	66 1/2	17	4 7/8	24.119
48 1/2	12	7 7/16	12.697	66 3/4	17	5 1/16	24.307
48 3/4	12	8 5/16	12.829	67	17	6 7/16	24.484
49	12	9 1/8	12.961	67 1/4	17	7 1/4	24.667
49 1/4	12	9 9/16	13.095	67 1/2	17	8	24.851
49 1/2	12	10 1/16	13.229	67 3/4	17	8 3/16	25.035
49 3/4	13	11 1/2	13.363	68	17	9 5/8	25.220
50	13	1 1/4	13.499	68 1/4	17	10 3/8	25.406
50 1/4	13	1 1/16	13.635	68 1/2	17	11 1/16	25.592
50 1/2	13	2 5/8	13.772	68 3/4	17	11 5/8	25.779
50 3/4	13	3 3/8	13.909	69	18	12 3/4	25.967
51	13	4 3/16	14.047	69 1/4	18	1 1/2	26.156
51 1/4	13	5	14.186	69 1/2	18	2 7/16	26.345
51 1/2	13	5 3/4	14.325	69 3/4	18	3 3/8	26.535
51 3/4	13	6 1/8	14.465	70	18	3 7/8	26.725
52	13	7 5/16	14.606	70 1/4	18	4 1/16	26.920
52 1/4	13	8 1/8	14.748	70 1/2	18	5 7/16	27.110
52 1/2	13	8 5/8	14.890	70 3/4	18	6 1/4	27.301
52 3/4	13	9 1/16	15.033	71	18	7	27.494
53	13	10 1/2	15.176	71 1/4	18	7 3/16	27.690
53 1/4	13	11 1/4	15.320	71 1/2	18	8 3/16	27.881
53 1/2	14	1 1/16	15.465	71 3/4	18	9 3/8	28.080
53 3/4	14	1 1/8	15.611	72	18	10 1/16	28.274
54	14	1 3/8	15.757	72 1/2	19	11 3/4	28.670
54 1/4	14	2 3/8	15.904	73	19	1 1/16	29.065
54 1/2	14	2 7/8	16.052	73 1/2	19	2 7/8	29.465
54 3/4	14	3 3/16	16.200	74	19	4 7/16	29.867
55	14	4	16.349	74 1/2	19	6	30.272
55 1/4	14	4 3/4	16.499	75	19	7 9/16	30.680
55 1/2	14	5 9/16	16.649	75 1/2	19	9 3/16	31.090
55 3/4	14	6 5/16	16.800	76	19	10 3/4	31.503
56	14	7 1/8	16.952	76 1/2	20	1 5/16	31.920
56 1/4	14	7 5/8	17.104	77	20	1 7/8	32.338
56 1/2	14	8 1/16	17.257	77 1/2	20	3 7/16	32.759
56 3/4	14	9 1/2	17.411	78	20	5	33.183
57	14	10 1/4	17.565	78 1/2	20	6 9/16	33.610
57 1/4	14	11 1/16	17.721	79	20	8 1/8	34.039
57 1/2	15	1 1/8	17.876	79 1/2	20	9 3/4	34.472
57 3/4	15	1 3/8	18.032	80	20	11 1/16	34.907
58	15	2 3/16	18.190	80 1/2	21	1 7/8	35.344
58 1/4	15	2 1/2	18.348	81	21	2 7/16	35.785
58 1/2	15	2 9/16	18.506	81 1/2	21	4	36.228
58 3/4	15	3 3/8	18.665	82	21	5 9/16	36.674
59	15	4 9/16	18.825	82 1/2	21	7 1/8	37.122
59 1/4	15	5 5/16	18.986	83	21	8 3/4	37.574
59 1/2	15	6 1/8	19.147	83 1/2	21	10 5/16	38.028
59 3/4	15	6 5/8	19.309	84	21	11 7/8	38.485
60	15	7 1/16	19.471	84 1/2	22	1 1/8	38.944
60 1/4	15	8 7/16	19.635	85	22	3	39.406
60 1/2	15	9 1/4	19.799	85 1/2	22	4 9/16	39.872
60 3/4	15	10 1/16	19.964	86	22	6 1/8	40.339
61	15	10 13/16	20.129	86 1/2	22	7 1/16	40.809
61 1/4	16	11 1/16	20.295	87	22	9 5/16	41.282
61 1/2	16	1 3/8	20.462	87 1/2	22	10 7/8	41.758
61 3/4	16	2 3/16	20.623	88	23	1 7/16	42.237
62	16	2 3/4	20.797	88 1/2	23	2	42.718
62 1/4	16	3 3/16	20.966	89	23	3 9/16	43.202
62 1/2	16	4 5/16	21.135	89 1/2	23	5 1/8	43.689
62 3/4	16	5 1/8	21.306	90	23	6 1/16	44.177
63	16	5 5/8	21.476	90 1/2	23	8 5/16	44.671
63 1/4	16	6 1/16	21.648	91	23	9 7/8	45.166
63 1/2	16	7 7/16	21.819	91 1/2	23	11 1/16	45.663
63 3/4	16	8 1/4	21.992	92	24	1	46.164
64	16	9	22.166	92 1/2	24	1 9/16	46.667
64 1/4	16	9 13/16	22.340	93	24	4 9/8	47.173
64 1/2	16	10 5/8	22.515	93 1/2	24	5 1/16	47.681
64 3/4	16	11 3/16	22.695	94	24	7 1/4	48.193
65	17	1 3/8	22.867	94 1/2	24	8 3/8	48.707
65 1/4	17	1 1/2	23.044	95	24	10 7/16	49.224
65 1/2	17	2 1/16	23.222	95 1/2	25	1 3/16	49.743
65 3/4	17	2 1/2	23.400	96	25	3 1/8	50.265
66	17	3 1/8	23.578	96 1/2	25	4 1/16	50.790
66 1/4	17	3 5/8	23.758	97	25	5 1/8	51.318
66 1/2	17	4 1/8	23.939	97 1/2	25	6 1/4	51.849

(Continued on following page)

*Note: To obtain weight of circle, multiply area per sq. ft. x weight per sq. ft. of gauge of steel circle used. See page 180 for weight per sq. ft.

CIRCUMFERENCE AND AREA OF STEEL CIRCLES

Diameter in Inches	Circumference in		Area Sq. Ft.	Diameter in Inches	Circumference in		Area Sq. Ft.
	Fl.	In.			Fl.	In.	
98	25	7 ⁷ / ₈	52.382	109 1/2	28	8	65.396
98 1/2	25	9 ¹ / ₁₆	52.917	110	28	9 ⁹ / ₁₆	65.995
99	25	11	53.456	110 1/2	28	11 ¹ / ₈	66.596
99 1/2	26	9 ⁹ / ₁₆	53.997	111	29	11 ¹¹ / ₁₆	67.201
100	26	2 ¹ / ₈	54.542	111 1/2	29	2 ¹ / ₄	67.808
100 1/2	26	3 ¹ / ₁₆	55.088	112	29	3 ¹³ / ₁₆	68.417
101	26	5 ¹ / ₄	55.638	112 1/2	29	5 ³ / ₈	69.030
101 1/2	26	6 ¹ / ₁₆	56.191	113	29	7	69.644
102	26	8 ⁷ / ₁₆	56.745	113 1/2	29	8 ³ / ₁₆	70.262
102 1/2	26	10	57.303	114	29	10 ¹ / ₈	70.882
103	26	11 ¹ / ₁₆	57.863	114 1/2	29	11 ¹¹ / ₁₆	71.506
103 1/2	27	1 ¹ / ₈	58.427	115	30	1 ¹ / ₄	72.131
104	27	2 ¹ / ₁₆	58.992	115 1/2	30	2 ¹³ / ₁₆	72.759
104 1/2	27	4 ¹ / ₄	59.562	116	30	4 ³ / ₈	73.391
105	27	5 ³ / ₁₆	60.132	116 1/2	30	5 ¹⁵ / ₁₆	74.026
105 1/2	27	7 ¹ / ₁₆	60.705	117	30	7 ⁹ / ₁₆	74.662
106	27	9	61.283	117 1/2	30	9 ¹ / ₈	75.301
106 1/2	27	10 ³ / ₁₆	61.861	118	30	10 ¹¹ / ₁₆	75.944
107	28	1 ¹ / ₈	62.446	118 1/2	31	1 ¹ / ₄	76.589
107 1/2	28	1 ¹ / ₁₆	63.030	119	31	1 ¹³ / ₁₆	77.236
108	28	3 ¹ / ₄	63.617	119 1/2	31	3 ³ / ₈	77.887
108 1/2	28	4 ¹ / ₁₆	64.208	120	31	4 ¹⁵ / ₁₆	78.540
109	28	6 ⁵ / ₈	64.801				

*Note: To obtain weight of circle, multiply area per sq. ft. x weight per sq. ft. of gauge of steel circle used. See page 180 for weight per sq. ft.



Electronic scales like this are placed strategically throughout the warehouse to provide a printed weight ticket for every customer on every shipment. Crane scales supplement the work of these floor scales. Each scale is tested and sealed by the city regularly, assuring the most accurate weight possible. Another innovation and safeguard to protect our customers.

WEIGHT OF COLD ROLLED STEEL

Table of Pounds per Lineal Foot

Decimal Thickness	Width in Inches						
	¼	⅓	⅔	¾	½	⅞	1
.2757	.2343	.2929	.3515	.4101	.4687	.5273	.5859
.2604	.2213	.2767	.3320	.3873	.4427	.4980	.5534
.2451	.2083	.2604	.3125	.3646	.4167	.4688	.5208
.2298	.1953	.2442	.2930	.3418	.3907	.4395	.4883
.2145	.1823	.2279	.2735	.3191	.3647	.4102	.4558
.1991	.1692	.2115	.2539	.2962	.3385	.3808	.4231
.1838	.1562	.1953	.2343	.2734	.3125	.3515	.3906
.1685	.1432	.1790	.2148	.2506	.2865	.3223	.3581
.1532	.1302	.1628	.1953	.2279	.2604	.2930	.3256
.1379	.1172	.1465	.1758	.2051	.2344	.2637	.2930
.125	.1063	.1328	.1594	.1859	.2125	.2391	.2656
.1225	.1041	.1302	.1562	.1822	.2083	.2343	.2603
.120	.1020	.1275	.1530	.1785	.2040	.2295	.2550
.109	.0927	.1158	.1390	.1621	.1853	.2085	.2316
.1072	.0911	.1139	.1367	.1595	.1822	.2050	.2278
.09375	.0797	.0996	.1195	.1395	.1594	.1793	.1992
.0919	.0781	.0976	.1172	.1367	.1562	.1758	.1953
.083	.0706	.0882	.1058	.1235	.1411	.1587	.1764
.0766	.0651	.0814	.0977	.1139	.1302	.1465	.1628
.0689	.0586	.0732	.0878	.1025	.1171	.1318	.1464
.065	.0553	.0691	.0829	.0967	.1105	.1243	.1381
.0625	.0531	.0664	.0797	.0930	.1063	.1195	.1328
.0613	.0521	.0651	.0782	.0912	.1042	.1172	.1303
.0551	.0468	.0585	.0703	.0820	.0937	.1054	.1171
.050	.0425	.0531	.0638	.0744	.0850	.0956	.1063
.049	.0417	.0521	.0625	.0729	.0833	.0937	.1041
.0429	.0365	.0456	.0547	.0638	.0729	.0820	.0912
.0375	.0319	.0398	.0478	.0558	.0638	.0717	.0797
.0368	.0313	.0391	.0469	.0547	.0626	.0704	.0782
.035	.0298	.0372	.0446	.0521	.0595	.0669	.0744
.0337	.0286	.0358	.0430	.0501	.0573	.0645	.0716
.0306	.0260	.0325	.0390	.0455	.0520	.0585	.0650
.0276	.0235	.0293	.0352	.0411	.0469	.0528	.0587
.025	.0213	.0266	.0319	.0372	.0425	.0478	.0531
.0245	.0208	.0260	.0312	.0364	.0417	.0469	.0521
.0214	.0182	.0227	.0273	.0318	.0364	.0409	.0455
.0184	.0156	.0196	.0235	.0274	.0313	.0352	.0391
.0169	.0144	.0180	.0215	.0251	.0287	.0323	.0359
.0153	.0130	.0163	.0195	.0228	.0260	.0293	.0325
.0138	.0117	.0147	.0176	.0205	.0235	.0264	.0293
.0123	.0105	.0131	.0157	.0183	.0209	.0235	.0261
.011	.0094	.0117	.0140	.0164	.0187	.0210	.0234
.010	.0085	.0106	.0128	.0149	.0170	.0191	.0213
.009	.0077	.0096	.0115	.0134	.0153	.0172	.0191
.008	.0068	.0085	.0102	.0119	.0136	.0153	.0170
.007	.0060	.0074	.0089	.0104	.0119	.0134	.0149
.006	.0051	.0064	.0077	.0089	.0102	.0115	.0128
.005	.0043	.0053	.0064	.0074	.0085	.0096	.0106
.004	.0034	.0043	.0051	.0060	.0068	.0077	.0085
.003	.0026	.0032	.0038	.0045	.0051	.0057	.0064
.002	.0017	.0021	.0026	.0030	.0034	.0038	.0043
.001	.0009	.0011	.0013	.0015	.0017	.0019	.0021

WEIGHT OF COLD ROLLED STEEL
Table of Pounds per Lineal Foot

Decimal Thickness	Width in Inches						
	$\frac{1}{16}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$
.2757	.6444	.7030	.7616	.8202	.8788	.9374	.9960
.2604	.6087	.6640	.7194	.7747	.8300	.8854	.9407
.2451	.5729	.6250	.6771	.7292	.7813	.8333	.8854
.2298	.5372	.5860	.6348	.6837	.7325	.7813	.8302
.2145	.5014	.5470	.5926	.6381	.6837	.7293	.7749
.1991	.4654	.5077	.5500	.5923	.6346	.6769	.7192
.1838	.4296	.4687	.5077	.5468	.5859	.6249	.6640
.1685	.3939	.4297	.4655	.5013	.5371	.5729	.6087
.1532	.3581	.3907	.4232	.4558	.4883	.5209	.5534
.1379	.3223	.3516	.3809	.4103	.4396	.4689	.4882
.125	.2922	.3188	.3453	.3719	.3984	.4250	.4516
.1225	.2863	.3124	.3384	.3644	.3905	.4165	.4425
.120	.2805	.3060	.3315	.3570	.3825	.4080	.4335
.109	.2548	.2780	.3011	.3243	.3474	.3706	.3938
.1072	.2506	.2734	.2961	.3189	.3417	.3645	.3873
.09375	.2191	.2391	.2590	.2789	.2988	.3188	.3387
.0919	.2148	.2343	.2539	.2734	.2929	.3125	.3320
.083	.1940	.2117	.2293	.2469	.2646	.2822	.2998
.0766	.1791	.1953	.2116	.2279	.2442	.2604	.2767
.0689	.1611	.1757	.1903	.2050	.2196	.2343	.2489
.065	.1519	.1658	.1796	.1934	.2072	.2210	.2348
.0625	.1461	.1594	.1727	.1859	.1992	.2125	.2258
.0613	.1433	.1563	.1693	.1824	.1954	.2084	.2214
.0551	.1288	.1405	.1522	.1639	.1756	.1873	.1990
.050	.1169	.1275	.1381	.1488	.1594	.1700	.1806
.049	.1145	.1250	.1354	.1458	.1562	.1666	.1770
.0429	.1003	.1094	.1185	.1276	.1367	.1459	.1550
.0375	.0877	.0956	.1036	.1116	.1195	.1275	.1355
.0368	.0860	.0938	.1017	.1095	.1173	.1251	.1329
.035	.0818	.0893	.0967	.1041	.1116	.1190	.1264
.0337	.0788	.0859	.0931	.1003	.1074	.1146	.1217
.0306	.0715	.0780	.0845	.0910	.0975	.1040	.1105
.0276	.0645	.0704	.0762	.0821	.8880	.0938	.0997
.025	.0584	.0638	.0691	.0744	.0797	.0850	.0903
.0245	.0573	.0625	.0677	.0729	.0781	.0833	.0885
.0214	.0500	.0546	.0591	.0637	.0682	.0728	.0773
.0184	.0430	.0469	.0508	.0547	.0587	.0626	.0665
.0169	.0395	.0431	.0467	.0503	.0539	.0575	.0611
.0153	.0358	.0390	.0423	.0455	.0488	.0520	.0553
.0138	.0323	.0352	.0381	.0411	.0440	.0469	.0499
.0123	.0288	.0314	.0340	.0366	.0392	.0418	.0444
.011	.0257	.0281	.0304	.0327	.0351	.0374	.0397
.010	.0234	.0255	.0276	.0298	.0319	.0340	.0361
.009	.0210	.0230	.0249	.0268	.0287	.0306	.0325
.008	.0187	.0204	.0221	.0238	.0255	.0272	.0289
.007	.0164	.0179	.0193	.0208	.0223	.0238	.0253
.006	.0140	.0153	.0166	.0179	.0191	.0204	.0217
.005	.0117	.0128	.0138	.0149	.0159	.0170	.0181
.004	.0094	.0102	.0111	.0119	.0128	.0136	.0145
.003	.0070	.0077	.0083	.0089	.0096	.0102	.0108
.002	.0047	.0051	.0055	.0060	.0064	.0068	.0072
.001	.0023	.0026	.0028	.0030	.0032	.0034	.0036

WEIGHT OF COLD ROLLED STEEL

Table of Pounds per Lineal Foot

Decimal Thickness	Width in Inches						
	1½	1⅝	1¾	1⅞	1⅝	1⅞	1½
.2757	1.0546	1.1131	1.1717	1.2303	1.2889	1.3475	1.4061
.2604	.9960	1.0514	1.1067	1.1620	1.2174	1.2727	1.3280
.2451	.9375	.9896	1.0417	1.0938	1.1458	1.1979	1.2500
.2298	.8790	.9278	.9767	1.0255	1.0743	1.1231	1.1720
.2145	.8205	.8660	.9116	.9572	1.0028	1.0484	1.0940
.1991	.7616	.8039	.8462	.8885	.9308	.9731	1.0154
.1838	.7030	.7421	.7812	.8202	.8593	.8983	.9374
.1685	.6445	.6803	.7161	.7519	.7877	.8235	.8594
.1532	.5860	.6185	.6511	.6837	.7162	.7488	.7813
.1379	.5275	.5568	.5861	.6154	.6447	.6740	.7033
.125	.4781	.5047	.5313	.5578	.5844	.6109	.6375
.1225	.4686	.4946	.5206	.5467	.5727	.5987	.6248
.120	.4590	.4845	.5100	.5355	.5610	.5865	.6120
.109	.4169	.4401	.4633	.4864	.5096	.5327	.5559
.1072	.4100	.4328	.4556	.4784	.5012	.5239	.5467
.09375	.3586	.3785	.3984	.4184	.4383	.4582	.4781
.0919	.3515	.3710	.3906	.4101	.4296	.4492	.4687
.083	.3175	.3351	.3528	.3704	.3880	.4057	.4233
.0766	.2930	.3093	.3256	.3418	.3581	.3744	.3907
.0689	.2635	.2782	.2928	.3075	.3221	.3367	.3514
.065	.2486	.2624	.2763	.2901	.3039	.3177	.3315
.0625	.2391	.2523	.2656	.2789	.2922	.3055	.3188
.0613	.2345	.2475	.2605	.2736	.2866	.2996	.3126
.0551	.2108	.2225	.2342	.2459	.2576	.2693	.2810
.050	.1913	.2019	.2125	.2231	.2338	.2444	.2550
.049	.1874	.1978	.2083	.2187	.2291	.2395	.2499
.0429	.1641	.1732	.1823	.1914	.2006	.2097	.2188
.0375	.1434	.1514	.1594	.1673	.1753	.1833	.1913
.0368	.1408	.1486	.1564	.1642	.1720	.1799	.1877
.035	.1339	.1413	.1488	.1562	.1636	.1711	.1785
.0337	.1289	.1361	.1432	.1504	.1575	.1647	.1719
.0306	.1170	.1235	.1301	.1366	.1431	.1496	.1561
.0276	.1056	.1114	.1173	.1232	.1290	.1349	.1408
.025	.0956	.1009	.1063	.1116	.1169	.1222	.1275
.0245	.0937	.0989	.1041	.1093	.1145	.1197	.1250
.0214	.0819	.0864	.0910	.0955	.1000	.1046	.1091
.0184	.0704	.0743	.0782	.0821	.0860	.0899	.0938
.0169	.0646	.0682	.0718	.0754	.0790	.0826	.0862
.0153	.0585	.0618	.0650	.0683	.0715	.0748	.0780
.0138	.0528	.0557	.0587	.0616	.0645	.0674	.0704
.0123	.0470	.0497	.0523	.0549	.0575	.0601	.0627
.011	.0421	.0444	.0468	.0491	.0514	.0538	.0561
.010	.0383	.0404	.0425	.0446	.0468	.0489	.0510
.009	.0344	.0363	.0383	.0402	.0421	.0440	.0459
.008	.0306	.0323	.0340	.0357	.0374	.0391	.0408
.007	.0268	.0283	.0288	.0312	.0327	.0342	.0357
.006	.0230	.0242	.0255	.0268	.0281	.0293	.0306
.005	.0191	.0202	.0213	.0223	.0234	.0244	.0255
.004	.0153	.0162	.0170	.0179	.0187	.0196	.0204
.003	.0115	.0121	.0128	.0134	.0140	.0147	.0153
.002	.0077	.0081	.0085	.0089	.0094	.0098	.0102
.001	.0038	.0040	.0043	.0045	.0047	.0049	.0051

WEIGHT OF COLD ROLLED STEEL

Table of Pounds per Lineal Foot

Decimal Thickness	Width in Inches						
	1 $\frac{1}{8}$	1 $\frac{3}{8}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	1 $\frac{7}{8}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$
.2757	1.4647	1.5232	1.5818	1.6404	1.6990	1.7576	1.8162
.2604	1.3834	1.4387	1.4940	1.5494	1.6047	1.6601	1.7154
.2451	1.3021	1.3542	1.4063	1.4583	1.5104	1.5625	1.6146
.2298	1.2208	1.2696	1.3185	1.3673	1.4161	1.4650	1.5138
.2145	1.1395	1.1851	1.2307	1.2763	1.3219	1.3674	1.4130
.1991	1.0577	1.1000	1.1423	1.1846	1.2270	1.2693	1.3116
.1838	.9764	1.0155	1.0546	1.0936	1.1327	1.1717	1.2108
.1685	.8952	.9310	.9668	1.0026	1.0384	1.0742	1.1100
.1532	.8139	.8464	.8790	.9115	.9441	.9767	1.0092
.1379	.7326	.7619	.7912	.8205	.8498	.8791	.9084
.125	.6641	.6906	.7172	.7438	.7703	.7969	.8234
.1225	.6508	.6768	.7028	.7289	.7549	.7809	.8070
.120	.6375	.6630	.6885	.7140	.7395	.7650	.7905
.109	.5791	.6022	.6254	.6486	.6717	.6949	.7180
.1072	.5695	.5923	.6151	.6378	.6606	.6834	.7062
.09375	.4980	.5180	.5379	.5578	.5777	.5977	.6176
.0919	.4882	.5077	.5273	.5468	.5663	.5859	.6054
.083	.4409	.4586	.4762	.4939	.5115	.5291	.5468
.0766	.4069	.4232	.4395	.4558	.4720	.4883	.5046
.0689	.3660	.3807	.3953	.4100	.4246	.4392	.4539
.065	.3453	.3591	.3729	.3868	.4006	.4144	.4282
.0625	.3320	.3453	.3586	.3719	.3852	.3984	.4117
.0613	.3257	.3387	.3517	.3647	.3778	.3908	.4038
.0551	.2927	.3044	.3161	.3278	.3396	.3513	.3630
.050	.2656	.2763	.2869	.2975	.3081	.3188	.3294
.049	.2603	.2707	.2811	.2916	.3020	.3124	.3228
.0429	.2279	.2370	.2461	.2553	.2644	.2735	.2826
.0375	.1992	.2072	.2152	.2231	.2311	.2391	.2470
.0368	.1955	.2033	.2111	.2190	.2268	.2346	.2424
.035	.1859	.1934	.2008	.2083	.2157	.2231	.2306
.0337	.1790	.1862	.1934	.2005	.2077	.2148	.2220
.0306	.1626	.1691	.1756	.1821	.1886	.1951	.2016
.0276	.1466	.1525	.1584	.1642	.1701	.1760	.1818
.025	.1328	.1381	.1434	.1488	.1541	.1594	.1647
.0245	.1302	.1354	.1406	.1458	.1510	.1562	.1614
.0214	.1137	.1182	.1228	.1273	.1319	.1374	.1410
.0184	.0978	.1017	.1056	.1095	.1134	.1173	.1212
.0169	.0898	.0934	.0970	.1006	.1041	.1077	.1113
.0153	.0813	.0845	.8878	.0910	.0943	.0975	.1008
.0138	.0733	.0762	.0792	.0821	.0850	.0880	.0909
.0123	.0653	.0680	.0706	.0732	.0758	.0784	.0810
.011	.0584	.0608	.0631	.0655	.0678	.0701	.0725
.010	.0531	.0553	.0574	.0595	.0616	.0638	.0659
.009	.0478	.0497	.0516	.0536	.0555	.0574	.0593
.008	.0425	.0442	.0459	.0476	.0493	.0510	.0527
.007	.0372	.0387	.0402	.0417	.0431	.0446	.0461
.006	.0319	.0332	.0344	.0357	.0370	.0383	.0395
.005	.0266	.0276	.0287	.0298	.0308	.0319	.0329
.004	.0213	.0221	.0230	.0238	.0247	.0255	.0264
.003	.0159	.0166	.0172	.0179	.0185	.0191	.0198
.002	.0106	.0111	.0115	.0119	.0123	.0128	.0132
.001	.0053	.0055	.0057	.0060	.0062	.0064	.0066

FULLERTON—A WAREHOUSE OF METALS AND SERVICE

WEIGHT OF COLD ROLLED STEEL

Table of Pounds per Lineal Foot

Decimal Thickness	Width in Inches						
	2	2 $\frac{1}{16}$	2 $\frac{1}{8}$	2 $\frac{3}{16}$	2 $\frac{1}{4}$	2 $\frac{5}{16}$	2 $\frac{3}{8}$
.2757	1.8748	1.9333	1.9919	2.0505	2.1091	2.1677	2.2263
.2604	1.7707	1.8261	1.8814	1.9367	1.9921	2.0474	2.1027
.2451	1.6667	1.7188	1.7708	1.8229	1.8750	1.9271	1.9792
.2298	1.5626	1.6115	1.6603	1.7091	1.7580	1.8068	1.8556
.2145	1.4586	1.5042	1.5498	1.5953	1.6409	1.6865	1.7321
.1991	1.3539	1.3962	1.4385	1.4808	1.5231	1.5654	1.6077
.1838	1.2498	1.2889	1.3280	1.3670	1.4061	1.4451	1.4842
.1685	1.1458	1.1816	1.2174	1.2532	1.2890	1.3248	1.3606
.1532	1.0418	1.0743	1.1069	1.1394	1.1720	1.2045	1.2371
.1379	.9377	.9670	.9963	1.0256	1.0549	1.0842	1.1135
.125	.8500	.8766	.9031	.9297	.9563	.9828	1.0094
.1225	.8330	.8590	.8851	.9111	.9371	.9632	.9892
.120	.8160	.8415	.8670	.8925	.9180	.9435	.9690
.109	.7412	.7644	.7875	.8107	.8339	.8570	.8802
.1072	.7290	.7517	.7745	.7973	.8201	.8429	.8656
.09375	.6375	.6574	.6773	.6973	.7172	.7371	.7570
.0919	.6249	.6444	.6640	.6835	.7030	.7226	.7421
.083	.5644	.5820	.5997	.6173	.6350	.6526	.6702
.0766	.5209	.5372	.5534	.5697	.5860	.6023	.6185
.0689	.4685	.4832	.4978	.5124	.5271	.5417	.5564
.065	.4420	.4558	.4696	.4834	.4973	.5111	.5249
.0625	.4250	.4383	.4516	.4648	.4781	.4914	.5047
.0613	.4168	.4299	.4429	.4559	.4689	.4820	.4950
.0551	.3747	.3864	.3981	.4098	.4215	.4332	.4449
.050	.3400	.3506	.3613	.3719	.3825	.3931	.4038
.049	.3332	.3436	.3540	.3644	.3749	.3853	.3957
.0429	.2917	.3008	.3100	.3191	.3282	.3373	.3464
.0375	.2550	.2630	.2709	.2789	.2869	.2948	.3028
.0368	.2502	.2581	.2659	.2737	.2815	.2893	.2972
.035	.2380	.2454	.2529	.2603	.2678	.2752	.2826
.0337	.2292	.2363	.2435	.2506	.2578	.2650	.2721
.0306	.2081	.2146	.2211	.2276	.2341	.2406	.2471
.0276	.1877	.1935	.1994	.2053	.2111	.2170	.2229
.025	.1700	.1753	.1806	.1859	.1913	.1966	.2019
.0245	.1666	.1718	.1770	.1822	.1874	.1926	.1978
.0214	.1455	.1501	.1546	.1592	.1637	.1683	.1728
.0184	.1251	.1290	.1329	.1369	.1408	.1447	.1486
.0169	.1149	.1185	.1221	.1257	.1293	.1329	.1365
.0153	.1040	.1073	.1105	.1138	.1170	.1203	.1235
.0138	.0938	.0968	.0997	.1026	.1056	.1085	.1114
.0123	.0836	.0863	.0889	.0915	.0941	.0967	.0993
.011	.0748	.0771	.0795	.0818	.0842	.0865	.0888
.010	.0680	.0701	.0723	.0744	.0765	.0786	.0808
.009	.0612	.0631	.0650	.0669	.0689	.0708	.0727
.008	.0544	.0561	.0578	.0595	.0612	.0629	.0646
.007	.0476	.0491	.0506	.0521	.0536	.0550	.0565
.006	.0408	.0421	.0434	.0446	.0459	.0472	.0485
.005	.0340	.0351	.0361	.0372	.0383	.0393	.0404
.004	.0272	.0281	.0289	.0298	.0306	.0315	.0323
.003	.0204	.0210	.0217	.0223	.0230	.0236	.0242
.002	.0136	.0140	.0145	.0149	.0153	.0157	.0162
.001	.0068	.0070	.0072	.0074	.0077	.0079	.0081

WEIGHT OF COLD ROLLED STEEL
Table of Pounds per Lineal Foot

Decimal Thickness	Width in Inches						
	2 ¹ / ₁₆	2 ¹ / ₂	2 ³ / ₁₆	2 ⁵ / ₁₆	2 ¹ / ₂	2 ³ / ₈	2 ¹ / ₂
.2757	2.2849	2.3435	2.4020	2.4606	2.5192	2.5778	2.6364
.2604	2.1581	2.2134	2.2687	2.3241	2.3794	2.4347	2.4901
.2451	2.0313	2.0834	2.1354	2.1875	2.2396	2.2917	2.3438
.2298	1.9045	1.9533	2.0021	2.0510	2.0998	2.1486	2.1975
.2145	1.7777	1.8233	1.8688	1.9144	1.9600	2.0056	2.0512
.1991	1.6500	1.6924	1.7347	1.7770	1.8193	1.8616	1.9039
.1838	1.5232	1.5623	1.6014	1.6404	1.6795	1.7185	1.7576
.1685	1.3964	1.4323	1.4681	1.5039	1.5397	1.5755	1.6113
.1532	1.2696	1.3022	1.3348	1.3673	1.3999	1.4324	1.4650
.1379	1.1428	1.1722	1.2015	1.2308	1.2601	1.2894	1.3187
.125	1.0359	1.0625	1.0891	1.1156	1.1422	1.1688	1.1953
.1225	1.0152	1.0413	1.0673	1.0933	1.1193	1.1454	1.1714
.120	.9945	1.0200	1.0455	1.0710	1.0965	1.2020	1.1475
.109	.9033	.9265	.9497	.9728	.9960	1.0192	1.0423
.1072	.8884	.9112	.9340	.9568	.9795	1.0023	1.0251
.09375	.7770	.7969	.8168	.8367	.8566	.8766	.8965
.0919	.7616	.7812	.8007	.8202	.8397	.8593	.8788
.038	.6879	.7055	.7231	.7488	.7584	.7761	.7937
.0766	.6348	.6511	.6674	.6837	.6999	.7162	.7325
.0689	.5710	.5857	.6003	.6149	.6296	.6442	.6589
.065	.5387	.5525	.5663	.5801	.5939	.6078	.6216
.0625	.5180	.5313	.5445	.5578	.5711	.5844	.5977
.0613	.5080	.5211	.5341	.5471	.5601	.5732	.5862
.0551	.4566	.4684	.4801	.4918	.5035	.5152	.5269
.050	.4144	.4250	.4356	.4463	.4569	.4675	.4781
.049	.4061	.4165	.4269	.4373	.4477	.4582	.4686
.0429	.3555	.3647	.3738	.3929	.3920	.4011	.4102
.0375	.3108	.3188	.3267	.3347	.3427	.3506	.3586
.0368	.3050	.3128	.3206	.3284	.3363	.3441	.3519
.035	.2901	.2975	.3049	.3124	.3198	.3273	.3347
.0337	.2793	.2865	.2936	.3008	.3079	.3151	.3223
.0306	.2536	.2601	.2666	.2731	.2796	.2861	.2926
.0276	.2287	.2346	.2405	.2463	.2522	.2581	.2639
.025	.2072	.2125	.2178	.2231	.2284	.2338	.2391
.0245	.2030	.2083	.2135	.2187	.2239	.2291	.2343
.0214	.1774	.1819	.1864	.1910	.1955	.2001	.2046
.0184	.1525	.1564	.1603	.1642	.1681	.1720	.1760
.0169	.1401	.1437	.1472	.1508	.1544	.1580	.1616
.0153	.1268	.1301	.1333	.1366	.1398	.1431	.1463
.0138	.1144	.1173	.1202	.1232	.1261	.1290	.1320
.0123	.1019	.1046	.1072	.1098	.1124	.1150	.1176
.011	.0912	.0935	.0958	.0982	.1005	.1029	.1052
.010	.0829	.0850	.0871	.0893	.0914	.0935	.0956
.009	.0746	.0765	.0784	.0803	.0822	.0842	.0861
.008	.0663	.0680	.0697	.0714	.0731	.0748	.0765
.007	.0580	.0595	.0610	.0625	.0640	.0655	.0669
.006	.0497	.0510	.0523	.0536	.0548	.0561	.0574
.005	.0414	.0425	.0436	.0446	.0457	.0468	.0478
.004	.0332	.0340	.0349	.0357	.0366	.0374	.0383
.003	.0249	.0255	.0261	.0268	.0274	.0281	.0287
.002	.0166	.0170	.0174	.0179	.0183	.0187	.0191
.001	.0083	.0085	.0087	.0089	.0091	.0094	.0096

WEIGHT OF COLD ROLLED STEEL

Table of Pounds per Lineal Foot

Decimal Thickness	Width in Inches						
	2 $\frac{7}{8}$	2 $\frac{1}{2}$	3	3 $\frac{1}{8}$	3 $\frac{1}{2}$	3 $\frac{3}{8}$	3 $\frac{1}{2}$
.2757	2.6950	2.7536	2.8121	2.8707	2.9293	2.9879	3.0465
.2604	2.5454	2.6007	2.6561	2.7114	2.7668	2.8221	2.8774
.2451	2.3959	2.4479	2.5000	2.5521	2.6042	2.6563	2.7084
.2298	2.2463	2.2951	2.3440	2.3928	2.4416	2.4905	2.5393
.2145	2.0967	2.1423	2.1879	2.2335	2.2791	2.3246	2.3702
.1991	1.9462	1.9885	2.0308	2.0731	2.1154	2.1577	2.2001
.1838	1.7966	1.8357	1.8748	1.9138	1.9529	1.9919	2.0310
.1685	1.6471	1.6829	1.7187	1.7545	1.7903	1.8261	1.8619
.1532	1.4975	1.5301	1.5626	1.5952	1.6278	1.6603	1.6929
.1379	1.3480	1.3773	1.4066	1.4359	1.4652	1.4945	1.5238
.125	1.2219	1.2484	1.2750	1.3016	1.3281	1.3547	1.3813
.1225	1.1974	1.2235	1.2495	1.2755	1.3016	1.3276	1.3536
.120	1.1730	1.1985	1.2240	1.2495	1.2750	1.3005	1.3260
.109	1.0655	1.0886	1.1118	1.1350	1.1581	1.1813	1.2045
.1072	1.0479	1.0707	1.0934	1.1162	1.1390	1.1618	1.1846
.09375	.9164	.9363	.9563	.9762	.9961	1.0160	1.0359
.0919	.8983	.9179	.9374	.9569	.9764	.9960	1.0155
.083	.8113	.8290	.8466	.8642	.8819	.8995	.9172
.0766	.7488	.7650	.7813	.7976	.8139	.8302	.8464
.0689	.6735	.6881	.7028	.7174	.7321	.7467	.7613
.065	.6354	.6492	.6630	.6768	.6906	.7044	.7183
.0625	.6109	.6242	.6375	.6508	.6641	.6773	.6906
.0613	.5992	.6122	.6253	.6383	.6513	.6643	.6774
.0551	.5386	.5503	.5620	.5737	.5854	.5971	.6089
.050	.4888	.4994	.5100	.5206	.5313	.5419	.5525
.049	.4790	.4894	.4998	.5102	.5206	.5310	.5415
.0429	.4193	.4285	.4376	.4467	.4558	.4649	.4740
.0375	.3666	.3745	.3825	.3905	.3984	.4064	.4144
.0368	.3597	.3675	.3754	.3832	.3910	.3988	.4066
.035	.3421	.3496	.3570	.3644	.3719	.3793	.3868
.0337	.3294	.3366	.3437	.3509	.3581	.3652	.3724
.0306	.2991	.3056	.3121	.3186	.3251	.3316	.3381
.0276	.2698	.2757	.2815	.2874	.2933	.2991	.3050
.025	.2444	.2497	.2550	.2603	.2656	.2709	.2763
.0245	.2395	.2447	.2499	.2551	.2603	.2655	.2707
.0214	.2092	.2137	.2183	.2228	.2274	.2319	.2365
.0184	.1799	.1838	.1877	.1916	.1955	.1994	.2033
.0169	.1652	.1688	.1724	.1760	.1796	.1832	.1867
.0153	.1496	.1528	.1561	.1593	.1626	.1658	.1691
.0138	.1349	.1378	.1408	.1437	.1466	.1496	.1525
.0123	.1202	.1228	.1255	.1281	.1307	.1333	.1359
.011	.1075	.1099	.1122	.1145	.1169	.1192	.1216
.010	.0978	.0999	.1020	.1041	.1063	.1084	.1105
.009	.0880	.0899	.0918	.0937	.0956	.0975	.0995
.008	.0782	.0799	.0816	.0833	.0850	.0867	.0884
.007	.0684	.0699	.0714	.0729	.0744	.0759	.0774
.006	.0587	.0599	.0612	.0625	.0638	.0650	.0663
.005	.0489	.0499	.0510	.0521	.0531	.0542	.0553
.004	.0391	.0400	.0408	.0417	.0425	.0434	.0442
.003	.0293	.0300	.0306	.0312	.0319	.0325	.0332
.002	.0196	.0200	.0204	.0208	.0213	.0217	.0221
.001	.0098	.0100	.0102	.0104	.0106	.0108	.0111

WEIGHT OF COLD ROLLED STEEL

Table of Pounds per Lineal Foot

Decimal Thickness	Width in Inches						
	3 $\frac{1}{8}$	3 $\frac{3}{8}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{3}{8}$	3 $\frac{7}{8}$	3 $\frac{1}{16}$
.2757	3.1051	3.1637	3.2222	3.2808	3.3394	3.3980	3.4566
.2604	2.9328	2.9881	3.0434	3.0988	3.1541	3.2094	3.2648
.2451	2.7604	2.8125	2.8646	2.9167	2.9688	3.0209	3.0729
.2298	2.5881	2.6370	2.6858	2.7346	2.7835	2.8323	2.8811
.2145	2.4158	2.4614	2.5070	2.5526	2.5981	2.6437	2.6893
.1991	2.2424	2.2847	2.3270	2.3693	2.4116	2.4539	2.4962
.1838	2.0700	2.1091	2.1482	2.1872	2.2263	2.2653	2.3044
.1685	1.8977	1.9335	1.9693	2.0052	2.0410	2.0768	2.1126
.1532	1.7254	1.7580	1.7905	1.8231	1.8556	1.8882	1.9207
.1379	1.5531	1.5824	1.6117	1.6410	1.6703	1.6996	1.7289
.125	1.4078	1.4344	1.4609	1.4875	1.5141	1.5406	1.5672
.1225	1.3797	1.4057	1.4317	1.4578	1.4838	1.5098	1.5358
.120	1.3515	1.3770	1.4025	1.4280	1.4535	1.4790	1.5045
.109	1.2276	1.2508	1.2739	1.2971	1.3203	1.3434	1.3666
.1072	1.2073	1.2301	1.2529	1.2757	1.2985	1.3212	1.3440
.09375	1.0559	1.0758	1.0957	1.1156	1.1355	1.1555	1.1754
.0919	1.0350	1.0546	1.0741	1.0936	1.1131	1.1327	1.1522
.083	.9348	.9524	.9701	.9877	1.0053	1.0230	1.0406
.0766	.8627	.8790	.8953	.9115	.9278	.9441	.9604
.0689	.7760	.7906	.8053	.8199	.8346	.8492	.8638
.065	.7321	.7459	.7597	.7735	.7873	.8011	.8149
.0625	.7039	.7172	.7305	.7438	.7570	.7703	.7836
.0613	.6904	.7034	.7164	.7295	.7425	.7555	.7685
.0551	.6206	.6323	.6440	.6557	.6674	.6791	.6908
.050	.5631	.5738	.5844	.5950	.6056	.6163	.6269
.049	.5519	.5623	.5727	.5831	.5935	.6039	.6143
.0429	.4832	.4923	.5014	.5105	.5196	.5287	.5379
.0375	.4223	.4303	.4383	.4463	.4542	.4622	.4702
.0368	.4145	.4223	.4301	.4379	.4457	.4536	.4614
.035	.3942	.4016	.4091	.4165	.4239	.4314	.4388
.0337	.3795	.3867	.3939	.4010	.4082	.4154	.4225
.0306	.3446	.3511	.3576	.3641	.3706	.3771	.3836
.0276	.3108	.3167	.3226	.3284	.3343	.3402	.3460
.025	.2816	.2869	.2922	.2975	.3028	.3081	.3134
.0245	.2759	.2811	.2863	.2916	.2968	.3020	.3072
.0214	.2410	.2456	.2501	.2547	.2592	.2638	.2683
.0184	.2072	.2111	.2151	.2190	.2229	.2268	.2307
.0169	.1903	.1939	.1975	.2011	.2047	.2083	.2119
.0153	.1723	.1756	.1788	.1821	.1853	.1886	.1918
.0138	.1554	.1584	.1613	.1642	.1672	.1701	.1730
.0123	.1385	.1411	.1438	.1464	.1490	.1516	.1542
.011	.1239	.1262	.1286	.1309	.1332	.1356	.1379
.010	.1126	.1148	.1169	.1190	.1211	.1233	.1254
.009	.1014	.1033	.1052	.1071	.1090	.1109	.1128
.008	.0901	.0918	.0935	.0952	.0969	.0986	.1003
.007	.0788	.0803	.0818	.0833	.0848	.0863	.0878
.006	.0676	.0689	.0701	.0714	.0727	.0740	.0752
.005	.0563	.0574	.0584	.0595	.0606	.0616	.0627
.004	.0451	.0459	.0468	.0476	.0485	.0493	.0502
.003	.0338	.0344	.0351	.0357	.0363	.0370	.0376
.002	.0225	.0230	.0234	.0238	.0242	.0247	.0251
.001	.0113	.0115	.0117	.0119	.0221	.0123	.0125

WEIGHT OF COLD ROLLED STEEL

Table of Pounds per Lineal Foot

Decimal Thickness	Width in Inches						
	3¼	3½	3¾	3⅞	4	4¼	4½
.2757	3.5152	3.5738	3.6323	3.6909	3.7495	3.8081	3.8667
.2604	3.3201	3.3754	3.4308	3.4861	3.5414	3.5968	3.6521
.2451	3.1250	3.1771	3.2292	3.2813	3.3334	3.3854	3.4375
.2298	2.9300	2.9788	3.0276	3.0764	3.1253	3.1741	3.2229
.2145	2.7349	2.7805	2.8260	2.8716	2.9172	2.9628	3.0084
.1991	2.5385	2.5808	2.6231	2.6655	2.7078	2.7501	2.7924
.1838	2.3435	2.3825	2.4216	2.4606	2.4997	2.5387	2.5778
.1685	2.1484	2.1842	2.2200	2.2558	2.2916	2.3274	2.3632
.1532	1.9533	1.9859	2.0184	2.0510	2.0835	2.1161	2.1486
.1379	1.7582	1.7875	1.8168	1.8461	1.8754	1.9047	1.9340
.125	1.5938	1.6203	1.6469	1.6734	1.7000	1.7266	1.7531
.1225	1.5619	1.5879	1.6139	1.6400	1.6660	1.6920	1.7181
.120	1.5300	1.5555	1.5810	1.6065	1.6320	1.6575	1.6830
.109	1.3998	1.4129	1.4361	1.4592	1.4824	1.5056	1.5287
.1072	1.3668	1.3896	1.4124	1.4351	1.4579	1.4807	1.5035
.09375	1.1953	1.2152	1.2352	1.2551	1.2750	1.2949	1.3148
.0919	1.1717	1.1913	1.2108	1.2303	1.2498	1.2694	1.2889
.083	1.0583	1.0759	1.0935	1.1112	1.1288	1.1464	1.1641
.0766	.9767	.9929	1.0092	1.0255	1.0418	1.0580	1.0743
.0689	.8785	.8931	.9078	.9224	.9370	.9517	.9663
.065	.8288	.8426	.8564	.8702	.8840	.8978	.9116
.0625	.7969	.8102	.8234	.8367	.8500	.8633	.8766
.0613	.7816	.7946	.8076	.8207	.8337	.8467	.8597
.0551	.7025	.7142	.7259	.7377	.7494	.7611	.7728
.050	.6375	.6481	.6588	.6694	.6800	.6906	.7013
.049	.6248	.6352	.6456	.6560	.6664	.6768	.6872
.0429	.5470	.5561	.5652	.5743	.5834	.5926	.6017
.0375	.4781	.4861	.4941	.5020	.5100	.5180	.5259
.0368	.4692	.4770	.4848	.4927	.5005	.5083	.5161
.035	.4463	.4537	.4611	.4686	.4760	.4834	.4909
.0337	.4297	.4368	.4440	.4512	.4583	.4655	.4726
.0306	.3902	.3967	.4032	.4097	.4162	.4227	.4292
.0276	.3519	.3578	.3636	.3695	.3754	.3812	.3871
.025	.3188	.3241	.3294	.3347	.3400	.3453	.3506
.0245	.3124	.3176	.3228	.3280	.3332	.3384	.3436
.0214	.2729	.2774	.2819	.2865	.2910	.2956	.3001
.0184	.2346	.2385	.2424	.2463	.2502	.2542	.2581
.0169	.2155	.2191	.2227	.2262	.2298	.2334	.2370
.0153	.1951	.1983	.2016	.2048	.2081	.2113	.2146
.0138	.1760	.1789	.1818	.1847	.1877	.1906	.1935
.0123	.1568	.1594	.1621	.1647	.1673	.1699	.1725
.011	.1403	.1426	.1449	.1473	.1496	.1519	.1543
.010	.1275	.1296	.1318	.1339	.1360	.1381	.1403
.009	.1148	.1167	.1186	.1205	.1224	.1243	.1262
.008	.1020	.1037	.1054	.1071	.1088	.1105	.1122
.007	.0893	.0907	.0922	.0937	.0952	.0967	.0982
.006	.0765	.0778	.0791	.8803	.0816	.0829	.0842
.005	.0638	.0648	.0659	.0669	.0680	.0691	.0701
.004	.0510	.0519	.0527	.0536	.0544	.0553	.0561
.003	.0383	.0389	.0395	.0402	.0408	.0414	.0421
.002	.0255	.0259	.0264	.0268	.0272	.0276	.0281
.001	.0128	.0130	.0132	.0134	.0136	.0138	.0140

WEIGHT OF COLD ROLLED STEEL

Table of Pounds per Lineal Foot

Decimal Thickness	Width in Inches						
	3/8	1/2	5/8	3/4	7/8	1	1 1/8
.2757	3.9253	3.9839	4.0425	4.1010	4.1596	4.2182	4.2768
.2604	3.7074	3.7628	3.8181	3.8735	3.9288	3.9841	4.0395
.2451	3.4896	3.5417	3.5938	3.6459	3.6979	3.7500	3.8021
.2298	3.2718	3.3206	3.3694	3.4183	3.4671	3.5159	3.5648
.2145	3.0539	3.0995	3.1451	3.1907	3.2363	3.2819	3.3274
.1991	2.8347	2.8770	2.9193	2.9616	3.0039	3.0462	3.0885
.1838	2.6169	2.6559	2.6950	2.7340	2.7731	2.8121	2.8512
.1685	2.3990	2.4348	2.4706	2.5064	2.5422	2.5781	2.6139
.1532	2.1812	2.2137	2.2463	2.2789	2.3114	2.3440	2.3765
.1379	1.9634	1.9927	2.0220	2.0513	2.0806	2.1099	2.1392
.125	1.7797	1.8063	1.8328	1.8594	1.8859	1.9125	1.9391
.1225	1.7441	1.7701	1.7962	1.8222	1.8482	1.8743	1.9003
.120	1.7085	1.7340	1.7595	1.7850	1.8105	1.8360	1.8615
.109	1.5519	1.5751	1.5982	1.6214	1.6445	1.6677	1.6909
.1072	1.5263	1.5490	1.5718	1.5946	1.6174	1.6402	1.6629
.09375	1.3348	1.3547	1.3746	1.3945	1.4145	1.4344	1.4543
.0919	1.3084	1.3280	1.3475	1.3670	1.3865	1.4061	1.4256
.083	1.1817	1.1994	1.2170	1.2346	1.2523	1.2699	1.2875
.0766	1.0906	1.1069	1.1231	1.1394	1.1557	1.1720	1.1883
.0689	.9810	.9956	1.0102	1.0249	1.0395	1.0542	1.0688
.065	.9254	.9393	.9531	.9669	.9807	.9945	1.0083
.0625	.8898	.9031	.9164	.9297	.9430	.9563	.9695
.0613	.8728	.8858	.8988	.9118	.9249	.9379	.9509
.0551	.7845	.7962	.8079	.8196	.8313	.8430	.8547
.050	.7119	.7225	.7331	.7438	.7544	.7650	.7756
.049	.6976	.7081	.7185	.7289	.7393	.7497	.7601
.0429	.6108	.6199	.6290	.6381	.6473	.6564	.6655
.0375	.5339	.5419	.5498	.5578	.5658	.5738	.5817
.0368	.5239	.5318	.5396	.5474	.5552	.5630	.5709
.035	.4983	.5058	.5132	.5206	.5281	.5355	.5429
.0337	.4798	.4870	.4941	.5013	.5084	.5156	.5228
.0306	.4357	.4422	.4487	.4552	.4617	.4682	.4747
.0276	.3930	.3988	.4047	.4106	.4164	.4223	.4281
.025	.3559	.3613	.3666	.3719	.3772	.3825	.3878
.0245	.3488	.3540	.3592	.3644	.3696	.3749	.3801
.0214	.3047	.3092	.3138	.3183	.3229	.3274	.3320
.0184	.2620	.2659	.2698	.2737	.2776	.2815	.2854
.0169	.2406	.2442	.2478	.2514	.2550	.2586	.2622
.0153	.2178	.2211	.2243	.2276	.2308	.2341	.2373
.0138	.1965	.1994	.2023	.2053	.2082	.2111	.2141
.0123	.1751	.1777	.1803	.1830	.1856	.1882	.1908
.011	.1566	.1590	.1613	.1636	.1660	.1683	.1706
.010	.1424	.1445	.1466	.1488	.1509	.1530	.1551
.009	.1281	.1301	.1320	.1339	.1358	.1377	.1396
.008	.1139	.1156	.1173	.1190	.1207	.1224	.1241
.007	.0997	.1012	.1026	.1041	.1056	.1071	.1086
.006	.0854	.0867	.0880	.0893	.0905	.0918	.0931
.005	.0712	.0723	.0733	.0744	.0754	.0765	.0776
.004	.0570	.0578	.0587	.0595	.0604	.0612	.0621
.003	.0427	.0434	.0440	.0446	.0453	.0459	.0465
.002	.0285	.0289	.0293	.0298	.0302	.0306	.0310
.001	.0142	.0145	.0147	.0149	.0151	.0153	.0155

WEIGHT OF COLD ROLLED STEEL

Table of Pounds per Lineal Foot

Decimal Thickness	Width in Inches						
	4 $\frac{5}{8}$	4 $\frac{1}{2}$	4 $\frac{3}{4}$	4 $\frac{1}{4}$	4 $\frac{7}{8}$	4 $\frac{5}{16}$	5
.2757	4.3354	4.3940	4.4526	4.5111	4.5697	4.6283	4.6869
.2604	4.0948	4.1501	4.2055	4.2608	4.3161	4.3715	4.4268
.2451	3.8542	3.9063	3.9584	4.0104	4.0625	4.1146	4.1667
.2298	3.6136	3.6624	3.7113	3.7601	3.8089	3.8578	3.9066
.2145	3.3730	3.4186	3.4642	3.5098	3.5553	3.6009	3.6465
.1991	3.1308	3.1732	3.2155	3.2578	3.3001	3.3424	3.3847
.1838	2.8903	2.9293	2.9684	3.0074	3.0465	3.0855	3.1246
.1685	2.6497	2.6855	2.7213	2.7571	2.7929	2.8287	2.8645
.1532	2.4091	2.4416	2.4742	2.5067	2.5393	2.5718	2.6044
.1379	2.1685	2.1978	2.2271	2.2564	2.2857	2.3150	2.3443
.125	1.9656	1.9922	2.0188	2.0453	2.0719	2.0984	2.1250
.1225	1.9263	1.9523	1.9784	2.0044	2.0304	2.0565	2.0825
.120	1.8870	1.9125	1.9380	1.9635	1.9890	2.0145	2.0400
.109	1.7140	1.7372	1.7604	1.7835	1.8067	1.8298	1.8530
.1072	1.6857	1.7085	1.7313	1.7541	1.7768	1.7996	1.8224
.09375	1.4742	1.4941	1.5141	1.5340	1.5539	1.5738	1.5938
.0919	1.4451	1.4647	1.4842	1.5037	1.5232	1.5428	1.5623
.083	1.3052	1.3228	1.3405	1.3581	1.3757	1.3934	1.4110
.0766	1.2045	1.2208	1.2371	1.2534	1.2696	1.2859	1.3022
.0689	1.0835	1.0981	1.1127	1.1274	1.1420	1.1567	1.1713
.065	1.0221	1.0359	1.0498	1.0636	1.0774	1.0912	1.1050
.0625	.9828	.9961	1.0094	1.0227	1.0359	1.0492	1.0625
.0613	.9639	.9770	.9900	1.0030	1.0160	1.0291	1.0421
.0551	.8664	.8782	.8899	.9016	.9133	.9250	.9367
.050	.7863	.7969	.8075	.8181	.8288	.8394	.8500
.049	.7705	.7809	.7914	.8018	.8122	.8226	.8330
.0429	.6746	.6837	.6928	.7020	.7111	.7202	.7293
.0375	.5897	.5977	.6056	.6136	.6216	.6295	.6375
.0368	.5787	.5865	.5943	.6021	.6100	.6178	.6256
.035	.5504	.5578	.5653	.5727	.5801	.5876	.5950
.0337	.5299	.5371	.5443	.5514	.5586	.5657	.5729
.0306	.4812	.4877	.4942	.5007	.5072	.5137	.5202
.0276	.4340	.4399	.4457	.4516	.4575	.4633	.4692
.025	.3931	.3984	.4038	.4091	.4144	.4197	.4250
.0245	.3853	.3905	.3957	.4009	.4061	.4113	.4165
.0214	.3365	.3411	.3456	.3502	.3547	.3593	.3638
.0184	.2893	.2933	.2972	.3011	.3050	.3089	.3128
.0169	.2658	.2693	.2729	.2765	.2801	.2837	.2873
.0153	.2406	.2438	.2471	.2503	.2536	.2568	.2601
.0138	.2170	.2199	.2229	.2258	.2287	.2317	.2346
.0123	.1934	.1960	.1986	.2013	.2039	.2065	.2091
.011	.1730	.1753	.1777	.1800	.1823	.1847	.1870
.010	.1573	.1594	.1615	.1636	.1658	.1679	.1700
.009	.1415	.1434	.1454	.1473	.1492	.1511	.1530
.008	.1258	.1275	.1292	.1309	.1326	.1343	.1360
.007	.1101	.1116	.1131	.1145	.1160	.1175	.1190
.006	.0944	.0956	.0969	.0982	.0995	.1007	.1020
.005	.0786	.0797	.0808	.0818	.0829	.0839	.0850
.004	.0629	.0638	.0646	.0655	.0663	.0672	.0680
.003	.0472	.0478	.0485	.0491	.0497	.0504	.0510
.002	.0315	.0319	.0323	.0327	.0332	.0336	.0340
.001	.0157	.0159	.0162	.0164	.0166	.0168	.0170

WEIGHT OF COLD ROLLED STEEL

Table of Pounds per Lineal Foot

Decimal Thickness	Width in Inches						
	5 $\frac{1}{16}$	5 $\frac{1}{8}$	5 $\frac{3}{16}$	5 $\frac{1}{4}$	5 $\frac{5}{16}$	5 $\frac{3}{8}$	5 $\frac{7}{16}$
.2757	4.7455	4.8041	4.8627	4.9212	4.9798	5.0384	5.0970
.2604	4.4821	4.5375	4.5928	4.6481	4.7035	4.7588	4.8141
.2451	4.2188	4.2709	4.3230	4.3750	4.4271	4.4792	4.5313
.2298	3.9554	4.0043	4.0531	4.1019	4.1508	4.1996	4.2484
.2145	3.6921	3.7377	3.7832	3.8288	3.8744	3.9200	3.9656
.1991	3.4270	3.4693	3.5116	3.5539	3.5962	3.6386	3.6809
.1838	3.1637	3.2027	3.2418	3.2808	3.3199	3.3589	3.3880
.1685	2.9003	2.9361	2.9719	3.0077	3.0435	3.0793	3.1151
.1532	2.6370	2.6695	2.7021	2.7346	2.7672	2.7997	2.8323
.1379	2.3736	2.4029	2.4322	2.4615	2.4908	2.5201	2.5494
.125	2.1516	2.1781	2.2047	2.2313	2.2578	2.2844	2.3109
.1225	2.1885	2.1346	2.1606	2.1866	2.2127	2.2387	2.2647
.120	2.0655	2.0910	2.1165	2.1420	2.1675	2.1930	2.2185
.109	1.8762	1.8993	1.9225	1.9457	1.9688	1.9920	2.0151
.1072	1.8452	1.8680	1.8907	1.9135	1.9363	1.9591	1.9819
.09375	1.6137	1.6336	1.6535	1.6734	1.6934	1.7133	1.7332
.0919	1.5818	1.6014	1.6209	1.6404	1.6599	1.6795	1.6990
.083	1.4286	1.4463	1.4639	1.4816	1.4992	1.5168	1.5345
.0766	1.3185	1.3348	1.3510	1.3673	1.3836	1.3999	1.4161
.0689	1.1859	1.2006	1.2152	1.2299	1.2445	1.2591	1.2738
.065	1.1188	1.1326	1.1464	1.1603	1.1741	1.1879	1.2017
.0625	1.0758	1.0891	1.1023	1.1156	1.1289	1.1422	1.1555
.0613	1.0551	1.0682	1.0812	1.0942	1.1072	1.1203	1.1333
.0551	.9484	.9601	.9718	.9835	.9952	1.0070	1.0187
.050	.8606	.8713	.8819	.8925	.9031	.9138	.9244
.049	.8434	.8538	.8642	.8747	.8851	.8955	.9059
.0429	.7384	.7475	.7566	.7658	.7749	.7840	.7931
.0375	.6455	.6534	.6614	.6694	.6773	.6853	.6933
.0368	.6334	.6412	.6491	.6569	.6647	.6725	.6803
.035	.6024	.6099	.6173	.6248	.6322	.6396	.6471
.0337	.5801	.5872	.5944	.6015	.6087	.6159	.6230
.0306	.5267	.5332	.5397	.5462	.5527	.5592	.5657
.0276	.4751	.4809	.4868	.4927	.4985	.5044	.5103
.025	.4303	.4356	.4409	.4463	.4516	.4569	.4622
.0245	.4217	.4269	.4321	.4373	.4425	.4477	.4529
.0214	.3683	.3729	.3774	.3820	.3865	.3911	.3956
.0184	.3167	.3206	.3245	.3284	.3324	.3363	.3402
.0169	.2909	.2945	.2981	.3017	.3053	.3088	.3124
.0153	.2634	.2666	.2699	.2731	.2764	.2796	.2829
.0138	.2375	.2405	.2434	.2463	.2493	.2522	.2551
.0123	.2117	.2143	.2169	.2196	.2222	.2248	.2274
.011	.1893	.1917	.1940	.1964	.1987	.2010	.2034
.010	.1721	.1743	.1764	.1785	.1806	.1828	.1849
.009	.1549	.1568	.1587	.1607	.1626	.1645	.1664
.008	.1377	.1394	.1411	.1428	.1445	.1462	.1479
.007	.1205	.1220	.1235	.1250	.1264	.1279	.1294
.006	.1033	.1046	.1058	.1071	.1084	.1097	.1109
.005	.0861	.0871	.0882	.0893	.0903	.0914	.0924
.004	.0689	.0697	.0706	.0714	.0723	.0731	.0740
.003	.0516	.0523	.0529	.0536	.0542	.0548	.0555
.002	.0344	.0349	.0353	.0357	.0361	.0366	.0370
.001	.0172	.0174	.0176	.0179	.0181	.0183	.0185

WEIGHT OF COLD ROLLED STEEL

Table of Pounds per Lineal Foot

Decimal Thickness	Width in Inches						
	5½	5⅝	5¾	5⅞	5¾	5⅞	5⅞
.2757	5.1556	5.2142	5.2728	5.3313	5.3899	5.4485	5.5071
.2604	4.8695	4.9248	4.9802	5.0355	5.0908	5.1462	5.2015
.2451	4.5834	4.6355	4.6875	4.7396	4.7917	4.8438	4.8959
.2298	4.2973	4.3461	4.3949	4.4438	4.4926	4.5414	4.5903
.2145	4.0112	4.0567	4.1023	4.1479	4.1935	4.2391	4.2846
.1991	3.7232	3.7655	3.8078	3.8501	3.8924	3.9347	3.9770
.1838	3.4371	3.4761	3.5152	3.5542	3.5933	3.6323	3.6714
.1685	3.1510	3.1868	3.2226	3.2584	3.2942	3.3300	3.3658
.1532	2.8648	2.8974	2.9300	2.9625	2.9951	3.0276	3.0602
.1379	2.5787	2.6080	2.6373	2.6666	2.6959	2.7252	2.7546
.125	2.3375	2.3641	2.3906	2.4172	2.4438	2.4703	2.4969
.1225	2.2908	2.3168	2.3428	2.3688	2.3949	2.4209	2.4469
.120	2.2440	2.2695	2.2950	2.3205	2.3460	2.3715	2.3970
.109	2.0383	2.0615	2.0846	2.1078	2.1310	2.1541	2.1773
.1072	2.0046	2.0274	2.0502	2.0730	2.0958	2.1185	2.1413
.09375	1.7531	1.7730	1.7930	1.8129	1.8328	1.8527	1.8727
.0919	1.7185	1.7381	1.7576	1.7771	1.7966	1.8162	1.8357
.083	1.5521	1.5697	1.5874	1.6050	1.6227	1.6403	1.6579
.0766	1.4324	1.4487	1.4650	1.4813	1.4975	1.5138	1.5301
.0689	1.2884	1.3031	1.3177	1.3324	1.3470	1.3616	1.3763
.065	1.2155	1.2293	1.2431	1.2569	1.2708	1.2846	1.2984
.0625	1.1688	1.1820	1.1953	1.2086	1.2219	1.2352	1.2484
.0613	1.1463	1.1593	1.1724	1.1854	1.1984	1.2114	1.2245
.0551	1.0304	1.0421	1.0538	1.0655	1.0772	1.0889	1.1006
.050	.9350	.9456	.9563	.9669	.9775	.9881	.9988
.049	.9163	.9267	.9371	.9475	.9580	.9684	.9788
.0429	.8022	.8113	.8205	.8296	.8387	.8478	.8569
.0375	.7013	.7092	.7172	.7252	.7331	.7411	.7491
.0368	.6882	.6960	.7038	.7116	.7194	.7273	.7351
.035	.6545	.6619	.6694	.6768	.6843	.6917	.6991
.0337	.6302	.6374	.6445	.6517	.6588	.6660	.6732
.0306	.5722	.5787	.5852	.5917	.5982	.6047	.6112
.0276	.5161	.5220	.5279	.5337	.5396	.5454	.5513
.025	.4675	.4728	.4781	.4834	.4888	.4941	.4994
.0245	.4582	.4634	.4686	.4738	.4790	.4842	.4894
.0214	.4002	.4047	.4093	.4138	.4184	.4229	.4275
.0184	.3441	.3480	.3519	.3558	.3597	.3636	.3675
.0169	.3160	.3196	.3232	.3268	.3304	.3340	.3376
.0153	.2861	.2894	.2926	.2959	.2991	.3024	.3056
.0138	.2581	.2610	.2639	.2669	.2698	.2727	.2757
.0123	.2300	.2326	.2352	.2379	.2405	.2431	.2457
.011	.2057	.2080	.2104	.2127	.2151	.2174	.2197
.010	.1870	.1891	.1913	.1934	.1955	.1976	.1998
.009	.1683	.1702	.1721	.1740	.1760	.1779	.1798
.008	.1496	.1513	.1530	.1547	.1564	.1581	.1598
.007	.1309	.1324	.1339	.1354	.1369	.1383	.1398
.006	.1122	.1135	.1148	.1160	.1173	.1186	.1199
.005	.0935	.0946	.0956	.0967	.0978	.0988	.0999
.004	.0748	.0757	.0765	.0774	.0782	.0791	.0799
.003	.0561	.0567	.0574	.0580	.0587	.0593	.0599
.002	.0374	.0378	.0383	.0387	.0391	.0395	.0400
.001	.0187	.0189	.0191	.0193	.0196	.0198	.0200

WEIGHT OF COLD ROLLED STEEL

Table of Pounds per Lineal Foot

Decimal Thickness	Width in Inches						
	5 $\frac{1}{16}$	6	6 $\frac{1}{16}$	6 $\frac{1}{8}$	6 $\frac{1}{4}$	6 $\frac{3}{8}$	6 $\frac{1}{2}$
.2757	5.5657	5.6243	5.6829	5.7415	5.8000	5.8586	5.9172
.2604	5.2568	5.3122	5.3675	5.4228	5.4782	5.5335	5.5888
.2451	4.9480	5.0000	5.0521	5.1042	5.1563	5.2084	5.2605
.2298	4.6391	4.6879	4.7368	4.7856	4.8344	4.8833	4.9321
.2145	4.3302	4.3758	4.4214	4.4670	4.5125	4.5581	4.6037
.1991	4.0193	4.0616	4.1039	4.1463	4.1886	4.2309	4.2732
.1838	3.7105	3.7495	3.7886	3.8276	3.8667	3.9058	3.9448
.1685	3.4016	3.4374	3.4732	3.5090	3.5448	3.5806	3.6164
.1532	3.0927	3.1253	3.1578	3.1904	3.2229	3.2555	3.2881
.1379	2.7839	2.8132	2.8425	2.8718	2.9011	2.9304	2.9597
.125	2.5234	2.5500	2.5766	2.6031	2.6297	2.6563	2.6828
.1225	2.4730	2.4990	2.5250	2.5511	2.5771	2.6031	2.6292
.120	2.4225	2.4480	2.4735	2.4990	2.5245	2.5500	2.5755
.109	2.2004	2.2236	2.2468	2.2699	2.2931	2.3163	2.3394
.1072	2.1641	2.1869	2.2097	2.2324	2.2552	2.2780	2.3008
.09375	1.8926	1.9125	1.9324	1.9523	1.9723	1.9922	2.0121
.0919	1.8552	1.8748	1.8943	1.9138	1.9333	1.9529	1.9724
.083	1.6756	1.6932	1.7108	1.7285	1.7461	1.7638	1.7814
.0766	1.5464	1.5626	1.5789	1.5952	1.6115	1.6278	1.6440
.0689	1.3909	1.4056	1.4202	1.4348	1.4495	1.4641	1.4788
.065	1.3122	1.3260	1.3398	1.3536	1.3674	1.3813	1.3951
.0625	1.2617	1.2750	1.2883	1.3016	1.3148	1.3281	1.3414
.0613	1.2375	1.2505	1.2635	1.2766	1.2896	1.3026	1.3157
.0551	1.1123	1.1240	1.1357	1.1475	1.1592	1.1709	1.1826
.050	1.0094	1.0200	1.0306	1.0413	1.0519	1.0625	1.0731
.049	.9892	.9996	1.0100	1.0204	1.0308	1.0413	1.0517
.0429	.8660	.8752	.8843	.8934	.9025	.9116	.9207
.0375	.7570	.7650	.7730	.7809	.7889	.7969	.8048
.0368	.7429	.7507	.7585	.7664	.7742	.7820	.7898
.035	.7066	.7140	.7214	.7289	.7363	.7438	.7512
.0337	.6803	.6875	.6946	.7018	.7090	.7161	.7233
.0306	.6177	.6242	.6307	.6372	.6437	.6503	.6568
.0276	.5572	.5630	.5689	.5748	.5806	.5865	.5924
.025	.5047	.5100	.5153	.5206	.5259	.5313	.5366
.0245	.4946	.4988	.5050	.5102	.5154	.5206	.5258
.0214	.4320	.4366	.4411	.4457	.4502	.4548	.4593
.0184	.3715	.3754	.3793	.3832	.3871	.3910	.3949
.0169	.3412	.3448	.3484	.3519	.3555	.3591	.3627
.0153	.3089	.3121	.3154	.3186	.3219	.3251	.3284
.0138	.2786	.2815	.2845	.2874	.2903	.2933	.2962
.0123	.2483	.2509	.2535	.2561	.2588	.2614	.2640
.011	.2221	.2244	.2267	.2291	.2314	.2338	.2361
.010	.2019	.2040	.2061	.2083	.2104	.2125	.2146
.009	.1817	.1836	.1855	.1874	.1893	.1913	.1932
.008	.1615	.1632	.1649	.1666	.1683	.1700	.1717
.007	.1413	.1428	.1443	.1458	.1473	.1488	.1502
.006	.1211	.1224	.1237	.1250	.1262	.1275	.1288
.005	.1009	.1020	.1031	.1041	.1052	.1063	.1073
.004	.0808	.0816	.0825	.0833	.0842	.0850	.0859
.003	.0606	.0612	.0618	.0625	.0631	.0638	.0644
.002	.0404	.0408	.0412	.0417	.0421	.0425	.0429
.001	.0202	.0204	.0206	.0208	.0210	.0213	.0215

SHEET SHEARING CHARGES

Applicable to all Carbon Sheets #8 gauge and lighter
(Including Floor Plates 1/8" and lighter)

Minimum charge \$1.00 per Gauge.

CUTTING TO ONE DIMENSION ONLY—(STRIPS)

DOLLARS PER 100#

DIMENSION CUT TO

Uncut Dimension Length Or Width	Under 1"	1" To Under 2"	2" To Under 3"	3" To Under 6"	6" To Under 12"	12" To Under 18"	18" To Under 36"	36" To Under 72"	72" and Over
NOS. 8, 9, 10 GAUGE									
72" Or Less....	3.05	1.55	0.90	0.65	0.60	0.60	0.55	0.35	0.25
Over 72" To 120"....	1.80	0.90	0.60	0.35	0.35	0.30	0.30	0.25	...
Over 120" To 144"....	1.90	0.95	0.60	0.35	0.30	0.30	0.25	0.25	...
NOS. 11, 12, 13, 14 GAUGE									
72" Or Less....	2.40	1.20	0.75	0.75	0.70	0.70	0.65	0.45	0.35
Over 72" To 120"....	1.10	0.80	0.60	0.45	0.40	0.40	0.35	0.35	...
Over 120" To 144"....	2.00	1.00	0.60	0.45	0.40	0.40	0.35	0.35	...
NOS. 15, 16, 17, 18 GAUGE									
60" Or Less....	2.05	1.55	0.95	0.90	0.85	0.80	0.75	0.55	0.45
Over 60" To 120"....	1.40	0.95	0.80	0.55	0.50	0.50	0.45	0.45	...
Over 120" To 144"....	2.60	1.30	0.80	0.55	0.50	0.50	0.45	0.45	...
NOS. 19, 20, 21, 22 GAUGE									
48" Or Less....	4.70	2.35	1.45	1.40	1.00	0.90	0.80	0.65	0.55
Over 48" To 120"....	2.10	1.20	0.95	0.70	0.60	0.60	0.55	0.55	...
Over 120" To 144"....	3.70	1.85	1.10	0.75	0.60	0.60	0.55	0.55	...
NOS. 23, 24, 25, 26 GAUGE									
48" Or Less....	7.40	3.70	2.25	2.20	1.60	1.45	1.35	0.95	0.70
Over 48" To 120"....	3.30	1.65	1.20	0.95	0.90	0.80	0.70	0.65	...
Over 120" To 144"....	6.00	3.00	1.80	1.20	0.90	0.80	0.65	0.65	...
NOS. 27, 28, 29, 30 GAUGE									
48" Or Less....	11.05	5.55	3.30	3.25	2.35	2.15	1.90	1.35	1.05
Over 48" To 120"....	4.90	2.45	1.50	1.40	1.30	1.15	1.05	0.80	...
Over 120" To 144"....	8.80	4.40	2.65	1.80	1.30	1.15	0.90	0.80	...

Lengths over 144", prices on application.

SHEET SHEARING CHARGES

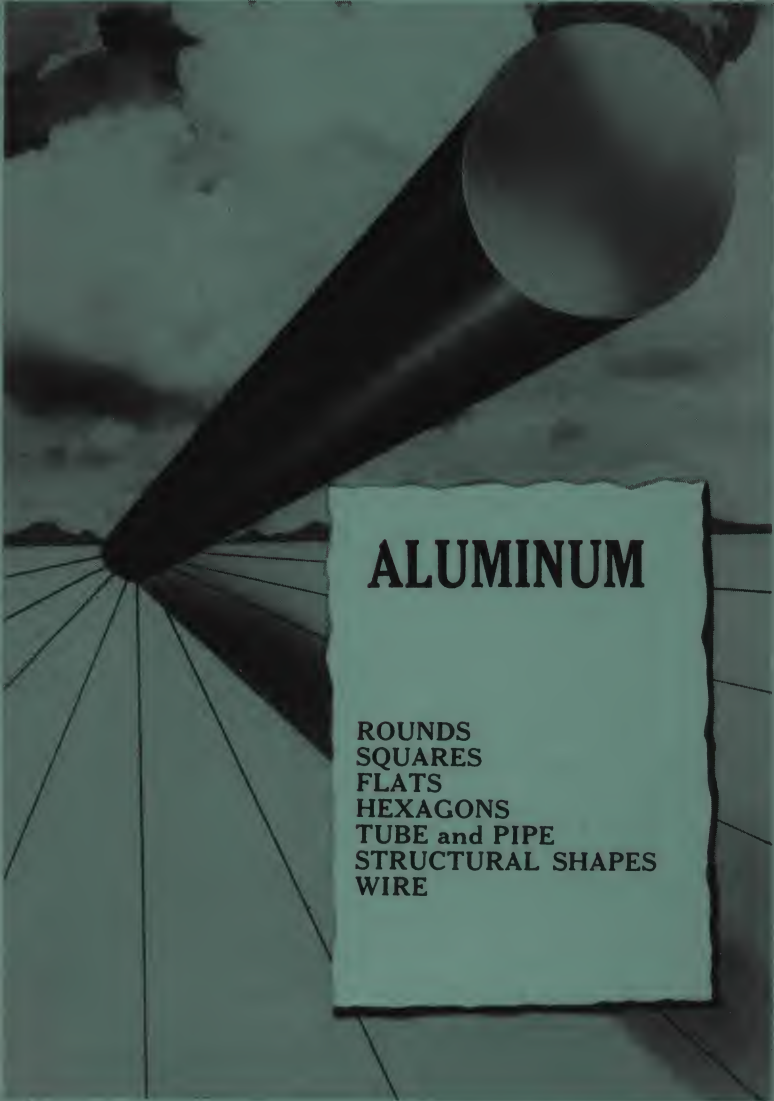
CUTTING TO TWO DIMENSIONS

(Length & Width—Blanks)

DOLLARS PER 100 LBS.

Finished Length		Finished Width							
		Under 1'	1' to Under 2'	2' to Under 3'	3' to Under 6'	6' to Under 12'	12' to Under 18'	18' to Under 36'	36' to 72' Incl.
		NOS. 8, 9, 10 GAUGE							
Under 6"		12.40	6.20	3.70	2.80	...	...	...	...
6" to 12"		6.90	3.45	2.05	1.55	1.45	...	...	...
12" to 36"		4.40	2.55	1.65	1.25	1.05	0.95	0.75	...
36" to 72"		3.50	2.20	1.45	1.05	0.80	0.70	0.55	0.55
72" to 120"		2.95	2.20	1.45	1.05	0.65	0.60	0.50	0.50
120" to 144" Incl.		2.95	2.20	1.45	1.05	0.55	0.50	0.50	0.50
		NOS. 11, 12, 13, 14 GAUGE							
Under 6"		13.80	6.90	4.15	3.20	...	...	...	...
6" to 12"		7.70	3.85	2.40	1.80	1.80	...	...	...
12" to 36"		3.70	2.70	2.10	1.60	1.05	1.00	0.85	...
36" to 72"		3.15	2.35	1.80	1.35	0.85	0.75	0.75	0.65
72" to 120"		3.15	2.35	1.80	1.35	0.70	0.60	0.60	0.60
120" to 144" Incl.		3.15	2.35	1.80	1.35	0.60	0.60	0.60	0.60
		NOS. 15, 16, 17, 18 GAUGE							
Under 6"		18.90	9.45	5.65	5.30	...	...	...	...
6" to 12"		11.20	5.60	3.35	3.00	2.35	...	...	...
12" to 36"		5.10	3.35	2.70	1.85	1.40	1.25	0.95	...
36" to 60"		3.60	2.85	2.35	1.60	1.00	0.90	0.80	0.80
60" to 120"		3.60	2.85	2.35	1.60	0.70	0.70	0.70	0.70
120" to 144" Incl.		3.60	2.85	2.35	1.60	0.70	0.70	0.70	0.70
		NOS. 19, 20, 21, 22 GAUGE							
Under 6"		31.00	15.50	9.30	8.65	...	...	...	...
6" to 12"		17.20	8.65	5.15	4.80	3.90	...	...	...
12" to 36"		7.30	4.20	3.35	2.45	2.00	1.60	1.25	...
36" to 48"		5.00	3.60	2.85	2.10	1.30	1.20	0.90	0.90
48" to 120"		4.65	3.60	2.85	2.10	1.05	1.00	0.85	0.85
120" to 144" Incl.		4.80	3.60	2.85	2.10	1.00	0.85	0.85	0.85
		NOS. 23, 24, 25, 26 GAUGE							
Under 6"		49.30	24.65	14.80	13.75	...	...	...	...
6" to 12"		27.20	13.60	8.15	7.60	6.20	...	...	...
12" to 36"		11.50	5.75	4.10	3.50	3.15	2.55	2.00	...
36" to 48"		8.00	4.50	3.55	2.65	1.90	1.90	1.30	1.00
48" to 120"		5.65	4.50	3.55	2.65	1.65	1.55	1.15	0.95
120" to 144" Incl.		7.70	4.50	3.55	2.65	1.55	1.30	0.95	0.95
		NOS. 27, 28, 29, 30 GAUGE							
Under 6"		73.30	36.65	22.00	20.40	...	...	...	...
6" to 12"		40.60	20.30	12.20	11.30	9.25	...	...	...
12" to 36"		17.20	8.60	6.15	5.20	4.70	3.75	3.00	...
36" to 48"		12.00	6.00	4.20	3.50	3.10	2.85	1.95	1.45
48" to 120"		7.50	5.25	4.20	3.15	2.40	2.35	1.70	1.30
120" to 144" Incl.		11.40	5.70	4.20	3.15	2.35	1.95	1.45	1.05

Lengths over 144", prices on application.



ALUMINUM

ROUNDS
SQUARES
FLATS
HEXAGONS
TUBE and PIPE
STRUCTURAL SHAPES
WIRE

INDEX

Description of Alloys	Page 203
Weights of Bars	Page 204
Formula for Estimating Weights	Page 206
Sectional Tolerances	Page 206
Table for Calculating Cutting Speeds	Page 207
Weights—	
Tubing and Pipe	Page 208
Extruded Shapes	Page 211
Welding Wire	Page 212
Squares	Page 213
Rivet Wire	Page 216
Rounds and Hexagons	Page 218
Flats—Rectangles	Page 224
Chemical Composition	Page 212
Cutting Speeds and Feeds—	
Box Tool and Hollow Mill	Page 213
Drilling	Page 214
Cut-Off	Page 214
Government Specifications	Page 226

Aluminum Alloys for Automatic Screw Machine Products

Various aluminum alloys can be easily worked on automatic screw machines. The principle alloys for such use are 2011-T3, 2017-T4, 2024-T4, 6061-T6, and 7075-T6. Of these alloys, 2011-T3 is considered to have the best machining qualities. This general purpose alloy is specifically made for a broad range of screw machine products. Lead and bismuth have been added to speed machining, produce better part finish, and to create finely divided, easy-to-handle chips. Addition of these alloying elements provides aluminum with those desirable machining qualities much in the same manner as lead improves brasses and bronzes and as sulphur helps steel in similar cutting operations.

The second widely used aluminum alloy is 2017-T4. Because of its high strength characteristics and increased properties over 2011-T3, it is recommended for those parts requiring greater strength either as a single unit or in assemblies. This alloy is often selected for products requiring deep drilling operations.

The third alloy in the group is 2024-T4. It is generally known as "the aircraft alloy" and has higher properties than either 2011-T3 and 2017-T4. Probably the largest usage of this alloy at present is for aircraft fittings. Then, too, because of its relatively higher shear strength, it is widely used for all types of threaded fasteners.

The fourth alloy is 6061-T6. This aluminum has somewhat lesser properties than the foregoing. While 6061-T6 may appear more "gummy" in machining, it does have superior corrosion resistant qualities. Also, it handles better when subsequent brazing, soldering, and fusion welding operations must be performed. Then, too, 6061-T6 has better finish when anodized.

The last and also the strongest and hardest alloy is 7075-T6. This material should be used for highly stressed parts where high strength is essential. This alloy is readily machinable and produces an excellent finish when machined with sharp, properly ground tools and adequate lubricant. This alloy can be spot and resistance welded, but fusion welding is not generally recommended.

In order to select the most suitable aluminum alloy for screw machine products, it is necessary to first determine the qualities needed in the part. Where superior workability is required, 2011-T3 should be used, especially if replacing different materials. The other aluminum alloys should be used where design characteristics are a determining factor for each.

WEIGHT CONVERSION FACTORS

Based on Pure Aluminum 1100—Density 2.71

Weight .0979 Lbs. Per Cu. Inch

3003—1.01	2018—1.03	4043—0.993	6053—0.993
2011—1.04	2024—1.02	5050—0.99	5056—0.974
2014—1.03	2025—1.03	6151—0.993	6061—1.00
2017—1.03	4032—0.993	5052—0.98	7075—1.03

WEIGHT TABLE ALUMINUM ROD, BAR AND WIRE* (Rounds & Hexagons)

Diameter or Distance Between Parallel Faces		Round		Hexagon	
		Section Area Sq. In.	Weight Lb./Ft.	Section Area Sq. In.	Weight Lb./Ft.
Fraction	Decimal				
1/32	0.0312	0.0008	0.0009	0.0008	0.0009
3/64	0.0469	0.0017	0.0020	0.0019	0.0022
1/16	0.0625	0.0031	0.0036	0.0034	0.0040
5/64	0.0781	0.0048	0.0056	0.0053	0.0061
3/32	0.0938	0.0069	0.0081	0.0088	0.0103
7/64	0.1094	0.0094	0.0110	0.0104	0.0122
1/8	0.1250	0.0123	0.0145	0.0135	0.0158
9/64	0.1406	0.0155	0.0182	0.0175	0.0200
5/32	0.1562	0.0192	0.0225	0.0211	0.0248
11/64	0.1719	0.0232	0.0272	0.0256	0.0300
3/16	0.1875	0.0276	0.0324	0.0305	0.0358
13/64	0.2031	0.0324	0.0381	0.0357	0.0420
7/32	0.2188	0.0376	0.0442	0.0414	0.0486
15/64	0.2344	0.0431	0.0506	0.0476	0.0558
1/4	0.2500	0.0491	0.0577	0.0542	0.0631
17/64	0.2656	0.0554	0.0651	0.0611	0.0718
9/32	0.2812	0.0621	0.0730	0.0685	0.0804
19/64	0.2969	0.0692	0.0813	0.0763	0.0896
5/16	0.3125	0.0767	0.0901	0.0845	0.0990
21/64	0.3281	0.0846	0.0994	0.0932	0.1096
11/32	0.3438	0.0928	0.1090	0.1022	0.1200
23/64	0.3594	0.1014	0.1191	0.1119	0.1313
3/8	0.3750	0.1104	0.1297	0.1218	0.1431
13/32	0.4062	0.1296	0.1522	0.1429	0.1679
7/16	0.4375	0.1503	0.1766	0.1658	0.1948
15/32	0.4688	0.1726	0.2028	0.1902	0.2235
1/2	0.5000	0.1963	0.2306	0.2165	0.2543
17/32	0.5312	0.2216	0.2603	0.2444	0.2872
9/16	0.5625	0.2485	0.2919	0.2740	0.3219
19/32	0.5938	0.2769	0.3253	0.3053	0.3587
5/8	0.6250	0.3068	0.3604	0.3381	0.3974
21/32	0.6562	0.3382	0.3973	0.3730	0.4382
11/16	0.6875	0.3713	0.4361	0.4091	0.4810
23/32	0.7188	0.4057	0.4766	0.4474	0.5256
3/4	0.7500	0.4418	0.5190	0.4870	0.5722
25/32	0.7812	0.4793	0.5631	0.5286	0.6210
13/16	0.8125	0.5185	0.6091	0.5715	0.6716
27/32	0.8438	0.5590	0.6567	0.6162	0.7239
7/8	0.8750	0.6013	0.7064	0.6626	0.7789
29/32	0.9062	0.6450	0.7577	0.7108	0.8350
15/16	0.9375	0.6903	0.8110	0.7601	0.8931
31/32	0.9688	0.7370	0.8660	0.8123	0.9543
1	1.0000	0.7854	0.9227	0.8650	1.016

* Weights shown are based on 1100. Conversion factors are shown above.

WEIGHT TABLE ALUMINUM ROD AND BAR*

Diameter or Distance Between Parallel Faces		Round		Hexagon	
Fraction	Decimal	Section Area Sq. In.	Weight Lb./Ft.	Section Area Sq. In.	0.8931 0.9543
1 1/32	1.0312	0.8352	0.9812	0.9200	1.080
1 1/16	1.0625	0.8866	1.041	0.9766	1.147
1 3/32	1.0938	0.9395	1.103	1.035	1.216
1 1/8	1.1250	0.9940	1.167	1.095	1.286
1 5/32	1.1562	1.049	1.233	1.157	1.359
1 3/16	1.1875	1.107	1.301	1.220	1.433
1 7/32	1.2188	1.166	1.370	1.285	1.510
1 1/4	1.2500	1.227	1.441	1.351	1.587
1 9/32	1.2812	1.289	1.514	1.420	1.669
1 5/16	1.3125	1.353	1.589	1.490	1.750
1 11/32	1.3438	1.418	1.665	1.562	1.836
1 3/8	1.375	1.484	1.744	1.635	1.921
1 13/32	1.406	1.553	1.824	1.711	2.010
1 7/16	1.437	1.622	1.906	1.787	2.100
1 15/32	1.469	1.694	1.990	1.867	2.193
1 1/2	1.500	1.767	2.076	1.946	2.286
1 9/16	1.5625	1.917	2.252	2.114	2.484
1 5/8	1.625	2.073	2.436	2.286	2.686
1 11/16	1.687	2.236	2.627	2.466	2.897
1 3/4	1.750	2.405	2.825	2.652	3.115
1 13/16	1.812	2.580	3.031	2.844	3.342
1 7/8	1.875	2.761	3.243	3.044	3.576
1 15/16	1.937	2.948	3.463	3.250	3.819
2	2.000	3.141	3.690	3.464	4.069
2 1/16	2.062	3.341	3.925	3.682	4.329
2 1/8	2.125	3.546	4.166	3.910	4.594
2 3/16	2.187	3.758	4.415	4.143	4.873
2 1/4	2.250	3.976	4.671	4.384	5.150
2 5/16	2.312	4.200	4.934	4.629	5.442
2 3/8	2.375	4.430	5.204	4.884	5.738
2 7/16	2.437	4.666	5.482	5.143	6.047
2 1/2	2.500	4.908	5.766	5.412	6.358
2 9/16	2.562	5.157	6.058	5.684	6.681
2 5/8	2.625	5.411	6.357	5.967	7.010
2 11/16	2.687	5.672	6.664	6.255	7.346
2 3/4	2.750	5.939	6.977	6.549	7.693
2 13/16	2.812	6.212	7.298	6.763	7.954
2 7/8	2.875	6.491	7.626	7.158	8.409
2 15/16	2.937	6.777	7.961	7.470	8.780
3	3.000	7.068	8.304	7.794	9.156
3 1/16	3.062	7.366	8.653	8.120	9.544
3 1/8	3.125	7.669	9.010	8.653	9.938
3 3/16	3.187	7.979	9.374	8.796	10.340
3 1/4	3.250	8.295	9.745	9.147	10.749
3 5/16	3.312	8.618	10.12	9.500	11.162
3 3/8	3.375	8.946	10.51	9.865	11.582
3 7/16	3.437	9.280	10.90	10.230	12.023
3 1/2	3.500	9.621	11.30	10.609	12.464
3 9/16	3.625	10.32	12.13	11.380	13.379
3 3/4	3.750	11.04	12.97	12.178	14.306
3 7/8	3.875	11.79	13.86	13.004	15.288
4	4.000	12.56	14.76	13.856	16.280
4 1/8	4.125	13.36	15.71	14.736	17.328
4 1/4	4.250	14.18	16.66	15.642	18.376
4 3/8	4.375	15.03	17.67	16.576	19.490
4 1/2	4.500	15.90	18.68	17.537	20.604
4 3/4	4.750	17.72	20.81	19.540	22.953
5	5.000	19.63	23.06	21.651	25.435

*Weights shown are based on 1100. Conversion factors are on previous page.

FORMULA FOR ESTIMATING WEIGHT OF MATERIAL

Length of Piece (in.) x $\frac{\text{Weight (lbs/ft)}}{12}$ x Conversion Factor

= Weight of 1 piece of desired alloy

Weight (One Piece) x No. of Pieces = Weight of Material

$\frac{\text{Bar Ends (in.)}}{\text{Bar Length (ft)} \times 12} \times 100 = \text{End Loss (Percent)}$

Estimate Rejection & Setup Loss (Percent)

Weight of Material (100 + end loss + setup loss) = Total Weight of Stock

SECTIONAL TOLERANCES

Standard Screw Machine Stock—Round

Diameter (Inches)	Tolerance (Inch)
0.125 to 0.500	±0.0015
0.531 to 1.000	±0.002
1.063 to 1.500	±0.0025
1.563 to 2.000	±0.006
2.063 to 3.375	±0.008
3.500	+0.031—0.016

Standard Screw Machine Stock—Hexagonal

Distance Between Parallel Faces (Inches)	Tolerance (Inch)
0.375 to 0.500	±0.0020
0.563 to 1.000	±0.0025
1.125 to 1.375	±0.0030

Rolled Rod

Cold Finished Rod

Diameter (Inches)	Tolerance (Inch)
0.375 to 0.500	±0.0015
0.501 to 1.000	±0.002
1.001 to 1.500	±0.0025
1.501 to 3.000	±0.004

Diameter (Inches)	Tolerance (Inch)	
	Plus	Minus
1.501 to 2.000	0.006	0.006
2.001 to 3.499	0.008	0.008
3.500 to 5.000	0.031	0.016
5.001 to 8.000	0.063	0.031

Cold Finished Hexagonal Bar

Distance Between Parallel Faces (Inches)	Tolerance (Inch)
0.375 to 0.500	±0.0020
0.501 to 1.000	±0.0025
1.001 to 1.500	±0.0030
1.501 to 2.000	±0.0050

Drawn Wire—Round & Hexagonal

Diameter or Distance Between Parallel Faces (Inches)	Tolerance (Inch)	
	Round	Hexagonal
0.0126 to 0.0201	±0.0005	.....
0.0202 to 0.0359	±0.0005	±0.001
0.036 to 0.064	±0.0010	±0.0015
0.065 to 0.374	±0.0015	±0.002

Rolled Hexagonal Bar

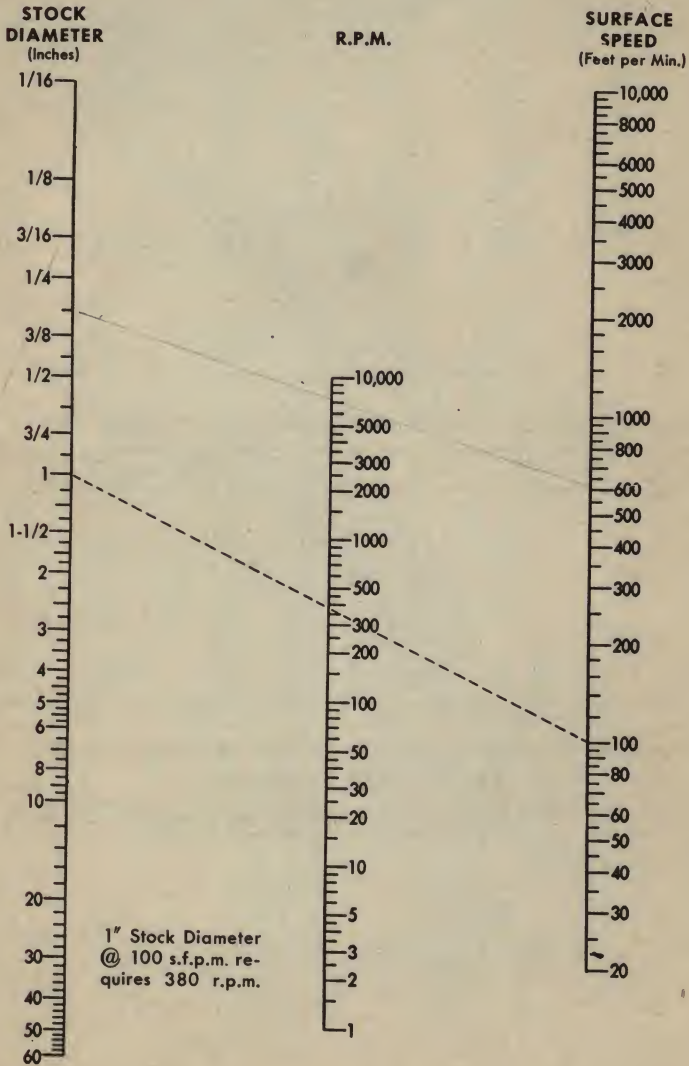
Distance Between Parallel Faces (Inches)	Tolerance (Inch)
1.563 to 2.000	±0.016
2.001 to 3.000	±0.020

STANDARD 12-FOOT LENGTHS

All Rod, Bar and Wire items supplied in standard 12-foot lengths are supplied with a length tolerance of $+\frac{1}{2}$ " , $-\frac{1}{2}$ " ; however, a maximum of 30%, by weight of each item may be supplied in random lengths between 8 and 12 feet.

ALUMINUM ROD AND BAR

NOMOGRAPH FOR CALCULATING CUTTING SPEEDS IN RPM FOR VARIOUS SURFACE SPEEDS



ALUMINUM TUBING AND PIPE

3003-H14 ROUND ALUMINUM TUBING—12 FT. LENGTHS

PRICE PER POUND				PRICE PER POUND			
O.D. IN INCHES	WALL THICKNESS STUBS GAUGE	DEC. EQUIV.	APPROX. WT. Per FT. LBS.	O.D. IN INCHES	WALL THICKNESS STUBS GAUGE	DEC. EQUIV.	APPROX. WT. Per FT. LBS.
3/16	24	.022	.014	1	20	.035	.126
	24	.022	.019		19	.042	.150
	20	.035	.028		18	.049	.174
3/8	24	.022	.029	1 1/8	17	.058	.204
	22	.028	.036		16	.065	.226
	20	.035	.044		17	.058	.230
7/16	18	.049	.057	1 1/4	20	.035	.159
	16	.065	.075		18	.049	.214
	20	.035	.053		17	.058	.259
1/2	22	.028	.049	1 3/8	16	.065	.287
	20	.035	.061		17	.058	.285
	18	.049	.083		20	.035	.191
5/8	16	.065	.105	1 1/2	18	.049	.266
	22	.028	.063		17	.058	.312
	20	.035	.077		16	.065	.347
3/4	18	.049	.105	1 3/4	20	.035	.224
	16	.065	.135		18	.049	.311
	20	.035	.093		16	.065	.408
7/8	18	.049	.128	2	20	.035	.257
	17	.058	.149		18	.049	.357
	16	.065	.166		16	.065	.469
1	20	.035	.110	2 1/2	18	.049	.447
	18	.049	.150		16	.065	.585
	17	.058	.177		3	16	.065	.707
16	.065	.196					

5052-O ROUND ALUMINUM TUBING—12 FT. LENGTHS

O.D.	STUBS GAGE NO.	WALL THICKNESS	WEIGHT PER FT. IN LBS.	O.D.	STUBS GAGE NO.	WALL THICKNESS	WEIGHT PER FT. IN LBS.	
3/8	20	.035	.0115	1 3/4	18	.049	.1257	
	20	.035	.0195		20	.035	.1238	
	22	.028	.0228		18	.049	.1703	
1/4	20	.035	.0275	1 1/2	20	.035	.1554	
	20	.035	.0355		18	.049	.2148	
	20	.035	.0436		1 1/2	18	.049	.2604
5/16	18	.049	.0584	1 3/8	18	.049	.3049	
	20	.035	.0594		2	20	.035	.2515
	18	.049	.0812		18	.049	.3495	
1/2	20	.035	.0752	2 1/4	16	.065	.4604	
	19	.042	.0891		20	.035	.3158	
	18	.049	.1030		18	.049	.4396	
5/8	20	.035	.0911					

6063-T5 RECTANGULAR AND SQUARE ALUMINUM TUBES 18' STANDARD LENGTHS

DEPTH	WIDTH	WALL THICKNESS INS.	WEIGHT PER FOOT
1/2	1	.125	.376
3/4	3/4	.125	.376
3/4	1 1/2	.125	.600
1	1	.125	.526
1	1 1/2	.125	.676
1	2	.125	.826
1 1/4	1 1/4	.125	.676
1 1/4	2 1/2	.125	1.050
1 1/2	1 1/2	.125	.826
1 1/2	2	.125	.976
1 3/4	3/4	.125	.976
1 3/4	3	.125	1.350
1 3/4	3 1/2	.125	1.500
2	2	.125	1.126

ALUMINUM TUBING AND PIPE

6061-T6 ROUND ALUMINUM TUBE

O.D.	WALL	WEIGHT PER FT. LBS.	O.D.	WALL	WEIGHT PER FT. LBS.	O.D.	WALL	WEIGHT PER FT. LBS.
3/16	.035	.0197	3/4	.035	.092	1 1/2	.035	.189
	.049	.0250			.049		.127		.049	.263
1/4	.035	.0278		.058	.148		.058	.309
	.049	.0364		.065	.164		.062	.329
5/16	.035	.0412	7/8	.083	.204		.065	.344
	.049	.0477			.035	.109		.083	.434
3/8	.058	.055		.049	.149	1 5/8	.035	.206
	.035	.0439		.058	.175			.058	.336
1/2	.049	.059	1	.065	.194	1 3/4	.058	.363
	.058	.068			.035		.125		.062	.387
5/8	.065	.074		.049	.172		.083	.510
	.035	.052		.058	.202	1 7/8	.058	.389
3/4	.049	.070		.065	.224			.049	.353
	.065	.089	1 1/8	.083	.281	2	.058	.416
.028	.0488			.035	.141			.062	.444
1	.035	.060	1 1/4	.058	.228		.065	.464
	.049	.082			.035	.157		.083	.590
1 1/8	.058	.095		.049	.217	2 1/4	.049	.398
	.065	.104		.058	.256			.065	.520
1 1/4	.028	.062		.062	.272		.083	.660
	.035	.076		.065	.284	2 1/2	.065	.580
1 1/2	.049	.104	1 3/8	.083	.357			.083	.740
	.058	.121			.035	.173	3	.065	.700
.065	.134		.058	.282		.083		.890

6063-T6 ALUMINUM I.P.S. PIPE
STOCK LENGTHS 12 FT. 1/8", 1/4", 3/8"
ALL OTHERS 20 FT. LONG

SIZE IN INCHES	WALL	WEIGHT PER FT. LBS.	SIZE IN INCHES	WALL	WEIGHT PER FT. LBS.	SIZE IN INCHES	WALL	WEIGHT PER FT. LBS.
1/8		.085	1 1/2		940	4		3.733
1/4		.147					5		5.057
3/8		.196	2		1.264	6		6.564
1/2		.294	2 1/2		2.004	8	.322	9.878
3/4		.391	3		2.621	10	.365	14.00
1		.581	3 1/2		3.151	12	.375	17.14
1 1/4		.786						

6061-T6 ALUMINUM I.P.S. PIPE
STOCK LENGTHS 12 FT. 1/8", 1/4", 3/8"
ALL OTHERS 20 FT. LONG

SIZE IN INCHES	WEIGHT PER FT. LBS.	SIZE IN INCHES	WEIGHT PER FT. LBS.	SIZE IN INCHES	WEIGHT PER FT. LBS.
1/8	.085	1	.581	2 1/2	2.004
1/4	.147	1 1/4	.786	3	2.621
3/8	.196	1 1/2	.940	3 1/2	3.151
1/2	.294	2	1.264	4	3.733
3/4	.391				

ALUMINUM TUBING AND PIPE

COMPARISON OF PIPE SIZES WITH NEAREST TUBING SIZES

A comparison of standard, extra heavy and double extra heavy steam, gas and water pipe sizes with nearest mechanical seamless tube size.

STANDARD PIPE SIZES

Nominal Pipe Size	Actual Pipe Size			Nearest Fractional Seamless Tube Size		
	O.D.	I.D.	Wall	O.D.	Wall	I.D.
1/8	.405	.269	.068	13/32	16 Ga.	.276
1/4	.540	.364	.088	17/32	14 Ga.	.365
3/8	.675	.493	.091	1 1/16	13 Ga.	.498
1/2	.840	.622	.109	27/32	12 Ga.	.626
3/4	1.050	.824	.113	1 1/8	12 Ga.	.845
1	1.315	1.049	.133	1 3/16	10 Ga.	1.045
1 1/4	1.660	1.380	.140	1 1/2	9 Ga.	1.392
1 1/2	1.900	1.610	.145	1 5/8	9 Ga.	1.579
2	2.375	2.067	.154	2 3/8	5/32	2.063
2 1/2	2.875	2.469	.203	2 7/8	7/32	2.438
3	3.500	3.068	.216	3 1/2	7/32	3.063
3 1/2	4.000	3.548	.226	4	3/4	3.500
4	4.500	4.026	.237	4 1/2	3/4	4.000
5	5.563	5.047	.258	5 1/16	9/32	5.000
6	6.625	6.065	.280	6 3/8	9/32	6.063
8	8.625	7.981	.322	8 3/8	1 1/32	7.938

EXTRA HEAVY PIPE SIZES

1/8	.405	.215	.095	3/32	13 Ga.	.216
1/4	.540	.302	.119	17/32	11 Ga.	.290
3/8	.675	.423	.126	1 1/16	1/8	.438
1/2	.840	.546	.147	27/32	7/32	.531
3/4	1.050	.742	.154	1 1/8	3/32	.750
1	1.315	.957	.179	1 3/16	3/16	.938
1 1/4	1.660	1.278	.191	1 1/2	7/16	1.313
1 1/2	1.900	1.500	.200	1 5/8	7/32	1.438
2	2.375	1.939	.218	2 3/8	7/32	1.938
2 1/2	2.875	2.323	.276	2 7/8	9/32	2.313
3	3.500	2.900	.300	3 1/2	5/16	2.875
3 1/2	4.000	3.364	.318	4	5/16	3.375
4	4.500	3.826	.337	4 1/2	1 1/32	3.813
5	5.563	4.813	.375	5 1/16	3/8	4.713
6	6.625	5.761	.432	6 3/8	7/16	5.750
8	8.625	7.625	.500	8 3/8	1/2	7.625

DOUBLE EXTRA HEAVY PIPE SIZES

1/2	.840	.252	.294	27/32	5/16	.219
3/4	1.050	.434	.308	1 1/8	3/16	.338
1	1.315	.599	.358	1 3/16	3/8	.563
1 1/4	1.660	.896	.382	1 1/2	3/8	.938
1 1/2	1.900	1.100	.400	1 5/8	13/32	1.063
2	2.375	1.503	.436	2 3/8	7/16	1.500
2 1/2	2.875	1.771	.552	2 7/8	9/16	1.750
3	3.500	2.300	.600	3 1/2	3/8	2.250
3 1/2	4.000	2.728	.636	4	5/8	2.750
4	4.500	3.152	.674	4 1/2	1 1/16	3.125
5	5.563	4.063	.750	5 1/16	3/4	4.063
6	6.625	4.897	.864	6 3/8	7/8	4.875
8	8.625	6.875	.875	8 3/8	7/8	6.875

ALUMINUM EXTRUDED SHAPES

6061-T6 ALUMINUM ANGLES x 25 ft. Rdm.

SIZE IN INCHES	WEIGHT PER FT.	SIZE IN INCHES	WEIGHT PER FT.
3/4 x 3/4 x 1/8	.20	1/4	1.11
1 x 1 x 1/8	.27	3/8	1.60
1 x 1 x 3/16	.40	2 1/2 x 2 x 3/16	.96
1 x 1 x 1/4	.51	1/4	1.25
1 1/4 x 1 1/4 x 1/8	.35	5/16	1.54
1 1/4 x 1 1/4 x 3/16	.51	2 1/2 x 2 1/2 x 3/16	1.07
1 1/2 x 1 1/4 x 1/8	.66	1/4	1.41
1 1/2 x 1 1/4 x 3/16	.39	5/16	1.73
1 1/2 x 1 1/4 x 1/4	.56	3 x 2 x 3/16	1.07
1 1/2 x 1 1/2 x 1/4	.74	1/4	1.40
1 1/2 x 1 1/2 x 3/16	.43	3/8	2.05
1 1/2 x 1 1/2 x 1/4	.62	3 x 2 1/2 x 1/4	1.53
1 3/4 x 1 1/4 x 1/8	.81	3 x 3 x 3/16	1.29
1 3/4 x 1 1/4 x 3/16	.43	1/4	1.68
1 3/4 x 1 1/4 x 1/4	.62	5/16	2.08
1 3/4 x 1 3/4 x 1/8	.81	3/8	2.47
1 3/4 x 1 3/4 x 3/16	.49	3 1/2 x 3 1/2 x 1/4	1.68
1 3/4 x 1 3/4 x 1/4	.73	5/16	2.45
2 x 1 1/2 x 1/8	.95	3/8	1.99
2 x 1 1/2 x 3/16	.49	4 x 3 x 1/4	2.92
2 x 1 1/2 x 1/4	.73	5/16	2.28
2 x 2 x 1/8	.95	3/8	2.82
2 x 2 x 3/16	.57	4 x 4 x 1/4	3.36
	.84	5/16	

6061-T6 STANDARD STRUCTURAL SHAPES

CHANNELS IN 25 FT. LENGTHS

Size in In.	Weight Per Ft.	Size in In.	Weight Per Ft.	Size in In.	Weight Per Ft.
3 x .170	1.42	4 x .320	2.50	6 x .314	3.62
3 x .258	1.73	5 x .190	2.31	6 x .437	4.45
3 x .356	2.07	5 x .325	3.10	7 x .230	3.53
4 x .180	1.84	5 x .472	3.97	8 x .250	4.25
4 x .247	2.15	6 x .225	3.00	8 x .487	6.47

6061-T6 STANDARD STRUCTURAL SHAPES

I BEAMS—25 FT. LENGTHS

3 x .170	1.96	4 x .326	3.28	6 x .230	4.30
3 x .349	2.59	5 x .210	3.42	6 x .343	5.09
4 x .190	2.64	5 x .494	5.09		

6061-T6 STANDARD STRUCTURAL SHAPES

H BEAMS—25 FT. LENGTHS

4 x .313	4.70
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6061-T6 STANDARD STRUCTURAL SHAPES

TEES—25 FT. LENGTHS

2 x 2 x 1/4	1.25
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NOMINAL COMPOSITION OF WROUGHT ALLOYS^①

SHEET—COIL—ROD—BAR—WIRE

Alloy	Per Cent of Alloying Elements—Aluminum and Normal Impurities Constitute Remainder								
	Copper	Silicon	Man- ganeso	Mag- nesium	Zinc	Nickel	Chro- mium	Lead	Bis- muth
EC	99.45% minimum Aluminum								
1100	99% minimum Aluminum								
3003 (2)	...	...	1.2	...	...	...	...	...	...
2011	5.5	...	...	...	...	...	...	0.5	0.5
2014	4.4	0.8	0.8	0.4	...	...	...	...	...
2017	4.0	...	0.5	0.5	...	...	...	...	...
2024 (2)	4.5	...	0.6	1.5	...	...	...	...	...
5050	...	...	...	1.4	...	...	...	...	...
5052	...	...	...	2.5	...	...	0.25	...	...
6061	0.25	0.6	...	1.0	...	...	0.25	...	...
7075 (2)	1.6	...	...	2.5	5.6	...	0.3	...	...

(1) Heat-treatment symbols have been omitted since composition does not vary for different heat-treatment practices.

(2) The Alclad form of these alloys consist of a "core" of the basis alloy coated with pure aluminum or a suitable alloy.

ALUMINUM WELDING WIRE

STANDARD WAREHOUSE SIZES

Size (Inch)		*COILED WELDING WIRE					
Fract.	Dec.	4043-H19	4043-H16	4043-0	5154-0	5356-0	1100-H18
—	.051	—	—	—	—	—	—
1/16	.063	X	—	X	X	X	—
—	.064	—	—	—	—	—	—
—	.081	—	—	—	—	—	—
—	.091	X	—	—	—	—	X
—	.092	—	—	—	—	—	—
3/32	.094	X	—	X	X	X	—
—	.102	—	—	—	—	—	—
—	.123	—	—	—	—	—	—
1/8	.125	X	—	X	X	X	X
—	.140	—	—	—	—	—	—
—	.154	—	—	—	—	—	—
3/32	.156	X	—	X	X	X	—
—	.158	—	—	—	—	—	—
—	.165	—	—	—	—	—	—
—	.184	—	—	—	—	—	—
3/16	.188	X	—	X	X	X	X
—	.247	—	—	—	—	—	—
1/4	.250	—	X	X	X	X	—

* See Round Drawn Wire Schedule for availability of 1100-0.

ALUMINUM SQUARE BAR AND WIRE

STANDARD WAREHOUSE SIZES

SQUARE DRAWN WIRE—STRAIGHTENED

Size	1100-H14	2017-T4	2024-T4
$\frac{3}{16}$ (.188)	X	—	—
$\frac{1}{4}$ (.250)	X	—	—
$\frac{5}{16}$ (.313)	X	—	—

SQUARE COLD FINISHED BAR—STRAIGHT LENGTHS

Size	1100-F	2017-T4	2024-T4
$\frac{3}{8}$ (.375)	X	X	X
$\frac{7}{16}$ (.438)	—	X	X
$\frac{1}{2}$ (.500)	—	X	X
$\frac{9}{16}$ (.563)	—	X	X
$\frac{5}{8}$ (.625)	—	X	X

ALUMINUM ROD AND BAR

BOX TOOL AND HOLLOW MILL SPEEDS AND FEEDS

Recommended cutting speeds depend upon the shape of stock:

Stock Shape	2011-T3	2017-T4 2024-T4
Round	700-800	450-550
Hexagonal	450-550	350-400
Square	300-350	250-300

Feed Per Revolution

Finished Size	Depth of Cut	2011-T3	2017-T4 2024-T4
$\frac{1}{4}$ plus	$\frac{1}{32}$	0.015	0.012
$\frac{1}{4}$ plus	$\frac{1}{16}$	0.0125	0.010
$\frac{1}{4}$ plus	$\frac{1}{8}$	0.010	0.008
$\frac{1}{4}$ plus	$\frac{3}{16}$	0.009	0.007
$\frac{1}{4}$ plus	$\frac{1}{4}$	0.008	0.006
$\frac{1}{8}$ - $\frac{1}{4}$	$\frac{1}{32}$	0.012	0.010
$\frac{1}{8}$ - $\frac{1}{4}$	$\frac{1}{16}$	0.010	0.009
$\frac{1}{8}$ - $\frac{1}{4}$	$\frac{1}{8}$	0.009	0.007
$\frac{1}{8}$ - $\frac{1}{4}$	$\frac{1}{4}$	0.008	0.007
$\frac{1}{8}$ - $\frac{1}{4}$	$\frac{1}{8}$	0.007	0.006

ALUMINUM ROD AND BAR

DRILLING SPEEDS AND FEEDS

Drill Diameter	Peripheral Speed (S.F.P.M.)
Less than 1"	600
1" to 1½"	550
Over 1½"	450

Feed Per Revolution (In Inches)

Drill Diameter	Tolerance	2011-T3	2017-T4 2024-T4
0.020	0.001	0.0015	0.0015
0.040	0.001	0.002	0.002
0.0625	0.0015	0.004	0.004
0.125	0.002	0.012	0.010
0.1875	0.002	0.0144	0.012
0.250	0.002	0.0168	0.014
0.375	0.0025	0.0204	0.017
0.500	0.0025	0.0204	0.017
0.750*	0.003	0.0204	0.017

*Note: Feeds for larger drills usually depend on the power available in the machine.

CUT-OFF SPEEDS AND FEEDS

Recommended cutting speeds depend upon the shape of stock:

	2011-T3	2017-T4 2024-T4
Round	700—800 S.F.P.M.	450—550 S.F.P.M.
Hexagonal	450—550 S.F.P.M.	350—400 S.F.P.M.
Square	300—350 S.F.P.M.	250—300 S.F.P.M.

Feed Per Revolution (In Inches)

CIRCULAR CUT-OFF TOOLS			STRAIGHT CUT-OFF BLADE		
Width of Cut	2011-T3	2017-T4 2024-T4	Width of Cut	2011-T3	2017-T4 2024-T4
¼—⅙	0.0035	0.003	⅙—⅙	0.0035	0.003
½—⅙	0.004	0.0035	⅙—¼	0.004	0.0035
¾—¼	0.0045	0.004	⅙—¾	0.0045	0.004

Note: Cut-off speeds and feeds are the same for both the cross slide cut-off and the independent slide cut-off.



ALUMINUM TUBE AND PIPE



ALUMINUM ROD AND BAR

**ALUMINUM RIVET WIRE
STANDARD WAREHOUSE SIZES**

Size (Inch)		COILED RIVET WIRE							
Frac.	Dec.	2024-H13	1100-H14	2017-H13	2117-H15	2024-0	6053-H13	5056-H32	
—	.061	—	X	—	—	—	—	—	
1/16	.063	—	—	—	—	—	—	—	
—	.091	—	—	—	—	—	—	—	
—	.092	X	X	X	X	X	—	X	
3/32	.094	—	—	—	—	—	—	—	
—	.108	X	—	—	—	X	—	—	
—	.110	X	—	—	—	X	—	—	
—	.113	X	—	—	—	X	—	—	
—	.118	X	X	X	—	X	—	—	
—	.123	X	X	X	X	X	X	X	
1/8	.125	—	—	—	—	—	—	—	
—	.131	X	—	—	—	X	—	—	
—	.140	X	—	—	—	X	—	—	
—	.147	X	—	—	—	X	—	—	
—	.154	X	X	X	X	X	—	X	

FULLERTON—A WAREHOUSE OF METALS AND SERVICE

	-	-	-	-	-	X	-	-	-	X	-	-	-	-	-	-	X	-	
	-	-	-	-	-	X	-	-	-	X	-	-	X	-	-	X	X	-	
	-	X	-	X	X	X	-	X	X	X	-	X	X	X	X	X	X	-	
	-	-	-	-	-	X	-	-	-	X	-	-	X	-	-	X	-		
	-	-	-	-	-	X	-	-	-	X	-	X	-	X	-	-	X		
	-	-	X	-	-	X	-	-	-	X	-	-	-	X	-	-	X		
	-	X	-	X	X	X	-	X	X	X	-	X	X	X	X	X	X		
$\frac{1}{2}$.156	.158	.162	.165	.169	.184	.188	.212	.222	.234	.247	.250	.271	.279	.310	.328	.340	.372	.494
	-	-	-	-	-	$\frac{3}{16}$	-	-	-	-	-	$\frac{1}{4}$	-	-	-	-	-	-	-

ALUMINUM ROD, BAR AND WIRE
STANDARD WAREHOUSE SIZES

Frac.	Size (Inches)	Round Drawn Wire and Standard Screw Machine Stock										Hexagonal Drawn Wire and Standard Screw Machine Stock					
		Coiled					Straightened					2011-T3	2017-T4	2024-T4			
		*1100-0	1100-H18	2011-T3	2017-T4	6061-T6	2024-T4	2011-T3	2017-T4	2024-T4							
—	.051	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	.064	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	.081	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	.091	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3/32	.094	X	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—
—	.102	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1/6	.125	X	X	—	—	K	K	—	X	—	X	—	—	—	—	—	—
5/32	.156	—	X	—	—	K	K	—	—	—	—	—	—	—	—	—	—
11/64	.172	—	—	—	—	—	K	—	—	—	—	—	—	—	—	—	—
3/16	.188	X	X	—	—	K	K	—	X	—	X	—	—	K	—	—	—
7/32	.219	—	—	—	—	K	K	—	—	—	—	—	—	—	—	—	—
15/64	.234	—	—	—	—	K	—	—	—	—	—	—	—	—	—	—	—
1/4	.250	X	X*	—	—	K	K	—	X	—	X	—	—	K	—	X	—
17/64	.266	—	—	—	—	K	—	—	—	—	—	—	—	—	—	—	—
9/32	.281	—	—	—	—	K	K	—	—	—	—	—	—	—	—	—	—
5/16	.313	—	X**	—	—	K	K	—	X	—	X	—	—	K	K	X	—
11/32	.344	—	—	—	—	K	—	—	—	—	—	—	—	—	—	—	—

* Alloy 1100-0 is suitable as coiled welding wire.

FULLERTON—A WAREHOUSE OF METALS AND SERVICE

Size (Inches)		Standard Screw Machine Stock and Rolled and Cold Finished Rod and Bar									
		Round Rod (1)					Hexagonal Bar				
Frac.	Dec.	1100-F	2011-T3	2017-T4	2024-T4	6061-T6	7075-T6	2011-T3	2017-T4	2024-T4	
3/8	.375	CF	K	K	CF	CF	CF	K	K	CF	
25/64	.391	—	K	—	—	—	—	—	—	—	
19/32	.406	—	K	K	—	—	—	—	—	—	
7/16	.438	CF	K	K	CF	CF	—	K	K	CF	
15/32	.469	—	K	K	—	—	—	—	—	—	

SYMBOLS

- K—Standard Screw Machine Stock.
- X—Standard Size for Drawn Wire other than Standard Screw Machine Stock items.
- R—Standard Size for Rolled Rod or Bar other than SSMS.
- CF—Standard Size for Cold Finished Rod or Bar other than SSMS.

(1) 2014F Forging Stock Available Upon Application.
 *—Available in H16 temper only.
 **—Available in H14 temper only.

ALUMINUM ROD, BAR AND WIRE

STANDARD WAREHOUSE SIZES

Frac.	Dec.	Standard Screw Machine Stock and Rolled and Cold Finished Rod and Bar												
		Round Rod (1)					Hexagonal Bar							
		1100-F	2011-T3	2017-T4	2024-T4	6061-T6	7075-T6	2011-T3	2017-T4	2024-T4				
1/2	.500	CF	K	K	CF	CF	CF	CF	CF	CF	K	K	CF	CF
17/32	.531	—	K	K	—	—	—	—	—	—	—	—	—	—
35/64	.547	—	K	—	—	—	—	—	—	—	—	—	—	—
9/16	.563	CF	K	K	CF	CF	CF	CF	CF	CF	K	K	CF	CF
19/32	.594	—	K	K	—	—	—	—	—	—	—	—	—	—
5/8	.625	CF	K	K	CF	CF	CF	CF	CF	CF	K	K	CF	CF
21/32	.656	—	K	—	—	—	—	—	—	—	—	—	—	—
11/16	.688	—	K	K	CF	—	—	—	—	—	K	K	CF	CF
23/32	.719	—	—	K	—	—	—	—	—	—	—	—	—	—
3/4	.750	CF	K	K	CF	CF	CF	CF	CF	CF	K	K	CF	CF
25/32	.781	—	—	K	—	—	—	—	—	—	—	—	—	—
13/16	.813	—	K	K	CF	—	—	—	—	—	K	K	CF	CF
7/8	.875	CF	K	K	CF	CF	CF	CF	CF	CF	K	K	CF	CF
15/16	.938	—	K	K	CF	CF	CF	CF	CF	CF	K	K	CF	CF
1	1.000	CF	K	K	CF	CF	CF	CF	CF	CF	K	K	CF	CF
1 1/16	1.063	—	K	K	CF	CF	CF	CF	CF	CF	—	—	—	—

FULLERTON—A WAREHOUSE OF METALS AND SERVICE

1½	1.125	—	K	K	CF	CF	CF	K	K	CF
1¾	1.188	—	K	K	—	—	—	—	K	—
1¼	1.250	CF	K	K	CF	CF	CF	K	K	CF
1⅝	1.313	—	K	K	CF	CF	—	—	K	—
1¾	1.375	CF	K	K	CF	CF	CF	K	K	CF
1⅞	1.438	—	K	K	CF	—	—	—	K	—
1½	1.500	CF	K	K	CF	CF	CF	—	K	CF
1¾	1.563	—	K	K	R	—	—	—	—	—
1¾	1.625	—	K	K	R	R	R	—	K	R
1⅞	1.688	—	K	K	—	—	—	—	—	—
1¾	1.750	R	K	K	R	R	R	—	K	R
1⅞	1.813	—	K	K	—	—	—	—	—	—

SYMBOLS

K—Standard Screw Machine Stock.

R—Standard Size for Rolled Rod or Bar other than Standard Screw Machine Stock.

CF—Standard Size for Cold Finished Rod or Bar other than SSMS.

(1) 2014F Forging Stock Available Upon Application.

ALUMINUM ROD, BAR AND WIRE

STANDARD WAREHOUSE SIZES

Size (Inches)		Standard Screw Machine Stock and Rolled and Cold Finished Rod and Bar									
		Round Rod (1)					Hexagonal Bar				
Frac.	Dec.	1100-F	2011-T3	2017-T4	2024-T4	6061-T6	7075-T6	2011-T3	2017-T4	2024-T4	
1 $\frac{7}{8}$	1.875	R	K	K	R	R	R	-	K	R	
1 $\frac{5}{8}$	1.938	-	K	K	-	-	-	-	-	-	
2	2.000	R	K	K	R	R	R	-	K	R	
2 $\frac{1}{8}$	2.063	-	-	K	-	-	-	-	-	-	
2 $\frac{1}{4}$	2.125	-	K	K	R	R	-	-	-	-	
2 $\frac{3}{8}$	2.188	-	-	K	-	-	-	-	-	-	
2 $\frac{1}{2}$	2.250	R	K	K	R	R	R	-	R	R	
2 $\frac{5}{8}$	2.313	-	-	K	-	-	-	-	-	-	
2 $\frac{3}{4}$	2.375	-	K	K	R	-	-	-	-	-	
2 $\frac{7}{8}$	2.438	-	-	K	-	-	-	-	-	-	
2 $\frac{1}{2}$	2.500	R	K	K	R	R	R	-	R	R	
2 $\frac{5}{8}$	2.563	-	K	K	-	-	-	-	-	-	
2 $\frac{3}{4}$	2.625	-	-	K	R	-	-	-	-	-	
2 $\frac{3}{4}$	2.750	-	K	K	R	R	R	-	R	R	
2 $\frac{7}{8}$	2.875	-	-	K	R	-	-	-	-	-	
3	3.000	R	K	K	R	R	R	-	R	R	
3 $\frac{1}{8}$	3.125	-	-	K	R	-	-	-	-	-	
3 $\frac{1}{4}$	3.250	-	-	K	R	R	R	-	-	-	

**ALUMINUM ROD, BAR AND WIRE
STANDARD WAREHOUSE SIZES**

**EXTRUDED RECTANGLE—Square Edge
(Standard 12' Lengths)**

Dimension	Die Number	6061-T6	6063-T5	2024-T4	7075-T6
1/8" x 1/2"	HK-27	—	K	K	—
3/8"	HK-40	—	K	K	—
3/4"	HK-32	—	K	K	—
1"	HK-139	K	K	K	—
1 1/4"	HK-140	—	K	K	—
1 1/2"	HK-141	—	K	K	—
1 3/4"	HK-248	—	K	—	—
2"	HK-142	—	K	K	—
3/16" x 1/2"	HK-34	—	K	K	—
3/8"	HK-56	—	—	K	—
3/4"	HK-25	K	K	K	—
1"	HK-33	K	K	K	—
1 1/4"	HK-57	K	K	K	—
1 1/2"	HK-50	K	K	K	—
2"	HK-58	—	K	K	—
2 1/2"	HK-249	—	K	—	—
1/4" x 1/2"	HK-59	—	K	K	—
3/8"	HK-60	—	K	K	—
3/4"	HK-61	—	K	K	—
7/8"	HK-291	—	—	K	—
1"	HK-54	K	K	K	K
1 1/4"	HK-55	—	K	K	—
1 1/2"	HK-49	K	K	K	K
1 3/4"	HK-250	—	K	—	—
2"	HK-36	K	K	K	—
2 1/2"	HK-62	—	K	K	—
3"	HK-63	K	K	K	—
4"	HK-35	—	—	K	—
5/16" x 1/2"	HK-146	—	—	K	—
3/8"	HK-292	—	—	K	—
3/4"	HK-73	—	—	K	—
1"	HK-74	—	—	K	—
1 1/2"	HK-75	K	—	K	—
2"	HK-76	—	—	K	—
3/8" x 1/2"	HK-64	—	K	K	—
3/8"	HK-65	—	K	K	—
3/4"	HK-147	—	K	K	—
1"	HK-67	K	K	K	K
1 1/4"	HK-143	K	K	K	—
1 1/2"	HK-68	—	K	K	—
1 3/4"	HK-5	—	—	K	K
2"	HK-69	K	K	K	K
2 1/2"	HK-70	—	—	K	—
3"	HK-71	—	K	K	—
4"	HK-72	—	—	K	—
6"	HK-206	—	—	K	—
1/2" x 3/8"	HK-85	—	—	K	—
3/4"	HK-86	—	K	K	—
7/8"	HK-87	—	—	K	—

•Available in 16' lengths only.

**ALUMINUM ROD, BAR AND WIRE
STANDARD WAREHOUSE SIZES**

**EXTRUDED RECTANGLE—Square Edge
(Standard 12' Lengths)**

Dimension	Die Number	6061-T6	•6063-T5	2024-T4	7075-T6
½" x 1"	HK-88	K	K	K	K
1¼"	HK-89	—	K	K	—
1½"	HK-90	—	K	K	K
1¾"	HK-91	—	—	K	K
2"	HK-92	K	K	K	K
2½"	HK-145	—	K	K	K
3"	HK-93	—	K	K	K
4"	HK-17	—	—	K	K
5"	HK-299	—	—	—	K
6"	HK-94	—	—	K	K
8"	HK-256	—	—	K	—
¾" x ¾"	HK-95	—	—	K	—
7/8"	HK-96	—	—	K	—
1"	HK-97	—	—	K	K
1¼"	HK-98	—	—	K	—
1½"	HK-99	—	—	K	K
2"	HK-100	—	—	K	K
¾" x 1"	HK-77	—	—	K	K
1¼"	HK-78	—	—	K	—
1½"	HK-79	—	K	K	—
1¾"	HK-80	—	—	K	—
2"	HK-84	—	K	K	—
2½"	HK-66	—	—	K	—
3"	HK-81	K	K	K	K
3½"	HK-257	—	—	K	—
4"	HK-82	K	—	K	—
6"	HK-83	—	—	K	—
1" x 1¼"	HK-101	—	—	K	—
1½"	HK-102	—	K	K	K
1¾"	HK-103	—	—	K	K
2"	HK-104	—	K	K	K
2½"	HK-105	—	—	K	K
3"	HK-106	—	—	K	K
3½"	HK-107	—	—	K	—
4"	HK-108	K	—	K	K
6"	HK-109	—	—	K	—

•Available in 16' lengths only.

**ALUMINUM ROD, BAR AND WIRE
GOVERNMENT AND AERONAUTICAL
MATERIAL SPECIFICATIONS**

ALLOY	PRODUCT	MILITARY SPECIFICATIONS	AERO MTL. SPEC. (AMS)	FEDERAL SPECIFICATIONS
1100	Rod, Bar & Wire	—	4102	QQ-A-411
	Rivet Wire	MIL-W-7986	7220	—
	Welding Wire	—	4180	QQ-R-566
3003	Rod, Bar & Wire	MIL-R-1150	—	QQ-A-356
2011	Rod, Bar & Wire	—	—	QQ-A-365
2017	Rod, Bar & Wire	—	4118	QQ-A-351
	Rivet Wire	MIL-W-7986	—	—
2024	Rod, Bar & Wire	—	4120	QQ-A-268
	Rivet Wire	MIL-W-7986	—	—
5052	Rod, Bar & Wire	—	4114	QQ-A-315
6061	Rod, Bar & Wire	—	4150	QQ-A-325
7075	Rod, Bar & Wire	—	4122, 4139	QQ-A-282

BRASS and COPPER

Other Copper Alloys



INDEX

Description and Advantages of Brass	Page 229
Weight Conversion Factors	Page 230
Weights—Brass	
Rod and Bar	Page 231
Rectangular Rod	Page 234
Brass Wire	Page 236
Phosphor Bronze Wire	Page 237
Nickel Silver Wire	Page 237
General Purpose Temper Brass Tube	Page 238
Red Brass Pipe	Page 239
Weights—Copper	
Pipe	Page 240
Seamless Tube	Page 241
Refrigeration Tube	Page 242
Automotive Tube	Page 242
Water Service Tube—Coils	Page 242
Water Service Tube—Straight Lengths	Page 243
Drawn Cold Heading Wires	Page 244
Tolerances—	
Diameter—Rod	Page 245
Diameter—Wire	Page 246
Diameter—Extruded Rod	Page 247
Length	Page 248
Thickness	Page 249
Width and Straightness	Page 252
Wall Thickness	Page 253
Average Diameter Tolerances	Page 255
Chemical and Physical Properties	Page 256
Government Specifications	Page 258
AMPCO METAL—	
Description and Definitions	Page 262
Government Specifications	Page 264
Weights—	
Extruded Rod	Page 265
Centrifugally Cast Semi-Finished Bar	Page 267
Chemical and Physical Properties	Page 268

COPPER—A metal that searches back into antiquity for the seeds of its first usage is stocked today in all its various alloys, tempers, sizes and gauges at Fullerton Steel and Wire Company.

Our inventory of copper and copper alloy products is geared to take care of all types of production requirements. Our Slitting, Shearing and Round Edging equipment are ready to serve both the large and the small orders. Every department is ready to give our each and every customer the individual kind of service that they deserve.

We take great pride in being able to provide those unusual and normally hard to get items. Please call us for any technical or fabricating assistance that you may require. We will constantly strive to continue to be . . . Fullerton, a warehouse of metal and service for you.

ADVANTAGES OF BRASS

- 1 The superior machining qualities of Free Cutting Brass Rod permit the use of heavy feeds and high cutting speeds.
- 2 Multiple operations by modern high speed machines are readily accomplished on brass. In fact, the more complicated the machining, the higher the relative production economies.
- 3 The greatly increased production with brass compared with cold rolled Bessemer open hearth steel screw stock effects savings that usually amount to much more than the initial difference in cost between the two metals.
- 4 Brass turning scrap has a relatively high salvage value, whereas steel scrap has very little value. The net metal cost of a brass part decreases as the percentage of scrap increases.
- 5 Tool life on brass is several times longer than on steel, based on the number of pieces machined and amount of stock removed. This includes standard tools such as drills, reamers and taps, to the most intricate form tools. Because of longer runs between grinds, there is less down-time.
- 6 Narrower cutting-off tools can be used on brass. On parts of short length, this results in an appreciable saving of rod stock.
- 7 Small-tool breakage is considerably less when machining brass rod in an automatic screw machine.
- 8 Close tolerances on machined diameters are held for longer continuous runs—reducing tool adjustment time and producing parts of greater accuracy. A machined finish on brass is always better than on steel—threads are cleaner and knurls are sharper.
- 9 Brass, because of its attractive color, is frequently used without applied finishes where parts made of steel would rust. Lacquer, enamel and japan finishes adhere tenaciously to brass—chipping or flaking off is most unusual.
- 10 Nickel and chromium plated finishes on brass are more durable than on steel, because brass cannot rust under the plate. On brass, buffing is generally the only preliminary polishing operation required before plating.
- 11 Special extruded and cold drawn brass shapes, such as pinion gear and cam forms, can be advantageously used for many screw machine products. With such shapes, many complicated machining operations are eliminated.
- 12 Fullerton Free Cutting Brass Rods are uniform in composition, temper, and free cutting characteristics. This permits ready duplication of known feeds, and prevents excessive tool wear, tool breakage, and other production delays.

WEIGHT CONVERSION FACTORS

To obtain weights of rods for the following alloys, apply the conversion factors below to the weights in the table for Free-Cutting Brass Rod, Free-Cutting Brass = 1,000

ALLOY	WEIGHT CONVERSION FACTORS
Electrolytic Tough Pitch Copper.....	1.049
Tellurium Copper.....	1.052
Selenium Copper.....	1.049
Leaded Copper.....	1.052
Tellurium-Nickel Copper.....	1.052
Commercial Bronze, 90%.....	1.036
Cartridge Brass, 70%.....	1.003
Leaded Commercial Bronze.....	1.039
Medium-Leaded Brass.....	0.997
High-Leaded Brass.....	0.997
Forging Brass.....	0.994
Architectural Bronze.....	0.994
Naval Brass.....	0.990
Leaded Naval Brass.....	0.994
Manganese Bronze, (A).....	0.984
Aluminum Bronze, 9%.....	0.892
Aluminum Bronze, 10%.....	0.892
Phosphor Bronze, 5%.....	1.042
Leaded Phosphor Bronze, 5%.....	1.049
Free-Cutting Phosphor Bronze.....	1.042
Nickel Silver, 65-18.....	1.029
Leaded Nickel Silver, 61.5-10.....	1.023
Leaded Nickel Silver, 61.5-12.....	1.026
Leaded Nickel Silver, 61.5-15.....	1.029
Leaded Nickel Silver, 61.5-18.....	1.033
Extruded Leaded Nickel Silver.....	0.997
Low-Silicon Bronze.....	1.029
Aluminum-Silicon Bronze.....	0.906

ROD AND BAR—FREE-CUTTING BRASS

12 FT. STANDARD LENGTHS

WEIGHTS—POUNDS PER LINEAR FOOT

Diameter, or distance across flats, in inches	WEIGHT			
	Round	Square	Hexagonal	Octagonal
1/32	.00283	.00360	.00312	.00298
1/16	.00636	.00809	.00701	.00671
1/8	.0113	.0144	.0125	.0119
3/16	.0177	.0225	.0195	.0186
1/4	.0254	.0324	.0280	.0268
5/16	.0346	.0441	.0382	.0365
3/8	.0452	.0576	.0499	.0477
7/16	.0572	.0729	.0631	.0604
1/2	.0706	.0899	.0779	.0745
5/8	.0855	.109	.0943	.0902
3/4	.102	.130	.112	.107
7/8	.119	.152	.132	.126
1	.138	.176	.153	.146
1 1/8	.159	.202	.175	.168
1 1/4	.181	.230	.199	.191
1 3/8	.204	.260	.225	.215
1 1/2	.229	.291	.252	.241
1 3/4	.255	.325	.281	.269
1 7/8	.283	.360	.312	.298
2	.312	.397	.344	.329
2 1/2	.342	.435	.377	.361
2 3/4	.374	.476	.412	.394
3	.407	.518	.449	.429
3 1/4	.441	.562	.487	.466
3 1/2	.478	.608	.527	.504
3 3/4	.515	.656	.568	.543
4	.554	.705	.611	.584
4 1/4	.594	.756	.655	.627
4 1/2	.636	.809	.701	.671
4 3/4	.679	.864	.749	.716
5	.723	.921	.798	.763
5 1/2	.817	1.04	.901	.861

Variations from these weights must be expected in practice.

For weight conversion factor see page 230.

ROD AND BAR—FREE-CUTTING BRASS

12 FT. STANDARD LENGTHS

WEIGHTS—POUNDS PER LINEAR FOOT

Diameter, or distance across flats, in inches	WEIGHT			
	Round	Square	Hexagonal	Octagonal
7/16	.915	1.17	1.01	.966
19/32	1.02	1.30	1.13	1.08
5/8	1.13	1.44	1.25	1.19
21/32	1.25	1.59	1.37	1.31
11/16	1.37	1.74	1.51	1.44
23/32	1.49	1.90	1.65	1.58
3/4	1.63	2.07	1.80	1.72
25/32	1.77	2.25	1.95	1.86
13/16	1.91	2.43	2.11	2.01
27/32	2.06	2.62	2.27	2.17
7/8	2.22	2.82	2.44	2.34
29/32	2.38	3.03	2.62	2.51
15/16	2.54	3.24	2.80	2.68
31/32	2.72	3.46	2.99	2.86
1	2.89	3.68	3.19	3.05
1 1/16	3.27	4.16	3.60	3.45
1 1/8	3.66	4.66	4.04	3.86
1 3/16	4.08	5.20	4.50	4.30
1 1/4	4.52	5.76	4.99	4.77
1 5/16	4.98	6.35	5.50	5.26
1 3/8	5.47	6.97	6.03	5.77
1 7/16	5.98	7.61	6.59	6.31
1 1/2	6.51	8.29	7.18	6.87
1 9/16	7.06	8.99	7.79	7.45
1 5/8	7.64	9.73	8.43	8.06
1 11/16	8.24	10.5	9.09	8.69
1 3/4	8.86	11.3	9.77	9.35
1 13/16	9.51	12.1	10.5	10.0
1 7/8	10.2	13.0	11.2	10.7
1 15/16	10.9	13.8	12.0	11.5
2	11.6	14.7	12.8	12.2
2 1/16	12.3	15.7	13.6	13.0
2 1/8	13.1	16.6	14.4	13.8
2 3/16	13.8	17.6	15.3	14.6
2 1/4	14.6	18.7	16.2	15.5
2 5/16	15.5	19.7	17.1	16.3
2 3/8	16.3	20.8	18.0	17.2
2 7/16	17.2	21.9	19.0	18.1

Variations from these weights must be expected in practice.

For weight conversion factor see page 230.

ROD AND BAR—FREE-CUTTING BRASS

12 FT. STANDARD LENGTHS

WEIGHTS—POUNDS PER LINEAR FOOT

Diameter, or distance across flats, in inches	WEIGHT			
	Round	Square	Hexagonal	Octagonal
2 ½	18.1	23.0	19.9	19.1
2 ⅝	19.0	24.2	21.0	20.0
2 ¾	19.9	25.4	22.0	21.0
2 ⅞	20.9	26.6	23.0	22.0
2 ¾	21.9	27.9	24.1	23.1
2 ⅞	22.9	29.1	25.2	24.1
2 ⅞	23.9	30.5	26.4	25.2
2 ⅞	25.0	31.8	27.5	26.3
3	26.0	33.2	28.7	27.5
3 ⅛	28.3	36.0	31.2	29.8
3 ¼	30.6	38.9	33.7	32.2
3 ⅜	33.0	42.0	36.4	34.8
3 ½	35.4	45.1	39.1	37.4
3 ⅝	38.0	48.4	41.9	40.1
3 ¾	40.7	51.8	44.9	42.9
3 ⅞	43.4	55.3	47.9	45.8
4	46.3	58.9	51.1	48.8
4 ⅛	49.2	62.7	54.3	51.9
4 ¼	52.3	66.5	57.6	55.1
4 ⅜	55.4	70.5	61.1	58.4
4 ½	58.6	74.6	64.6	61.8
4 ⅝	61.9	78.8	68.3	65.3
4 ¾	65.3	83.1	72.0	68.9
4 ⅞	68.8	87.6	75.8	72.5
5	72.3	92.1	79.8	76.3
5 ⅛	79.7	102.	88.0	84.1
5 ½	87.5	111.	96.5	92.3
5 ¾	95.7	122.	106.	101.
6	104.	133.	115.	110.
6 ⅛	113.	144.	125.	119.
6 ½	122.	156.	135.	129.
6 ¾	132.	168.	145.	139.
7	142.	181.	156.	150.
7 ⅛	152.	194.	168.	160.
7 ½	163.	207.	180.	172.
7 ¾	174.	221.	192.	183.
8	185.	236.	204.	195.
8 ⅛	197.	251.	217.	208.

Variations from these weights must be expected in practice.

For weight conversion factor see page 230.

RECTANGULAR BRASS ROD

FREE CUTTING

12 ft. Standard Lengths

Thickness in Inches	Width in Inches	Weight per Foot, lbs.	Thickness in Inches	Width in Inches	Weight per Foot, lbs.
1/16	1/4	.0574	1/4	1	.691
	5/16	.0717		1 1/4	.863
	3/8	.0861		1 1/2	1.036
	1/2	.115		1 3/4	1.209
1/16	5/8	.143		2	1.382
	3/4	.172		3/8	.345
	7/8	.201		1/2	.461
1/8	1	.230		5/8	.576
	1/4	.115		3/4	.691
	5/16	.143		7/8	.806
	3/8	.172		1	.921
	7/16	.201		1 1/4	1.151
	1/2	.230	1 1/2	1.381	
	5/8	.287	1 3/4	1.612	
	3/4	.344	2	1.842	
	7/8	.402	2 1/4	2.074	
	1	.459	2 1/2	2.302	
	1 1/8	.518	3	2.763	
	1 1/4	.576	3 1/2	3.22	
	1 1/2	.691	4	3.68	
	1 3/4	.806	5	4.65	
	3/16	2	.918	6	5.53
2 1/2		1.151	5/16	3/8	
3		1.382	1/2	.576	
3/8		.258	5/8	.735	
1/2		.344	3/4	.863	
5/8		.432	7/8	1.030	
3/4		.518	1	1.151	
7/8		.604	1 1/4	1.500	

*For wt. of Copper Bus Bar, multiply the above wt. per ft. x 1.049.

RECTANGULAR BRASS ROD

FREE CUTTING

12 ft. Standard Lengths

Thickness in Inches	Width in Inches	Weight per Foot, lbs.	Thickness in Inches	Width in Inches	Weight per Foot, lbs.
	1½	1.727		2	3.680
	1¾	2.059		2½	4.600
	2	2.303		3	5.530
	3	3.531		4	7.360
3/8	½	.691		6	11.060
	5/8	.863	5/8	¾	1.726
	¾	1.036		1	2.303
	7/8	1.209		1¼	2.878
	1	1.382		1½	3.451
	1¼	1.727		2	4.601
	1½	2.072		3	6.910
	2	2.763	¾	1	2.764
	2¼	3.178		1¼	3.454
	2½	3.450		1½	4.144
	3	4.140	¾	2	5.526
	4	5.530		2½	6.220
7/16	1	1.612		3	8.280
½	5/8	1.151	7/8	1	3.220
	¾	1.382	1	1½	5.800
	7/8	1.612		2	7.750
	1	1.842		3	11.60
	1¼	2.303		4	15.50
	1½	2.763	1½	2	10.92

*For wt. of Copper Bus Bar, multiply the above wt. per ft. x 1.049.

ROUND BRASS WIRE*

Spring Temper—70-30

B & S Gauge	Size in Inches	Weight, lbs. per 1000 ft.	Foot per Pound	B & S Gauge	Size in Inches	Weight, lbs. per 1000 ft.	Foot per Pound
28	.0126	.460	2170	12	.0808	19	52.8
27	.0142	.585	1710	11	.0907	23.9	41.9
26	.0159	.734	1360	..	.095	27.3	36.6
25	.0179	.930	1080	10	.102	30.2	33.1
24	.0201	1.17	853	..	.109	35.9	27.8
22	.0253	1.86	538	9	.1142	37.7	26.5
21	.0285	2.36	424	..	.120	42.0	23.8
20	.0320	2.97	336	1/4	.125	45.2	22.1
19	.0359	3.74	267	8	.1285	47.6	21.0
18	.0403	4.71	212	..	.134	52.2	19.1
17	.0453	5.96	168	7	.144	60.2	16.6
16	.0508	7.49	133	5/32	.156	70.6	14.1
15	.0571	9.46	106	6	.162	76.2	13.1
14	.0641	11.9	83.8	5	.182	96.2	10.4
13	.0720	15.0	66.5	4	.204	121.0	8.28

ROUND BRASS WIRE*

Half Hard Temper—70-30

B & S Gauge	Size in Inches	Weight, lbs. per 1000 ft.	Foot per Pound	B & S Gauge	Size in Inches	Weight, lbs. per 1000 ft.	Foot per Pound
20	.0320	2.97	336	10	.102	30.2	33.1
18	.0403	4.71	212	9	.1142	37.7	26.5
16	.0508	7.49	133	8	.1285	47.6	21.0
15	.0571	9.46	106	7	.144	60.2	16.6
14	.0641	11.9	83.8	5/32	.156	70.6	14.1
13	.0720	15.0	66.5	6	.162	76.2	13.1
12	.0808	19.0	52.8	5	.182	96.2	10.4
11	.0907	23.9	41.9	3/16	.1875	102.0	9.8

ROUND BRASS WIRE*

Soft Temper—70-30

B & S Gauge	Size in Inches	Weight, lbs. per 1000 ft.	Foot per Pound	B & S Gauge	Size in Inches	Weight, lbs. per 1000 ft.	Foot per Pound
22	.0253	1.86	538	13	.072	15.0	66.5
20	.032	2.97	336	12	.0808	19.0	52.8
19	.0359	3.74	267	11	.0907	23.9	41.9
18	.0403	4.71	212	10	.102	30.2	33.1
17	.0453	5.96	168	8	.1285	47.6	21.0
16	.0508	7.49	133	5/32	.156	70.6	14.1
15	.0571	9.46	106	3/16	.1875	102.0	9.8
14	.0641	11.9	83.8				

*Weights for cold heading wires shown on page 244.
Phillips head quality also available.

PHOSPHOR BRONZE WIRE

Grade A—Spring Temper

B & S Gauge	Size in Inches	Weight, lbs. per 1000 Feet	Feet per Pound	B & S Gauge	Size in Inches	Weight, lbs. per 1000 Feet	Feet per Pound
33	.0071	.152	6580	11	.0907	24.8	40.3
32	.008	.193	5180	..	.095	27.3	36.6
31	.0089	.239	4190	10	.102	31.4	31.9
30	.010	.302	3320	..	.105	32.4	30.8
29	.0113	.385	2600	..	.109	35.9	27.9
28	.0126	.479	2100	9	.114	39.2	25.5
27	.0142	.608	1640	..	.120	43.6	22.9
26	.0159	.762	1310	7/8	.125	47.5	21.0
25	.0179	.966	1040	8	.1285	49.4	20.2
24	.0201	1.22	821	..	.134	54.3	18.4
23	.0226	1.54	649	7	.144	62.5	16.0
22	.0253	1.93	518	..	.148	66.3	15.0
21	.0285	2.45	408	5/8	.156	73.6	13.5
20	.032	3.09	324	6	.162	79.2	12.6
19	.0359	3.89	257	5	.182	99.9	10.0
18	.0403	4.90	204	3/4	.1875	106.9	9.35
17	.0453	6.19	162	4	.204	126.0	7.97
16	.0508	7.78	128	..	.220	146.2	6.84
..	.054	8.84	113	3	.229	158.0	6.32
15	.0571	9.83	102	1/2	.250	190.2	5.25
14	.0641	12.4	80.7	..	.259	207.2	4.82
13	.072	15.6	64.0	5/8	.3125	297.1	3.36
12	.0808	19.7	50.8				

18% NICKEL SILVER WIRE

Spring Temper

B & S Gauge	Size in Inches	Weight, lbs. per 1000 Feet	Feet per Pound
22	.0253	1.89	528
20	.032	3.03	330
18	.0403	4.81	208
16	.0508	7.64	131
15	.0571	9.65	104.0
14	.0641	12.2	82.2

18% NICKEL SILVER WIRE

Half Hard Temper

B & S Gauge	Size in Inches	Weight, lbs. per 1000 Feet	Feet per Pound
22	.0253	1.89	528
20	.032	3.03	330
18	.0403	4.81	208

ROUND SEAMLESS BRASS TUBE

General Purpose Temper—12 Ft. Standard Lengths

Outside Diam. Inches	B & S Gage	Wall Thick. Inches	Approx. Inside Diameter	Weight per Foot, lbs.	Outside Diam. Inches	B & S Gage	Wall Thick. Inches	Approx. Inside Diameter	Weight per Foot, lbs.
1/8	26	.016	.093	.020	1 1/16	14	.065	.557	.468
	24	.020	.085	.024		8	.128	.431	.814
5/32	20	.032	.061	.034	3/4	22	.025	.700	.210
	22	.025	.106	.038		20	.032	.686	.266
3/16	20	.032	.092	.046	18	18	.040	.670	.329
	26	.016	.155	.032		16	.051	.648	.405
7/32	24	.020	.147	.038	14	14	.065	.620	.515
	22	.025	.137	.047		12	.081	.588	.620
1/4	20	.032	.123	.057	11	11	.091	.568	.687
	18	.040	.107	.068		8	.128	.494	.920
5/16	20	.032	.154	.069	13 1/16	22	.025	.762	.228
	24	.020	.210	.053		20	.032	.748	.290
3/8	22	.025	.200	.065	7/8	14	.065	.682	.562
	21	.028	.194	.072		20	.032	.811	.312
7/16	20	.032	.186	.080	18	18	.040	.795	.387
	18	.040	.170	.097		16	.051	.773	.377
1/2	16	.051	.148	.120	14	14	.065	.745	.609
	14	.065	.120	.139		12	.081	.713	.736
5/8	24	.020	.272	.067	11	11	.091	.693	.818
	22	.025	.262	.084		8	.128	.619	1.110
3/4	20	.032	.248	.104	15 1/16	20	.032	.873	.335
	18	.040	.232	.126		19	.035	.867	.370
7/8	16	.051	.210	.151	18	18	.040	.857	.420
	14	.065	.182	.186		14	.065	.807	.656
1	11	.091	.130	.232	8	8	.128	.681	1.220
	24	.020	.335	.082		24	.020	.960	.226
1 1/8	22	.025	.325	.101	22	22	.025	.950	.282
	20	.032	.311	.127		20	.032	.936	.358
1 1/4	19	.035	.305	.137	18	18	.040	.920	.444
	18	.040	.295	.155		16	.051	.898	.550
1 3/8	16	.051	.273	.189	14	14	.065	.870	.703
	15	.057	.261	.213		12	.081	.838	.852
1 1/2	14	.065	.245	.233	11	11	.091	.818	.948
	12	.081	.213	.270		8	.128	.744	1.29
1 5/8	11	.091	.193	.297	22	22	.025	1.012	.300
	22	.025	.387	.119		14	.065	.934	.750
1 3/4	20	.032	.373	.150	8	8	.128	.806	1.370
	18	.040	.357	.184		22	.025	1.075	.318
1 7/8	16	.051	.335	.224	20	20	.032	1.061	.404
	14	.065	.307	.280		18	.040	1.045	.502
2	12	.081	.275	.331	16	16	.051	1.023	.622
	24	.020	.460	.100		14	.065	.995	.794
2 1/8	22	.025	.450	.137	11	11	.091	.943	1.080
	20	.032	.436	.173		8	.128	.869	1.480
2 1/4	19	.035	.430	.188	20	20	.032	1.123	.430
	18	.040	.420	.213		14	.065	1.057	.840
2 3/8	16	.051	.398	.260	8	8	.128	.931	1.590
	14	.065	.370	.327		20	.032	1.186	.451
2 1/2	12	.081	.338	.389	19	19	.035	1.180	.492
	11	.091	.318	.427		16	.051	1.148	.694
2 5/8	8	.128	.244	.550	14	14	.065	1.120	.891
	22	.025	.512	.155		8	.128	.994	1.660
2 3/4	21	.028	.506	.173	20	20	.032	1.248	.472
	20	.032	.498	.196		14	.065	1.182	.938
3	18	.040	.482	.240	20	20	.032	1.311	.496
	16	.051	.460	.300		16	.051	1.273	.767
3 1/8	14	.065	.432	.374	14	14	.065	1.245	.985
	8	.128	.306	.633		8	.128	1.119	1.850
3 1/4	24	.020	.585	.140	22	22	.025	1.450	.427
	22	.025	.575	.174		16	.032	1.436	.544
3 3/8	20	.032	.561	.220	16	16	.051	1.398	.839
	19	.035	.555	.239		14	.065	1.370	1.080
3 1/2	18	.040	.545	.270	12	12	.081	1.338	1.31
	16	.051	.523	.333		11	.091	1.318	1.500
3 5/8	14	.065	.495	.421	8	8	.128	1.244	2.03
	12	.081	.463	.505		18	.040	1.545	.734
3 3/4	11	.091	.443	.557	14	14	.065	1.495	1.160
	8	.128	.369	.724		8	.128	1.369	2.220
4	22	.025	.637	.191	20	20	.032	1.686	.636
	20	.032	.623	.242		18	.040	1.670	.792

(Continued on following page)

ROUND SEAMLESS BRASS TUBE

General Purpose Temper—12 Ft. Standard Lengths

Outside Diam. Inches	B & S Gage	Wall Thick. Inches	Approx. Inside Diameter	Weight per Foot, lbs.	Outside Diam. Inches	B & S Gage	Wall Thick. Inches	Approx. Inside Diameter	Weight per Foot, lbs.
1 ¼	14	.065	1.620	1.270	3 ½	8	.128	3.244	4.960
	8	.128	1.494	2.400	3 ¾	14	.065	3.620	2.77
1 ½	14	.065	1.682	1.312		8	.128	3.494	5.33
1 ⅝	20	.032	1.811	.680	4	14	.065	4.870	2.96
	14	.065	1.745	1.340		8	.128	3.744	5.69
	8	.128	1.619	2.590	4 ¼	14	.065	4.120	3.15
2	20	.032	1.936	.729		8	.128	3.994	6.06
2	19	.035	1.930	.796	4 ½	14	.065	4.370	3.34
	18	.040	1.920	.907		8	.128	4.244	6.43
	16	.051	1.898	1.140	4 ¾	14	.065	4.620	3.52
	14	.065	1.870	1.430		8	.128	4.494	6.79
	8	.128	1.744	2.770	5	14	.065	4.870	3.71
2 ½	14	.065	1.995	1.550		8	.128	4.744	7.16
	8	.128	1.869	2.890	5 ¼	8	.128	4.994	7.57
2 ¾	16	.051	2.148	1.270	5 ½	8	.128	5.244	7.90
	14	.065	2.120	1.620	5 ¾	8	.128	5.494	8.27
	8	.128	1.994	3.150	6	8	.128	5.744	8.62
2 ¾	14	.065	2.245	1.752	6 ¼	8	.128	5.994	9.00
2 ½	14	.065	2.370	1.830	6 ½	8	.128	6.244	9.37
	8	.128	2.244	3.520	6 ¾	8	.128	6.494	9.60
2 ¾	14	.065	2.620	2.020	7	8	.128	6.744	10.10
	8	.128	2.494	3.890	7 ¼	8	.128	6.994	10.47
2 ¾	14	.065	2.745	2.080	7 ½	8	.128	7.244	10.83
3	14	.065	2.870	2.170	7 ¾	8	.128	7.494	11.20
	8	.128	2.744	4.220	8	8	.128	7.744	11.57
3 ¼	14	.065	3.120	2.360	8 ¼	8	.128	7.994	12.60
	8	.128	2.994	4.520	8 ½	8	.128	8.244	12.31
3 ½	14	.065	2.370	2.580	9 ¾	¾	.187	9.250	20.35

ROUND

RED BRASS PIPE—IPS

Standard Pipe Sizes—12 Ft. Exact Lengths

Nominal Size	Outside Dia.	Wall Thickness	Inside Dia.	Weight per Foot, lbs.
¼	.405	.062	.281	.253
½	.540	.082	.375	.449
¾	.675	.090	.494	.630
1	.840	.107	.625	.938
1 ¼	1.050	.114	.822	1.27
1 ½	1.315	.126	1.062	1.79
2	1.660	.146	1.368	2.63
2 ½	1.900	.150	1.600	3.13
3	2.375	.156	2.062	4.14
3 ½	2.875	.187	2.500	6.00
4	3.500	.219	3.062	8.56
4 ½	4.000	.250	3.500	11.17
5	4.500	.250	4.000	12.66
6	5.563	.250	5.063	15.85

**ROUND
RED BRASS PIPE—IPS**

Extra Heavy Pipe Sizes—12 Ft. Exact Lengths

Nominal Size	Outside Dia.	Wall Thickness	Inside Dia.	Weight per Foot, lbs.
1/8	.405	.100	.205	.363
1/4	.540	.123	.294	.611
3/8	.675	.127	.421	.829
1/2	.840	.149	.542	1.23
3/4	1.050	.157	.736	1.67
1	1.315	.182	.951	2.46
1 1/4	1.660	.194	1.272	3.39
1 1/2	1.900	.203	1.494	4.10
2	2.375	.221	1.933	5.67
2 1/2	2.875	.280	2.315	8.66
3	3.500	.304	2.892	11.57
3 1/2	4.000	.321	3.358	14.07
4	4.500	.341	3.818	16.90

**ROUND
COPPER PIPE—IPS**

Standard Pipe Sizes—12 Ft. Exact Lengths

Nominal Size	Outside Dia.	Wall Thickness	Inside Dia.	Weight per Foot, lbs.
1/8	.405	.062	.281	.259
1/4	.540	.082	.375	.457
3/8	.675	.090	.494	.641
1/2	.840	.107	.625	.955
3/4	1.050	.114	.822	1.30
1	1.315	.126	1.062	1.83
1 1/4	1.660	.146	1.368	2.69
1 1/2	1.900	.150	1.600	3.20
2	2.375	.156	2.062	4.23
2 1/2	2.875	.187	2.500	6.12
3	3.500	.219	3.062	8.75
4	4.500	.250	4.000	12.90

**ROUND
COPPER PIPE—IPS**

Extra Heavy Pipe Sizes—12 Ft. Exact Lengths

Nominal Size	Outside Dia.	Wall Thickness	Inside Dia.	Weight per Foot, lbs.
1/8	.405	.100	.205	.371
1/4	.540	.123	.294	.625
3/8	.675	.127	.421	.847
1/2	.840	.149	.542	1.25
3/4	1.050	.157	.736	1.71
1	1.315	.182	.951	2.51
1 1/4	1.660	.194	1.272	3.46
1 1/2	1.900	.203	1.494	4.19
2	2.375	.221	1.933	5.80

**ROUND
SEAMLESS COPPER TUBE**

Half Hard Temper—12 Ft. Standard Lengths

Outside Diameter	Wall B & S Gage	Wall Thickness	Approximate Inside Diameter	Weight per Foot, lbs.
3/16	20	.032	.143	.060
1/4	20	.032	.186	.084
	14	.065	.120	.146
5/16	20	.032	.248	.109
	14	.065	.182	.195
3/8	20	.032	.311	.133
	19	.035	.305	.137
	14	.065	.245	.245
7/16	20	.032	.373	.158
	14	.065	.307	.294
1/2	20	.032	.436	.182
	14	.065	.370	.344
5/8	20	.032	.561	.231
		.049	.527	.343
	14	.065	.495	.443
3/4	20	.032	.686	.279
	14	.065	.620	.542
	8	.128	.494	.953
7/8	20	.032	.811	.328
	14	.065	.745	.641
1	20	.032	.936	.377
	14	.065	.870	.740
	8	.128	.744	1.340
1 1/4	20	.032	1.186	.474
	19	.035	1.180	.517
	14	.065	1.120	.937
	8	.128	1.194	1.750
1 1/2	20	.032	1.436	.572
	14	.065	1.370	1.136
	8	.128	1.244	2.120
1 3/4	14	.065	1.620	1.334
2	19	.035	1.930	.837
	14	.065	1.870	1.532
2 1/2	14	.065	2.370	1.927
3	14	.065	2.870	2.323

**ROUND
SEAMLESS COPPER TUBE**

Soft Temper—50 Foot Coils

Outside Diameter	Wall B & S Gage	Wall Thickness	Approximate Inside Diameter	Weight per Foot, lbs.
1/8	19	.035	.055	.038
3/16	19	.035	.117	.064
1/4	19	.035	.180	.091
	14	.065	.120	.146
5/16	19	.035	.242	.118
	19	.035	.305	.145
3/8	14	.065	.245	.245
	19	.035	.267	.171
7/16	19	.035	.430	.198
	14	.065	.370	.344
1/2	19	.035	.555	.252
	14	.065	.495	.443
5/8	19	.035	.680	.305
	14	.065	.620	.542
3/4	19	.035	.811	.328
	14	.065	.745	.641
1	19	.035	.936	.377
	14	.065	.870	.740
	8	.128	.744	1.340

SEAMLESS COPPER REFRIGERATION TUBE

Dehydrated and Sealed—Dead Soft
50 Ft. Exact Coils—Individually Packaged

Outside Diameter	Wall Thickness	Weight per Foot, lbs.	Weight per Coil, lbs.	Cartons per Master Carton
⅜	.030	.0347	1.74	25
	.035	.0384	1.92	25
⅜	.030	.0575	2.88	18
	.035	.065	3.25	18
½	.030	.0804	4.02	15
	.035	.0916	4.58	15
⅝	.032	.109	5.45	11
	.035	.118	5.90	11
¾	.032	.134	6.70	9
	.035	.145	7.25	9
⅞	.035	.172	8.60	...
1	.032	.182	9.10	6
	.035	.198	9.90	6
1 ⅛	.035	.251	12.55	4
1 ¼	.035	.305	15.25	4

SEAMLESS COPPER AUTOMOTIVE TUBE

25 Ft. Exact Coils—Individually Packaged

Outside Diameter	Wall Thickness	Weight per Foot, lbs.	Weight per Coil, lbs.	Cartons per Master Carton
⅜	.030	.0347	.867	25
⅜	.030	.0575	1.44	25
½	.030	.0804	2.01	25
⅝	.032	.109	2.73	25
¾	.032	.134	3.35	25
⅞	.032	.158	3.95	25
1	.032	.182	4.55	25

DEOXIDIZED COPPER WATER SERVICE TUBE

Type K—Soft Temper—60 Ft. Coils
Operating Pressure Up to 250 Lbs.
Individually Packaged

Nominal Size	Actual Outside Diameter	Wall Thickness	Weight per Foot, lbs.
¾	½	.049	.269
1	¾	.049	.344
1 ¼	1	.065	.641
1 ½	1 ¼	.065	.839

DEOXIDIZED COPPER WATER SERVICE TUBE

Type L—Soft Temper—60 Ft. Coils
 Operating Pressure Up to 200 Lbs.
 Individually Packaged

Nominal Size	Actual Outside Diameter	Wall Thickness	Weight per Foot, lbs.
¼	¾	.030	.126
¾	½	.035	.198
½	¾	.040	.285
¾	¾	.045	.455
1	1½	.050	.655

DEOXIDIZED COPPER WATER SERVICE TUBE

Hard Temper—20 Ft. Exact Lengths
 Type K Up to 400 Lbs.
 Operating Pressure: Type L Up to 300 lbs.
 Type M Up to 250 Lbs.

Nominal Size	Actual Outside Diameter	TYPE K		TYPE L		TYPE M	
		Wall Thickness	Weight per Foot, lbs.	Wall Thickness	Weight per Foot, lbs.	Wall Thickness	Weight per Foot, lbs.
¼	¾	....	.....	.030	.126	....	.....
¾	½	.049	.269	.035	.198	.025	.145
½	¾	.049	.344	.040	.285	.028	.204
¾	¾	.049	.418	.042	.362	....	.....
¾	¾	.065	.641	.045	.455	.032	.328
1	1½	.065	.839	.050	.655	.035	.465
1 ¼	1¾	.065	1.04	.055	.884	.042	.682
1½	1¾	.072	1.36	.060	1.14	.049	.940
2	2½	.083	2.06	.070	1.75	.058	1.46
2½	2¾	.095	2.93	.083	2.48	.065	2.03
3	3½	.109	4.00	.090	3.33	.072	2.68

DRAWN COLD-HEADING WIRE—brass and copper alloys

WEIGHT OF WIRE IN POUNDS PER 100 LINEAR FEET

Diameter in Inches	Density: 0.306 lbs. per cu. in.	Density: 0.308 lbs. per cu. in.	Density: 0.314 lbs. per cu. in.	Density: 0.323 lbs. per cu. in.
	Weights exact for: Medium-Leaded Brass Yellow Brass, 66% Weights approx. for: (less than 1/4% difference) Leaded Naval Brass Free-Cutting Brass	Weights exact for: Cartridge Brass, 70%	Weights exact for: Nickel Silver, 12%	Weights exact for: Tellurium Copper Subtract 1% for: (Phosphor Bronze, 5% (A))
.0031	.0277	.0279	.0284	.0293
.0035	.0353	.0356	.0363	.0373
.0040	.0461	.0464	.0474	.0487
.0045	.0584	.0588	.0599	.0616
.0050	.0721	.0726	.0740	.0761
.0056	.0904	.0910	.0928	.0955
.0063	.114	.115	.117	.121
.0071	.145	.146	.149	1.53
.0080	.185	.186	.189	.195
.0089	.228	.230	.234	.241
.0100	.288	.290	.296	.304
.0113	.368	.371	.378	.389
.0126	.458	.461	.470	.483
.0142	.582	.585	.597	.614
.0159	.729	.734	.748	.770
.0179	.924	.930	.948	.975
.0201	1.17	1.17	1.20	1.23
.0226	1.47	1.48	1.51	1.55
.0253	1.85	1.86	1.89	1.95
.0285	2.34	2.36	2.40	2.47
.0320	2.95	2.97	3.03	3.12
.0359	3.72	3.74	3.81	3.92
.0403	4.68	4.71	4.81	4.94
.0453	5.92	5.96	6.07	6.25
.0508	7.44	7.49	7.64	7.86
.0571	9.40	9.46	9.65	9.93
.0641	11.8	11.9	12.2	12.5
.0720	15.0	15.0	15.3	15.8
.0808	18.8	19.0	19.3	19.9
.0907	23.7	23.9	24.3	25.0
.102	30.0	30.2	30.8	31.7
.114	37.5	37.7	38.5	39.6
.128	47.3	47.6	48.5	49.9
.144	59.8	60.2	61.4	63.1
.162	75.7	76.2	77.7	79.9
.182	95.5	96.2	98.0	101.
.204	120.	121.	123.	127.
.229	151.	152.	155.	160.
.258	192.	193.	197.	203.
.289	240.	242.	247.	254.
.325	305.	307.	313.	322.
.365	384.	387.	394.	406.
.410	485.	488.	497.	512.
.460	610.	614.	626.	644.
.500	721.	726.	740.	761.
.562	911.	917.	935.	961.
.625	1130.	1130.	1160.	1190.
.688	1370.	1370.	1400.	1440.
.750	1620.	1630.	1660.	1710.

SQUARE WIRE: To obtain pounds per 1000 linear feet, multiply figures given above for round wire by 1.273, or alternately for rough estimation simply add 25%.
 HEXAGONAL WIRE: To obtain pounds per 1000 linear feet, multiply figures given for round wire by 1.103, or alternately for very close approximation add 10%.

COPPER AND COPPER ALLOYS

TOLERANCES ON DIAMETER OR DISTANCE BETWEEN PARALLEL SURFACES

ROD

COLD DRAWN TO FINAL SIZE

The tolerances for rod up to 0.150", inclusive, in this table, are greater than for similar sizes in Wire Table following, but are required by dimensional changes resulting from the straightening operation, which changes are negligible in sizes over 0.150".

TOLERANCES — IN INCHES

Diameter or Distance between Parallel Surfaces in Inches	Non-Refractory Alloys†		Refractory Alloys††	
	Hexagonal Octagonal		Hexagonal Octagonal	
	Round	Hexagonal Octagonal	Round	Hexagonal Octagonal
Up to .150 incl.....	.0013	.0025	.002	.004
Over .150 to .500 Incl.....	.0015	.003	.002	.005
Over .500 to 1.00 Incl.....	.002	.004	.003	.006
Over 1.00 to 2.00 Incl.....	.0025	.005	.004	0.40%*
Over 2.00.....	0.15%*	0.30%*	0.20%*	0.40%*

*Expressed to the nearest 0.001".

†Non-Refractory Alloy: Copper and all alloys not listed as Refractory Alloys.

††Refractory Alloys: Nickel Silver, Phosphor Bronze, Olympic Bronze, Manganese Bronze, (A), Forging Brass, Telnic Bronze, Architectural Bronze, 444 Bronze, Phosnic Bronze.

Tolerances are plus and minus; if tolerances all plus or all minus are desired, double the values given.

COPPER AND COPPER ALLOYS

TOLERANCES ON DIAMETER OR DISTANCE BETWEEN PARALLEL SURFACES

WIRE

COLD DRAWN TO FINAL SIZE

TOLERANCES — IN INCHES

Diameter or Distance between Parallel Surfaces in Inches	Non-Refractory Alloys†		Refractory Alloys††	
	Round	Hexagonal Octagonal	Round	Hexagonal
	Up to .010 Incl.....	.0001		.0002
Over .010 to .020 Incl.....	.0002		.0003	
Over .020 to .030 Incl.....	.0003		.0005	
Over .030 to .040 Incl.....	.0004	.0008	.0007	.002
Over .040 to .050 Incl.....	.0005	.0010	.0008	.003
Over .050 to .060 Incl.....	.0006	.0012	.0010	.003
Over .060 to .080 Incl.....	.0008	.0016	.0015	.004
Over .080 to .150 Incl.....	.0010	.002	.002	.004
Over .150 to .500 Incl.....	.0015	.003	.002	.004
Over .500 to .750 Incl.....	.002	.004	.003	.005

For wire for subsequent redrawing or re-rolling, double the above tolerances.

† Non-Refractory Alloy: Copper and all alloys not listed as Refractory Alloys.

†† Refractory Alloys: Nickel Silver, Phosphor Bronze, Olympic Bronze, Manganese Bronze, (A), Forging Brass, Telnic Bronze, Architectural Bronze, 444 Bronze, Phosnic Bronze.

COPPER AND COPPER ALLOYS

TOLERANCES ON DIAMETER OR DISTANCE BETWEEN PARALLEL SURFACES

EXTRUDED ROD, BAR AND WIRE

FURNISHED AS EXTRUDED

Diameter, or Distance between Parallel Surfaces in Inches	TOLERANCES—IN INCHES	
	Non-Refractory Alloys*	Refractory Alloys**
	Round—Square—Rectangular Hexagonal—Octagonal	
Up to 1.00 Incl.....	.010	.020
Over 1.00 to 2.00 Incl.....	.015	.030
Over 2.00 to 3.00 Incl.....	.025	.050
Over 3.00 to 3.50 Incl.....	.035	.070
Over 3.50 to 4.00 Incl.....	.060	.120

* Non-Refractory Alloys: Copper and all alloys not listed as Refractory Alloys.

** Refractory Alloys: Muntz Metal, Free-Cutting Brass, Forging Brass, Architectural Bronze, Naval Brass, Leaded Naval Brass, Manganese Bronze, (A).

Tolerances are plus and minus; if tolerances all plus or all minus are desired, double the values given.

COPPER AND COPPER ALLOYS

TOLERANCES ON LENGTHS

ROD

Lengths	Length Tolerances (all plus) in Inches
Specific Lengths.....	$\frac{3}{8}$ *
Specific Lengths with ends.....	1
(applicable only to full length pieces).....	

**If all minus tolerances are desired, use the same values; if tolerances are desired plus and minus, halve the values given.*

SQUARE AND RECTANGULAR DRAWN BAR

Lengths	Length Tolerances (all plus) in Inches
Specific Lengths.....	$\frac{3}{8}$ *
Specific Lengths with ends.....	1
(applicable only to full length pieces)	

**If all minus tolerances are desired, use the same values; if tolerances are desired plus and minus, halve the values given.*

COPPER AND COPPER ALLOYS

TOLERANCES ON THICKNESSES

SQUARE AND RECTANGULAR BAR AND WIRE

ROUND OR SQUARE EDGES OR ROUNDED CORNERS

COPPER

Thickness—in Inches	Width—in Inches				
	Up to ½ Incl.	Over ½ to ¾ Incl.	Over ¾ to 2.00 Incl.	Over 2.00 to 4.00 Incl.	Over 4.00 to 8.00 Incl. Over 8.00 to 12.00 Incl.
Up to .013 Incl.....	.001	.001			
Over .013 to .050 Incl.....	.0013	.0013	.0015		
Over .050 to .090 Incl.....	.0015	.0015	.002	.0025	
Over .090 to .130 Incl.....	.002	.002	.0025	.003	.0035
Over .130 to .188 Incl.....	.0025	.0025	.003	.0035	.004
Over .188 to .500 Incl.....	.003	.003	.0035	.004	.0045
Over .500 to 1.00 Incl.....		.004	.004	.0045	.005
Over 1.00 to 2.00 Incl.....		.0045	.0045	.005	.006
Over 2.00 to 4.00 Incl.....				0.30%*	

Tolerances are plus and minus; if tolerances all plus or all minus are desired, double the values given.

COPPER AND COPPER ALLOYS

TOLERANCES ON THICKNESSES

SQUARE AND RECTANGULAR BAR AND WIRE ROUND OR SQUARE EDGES OR ROUNDED CORNERS

NON-REFRACTORY ALLOYS

All Alloys except those listed in the following as Refractory.

Thickness — in Inches	Width — in Inches					
	Up to ½ Incl.	Over ½ to 1¼ Incl.	Over 1¼ to 2.00 Incl.	Over 2.00 to 4.00 Incl.	Over 4.00 to 8.00 Incl.	Over 8.00 to 12.00 Incl.
Up to .013 Incl.....	.001	.0013				
Over .013 to .050 Incl.....	.0013	.0015	.002			
Over .050 to .090 Incl.....	.0015	.002	.003	.0035		
Over .090 to .130 Incl.....	.002	.0025	.0035	.004		
Over .130 to .188 Incl.....	.003	.0035	.004	.0045	.006	.008
Over .188 to .500 Incl.....	.0035	.004	.0045	.0045	.006	.008
Over .500 to 1.00 Incl.....		.0045	.005	.005	.007	.009
Over 1.00 to 2.00 Incl.....		.005	.005	.006	.008	
Over 2.00 to 4.00 Incl.....				0.30%*		

Tolerances are plus and minus; if tolerances all plus or all minus are desired, double the values given.

COPPER AND COPPER ALLOYS

TOLERANCES ON THICKNESSES

REFRACTORY ALLOYS

Manganese Bronze, (A), Nickel Silver, Phosphor Bronze, Olympic Bronze, Telnic Bronze, Phosnic Bronze, Architectural Bronze, 444 Bronze.

Thickness—in Inches	Width—in Inches				
	Up to ½ Incl.	Over ½ to 1¼ Incl.	Over 1¼ to 2.00 Incl.	Over 2.00 to 4.00 Incl.	Over 4.00 to 8.00 Incl. Over 8.00 to 12.00 Incl.
Up to .050 Incl.....	.0015	.002			
Over .050 to .090 Incl.....	.002	.003	.004	.005	
Over .090 to .130 Incl.....	.003	.004	.0045	.006	
Over .130 to .188 Incl.....	.004	.0045	.005	.007	.012
Over .188 to .500 Incl.....	.005	.005	.006	.007	.012
Over .500 to 1.00 Incl.....		.006	.007	.008	.013
Over 1.00 to 2.00 Incl.....		.006	.007	.009	.011
Over 2.00 to 4.00 Incl.....				0.50%*	

*Expressed to the nearest .001".

COPPER AND COPPER ALLOYS TOLERANCES ON WIDTHS RECTANGULAR BAR

(For Square Bar use Thickness Tolerances Schedule)

Width—in Inches	Width Tolerances—in Inches	
	Copper and Non-Refractory Alloys	Refractory Alloys
Up to .050 Incl.....	.0013	.0015
Over .050 to .090 Incl.....	.0015	.002
Over .090 to .130 Incl.....	.002	.003
Over .130 to .188 Incl.....	.003	.004
Over .188 to .500 Incl.....	.0035	.005
Over .500 to 1.25 Incl.....	.005	.007
Over 1.25 to 2.00 Incl.....	.008	.010
Over 2.00 to 4.00 Incl.....	.012	.015
Over 4.00 to 12.00 Incl.....	0.30%*	0.50%*

*Expressed to the nearest .001".

These tolerance schedules are used as applicable to commercial material, in the absence of other specifications by the purchaser.

TOLERANCES ON STRAIGHTNESS ROD AND SHAPES

APPLICABLE TO ANY LONGITUDE SURFACE OR EDGE

Drawn Rods (Except Shafting) $\frac{1}{2}$ % maximum curvature (depth of arc) in any 10 foot portion of the total length.
 Shapes (Except Hot Rolled Shapes and Shapes for Forging Purposes, for which no tolerances are established) $\frac{1}{2}$ % maximum curvature (depth of arc) in any 6 foot portion of the total length.

These tolerance schedules are used as applicable to commercial material, in the absence of other specifications by the purchaser.

COPPER AND COPPER ALLOYS

TOLERANCES ON WALL THICKNESSES

ROUND SEAMLESS TUBE

EXCEPT CONDENSER TUBE, PIPE AND COPPER WATER TUBE AND TUBE FURNISHED AS EXTRUDED

NON-REFRACTORY ALLOYS

Copper and all alloys not listed below as Refractory Alloys.

Wall Thickness in Inches	OUTSIDE DIAMETER (O.D.) IN INCHES						
	$\frac{1}{8}$ to $\frac{1}{4}$ Incl.	Over $\frac{1}{8}$ to $\frac{1}{4}$ Incl.	Over $\frac{5}{16}$ to $\frac{1}{2}$ Incl.	Over 1 to 2 Incl.	Over 2 to 4 Incl.	Over 4 to 7 Incl.	Over 7 to 10 Incl.
Up to .018 . . . . .	.002	.001	.0015	.002	.002		
Incl. .018 to .025 . . . .	.003	.002	.002	.0025			
Incl. .025 to .035 . . . .	.003	.0025	.0025	.003	.004		
Incl. .035 to .058 . . . .	.003	.003	.0035	.0035	.005	.007	
Incl. .058 to .083 . . . .	.003	.0035	.004	.004	.006	.008	.010
Incl. .083 to .120 . . . .	.004	.004	.005	.005	.007	.009	.011
Incl. .120 to .165 . . . .	.005	.005	.006	.006	.008	.010	.012
Incl. .165 to .220 . . . .	.007	.007	.0075	.008	.010	.012	.014
Incl. .220 to .284 . . . .			.009	.010	.012	.014	.016
Incl. .284 to .380 . . . .			.011	.012	.014	.016	.018
Incl. .380 and over			5%	5%	5%	6%	6%

Maximum deviation at any point—Tolerances are plus and minus; if tolerances all plus or all minus are desired, double the values given.

COPPER AND COPPER ALLOYS

TOLERANCES ON WALL THICKNESSES

ROUND SEAMLESS TUBE

EXCEPT CONDENSER TUBE, PIPE AND COPPER WATER TUBE AND TUBE FURNISHED AS EXTRUDED

REFRACTORY ALLOYS

Antimonial Admiralty, Naval Brass, Aluminum Brass, Cupro-Nickel, 30%, Cupro-Nickel, 20%, Olympic Bronze.

Wall Thickness in Inches	OUTSIDE DIAMETER (O.D.) IN INCHES						
	$\frac{1}{2}$ to $\frac{1}{8}$ Incl.	Over $\frac{3}{8}$ to $\frac{1}{2}$ Incl.	Over $\frac{1}{2}$ to 1 Incl.	Over 1 to 2 Incl.	Over 2 to 4 Incl.	Over 4 to 7 Incl.	Over 7 to 10 Incl.
Up to .018 . . . . .	.0025	.0015	.002	.0025			
Incl. .018 to .025 . . . .	.004	.0025	.0025	.003			
Incl. .025 to .035 . . . .	.004	.003	.003	.004	.005		
Incl. .035 to .058 . . . .	.004	.004	.0045	.0045	.0065	.009	
Incl. .058 to .083 . . . .		.0045	.005	.005	.0075	.010	.013
Incl. .083 to .120 . . . .		.005	.0065	.0065	.009	.011	.014
Incl. .120 to .165 . . . .		.007	.007	.0075	.010	.013	.015
Incl. .165 to .220 . . . .			.009	.010	.013	.015	.018
Incl. .220 to .284 . . . .			.012	.013	.015	.018	.020
Incl. .284 to .380 . . . .				.015	.018	.020	.023
Incl. .380 and over				6%	6%	8%	8%

Maximum deviation at any point—Tolerances are plus and minus; if tolerances all plus or all minus are desired, double the values given.

AVERAGE DIAMETER * TOLERANCE

All tolerances plus and minus.

Tolerances on a given tube may be specified with respect to any two, but not all three of the following:

- a. Outside dimension
- b. Inside dimension
- c. Wall thickness

For Redraw Tube, double the mean diameter tolerance.

When tube is ordered by O.D. and I.D., the maximum plus and minus deviation of the wall thickness from the nominal at any point shall not exceed by more than 50% the values, shown above.

These tolerance schedules are used as applicable to commercial material, in the absence of other specifications by the purchaser.

Specified Diameter in Inches	Tolerance Applies to	Tolerance in Inches	
		Non- Refractory Alloy	Refrac- tory Alloy
Up to 1/8 Incl.	Inside Dia.	.002	.003
Up to 1/8 Incl.	Outside Dia.	.002	.0025
Over 1/8 to 1/4 Incl.	Inside or Outside	.002	.0025
Over 1/4 to 1/2 Incl.	Inside or Outside	.0025	.003
Over 1/2 to 3/4 Incl.	Inside or Outside	.003	.004
Over 3/4 to 1 Incl.	Inside or Outside	.004	.005
Over 1 to 2 Incl.	Inside or Outside	.005	.006
Over 2 to 3 Incl.	Inside or Outside	.006	.008
Over 3 to 4 Incl.	Inside or Outside	.007	.009
Over 4 to 5 Incl.	Inside or Outside	.008	.010
Over 5 to 6 Incl.	Inside or Outside	.009	.011
Over 6 to 8 Incl.	Inside or Outside	.010	.013
Over 8 to 10 Incl.	Inside or Outside	.010	.013

*The average diameter of a tube is the average of the maximum and minimum outside diameters, or of the maximum and minimum inside diameters, as determined at any one cross-section of the tube.

CHEMICAL COMPOSITION • PHYSICAL

ALLOY	NOMINAL COMPOSITION (%)					DENSITY LBS. PER CU. IN.
	COPPER	ZINC				
COPPERS						
Electrolytic Tough Pitch Copper	99.9+					0.323
Tellurium	99.4			Oxygen 0.04 Tellurium 0.6		0.323
BRASSES						
Gilding, 95%	95	5				0.320
Commercial Bronze, 90%	90	10				0.318
Jewelry Bronze	87.5	12.5				0.317
Red Brass, 85%	85	15				0.316
Low Brass, 80%	80	20				0.313
Cartridge Brass, 70%	70	30				0.308
Yellow Brass	66	34				0.306
Muntz Metal	61	39				0.303
LEADED BRASSES						
Leaded Commercial Bronze	89	9	Lead			0.319
Low-Leaded Brass (Tube)	66.5	33	2			0.307
Medium-Leaded Brass	65	34	0.5			0.306
High-Leaded Brass (Tube)	66	32.25	1			0.308
High-Leaded Brass	64	34	1.75			0.307
Free-Cutting Brass	62	34.75	2			0.307
Forging Brass	59.75	38.25	3.25			0.305
Architectural Bronze	58	38.75	2			0.306
SPECIAL BRASSES						
Naval Brass	60	39.25	Lead	Tin		0.304
Leaded Naval Brass	60	37.25	2	0.75 0.75		0.305
PHOSPHOR BRONZES						
Phosphor Bronze, 5% (A)	95		Lead	Tin	Phos- phorus	0.320
Leaded Phosphor Bronze (B)	94		1	4.75 4.75	0.25 0.25	0.322
444 Bronze	88	4	4	4		0.321
NICKEL SILVERS						
Nickel Silver, 12%	64	24	Lead	Nickel		0.314
Leaded Nickel Silver, 12%	64	23	—	12 12		0.314
Nickel Silver, 18% (A)	65	17	1	18		0.316
CUPRO-NICKEL						
Cupro-Nickel, 10%	89.10		Iron	Nickel	Man- ganese	0.323
			0.75	10	0.15	

(1) Average 77F. to 572F.

(2) Based on a value of 100 for Free-Cutting Brass.

L—Long M—Medium S—Short MS—Medium Short

PROPERTIES • CHARACTERISTICS

MELTING TEMP. DEG. F.	COEFFICIENT OF THERMAL EXPANSION PER F. (1)	APPROX. RELATIVE SUITABILITY FOR BEING WORKED		APPROX. RELATIVE SUITABILITY FOR BEING WELDED				APPROX. RELATIVE MACHINABILITY (2)		Commercial Hard Temper		
		COLD	HOT	GAS	Carbon ARC	Metal ARC	Resistance	RATING	TYPE CHIP	TENSILE Strength LB. PER SQ. IN.	YIELD Strength AT 0.5% ELONG. UNDER LOAD. LB. PER SQ. IN.	ELONGATION % IN 2-IN.
1980	9.8	E	E	P	F	G	P	20	L	45,000	40,000	15
1980	9.9	G	G	F	F	F	P	90	S	45,000	—	10
1950	10.0	E	G	F	G	G	P	20	L	—	—	—
1910	10.2	E	G	G	G	F	P	20	L	—	—	—
1900	10.3	E	G	G	G	F	P	20	L	54,000	45,000	20
1880	10.4	E	G	G	G	F	P	30	L	—	—	—
1830	10.6	E	F	G	G	F	P	30	L	56,000	45,000	20
1750	11.1	E	F	G	F	F	P	30	L	—	—	—
1710	11.3	E	P	G	F	F	P	30	L	—	—	—
1670	11.6	F	E	G	F	F	G	40	L	65,000	50,000	20
1900	10.2	G	P	F	F	F	P	80	MS	54,000	45,000	15
1720	11.2	E	P	F	F	F	P	60	M	—	—	—
1700	11.3	G	P	F	F	P	P	70	M	—	—	—
1710	11.3	F	P	F	F	P	P	80	S	—	—	—
1690	11.3	F	P	F	F	P	P	90	S	—	—	—
1650	11.4	P	F	F	F	P	P	100	S	58,000	42,000	18
1640	11.5	F	E	F	F	P	P	80	S	—	—	—
1630	11.6	F	E	F	F	P	P	90	S	—	—	—
1650	11.8	F	E	G	F	P	F	30	L	63,000	35,000	30
1650	11.8	P	G	F	F	P	F	70	S	63,000	35,000	25
1920	9.9	E	P	G	G	G	G	20	L	65,000	55,000	30
1920	9.9	F	P	P	P	F	P	50	M	65,000	55,000	25
1830	9.6	F	P	P	P	F	P	100	S	—	—	—
1900	9.0	E	P	G	F	P	E	20	L	—	—	—
1900	9.0	F	P	F	F	P	E	50	M	68,000	60,000	15
2030	9.0	E	P	G	F	G	E	20	L	70,000	—	20
2110	9.4	G	G	G	F	G	E	20	L	—	—	—

E..Excellent G..Good F..Fair P..Poor

TRADE AND GOVERNMENT SPECIFICATIONS

FREE-CUTTING BRASSES	*Machin- ability	A.S.T.M.	S.A.E.	AMS	MILITARY	ARMY	NAVY	FEDERAL
Free-Cutting Brass Copper, 62.00 Lead, 3.25 Zinc, 34.75	100%	B16	72	4610F	MIL-B-895 Amend. #1		47B2h	QQ-B-611a Amend. #4 Comp. B QQ-B-626 Comp. 22
Forging Brass Copper, 60.00 Zinc, 38.00 Lead, 2.00	80%	B124 Alloy 2	88	4614D	MIL-B-895 Amend. #1	57-161-2A Amend. #1	47B2h	QQ-B-626 Comp. 21 QQ-B-611a Amend. #4 Comp. A



TRADE AND GOVERNMENT SPECIFICATIONS

FREE-CUTTING BRASSES	*Machinability	A.S.T.M.	S.A.E.	AMS	MILITARY	ARMY	NAVY	FEDERAL
Leaded Flanging Brass Copper, 62.5 Zinc, 35.6 Lead, 1.9	90%				MIL-B-895 Amend. #1			
Medium-Leaded Brass Copper, 64.5 Zinc, 34.5 Lead, 1.0	70%				MIL-B-895 Amend. #1			
Leaded Naval Brass Copper, 60.50 Zinc, 36.75 Tin, 0.75 Lead, 2.00	70%	B21 Alloy C			MIL-B-895 Amend. #1		47B2h	QQ-B-636a Amend. #2 Class C
Medium-Leaded Naval Brass Copper, 60.5 Zinc, 38.0 Tin, 0.75 Lead, 0.75	60%	B21 Alloy B			MIL-B-994A Comp. B		46B6 (INT) of 1/2/46 Grade B	QQ-B-636a Amend. #2 Class B
Leaded Commercial Bronze Copper, 89.0 Zinc, 9.0 Lead, 2.0	80%	B140 Alloy B						
High-Strength Leaded Commercial Bronze Copper, 90.25 Zinc, 6.90 Lead, 1.75 Phosphorus, 0.10 Nickel, 1.00	80%	No Applicable Specifications						
Leaded Red Brass Copper, 85.00 Zinc, 13.25 Lead, 1.75	80%	B140 Alloy A						

* Approximate machinability rating based on Free-Cutting Brass = 100%.

TRADE AND GOVERNMENT SPECIFICATIONS

BRONZES	*Machinability	A.S.T.M.	S.A.E.	AMS	MILITARY	ARMY	NAVY	FEDERAL
Aluminum Silicon Bronze Copper, 91.2 Aluminum, 7.0 Silicon, 1.8	60%	B150 Alloy #1	701B	4631B	MIL-B-15939 Amend. #2 Comp. #1 MIL-B-6946		46B17c Grade B	QQ-B-666 Amend. #4 Grade B
444 Bronze (B2) Copper, 88.4 Zinc, 3.5 Lead, 4.0 Tin, 4.0 Phosphorus, 0.1	80%	B139 Alloy B2	791					
Phosphor Bronze, 5% (A) Copper, 95.00 Tin, 4.75 Phosphorus, 0.25	20%	B139 Alloy A	81	4625D	MIL-B-892 Amend. #1		46B14f	QQ-B-746a Amend. #2 Comp. A
Leaded Phosphor Bronze, 5% (B1) Copper, 94.00 Tin, 4.75 Lead, 1.00 Phosphorus, 0.25	50%	B139 Alloy B1						
Phosphor Bronze, 8% (C) Copper, 92.00 Tin, 7.75 Phosphorus, 0.25	20%	B139 Alloy C						
Phosphor Bronze, 10% (D) Copper, 90.00 Tin, 9.85 Phosphorus, 0.15	20%	B139 Alloy D						QQ-B-746a Amend. #2 Comp. D

* Approximate machinability rating based on Free-Cutting Brass = 100%.

TRADE AND GOVERNMENT SPECIFICATIONS

COPPERS	*Machin-ability	A.S.T.M.	S.A.E.	AMS	MILITARY	ARMY	NAVY	FEDERAL
Electrolytic Tough Pitch Copper Copper, 99.9+ Oxygen, about 0.04	20%	B133				57-154-1B	47C2f	QQ-C-502 QQ-C-501a Amend. #4
Oxygen-Free High Conductivity Copper Copper, 99.92+	20%				MIL-C-15998			QQ-C-502
Tellurium Copper Copper, 99.50% Tellurium, 0.50%	90%							

No Applicable Specifications

SPECIAL BRASSES	*Machin-ability	A.S.T.M.	S.A.E.	AMS	MILITARY	ARMY	NAVY	FEDERAL
Manganese Bronze (A) Copper, 58.50 Tin, 1.00 Zinc, 39.25 Iron, 1.00 Manganese, 0.25	30%	B138 Alloy A					46B15e Amend. #1 Class A	QQ-B-721a Amend. #3 Class A
Naval Brass Copper, 60.50 Zinc, 38.75 Tin, 0.75	30%	B21 Alloy A	73	4611B 4612C	MIL-B-994A Comp. A		46B6k and 46B6 (INT) of 1/2/46 Grade A	QQ-B-636a Amend. #2 Class A
Muntz Metal Copper, 62.00 Zinc, 38.00	40%				MIL-B-895 Amend. #1		47B2h	QQ-B-611a Amend. #4 Comp. D
Yellow Brass Copper, 66.00 Zinc, 34.00	30%				MIL-B-895 Amend. #1		47B2h	QQ-B-611a Amend #4 Comp. D

* Approximate machinability rating based on Free-Cutting Brass = 100%.

AMPCO* METAL

"Ampco Metal" designates a series of aluminum bronze alloys of the high aluminum, high iron type, developed by Ampco Metal, Inc. to meet demands for high strength engineering bronzes possessing unusual properties. Available in several different grades, some of which have one or more heat-treated variations, these alloys cover a wide range of physical properties and offer a maximum flexibility of selection for any particular application. Ampco Metal possesses an inherent resistance to wear and performs well under excessive loads and other unfavorable conditions where other bronzes fail. The ability of Ampco alloys to resist corrosion, erosion and abrasion is being continually demonstrated in the chemical process, marine and other industries where such problems exist.

*Reg. U. S. Pat. Off.

AMPCO METAL GRADE 8 EXTRUDED ROD

The principle uses of extruded Ampco Metal, Grade 8 are in products where good resistance to corrosion, erosion, abrasion and cavitation-pitting is essential. Having the same chemical composition and like physical properties to Grade 8 sheet and plate, it is ideally suited for pipe, tube, fittings and other essential parts of fabricated units or vessels used in the process, marine and other kindred industries. The extreme toughness of this alloy makes it an ideal bolting material. Fasteners can be made from Grade 8 extruded in the form of studs, machine bolts, screws, etc. as the material lends itself to cold heading and forging operations. Like all grades of Ampco Metal, this material has splendid bearing characteristics. It is used as bushings, bearings, wear strips, and in similar applications where unusual toughness and ductility are essential to uninterrupted operation. Grade 8 rod has good surface finish.

For availability, see page 265.

AMPCO METAL GRADE 15 EXTRUDED ROD

Combining good bearing qualities and wear resistance, Ampco Metal, Grade 15 extruded material is widely used for bushings, bearings, gears, worms and worm wheels, valve seats and guides, plungers, pump rods and similar parts. This alloy possesses splendid resistance to corrosion, making it possible for the designer or user to take full advantage of its excellent physical properties.

For availability, see page 265.

AMPCO METAL GRADE 16
CENTRIFUGALLY CAST BAR

This alloy is used for gears and worm wheels as well as bushings, bearings, slides, shifter forks and machine parts subject to shock and/or impact. Ampco Grade 16 resists "squashing" or "peining out" when subjected to overloads.

Availability upon application.

AMPCO METAL GRADE 18
EXTRUDED ROD

Where high strength and hardness combined with resistance to wear and fatigue are required, Ampco Grade 18 is ideally suited. Some of the more usual applications of this alloy are bushings, bearings, gears, worms and worm wheels, valve seats and guides, hydraulic valve parts, plungers, pump rods, guide pin bushings, gibs, slides, etc.

For availability, see page 265.

AMPCO METAL GRADE 18
CENTRIFUGALLY CAST BARS

This is the most widely used of all Ampco grades. It is an accepted wear resistant material having exceptional impact and fatigue characteristics. It is used generally in maintenance and production as bearings, bushings, gears, worm wheels, slides, guides and numerous other wear applications.

For availability, see page 267.

Fullerton stocks a complete line of Ampco Grade 18 Centrifugally Cast SEMI-FINISHED bars. These bars are semi-finished machined all over with $\frac{1}{16}$ " finish allowance to stated size. Custom sizes also available upon application. Rough cast bars upon inquiry.

**AMPCO METAL GRADES 18-13,
18-22, 18-23
CENTRIFUGALLY CAST BARS**

These grades are heat treated variations of Ampco 18 and their uses are similar in maintenance and production. The treatment of Grade 18-13 reduces hardness and increases elongation for improved impact resistance and enhances the bearing qualities. Grades 18-22 and 18-23 develop the maximum hardness, yield and tensile strength. This, combined with substantially increased proportional limit, offers the advantage of much greater stress allowance when heat and wear are factors.

Availability upon application.

**AMPCO METAL MEETS THE
FOLLOWING GOVERNMENT SPECIFICATIONS**

Extruded Ampco Metal, Grade 8	SAE-701B
Extruded Ampco Metal, Grade 15 with diameters up to 3"	MIL-B6946; AN-B-16, Amend. 1; ASTM-B-150-52, Alloy 1; QQ-B-666, Amend. 4 Grade B; NAVY 46B-17c, Grade B; MIL-B-15939, Amend. 2 Compl; SAE-701B
Extruded Ampco Metal, Grade 18 with diameters up to 3"	AMS-4635B
Ampco Metal, Grade 18 Cast	QQ-B671b, Class 3, Cast; ASTM-B-148-52, Alloy 9C; MIL-B-16033, Class 3; NAVY 46-B-18d, Class 3.

AMPCO METAL
STOCK SIZES OF SOLID EXTRUDED ROD

DIAMETER SIZE	WEIGHT POUNDS PER FOOT	GRADE 45	GRADE 8	GRADE 15	GRADE 18
$\frac{3}{16}$	.091			X	
$\frac{1}{4}$	.162	X		X	
$\frac{5}{16}$	.254	X		X	
$\frac{3}{8}$	.366	X	X	X	X
$1\frac{1}{32}$	.430			X	
$\frac{7}{16}$	.496	X		X	X
$\frac{1}{2}$	.650	X	X	X	X
$\frac{9}{16}$	.820	X	X	X	X
$\frac{5}{8}$	1.015	X	X	X	X
$1\frac{1}{16}$	1.23	X		X	X
$\frac{3}{4}$	1.47	X	X	X	X
$1\frac{3}{16}$	1.72	X		X	X
$\frac{7}{8}$	1.98	X	X	X	X
$1\frac{1}{8}$	2.28	X		X	X
1	2.57	X	X	X	X
$1\frac{1}{32}$	2.70			X	
$1\frac{1}{16}$	2.91	X		X	X
$1\frac{1}{8}$	3.30	X	X	X	X
$1\frac{3}{16}$	3.62	X	X	X	X
$1\frac{1}{4}$	4.09	X	X	X	X
$1\frac{3}{8}$	4.44			X	X
$1\frac{1}{2}$	4.90	X		X	X
$1\frac{5}{8}$	5.38	X		X	X
$1\frac{1}{2}$	5.84	X	X	X	X
$1\frac{3}{4}$	6.31	X		X	X
$1\frac{7}{8}$	6.90	X		X	X
$1\frac{1}{4}$	7.36	X		X	X

AMPCO METAL
STOCK SIZES OF SOLID EXTRUDED ROD

DIAMETER SIZE	WEIGHT POUNDS PER FOOT	GRADE	GRADE	GRADE	GRADE
		45	8	15	18
1 3/4	7.94	X	X	X	X
1 13/16	8.53			X	X
1 7/8	9.11	X		X	X
1 5/8	9.70			X	X
2	10.40	X	X	X	X
2 1/16	10.98	X			
2 1/8	11.68	X		X	X
2 1/4	13.20	X		X	X
2 5/16	13.90	X			
2 3/8	14.61	X		X	X
2 1/2	16.24	X		X	X
2 5/8	17.88	X		X	X
2 3/4	19.62	X		X	X
2 7/8	21.50	X		X	X
3	23.37	X		X	X
3 1/8	25.35			X	X
3 1/4	27.45	X		X	X
3 3/8	29.57			X	X
3 1/2	31.78	X		X	X
3 5/8	34.12			X	X
3 3/4	36.57	X		X	X
3 7/8	37.74	X			
3 7/8	39.03			X	X
4	41.60	X		X	X
4 1/4	46.86			X	X
4 1/2	52.58			X	X
4 3/4	58.54			X	X
5	64.94			X	X

**AMPCO METAL GRADE 18
CENTRIFUGALLY CAST
SEMI-FINISHED BARS***

Standard 12 1/2-In. Lengths

I.D.	O.D.	APPROX. WEIGHT	I.D.	O.D.	APPROX. WEIGHT	
1 1/4"	1 3/4"	5.5	2 3/4"	3 1/2"	20.0	
	2"	8.25		3 3/4"	25.0	
	2 1/4"	11.5		4"	30.75	
	2 1/2"	14.75		4 1/2"	42.5	
	2 3/4"	18.5		5"	55.0	
	3"	22.75		3"	3 1/2"	16.5
1 3/8"	2"	7.5			3 3/4"	21.5
	2 1/4"	10.5			4"	27.25
	2 1/2"	13.75			4 1/4"	33.0
	2 3/4"	17.5		4 1/2"	39.0	
	3"	22.0	4 3/4"	45.5		
1 1/2"	2"	6.25	3"	3 3/4"	18.0	
	2 1/4"	9.5		4"	23.5	
	2 1/2"	12.75		4 1/4"	27.5	
	2 3/4"	16.25		4 1/2"	35.75	
	3"	20.5		5"	49.5	
	3 1/4"	25.25		5 1/2"	63.0	
	3 1/2"	30.25		6"	82.0	
	3 3/4"	35.25	7"	120.0		
	4"	41.0	3 1/4"	4"	19.0	
	1 3/4"	2 1/4"		7.25	4 1/4"	25.0
2 1/2"		11.0		4 1/2"	31.5	
2 3/4"		14.5		5"	45.25	
3"		19.0	5 1/2"	59.0		
3 1/4"		23.5	6"	77.5		
3 1/2"		28.5	3 1/2"	4 1/2"	25.75	
3 3/4"		33.25		5"	39.5	
4"		39.0		5 1/2"	54.0	
2"	2 1/2"	8.5		6"	70.0	
	2 3/4"	12.25	4"	4 3/4"	21.5	
	3"	16.5		5"	29.0	
	3 1/4"	21.0		5 1/2"	43.75	
	3 1/2"	26.0		6"	62.5	
	3 3/4"	31.0		7"	100.0	
	4"	36.5		8"	140.0	
	4 1/2"	49.0		5"	7"	76.0
	5"	62.0	8"		120.0	
	2 1/4"	2 3/4"	9.5		9"	167.0
3"		13.5	10"		217.0	
3 1/4"		18.0	6"	8"	89.0	
3 1/2"		23.0		9"	135.0	
3 3/4"		28.0		10"	188.0	
4"		33.5	7"	9"	102.0	
2 1/2"	3"	10.5		10"	156.0	
	3 1/4"	14.75	8"	10"	113.0	

Stated sizes are those to which bars will finish.
Finish allowance is 1/4" on O.D. and I.D.

*Other than listed sizes available on inquiry.

CHEMICAL AND PHYSICAL PROPERTIES OF AMPCO METAL*

GRADE	CHEMICAL				PHYSICAL			
	COPPER	ALUMINUM	IRON	OTHERS	TENSILE STRENGTH PSI‡	YIELD STRENGTH PSI‡	ELONGATION % IN 2"	BRINELL HARDNESS (3000KG)
# 8**	Bal.	6.0- 8.0	1.5 -3.0	0.50 max.	78-85	43-58	35	143-153
#15**	Bal.	8.5-10.0	2.5 -3.75	0.50 max.	87-94	40-49	22-30	163-183
#16	Bal.	9.3-10.3	2.75-4.0	0.50 max.	100	34	27	174
#18**	Bal.	10.0-11.2	3.0 -4.25	0.50 max.	95-100	45-50	12-14	196-202
#18	Bal.	10.0-11.2	3.0 -4.25	0.50 max.	105	38	20	187
#18-13	Bal.	10.0-11.2	3.0 -4.25	0.50 max.	105	35	20	174
#18-22	Bal.	10.0-11.2	3.0 -4.25	0.50 max.	110	55	8	229
#18-23	Bal.	10.0-11.2	3.0 -4.25	0.50 max.	110	52	16	207

*Average values—physical properties shown as range reflect various size range differences.

**Values stated as extruded—other values as cast.

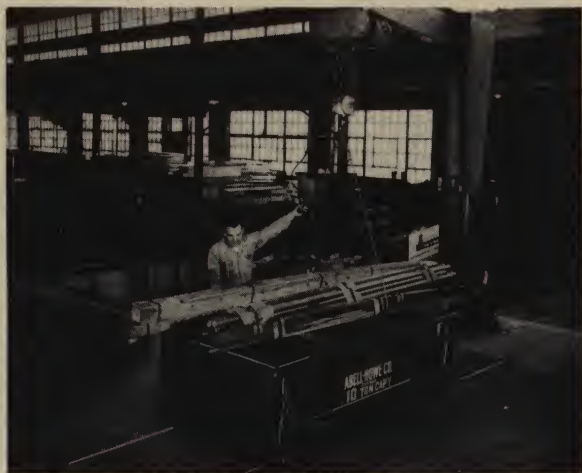
‡In thousands of pounds.

MAGNESIUM



INDEX

For description and definitions, see Sheet Section.	
Physical, Mechanical, and Chemical Properties	Page 272
Weights—	
Rounds, Squares, Hexagons	Page 274
Rectangular Bars	Page 276
Tubing	Page 278
Structural Shapes	Page 279
Unequal Angles	Page 280
Equal Angles	Page 281
Tolerances—Rod, Bar, Shapes,	
Cross Sectional, Length, Straightness and Twist	Page 282
Angle, Radii, Surface Roughness	Page 283
Tolerances—Tubing	
Minimum Section Thickness	Page 283
Manufacturing Limits	Page 283
Diameter, Wall Thickness and Length	Page 284
Straightness, Twist, Angle, Radii, Surface Roughness	Page 285



Narrow gauge railroad track and rail car cutting across the bays was designed especially for Fullerton to speed the flow of metal to waiting trucks at the shipping docks. Once laid on the rail car by one of the overhead cranes, the metal is loaded and out the door in a matter of a few minutes. Fullerton's customers have the advantage of the most modern processing equipment available.

**Description and information concerning
magnesium may be found in the MAGNESIUM
SHEET SECTION—pages 105 through 132.**

PROPERTIES AND FORMS

form	Dow-metal	condition ¹	nominal composition—per cent						physical properties				
			aluminum	zinc	manganese	rare earths	zirconium	mag-nesium	specific gravity (75°F)	density lb/cu in	melting point°F	thermal conductivity C.G.S. units (212-570°F)	electrical resistivity micrometers (68°F)
sheet ⁴	AZ31B & AZ31C	—F —H24 —O	3.0	1.0	—	—	—	re-main-der	1.77	0.064	1160	0.23	10.0
	M1A	—F —H24 —O	—	—	1.2	—	—		1.76	0.064	1200	0.30	5.0
	AZ31B-AZ31C	—F	3.0	1.0	—	—	—		1.77	0.064	1160	0.23	10.0
extruded bars, rods and solid shapes ⁵	AZ61A	—F	6.5	1.0	—	—	—	re-main-der	1.80	0.065	1145	0.19	12.5
	M1A	—F	—	—	1.2	—	—		1.76	0.064	1200	0.30	5.0
	AZ80A	—F —T5	8.5	0.5	—	—	—		1.80	0.065	1130	0.18	14.5
	ZK60A	—F —T5	—	5.7	—	—	0.55		1.83	0.066	1175	—	—
	AZ31B-AZ31C	—F	3.0	1.0	—	—	—		1.77	0.064	1160	0.23	10.0
	AZ61A	—F	6.5	1.0	—	—	—		1.80	0.065	1145	0.19	12.5
extruded hollow shapes and tubing	M1A	—F	—	—	1.2	—	—	re-main-der	1.76	0.064	1200	0.30	5.0
	ZK60A	—F —T5	—	5.7	—	—	0.55		1.83	0.066	1175	—	—

¹ Condition —T4=solution heat treated. —T6; —T61=solution heat treated and artificially aged. —O=annealed. —H24=hard rolled. —F=as fabricated. —T5=artificially aged.

² Unless otherwise indicated, values are typical.

³ Yield strength is defined as the stress at which the stress-strain curve deviates 0.2% from the modulus line.

CHEMICAL COMPOSITION

Dow-metal	Aluminum	Manganese min.	Zinc.	Zirconium	Rare Earths
AZ81A	7.0-8.1	0.13	0.4-1.0	—	—
AZ91C	8.1-9.3	0.13	0.4-1.0	—	—
C	8.3-9.7	0.10	1.6-2.4	—	—
E K30A	—	—	0.3 max.	0.2 min.	2.5-4.4
E K41A	—	—	0.3 max.	0.40-1.0	3.0-5.0
E Z33A	—	—	2.0-3.5	0.5 min.	2.5-4.0
AZ31C	2.5-3.5	0.20	0.6-1.4	—	—
AZ31B	2.5-3.5	0.20	0.7-1.3	—	—
H	5.3-6.7	0.15	2.5-3.5	—	—
AZ61A	5.8-7.2	0.15	0.4-1.5	—	—
M1A	—	1.20	—	—	—
AZ80A	7.8-9.2	0.15	0.2-0.8	—	—
R	8.3-9.7	0.13	0.4-1.0	—	—
RC	8.3-9.7	0.13	0.4-1.0	—	—
ZK60A	—	—	4.8-6.2	0.45 min.	—

OF MAGNESIUM ALLOYS

mechanical properties ²														
tensile strength 1000 psi		tensile yield strength ³ 1000 psi		elongation in 2"—%		compressive yield strength 1000 psi		shear 1000 psi	bearing strength 1000 psi		hardness		condition ¹	
									ult.	yield	Brinell	Rock-well E		
typ.	min.	typ.	min.	typ.	min.	typ.	min.							
37	32	22	—	21	12	13	—	21	—	—	—	—	—	—F
42	39	32	29	15	4	26	24	23	72	47	73	83	—H24	
37	32	22	15	21	12	16	12 ⁷	21	70	42	56	67	—O	
33	28	—	—	—	8	—	—	—	—	—	—	—	—	—F
36	32	27	22	7	3	18	—	17	—	—	56	67	—H24	
34	28	17	—	16	12	11	—	18	56	28	48	55	—O	
38	35	29	22	15	10	14	12	19	56	33	49	57	—F	
45	40	33	24	16	10	19	14	20	68	41	60	72	—F	
37	32	26	—	11	3	12	—	18	51	28	44	45	—F	
49	43	36	28	11	9	—	17	22	68	48	60	77	—F	
55	48	40	33	7	4	35	28	24	—	—	82	88	—T5	
49	13	38	31	14	5	33	27	27	80	57	75	84	—F	
53	45	44	36	11	4	36	30	26	83	60	82	88	—T5	
36	32	24	16	16	8	12	10	—	—	—	46	51	—F	
41	36	24	16	14	7	16	11	—	—	—	50	60	—F	
35	28	21	—	10	2	9	—	—	—	—	42	41	—F	
46	40	34	28	12	5	25	20	—	—	—	75	84	—F	
50	46	40	38	11	4	29	26	—	—	—	82	88	—T5	

¹ Properties apply to following thickness ranges: FSI-F and M-F=0.080-0.500"; FSI-H24=0.065-0.250"; FSI-O=0.064-0.250"; M-H24 and M-O=0.020-0.250".

² The properties for bars, rods and solid shapes apply to extrusions with a minimum dimension of 1/4" to a 1 1/2" maximum. ZK60A properties are based on sections less than 2 sq. in. in cross-sectional area.

³ Permanent mold casting alloy only.

⁷ FSIW has minimum CYS of 10,000 psi.

OF MAGNESIUM ALLOYS

Calcium	Silicon max.	Copper max.	Nickel max.	Iron max.	Other Imp. Max.	Magnesium
—	0.3	0.10	0.01	—	0.3	Bal.
—	0.3	0.10	0.01	—	0.3	Bal.
—	0.3	0.10	0.01	—	0.3	Bal.
—	—	—	—	—	0.3	Bal.
—	—	—	—	—	0.3	Bal.
—	—	—	—	—	0.3	Bal.
0.04 max.	0.3	0.10	0.03	—	0.3	Bal.
0.04 max.	0.3	0.05	0.005	0.005	0.3	Bal.
—	0.3	0.10	0.01	—	0.3	Bal.
—	0.3	0.05	0.005	0.005	0.3	Bal.
0.08-0.14	0.3	0.05	0.01	—	0.3	Bal.
—	0.3	0.05	0.005	0.005	0.3	Bal.
—	0.5	0.10	0.01	—	0.3	Bal.
—	0.5	0.3	0.01	—	0.3	Bal.
—	—	—	—	—	0.3	Bal.

ROUND RODS—sizes and weights

Size inches	Weight lbs/ft	Size inches	Weight lbs/ft	Size inches	Weight lbs/ft	Size inches	Weight lbs/ft
¼	0.038	1 ¹ / ₁₆	0.681	1 ¹ / ₂	1.98	3 ¹ / ₈	5.89
⅜	0.059	1 ¹ / ₈	0.763	1 ³ / ₈	2.12	3 ¹ / ₄	6.37
½	0.084	1 ³ / ₁₆	0.852	1 ⁵ / ₁₆	2.26	3 ³ / ₈	6.87
⅝	0.115	1 ¹ / ₄	0.945	2	2.41	3 ¹ / ₂	7.39
¾	0.151	1 ⁵ / ₁₆	1.04	2 ¹ / ₁₆	2.73	3 ⁵ / ₈	7.91
7 ¹ / ₁₆	0.190	1 ³ / ₈	1.14	2 ¹ / ₄	3.06	3 ³ / ₄	8.45
1	0.236	1 ⁷ / ₁₆	1.24	2 ³ / ₈	3.40	3 ⁷ / ₈	9.06
1 ¹ / ₁₆	0.285	1 ¹ / ₂	1.36	2 ¹ / ₂	3.77	4	9.68
1 ¹ / ₈	0.339	1 ⁹ / ₁₆	1.47	2 ⁵ / ₈	4.15	4 ¹ / ₄	10.9
1 ³ / ₁₆	0.398	1 ⁵ / ₈	1.59	2 ³ / ₄	4.56	4 ¹ / ₂	12.2
1 ¹ / ₄	0.462	1 ¹¹ / ₁₆	1.72	2 ⁷ / ₈	4.98	4 ³ / ₄	13.6
1 ³ / ₈	0.530	1 ³ / ₄	1.84	3	5.43	5	15.1
1	0.603						

SQUARE BARS—sizes and weights

Size inches	Weight lbs/ft	Size inches	Weight lbs/ft	Size inches	Weight lbs/ft	Size inches	Weight lbs/ft
¼	0.048	¾	0.300	1 ¹ / ₄	1.20	2 ¹ / ₂	4.89
⅜	0.075	7 ⁸ / ₁₆	0.432	1 ¹ / ₂	1.73	3	6.91
½	0.108	1	0.588	1 ³ / ₄	2.38	3 ¹ / ₂	9.37
⅝	0.147		0.768	2	3.07	4	12.3
¾	0.192						

HEXAGONAL BARS—sizes and weights

Size across flats inches	Weight lbs/ft	Size across flats inches	Weight lbs/ft	Size across flats inches	Weight lbs/ft	Size across flats inches	Weight lbs/ft
¼	0.041	¾	0.259	1 ¹ / ₄	1.04	2 ¹ / ₂	4.15
⅜	0.064	7 ⁸ / ₁₆	0.374	1 ¹ / ₂	1.50	3	5.98
½	0.094	1	0.509	1 ³ / ₄	2.03	3 ¹ / ₂	8.14
⅝	0.127		0.665	2	2.66	4	10.6
¾	0.166						



MAGNESIUM ROD, BAR AND EXTRUSIONS

RECTANGULAR BARS—sizes and weights

width inches	thickness— inches												
	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1	1 1/8	
3/16	0.018												
1/4	0.024	0.036											
5/16	0.030	0.045	0.060										
3/8	0.036	0.054	0.072	0.090									
7/16	0.042	0.063	0.084	0.105	0.126								
1/2	0.048	0.072	0.096	0.120	0.144	0.168							
5/8	0.060	0.090	0.120	0.150	0.180	0.210	0.240						
3/4	0.072	0.108	0.144	0.180	0.210	0.252	0.288	0.360					
7/8	0.084	0.126	0.168	0.210	0.252	0.294	0.336	0.420	0.504				
1	0.096	0.144	0.192	0.240	0.288	0.336	0.384	0.480	0.576	0.672			
1 1/8	0.108	0.162	0.216	0.270	0.324	0.378	0.432	0.540	0.648	0.756	0.864		
1 1/4	0.120	0.180	0.240	0.300	0.360	0.420	0.480	0.600	0.720	0.840	0.960	1.08	
1 3/8	0.132	0.198	0.264	0.330	0.396	0.462	0.528	0.660	0.792	0.924	1.06	1.19	
1 1/2	0.144	0.216	0.288	0.360	0.432	0.504	0.576	0.720	0.864	1.01	1.15	1.30	
1 5/8	0.156	0.234	0.312	0.390	0.468	0.546	0.624	0.780	0.936	1.09	1.25	1.40	
1 3/4	0.168	0.252	0.336	0.420	0.504	0.588	0.672	0.840	1.01	1.18	1.34	1.51	
1 7/8	0.180	0.270	0.360	0.450	0.540	0.630	0.720	0.900	1.08	1.26	1.44	1.62	
2	0.192	0.288	0.384	0.480	0.576	0.672	0.768	0.960	1.51	1.34	1.54	1.73	
2 1/4	0.216	0.324	0.432	0.540	0.648	0.756	0.864	1.08	1.30	1.51	1.73	1.94	
2 1/2	0.240	0.360	0.480	0.600	0.720	0.840	0.960	1.20	1.44	1.68	1.92	2.16	
2 3/4	0.264	0.396	0.528	0.660	0.792	0.924	1.06	1.32	1.58	1.85	2.11	2.38	
3	0.288	0.432	0.576	0.720	0.864	1.01	1.15	1.44	1.73	2.02	2.30	2.59	
3 1/2	0.336	0.504	0.672	0.840	1.01	1.18	1.34	1.68	2.02	2.35	2.69	3.02	
4	0.384	0.576	0.768	0.960	1.15	1.34	1.54	1.92	2.30	2.67	3.07	3.46	
4 1/2		0.648	0.864	1.08	1.30	1.51	1.73	2.16	2.59	3.02	3.46	3.89	
5		0.720	0.960	1.20	1.44	1.68	1.92	2.40	2.88	3.36	3.84	4.32	
5 1/2			1.06	1.32	1.58	1.84	2.11	2.64	3.17	3.70	4.22	4.75	
6			1.15	1.44	1.73	2.02	2.30	2.88	3.46	4.03	4.61	5.18	
7			1.34	1.68	2.20	2.35	2.69	3.36	4.03	4.70	5.38	6.05	
8			1.54	1.92	2.30	2.69	3.07	3.84	4.61	5.38	6.14	6.91	
9					2.59	3.02	3.46	4.32	5.18	6.05	6.91	7.78	
10					2.88	3.36	3.84	4.80	5.76	6.72	7.68	8.64	
11							4.22	5.28	6.34	7.39	8.45	9.50	

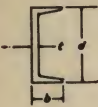
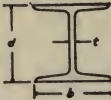
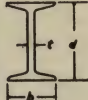
For FSI—Multiply by 1.005.

ROUND MAGNESIUM TUBING—sizes and weights

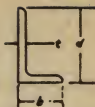
o. d. in.	wall thickness—inches and Stubs gauge no.															1.0 1	
	.028	.035	.049	.065	.094	.125	.156	.187	.250	.312	.375	.500	.625	.750	.875		
	22	20	18	16	$\frac{3}{32}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$			
$\frac{1}{4}$	0.015	0.018	0.024	0.031													
$\frac{3}{8}$	0.023	0.029	0.039	0.049	0.063												
$\frac{1}{2}$	0.031	0.040	0.053	0.069	0.092	0.113											
$\frac{5}{8}$	0.039	0.051	0.067	0.088	0.120	0.150	0.176										
$\frac{3}{4}$	0.048	0.062	0.082	0.108	0.148	0.189	0.223	0.255									
$\frac{7}{8}$		0.073	0.096	0.127	0.176	0.226	0.271	0.312									
1	0.084	0.111	0.147	0.204	0.264	0.318	0.369	0.452									
1 $\frac{1}{8}$		0.126	0.166	0.232	0.302	0.364	0.425	0.526									
1 $\frac{1}{4}$		0.140	0.186	0.261	0.340	0.412	0.483	0.601	0.708								
1 $\frac{3}{8}$			0.206	0.289	0.377	0.459	0.540	0.675	0.802								
1 $\frac{1}{2}$			0.225	0.317	0.415	0.507	0.596	0.750	0.896	1.02							
1 $\frac{3}{4}$			0.245	0.345	0.453	0.555	0.653	0.825	0.993	1.13							
1 $\frac{3}{8}$			0.265	0.373	0.490	0.602	0.709	0.899	1.09	1.24							
1 $\frac{7}{8}$				0.401	0.527	0.649	0.766	0.973	1.18	1.36							
2				0.430	0.564	0.696	0.822	1.06	1.27	1.47	1.81						
2 $\frac{1}{4}$				0.487	0.639	0.790	0.935	1.21	1.46	1.70	2.11						
2 $\frac{1}{2}$				0.543	0.714	0.884	1.04	1.36	1.65	1.92	2.42	2.83					
2 $\frac{3}{4}$				0.599	0.788	0.978	1.15	1.51	1.84	2.15	2.71	3.20					
3					0.862	1.07	1.27	1.61	2.03	2.38	3.02	3.58	4.08				
3 $\frac{1}{4}$					0.936	1.16	1.37	1.81	2.22	2.60	3.32	3.96	4.53				
3 $\frac{1}{2}$					1.02	1.26	1.49	1.96	2.40	2.83	3.62	4.34	4.98	5.55			
3 $\frac{3}{4}$					1.10	1.35	1.61	2.11	2.60	3.06	3.92	4.72	5.43	6.07			
4						1.45	1.72	2.26	2.78	3.28	4.22	5.09	5.88	6.60	7.23		
4 $\frac{1}{2}$						1.63	1.94	2.56	3.16	3.74	4.82	5.85	6.79	7.66	8.42		
5							2.17	2.86	3.54	4.19	5.42	6.60	7.68	8.70	9.62		
5 $\frac{1}{2}$							2.39	3.16	3.91	4.65	6.02	7.36	8.60	9.76	10.84		
6								3.46	4.29	5.10	6.62	8.11	9.50	10.80	12.06		

weight—lbs/ft

STANDARD STRUCTURAL SHAPES—SIZES AND WEIGHTS

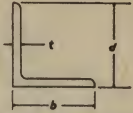
Shape	Size—Inches			Weight lbs./ft.	Shape	Size—Inches			Weight lbs./ft.
	d	b	t			d	b	t	
Channels 	3	1.41	0.170	0.929	H-beams 	4	4.00	0.313	3.07
		1.50	0.258	1.13		5	5.00	0.313	4.21
		1.60	0.356	1.35		6	5.94	0.250	5.10
	4	1.58	0.180	1.21	I-beams 	3	2.33	0.170	1.28
		1.65	0.247	1.41			2.51	0.349	1.70
		1.72	0.320	1.64		4	2.66	0.190	1.73
	5	1.75	0.190	1.51			2.72	0.253	1.92
		1.89	0.325	2.03			2.87	0.400	2.37
		2.03	0.472	2.60		5	3.00	0.210	2.24
	6	1.92	0.200	1.84			3.28	0.494	3.33
1.95		0.225	1.96	6		3.33	0.230	2.81	
2.03		0.314	2.37			3.44	0.343	3.33	
2.16		0.437	2.93	7		3.66	0.250	3.44	
7	2.09	0.210	2.20		3.76	0.345	3.96		
	2.11	0.230	2.31	8	4.00	0.414	4.15		
	2.19	0.314	2.76	Zees	3	2.687	0.250	1.55	
	2.30	0.419	3.52			2.687	0.375	2.21	
	2.51	0.629	4.45		4	3.062	0.250	1.86	
8	2.29	0.250	2.78			5	3.25	0.500	4.05
	2.34	0.303	3.10						
	2.44	0.395	3.68						
	2.53	0.487	4.23						
9	2.43	0.230	3.00						
	2.65	0.448	4.52						
10	2.60	0.240	3.45						
	2.89	0.526	5.64						

UNEQUAL ANGLES—SIZES AND WEIGHTS



Size—Inches			Weight lbs./ft.	Size—Inches			Weight lbs./ft.
d	b	t		d	b	t	
¾	¾	⅜	0.149	3	2½	⅜	0.799
1	¾	¼	0.264			¼	1.01
1¼	¾	⅜	0.138			⅜	1.24
		⅝	0.184	⅝	1.47		
1¼	1	⅝	0.207	3½	2½	¼	1.10
1½	¾	⅝	0.207			⅜	1.36
		¾	0.292			⅝	1.61
1½	1	¾	0.284	3½	3	½	2.10
		⅝	0.430			¾	1.21
1½	1¼	⅝	0.253	4	3	¼	1.33
		¾	0.370			⅜	1.61
		¾	0.484			⅝	1.91
1¾	1¼	⅝	0.276	4	3	¾	2.20
		¾	0.405			½	2.50
		¾	0.530			¾	3.06
2	1½	⅝	0.322	4	3½	⅝	2.04
		¾	0.476	5	3	½	2.68
		¾	0.622			¾	2.19
2½	1½	¾	0.554	5	3½	⅝	1.97
		¾	0.722			¾	2.34
		¾	0.891			¾	2.71
2½	2	⅝	0.422	5	3½	½	3.07
		¾	0.626			⅝	3.87
		¾	0.822			¾	2.21
		¾	1.01			¾	2.63
3	2	¾	1.19	6	4	½	3.46
		¾	0.699			¾	2.76
		¾	0.914			¾	3.21
		¾	1.13			½	3.64
		¾	1.34			¾	4.07
¾	1.54	¾	4.49				
						¾	5.32

EQUAL ANGLES—SIZES AND WEIGHTS



Size—Inches				Size—Inches					
d	b	t	Weight lbs./ft.	d	b	t	Weight lbs./ft.		
1/2	1/2	1/16	0.045	3	3	3/16	0.845		
						1/4	1.10		
3/8	5/8	1/16	0.057			5/16	1.36		
						3/8	1.61		
						7/16	1.86		
						1/2	2.10		
3/4	3/4	1/16	0.068	3 1/2	3 1/2	1/4	1.30		
		3/32	0.101			5/16	1.61		
		1/8	0.131			3/8	1.91		
		3/16	0.188			1/2	2.50		
1	1	3/32	0.136	4	4	1/4	1.51		
		1/8	0.180			5/16	1.85		
		3/16	0.261			3/8	2.20		
		1/4	0.336			7/16	2.54		
						1/2	2.88		
1 1/4	1 1/4	1/8	0.230			5/16	3.22		
		3/16	0.334			3/8	3.53		
		1/4	0.430			1 1/16	3.86		
1 1/2	1 1/2	1/8	0.276			3/4	4.18		
		3/16	0.407			5	5	3/8	2.76
		1/4	0.530					7/16	3.21
1 3/4	1 3/4	1/8	0.325			1/2	3.64		
		3/16	0.478			5/8	4.49		
		1/4	0.622			6	6	3/8	3.34
		5/16	0.768					7/16	3.88
2	2	1/8	0.377			1/2	4.41		
		3/16	0.553			5/8	5.45		
		1/4	0.725						
		5/16	0.883						
		3/8	1.05						
2 1/2	2 1/2	1/8	0.476						
		3/16	0.698						
		1/4	0.914						
		5/16	1.13						
		3/8	1.34						

CROSS SECTIONAL DIMENSIONS—BARS, RODS AND SHAPES

cross-sectional tolerance—inch plus or minus

specified dimension inches	at dimension points where 75 per cent or more of the dimension is metal		at dimension points where more than 25 per cent of the dimension is space,			
	all except those covered by column 3	wall thickness completely enclosing space 0.11 sq. in. and over	0.250-0.624 inch from base of leg	0.625-1.249 inches from base of leg	1.250-2.499 inches from base of leg	2.500 in. or more from base of leg
column 1	column 2	column 3	column 4	column 5	column 6	column 7
thru 0.124	0.006		0.010	0.012	0.014	0.016
0.125- 0.249	0.007		0.012	0.014	0.016	0.020
0.250- 0.499	0.008		0.014	0.016	0.018	0.022
0.500- 0.749	0.009		0.016	0.018	0.020	0.026
0.750- 0.999	0.010	Plus or minus	0.018	0.020	0.022	0.030
1.000- 1.499	0.012	10 per cent	0.020	0.022	0.026	0.034
1.500- 1.999	0.016	max. 0.060	0.024	0.028	0.034	0.050
2.000- 3.999	0.024	min. 0.010	0.032	0.036	0.048	0.064
4.000- 5.999	0.034		0.042	0.050	0.064	0.088
6.000- 7.999	0.044		0.054	0.062	0.082	0.112
8.000- 9.999	0.054		0.064	0.074	0.100	0.136
10.000-11.999	0.064		0.074	0.088	0.116	0.160
12.000-13.999	0.074		0.084	0.100	0.134	0.184
14.000-14.999	0.080		0.090	0.106	0.142	0.196

¹ The tolerance applicable to a dimension composed of two or more component dimensions is the sum of the tolerances of the component dimensions if all the component dimensions are indicated.

² At points less than 0.250 in. from base of leg, tolerances in Column 2 apply.

³ Where space is completely enclosed, tolerances in Column 4 apply.

⁴ Where outside and inside dimensions rather than wall thickness are specified, tolerances in Column 3 apply to mean wall thickness.

LENGTH—BARS, RODS AND SHAPES

Specified Length—Feet	Tolerance—Inch, Plus Only
up to 10	1/8
10 to 30	1/4
30 and up	1/2

STRAIGHTNESS—BARS, RODS AND SHAPES

Circumscribed Circle Diameter ¹ —Inches	Minimum Thickness Inches	Tolerance ² Inch Per Foot
thru 1.499	thru 0.094	0.0500
thru 1.499	0.095 and up	0.0125
1.500 and up	—	0.0125

¹ The smallest circle that will completely enclose the shape.

² When weight of shape on flat surface minimizes deviation.

TWIST—BARS, RODS AND SHAPES

Circumscribed Circle Diameter ¹ —Inches	Tolerance—Degrees	
	Per Foot	Total
thru 1.499 (flexible sections) ²	1	—
thru 1.499	1/2	7
1.500-2.999	1/2	5
3.000 and up	1/4	3

¹ The smallest circle that will completely enclose the shape.

² Those that can be pushed easily to a supporting surface.

ANGLE—BARS, RODS AND SHAPES

Thickness of Thinnest Leg Inches	Leg Angle Tolerance Degrees, Plus or Minus
thru 0.187	2
0.188 to 0.749	1½
0.750 to solid	1

CORNER AND FILLET RADII—BARS, RODS AND SHAPES

Specified Radius—Inches	Tolerance—Inch
sharp corners	±¼
thru 0.187	±¼
0.188 and up	±10%

SURFACE ROUGHNESS—BARS, RODS AND SHAPES

Section Thickness Inches	Maximum Permissible Depth of Defect ¹ Inch
thru 0.063	0.0015
0.064-0.125	0.002
0.126-0.188	0.0025
0.189-0.250	0.003
0.251 and up	0.004

¹ Includes die marks, handling marks, and polishing marks.

MINIMUM SECTION THICKNESS IN MAGNESIUM TUBING

circumscribed circle diameter—inches	Dow metal			
	M	FS1	ZK60A	01 & J1
1	0.035	0.040	0.040	0.040
2	0.040	0.045	0.045	0.050
3	0.045	0.050	0.055	0.060
4	0.050	0.060	0.062	0.070
5	0.060	0.065	0.078	0.078
6	0.070	0.080	0.085	0.094
7	0.095	0.095	0.100	0.109
8	0.105	0.120	0.125	0.125
10	0.125	0.140	0.150	0.156
12	0.160	0.190	0.200	0.200

MANUFACTURING LIMITS ON MAGNESIUM TUBING

alloy	D/t ratio		minimum wall thickness inches
	minimum	maximum	
FS	4	30	0.028
FS1	4	30	0.028
J1	4	22	0.028
M	4	32	0.028
ZK60A	4	32	0.028

D = Diameter of round tubes or perimeter of other tubes in inches/3.14

t = Wall thickness in inches.

DIAMETER, ROUND TUBING

Specified Outside Or ¹ Inside Diameter—Inches	Tolerance		
	Deviation At Any Point—Inch±	Ovality At Any Point ¹	
		D/t thru 20	D/t more than 20 ²
thru 0.500	0.008	0.008	0.016
0.501—1.000	0.010	0.010	0.020
1.001—2.000	0.015	0.015	0.025
2.001—3.000	0.018	0.018	0.030
3.001—4.000	0.023	0.023	0.030
4.001—5.000	0.027	0.027	0.050
5.001—6.000	0.031	0.031	0.050
6.001—10.000	Subject to Special Quote		

¹ Ovality or "out of roundness" tolerance for round tubing is the difference in two diameters measured at right angles. In no case can an individual reading exceed the limits set by the first column.

² See Table 9.

WALL THICKNESS—ROUND TUBING

Specified Wall Thickness Inches	Wall Thickness Tolerance—Inch, Plus or Minus ^{2, 3}			
	Allowable Deviation At Any Point From Mean ¹ Wall Thickness			Allowable Deviation At Any Point From Specified Wall Thickness
	Outside Diameter—Inches			
	thru 2.99	3.00—4.99	5.00 and up	
thru 0.062	0.007	0.008	0.010	10%
0.063—0.124	0.008	0.010	0.015	of
0.125—0.249	0.009	0.013	0.020	wall
0.250—0.374	0.011	0.016	0.025	thickness
0.375—0.499	0.015	0.021	0.035	0.060 max.
0.500—0.749	0.020	0.028	0.045	0.010 min.
0.750—0.999	—	0.035	0.055	
1.000—1.499	—	0.045	0.065	

¹ Mean wall thickness is the average of two measurements taken on opposite walls.

² When outside diameter, inside diameter, and wall thickness are all specified, standard tolerances apply to any two dimensions, but not to all three.

³ Tolerances other than these are as agreed upon with the customer.

LENGTH—ALL TUBING

Specified Length—Feet	Tolerance—Inch—Plus Only		
	Specified Outside Diameter—Inches		
	thru 2.999	3.000 to 7.999	8.000 and up
thru 9.99	1/8	3/16	1/4
10.00-29.99	3/16	1/4	3/8
30 and up	1/4	3/8	1/2

STRAIGHTNESS—ALL TUBING

Specified Outside Diameter or Greatest Distance Across Flats—Inches	Tolerance—Inch Per Foot of Length
thru 5.999	0.010
6.000 and up	0.020

TWIST—ALL TUBING

Specified Greatest Distance Across Flats Inches	Tolerance	
	Degree Per Foot	Degrees Total
thru 1.499 (flexible section) ¹	1	—
thru 1.499	½	7
1.500—2.999	½	5
3.000 and up	¼	3

¹ Those that can be pushed easily to a supporting surface.

ANGLE—ALL TUBING

Thickness of Thinnest Leg Inches	Leg Angle Tolerance Degrees, Plus or Minus
thru 0.187	2
0.188 to 0.749	1½
0.750 to solid	1

CORNER RADII—ALL TUBING

Specified Radius—Inches	Tolerance—Inch
sharp corners	+¼
thru 0.187	±¼
0.188 and up	±10%

SURFACE ROUGHNESS—ALL TUBING

Wall Thickness—Inches	Maximum Permissible Depth of Defect ¹ —Inch
thru 0.063	0.0015
0.064—0.125	0.002
0.126—0.188	0.0025
0.189—0.250	0.003
0.251 and up	0.004

¹ Includes die marks, handling marks and polishing marks.

STAINLESS STEEL



ROUNDS
SQUARES
FLATS
HEXAGONS

STAINLESS STEEL

INDEX

Classifications and Description.....	Page 289
Types and Analyses.....	Page 290
Estimated Weights in Pounds per Lineal Foot	
Rounds, Squares, Hexagons.....	Page 291
Flats.....	Page 292
Hardenable Chromium Martensitic Type Chart.....	Page 294
Physical and Mechanical Properties.....	Page 296
Heat Treatment.....	Page 298
High Temperature Strength.....	Page 299
Machining Rates.....	Page 300
Commercial Tolerances—	
Round and Square.....	Page 302
Government Specifications—	
Federal and Aeronautical.....	Page 303
Military.....	Page 304

CLASSIFICATION

Austenitic Group I. Austenitic stainless steels are "chrome-nickel" alloys. They have high tensile strength, ductility and corrosion resistance. They can be hardened by cold working; they are not hardenable by heat treating. Types 302, 304, 321, 347, 316, 303, 309, 310 are examples of this group. In the annealed condition these steels are non-magnetic. Sometimes after severe cold working, these alloys will respond slightly to magnetism; however, they will not respond to magnaflux tests.

Ferritic Group II. Ferritic or "straight chrome" alloys contain a minimum of 14% chromium and they also do not respond to hardening by heat treatment. They have good ductility in the annealed condition and may be cold formed readily. They are not as ductile as the Austenitic types, however. Examples of Ferritic alloys are type 430 and type 446. These alloys respond to magnetism (are magnetic).

Martensitic Group III. Martensitic stainless and heat resisting steels may be hardened by heat treatment—thereby developing high physical strength and toughness. Some of these alloys are fully corrosion resistant only in the heat treated condition. Types 410, 405, 416, 501, 502 are examples of Martensitic alloys. These alloys are magnetic as in the case of Group II above.

MACHINABILITY OF ROD & BAR

It is suggested that if the end use permits, it is advisable to select a "free machining" grade of stainless steel wherever possible. These "free machining" grades have been developed for use in automatic screw machines. Specifically these grades are types 303, 416, 420F, 430F, 440F.

STAINLESS AND HEAT RESISTING STEEL BARS AND WIRES

Analysis, types and shapes of stainless and heat resisting steels listed in this section are normally available from our stocks, or from our mill sources upon application. These products are subject to normal commercial practices of the industry with regard to variations from standard within the allowable limits for chemical and physical properties, workmanship, etc.

AIRCRAFT QUALITY

We are prepared to furnish exact chemistry and physical properties of all stainless and heat resisting products with certifications to applicable government specifications.

CUTTING TO LENGTH—RANDOM LENGTH

In cutting to multiple lengths, we will add $\frac{1}{4}$ -in. for each multiple unless otherwise specified. Random lengths carry a permissible length variation of not less than 24-in. Any length tolerance specified or required less than 24-in. is subject to applicable extras.

STAINLESS STEELS—STANDARD TYPES AND ANALYSES

AISI Type Number	Carbon Per Cent	Manganese Per Cent	Silicon Per Cent	Phosphorus Per Cent	Sulphur Per Cent	Chromium Per Cent	Nickel Per Cent	Other Elements Per Cent	Similar SAE Number
301	Over 0.08/0.20	2.00	1.00	0.040	0.030	16.00/18.00	6.00/8.00	—	30301
302	Over 0.08/0.20	2.00	1.00	0.040	0.030	17.00/19.00	8.00/10.00	—	30302
303	0.15 Max.	2.00	1.00	—	—	17.00/19.00	8.00/10.00	P, S, Se Min. 0.07 Zr, Mo Max. 0.60	30303F
304	0.08 Max.	2.00	1.00	0.040	0.030	18.00/20.00	8.00/11.00	—	30304
304ELC	0.03 Max.	2.00	1.00	0.040	0.030	18.00/20.00	8.00/11.00	—	—
305	0.12 Max.	2.00	1.00	0.040	0.030	17.00/19.00	10.00/13.00	—	30305
308	0.20 Max.	2.00	1.50	0.040	0.030	22.00/24.00	12.00/15.00	—	30309
310	0.25 Max.	2.00	1.50	0.040	0.030	24.00/26.00	19.00/22.00	—	30310
316	0.10 Max.	2.00	1.00	0.040	0.030	16.00/18.00	10.00/14.00	Mo 2.00/3.00	30316
316ELC	0.03 Max.	2.00	1.00	0.040	0.030	16.00/18.00	10.00/14.00	Mo 2.00/3.00	—
317	0.10 Max.	2.00	1.00	0.040	0.030	18.00/20.00	11.00/14.00	Mo 3.00/4.00	30317
321	0.08 Max.	2.00	1.00	0.040	0.030	17.00/19.00	8.00/11.00	Ti 5xC Min.	30321
329	0.10 Max.	2.00	1.00	0.040	0.030	25.00/30.00	3.00/5.00	Mo 1.00/1.50	—
347	0.08 Max.	2.00	1.00	0.040	0.030	17.00/19.00	9.00/12.00	Cb+Ta 10xC Min.	30347
17-4PH	0.05	1.00	1.00	0.040	0.030	16.50	4.00	Cu 4.00	—
17-7PH	0.07	1.00	1.00	0.040	0.030	17.00	7.00	Al 1.00	—
403	0.15 Max.	1.00	0.50	0.040	0.030	11.50/13.00	—	Turbine Quality	—
405	0.08 Max.	1.00	1.00	0.040	0.030	11.50/13.50	—	Al 0.10/0.30	—
410	0.15 Max.	1.00	1.00	0.040	0.030	11.50/13.50	—	—	51410
414	0.15 Max.	1.00	1.00	0.040	0.030	11.50/13.50	1.25/2.50	—	51414
416	0.15 Max.	1.25	1.00	—	—	12.00/14.00	—	—	51416F
420	Over 0.15	1.00	1.00	0.040	0.030	12.00/14.00	—	P, S, Se Min. 0.07 Zr, Mo Max. 0.60	51420
430	0.12 Max.	1.00	1.00	0.040	0.030	14.00/18.00	—	—	51430
430F	0.12 Max.	1.25	1.00	—	—	14.00/18.00	—	P, S, Se Min. 0.07 Zr, Mo Max. 0.60	51430F
431	0.20 Max.	1.00	1.00	0.040	0.030	15.00/17.00	1.25/2.50	—	51431
440A	0.60/0.75	1.00	1.00	0.040	0.030	16.00/18.00	—	Mo 0.75 Max.	51440A
440C	0.95/1.20	1.00	1.00	0.040	0.030	16.00/18.00	—	Mo 0.75 Max.	51440C
440F	0.95/1.20	1.00	1.00	0.040	0.030	16.00/18.00	—	Su 0.05-0.10	51440F
442	0.25 Max.	1.00	1.00	0.040	0.030	16.00/23.00	—	—	51442
446	0.35 Max.	1.50	1.00	0.040	0.030	23.00/27.00	—	N 0.25 Max.	51446
501	Over 0.10	1.00	1.00	0.040	0.030	4.00/6.00	—	—	—
502	0.10 Max.	1.00	1.00	0.040	0.030	4.00/6.00	—	—	51501

STAINLESS STEEL BARS AND WIRE
ESTIMATED WEIGHTS IN POUNDS PER LINEAL FOOT

Inches	Round	Hexagon	Square	Inches	Round	Hexagon	Square
1/4	.0006519	.0007188	.0008300	1 1/2	2.839	3.131	3.615
1/32	.002607	.002875	.003320	1 1/6	3.015	3.324	3.838
3/64	.005867	.006470	.007470	1 3/32	3.194	3.522	4.067
1/16	.01043	.01150	.01328	1 1/8	3.380	3.726	4.303
5/64	.01630	.01797	.02075	1 5/32	3.570	3.936	4.545
3/32	.02347	.02588	.02988	1 3/16	3.766	4.152	4.795
7/64	.03194	.03522	.04067	1 7/32	3.966	4.373	5.050
1/8	.04172	.04601	.05312	1 1/4	4.172	4.601	5.313
9/64	.05280	.05823	.06723	1 9/32	4.383	4.833	5.581
5/32	.06519	.07189	.08300	1 5/16	4.600	5.072	5.857
1 1/64	.07888	.08698	.1004	1 11/32	4.822	5.317	6.139
3/16	.09387	.1035	.1195	1 5/8	5.049	5.567	6.428
13/64	.1102	.1215	.1403	1 13/32	5.281	5.823	6.724
7/32	.1278	.1409	.1627	1 7/16	5.518	6.084	7.026
15/64	.1467	.1617	.1868	1 5/8	5.761	6.352	7.335
1/4	.1669	.1840	.2125	1 1/2	6.009	6.626	7.650
17/64	.1884	.2077	.2399	1 9/16	6.519	7.188	8.301
9/32	.2112	.2329	.2689	1 3/4	7.051	7.774	8.978
19/64	.2353	.2595	.2996	1 11/16	7.604	8.384	9.682
5/16	.2607	.2875	.3320	1 3/4	8.178	9.017	10.41
21/64	.2874	.3170	.3660	1 13/16	8.773	9.673	11.17
11/32	.3155	.3479	.4017	1 7/8	9.388	10.35	11.95
23/64	.3448	.3803	.4391	1 5/8	10.02	11.05	12.76
3/8	.3755	.4141	.4781	2	10.68	11.78	13.50
25/64	.4074	.4493	.5187	2 1/16	11.36	12.52	14.46
13/32	.4406	.4859	.5611	2 1/8	12.06	13.30	15.35
27/64	.4752	.5240	.6051	2 1/16	12.78	14.09	16.27
7/16	.5111	.5636	.6507	2 1/4	13.52	14.91	17.21
29/64	.5482	.6046	.6980	2 5/16	14.28	15.74	18.18
15/32	.5867	.6470	.7470	2 3/8	15.06	16.61	19.18
31/64	.6264	.6908	.7976	2 7/16	15.87	17.49	20.20
1/2	.6675	.7361	.8499	2 1/2	16.69	18.40	21.25
33/64	.7099	.7828	.9038	2 9/16	17.53	19.33	22.33
17/32	.7536	.8310	.9595	2 5/8	18.40	20.29	23.43
35/64	.7985	.8806	1.017	2 11/16	19.29	21.27	24.56
9/16	.8448	.9216	1.076	2 3/4	20.20	22.27	25.71
37/64	.8924	.9814	1.136	2 13/16	21.12	23.29	26.90
19/32	.9413	1.038	1.198	2 7/8	22.07	24.34	28.10
39/64	.9915	1.093	1.262	2 5/8	23.04	25.41	29.34
3/8	1.043	1.150	1.328	3	24.03	26.50	30.60
41/64	1.096	1.208	1.395	3 1/8	26.08	28.76	33.20
21/32	1.150	1.268	1.464	3 1/4	28.21	31.10	35.91
43/64	1.205	1.329	1.535	3 3/8	30.42	33.54	38.73
11/16	1.262	1.392	1.607	3 1/2	32.71	36.07	41.65
45/64	1.320	1.456	1.681	3 5/8	35.09	38.69	44.68
23/32	1.379	1.521	1.756	3 3/4	37.55	41.40	47.81
47/64	1.440	1.588	1.833	3 7/8	40.10	44.21	51.05
3/4	1.502	1.656	1.913	4	42.73	47.11	54.40
49/64	1.565	1.726	1.993	4 1/4	48.23	53.18	61.41
25/32	1.630	1.797	2.075	4 1/2	54.07	59.62	68.85
51/64	1.696	1.870	2.159	4 3/4	60.25	66.43	76.71
13/16	1.763	1.944	2.245	5	66.76	73.61	85.00
53/64	1.831	2.019	2.331	5 1/4	73.60	81.15	93.71
27/32	1.901	2.096	2.420	5 1/2	80.78	89.07	102.8
55/64	1.972	2.174	2.511	5 3/4	88.29	97.35	112.4
7/8	2.044	2.254	2.603	6	96.13	106.0	122.4
57/64	2.118	2.335	2.697	6 1/2	112.8	124.4	143.7
29/32	2.193	2.418	2.792	7	130.9	144.4	166.6
59/64	2.269	2.502	2.889	7 1/2	150.2	165.6	191.3
15/16	2.347	2.588	2.988	8	170.9	188.4	217.6
61/64	2.426	2.675	3.088	9	216.3	238.5	275.4
31/32	2.506	2.763	3.190	10	267.0	294.4	340.0
63/64	2.587	2.853	3.294	11	323.1	356.3	411.4
1	2.670	2.944	3.400	12	384.5	424.0	489.6

BARS AND WIRE—FLATS

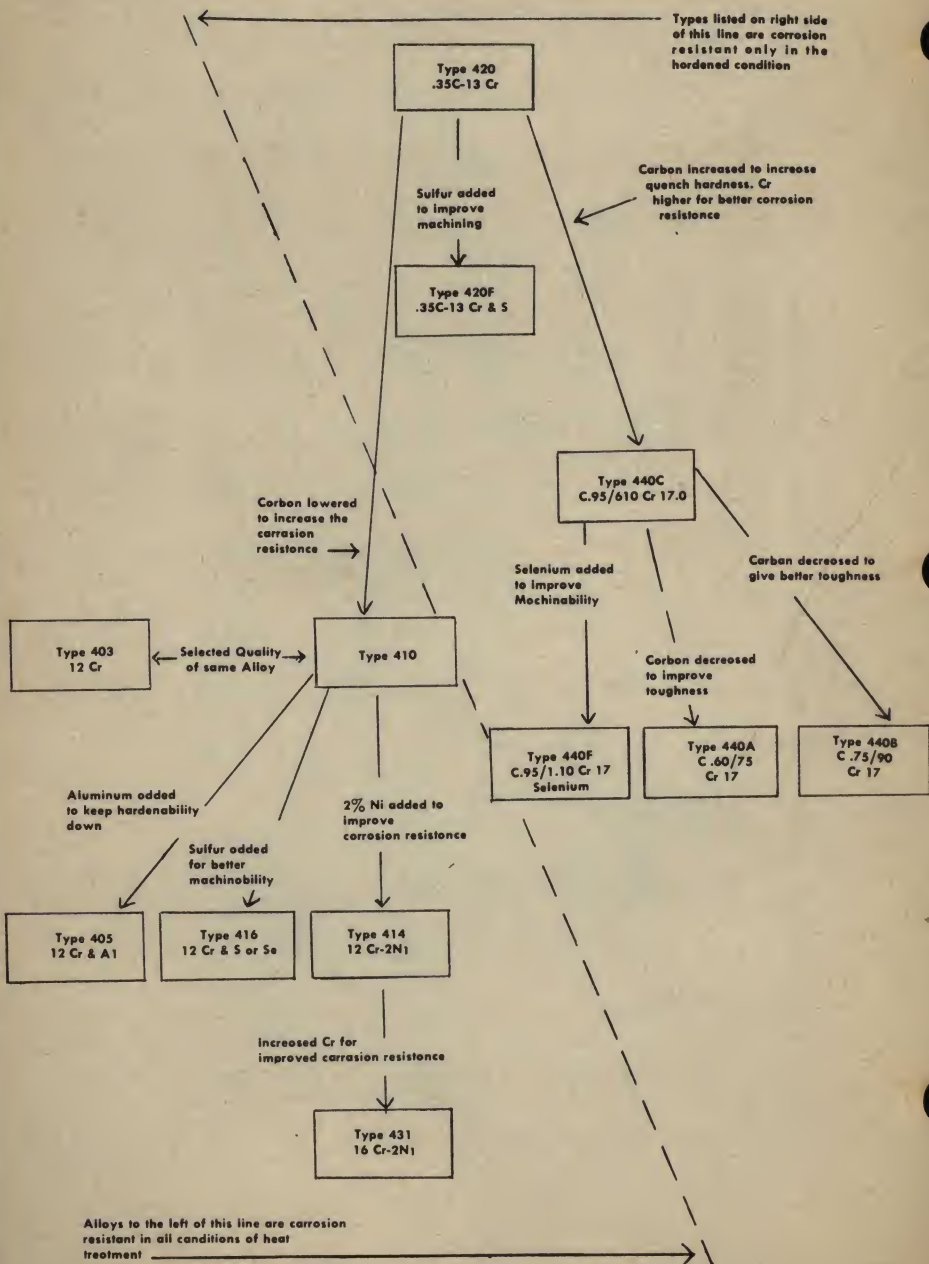
ESTIMATED WEIGHTS IN POUNDS PER LINEAL FOOT

Inches	¼	⅕	⅙	⅛	1/16	3/32	1/8	5/32	3/16	7/32	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	
1/16	.053	.066	.080	.093	.106	.120	.133	.146	.159	.173	.186	.199	.213	.226	.239	.252	.266	.279	.292	.305	.319	.332	.345	.358	.372	.386
3/32	.080	.100	.120	.140	.159	.179	.199	.219	.239	.259	.279	.299	.319	.339	.359	.379	.398	.418	.438	.458	.478	.498	.518	.538	.558	.578
1/8	.106	.133	.159	.186	.213	.239	.266	.292	.319	.345	.372	.398	.425	.451	.478	.505	.531	.558	.584	.611	.638	.664	.691	.718	.744	.771
5/32	.133	.166	.199	.232	.266	.299	.332	.365	.398	.432	.465	.498	.531	.564	.598	.631	.664	.697	.731	.764	.797	.830	.863	.896	.930	.963
3/8	.159	.199	.239	.279	.319	.358	.398	.438	.478	.518	.558	.598	.638	.678	.717	.757	.797	.837	.877	.916	.956	.995	.104	.112	.120	.128
7/16	.213	.266	.319	.372	.425	.478	.531	.584	.638	.691	.744	.797	.850	.903	.956	1.009	1.062	1.115	1.168	1.221	1.274	1.327	1.380	1.433	1.486	1.539
1/2	.266	.332	.398	.465	.531	.598	.664	.731	.797	.863	.930	.996	1.062	1.128	1.194	1.260	1.326	1.392	1.458	1.524	1.590	1.656	1.722	1.788	1.854	1.920
5/8	.319	.398	.478	.558	.638	.717	.797	.877	.956	1.04	1.12	1.20	1.28	1.36	1.44	1.52	1.60	1.68	1.76	1.84	1.92	2.00	2.08	2.16	2.24	2.32
3/4	.372	.465	.558	.651	.744	.837	.930	1.02	1.12	1.21	1.30	1.40	1.49	1.58	1.67	1.76	1.85	1.94	2.03	2.12	2.21	2.30	2.39	2.48	2.57	2.66
7/8	.425	.531	.638	.744	.850	.956	1.06	1.17	1.28	1.38	1.49	1.59	1.70	1.81	1.91	2.01	2.11	2.21	2.31	2.41	2.51	2.61	2.71	2.81	2.91	3.01
1	.478	.598	.717	.837	.956	1.08	1.20	1.32	1.43	1.55	1.63	1.79	1.91	2.05	2.19	2.33	2.46	2.60	2.74	2.88	3.02	3.16	3.30	3.44	3.58	3.72
1 1/8	.531	.664	.797	.930	1.06	1.20	1.33	1.46	1.59	1.73	1.86	1.99	2.13	2.25	2.42	2.59	2.76	2.93	3.10	3.27	3.44	3.61	3.78	3.95	4.12	4.29
1 1/4	.584	.731	.877	1.02	1.17	1.32	1.46	1.61	1.75	1.90	2.05	2.19	2.34	2.49	2.63	2.82	2.99	3.18	3.37	3.56	3.75	3.94	4.13	4.32	4.51	4.70
1 3/8	.638	.797	.956	1.12	1.28	1.43	1.59	1.75	1.91	2.07	2.23	2.39	2.55	2.72	2.89	3.06	3.23	3.41	3.59	3.78	3.96	4.15	4.34	4.53	4.72	4.91
1 1/2	.691	.863	1.04	1.21	1.38	1.55	1.73	1.90	2.07	2.25	2.42	2.59	2.76	2.93	3.11	3.29	3.47	3.65	3.83	4.01	4.19	4.38	4.56	4.75	4.93	5.12
1 5/8	.744	.930	1.12	1.30	1.49	1.67	1.86	2.05	2.23	2.42	2.60	2.79	2.98	3.17	3.35	3.54	3.72	3.91	4.10	4.29	4.48	4.67	4.86	5.05	5.24	5.43
1 3/4	.797	.996	1.20	1.40	1.59	1.79	1.99	2.19	2.39	2.59	2.79	2.99	3.19	3.39	3.59	3.79	3.99	4.19	4.39	4.59	4.79	4.99	5.19	5.39	5.59	5.79
1 7/8	.850	1.06	1.28	1.49	1.70	1.91	2.13	2.34	2.55	2.76	2.98	3.19	3.40	3.61	3.83	4.04	4.25	4.46	4.68	4.89	5.10	5.31	5.52	5.73	5.94	6.15
2	.956	1.20	1.43	1.67	1.91	2.15	2.39	2.63	2.87	3.11	3.35	3.59	3.83	4.07	4.30	4.54	4.78	5.02	5.26	5.49	5.73	5.97	6.21	6.45	6.69	6.93
1 1/4	1.06	1.33	1.59	1.86	2.13	2.39	2.66	2.92	3.19	3.45	3.72	3.98	4.25	4.51	4.78	5.04	5.31	5.58	5.84	6.11	6.38	6.65	6.91	7.18	7.44	7.71
1 1/2	1.17	1.46	1.75	2.05	2.34	2.63	2.92	3.21	3.51	3.80	4.09	4.38	4.68	4.97	5.26	5.55	5.84	6.13	6.42	6.71	7.00	7.29	7.58	7.87	8.16	8.45
1 5/8	1.28	1.59	1.91	2.23	2.55	2.87	3.19	3.51	3.83	4.14	4.46	4.78	5.10	5.42	5.74	6.06	6.38	6.70	7.02	7.34	7.66	7.98	8.30	8.62	8.94	9.26
1 3/4	1.38	1.73	2.07	2.42	2.76	3.11	3.45	3.80	4.14	4.49	4.83	5.18	5.53	5.88	6.22	6.57	6.91	7.26	7.60	7.95	8.29	8.64	8.99	9.34	9.69	10.04
1 7/8	1.49	1.86	2.23	2.60	2.98	3.35	3.72	4.09	4.46	4.83	5.20	5.58	5.95	6.32	6.69	7.06	7.43	7.80	8.17	8.54	8.91	9.28	9.65	10.02	10.39	10.76
2	1.59	1.99	2.39	2.79	3.19	3.59	3.98	4.38	4.78	5.18	5.58	5.98	6.38	6.78	7.17	7.57	7.97	8.37	8.77	9.16	9.56	9.96	10.36	10.76	11.16	11.56
2 1/4	1.70	2.13	2.55	2.98	3.40	3.83	4.25	4.68	5.10	5.53	5.95	6.38	6.80	7.23	7.65	8.08	8.50	8.93	9.35	9.78	10.20	10.62	11.05	11.47	11.90	12.33
2 1/2	1.81	2.29	2.87	3.35	3.83	4.30	4.78	5.26	5.74	6.21	6.69	7.17	7.65	8.12	8.60	9.08	9.56	10.04	10.52	11.00	11.48	11.96	12.44	12.92	13.40	13.88
2 3/4	2.13	2.66	3.19	3.72	4.25	4.78	5.31	5.84	6.38	6.91	7.44	7.97	8.50	9.03	9.56	10.09	10.62	11.15	11.68	12.21	12.74	13.27	13.80	14.33	14.86	15.39
3	2.34	2.92	3.51	4.09	4.68	5.26	5.84	6.43	7.01	7.60	8.18	8.77	9.35	9.94	10.52	11.11	11.69	12.28	12.86	13.45	14.03	14.62	15.20	15.79	16.37	16.96
3 1/2	2.55	3.19	3.83	4.46	5.10	5.74	6.38	7.01	7.65	8.29	8.93	9.56	10.20	10.84	11.48	12.12	12.75	13.39	14.03	14.67	15.30	15.94	16.58	17.22	17.85	18.49

BARS AND WIRE—FLATS
ESTIMATED WEIGHTS IN POUNDS PER LINEAL FOOT (Continued)

Inches	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	4 1/4	4 1/2	4 3/4	5	5 1/4	5 1/2	5 3/4	6	8	10	12
1/16	.425	.478	.531	.584	.638	.691	.744	.797	.850	.903	.956	1.01	1.06	1.12	1.17	1.22	1.28	1.70	2.13	2.55
3/32	.638	.717	.797	.877	.956	1.04	1.12	1.20	1.28	1.36	1.43	1.51	1.59	1.67	1.75	1.83	1.91	2.55	3.19	3.83
1/8	.850	.956	1.06	1.17	1.28	1.38	1.49	1.59	1.70	1.81	1.91	2.02	2.13	2.23	2.34	2.44	2.55	3.40	4.25	5.10
5/32	1.06	1.20	1.33	1.46	1.59	1.73	1.86	1.99	2.13	2.26	2.39	2.52	2.66	2.79	2.92	3.05	3.19	4.25	5.31	6.38
3/16	1.28	1.43	1.59	1.75	1.91	2.07	2.23	2.39	2.55	2.71	2.87	3.03	3.19	3.35	3.51	3.67	3.83	5.10	6.38	7.65
1/4	1.70	1.91	2.13	2.34	2.55	2.76	2.98	3.19	3.40	3.61	3.83	4.04	4.25	4.46	4.68	4.89	5.10	6.80	8.50	10.20
5/16	2.13	2.39	2.66	2.92	3.19	3.45	3.72	3.98	4.25	4.52	4.78	5.05	5.31	5.58	5.84	6.11	6.38	8.50	10.63	12.75
3/8	2.55	2.87	3.19	3.51	3.83	4.14	4.46	4.78	5.10	5.42	5.74	6.06	6.38	6.69	7.01	7.33	7.65	10.20	12.75	15.30
7/16	2.98	3.35	3.72	4.09	4.46	4.83	5.21	5.58	5.95	6.32	6.69	7.07	7.44	7.81	8.18	8.55	8.93	11.90	14.88	17.85
1/2	3.40	3.83	4.25	4.68	5.10	5.53	5.95	6.38	6.80	7.23	7.65	8.08	8.50	8.93	9.35	9.78	10.20	13.60	17.00	20.40
9/16	3.83	4.30	4.78	5.26	5.74	6.22	6.69	7.17	7.65	8.13	8.61	9.08	9.56	10.04	10.52	11.00	11.48	15.30	19.13	22.95
5/8	4.25	4.78	5.31	5.84	6.38	6.91	7.44	7.97	8.50	9.03	9.56	10.09	10.63	11.16	11.69	12.22	12.75	17.00	21.25	25.50
11/16	4.68	5.26	5.84	6.43	7.01	7.60	8.18	8.77	9.35	9.93	10.52	11.10	11.69	12.27	12.86	13.44	14.03	18.70	23.38	28.05
3/4	5.00	5.48	6.38	7.01	7.65	8.29	8.93	9.56	10.20	10.84	11.48	12.11	12.75	13.39	14.03	14.66	15.30	20.40	25.50	30.60
13/16	5.53	6.22	6.91	7.60	8.29	8.98	9.67	10.36	11.05	11.74	12.43	13.12	13.81	14.50	15.19	15.88	16.58	22.10	27.63	33.15
7/8	5.95	6.69	7.44	8.18	8.93	9.67	10.41	11.16	11.90	12.64	13.39	14.13	14.88	15.62	16.36	17.11	17.85	23.80	29.75	35.70
1 1/8	6.38	7.17	7.97	8.77	9.56	10.36	11.16	11.95	12.75	13.55	14.34	15.14	15.94	16.73	17.53	18.33	19.13	25.50	31.88	38.25
1 1/16	6.80	7.65	8.50	9.35	10.20	11.05	11.90	12.75	13.60	14.45	15.30	16.15	17.00	17.85	18.70	19.55	20.40	27.20	34.00	40.80
1 1/8	7.65	8.61	9.56	10.52	11.48	12.43	13.39	14.34	15.30	16.26	17.21	18.17	19.13	20.08	21.04	21.99	22.95	30.60	38.25	45.90
1 1/4	8.50	9.56	10.63	11.69	12.75	13.81	14.88	15.94	17.00	18.06	19.13	20.19	21.25	22.31	23.38	24.44	25.50	34.00	42.50	51.00
1 3/8	9.35	10.52	11.69	12.86	14.03	15.19	16.36	17.53	18.70	19.87	21.04	22.21	23.38	24.54	25.71	26.88	28.05	37.40	46.75	56.10
1 1/2	10.20	11.48	12.75	14.03	15.30	16.58	17.85	19.13	20.40	21.68	22.95	24.33	25.50	26.78	28.05	29.33	30.60	40.80	51.00	61.20
1 5/8	11.05	12.43	13.81	15.19	16.58	17.96	19.34	20.72	22.10	23.48	24.86	26.24	27.63	29.01	30.39	31.77	33.15	44.20	55.25	66.30
1 3/4	11.90	13.39	14.88	16.36	17.85	19.34	20.83	22.31	23.80	25.29	26.78	28.26	29.75	31.24	32.73	34.21	35.70	47.60	59.50	71.40
1 7/8	12.75	14.34	15.94	17.53	19.13	20.72	22.31	23.91	25.50	27.09	28.69	30.28	31.88	33.47	35.06	36.66	38.25	51.00	63.75	76.50
2	13.60	15.30	17.00	18.70	20.40	22.10	23.80	25.50	27.20	28.90	30.60	32.30	34.00	35.70	37.40	39.10	40.80	54.40	68.00	81.60
2 1/4	15.30	17.21	19.13	21.04	22.96	24.86	26.78	28.68	30.60	32.52	34.42	36.34	38.26	40.16	42.08	43.99	45.90	61.20	76.50	91.80
2 1/2	17.00	19.13	21.26	23.38	25.50	27.62	29.76	31.88	34.00	36.12	38.26	40.38	42.50	44.63	46.75	48.88	51.00	68.00	85.00	102.0
2 3/4	18.70	21.04	23.38	25.72	28.06	30.38	32.72	35.06	37.40	39.74	42.08	44.42	46.76	49.09	51.43	53.76	56.10	74.80	93.50	112.2
3	20.40	22.96	25.50	28.06	30.60	33.16	35.70	38.26	40.80	43.36	45.90	48.46	51.00	53.55	56.10	58.65	61.20	81.60	102.0	122.4

DESCRIPTION OF HARDENABLE CHROMIUM MARTENSITIC TYPES





STAINLESS STEEL ROD AND BAR

PROPERTIES OF STAINLESS

Physical Properties	302 303 304 304ELC	316 316ELC	347
Density			
2. lb./cu. in.	0.29	0.29	0.29
3. low carbon steel = 1.00	1.02	1.02	1.02
Specific Elec. Resis. at 68° F.			
5. microhms/cm ³	72	74	72
6. microhms/in. ³	28.4	29.2	28.5
7. low carbon steel = 1.00	6.6	6.8	6.5
8. Melting Range deg. F.	2550-2650	2500-2550	2550-2600
9. Structure	Austenitic	Austenitic	Austenitic
10. Magnetic Permeability as annealed	$\mu = 1.003^{***}$	$\mu = 1.003^{***}$	$\mu = 1.003^{***}$
Specific Heat			
12. cal./deg. C./gm. (0 to 100°C.)	0.12	0.12	0.12
13. B.t.u./°F./lb. (32 to 212°F.)	0.12	0.12	0.12
14. low carbon steel = 1.00 (0 to 100°C.)	1.1	1.1	1.1
Thermal Conductivity			
16. cal./cm ² /sec./°C./cm., at 100° C.	0.0390	0.0373	0.0385
17. B.t.u./sq. ft./hr./°F./in. at 212°F.	113	113	112
18. low carbon steel = 1.00 at 100°C.	0.34	0.34	0.33
19. cal./cm.;/sec./°C./cm., at 500°C.	0.0512	0.0512	0.0532
20. B.t.u./sq. ft./hr./°F./in. at 932°F.	149	149	154
Coefficient of Thermal Expansion			
22. per °F. x 10 ⁻⁶ (32 to 212°F.)	9.6	8.9	9.3
23. low carbon steel = 1.00 (32 to 212°F.)	1.45	1.35	1.41
24. per °F. x 10 ⁻⁶ (32 to 932°F.)	10.2	9.7	10.3
Mechanical Properties at Room Temperatures	Annealed	Annealed	Annealed
25. Tensile Strength, 10 ³ lb./sq. in.	75-95	80-95	80-100
26. Yield Strength, 10 ³ lb./sq. in.	30-45	30-45	35-50
27. Modulus of Elasticity, 10 ⁶ p.s.i.	28	28	28
28. Elongation in 2 in., %	60-50	60-40	50-40
29. Reduction of Area, %	75-60	70-55	70-50
30. Izod Impact Strength, ft.-lb.	110-80	110-80	110-80
31. Endurance Limit, 10 ³ p.s.i.	30-55	30-55	35-60
32. Brinell Hardness Number	135-185	135-185	135-185
33. Rockwell Hardness Number	B75-90	B75-90	B75-90
34. Olsen Value, inches.	0.5-0.4	0.4-0.5	0.365-.465
*Stress Causing 1% Elongation in 10,000 Hours (Creep)			
37. At 1000 deg. F., lb./sq. in.	17000	25000	19000
38. At 1200 deg. F., lb./sq. in.	7000	11000	9500
39. At 1350 deg. F., lb./sq. in.	3000	5200	4000
40. At 1500 deg. F., lb./sq. in.	850	2000	850
41. Scaling Temp., °F. (approx.)	1650	1650	1650
42. Initial Forging Temperature, °F.	2100-2300	2100-2300	2100-2300
43. Finishing Temp., °F. min.	1700	1700	1700
44. Annealing Treatment	1900-2000 deg. F. and quench	1900-2050 deg. F. and quench	Heat to 1750-2050 deg. F. Cooling optional (A)
	(A) (B)	(A) (B)	(A)

(A) Preheat heavy sections slowly to 1600 deg. F., then heat rapidly to the forging or annealing temperature.

(B) Cooling rate should be rapid enough to prevent harmful carbide precipitation which impairs corrosion resistance. Retarded cooling through, or heating in, the temperature range of 900 to 1500 deg. F. should be avoided in service or in heat treating. Anneal after welding for maximum corrosion resistance.

*Undetermined for Type 303.

***This value is a function of chemical composition and increases with cold work.

AND HEAT RESISTING STEELS

410 416	430 430F	440 C 440F	446
0.28	0.28	0.284	●0.270
0.97	0.97-	....	0.95
57	60	60	67
22.4	23.6	....	26.4
5.2	5.5	....	6.1
2700-2790	2600-2750	2620 approx.	2600-2750
Martensitic	Ferritic	Pearlite-Carbide	Ferritic
Ferromagnetic	Ferromagnetic	Ferromagnetic	Ferromagnetic
0.11	0.11	....	0.12
0.11	0.11	0.11	0.12
1.0	1.0	....	1.0
0.0595	0.0625	....	0.0500
173	181	203	145
0.52	0.54	....	0.43
0.0686	0.0627	....	0.0583
199	182	....	169
5.5	5.0	5.9**	5.9
0.83	0.76	....	0.89
6.4	6.2	....	6.4

Annealed	Quenched & Drawn	Annealed	Annealed	Quenched & Drawn	Annealed
65-85	90-200	70-90	approx. 100	95-250	75-95
35-45	60-145	35-55	approx. 60	55-220	45-60
29	29	29	29.0-30.0	29.0-30.0	29
35-20	28-15	35-20	max. 20	4 to 1	30-20
75-60	75-60	60-40	35.0	13	50-40
100-60	100-30	....	21	7	....
30-50	40-100	35-50	55	45-140	30-55
135-165	180-375	145-185	max. 240	200-600	140-185
B75-85	C10-41	B75-90	C-24	C59-B93	B80-90
0.4-0.3	....	0.4-0.3	....	....	....
12000*		8500	....		6000
2000*		2200	....		1500
1400*		1200	....		600
....	
1300		1550	1500		2000
2000-2200		1900-2050	2100		1950-2050
1500		1500	1600		1450
Furnace cool to 1100 from 1500-1650 deg. F. or air cool from 1400-1200 deg. F.***		Air cool from 1500-1400 deg. F.	1600-1650 deg. F., Furnace Cool		Rapid cool from 1600-1450 deg. F.
(A)		(B)	(A)		(B)

(A) Preheat slowly to 1450 deg. F., then heat rapidly to initial temperature for forging. Full corrosion resistance is developed only in the heat treated condition.

(B) In forging, preheat slowly to 1450 deg. F. Excessive grain growth takes place above 2000 deg. F. Expert welding is required to avoid excessive grain growth. Prolonged exposure at 850 to 950 deg. F. produces cold brittleness. Re-anneal to restore ductility.

*Applies only to Type 410.

**68 to 212 deg. F.

***Hardening treatment: Cool rapidly from 1700°-1850°F.

Tempering treatment: After hardening reheat to a selected temperature within the range 400°-1400°F., depending upon the properties desired.

HEAT TREATMENT OF STAINLESS STEELS Straight Chromium Hardenable Grades

TYPES	PRE-HEATING	HARDENING	STRESS RELIEVING	TEMPERING	ANNEALING		PRECAUTIONS
					PROCESS	FULL	
403 410 416	A	1700°-1850°F., ¼-½ Hr. Quench in Oil (Air for small sections) Hardness...380-415	450°-700°F.....1-3 Hrs. Cool in Air, Oil or Water Hardness...360-380	1000°-1400°F.....1-4 Hrs.* Cool in Air, Oil or Water 1000°F. produces hardness 260-330 1100°F. produces hardness 210-250 1200°F. produces hardness 200-230 1300°F. produces hardness 195-220	1350°-1450°F...1-3 Hrs. Cool in Air, Oil or Water Hardness...170-195	1550°-1650°F...1-3 Hrs. Slow furnace cool to 1100°F. at rate of 50°F. per hour; then cool in Air, Oil or Water. Hardness...135-160	For maximum toughness: A. Use high side of hardening range if material is to be stress relieved. B. Use low side if material is to be tempered.
414	A	1800°-1950°F., ¼-½ Hr. Quench in Oil (Air for small sections) Hardness...400-450	450°-750°F.....1-3 Hrs. Cool in Air, Oil or Water Hardness...380-420	1050°-1300°F.....1-4 Hrs. Cool in Air, Oil or Water 1000°F. produces hardness 250-290 1100°F. produces hardness 245-285 1300°F. produces hardness 240-285	This grade does not respond to full annealing by slow cooling from above critical temperature. Maximum softening is obtained by process annealing. Difficult to soften below 240.	1600°-1650°F...1-2 Hrs. Cool in Air, Oil or Water Hardness.....205-225	Carefully preheat before hardening. Use only in hardened and stress-relieved condition except for machining or processing. Stress-relieve immediately after quenching. (For best impact strength, do not temper over 750°F.) Stress-relieve before pickling or hardening.
420	A	Quench in warm oil or air Hardness: C53-56 Rockwell	300°-700°F.....1-2 Hrs. Cool in Air, Oil or Water Hardness: C48-53 Rockwell	1100°-1400°F.....1-4 Hrs. NOT for final application.	1350°-1450°F...1-2 Hrs. Cool in Air, Oil or Water Hardness.....205-225	1600°-1650°F...1-2 Hrs. Slow furnace cool to 1000°/200°F. at rate of 25°-50°F. per hr. Then cool in Air, Oil or Water. Hardness.....155-180	
431	B	1800°-1950°F., ¼-½ Hr. Quench in Air, Oil or Water Hardness...400-440	450°-750°F.....1-3 Hrs. Cool in Air, Oil or Water Hardness...355-400	1000°-1225°F.....1-4 Hrs. Cool in Air or Oil 1000°F. produces hardness 270-340 1100°F. produces hardness 245-285 1200°F. produces hardness 230-260	This grade does not respond to full annealing by slow cooling from above critical temperature. Maximum softening is obtained by process annealing. Difficult to soften below 230.	1350°-1450°F...2-6 Hrs. Cool in Air, Oil or Water Hardness: 440A—230-245 440B—235-350 440C—240-255	Selection of hardening temperature important. For max. toughness: A. Harden from 1875°-1950°F. if material is to be stress-relieved. B. Harden from 1800°-1875°F. if material is to be tempered.
440A 440B 440C (440C(F))	B	1850°-1950°F., ¼-½ Hr. Quench in warm oil or air Hardness: (Rockwell) 440A—C55-58 440B—C57-59 440C—C58-62 440F—C55-60	Must immediately follow quenching 300°-700°F.....1-2 Hrs. Cool in Air, Oil or Water Hardness: 440A—C51-56 440B—C53-58 440C—C55-60 440F—C55-58	For machining and fabricating only. NOT for final application. 1100°-1400°F.....1-4 Hrs.	1625°-1675°F...2-6 Hrs. Slow furnace cool to 1000°/200°F. at rate of 25°-50°F. per hr. Then cool in Air, Oil or Water. Hardening: 440A—190-245 440B—205-250 440C—215-255	Carefully preheat before hardening. Use only in hardened and stress-relieved condition except for machining or processing. Stress-relieve immediately after quenching. (For best impact strength, do not temper over 750°F.) Stress-relieve before pickling or hardening.	

PREHEATING: A—Only necessary if part is large, complex, or already hardened, 1000°-1450°F., approximately 1 hour, and soak.
B—Start at 1000°F., raise slowly to 1450°F., and soak.

NOTES: Hardness figures are Brinell unless otherwise noted.
(*) Preliminary or pilot tests are recommended when tempering to narrow hardness range.

STAINLESS & HEAT RESISTING STEELS

Strength at elevated temperatures

Short time tensile tests at	type 302	type 303	type 304	type 305	type 316	type 321	type 347	type 410	type 416	type 430	type 4460
400°F. psi.	75000	70000	70000	65000	70000	75000	75000	75000	75000	65000	85000
600°F. psi.	77000	60000	60000	65000	70000	65000	65000	70000	70000	63000	80000
800°F. psi.	65000	60000	58000	65000	70000	60000	60000	65000	65000	55000	78000
1000°F. psi.	55000	52000	52000	60000	68000	55000	55000	40000	40000	35000	70000
12000°F. psi.	45000	35000	35000	45000	50000	40000	40000	25000	25000	18000	25000
14000°F. psi.	30000	30000	20000	28000	30000	30000	30000	10000	10000	7500	7000
16000°F. psi.	17000	20000	11000	16000	18000	17000	17000	9000	9000	3500	3300

Stress causing 1% Elongation (Creep) in 10000 hours at:

1000°F. psi.	14000	14000	14000	16000	25000	14000	14000	13000	13000	8500	6000
1200°F. psi.	6500	6500	6500	7000	18000	6500	6500	2300	2300	2100	1600
1350°F. psi.	3000	3000	3000	3500	8000	3000	3000	1400	1400	1200	400
1500°F. psi.	800	800	850	1000	3000	850	850				

MACHINING RATES OF STAINLESS STEELS

Surface Feet per Minute for Specific Tooling

Single Point Turning

Tooling Types	Rough	Finish	Rough	Finish	Rough	Finish
Types	5	5	3-4	3-4	1-2	1-2
302 304 17-7PH	130-180	150-300	100-130	100-150	60- 90	100-120
303	150-250	200-400	100-150	150-200	70- 90	100-140
309 316	130-180	150-300	100-130	100-150	60- 90	100-120
321 347	130-180	150-300	100-130	100-150	60- 90	100-120
403 410 17-4PH	150-200	200-400	100-130	100-150	80-100	80-130
416	150-200	200-400	100-150	150-200	80-100	100-150
420 (F)	100-150	150-250	80-100	100-150	60- 80	80-120
430	150-200	200-400	100-130	100-150	80-100	80-130
430 F	150-200	200-400	100-150	150-200	80-100	100-150
431	140-180	150-350	90-120	90-140	60- 80	80-100
440, A, B, C, F ₂	100-150	150-200	60- 80	80-100	40- 60	60- 80
446	140-180	150-350	100-130	100-150	60- 90	90-120

KEY TO TOOLING

1. High-speed steels, tungsten or moly.
2. High-speed steels, cobalt type.
3. High-speed steels, 10 cobalt type.
4. Cast alloy tools.
5. Carbide type.

NOTES

1. Type 420 F allows an increase of approximately 10% over cutting rates of type 420.
2. Type 440 F allows an increase of approximately 10% over cutting rates of types 440 A, B, C.

MACHINING RATES OF STAINLESS STEELS

Machining Rates—Surface Feet per Minute

Tooling Types	Automatic Screw Machine	Heavy Duty Single and Multiple Spindle	Turret Lathe	Swiss Type Automatic	REAMING at .003"/.0075" Feed		Threading	Tapping	Milling	Drill Press
					Smooth	Working				
302	70-90	60-80	60-80	80-120	15-40	40-80	10-25	10-25	40-60	30-50
304										
17-7PH										
303	100-130	90-120	90-120	110-130	15-40	40-120	10-25	10-25	40-60	50-80
309	60-80	60-80	60-80	80-120	15-40	40-80	10-25	10-25	30-50	30-50
316										
321	70-90	60-80	60-80	80-120	15-40	40-80	10-25	10-25	40-60	30-50
347										
403	90-100	80-100	80-100	110-140	15-40	40-120	10-25	10-25	40-60	40-80
410										
17-4PH										
416	120-150	110-130	110-130	120-150	15-40	40-120	10-25	10-25	50-80	60-90
420 (F1)	80-100	60-80	60-80	90-120	15-40	40-120	10-25	10-25	30-50	30-50
430	90-100	80-100	80-100	110-140	15-40	40-120	10-25	10-25	40-60	40-80
430 F	120-150	110-130	110-130	120-150	15-40	40-120	10-25	10-25	50-80	60-90
431	80-100	70-90	70-90	100-140	15-40	40-120	10-25	10-25	40-60	40-60
440 A, B, C, Fz	60-80	50-70	50-70	60-100	15-40	40-120	10-25	10-25	30-50	30-50
446	80-100	60-80	60-80	100-140	15-40	40-120	10-25	10-25	40-60	40-60

KEY TO TOOLING

1. High-speed steels, tungsten or moly.
 2. High-speed steels, cobalt type.
 3. High-speed steels, 10 cobalt type.
 4. Cast alloy tools.
 5. Carbide type.
- *increase rates 15-30%.

NOTES

1. Type 420F allows an increase of approximately 10% over cutting rates of type 420.
2. Type 440F allows an increase of approximately 10% over cutting rates of types 440 A, B, C.

**COMMERCIAL TOLERANCES
STAINLESS COLD FINISHED BARS AND WIRE
ROUND AND SQUARE**

SIZE IN INCHES	STANDARD TOLERANCE PLUS OR MINUS INCH	SIZE IN INCHES	STANDARD TOLERANCE PLUS OR MINUS INCH
.044 to .050	.001	.216 to .233	.001
.051 to .057	.001	.234 to .249	.001
.058 to .066	.001	¼ to ⅜	.001
.067 to .075	.001	⅝ to ⅞	.0015
.076 to .085	.001	¾ to 1⅛	.0015
.086 to .098	.001	½ to 1⅝	.002
.099 to .112	.001	⅝ to 1⅞	.002
.113 to .127	.001	1 to 1½	.0025
.128 to .141	.001	1½ to 2¾	.003
.142 to .145	.001	2⅞ to 3	.003
.155 to .169	.001	3¼ to 4	.003
.170 to .184	.001	4⅞ to 4½	.005
.185 to .199	.001	4⅞ to 5	.008
.200 to .215	.001	5¼ to 6	.008



STAINLESS BAR SECTION

GOVERNMENT SPECIFICATIONS
FEDERAL SPECIFICATIONS

SPEC. NO.	MATERIAL	CLASS	TYPE	SAI GRADE	CONDITION OR FINISH	
QQ-S-763a	Bars and Forgings	1	A	304	Annealed	
			B	302	Hot Worked	
			C	302	Cold Worked	
			D	302	Annealed	
			2		325	
			3	A	410	Annealed
				C	410	Cold Worked
				E	410	Tempered
				F	410	Hardened
			4		430	
				420	Annealed	
		5	F	420	Hardened	
			A	416	Annealed	
			C	416	Cold Drawn	
		6	E	416	Tempered	
			A	303	Annealed	
			B	303	Hot Worked	
		7	A	321-347	Annealed	
			A	316	Annealed	
		8	C	316	Cold Worked	
			A	440C	Annealed	

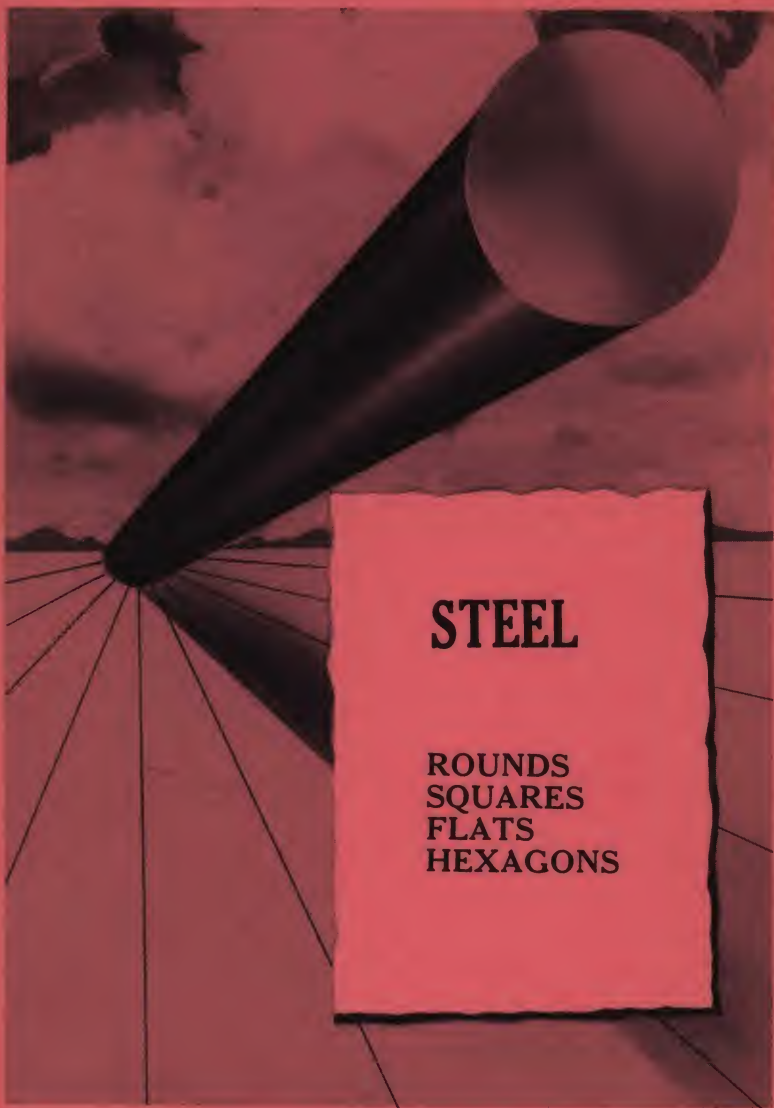
AERONAUTICAL MATERIAL SPECIFICATIONS

AMS SPEC. NO.	SAI NO.	MATERIAL	CONDITION OR FINISH
5610-E	416	Bars, Billets, Forgings, Wire	BH 187-241
5613-B	410	Bars, Billets, Forgings, Wire	BH 241 Max.
5614	403	Bars, Billets, Forgings, Wire	Annealed
5615-B	414	Bars, Billets, Forgings, Wire	BH 207-255
5620-B	420F	Bars, Billets, Forgings, Wire	BH 241 Max.
5627	430	Bars, Billets, Forgings, Wire	Annealed
5628-A	431	Bars, Billets, Forgings, Wire	BH 228-285
5630-B	440C	Bars, Billets, Forgings, Wire	BH 255 Max.
5632-A	440F	Bars, Billets, Forgings, Wire	BH 255 Max.
5636-A	302	Bars, Billets, Forgings, Wire	100,000 Min. Psi Tensile
5637-A	302	Bars, Billets, Forgings, Wire	125,000 Min. Psi Tensile
5640-E Type 1	303	Bars, Billets, Forgings, Wire	{ up to 3/4", BH 170-255 { 3/4" to 1 1/2", BH 163-255 { 1 1/2" and over, BH 140-241
Type 2	303Se	Bars, Billets, Forgings, Wire	
5641-A	303Se 75,000-115,000 Psi Ten.	Bars, Billets, Forgings, Wire	
5642-B	347F	Bars, Billets, Forgings, Wire	Same as 5640-E
5643-B	17-4PH	Bars, Billets, Forgings, Wire	
5645-E	321	Bars, Billets, Forgings, Wire	Same as 5640-E
5646-C	347	Bars, Billets, Forgings, Wire	Same as 5640-E
5648-B	316	Bars, Billets, Forgings, Wire	Same as 5640-E
5649	316F	Bars, Billets, Forgings, Wire	
5651-B	310S		
	(low carbon)	Bars, Billets, Forgings, Wire	BH 187 Max.
5652	314	Bars, Billets, Forgings, Wire	BH 187 Max.
5685	305	Bars, Billets, Forgings, Wire	{ Coils—110,000 Psi Max. { Str. lengths—120,000 Psi Max.
5690-D	316	Bars, Billets, Forgings, Wire	Annealed

GOVERNMENT SPECIFICATIONS
MILITARY SPECIFICATIONS

SPEC. NO.	AISI	CONDITIONS OR FINISH
MIL-S-853A (Ships)—Bars and Forgings (Supersedes 46-S-18e)	Class 1	304
	2	302
	3	410
	4	430
	5	420
	6	416
	7	303
	8	321 or 347
	9	316
	10	431
	11	310
	12	325
	14	17-4PH
	Type A—Annealed Type B—Hot Worked Type C—Annealed and Cold Drawn Type E—Tempered Type F—Hardened	
MIL-S-7720—Bars, Forging stock (Aircraft Application) (Supersedes AN-S-771)	Comp G	302
	Comp MCR	316
	Comp FM-S	303
	Comp FM-P	303
	Comp FM-Se	303Se
A—Heat Treated (Annealed) B—Annealed and cold worked C—Hot Rolled or Forged only		

**For LABORATORY CORROSION RESISTANCE DATA, see
Stainless Steel Sheet section.**



STEEL

ROUNDS
SQUARES
FLATS
HEXAGONS

INDEX

Description and Definitions	Page 307
Tolerances—Cold Finished Bars	Page 308
Weights—	
Cold Finished Rounds	Page 309
Cold Finished Squares	Page 310
Cold Finished Hexagons	Page 311
Cold Finished Flats	Page 312
Standard Analysis Specifications	Page 314

COLD FINISHED CARBON STEEL BARS

Cold finished steel bars are presently produced by drawing unheated steel bars which have been previously hot rolled through a die or by turning or grinding. Although unheated bars at one time were produced by reducing them between rolls, this process is no longer economical; thus the proper term to use in referring to bars finished in is "cold finished" rather than "cold rolled" bars.

AISI C 1018

C 1018—is an Open Hearth steel suitable for shafting as well as bending and cold forming applications where the strength of higher carbon and alloy steels is not required. This material responds well to case hardening and may be easily welded or brazed by conventional means.

Cold Drawn C 1018	Tensile Strength.....	70/85,000 lbs. per sq. in.
	Yield Point.....	50/70,000 lbs. per sq. in.
	Elongation in 2".....	15/25%
	Reduction of Area.....	45/55%
	Rockwell B.....	80/90
Turned & Polished C 1018	Tensile Strength.....	60/80,000 lbs. per sq. in.
	Yield Point.....	30/50,000 lbs. per sq. in.
	Elongation in 2".....	30/40%
	Reduction of Area.....	50/65%
	Rockwell B.....	77/87

AISI B 1113

B 1113— is a free machining Bessemer screw stock with high sulfur content which allows 20/40% higher cutting speeds and tool life than standard Bessemer steel. This material is well suited for automatic screw machine production parts.

Cold Drawn B 1113	Tensile Strength.....	80/100,000 lbs. per sq. in.
	Yield Point.....	70/80,000 lbs. per sq. in.
	Elongation in 2".....	10/20%
	Reduction of Area.....	40/50%
	Rockwell B.....	85/95

MXB 1113—MXC 1213—B 1113X

These steels are now made by the Open Hearth process. They have been developed to give higher speed, better finish, and greater tool life than can be obtained from B 1113. These steels are also well suited for production parts machined in automatic screw machines—at speeds up to 300 S.F.M.

Cold Drawn MXB 1113, MXC 1213 and B 1113X	Tensile Strength.....	80/95,000 lbs. per sq. in.
	Yield Point.....	70/80,000 lbs. per sq. in.
	Elongation in 2".....	10/20%
	Reduction of Area.....	35/45%
	Rockwell B.....	80/95

AISI C 1117

This is an Open Hearth mild manganese steel developed for good machinability coupled with excellent case hardening characteristics. The machinability of this steel is approximately 90% that of B 1113. This steel also has reasonably good cold forming characteristics.

Cold Drawn	Tensile Strength..... 80/90,000 lbs. per sq. in.
	Yield Point..... 60/75,000 lbs. per sq. in.
	Elongation in 2"..... 15/20%
C 1117	Reduction of Area..... 40/50%
	Rockwell B..... 80/90

Leaded Steel

This steel is a low carbon Open Hearth screw stock having excellent machining, finishing, and tool life characteristics as in the case of MX steel, due to the addition of lead. The small quantities of lead added to improve these characteristics does not affect the physical properties of this steel. This steel is much superior to the other free cutting screw stocks with respect to case hardening and hot and cold formability.

COLOR CODE—COLD FINISHED STEEL BARS

For ease in the identification of cold finished bars, we have adopted the following color code. Bar ends will be identified in this manner unless we are specifically requested to furnish material identified otherwise:

C 1018 —ends green C 1117 —ends pink B 1113 —ends gold Leaded Steel—ends white	MXC 1213 —ends lavender MXB 1113 —ends lavender B 1113X —ends lavender C 1213 —ends lavender
--	---

MACHINABILITY COMPARISON—COLD FINISHED BARS

Cold Drawn	C1018	C1117	B1113	MXC1213	MXB1113	Leaded Steel
SFM (average)	130	145	213	250	250	270/300
Rating (%)	78	85	125	145	145	160/175

STANDARD MANUFACTURING TOLERANCES COLD FINISHED BARS

(all tolerances are minus)

Size	Rounds	Hexagons	Squares
up to $\frac{5}{16}$ " incl.	.002	.002	.003
over $\frac{5}{16}$ " to 1"	.002	.003	.004
over 1" to 2"	.003	.004	.005
over 2" to 2 $\frac{1}{2}$ "	.004	.004	.005
over 2 $\frac{1}{2}$ " to 3 $\frac{1}{8}$ "	.004	.005	.006
over 3 $\frac{1}{8}$ " to 4"	.004		.006
over 4" to 6"	.005		
over 6" to 7 $\frac{3}{4}$ "	.006		

FULLERTON—A WAREHOUSE OF METALS AND SERVICE

**COLD FINISHED CARBON STEEL BARS
IN STOCK—ROUND**

Size	C1018	B1113	C1117	LEDLOY	WT. PER FT.	Size	C1018	B1113	C1117	LEDLOY	WT. PER FT.
1/16					.010	63/64					2.588
3/64					.016	1	X	X	X	X	2.670
1/32					.023	1 1/16	X	X	X	X	3.015
7/64					.032	1 1/8	X	X	X	X	3.380
1/8	X	X		X	.042	1 3/16	X	X	X	X	3.766
9/64		X			.053	1 1/4	X	X	X	X	4.172
5/32		X	X	X	.065	1 5/16	X	X	X	X	4.600
11/64		X			.079	1 3/8	X	X	X	X	5.049
3/16	X	X	X	X	.094	1 7/16	X	X	X	X	5.518
13/64		X			.110	1 1/2	X	X	X	X	6.008
7/32		X	X	X	.128	1 9/16	X	X	X	X	6.519
15/64		X			.147	1 5/8	X	X	X	X	7.051
1/4	X	X	X	X	.167	1 11/16	X	X	X	X	7.604
17/64		X			.188	1 3/4	X	X	X	X	8.178
9/32		X	X	X	.211	1 13/16	X	X	X	X	8.773
19/64		X			.235	1 7/8	X	X	X	X	9.388
5/16	X	X	X	X	.261	1 15/16	X	X	X	X	10.024
21/64		X			.288	2	X	X	X	X	10.69
11/32		X		X	.316	2 1/16	X	X	X	X	11.36
23/64		X			.345	2 1/8	X	X	X	X	12.06
3/8	X	X	X	X	.376	2 1/4	X	X	X	X	12.78
25/64		X			.408	2 1/2	X	X	X	X	13.52
13/32		X		X	.441	2 5/16	X	X	X	X	14.28
27/64		X			.475	2 3/8	X	X	X	X	15.06
7/16	X	X	X	X	.511	2 1/2	X	X	X	X	15.87
29/64		X			.548	2 1/2	X	X	X	X	16.69
15/32		X		X	.587	2 9/16	X	X	X	X	17.53
31/64		X			.627	2 3/4	X	X	X	X	18.40
1/2	X	X	X	X	.668	2 11/16	X	X	X	X	19.29
33/64		X			.710	2 3/4	X	X	X	X	20.19
17/32		X		X	.754	2 13/16	X	X	X	X	21.12
35/64		X			.799	2 7/8	X	X	X	X	22.07
9/16	X	X	X	X	.845	2 15/16	X	X	X	X	23.04
37/64		X			.893	3	X	X	X	X	24.03
19/32		X		X	.941	3 1/8	X	X	X	X	26.08
39/64		X			.992	3 1/4	X	X	X	X	28.21
5/8	X	X	X	X	1.043	3 3/8	X	X	X	X	30.42
41/64		X			1.096	3 1/2	X	X	X	X	32.71
21/32		X		X	1.150	3 5/8	X	X	X	X	35.09
43/64		X			1.205	3 3/4	X	X	X	X	37.55
11/16	X	X	X	X	1.262	3 7/8	X	X	X	X	40.10
45/64		X			1.320	4	X	X	X	X	42.73
23/32		X		X	1.380	4 1/8	X	X	X	X	45.44
47/64		X			1.440	4 1/4	X	X	X	X	48.23
3/4	X	X	X	X	1.502	4 3/8	X	X	X	X	51.11
49/64		X			1.565	4 1/2	X	X	X	X	54.08
25/32		X		X	1.631	4 5/8	X	X	X	X	57.12
51/64		X				4 3/4	X	X	X	X	60.25
13/16	X	X	X	X	1.763	4 7/8	X	X	X	X	63.46
53/64		X				5	X	X	X	X	66.76
27/32		X		X	1.901	5 1/8	X	X	X	X	70.14
55/64		X				5 1/4	X	X	X	X	73.60
7/8	X	X	X	X	2.045	5 3/8	X	X	X	X	77.15
57/64		X			2.118	5 1/2	X	X	X	X	80.78
29/32		X		X	2.193	5 5/8	X	X	X	X	84.49
59/64		X				5 3/4	X	X	X	X	88.29
15/16	X	X	X	X	2.347	5 7/8	X	X	X	X	92.17
61/64		X				6	X	X	X	X	96.13
31/32		X		X	2.506						

COLD FINISHED CARBON STEEL BARS
IN STOCK—SQUARES

Size	C1018	B1113	WT. PER FT.
1/8		X	.053
3/32			.083
3/16	X		.120
7/32			.163
1/4	X	X	.213
9/32			.269
5/16	X	X	.332
3/8	X	X	.478
7/16		X	.651
1/2	X	X	.850
9/16			1.076
5/8	X	X	1.329
11/16			1.608
3/4	X	X	1.914
13/16			2.246
7/8	X	X	2.605
15/16			2.990
1	X	X	3.402
1 1/16			3.841
1 1/8	X	X	4.306
1 1/4			4.798
1 1/4	X	X	5.316
1 5/16			5.861
1 3/8	X	X	6.432
1 7/16			7.030
1 1/2	X	X	7.655
1 5/8			8.306
1 3/4			8.984
1 3/4	X	X	10.419
1 7/8	X		11.95
2	X	X	13.60
2 1/8			15.35
2 1/4			17.22
2 3/8			19.18
2 1/2			21.26
2 5/8			23.43
2 3/4			25.73
2 7/8			28.10
3			30.60
3 1/4			35.91
3 1/2			41.65
3 3/4			47.81
4			54.40
4 1/2			68.85

COLD FINISHED CARBON STEEL BARS
IN STOCK—HEXAGON

Size	C1018	B1113	C1117	LEDLOY	WT. PER FT.
1/8					.046
3/16		X			.104
7/32		X			.141
1/4	X	X		X	.184
9/32					.233
5/16		X	X	X	.288
11/32		X			.348
3/8	X	X	X	X	.414
13/32		X			.486
7/16		X		X	.564
1/2	X	X	X	X	.736
9/16		X		X	.932
5/8	X	X		X	1.15
11/16		X		X	1.39
3/4	X	X	X	X	1.66
13/16		X		X	1.94
7/8		X		X	2.25
15/16		X		X	2.59
1	X	X	X	X	2.94
1 1/16		X		X	3.32
1 1/8		X		X	3.73
1 1/4		X		X	4.15
1 1/4		X	X	X	4.60
1 5/16		X		X	5.07
1 3/8		X		X	5.57
1 7/16		X		X	6.09
1 1/2		X	X	X	6.63
1 9/16		X			7.19
1 5/8		X			7.78
1 11/16		X			8.39
1 3/4		X	X	X	9.02
1 13/16		X			9.67
1 7/8		X			10.35
1 15/16		X			11.05
2		X	X		11.77
2 1/8		X			13.29
2 1/16		X			14.10
2 1/4		X			14.91
2 3/8		X			16.61
2 1/2		X	X		18.40
2 5/8		X			20.29
2 3/4		X			22.26
2 7/8		X			24.33
3		X	X		26.50
3 1/8					28.75

Standard Analyses Specifications

CARBON STEELS

AISI Number	Chemical Composition Limits, Per Cent.				Similar SAE Number	Similar AMS Number
	C	Mn	P. Max.	S. Max.		
C 1005	0.06 Max.	0.35 Max.	0.040	0.050	—	—
C 1006	0.08 Max.	0.25/0.40	0.040	0.050	1006	5041
C 1008	0.10 Max.	0.25/0.50	0.040	0.050	1008	5040E
C 1010	0.08/0.13	0.30/0.60	0.040	0.050	1010	5042E
C 1011	0.08/0.13	0.60/0.90	0.040	0.050	—	5044C
C 1012	0.10/0.15	0.30/0.60	0.040	0.050	—	5050D
C 1013	0.11/0.16	0.50/0.80	0.040	0.050	—	5053A
C 1015	0.13/0.18	0.30/0.60	0.040	0.050	1015	5060B
C 1016	0.13/0.18	0.60/0.90	0.040	0.050	1016	—
C 1017	0.15/0.20	0.30/0.60	0.040	0.050	1017	—
C 1018	0.15/0.20	0.60/0.90	0.040	0.050	1018	—
C 1019	0.15/0.20	0.70/1.00	0.040	0.050	1019	—
C 1020	0.18/0.23	0.30/0.60	0.040	0.050	1020	5042A 5054B
C 1021	0.18/0.23	0.60/0.90	0.040	0.050	1021	—
C 1022	0.18/0.23	0.70/1.00	0.040	0.050	1022	5070B
C 1023	0.20/0.25	0.30/0.60	0.040	0.050	—	—
C 1024	0.19/0.25	1.35/1.65	0.040	0.050	1024	—
C 1025†	0.22/0.28	0.30/0.60	0.040	0.050	1025	5075A 5077A
C 1026	0.22/0.28	0.60/0.90	0.040	0.050	1026	—
C 1027	0.22/0.29	1.20/1.50	0.040	0.050	1027	—
C 1029	0.25/0.31	0.60/0.90	0.040	0.050	—	—
C 1030	0.28/0.34	0.60/0.90	0.040	0.050	1030	—
C 1032	0.32/0.36	0.60/0.90	0.040	0.050	—	—
C 1033	0.30/0.36	0.70/1.00	0.040	0.050	1033	—
C 1034	0.32/0.38	0.50/0.80	0.040	0.050	1034	—
C 1035	0.32/0.38	0.60/0.90	0.040	0.050	1035	5080B 5802
C 1036	0.30/0.37	1.20/1.50	0.040	0.050	1036	—
C 1037	0.35/0.42	0.40/0.70	0.040	0.050	—	—
C 1038	0.35/0.42	0.60/0.90	0.040	0.050	1038	—
C 1039	0.37/0.44	0.70/1.00	0.040	0.050	1039	—
C 1040	0.37/0.44	0.60/0.90	0.040	0.050	1040	—
C 1041	0.36/0.44	1.35/1.65	0.040	0.050	1041	—
C 1042	0.40/0.47	0.60/0.90	0.040	0.050	1042	—
C 1043	0.40/0.47	0.70/1.00	0.040	0.050	1043	—
C 1045	0.43/0.50	0.60/0.90	0.040	0.050	1045	—
C 1046	0.43/0.50	0.70/1.00	0.040	0.050	1046	—
C 1049	0.46/0.53	0.60/0.90	0.040	0.050	1049	—
C 1050	0.48/0.55	0.60/0.90	0.040	0.050	1050	—
C 1051	0.45/0.56	0.85/1.15	0.040	0.050	—	—
C 1052	0.47/0.55	1.20/1.50	0.040	0.050	1052	—
C 1053	0.48/0.55	0.70/1.00	0.040	0.050	—	—
C 1054	0.50/0.60	0.50/0.80	0.040	0.050	—	—
C 1055	0.50/0.60	0.60/0.90	0.040	0.050	1055	—
C 1057	0.50/0.61	0.85/1.15	0.040	0.050	—	—
C 1059	0.55/0.65	0.50/0.80	0.040	0.050	—	—
C 1060	0.55/0.65	0.60/0.90	0.040	0.050	1060	—
C 1061	0.54/0.65	0.75/1.05	0.040	0.050	—	—
C 1062	0.54/0.65	0.85/1.15	0.040	0.050	1062	—
C 1064	0.60/0.70	0.50/0.80	0.040	0.050	1064	—
C 1065	0.60/0.70	0.60/0.90	0.040	0.050	1065	—
C 1066	0.60/0.71	0.85/1.15	0.040	0.050	1066	—
C 1069	0.65/0.75	0.40/0.70	0.040	0.050	—	—
C 1070	0.65/0.75	0.60/0.90	0.040	0.050	1070	5115B 5120C
C 1071	0.65/0.76	0.75/1.05	0.040	0.050	—	—
C 1072	0.65/0.76	1.00/1.30	0.040	0.050	—	—
C 1074	0.70/0.80	0.50/0.80	0.040	0.050	1074	—
C 1075	0.70/0.80	0.40/0.70	0.040	0.050	—	—
C 1078	0.72/0.85	0.30/0.60	0.040	0.050	1078	—

Standard Analyses Specifications

CARBON STEELS

AISI Number	Chemical Composition Limits, Per Cent.				Similar SAE Number	Similar AMS Number
	C	Mn	P. Max.	S. Max.		
C 1080	0.75/0.88	0.60/0.90	0.040	0.050	1080	5110A
C 1084	0.80/0.93	0.60/0.90	0.040	0.050	—	—
C 1085	0.80/0.93	0.70/1.00	0.040	0.050	1085	—
C 1086	0.82/0.95	0.30/0.50	0.040	0.050	1086	—
C 1090	0.85/0.98	0.60/0.90	0.040	0.050	1090	5112D
C 1095	0.90/1.03	0.30/0.50	0.040	0.050	1095	5121B 5122B 5132C
B 1006	0.08 Max.	0.45 Max.	0.07/0.12	0.060	—	—
B 1010	0.13 Max.	0.30/0.60	0.07/0.12	0.060	—	—

FREE CUTTING STEELS

AISI Number	Chemical Composition Limits, Per Cent.				Similar SAE Number	Similar AMS Number
	C	Mn	P. Max.	S.		
B 1111	0.13 Max.	0.60/0.90	0.07/0.12	0.08/0.15	1111	—
B 1112	0.13 Max.	0.70/1.00	0.07/0.12	0.16/0.23	1112	5010C
B 1113	0.13 Max.	0.70/1.00	0.07/0.12	0.24/0.33	1113	—
B 1113X	0.13 Max.	0.70/1.00	0.07/0.12	0.24/0.33	—	—
C 1106	0.08 Max.	0.30/0.60	0.040	0.08/0.13	—	—
C 1108	0.08/0.13	0.50/0.80	0.040	0.08/0.13	—	—
C 1109	0.08/0.13	0.60/0.90	0.040	0.08/0.13	1109	—
C 1110	0.08/0.13	0.30/0.60	0.040	0.08/0.13	—	—
C 1111	0.08/0.13	0.60/0.90	0.040	0.16/0.23	—	—
C 1113	0.10/0.16	1.00/1.30	0.040	0.24/0.33	—	—
C 1114	0.10/0.16	1.00/1.30	0.040	0.08/0.13	1114	—
C 1115	0.13/0.18	0.60/0.90	0.040	0.08/0.13	1115	—
C 1116	0.14/0.20	1.10/1.40	0.040	0.16/0.23	1116	—
C 1117	0.14/0.20	1.00/1.30	0.040	0.08/0.13	1117	5022E
C 1118	0.14/0.20	1.30/1.60	0.040	0.08/0.13	1118	—
C 1119	0.14/0.20	1.00/1.30	0.040	0.24/0.33	1119	—
C 1120	0.18/0.23	0.70/1.10	0.040	0.08/0.13	1120	—
C 1125	0.22/0.28	0.60/0.90	0.040	0.08/0.13	—	—
C 1132	0.27/0.34	1.35/1.65	0.040	0.08/0.13	1132	—
C 1137	0.32/0.39	1.35/1.65	0.040	0.08/0.13	1137	5024C
C 1138	0.34/0.40	0.70/1.00	0.040	0.08/0.13	1138	—
C 1140	0.37/0.44	0.70/1.00	0.040	0.08/0.13	1140	—
C 1141	0.37/0.45	1.35/1.65	0.040	0.08/0.13	1141	—
C 1144	0.40/0.48	1.35/1.65	0.040	0.24/0.33	1144	—
C 1145	0.42/0.49	0.70/1.00	0.040	0.04/0.07	1145	—
C 1146	0.42/0.49	0.70/1.00	0.040	0.08/0.13	1146	—
C 1148	0.45/0.52	0.70/1.00	0.040	0.04/0.07	—	—
C 1151	0.48/0.55	0.70/1.00	0.040	0.08/0.13	1151	—
C 1211	0.13 Max.	0.60/0.90	0.07/0.12	0.08/0.15	—	—
C 1212	0.13 Max.	0.70/1.00	0.07/0.12	0.16/0.23	—	5010C
C 1213	0.13 Max.	0.70/1.00	0.07/0.12	0.24/0.33	—	—

MANGANESE STEELS

AISI Number	Chemical Composition Limits, Per Cent.									Similar SAE No.
	C	Mn	P	S	Si	Ni	Cr	Mo	V	
1320	0.18/0.23	1.60/1.90	0.040	0.040	0.20/0.35	—	—	—	—	1320
1321	0.17/0.22	1.80/2.10	0.050	0.050	0.20/0.35	—	—	—	—	—
1330	0.28/0.33	1.60/1.90	0.040	0.040	0.20/0.35	—	—	—	—	1330
1335	0.33/0.38	1.60/1.90	0.040	0.040	0.20/0.35	—	—	—	—	1335
1340	0.38/0.43	1.60/1.90	0.040	0.040	0.20/0.35	—	—	—	—	1340

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