STEEL – SOME COMMON TYPES

1010 This is one of the most widely used low carbon steels for low strength applications. It is best suited for parts whose fabrication involves moderate to severe forming and some machining. Its weldability is excellent and it can be case hardened for wear resistance by cyaniding.

1018 is a popular carburizing grade of steel. It can be strengthened by cold working or surface hardened by carburizing or cyaniding. It is relatively soft and has good weldability and formability.

1020 is a general-purpose low-carbon "mild" steel. It is easy to fabricate by the usual methods such as mild cold or hot forming and welding. It is weldable by all processes and the resulting welds are of extremely high quality.

4130 This chromium-molybdenum alloy is one of the most widely used aircraft steels because of its combination of weldability, ease of fabrication and mild hardenability. In relatively thin sections, it may be heat treated to high strength levels. In the normalized condition it has adequate strength for many applications. It may be nitrided for resistance to wear and abrasion.

4140 This chromium-molybdenum alloy is a deep hardening steel used where strength and impact toughness are required. It has high fatigue strength making it suitable for critical stressed applications. It may be nitrided for increased resistance to wear and abrasion.

4340 This chromium-nickel-molybdenum alloy is a widely used deep-hardening steel. It possesses remarkable ductility and toughness. With its high alloy content uniform hardness is developed by heat treatment in relatively heavy sections. Its high fatigue strength makes it ideal for highly stressed parts.

6150 This chromium-vanadium alloy steel is similar to 4340. It has good hardenability, good fatigue properties and excellent resistance to impact and abrasion.

8620 This is a "triple alloy" chromium-nickel-molybdenum steel. It is readily carburized. It may be heat treated to produce a strong, tough core and high case hardness. It has excellent machinability and responds well to polishing operations. It is easily welded by any of the common welding processes, although the section should be heated and stress relieved after welding.

9310 This chromium-nickel-molybdenum alloy is a carburizing steel capable of attaining high case hardness with high core strength. It has excellent toughness and ductility.

4620 This nickel-molybdenum alloy is a carburizing steel capable of developing high case hardness and core toughness. It can be forged similarly to the other carburizing grades. Because of its relatively high nickel content, it is not as readily cold-formed.

5160 This carbon-chromium grade of spring steel has a high yield/tensile strength ratio, excellent toughness and high ductility. It is very difficult to machine in the as-rolled condition and should be annealed prior to machining. It is not readily welded, but it can be welded by either the gas or arc welding processes if the section involved is preheated and stress relieved after welding.

52100 This high carbon-high chromium alloy is produced by the electric furnace process and then vacuum degassed to meet the rigid standards of the aircraft industry for bearing applications. It develops high hardness and has exceptional resistance to wear and abrasion.

SHEET GAUGES

Gauge No.	STEEL SHEETS		GALVANIZED SHEETS		STAINLESS STEEL SHEETS Weight Lbs. per Square Ft.			ALUMINUM SHEETS	
	Weight Lbs. per Square Ft.	Thickness in Inches	Weight Lbs. per Square Ft.	Thickness in Inches	Straight Chromium (400 Series)	Chromium Nickel (300 Series)	Approx. Thickness in Inches	Weight Lbs. per Square Ft. (1100)	Thickness in Inches
38	.25000	.0060						.0558	.00396
37	.26562	.0064						.0627	.00445
36	.28125	.0067						.0705	.00500
35	.31250	.0075						.0791	.00561
34	.34375	.0082						.0888	.00630
33	.39500	.0090						.0998	.00708
32	.40625	.0097	.56250	.0134	.3708	.3780	.010	.1121	.00795
31	.43750	.0105	.59375	.0142	.4506	.4594	.011	.1259	.00893
30	.50000	.0120	.65625	.0157	.5150	.5250	.013	.1410	.0100
29	.56250	.0135	.71875	.0172	.5794	.5906	.014	.1593	.0113
28	.62500	.0149	.78125	.0187	.6438	.6562	.016	.1777	.0126
27	.68750	.0164	.84375	.0202	.7081	.7218	.017	.2002	.0142
26	.75000	.0179	.90625	.0217	.7725	.7875	.019	.2242	.0159
25	.87500	.0209	1.03125	.0247	.9013	.9187	.022	.2524	.0179
24	1.0000	.0239	1.15625	.0276	1.0300	1.0500	.025	.2834	.0201
23	1.1250	.0269	1.28125	.0306	1.1587	1.1813	.028	.3187	.0226
22	1.2500	.0299	1.40625	.0336	1.2875	1.3125	.031	.3567	.0253
21	1.3750	.0329	1.53125	.0366	1.4160	1.4437	.034	.4019	.0285
20	1.5000	.0359	1.65625	.0396	1.5450	1.5750	.038	.4512	.0320
19	1.7500	.0418	1.90625	.0456	1.8025	1.8375	.044	.5062	.0359
18	2.0000	.0478	2.15625	.0516	2.0600	2.1000	.050	.5682	.0403
17	2.2500	.0538	2.40625	.0575	2.3175	2.3625	.056	.6387	.0453
16	2.5000	.0598	2.65625	.0635	2.5750	2.6250	.063	.7163	.0508
15	2.8125	.0673	2.96875	.0710	2.8968	2.9531	.070	.8051	.0571
14	3.1250	.0747	3.28125	.0785	3.2187	3.2812	.078	.9038	.0641
13	3.7500	.0897	3.90625	.0934	3.8625	3.9375	.094	1.015	.0720
12	4.3750	.1046	4.53125	.1084	4.5063	4.5937	.109	1.139	.0808
11	5.0000	.1196	5.15625	.1233	5.1500	5.250U	.125	1.279	.0907
10	5.6250	.1345	5.78125	.1382	5.7937	5.9062	.141	1.437	.1019
9	6.2500	.1495	6.40625	.1532	6.4375	6.5625	.156	1.613	.1144
8	6.8750	.1644	7.03125	.1681	7.0813	7.2187	.172	1.812	.1285
7	7.5000	.1793						2.035	.1443
6	8.1250	.1943						2.284	.1620
5	8.7500	.2092						2.565	.1819
4	9.3750	.2242						2.881	.2043
3	10.0000	.2391						3.235	.2294

BENDING OF 4130 STEEL

Specification MIL-S-18729C states that 4130 steel .749 inch and less in thickness shall withstand bending without cracking at room temperature, with the axis of bending transverse to the direction of rolling, through an angle as indicated in the table. Condition N materials shall be bent around a diameter three times the thickness of the material. Test samples are bent cold either by pressure or blows. In the event of dispute, bending shall be by pressure. Paragraph 4.5.3 of the specification states that the formation of cracks not over 1/16" in aggregate lengths at the corners on the outside of the bend shall not be cause for rejection.

Thickness of Material Inches	Min. Angle of Bend Cond. N Degrees
Under .090	180
.090 to .187, Incl.	135
Over .187 to .249, Incl.	90
Over .249 to .749, Incl.	90

STEEL ALLOY DESIGNATIONS

STANDARD AISI AND SAE STEELS

Studies have been made in the steel industry for the purpose of establishing certain "standard" steels and eliminating as much as possible the manufacture of other steels which vary only slightly in composition from the standard steels, These standard steels are selected on the basis of serving the significant metallurgical and engineering needs of fabricators and users of steel products.

STANDARD CARBON STEELS

Definition. By common custom. steel is considered to be carbon steel when no minimum content is specified or required for aluminum, boron. chromium, cobalt, columbium, molybdenum. nickel, titanium, tungsten, vanadium or zirconium, or for any other element added to obtain a desired alloying effect; when the specified minimum for copper does not exceed 0.40 per cent; or when the maximum content specified for any of the following elements does not exceed the percentages noted: manganese 1.65, silicon 0.60, copper 0.60.

NUMBERING SYSTEM. In the AISI system of identification. the prefix "B" is used to designate acid bessemer steel. The letter "L'' within the grade number is used to identify leaded steels.
A four-numeral series is used to designate graduations of chemical composition of carbon steel. The last two numbers of which are intended to indicate the approximate middle of the carbon range. For example, in the grade designation 1035, 35 represents a carbon range of 0.32 to 0.38 per cent.
It is necessary, however. to deviate from this rule and to Interpolate numbers in the case of some carbon ranges and for variations in manganese, phosphorus or sulphur with the same carbon range.
The first two digits of the four-numeral series of the various grades of carbon steel and their meanings are as follows:

10xx	Nonresulphurized carbon steel grades
11xx	Resulphurized carbon steel grades
12xx	Rephosphorized and resulphurized carbon steel grades
I5xx	Nonresulphurized high manganese carbon steels.

STANDARD ALLOY STEELS

DEFINITION. Steel is considered to be alloy steel when the maximum of the range given for the content of alloying elements exceeds one or more of the following limits: manganese, 1.65 per cent; silicon, 0.60 per cent; copper, 0.60 per cent; or in which a definite range or a definite minimum quantity of any of the following elements is specified or required within the limits of the recognized field of constructional alloy steels: aluminum, boron, chromium up to 3.99 per cent, cobalt, columbium, molybdenum, nickel, titanium, tungsten, vanadium, zirconium or any other alloying element added to obtain a desired alloying effect.

NUMBERING SYSTEM. In the AISI numbering system, the prefix letter E is used to designate steels normally made only by the basic electric furnace process. Steels without a prefix letter are normally manufactured by the basic open hearth or basic oxygen processes, but may be manufactured by the basic electric furnace process with adjustments in phosphorus and sulphur limits.
The last two digits of the four-numeral series are intended to indicate the approximate middle of the carbon range. For example, in the grade designation 4142, 42 represents a carbon range of 0.40 to 0.45 per cent. (Where a five-numeral series occurs, the last three digits indicate the carbon content.) It is necessary, however, to deviate from this rule and to interpolate numbers in the case of some carbon ranges, and for variations in manganese, sulphur, chromium, or other elements.

The first two digits indicate the type of alloy according to alloying elements as follows:

13xx	Manganese 1.75 per cent
40xx	Molybdenum 0.20 or 0.25 per cent
41xx	Chromium 0.50, 0.80 or 0.95 per cent — Molybdenum 0.12, 0.20 or 0.30 per cent
43xx	Nickel 1.83 per cent—Chromium 0.50 or 0.80 percent —Molybdenum 0.25 per cent
44xx	Molybdenum 0.53 per cent
46xx	Nickel 0.85 or 1.83 per cent—Molybdenum 0.20 or 0.25 percent
47xx	Nickel 1.05 per cent Chromium 0.45 per cent
48xx	Nickel 3.50 per cent Molybdenum 0.25 per cent
50xx	Chromium 0.40 per cent
51xx	Chromium 0.80, 0.88, 0.93, 0.95 or 1.00 per cent
5xxxx	Carbon 1.04 per cent -- chromium 1.03 or 1.45 per cent
61xx	Chromium 0.60 or 0.95 per cent -- Vanadium 0.13 per cent or 0.15 per cent min.
86xx	Nickel 0.55 per cent --Chromium 0.50 per cent-- Molybdenum 0.25 per cent
87xx	Nickel 0.55 per cent -- Chromium 0.50 per cent -- Molybdenum 0.35
88xx	Nickel 0.55 per cent --Chromium 0.50 per cent -- Molybdenum 0.35
92xx	Silicon 2.00 per cent

EFFECTS OF COMMON ALLOYING ELEMENTS IN STEEL

By definition, steel is a combination of iron and carbon. Steel is alloyed with various elements to improve physical properties and to produce special properties, such as resistance to corrosion or heat. Specific effects of the addition of such elements are outlined below:

CARBON (C), although not usually considered as an alloying element, is the most important constituent of steel. It raises tensile strength, hardness and resistance to wear and abrasion. It lowers ductility, toughness and machinability.

MANGANESE (Mn) is a deoxidizer and degasifier and reacts with sulphur to improve forgeability. It increases tensile strength, hardness, hardenability and resistance to wear. It decreases tendency toward scaling and distortion. It increases the rate of carbon-penetration in carburizing.

PHOSPHORUS (P) increases strength and hardness and improves machinability. However, it adds marked brittleness or cold-shortness to steel.

SULPHUR (S) Improves machinability in free-cutting steels, but without sufficient manganese it produces brittleness at red heat. It decreases weldability, impact toughness and ductility.

SILICON (Si) is a deoxidizer and degasifier. It increases tensile and yield strength, hardness, forgeability and magnetic permeability.

CHROMIUM (Cr) increases tensile strength, hardness, hardenability. toughness, resistance to wear and abrasion. resistance to corrosion and scaling at elevated temperatures.

NICKEL (Ni) increases strength and hardness without sacrificing ductility and toughness. It also increases resistance to corrosion and scaling at elevated temperatures when introduced in suitable quantities in high chromium (stainless) steels.

MOLYBDENUM (Mo) increases strength, hardness, hardenability and toughness, as well as creep resistance and strength at elevated temperatures. It improves machinability and resistance to corrosion and it intensifies the effects of other alloying elements. In hot-work steels, it increases red-hardness properties.

TUNGSTEN (W) increases strength, hardness and toughness. Tungsten steels have superior hot-working and greater cutting efficiency at elevated temperatures.

VANADIUM (V) increases strength, hardness and resistance to shock impact. It retards grain growth, permitting higher quenching temperatures. It also enhances the red hardness properties of high speed metal cutting tools and intensifies the individual effects of other major elements.

COBALT (Co) Increases strength and hardness and permits higher quenching temperatures. It also intensifies the individual effects of other major elements in more complex steels.

ALUMINUM (Al) is a deoxidizer and degasifier. It retards grain growth and is used to control austenitic grain size. In nitriding steels it aids in producing a uniformly hard and strong nitrided case when used in amounts 1.00% - 1.25%.

LEAD (Pb), while not strictly an alloying element, is added to improve machining characteristics. It is almost completely insoluble in steel, and minute lead particles, well dispersed, reduce friction where the cutting edge contacts the work. Addition of lead also improves chip-breaking formations.

METAL HARDNESS & FINISHING DATA

HEAT TREATMENT OF STEEL

By thermal treatment, steel may be made harder or softer, stresses induced or relieved, mechanical properties increased or decreased, crystalline structure changed, machinability enhanced, etc. The terms used to describe such heat treatments and their effects are listed below.

NORMALIZE

Normalizing consists of uniform heating to a temperature slightly above the point at which grain structure is affected (known as the critical temperature), followed by cooling in still air to room temperature. This produces a uniform structure and hardness throughout.

ANNEAL

When not preceded by a descriptive adjective, annealing consists of heating to and holding at a suitable temperature, then allowing to cool slowly. Annealing removes stresses, reduces hardness, increases ductility and produces a structure favorable for formability.

Full Anneal - This term is synonymous with annealing and is used to differentiate anneal from bright anneal, stress relief anneal, etc.

Spherodize Anneal - This treatment is similar to full annealing except the steel is held at an elevated temperature for a prolonged period of time, followed by slow cooling in order to produce a microstructure where carbides exist in a globular or spheroidal form.

Soft Anneal - When maximum softness and ductility are required without change in grain structure, steel should be ordered soft annealed. This process consists of heating to a temperature slightly below the critical temperature and cooling in still air.

Stress Relief Anneal - Stress relieving is intended to reduce the residual stresses imparted to the steel in the drawing operation. It generally consists of heating the steel to a suitable point below the critical temperature followed by slow cooling.

Bright Anneal - This process consists of annealing in a closely controlled furnace atmosphere which will permit the surface to remain relatively bright.

QUENCH

Quenching consists of heating steel above the critical range, then hardening by immersion in an agitated bath of oil, water, brine or caustic. Quenching increases tensile strength, yield point and hardness. It reduces ductility and impact resistance. By subsequent tempering some ductility and impact resistance may be restored, but at some sacrifice of tensile strength, yield point and hardness.

TEMPER

Tempering is the reheating of steel, after quenching, to the specified temperature below the critical range, then air cooling. It is done in furnaces, oil or salt baths, at temperatures varying from 300 to 1200°F. Low tempering temperatures give maximum hardness and wear resistance. Maximum toughness is achieved at the higher temperatures.

RELATIONSHIP OF HARDNESS TO TENSILE STRENGTH OF CARBON & ALLOY STEEL

Brinell Indentation Diameter mm	Brinell Hardness Number		Rockwell Hardness Number		Tensile Strength (Approxi- 1000 psi
	Standard Ball	Tungsten Carbide Ball	B Scale	C Scale	
2.45	---	627	---	58.7	347
2.50	---	601	---	57.3	328
2.55	---	578	---	56.0	313
2.60	---	555	---	54.7	298
2.65	---	534	---	53.5	288
2.70	---	514	---	52.1	274
2.75	---	495	---	51.0	264
2.80	---	477	---	49.6	252
2.85	---	461	---	48.5	242
2.90	---	444	---	47.1	230
2.95	429	429	---	45.7	219
3.00	415	415	---	44.5	212
3.05	401	401	---	43.1	202
3.10	388	388	---	41.8	193
3.15	375	375	---	40.4	184
3.20	363	363	---	39.1	177
3.25	352	352	---	37.9	171
3.30	341	341	---	36.6	164
3.35	331	331	---	35.5	159
3.40	321	321	---	34.3	153
3.45	311	311	---	33.1	149
3.50	302	302	---	32.1	146
3.55	293	293	---	30.9	141
3.60	285	285	---	29.9	138
3.65	277	277	---	28.8	134
3.70	269	269	---	27.6	130
3.75	262	262	---	26.6	127
3.80	255	255	---	25.4	124
3.85	248	248	---	24.2	120
3.90	241	241	100.00	22.8	116
3.95	235	235	99.0	21.7	114
4.00	229	229	98.2	20.5	111
4.05	223	223	97.3	---	104
4.10	217	217	96.4	---	103
4.15	212	212	95.5	---	100
4.20	207	207	94.6	---	99
4.25	201	201	93.8	---	97
4.30	197	197	92.8	---	94
4.35	192	192	91.9	---	92
4.40	187	187	90.7	---	90
4.45	183	183	90.0	---	89
4.50	179	179	89.0	---	88
4.55	174	174	87.8	---	86
4.60	170	170	86.8	---	84
4.65	167	167	86.0	---	83
4.70	163	163	85.0	---	82
4.80	156	156	82.9	---	80
4.90	149	149	80.8	---	73
5.00	143	143	78.7	---	71
5.10	137	137	76.4	---	67
5.20	131	131	74.0	---	65
5.30	126	126	72.0	---	63
5.40	121	121	69.0	---	60
5.50	116	116	67.6	---	58
5.60	111	111	65.7	---	56

** This table, which is based on ASTM A 370-68, Table III, lists the approximate relationship of hardness values to corresponding approximate tensile strength values of steels. Some compositions and processing histories may deviate from these relationships. The data in this table do not represent hardness-to-tensile strength conversions for austenitic, ferritic, and martensitic stainless steel. If more precise conversions are required, they should be developed for each specific composition and heat treatment. Related Rockwell superficial hardness numbers, if of interest, may be found in ASTM A 370-68.*

METAL FINISHING DATA

Cadmium Plating - a nonporous electrolytically deposited layer of cadmium that offers better corrosion resistance for steel than zinc coating. Plating is per specification MIL-P-416A (or equivalent commercial specification QQ-P-416A). Three types of cadmium plating are considered in this specification:

- ***Type I*** – Pure silver-colored cadmium plate, without supplementary treatment. This type of cadmium coating was used on all steel aircraft hardware in the past.
- ***Type II*** – This consists of Type I plating followed by a chromate treatment. Type II plating is a light to dark gold color. It has improved corrosion resistance. Procurement specifications for aircraft hardware now specify Type II plating.
- ***Type III*** – This is Type I coating followed by a phosphate treatment. It is used mainly as a paint base.

In addition to the type of plating, MIL-P-416A also defines the plating thickness in terms of the following classes:

Class 1 - .0005" minimum, Class 2 - .0003" minimum, Class 3 - .0002" min. Steel parts with a Rockwell hardness greater than Rc40 (approx. 180,000 PSI tensile strength) must be stress relieved before cleaning and plating, and if they are subject to flexure (springs, etc.) they must be baked at 375°F. within 30 minutes after plating to prevent hydrogen embrittlement.

Anodizing - This finish, applied to aluminum by an acid plating process, hardens the surface, reduces porosity, increases abrasion resistance and has high dielectric strength. Anodized aluminum can be dyed almost any color. Specification MIL-A-8625B covers three types of anodizing:

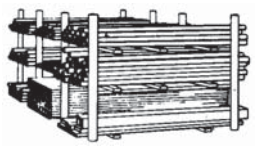
- ***Type I*** – Chromic anodize coating will vary from a light to a dark gray color, depending on the alloy. Coating is given a chromate treatment to seal surface.
- ***Type II*** – Sulfuric anodize coating is the best coating for dying (Class 2). Non-dyed (Class 1) coatings will have a dull yellow-green (gold) appearance when sealed with a chromate treatment.
- ***Type III*** – Hard anodize coating can be used as an electrical insulation coating or as an abrasion resisting coating on devices such as hydraulic cylinders, wear surfaces and actuating cams.

Bonderizing - a chemical process which rust proofs steel and supplies a base for paint or enamel. This treatment is used on AN301 steel aircraft nails.

Phosphate Coating - is a light coating applied to steel parts as a paint base. Most Tinnerman speed nuts are phosphate coated before painting with olive drab paint.

4130 STRUCTURAL TUBING

4130 ALLOY STEEL ROUND SEAMLESS TUBING MIL-T-6736 NORMALIZED /ANNEALED



4130 is a chromium-molybdenum general purpose alloy steel tubing that is weldable and is capable of developing good strength. It has been for years the standard of the aircraft industry. Tensile Strength: 90,000 PSI. The stock sizes listed below can be furnished in lengths from 1 foot to 12 feet. Large orders are filled in random lengths from 10 to 12 feet unless specific lengths are requested. No charge is made for cutting stock sizes of tubing to mailable length. Quotations furnished on unlisted sizes.

IF MFG TEST REPORTS ARE REQUIRED THERE IS A MINIMUM $25.00 CHARGE PER ORDER. CHARGE IS HIGHER IF MORE THAN 5 ITEMS. P/N "CERTS" - PLEASE INDICATE AT TIME OF ORDER

ME

O.D. (In.)	Wall Thickness	I.D. (In.)	Wt. Per Ft.	Part No.	Price Per Ft.
3/16	.028	.131	.0478	03-00100	.
1/4	.028	.194	.0672	03-00250	.
	.035	.180	.0804	03-00300	.
	.049	.152	.1052	03-00400	.
	.058	.134	.1189	03-00500	.
	.065	.120	.1284	03-00510	.
5/16	.028	.256	.0852	03-00600	.
	.035	.243	.1039	03-00700	.
	.049	.215	.1382	03-00800	.
	.058	.196	.1580	03-00810	.
	.065	.182	.1722	03-00900	.
	.095	.123	.2212	03-01000	.
3/8	.028	.319	.1038	03-01100	.
	.035	.305	.1271	03-01200	.
	.049	.277	.1706	03-01300	.
	.058	.259	.1964	03-01400	.
	.065	.249	.2152	03-01500	.
	.083	.209	.2588	03-01600	.
	.095	.185	.2841	03-01610	.
7/16	.035	.367	.1506	03-01700	.
	.049	.340	.2036	03-01800	.
	.065	.307	.2589	03-02000	.
	.095	.247	.3480	03-02100	.
	.120	.197	.4075	03-02200	.
1/2	.028	.444	.1411	03-02300	.
	.035	.430	.1738	03-02400	.
	.049	.402	.2360	03-02500	.
	.058	.384	.2738	03-02600	.
	.065	.370	.3020	03-02700	.
	.083	.334	.3696	03-02710	.
	.095	.310	.4109	03-02800	.
	.120	.260	.4870	03-02900	.
9/16	.035	.492	.1974	03-03000	.
	.049	.464	.2690	03-03100	.
	.065	.432	.3457	03-03200	.
	.120	.322	.5677	03-03400	.
5/8	.028	.569	.1785	03-03500	.
	.035	.555	.2205	03-03600	.
	.049	.527	.3014	03-03700	.
	.058	.509	.3512	03-03800	.
	.065	.495	.3888	03-03900	.
	.095	.435	.5377	03-04000	.
	.120	.385	.6472	03-04100	.
	.156	.313	.7814	03-04110	.
3/4	.028	.694	.2159	03-04250	.
	.035	.680	.2673	03-04300	.
	.049	.652	.3668	03-04400	.
	.058	.634	.4287	03-04500	.
	.065	.620	.4755	03-04600	.
	.095	.560	.6646	03-04700	.
	.120	.510	.8074	03-04800	.
	.156	.437	.9897	03-04900	.
	.188	.375	1.128	03-05000	.
7/8	.035	.805	.3140	03-05300	.
	.049	.777	.4323	03-05400	.
	.058	.759	.5061	03-05500	.
	.065	.745	.5623	03-05600	.
	.083	.709	.7021	03-05700	.
	.095	.685	.7914	03-05800	.
	.120	.635	.9676	03-05900	.
	.188	.500	1.379	03-06000	.

Please call for price on any unlisted size.
Discount of 10% for 100 ft. or more of the same part number.

O.D. (In.)	Wall Thickness	I.D. (In.)	Wt. Per Ft.	Part No.	Price Per Ft.
1	.028	.944	.2907	03-06110	.
	.035	.930	.3607	03-06100	.
	.049	.902	.4977	03-06200	.
	.058	.884	.5835	03-06300	.
	.065	.870	.6491	03-06400	.
	.083	.---	.---	03-06450	.
	.095	.810	.9182	03-06500	.
	.120	.760	1.128	03-06600	.
	.156	.687	1.406	03-06700	.
	.188	.625	1.630	03-06800	.
1-1/8	.035	1.055	.4074	03-06900	.
	.049	1.027	.5631	03-07000	.
	.058	1.009	.6609	03-07100	.
	.065	.995	.7359	03-07200	.
	.095	.935	1.045	03-07300	.
	.120	.885	1.288	03-07400	.
1-1/4	.035	1.180	.4542	03-07500	.
	.049	1.152	.6285	03-07600	.
	.058	1.134	.7384	03-07700	.
	.065	1.120	.8226	03-07800	.
	.083	1.084	2.132	03-07810	.
	.095	1.060	1.172	03-07900	.
	.120	1.010	1.448	03-08000	.
	.156	.938	1.823	03-08100	.
1-3/8	.035	1.305	.5009	03-08210	.
	.049	1.277	.6939	03-08200	.
	.058	1.259	.8158	03-08300	.
	.065	1.245	.9094	03-08400	.
	.095	1.185	1.299	03-08500	.
	.120	1.135	1.609	03-08600	.
	.188	1.000	2.383	03-08700	.
1-1/2	.035	1.430	.5476	03-08800	.
	.049	1.402	.7593	03-08900	.
	.058	1.384	.8932	03-09000	.
	.065	1.370	.9962	03-09100	.
	.083	1.334	1.256	03-09110	.
	.095	1.310	1.426	03-09200	.
	.120	1.260	1.769	03-09300	.
	.188	1.125	2.634	03-09400	.
1-5/8	.058	1.509	.9707	03-09600	.
	.065	1.495	1.083	03-09700	.
	.083	1.459	1.10	03-00042	.
	.095	1.435	1.552	03-09800	.
	.120	1.385	1.929	03-09900	.
	.156	1.312	2.447	03-10000	.
	.188	1.250	2.885	03-10100	.
1-3/4	.049	1.652	.8902	03-10200	.
	.058	1.634	1.048	03-10210	.
	.065	1.620	1.170	03-10300	.
	.095	1.560	1.679	03-10400	.
	.120	1.510	2.089	03-10500	.
	.188	1.375	3.136	03-10510	.
1-7/8	.250	1.375	2.249	03-10600	.
2	.049	1.902	1.021	03-10710	.
	.065	1.870	1.343	03-10800	.
	.095	1.810	1.933	03-10900	.
	.120	1.760	2.409	03-11000	.
2-1/4	.120	2.010	2.730	03-11100	.
2-1/2	.250	2.000	6.008	03-11206	.
	.120	2.260	3.050	03-11200	.
2-3/4	.120	2.510	3.370	03-11210	.

Ordering tubing/bar by the foot.
Add a dash number after part number to indicate length of tubing required.
Ex: 3 ft required add -3, 03-00100-3.

4130 TUBING KITS

We furnish complete 4130 tubing kits for a variety of aircraft designs including the Skybolt, Pitts Special, Acro Sport, Starduster, Osprey, and many more. The kits contain sufficient round, square, & streamline tubing to produce the pieces shown on our materials list for each design. We urge the builder to verify his own materials list against ours. Request kit list you require & current quotation. Enjoy big savings by purchasing a complete tubing kit for your aircraft at one time.

TUBE SEAL (LINE OIL)

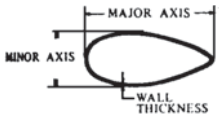
Prevents rust and corrosion inside aircraft tubing structures. Will climb tubing wall and spread over entire surface. Will penetrate and reveal small pin holes in a weld and in time, due to exposure, will congeal and seal the hole. Directions on label. One quart will treat two light aircraft fuselages. Quart..... P/N 03-14000.....

BARGAIN BAG 4130 TUBING

Starter Kit - An assortment of 4130 tubing, rod and bar in short lengths to practice welding. At least 15 ft. of tubing in assorted sizes and wall thicknesses. Furnished subject to availability of cutoffs.

P/N 03-15900 .....

STEEL TUBING & ROD



4130 STREAMLINE TUBING MIL-T6736 NORMALIZED

The prices for streamline tubing have increased sharply. The only manufacturer of streamline tubing, Columbia Summerill, have encountered problems with cracking on the trailing edge intermittently for many years and it has been a worrisome problem for builders. In an effort to control the situation, Columbia Summerill have installed sophisticated inspection equipment in their plant to assure that no cracked tubing gets into the field again. The cost of the equipment is reflected in the prices for the tubing which must be shared by all.

Major Axis	Minor Axis	Wall	Equivalent Round Tension	Equivalent Tubing Compr.	Wt./ Ft.	Part No.	Price Per Ft
1.012	.428	.035	3/4”	1/2”	.2687	03-11300	.
1.180	.500	.035	7/8”	7/16”	.3140	03-11400	.
1.349	.571	.049	1”	5/8”	.4977	03-11500	.
1.685	.714	.049	1-1/4”	3/4”	.6285	03-11600	.
2.023	.857	.049	1-1/2”	1”	.7593	03-11700	.
2.360	1.000	.049	1-3/4”	1-1/8”	.8902	03-11800	.
2.697	1.143	.049	2”	1-1/4”	1.021	03-11900	.
3.372	1.429	.049	2-1/2”	1-1/2”	1.283	03-12000	.

4130 AIRFRAME SQUARE & RECTANGULAR TUBING MIL-T-6736 NORMALIZED

O.D. (In.)	Wall (In.)	Weight Per Ft.	Part No.	Price Per Ft.
3/8 x 3/8	.049	.2172	03-12100	.
1/2 x 1/2	.035	.2213	03-12200	.
	.049	.3005	03-12300	.
1/2 x 1	.065	.6055	03-12350	.
5/8 x 5/8	.035	.2808	03-12400	.
	.049	.4234	03-12500	.
	.065	.388	03-12600	.
3/4 x 3/4	.035	.3403	03-12700	.
	.049	.4671	03-12800	.
	.058	.5454	03-12900	.
	.065	.6055	03-13000	.
7/8 x 7/8	.035	.3998	03-13100	.
	.049	.5504	03-13200	.
	.065	.7160	03-13300	.
1 x 1	.035	.4593	03-13400	.
	.049	.6337	03-13500	.
	.065	.8265	03-13700	.
3/4 x 1-1/2	.049	.9057	03-13900	.
1 x 1-3/4	.065	1.158	03-13950	.

E-4340 ROUND STEEL ROD

SPEC. MIL-S-8503 COLD FINISHED ANNEALED

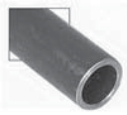
E4340 rod has high fatigue strength and maintains its hardness and strength qualities even at high temperatures. Excellent for use in highly stressed parts. Meets AMS2032 and is furnished normalized and tempered cold finished.

Dia. (In.)	Wt./Ft. (Lbs.)	Part No.	Price / Ft.
1	2.67	03-26700	.
1-1/4	4.173	03-26850	.
1-3/8	5.049	03-26900	.
2	11.20	03-26950	.

STAINLESS STEEL ROD TYPE 304 CD

3/16” Diameter type 304 CD stainless steel rod. Used in “new canard” for Long-EZ as specified by RAF.

P/N 03-26600 ..... **./ft.**



STAINLESS STEEL TUBING

Tubing Type	O D.	Wall	Part No.	Price/Ft.
304 Welded	3/8”	.028”	03-16100	.
321 Welded	1-1/2”	.035”	03-16300	.
321 Welded	1- 3/4”	.035”	03-16400	.
321 Welded	2”	.035”	03-16500	.
304 Seamless	1/8	.020”	03-00148	.
304 Seamless	1/8”	.035”	03-16010	.
304 Seamless	3/16”	.035”	03-16020	.
304 Seamless	1/4”	.035”	03-16030	.
304 Seamless	5/16”	.035”	03-16040	.
304 Seamless	3/8”	.035”	03-16045	.
304 Seamless	1/2”	.035”	03-16050	.
304 Seamless	5/8”	.035”	03-16060	.
321 Seamless	1-1/4”	.028”	03-16540	.
321 Seamless	1-1/2”	.035”	03-16560	.

BUSHING STOCK 1015/1020 STEEL

Seamless mechanical tubing may be used either statically or dynamically. Its close tolerance, good finish and dense structure make it ideal for parts such as shafts, bushings, bearings, etc. Tensile strength 80,000 PSI. Drill or ream for proper bolt fit.

SPECIFY CUTTING INSTRUCTIONS FOR SHIPMENT

O.D.	I.D.	Wall	Part No.	Price/Ft.
1/4”	1/8”	.065”	03-16550	.
3/8”	1/4”	.065”	03-16700	.
1/2”	3/8”	.065”	03-16900	.
5/8”	1/2”	.065”	03-17100	.

ROUND BRASS SEAMLESS TUBING

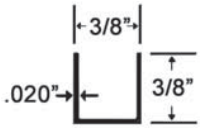
O.D.	I.D	Wall	Part No.	Price / Ft.
1 /4”	3/16”	.032”	03-17300	.
5 /16”	3/16”	.065”	03-17400	.
7 / 16”	5/16”	.065”	03-17600	.
1/ 2”	3/8”	.065”	03-17800	.
5 / 8”	3/8”	.125”	03-17900	.

4130 ROUND STEEL ROD COLD FINISHED

SPEC. MLL-S-6758A-NORMALIZED

Dia (In.)	Wt./Ft.	Part No.	Price / Ft.
1/8	.042	03-20100	.
3/16	.092	03-20200	.
1/4	.167	03-20300	.
5/16	.261	03-20400	.
3/8	.376	03-20500	.
7/16	.511	03-20600	.
1/2	.668	03-20700	.
9/16	.845	03-20800	.
5/8	1.043	03-20900	.
3/4	1.502	03-21000	.
7/8	2.044	03-21100	.
1	2.670	03-21200	.
1-1/4	4.173	03-21300	.
1-3/8	5.049	03-21400	.
1-1/2	6.008	03-21500	.
1-3/4	8.178	03-21600	.

Ordering tubing/bar by the foot. Add a dash number after part number to indicate length of tubing required. Ex: 3 ft required add -3, 03-00100-3.

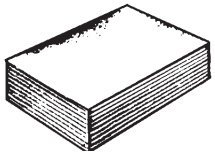


3/8” PIPER CHANNEL

Available in mild steel. 0.020” thick.
6-ft. length .....P/N 03-46600 .....

ME

4130 SHEET



4130 STEEL SHEETS & STRIPS MIL-S-6345A NORMALIZED

This chromium-molybdenum alloy is one of the most widely used aircraft steels because of its combination of weldability, ease of fabrication and mild hardenability. It will respond to heat treatment to high strength levels and yet, in the annealed condition, it has adequate strength for many applications. Used for the manufacture of parts and components. Tensile strength 75,000-85,000 PSI. Furnished cold-rolled and oiled in sheet thicknesses of .025-.125 inch. Sheets of .190-.250 inch and greater thickness are hot-rolled, pickled and oiled. Sheared to sheet and strip sizes listed below. Subject to availability of normalized sheet, annealed 4130 sheet may be substituted.

ME

4130 STEEL SHEET

Thickness (In.)	Price per Piece												
	6" x 12'		9" x 9"		9" x 18"		18" x 18"		18" x 36"		18" x 72"		Wt.**
	Part No.	Price	Part No.	Price	Part No.	Price	Part No.	Price	Part No.	Price	Part No.	Price	(Lbs.)
.025	03-21800	.	03-21850	.	03-21900	.	03-22000	.	03-22100	.	03-22150	.	2.30
.032	03-22510	.	03-22515	.	03-22520	.	03-22525	.	03-22530	.	03-22535	.	---
.040	03-22600	.	03-22650	.	03-22700	.	03-22800	.	03-22900	.	03-22950	.	3.75
.050	03-23000	.	03-23050	.	03-23100	.	03-23200	.	03-23300	.	03-23350	.	4.80
.063	03-23400	.	03-23450	.	03-23500	.	03-23600	.	03-23700	.	03-23750	.	5.85
.071	03-23800	.	03-23850	.	03-23900	.	03-24000	.	03-24100	.	03-24150	.	6.55
.080	03-24200	.	03-24250	.	03-24300	.	03-24400	.	03-24500	.	03-24550	.	7.15
.090	03-24600	.	03-55500	.	03-24700	.	03-24800	.	03-24900	.	03-24950	.	8.15
.100	03-25000	.	---	---	03-25100	.	03-25200	.	03-25300	.	03-25350	.	10.45
.125	03-55300	.	03-25370	.	03-25400	.	03-25500	.	03-25600	.	---	---	11.25
.190	---	--	03-25660	.	03-25700	.	03-25750	.	03-26025	.	---		17.50
.250	---	---	03-25850	.	03-25900	.	03-25950	.	03-26050	.	---	---	26.05

***** Wt. per 18" x 18" sheet.***

Less 10% discount on 6 sheets 18" x 36" or 3 sheets of 18" x 72" per part number.

4130 STEEL STRIPS

Thickness	Size	Part No.	Price*
.025	5/8" x 72"	03-18000	.
.025	1" x 72"	03-18100	.
.032	5/8" x 72"	03-18110	.
.032	1" x 72"	03-18120	.
.032	2" x 72"	03-18130	.
.032	3" x 72"	03-18140	.
.040	5/8" x 72	03-18200	.
.040	1" x 72"	03-18300	.
.040	2" x 72"	03-18310	.
.040	3" x 72"	03-18320	.
.050	1" x 72"	03-18400	.
.050	2" x 72"	03-18410	.
.050	3" x 72"	03-18420	.
.063	5/8" x 72"	03-18500	.
.063	3/4" x 72"	03-18600	.
.063	1" x 72"	03-18700	.
.063	1-1/4" x 72"	03-18800	.
.063	1-1/2" x 72"	03-18900	.
.063	2" x 72"	03-19000	.
.063	3" x 72"	03-19100	.
.071	5/8" x 72"	03-19180	.
.071	1" x 72"	03-19200	.
.071	2" x 72"	03-19210	.
.071	3" x 72"	03-19220	.
.080	5/8" x 72"	03-19280	.
.080	1" x 72"	03-19290	.
.080	2" x 72"	03-19300	.
.090	1" x 72"	03-19400	.
.090	1-1/2" x 72"	03-19500	.
.090	2" x 72"	03-19520	.
.090	3" x 72"	03-19600	.
.100	1" x 72"	03-19610	.
.100	1-1/2" x 72"	03-19620	.
.100	3" x 72"	03-19630	.
.125	1" x 72"	03-19700	.
.125	1-1/2" x 72"	03-19800	.
.125	2" x 72"	03-19820	.
.125	3" x 72''	03-19900	.
.250	1-1/4" x 18"	03-20000	.

**** 3-Ft. lengths available at the half price of 6' lengths.***

6 ft. lengths are subject to UPS oversize charges. Consider 3 ft. lengths which ship at cheaper rates

4130 STEEL SHEET

(As Used in Christavia Kits)

Thickness	Size	Part No.	Price
.040	8" x8"	03-56302	.
.040	12" x 12"	03-56304	.
.040	12" x 20"	03-56316	.
.040	10" x 26'	03-56312	.
.040	12" x 24"	03-56306	.
.040	14" x 30"	03-56308	.
.040	18" x30"	03-56310	.
.040	24" x 24"	03-56314	---
.050	4" x 24"	03-56320	.
.050	12" x 12"	03-56318	.
.050	8" x 24"	03-56322	.
.050	12" x 24"	03-56324	.
.063	10" x 10"	03-56326	.
.063	10" x 14"	03-56332	.
.063	12" x 12"	03-56328	.
.063	12" x 24"	03-56330	.
.071	4" x 4"	03-56334	.
.071	12" x 12"	03-56336	.
.071	12" x 24"	03-56338	.
.080	2" x 10"	03-56354	.
.080	12" x 24"	03-56340	.
.090	2" x 10"	03-56344	.
.090	6" x 8"	03-56342	.
.090	12" x 24"	03-56346	.
.125	10" x 24"	03-56348	.
.125	12" x 24"	03-56350	.

E4340 RECTANGULAR FLAT STEEL

SPEC. MIL-S-5000 ANNEALED

This chromium-nickel-molybdenum alloy, "king" of the hardening grades of alloy steels, possesses much deeper hardenability than the 4100 series. The fatigue-tensile ratio makes it ideal for highly stressed parts such as landing gear legs, and is often referred to as "spring steel". Tensile strength is about 110,000 PSI. It is difficult to weld but can be welded by any of the common welding processes providing the section is preheated and stress relieved after welding.

Size (In.)	Wt./Ft (Lbs.)	Part No.	Price/Ft.
1/4 x 1-1/2	1.275	03-26100	.
1/4 x 2	1.702	03-26150	.
3/8 x 2	2.550	03-26200	.
1/2 x 3	5.100	03-26300	.
1/2 x 4	6.800	03-26400	.

VACUUM MELTED LOW ALLOY 4130 STEEL WELDING WIRE

This high quality welding rod is produced from vacuum melted material. This material has ultra-low levels of oxygen, hydrogen, and nitrogen and is extremely low in trace elements. This rod is cleaner than standard rods and is the best available for 4130 welding. .062 dia. 36" long. Appro. 32 units per pound.

P/N 03-27600 ..... **/lb.**

BRASS BRAZING ROD

1/16" ..... P/N 03-27625 ..... **/lb.**
3/32" ..... P/N 03-00118 ..... **/lb.**

OXWELD WELDING ROD

For big-strength welds in steel plate, sheet, structural shapes, pipe and steel castings. Supplied in 36" lengths in sizes 1/16", 3/32" and 1/8".

NO. 32CMS – Recommended for 4130 steel structures for most satisfactory results. This rod is heat-treatable after welding.

1/16" Dia .....P/N 03-27000 ..... **/lb.**
3/32" Dia .....P/N 03-27100 ..... **/lb.**
1/8" Dia. .....P/N 03-27200 ..... **/lb.**

NO. 7 – Used in general commercial welding and by many mechanics for non-heat-treated airframe repairs.

1/16" Dia.....P/N 03-27300 ..... **/lb.**
3/32" Dia.....P/N 03-27400 ..... **/lb.**
1/8" Dia.....P/N 03-27500 ..... **/lb.**

WELD BRUSH

Stainless steel bristles set in curved wooden handle. Just right for cleaning welds. 1/2" Wide x 8" Long.

P/N 03-26500 .....

For Alumium Welding Rod, see page 71.
For Welding Equipment, see pages 658-660.

ALUMINUM – THE MOST COMMON GRADES

1100 This grade is commercially pure aluminum. It is soft and ductile and has excellent workability. It is ideal for applications involving intricate forming because it work hardens more slowly than other alloys. It is the most weldable of aluminum alloys, by any method. It is non heat-treatable. It has excellent resistance to corrosion and is widely used in the chemical and food processing industries. It responds well to decorative finishes which make it suitable for giftware.

2011 This is the most free-machining of the common aluminum alloys. It also has excellent mechanical properties. Thus, it is widely used for automatic screw machine products in parts requiring extensive machining.

2014 & 2017 The 2017 alloy combines excellent machinability and high strength with the result that it is one of the most widely used alloys for automatic screw machine work. It is a tough, ductile alloy suitable for heavy-duty structural parts. Its strength is slightly less than that of 2014.

2024 This is one of the best known of the high strength aluminum alloys. With its high strength and excellent fatigue resistance, it is used to advantage on structures and parts where good strength-to-weight ratio is desired. It is readily machined to a high finish. It is readily formed in the annealed condition and may be subsequently heat treated. Arc or gas welding is generally not recommended, although this alloy may be spot, seam or flash welded. Since corrosion resistance is relatively low, 2024 is commonly used with an anodized finish or in clad form ("Alclad") with a thin surface layer of high purity aluminum. Applications: aircraft structural components, aircraft fittings, hardware, truck wheels and parts for the transportation industry.

3003 This is the most widely used of all aluminum alloys. It is essentially commercially pure aluminum with the addition of manganese which increases the strength some 20% over the 1100 grade. Thus, it has all the excellent characteristics of 1100 with higher strength. It has excellent corrosion resistance. It has excellent workability and it may be deep drawn or spun, welded or brazed. It is non heat treatable. Applications: cooking utensils, decorative trim, awnings, siding, storage tanks, chemical equipment.

5005 This alloy is generally considered to be an improved version of 3003. It has the same general mechanical properties as 3003 but appears to stand up better in actual service. It is readily workable. It can be deep drawn or spun, welded or brazed. It has excellent corrosion resistance. It is non heat-treatable. It is well suited for anodizing and has less tendency to streak or discolor. Applications same as 3003.

5052 This is the highest strength alloy of the more common non heat-treatable grades. Fatigue strength is higher than most aluminum alloys.In addition this grade has particularly good resistance to marine atmosphere and salt water corrosion. It has excellent workability. It may be drawn or formed into intricate shapes and its slightly greater strength in the annealed condition minimizes tearing that occurs in 1100 and 3003. Applications: Used in a wide variety of applications from aircraft components to home appliances, marine and transportation industry parts, heavy duty cooking utensils and equipment for bulk processing of food.

5083 & 5086 For many years there has been a need for aluminum sheet and plate alloys that would offer, for high strength welded applications, several distinct benefits over such alloys as 5052 and 6061. Some of the benefits fabricators have been seeking are greater design efficiency, better welding characteristics, good forming properties, excellent resistance to corrosion and the same economy as in other non heat-treatable alloys. Metallurgical research has developed 5083 and 5086 as superior weldable alloys which fill these needs. Both alloys have virtually the same characteristics with 5083 having slightly higher mechanical properties due to the increased manganese content over 5086. Applications: unfired pressure vessels, missile containers, heavy-duty truck and trailer assemblies, boat hulls and superstructures.

6061 This is the least expensive and most versatile of the heat-treatable aluminum alloys. It has most of the good qualities of aluminum. It offers a range of good mechanical properties and good corrosion resistance. It can be fabricated by most of the commonly used techniques. In the annealed condition it has good workability. In the T4 condition fairly severe forming operations may be accomplished. The full T6 properties may be obtained by artificial aging. It is welded by all methods and can be furnace brazed. It is available in the clad form ("Alclad") with a thin surface layer of high purity aluminum to improve both appearance and corrosion resistance. Applications: This grade is used for a wide variety of products and applications from truck bodies and frames to screw machine parts and structural components. 6061 is used where appearance and better corrosion resistance with good strength are required.

6063 This grade is commonly referred to as the architectural alloy. It was developed as an extrusion alloy with relatively high tensile properties, excellent finishing characteristics and a high degree of resistance to corrosion. This alloy is most often found in various interior and exterior architectural applications, such as windows, doors, store fronts and assorted trim items. It is the alloy best suited for anodizing applications - either plain or in a variety of colors.

7075 This is one of the highest strength aluminum alloys available. Its strength-to weight ratio is excellent and it is ideally used for highly stressed parts. It may be formed in the annealed condition and subsequently heat treated. Spot or flash welding can be used, although arc and gas welding are not recommended. It is available in the clad ("Alclad") form to improve the corrosion resistance with the over-all high strength being only moderately affected. Applications: Used where highest strength is needed.

ALUMINUM ALLOY DESIGNATIONS

ALUMINUM ALLOY DESIGNATIONS

The aluminum industry uses a four-digit index system for the designation of its wrought aluminum alloys.

As outlined below, the first digit indicates the alloy group according to the major alloying elements.

1XXX SERIES

In this group. minimum aluminum content is 99%. and there is no major alloying element.

The second digit indicates modifications in impurity limits. If the second digit is zero, there is no special control on individual impurities. Digits 1 through 9, which are assigned consecutively as needed, indicate special control of one or more individual impurities.

The last two digits indicate specific minimum aluminum content. Although the absolute minimum aluminum content in this group is 99% the minimum for certain grades is higher than 99%, and the last two digits represent the hundredths of a per cent over 99.

Thus, 1030 would indicate 99.30% minimum aluminum. without special control on individual impurities. The designations 1130, 1230, 1330, etc.. indicate the same purity with special control on one or more impurities. Likewise. 1100 indicates minimum aluminum content of 99.00% with individual impurity control.

2XXX THROUGH 9XXX SERIES

The major alloying elements are indicated by the first digit, as follows:

2xxx	Copper
3xxx	Manganese
4xxx	Silicon
5xxx	Magnesium
6xxx	Magnesium and silicon
7xxx	Zinc
8xxx	Other element
9xxx	Unused series

The second digit indicates alloy modification. If the second digit is zero. it indicates the original alloy: digits 1 through 9, which are assigned consecutively, indicate alloy modifications. The last two digits have no special significance, serving only to identify the different alloys in the group.

EXPERIMENTAL ALLOYS

Experimental alloys are designated according to the four digit system, but they are prefixed by the letter X. The prefix is dropped when the alloy becomes standard. During development, and before they are designated as experimental, new alloys are identified by serial numbers assigned by their originators. Use of the serial number is discontinued when the X number is assigned.

ALUMINUM TEMPER DESIGNATIONS

Temper designations of wrought aluminum alloys consist of suffixes to the numeric alloy designations. For example, in 3003-H14, 3003 denotes the alloy and “H14” denotes the temper, or degree of hardness. The temper designation also reveals the method by which the hardness was obtained. Temper designations differ between non heat-treatable alloys and heat-treatable alloys. and their meanings are given below:

NON HEAT-TREATABLE ALLOYS

The letter “H” is always followed by 2 or 3 digits. The first digit indicates the particular method used to obtain the temper. as follows:

— Hl means strain hardened only.

— H2 means strain hardened, then partially annealed.

— H3 means strain hardened, then stabilized.

The temper is indicated by the second digit as follows:

2	1/4 hard
4	I/2 hard
6	3/4 hard
8	full hard
9	extra hard

Added digits indicate modification of standard practice.

HEAT-TREATABLE ALLOYS

-F	As fabricated
-O	Annealed
-T	Heat treated

The letter “T” is always followed by one or more digits. These digits indicate the method used to produce the stable tempers, as follows:

-T3	Solution heat treated, then cold worked.
-T351	Solution heat treated, stress-relieved stretched, then cold worked.
-T36	Solution heat treated, then cold worked (controlled).
-T4	Solution heat treated, then naturally aged.
-T451	Solution heat treated, then stress relieved stretched.
-T5	Artificially aged only.
-T6	Solution heat treated, then artificially aged.
-T61	Solution heat treated (boiling water quench), then artificially aged.
-T651	Solution heat treated, stress-relieved stretched, then artificially aged (precipitation heat treatment).
-T652	Solution heat treated, stress relieved by compression. then artificially aged.
-T7	Solution heat treated, then stabilized.
-T8	Solution heat treated, cold worked, then artificially aged.
-T81	Solution heat treated, cold worked (controlled), then artificially aged.
-T851	Solution heat treated, cold worked, stress-relieved stretched, then artificially aged.
-T9	Solution heat treated, artificially aged, then cold worked.
-T10	Artificially aged, then cold worked.
	Added digits indicate modification of standard practice.

COMPARISON OF MODERN & OLD SYSTEMS OF ALUMINUM ALLOY DESIGNATION

Although the old system of aluminum identification has been obsolete for many years, stock with the old markings is still occasionally found. The following comparison is presented as an aid in identifying such materials in terms of the modern system.

In the old system, alloy composition was indicated by a one- or two-digit number followed by the letter “S” to indicate that it was a wrought alloy, i.e., an alloy that could be shaped by rolling, drawing or forging. Any variation in the basic composition was indicated by a letter preceding the numerical alloy designation. For example, A17S was a modification of the basic alloy 17S. In modern terminology these two alloys are designated 2117S and 2017S, respectively. Temper was designated by a second letter: “O” for soft (annealed), “H”for strain hardness of non heat-treatable alloys, and “T”for hardness of heat-treatable alloys. Degree of hardness of non heat-treatable alloys was indicated by a fraction preceding the letter “H”. For example, 3S1/4H would be quarter-hard 3S alloy.

The following Table gives examples of the old and modern designations of some common aluminum alloys.

Modern System	*Old System*
1100	2S
3003	3S
3003-0	3SO
2014	14S
2017	17S
2117	A17S
2018	18S
2218	B18S
2024T	24ST
5052	52S
7075T6	75ST6

ALUMINUM PLATE & SHEET DATA

ALUMINUM ALLOY CHARACTERISTICS

	Alloy	Temper	Gen'l. Availability: Flat Sheet	Coil Sheet	Cut to Length Sheet	Plate	Typical Characteristics*: Corrosion Resistance	Cold Workability	Machinability	Brazability	Weldability: Gas	Arc Resistance, spot and steam	Specified Mechanical Properties — Tensile Strength - Ksi: Ultimate Minimum	Ultimate Maximum	Yield Minimum	Yield Maximum	Elongation in 2" or 4 times diameter -percent minimum: Sheet	Plate
Non-Heat Treatable Alloys	**1100**	O	x	x	x	-	A	A	D	A	A	A	B	11	15.5	3.5[1]	-	15-30	-
		H14	X	X	X	-	A	A	C	A	A	A	A	16	21	14[1]	-	3-9	-
		F	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-
	3003	O	X	X	X	-	A	A	D	A	A	A	B	14	19	5[1]	-	14-25	-
		H14	X	X	X	-	A	B	C	A	A	A	A	20	26	17[1]	-	1-7	-
		F	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-
	5052	O	X	X	X	-	A	A	D	C	A	A	B	25	31	9.5[1]	-	15-20	-
		H32	X	X	X	X	A	B	C	C	A	A	A	31	38	23[1]	-	4-9	11-12
		H34	X	X	X	-	A	B	C	C	A	A	A	34	41	26[1]	-	3-7	-
Heat-Treatable Alloys	**Bare 2024**	O[3]	X	-	-	X	C	B	D	D	D	C	B	-	32	-	14	12	12
		T3	X	-	-	-	C	C	B	D	D	C	A	63-64	-	42	-	10-15	-
		T351	-	-	-	X	C	C	B	D	D	C	A	56-64	-	40-41	-	-	4-12
		T42[2]	-	-	-	-	C	C	B	D	D	C	A	58-62	-	38	-	12-15	4-12
	Alclad 2024	O[3]	X	X	-	X	A	B	D	D	D	C	B	-	30-32	-	14	10-12	12
		T3	X	-	-	-	A	D	B	D	D	C	A	58-63	-	39-40	-	10-15	-
		T351	-	-	-	X	A	D	B	D	D	C	A	56-63	-	40-41	-	-	4-8
		T42[2]	-	-	-	-	A	D	B	D	D	C	A	55-61	-	34-38	-	10-15	4-12
	6061	O[31]	X	X	-	X	A	A	D	A	A	A	B	-	22	12	12	10-18	16-18
		T4	X	-	-	-	A	C	C	A	A	A	A	30	-	16	-	10-16	-
		T6	X	-	-	-	A	C	C	A	A	A	A	42	-	35	-	4-10	-
		T651	-	-	-	X	A	C	C	A	A	A	A	40-42	-	35	-	-	6-10
		T42[2]	-	-	-	-	A	C	C	A	A	A	A	30	-	14	-	10-16	16-18
	Bare 7075	O[1]	X	-	-	-	C	D	D	D	D	D	B	-	40	-	21	10	-
		T6	X	-	-	-	C	D	B	D	D	D	B	76-77	-	65-66	-	7-8	-
		T651	-	-	-	X	C	D	B	D	D	D	B	67-77	-	53-66	-	-	2-8
	Alclad 7075	O[1]	X	X	-	-	A	B	C	D	D	D	B	-	36-39	-	20-21	9-10	-
		T6	X	-	-	-	A	D	B	D	D	D	B	68-75	-	58-64	-	5-8	-

Ratings A, B, C, D are relative in decreasing order of merit. weldability and brazability ratings are specifically defined as:

A - Generally weldable by all commercial procedures and methods.

B - Weldable with special technique or specific applications which justify preliminary trials or testing to develop welding procedure and weld performance.

C -Limited weldability because of crack sensitivity or loss on resistance to corrosion, and all mechanical properties.

D - No commonly used welding methods have so far been developed.

1 - These yield strengths not determined unless specifically requested.

2 - Although sheet and plate are not sold in this temper, material heat treated from any temper by the user should attain the mechanical properties applicable to this temper.

3 - Annealed (0 temper) material shall, upon heat treatment, be capable of developing the mechanical properties applicable to T 42 temper material.

4 - Annealed (0 temper) material shall, upon heat treatment and aging, be capable of developing the mechanical properties applicable to T 67 temper material.

APPROXIMATE MINIMUM RADII FOR 90° COLD BEND

Where range is shown, use smaller radius with extreme caution.

ALLOY	TEMPER	*RADII' For Various Thicknesses Expresses in Terms of Thickness "t"* 1/64 Inch	1/32 Inch	1/16 Inch	1/8 Inch	3/16 Inch	1/4 Inch	3/8 Inch	1/2 Inch
	-O	O	O	O	O	O	O	O	1t-2t
	-H12	O	O	O	O	O-1t	O-1t	O-1t	1t-3t
1100	-H14	O	O	O	O	O-1t	O-1t	O-1t	2t-3t
	-H16	O	O	O-1t	1/2t-1-1/2t	1t-2t	1-1/2t-3t	2-1/2t-3-1/2t	3t-4t
	-H18	O-1t	1/2-1-1/2t	1t-2t	1-1/2t-3t	2t-4t	2t-4t	3t-5t	3t-6t
Alclad	-O	O	O	O	O	O-1t	O-1t	1-1/2t-3t	3t-5t
	-T3	1t-2t	1-1/2t-3t	2t-4t	3t-5t	4t-6t	4t-6t	5t-7t	5-1/2t-8t
2014	-T4	1t-2t	1-1/2t-3t	2t-4t	3t-5t	4t-6t	4t-6t	5t-7t	5-1/2t-8t
	-T6	2t-4t	3t-5t	3t-5t	4t-6t	5t-7t	6t-10t	7t-10t	8t-11t
	-O[2]	O	O	O	O	O-1t	O-1t	1-1/2t-3t	3t-5t
	-T3[23]	1-1/2t-3t	2t-4t	3t-5t	4t-6t	4t-6t	5t-7t	6t-8t	6t-9t
2024	-36[2]	2t-4t	3t-5t	4t-6t	5t-7t	5t-7t	6t-10t	7t-10t	8t-11t
	-T42	1-1/2t-3t	2t-4t	3t-5t	4t-6t	4t-6t	5t-7t	6t-8t	6t-9t
	-T81	3-1/2t-5t	4-1/2t-6t	5t-7t	6-1/2t-8t	7t-9t	8t-10t	9t-11t	9t-12t
	-T86	4t-5-1/2t	5t-7t	6t-8t	7t-10t	8t-11t	10t-13t	10t-13t	1t-2t
	-O	O	O	O	O	O	O	O	1t-2t
	-H12	O	O	O	O	O-1t	O-1t	O-1t	1t-3t
3003	-H14	O	O	O	O-1t	O-1t	1/2t-1-1/2t	1t-2-1/2t	1-1/2t-3t
	-H16	0-1t	01t	1/2t-1-1/2t	1t-2t	1-1/2t-3t	2t-4t	1-1/2t-4t	3t-5t
	-H18	1/2t-1-1/2t	1t-2t	1-1/2t-3t	2t-4t	3t-5t	4t-6t	4t-7t	5t-8t
	-O	O	O	O	O	O-1t	O-1t	1/2t-1-1/2t	1t-2t
	-H32	O	O	O	O-1t	O-1t	1/2t-1-1/2t	1t-2t	1-1/2t-2-1/2t
5052	-H34	O	O	O-1t	1/2t-1-1/2t	1t-2t	1-1/2t-3t	2t-3t	2-1/2t-3-1/2t
	-H36	0-1t	1/2t-1-1/2t	1t-2t	1-1/2t--3t	2t-4t	2t-4t	2-1/2t-5t	3t-5-1/2t
	-H38	1/2t-1-1/2t	1t-2t	1-1/2t-3t	2t-4t	3t-5t	4t-6t	4t-7t	5t-8t
	-O	O	O	O	O	O-1t	O-1t	1/2t-2t	1t-1-1/2t
6061	-T4[2]	O-1t	O-1t	1/2t-1-1/2t	1t-2t	1-1/2t-3t	2t-4t	2-1/2t-4t	3t-5t
	-T6[2]	O-1t	1/2t-1-1/2t	1t-2t	1-1/2t-3t	2t-4t	3t-4t	3-1/2t-5-1/2t	4t-6t
7075	-O	O	O	O-1t	1/2t-1-1/2t	1t-2t	1-1/2t-3t	2-1/2t-4t	3t-5t
	-T6[2]	2t-4t	3t-5t	4t-6t	5t-7t	5t-7t	6t10t	7t-11t	7t-12t

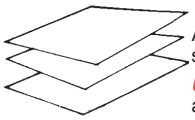
1.Minimum permissible radius over which sheet or plate may be bent varies with nature of forming operation. type of forming equipment, and design and conditions of tools. Minimum working radius for a given material or hardest alloy and temper for a given radius can be ascertained only by actual trial under contemplated conditions of fabrication. Where range is shown, use a smaller radius with extreme caution.

2. Alclad sheet can be bent over slightly smaller radii than the corresponding tempers of the uncoated alloy.

3. Immediately after quenching, this alloy can be formed over appreciable smaller radii. 4217661360076962

ALUMINUM – STAINLESS-GALVANIZED SHEET

ALUMINUM SHEET



Aluminum alloy sheet is sold in the thicknesses and sheet sizes shown in the table. Order by part number. No guarantee against scratches is possible due to the handling required to cut sheets to sizes shown.

CUTTING CHARGES: We can cut standard sheet sizes shown in the table to special sizes, but special order cutting charges will apply. Cutting Charges range from $20 to $50 or more depending on sizes desired and number of cuts. Special shapes are not cut, only straight edges. Request quote on Cutting Charges prior to order, as special cut pieces are not returnable.

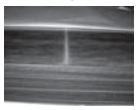
Alloy & Temper	Surface Finish	Thickness (In.)	Wt./ Sq.Ft. (Lbs.)	Price Per Sheet									
				4' x 12'		4' x 8'		4' x 6'		4' x 4'		2' x 4'	
				Part No.	Price	Part No.	Price	Part No.	Price	Part No.	Price	Part No.	Price
2024T3	Alclad	.016	.230	03-27710	.	03-27720	.	03-27730	.	03-27740	.	03-27750	.
		.020	.288	03-27810	.	03-27820	.	03-27830	.	03-27840	.	03-27850	.
		.025	.360	03-27910	.	03-27920	.	03-27930	.	03-27940	.	03-27950	.
		.032	.461	03-28010	.	03-28020	.	03-28030	.	03-28040	.	03-28050	.
		.040	.576	03-28110	.	03-28120	.	03-28130	.	03-28140	.	03-28150	.
		.050	.720	03-28210	.	03-28220	.	03-28230	.	03-28240	.	03-28250	.
		.063	.907	03-28310	.	03-28320	.	03-28330	.	03-28340	.	03-28350	.
		.071	1.02	03-28410	.	03-28420	.	03-28430	.	03-28440	.	03-28450	.
		.080	1.15	03-28510	.	03-28520	.	03-28530	.	03-28540	.	03-28550	.
		.090	1.30	03-28610	.	03-28620	.	03-28630	.	03-28640	.	03-28650	.
		.125	1.80	03-28710	.	03-28720	.	03-28730	.	03-28740	.	03-28750	.
		.160	-	03-70010	.	03-70020	.	03-70030	.	03-70040	.	03-70050	.
		.190	2.74	03-28810	.	03-28820	.	03-28830	.	03-28840	.	03-28850	.
	Bare	.250	3.60	03-28910	.	03-28920	.	03-28930	.	03-28940	.	03-28950	.
2024-0	Alclad	.032	.461	03-29010	.	03-29020	.	03-29030	.	03-29040	.	03-29050	.
		.040	.576	03-29110	.	03-29120	.	03-29130	.	03-29140	.	03-29150	.
6061T4	Bare	.025	.353	03-29210	.	03-29220	.	03-29230	.	03-29240	.	03-29250	.
		.032	.452	03-29310	.	03-29320	.	03-29330	.	03-29340	.	03-29350	.
		.040	.564	03-29410	.	03-29420	.	03-29430	.	03-29440	.	03-29450	.
		.050	.706	03-29510	.	03-29520	.	03-29530	.	03-29540	.	03-29550	.
		.063	.889	03-29610	.	03-29620	.	03-29630	.	03-29640	.	03-29650	.
		.080	1.13	03-29710	.	03-29720	.	03-29730	.	03-29740	.	03-29750	.
		.125	1.76	03-29810	.	03-29820	.	03-29830	.	03-29840	.	03-29850	.
6061T6	Bare	.016	.228	03-08910	.	03-08920	.	03-08930	.	03-08940	.	03-08950	.
		.020	.285	03-09910	.	03-09920	.	03-09930	.	03-09940	.	03-09950	.
		.025	.353	03-29910	.	03-29920	.	03-29930	.	03-29940	.	03-29950	.
		.032	.452	03-30010	.	03-30020	.	03-30030	.	03-30040	.	03-30050	.
		.040	.570	03-31110	.	03-31120	.	03-31130	.	03-31140	.	03-31150	.
		.050	.713	03-31210	.	03-31220	.	03-31230	.	03-31240	.	03-31250	.
		.063	.889	03-30110	.	03-30120	.	03-30130	.	03-30140	.	03-30150	.
		.090	1.27	03-30210	.	03-30220	.	03-30230	.	03-30240	.	03-30250	.
		.125	1.76	03-30310	.	03-30320	.	03-30330	.	03-30340	.	03-30350	.
		.190		03-10010	.	03-10020	.	03-10030	.	03-10040	.	0310050	.
6061-0	Bare	.020	.282	03-30410	.	03-30420	.	03-30430	.	03-30440	.	03-30450	.
		.040	.564	03-30510	.	03-30520	.	03-30530	.	03-30540	.	03-30550	.
		.063	.889	03-30610	.	03-30620	.	03-30630	.	03-30640	.	03-30650	.
		.080	1.13	03-30710	.	03-30720	.	03-30730	.	03-30740	.	03-30750	.
7075T6	Alclad	.025	.364	03-60010	.	03-60020	.	03-60030	.	03-60040	.	03-60050	.
		.032	.466	03-61010	.	03-61020	.	03-61030	.	03-61040	.	03-61050	.
		.040	.582	03-62010	.	03-62020	.	03-62030	.	03-62040	.	03-62050	.
		.050	.727	03-63010	.	03-63020	.	03-63030	.	03-63040	.	03-63050	.
		.063	.916	03-64010	.	03-64020	.	03-64030	.	03-64040	.	03-64050	.
		.125	1.82	03-65010	.	03-65020	.	03-65030	.	03-65040	.	03-65050	.
7075-0	Alclad	.025	.364	03-66010	.	03-66020	.	03-66030	.	03-66040	.	03-66050	.
		.032	.466	S10	.	03-67020	.	03-67030	.	03-67040	.	03-67050	.
		.040	.582	03-68010	.	03-68020	.	03-68030	.	03-68040	.	03-68050	.
		.063	.916	03-69010	.	03-69020	.	03-69030	.	03-69040	.	03-69050	.

For 2'x2' piece of aluminum sheet, take 2'x4' price ÷ 2, and then add 15%. For 2'x2' piece, change last two digits of P/N to "60". Thicknesses of .016, .020 and .025 can be rolled and boxed for UPS shipment with insurance coverage, but we cannot guarantee rolled sheets will lay flat without creasing when unpacked. Full sheets of heavier gauges or cut sheets exceeding 108" length plus girth (once down and once around) must be shipped by truck. Maximum sheet size for UPS shipment is 2' x 4'. ***QUANTITY DISCOUNT SCHEDULE:*** 10% on 6-10 Full Sheets; 15% on 11-15 Full Sheets. May be assorted thicknesses and alloys. Write for quotation on larger orders. Heavy gauge 2024T4 aluminum plate available in .375, . 500 and .625 thickness. Indicate sheet size required.

3003H-14 SOFT ALUMINUM SHEET

Thick.	P/N #	4' x 12'	P/N #	4' x 8'	P/N #	4' x 6'	P/N #	4' x 4'
.020	03-31410	**	03-31420	.	03-31430	.	03-31440	.
.025	03-32410	.	03-32420	.	03-32430	.	03-32440	.
.032	03-33410	.	03-33420	.	03-33430	.	03-33440	.
.040	03-34410	.	03-34420	.	03-34430	.	03-34440	.
.050	03-34510	.	03-34520	.	03-34530	.	03-34540	.
.063	03-34610	.	03-34620	.	03-34630	.	03-34640	.

***** Length of full sheet of .025 thickness is 10 ft.***
For 2'x4' pcs. of 3003H-14 use "45" as last 2 digits of P/N (Ex: 03-34645)



5052H-32 ALUMINUM SHEET FOR FUEL TANKS

5052H32 Aluminum alloy sheets for fabrication of fuel tanks. Available in full sheets (48"x144") & 1/2 sheets (48"x72") only, in .040 & .050 thicknesses. May be combined with other aluminum sheets for discount. See shipping specs above.

.032 Thickness — Full Sheet .....P/N 03-30810 ..... .
Half Sheet.....P/N 03-30860 ..... .

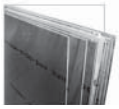
.040 Thickness — Full Sheet .....P/N 03-30900 ..... .
Half Sheet.....P/N 03-30950 ..... .

.050 Thickness — Full Sheet .....P/N 03-31000 ..... .
Half Sheet.....P/N 03-31050 ..... .

016 ALUMINUM LEADING EDGE 2024T3

12" Wide X 12 ft. (rolled for mailing). Sold in 12 ft. lengths only. P/N 03-30800 ..... **Ea.**
18" Wide x 12 ft. (rolled for mailing). Sold in 12 ft. lengths only. P/N 03-30850 ..... **Ea.**

Other widths available at proportionate cost plus shearing charge.



STAINLESS STEEL & GALVANIZED FIREWALL SHEET

Material (36" Width)	Thickness (In.)	Weight/ Lin.Ft.(Lbs)	Part No.	Price/ Lin.Ft.
301 Stainless, 1/2 Hard	.016	2.016	03-31200	.
304 Stainless	.018	2.173	03-20010	.
302/304 Stainless, Ann.*	.035	4.38	03-31300	.
Galvanized Sheet, 26 Ga.	.022	2.718	03-31400	.

301 furnished in 36" full sheet width only. Galvanized & 304-302/304 sheet is 48" wide. Cannot be rolled for UPS shipment. * 2B Finish To Order: Complete P/N of above Stainless or Galvanized sheet with the lineal feet you wish to order. A piece of stainless sheet .016 thick 36" wide x 6 ft. is P/N 03-31200-6. -6 specifies 6 lineal feet.

ALUMINUM TUBING

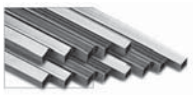
ROUND DRAWN ALUMINUM TUBING 2024T3

O.D. (In.)	I.D. (In.)	Wall Thickness	Wt./Ft. (Lb.)	Part No.	Price Per Ft.
1/4	.180	.035	.2081	03-31600	.
5/16	.243	.035	.0366	03-31700	.
	.215	.049	.0487	03-31800	.
3/8	.305	.035	.0449	03-32000	.
	.277	.049	.0602	03-32100	.
	.245	.065	.0755	03-32200	.
1/2	.430	.035	.0612	03-32500	.
	.402	.049	.0829	03-32600	.
	.384	.058	.0970	03-32700	.
	.370	.065	.1061	03-32800	.
5/8	.555	.035	.0775	03-32900	.
	.527	.049	.1060	03-33000	.
	.509	.058	.1234	03-33100	.
	.495	.065	.1367	03-33200	.
3/4	.680	.035	.0938	03-33300	.
	.652	.049	.1288	03-33400	.
	.620	.065	.1670	03-33600	.
7/8	.805	.035	.1423	03-33650	.
	.777	.049	.1530	03-33700	.
	.759	.058	.1777	03-33800	.
	.745	.065	.1979	03-33900	.
	.635	.120	.3398	03-34000	.
1	.930	.035	.1250	03-34100	.
	.902	.049	.1754	03-34200	.
	.884	.058	.2028	03-34250	.
	.870	.065	.2295	03-34400	.
	.834	.083	.2866	03-34500	.
1-1/4	1.180	.035	.1601	03-34600	.
	1.152	.049	.2213	03-34700	.
	1.180	.065	.3000	03-00045	.
1-3/8	1.277	.049	.2448	03-34800	.
1-1/2	1.402	.049	.2683	03-34900	.
	1.370	.065	.3519	03-35000	.
1-3/4	1.250	.250	1.428	03-35075	.
2	1.870	.065	.4743	03-35200	.

ROUND ALUMINUM TUBING 6061-0

O.D. (In.)	I.D. (In.)	Wall Thickness	Wt./Ft. (Lb.)	Part No.	Price Per Ft.
1/2	.430	.035	.0612	03-38500	.
3/4	.680	.035	.0920	03-38600	.
1	.930	.035	.1250	03-38700	.
1-1/4	1.180	.035	.1601	03-38800	.

Sold in full 6-ft or 12ft lengths only. No charge for cutting to 8 ft or less for UPS shipment.



6061T6 SQUARE ALUMINUM TUBING

Size (In.)	Wall Thickness	Wt/Ft (Lb.)	Part No.	Price Per Ft.
1/2x1/2	.058	.156	03-00008	.
3/4x3/4	.049	.217	03-00009	.
1 X 1	.065	.300	03-38900	.
2 X 2	.125	1.120	03-00141	.

5052-0 ALUMINUM TUBING

Rigid 5052-0 aluminum alloy tubing is used for low and medium pressure hydraulic systems, fuel lines and oil lines. This tubing will withstand a higher pressure than 3003-0 tubing.

O.D. (In.)	I.D. (In.)	Thickness	Wt./Ft. (Lb.)	Part No.	Price Per Ft.
1/8	.069	.035	.0101	03-39100	.
3/16	.132	.035	.0168	03-39200	.
1/4	.152	.049	.0371	03-39250	.
	.180	.035	.0281	03-39300	.
5/16	.242	.035	.0360	03-39400	.
3/8	.305	.035	.0449	03-39500	.
	.277	.049	.0602	03-39550	.
1/2	.436	.035	.0612	03-39600	.
	.402	.049	.0829	03-39650	.
5/8	.555	.035	.0760	03-39700	.
	.527	.049	.1060	03-39750	.
3/4	.680	.035	.0938	03-39800	.
	.652	.049	.1288	03-39850	.
1	.930	.035	.1256	03-39900	.
	.902	.049	.1754	03-39950	.

*Sold in full 6-ft. or 12-ft. lengths only. No charge for cutting to 8 ft. or less for UPS shipment.*Unlisted sizes of aluminum tubing available in full 12' lengths. No charge for cutting to 8' or less for UPS. Longer lengths shipped via truck. ***Ordering tubing/bar by the foot. Add a dash number after part number to indicate length of tubing required. Ex: 3 ft required add -3, 03-00100-3.***

ROUND ALUMINUM TUBING 6061T6

O.D. (In.)	I.D. (In.)	Wall Thickness	Wt./Ft. (Lb.)	Part No.	Price Per Ft.
1/4	.180	.035	.0281	03-35300	.
	.152	.049	.036	03-00014	.
3/16	.180	.035	----	03-00012	.
5/16	.215	.049	.0423	03-35350	.
	.197	.058	.0561	03-35400	.
3/8	.305	.035	.0449	03-35500	.
	.259	.058	.0694	03-35600	.
	.245	.065	.0755	03-35700	.
	.209	.083	.0895	03-35750	.
7/16	.308	.065	.090	03-35775	.
1/2	.444	.028	.0496	03-35795	.
	.430	.035	.0612	03-35800	.
	.402	.049	.0816	03-35850	.
	.384	.058	.0962	03-35900	.
	.370	.065	.1040	03-35950	.
	.260	.120	.168	03-35975	.
5/8	.555	.035	.0775	03-36000	.
	.527	.049	.1060	03-36010	.
	.509	.058	.1227	03-36050	.
	.495	.065	.1367	03-36100	.
3/4	.680	.035	.093	03-36150	.
	.652	.049	.1288	03-36200	.
	.634	.058	.1506	03-36300	.
	.620	.065	.164	03-36350	.
7/8	.805	.035	.109	03-36375	.
	.777	.049	.150	03-36380	.
	.759	.058	.1777	03-36400	.
	.745	.065	.1983	03-36450	.
	.635	.120	.3350	03-36500	.
1	.930	.035	.1275	03-36600	.
	.902	.049	.1754	03-36610	.
	.884	.058	.2060	03-36700	.
	.870	.065	.2295	03-36800	.
	.830	.083	.281	03-36850	.
	.810	.095	.3244	03-36900	.
	.750	.125	.404	03-36950	.
	.500	.250	.693	03-36975	.
1-1/8	1.027	.049	.185	03-36980	.
	1.009	.058	.2321	03-37000	.
	.875	.125	.4712	03-37100	.
1-1/4	1.180	.035	.1601	03-37200	.
	1.152	.049	.2213	03-37210	.
	1.134	.058	.2601	03-37300	.
	1.120	.065	.2907	03-37400	.
	1.010	.120	.510	03-37450	.
1-3/8	1.259	.058	.2865	03-37500	.
1-1/2	1.430	.035	.1928	03-37550	.
	1.402	.049	.2683	03-37610	.
	1.384	.058	.3137	03-37710	.
	1.370	.065	.3519	03-37800	.
	1.260	.125	.635	03-37850	.
1-5/8	1.509	.058	.3409	03-37900	.
1-3/4	1.680	.035	.2264	03-37910	.
	1.652	.049	.3142	03-37925	.
	1.634	.058	.3703	03-37950	.
	1.584	.083	.5202	03-37975	.
1-7/8	1.759	.058	.3954	03-38000	.
2	1.902	.049	.3601	03-38100	.
	1.884	.058	.4225	03-38200	.
	1.870	.065	.4743	03-38300	.
2-1/4	2.152	.049	.406	03-38307	.
	2.120	.065	.5328	03-38308	.
	1.959	.083	.824	03-38309	.
	2.000	.125	.999	03-38310	.
2-1/2	2.430	.035	.3254	03-38315	.
	2.402	.049	.444	03-38318	.
	2.370	.065	.5803	03-38320	.
3	2.930	.035	.3891	03-38330	.
	2.870	.065	.7140	03-38340	.
4	3.930	.035	.5205	03-38350	.
	3.902	.049	.7153	03-38360	.

3003-0 VERSATUBE

Soft aluminum tubing for instrument air and vacuum lines, fuel and oil lines, and primer lines.

Safety factor of 2
20% discount for full 50' coils of Versatube

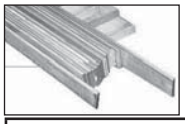
O.D. (In.)	Wall Thickness	Max. Working Pressure* (PSI)	Part No.	Price Per Ft.
1/8	.025	1820	03-40200	.
3/16	.028	880	03-40300	.
1/4	.032	795	03-40400	.
5/16	.035	630	03-40500	.
3/8	.035	520	03-40600	.
1/2	.035	390	03-40700	.
5/8	.035	305	03-40800	.

ALUMINUM ROD – BAR – ANGLE

ROUND ALUMINUM ROD 2024T3/2024T4

Dia. (In.)	Wt./Ft. (Lb.)	Part No.	Price/Ft
1/8	.015	03-41300	.
3/16	.033	03-41400	.
1/4	.059	03-41500	.
5/16	.092	03-41600	.
3/8	.132	03-41700	.
7/16	.1822	03-41750	.
1/2	.235	03-41800	.
5/8	.368	03-41900	.
3/4	.529	03-42000	.
7/8	.721	03-42100	.
1	.941	03-42200	.
1-1/8	1.205	03-42250	.
1-1/4	1.47	03-42300	.
1-3/8	1.800	03-42350	.
1-1/2	2.12	03-42400	.
2	3.76	03-42500	.
2-1/2	5.88	03-42600	.

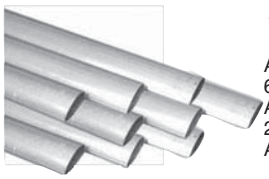
No charge for cutting to 8 ft. or less for UPS shipment.
Over 8 ft. shipped via truck. Special sizes available (12 foot minimum)
If ordering only T3 or T4, please call 877-477-7823



ALUMINUM SQUARE & RECTANGLE BAR 2024T3/2024T4

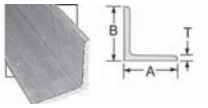
Size (In.)	Wt./Ft. (Lb.)	Part No.	Price/Ft.
1/8 x 1	.150	03-42700	.
1/8 x 1-1/4	.187	03-42750	.
1/8 x 1-1/2	.225	03-42800	.
1/8 x 2	.300	03-42900	.
3/16 x 1/2	.112	03-43000	.
3/16 x 3/4	.169	03-43100	.
3/16 x 1	.2273	03-43150	.
3/16 x 1-1/4	.281	03-43200	.
3/16 x 1-1/2	.3420	03-43250	.
3/16 x 2	.450	03-43300	.
1/4 x 1	.300	03-43400	.
1/4 x 1-1/4	.375	03-43500	.
1/4 x 1-1/2	.450	03-43600	.
1/4 x 2	.599	03-43700	.
1/4 x 3	.900	03-43800	.
1/4 x4	1.99	03-43850	.
3/8 x 1	.4545	03-43875	.
3/8 x 1-1/4	.562	03-43900	.
3/8 x 1-1/2	.6818	03-43950	.
3/8 x 2	.674	03-44000	.
3/8 x 3	1.35	03-44100	.
1/2 x 1/2	.3030	03-44250	.
1/2 x 5/8	.375	03-44300	.
1/2 x 1	.599	03-44400	.
1/2 x 1-1/4	.7575	03-44450	.
1/2 x 2	1.20	03-44500	.
1/2 x 2-1/2	1.50	03-44600	.
5/8 x 5/8	.468	03-44700	.
5/8 x 1	.7575	03-44850	.
3/4 x 3/4	.674	03-44900	.
3/4 x 1-1/2	1.35	03-45000	.
3/4 x 1-3/4	1.59	03-45550	.
3/4 x 2	1.80	03-45100	.
3/4 x 2-1/2	2.25	03-45200	.
1 x 1	1.20	03-45300	.
1 x 2	2.424	03-45450	.
1 x 2-1/2	3.030	03-45475	.
1/2 x 6	--	03-56000	.

Unlisted sizes of aluminum rod and bar available in full 12 ft. lengths.
No charge for cutting to 8 ft. or less for UPS. Longer lengths shipped via truck.
If ordering only T3 or T4, please call 877-477-7823
Ordering tubing/bar by the foot. Add a dash number after part no. to indicate length of tubing req.
Example: 3 ft required add -3, 03-00100-3.



ALUMINUM STREAMLINE STRUT TUBING

Aluminum streamline strut tubing, 6061T6, anodized. Used for struts in American Eaglet sailplane. Major axis 2.697", minor axis 1.143", .049" wall. Available in 6 ft. lengths only.
P/N 03-40000 ..... .



ALUMINUM ANGLE

Extruded aluminum angle is produced by forcing a heated aluminum billet through a die of the proper shape by means of a hydraulic press. Our 90° aluminum extrusions have fillet radius as illustrated.

Type	Size (In.) Wt./Ft. "A" x "B" x "T"	Part No.	Wt. Per Ft. (Lb.)	Price Per Ft
2024T3	1/2 x 1/2 x 1/16	03-46800	.070	.
2024T3	5/8 x 5/8 x 1/16	03-46900	.095	.
2024T3	3/4 x 3/4 x 1/16	03-47000	.109	.
2024T3	7/8 x 7/8 x 1/8	03-47100	.238	.
2024T3	1 x 1 x 1/16	03-47200	.154	.
2024T3	1 x 1 x 1/8	03-47300	.282	.
2024T3	1 x 1-1/2 x 1/8	03-47400	.354	.
2024T3	1-1/2 x 1-1/2 x 1/16	03-47500	.229	.
2024T3	1-1/2 x 1-1/2 x 1/8	03-47600	.432	.
2024T3	2 x 2 x 1/8	03-47625	.581	.
2024T3	3-1/2 x 3-1/2 x 1/4	03-47675	2.050	.

Type	Size (In.) Wt./Ft. "A" x "B" x "T"	Part No.	Wt. Per Ft. (Lb.)	Price Per Ft
6061T6	3/4 x 3/4 x 1/16	03-00185	.106	.
6061T6	3/4 x 3/4 x 1/8	03-47900	.200	.
6061T6	1 x 1 x 1/16	03-00187	.150	.
6061T6	1 x 1 x 1/8	03-48000	.270	.
6061T6	1 x 3 x 1/8	03-48050	.581	.
6061T6	1-1/4 x 1-1/4 x 1/8	03-00189	.350	.
6061T6	1-1/2 x 1-1/4 x 1/8	03-48075	.390	.
6061T6	1-1/2 x 1-1/2 x 1/8	03-48100	.430	.
6061T6	1-1/2 x 1-1/2 x 3/16	03-48200	.625	.
6061T6	1-1/2 x 1-1/2 x 1/4	03-48250	.831	.
6061T6	1-1/2 x 2 x 1/8	03-48300	.506	.
6061T6	1-3/4 x 1-3/4 x 1/8	03-48350	.490	.
6061T6	2 x 2 x 1/8	03-48400	.470	.
6061T6	2 x 2 x 3/16	03-48450	.850	.
6061T6	2 x 2 x 1/4	03-48500	1.110	.
6061T6	2 x 3 x 1/4	03-48550	1.400	.
6061T6	2 x 2-1/2 x 1/4	03-48600	1.250	.
6061T6	2-1/2 x 2-1/2 x 3/16	03-00007	.970	.
6061T6	2-1/2 x 2-1/2 x 1/8	03-48650	.720	.
6061T6	2-1/2 x 4 x 1/8	03-48675	.960	.
6061T6	4 x 4 x 1/4	03-48680	2.28	.

Standard lengths: 2024-12' and 20', 6061-25', 6063-16' (no fillet). No charge for cutting to 8 ft. or less for UPS. Many unlisted sizes available. Request quotation.

ALUMINUM PRE-FORMED ANGLES

2024T3 Aluminum angles, formed from .063" sheet. Generous radius at bend. Used as supports in composite aircraft such as the VariEze.

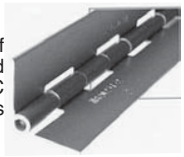
1.5" x 1.5" x 12" Angle..... P/N 03-48700 ..... . **pc**

ALUMINUM ROUND, SQUARE AND RECTANGLE BAR, 6061T6

Size (In.)	Wt./Ft. (Lb.)	Part No.	Price/Ft.
3/16 Dia. Round	.032	03-45500	.
1/4	.058	03-45600	.
5/16	.090	03-45700	.
3/8	.130	03-45800	.
1/2	.231	03-45900	.
5/8	.359	03-45920	.
3/4	.519	03-46000	.
7/8	.787	03-46010	.
1	.923	03-46100	.
1-1/4	1.436	03-45940	.
1-1/2	2.068	03-45960	.
1-5/8	2.44	03-46200	.
1/4 x 1 Rect.	.294	03-46300	.
3/4 x 3/4 Sq.	.660	03-46400	.
3/16" x 1-1/4"	.275	03-46250	.
1/4" x 1-1/2"	.441	03-46350	.
1/4" x 2"	.675	03-00005	.
1/4" x 3"	.881	03-46360	.
1/2" x 3/4"	.441	03-46370	.
1/2" x 1"	.587	03-46375	.
1/2" x 1-1/4"	.734	03-46380	.
1/2" x 2"	1.170	03-46390	.
1" x 1"	1.170	03-46450	.
1" x 1-1/4"	1.270	03-00006	.

ALUMINUM HINGE – STRINGERS

PIANO HINGE



MS20257P (supercedes AN257) hinge consists of two aluminum half hinges which mate and are held together by a hinge pin. Anodized finish. MS20257C is similar to MS20257P except made in stainless steel.

MS20001P aluminum hinge is extruded. The closed hinge loops cannot be pulled apart. Furnished with hinge pin. Anodized finish.

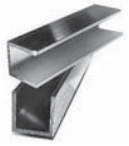
Part No.*	Open Width	Thickness	Price/Length	
			3 Ft.*	6 Ft.*
MS20257P1	3/4"	.032"	.	.
MS20257P2	1-1/16"	.040"	.	.
MS20257P3	1-1/4"	.040"	.	.
MS20257P4	1-1/2"	.040"	.	.
MS20257P5	2"	.051"	.	.
MS20001P3	1-1/4"	.040"	.	.
MS20001P4	1-1/2"	.040"	.	.
MS20001P5	1-3/4"	.051"	.	.
MS20001P6	2"	.051"	.	.
MS20257C1	3/4"	.031	.	.
MS20257C2	1-1/16"	.037	.	.
MS20257C3	1-1/4"	.050	.	.
MS20257C4	1-1/2"	.062	.	.
MS20257C5	2"	.062	.	.

* Add "-3" to part number for 3 ft. pc. and "-6" to part number for 6 ft. pc.
Example: MS20001P6-3 is 3 ft. pc. of MS20001P6 hinge.

HINGE PIN ONLY – Stainless Steel
089" Dia. x 6' .....P/N 03-49000 ..... .

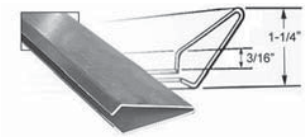
BARGAIN BAG OF ALUMINUM TUBING

Assorted sizes of 2024 and 6061 aluminum tubing, angle rodand bar. Approximately 20 ft.
P/N 03-40100 ..... .



6063T 52 U CHANNEL

3/4"x 3/4"x1/8".....P/N 03-38950 ..... **/ft.**
1"x1"x1/8" .....P/N 03-39050 ..... **/ft.**
1-1/4"x1-1/4"x1/8".....P/N 03-39150 ..... **/ft.**

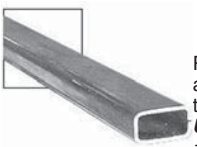


TRAILING EDGE

Fabricated of .025 aluminum 3003H14 to size illustrated. Wt.12oz. per 10ft. length. Shipped via truck. ***No charge for cutting to 8 ft. or less for UPS shipment.***

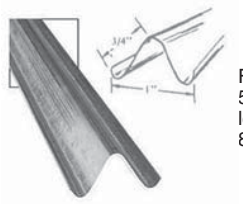
10 Ft. Length.....P/N 03-48900 ..... .

Less 20% on 12 or more lengths. Please add $2.00 carton charge for trailing edge - this box insures safe UPS shipment.



RECTANGULAR ALUMINUM STRINGERS

Rectangular stringers, 5/8" x 5/16" x .032" 3003H14 aluminum. Wt. 11 oz./12ft. length. Shipped via truck. ***No charge for cutting to 8ft. or less for UPS shipment.***
12 Ft. Length .....P/N 03-48800 ..... .



"HAT" SECTION ALUMINUM STRINGERS

Fabricated from .020 2024T3 aluminum. Wt. 5 oz. per 8-ft. length. May be spliced to form longer stringers.
8-Ft. Length.....P/N 03-46500 ..... .
Less 10% on orders for 12 or more.

WELDING ROD FOR ALUMINUM

ALUMINUM

ER4043 – A versatile alloy well suited for welding 6061T-6, 5005, and 6063. Extremely ductile. 1/16" dia.....P/N 03-27520 ..... **/lb.**
3/32" dia.....P/N 03-27525 ..... **/lb.**

ER4145 – Welding alloy recommended for use with 2024T3. A high strength alloy. 1/16" dia.....P/N 03-27510 ..... **lb.**
3/32" dia.....P/N 03-27515 ..... **/lb.**

ER5356 – Combination of strength and ductility for welding 5083, 5086, and 7000 series. Deposit can be anodized after welding.
1/16" dia.....P/N 03-27530 ..... **/lb.**
3/32" dia.....P/N 03-27535 ..... **/lb.**

UTP4 – Pure aluminum for 1100 grade.
1/16" dia.....P/N 03-27540 ..... **lb.**

ER347 – Popular aircraft type, stabilized austenitic stainless alloy for welding 302 and 304 base materials. Excellent for welding Ti stabilized grades such as 321 with high strength and elongation.
1/16" dia.....P/N 03-27545 ..... **lb.**
3/32" dia.....P/N 03-27550 ..... **/lb.**

UTP A-65 – A multi alloy wire for a wide range of base materials including stainless steel, low alloy high strength steel and especially outstanding for dissimilar metals with over 120,000 psi tensile strength and 25% elongation. Machinable. 1/16" dia.....P/N 03-27555 ..... **/lb.**
3/32" dia.....P/N 03-27560 ..... **/lb.**

BRAZING ALLOYS

UTP 306M – Cadmium free, low temperature silver brazing alloy for high strength joints on stainless or copper. Exceptional for thin gauge applications such as tubing. Flux coated for easy use.
1/16" dia.....P/N 03-27565 ..... **/lb.**

UTP 1M – High strength, machinable torch rod for steel, brass, bronze and other copper alloys. Easy to apply, high strength, and versatile all purpose brazing rod. 1/8" dia.....P/N 03-27570 ..... **/lb.**

MAINTENANCE

UTP 612 – An all position mild steel coated electrode for arc welding. Operates on AC or DC current and can be welded by even the most inexperienced welder. 72,000 psi tensile strength, moisture resistant and conveniently packaged in 10 lb containers.
3/32" dia.....P/N 03-27575 ..... **/lb.**
1/16" dia.....P/N 03-27580 ..... **/lb.**

UTP Unial – Self fluxing aluminum torch rod that can be applied with even a butane torch. Low temperature, color matching and ideal for repairs to tubing. P/N 03-27585 ..... **/lb**.

For additional Welding Equipment see pages 658-660.

COPPER TUBING

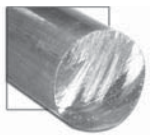
Seamless copper tubing for primer, fuel and oil pressure lines.

O.D. (In.)	Wall Thickness	Part No.	Price/Ft.
1/8	.030	03-40900	.
1/4	.030	03-41000	.
5/16	.032	03-41100	.
3/8	.032	03-41200	.
1/2	.032	03-41250	.

20% discount for full soft coils of 50 ft. of Copper Tubing.

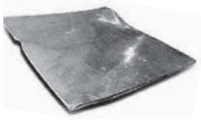
COPPER BUS BAR

.125 X 1/2" wide ..... P/N 03-40890 ..... **/ft.**



ROUND ALUMINUM-BRONZE BAR SPEC. ASTMB-150

Cold-drawn, annealed, 1-3/4" dia. Use this material for fabrication of bronze bushings to your specific requirements. P/N 03-21700 ..... **/in.**



LEAD SHEET

Lead sheet per specification QQ-L-201, Grade B. 1/8" thick. Wt. 8 lbs./sq.ft.
P/N 03-31500 ..... **/ft.**
Half Sheet (24"x 36", 48 Lbs.)
P/N 03-31520 ..... .
Full Sheet (36" x48", 96 Lbs.) ..... P/N 03-31540 ..... .

ME

WORKING WITH PLEXIGLAS

1.Scribing and Breaking (up to 1/4" thickness)

Using a straight edge as a guide, place the point of the "Cutting Tool for Plexiglas acrylic sheet" at the edge of the material and, applying pressure, draw the cutting point the full width of the material (5 to 6 times for thicknesses from 0.100" to 0.187" and 7 to 10 times for 0.250"). The scribed line should be positioned face up over a 3/4" diameter wood dowel running the length of the intended break. To break, hold the sheet with one hand and apply downward pressure on the short side of the break with the other. The hands should be kept adjacent to one another and successively repositioned about 2" in back of the break as it progresses along the scribed line. The minimum cut-off width is about 1-1/2". Patterned Plexiglas cannot be scored or broken.

Follow edge finishing instructions in Section 4.

2. Cutting with Saws

Do not remove protective masking paper before cutting. If cutting unmasked sheet is unavoidable—apply masking tape on both sides of intended cut to reduce friction and gumming behind blade.

Curved shapes are easily cut with sabre, band and reciprocating jig saws. Sabre and reciprocating jig saw blades should have at least 14 teeth per inch. Straight cuts can be made with a sabre or hand jig saw by guiding the tool along a straight edge. Band saws should have at least 10 teeth per inch. Hold Plexiglas down firmly when cutting. Do not force feed. Follow edge finishing instructions in Section 4.

Circular saws are ideal for straight cutting. Use a steel crosscut blade which is recommended for finish cuts on plywood, veneers, laminates, etc. The blade should have at least 6 teeth per inch. All the teeth should be of the same shape, height, and point to point distance. Set the blade height just a little above the thickness of the sheet to prevent chipping. Hold Plexiglas down firmly when cutting. Do not force feed. Follow edge finishing instructions in Section 4.

3. Drilling By Hand With Standard Twist Drills

Standard twist drills commonly used for metals can be used to drill Plexiglas if reasonable care is exercised. Back Plexiglas with wood, clamp or hold firmly, use a sharp drill, very slow speed, and minimum pressure.

Caution: *If too much speed is used, Plexiglas will tend to climb the drill. If too much pressure is used, chipping will occur on the back side of the hole. (See instructions for through fastening).*

4. Edge Finishing

Sawed edges and other tool marks should be removed by scraping the edge with a sharp knife, filing with a fine tooth file, and/ or sanding with medium grit (60-80) paper. This will insure maximum breakage resistance of the Plexiglas part. To further improve the appearance of the surface or edge, follow the initial finishing with "wet or dry" (150-220) grit sand paper. For a transparent edge, follow this step with grits to 400 and buff with a clean muslin wheel dressed with a good grade of fine grit buffing compound. Finish up with a clean soft cotton flannel wheel.

5. Cementing

Capillary cementing with a solvent such as methylene chloride ("MDC") or ethylene dichloride ("EDC") or 1,1,2-trichloroethane is an easy method of joining two pieces of Plexiglas. Sand surfaces to be cemented, do not polish. Remove protective masking paper. Hold pieces together with strips of masking tape.

Apply solvent to the joint with a syringe, oil can with a very fine spout, eye dropper, or small paint brush. Let joint dry thoroughly. Caution: solvents may be toxic if inhaled for extended periods of time or if swallowed; many are also flammable. Use in a well ventilated area, keep away from children.

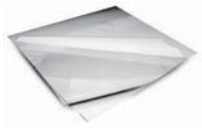
6. Through-Fastening of Plexiglas

Drill oversize holes (allow 1/16" oversize per foot of length of the Plexiglas to provide for expansion and contraction), following drilling instructions in Section 3. Holes should be located to provide at least 1/4" solid material from edge of hole to edge of sheet. Smoothing hole surface with a round file should provide maximum resistance to breakage. Bring screws up just snugly and back off 1/4 turn to provide freedom of movement for expansion or contraction of the Plexiglas.

7. Cleaning of Plexiglas

Wash Plexiglas with a mild soap and lukewarm water solution. Use a clean soft cloth or sponge and as much of the solution as possible. Rinse well. Dry by blotting with a damp cloth or chamois. A periodic waxing with a good grade of hard automobile paste wax (not a cleaner-wax combination) will fill in minor surface scratches and help maintain the lustre. Apply sparingly and buff lightly with clean cotton flannel or jersey. Sanding and buffing as described in #4 (Edge Finishing) will remove deeper scratches.

PLEXIGLAS



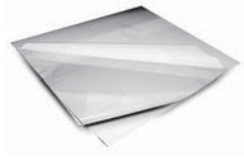
American made Plexiglas Grade C to Specification LP-391 is unshrunk. When heated to forming temperature of 220-250°F, it will shrink about 2.2% in length and width and will increase about 4% in thickness. When heated to a pliable state it can be drilled, sawed and machined. It has excellent resistance to weathering. It is less than half as heavy as glass and has good impact resistance. .060" or .080" thickness is generally used for side windows and .125" for windshields. Both sides are paper covered for protection. Sheet size: 48"x96". Sold in 2'x2' increments only. Order by part number (see table).

Thickness Inch	Weight Lb./Sq.Ft.	Part No.***	Price Per Sq. Ft.
.060 Clear	.37	03-498—	
.080 Clear	.49	03-499—	
.125 Clear	.62	03-500—	
.125 Tinted*	.77	03-501—	
.125 Tinted**	.77	03-502—	

* *Smoke tint* *** #2111 Green tint*

*** ***Order by basic part number and add last two digits according to dimensions of piece, as follows: 2'x2' (4 Sq.Ft.) add "02"; 2'x4' (8 Sq.Ft.) add "04"; 4'x4'; (16 Sq.Ft.), add "08"; 4'x8' (32 Sq.Ft.), add "10". Example: 2'x4 .080 Clear is P/N 03-49904.***

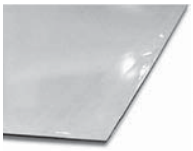
LEXAN



American made Kirex polycarbonate sheet (an equivalent to G.E. Lexan) is a very strong plastic which is guaranteed by manufacturer against breakage when used as a window for a 3 year period. It will scratch like Plexiglas, but will not break. Clear, masked both sides. Sheet size: 48"x96". Sold in 2'x2' increments only. Order by part number (see table)

Thickness Inch	Weight Lb./Sq.Ft.	Part No.*	Price Per Sq. Ft.
.060	.38	03-503—	
.080	.50	03-504—	
.093	.59	03-505—	
.125	.78	03-506—	

* ***Order by basic part number and add last two digits according to dimensions of piece, as follows: 2'x2' (4 Sq.Ft.), add "02"; 2'x4' (8 Sq.Ft.) add "04"; 4'x4' (16 Sq.Ft.), add "08"; 4'x8' (32 Sq.Ft.), add "10". Example: 4'x4' of .093 is P/N 03-50508.***



CLEAR CELLULOSE ACETATE SHEET

May be used to make inspection rings, grommets and shapes which will adhere to fabric with dope or fabric cement. Sheet size: 20" x 50". Thickness: .030". P/N 03-50700 ..... ./Sheet

GRAPHLITE CARBON FIBER ROD

Prepreg tape has an inherent waviness which can reduce the strength and stiffness of a laminate. Graphlite rod eliminates fiber waviness and unlike tape, it can be placed along any curved surface and retain fiber alignment. Graphlite can be used in layers to form building blocks for stiffeners, spar caps, longerons and other axially loaded parts. Components made with Graphlite offer tension strength on the lower wing surface and compression strength on the upper surface that are almost equal. In addition, a single layer of rods is as thick as 10 layers of tape, meaning fewer passes and less effort. Graphlite rods increase compression strength, reduce fabrication costs by 50%, can be laid on compound curves, and require no special storage. Available in two rod types: standard module (SM) which is 33-34 MSI and intermediate module which is 42 msi. Sold by the roll. Typical light aircraft requires minimum of 1000 ft. Graphlite rod.

Rod Type	Rod Diameter	Tensile Strength	P/N	Price per roll
IM	0.067	503	03-50706	. /12 ft.
SM	0.125	503	03-50707	. /12 ft.
SM	0.158	503	03-50708	. /12 ft.
SM	0.063	785	03-50710	. /12 ft.

3M™ WINDOW SEALANTS

3M STRIP CAULK - This black, nonhardening compound in 12" strips is the most satisfactory product for sealing windshields and windows. 61 strips per box, more than enough for an average, leakproof windshield installation.

P/N 08578 ..... ./Box

FOR OTHER 3M™ PRODUCTS SEE PAGES 345-352

SILASTIC RTV SEALANTS

Dow Corning "SILASTIC" - These 1-part RTV silicone rubber adhesive/sealants adhere to metals, glass, paint, ceramics, wood and most plastics. Form a tack-free skin in one hour & cure to a firm silicone rubber in 24 hrs.

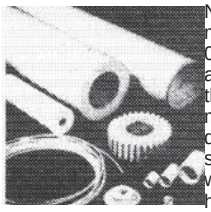
#732 RTV (Clear), 4.7 Oz. Tube ..... P/N 09-27800.....
#732 RTV (White), 4.7 Oz. Tube ..... P/N 09-27810.....
#732 RTV (Black), 4.7 Oz. Tube ..... P/N 09-27815.....
#736 High temp. (to 500°F) Red RTV, 3oz.tube... P/N 09-27900.....

DOW CORNING RTV-3145 ADHESIVE / SEALANT

Sealing openings in modules and housings; adding mechanical stability to individual components; assembly of components on PWBs; sealing in and around wires and electrical leads; yoke assembly.

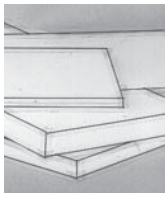
Clear.....P/N 09-02041 ..... .
Gray.....P/N 09-02042 ..... .

NYLON



Nylon, a polyimide resin, is a light yet tough thermoplastic material. Its density is approximately .041 lb./cu.in. It is a tough, resilient material with a low coefficient of frictionabrasion tests show that Nylon loses less material than do many metals, other plastics, and hard rubber. It can deform under load, then return to its original shape. Nylon retains its impact strength over a wide range of temperatures (-60° to 400°F). It has good resistance to most chemicals. It can be easily machined on most standard metal working machines, power hacksaws, band saws, or circular saws. It is desirable to use a saw with a coarse tooth blade.

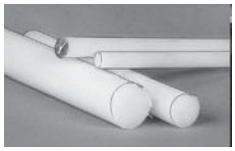
NYLON PLATE



Thickness (Inch) (Lbs.)	Wt. per Sq. Ft.	Part No.	Price/ Sq. Ft.*
1/16	.39	03-51000	.
1/8	.77	03-51100	.
1/4	1.54	03-51200	.
1/2	3.07	03-51300	.
3/4	4.61	03-51400	.
1	6.15	03-51500	.

Sold in 6"x6" (1/4 sq. Ft.) increments only

NYLON ROUND ROD

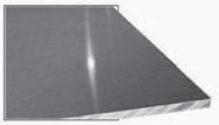


Less 10% for 4 ft. lengths. Less 20% for full 8 ft. lengths. Furnish cutting instructions for UPS shipment.

DIAMETER (IN.)	P/N	PRICE/ FT.
1/8	03-51600	.
1/4	03-51700	.
1/2	03-51800	.
3/4	03-51900	.
1	03-52000	.
1-1/4	03-52100	.
1-1/2	03-52200	.
2	03-52300	.

HIGH PRESSURE LAMINATED PHENOLIC

Commonly called "Micarta", a trademark of Westinghouse. Laminated sheets, tube and rods are produced in many grades, sizes and colors. These laminates combine a base material - canvas, linen, paper, glass cloth or Nylon cloth, with a resin- phenolic, melamine, epoxy or silicone, under high heat and pressure to produce a new material with specific characteristics. These characteristics vary with the grade and its use.



GRADE L (LINEN BASE) PHENOLIC SHEET

Used for precision machining and high strength applications. Sheet Size: 36" x 48". Sold in 6" x 6", 6" x 12", 12" x 12", etc. pieces only.

Thickness (In.)	Wt. /Sq . Ft(Lbs.)	Part No.	Price. Per Sq. Ft.
1/16	.422	03-52400	.
1/8	. 844	03-52500	.
3/16	1.349	03-00111	.
1/4	1.853	03-52600	.
3/8	2.772	03-52700	.
1/2	3.685	03-52800	.
3/4	5.495	03-52900	.
1	7.302	03-53000	.

GRADE L (LINEN BASE) PHENOLIC ROD

Used to provide high-strength close-tolerance bolt holes in wooden spars. Cut rod to spar thickness, drill and ream for proper bolt fit. Drill hole in spar for slip fit of rod, then bond in spar with epoxy cement. Produced in 4 ft. lengths.

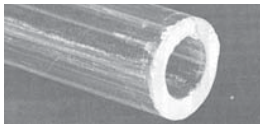
5/8" dia. .....P/N 03-53100 ..... **/In.**
3/4" dia. .....P/N 03-53200 ..... **/In.**

GRADE XXX (PAPER BASE) PHENOLIC TUBING

Other sizes and wall thicknesses available at comparable prices .

O.D. (In.)	I.D. (In.)	Wall (In.)	Part No.	Price Per Ft.
3/8	1/4	1/16	03-53300	.
1/2	3/8	1/16	03-53400	.
5/8	1/2	1/16	03-53500	.
3/4	5/8	1/16	03-53600	.
7/8	3/4	1/16	03-53700	.

CLEAR EXTRUDED ACRYLIC TUBING



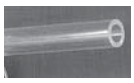
O.D. (In.)	I.D. (In.)	Wall (In.)	Part No.	Price Per Ft.
3/8	1/8	.125	03-53800	.
1/2	1/4	.125	03-53900	.
5/8	3/8	.125	03-54000	.

GLASS EPOXY ROD

G-10 Glass Epoxy Rod - 5/8" Dia.
P/N 03-50900 ..... **Ft.**

Other sizes available in 4-ft. lengths.

CLEAR PVC PIPE



Clear, rigid Schedule 40 PVC pipe for sight gauges. Used in Quickie as fuel level gauge. Excellent resistance to gasoline. Nominal 1/4" pipe size (0.54" O.D., 0.33" I.D.) . P/N 03-54100 ..... **Ft.**

UNMASK

For easy removal of stubborn masking paper from plastic sheets. This worksaver also removes adhesive residue.

Quart ..... P/N 03-55100 ..... .
Gal. ..... P/N 03-55105..... .

PROTEX

Description: 20 mil latex impregnated paper with external vinyl coating for more abrasion resistance. **Application**: Heavy duty protection of acrylic windows, canopies, windshields and certain metal and painted surfaces where high abrasion resistance is required. Protex 20V is used to proect wood interiros of high quality business jets during manufacturing. P/N 09-02314.....

Description: 2 mil polyester film tinted light green. Capable of withstanding outdoor exposure **Application**: Window protection. Liner allows for die-cutting or hand-cutting masks to required size. Protects various plastic surfaces during installation, shipment and painting operations. Solvent and heat resistance properties same as PROTEX 8216-2. 48" Width Can be printed on by silk screen method. P/N 09-02315.....

DELRIN® ROD

Delrin® is a thermoplastic acetal resin. The most important attributes of Delrin® are high mechanical strength and rigidity, fatigue endurance and high resistance to moisture, gasoline and solvents. This product contains Delrin® resin. Delrin® is a registered trademark of E. I. du Pont de Nemours & Co. Color: Natural. Sold by the foot.

Diameter	Part No.	Price / Ft.	Diameter	Part No.	Price/Ft.
1/8"	02-52018	.	3/4"	02-52034	.
3/16"	02-52316	.	7/8"	02-52078	.
1/4"	02-52014	.	1"	02-52001	.
5/16"	02-52516	.	1-1/8"	02-52118	.
3/8"	02-52038	.	1-1/4"	02-52114	.
7/16"	02-52716	.	1-3/8"	02-52138	.
1/2"	02-52012	.	1-1/2"	02-52112	.
9/16"	02-52916	.	1-3/4"	02-52134	.
5/8"	02-52058	.	2"'	02-52002	.

PLEXIGLAS CUTTING TOOL

Cut up to 1/4" thick Plexiglas by scribing and breaking with this cutting tool. Complete with instructions.
P/N 03-54200 ..... .

ACRYLIC DRILL BITS

5/16" & 7/16" Acrylic Drill Bit.
5/16" ..... P/N 12-01075 ..... .
7/16" ..... P/N 12-01076 ..... .

PLEXIGLAS DRILLS

Specially ground point, 60° included tip angle, 0°rake angle, shoulder relieved, for drilling Plexiglas to prevent fractures, chipping or cracking. With instructions.

Drill Size	Part No.	Price Ea.
1/8"	03-54300	.
5/32"	03-54400	.
3/16"	03-54500	.
1/4"	03-54600	.

Drill Size	Part No.	Price Ea.
5/16"	03-00114	.
3/8"	03-54700	.
7/16"	03-00115	.
1/2"	03-00116	.

DISCOAT 4220 PLEXIGLASS PROTECTOR

General Chemical's Disccoat 4220 is a CLEAR water resistant; water based peelable temporary protective coating for Aircraft windshields & windows which provides a long lasting durable protective layer tht protects form scratches and oxidation. Used for protecting canopies and windshields during construction. Discoat 4220 air dries quickly, leaving a tough, yet flexible coating that is easily removed and requires no other additional step. 4220 represents the ultimate in water-based removable coating technology. It is stabilized against brittleness and is not softened or penetrated by most water-based compounds.

4220 is impregnated with transparent blue dye for easy visual inspection as well as identification and is non-staining and stable to 100 degrees Celsius. Approximate coverage: 35 sq. ft. per quart. May be applied by spray or brush. Minimum of 4 coats recommended for best results.

Discoat 4220 Plexiglass Protector QT ..... P/N 03-00158.....
Discoat 4220 Plexiglass Protector GL..... P/N 03-00159.....

SPRAY LAT PLEXIGLAS PROTECTOR

Sprayable, clear compound specially formulated as a strippable, protective coating for Plexiglas, flat and formed. Used for protecting canopies from scratches during construction. Coverage: Approx. 35 sq.ft. per quart. Caution: Spray Lat can be difficult to remove if left on for more than 1 year.

Spray Lat Plexiglas Protector - Quart ..... 03-54900..... .
Spray Lat Plexiglas Protector - Gallon ..... 03-55000..... .