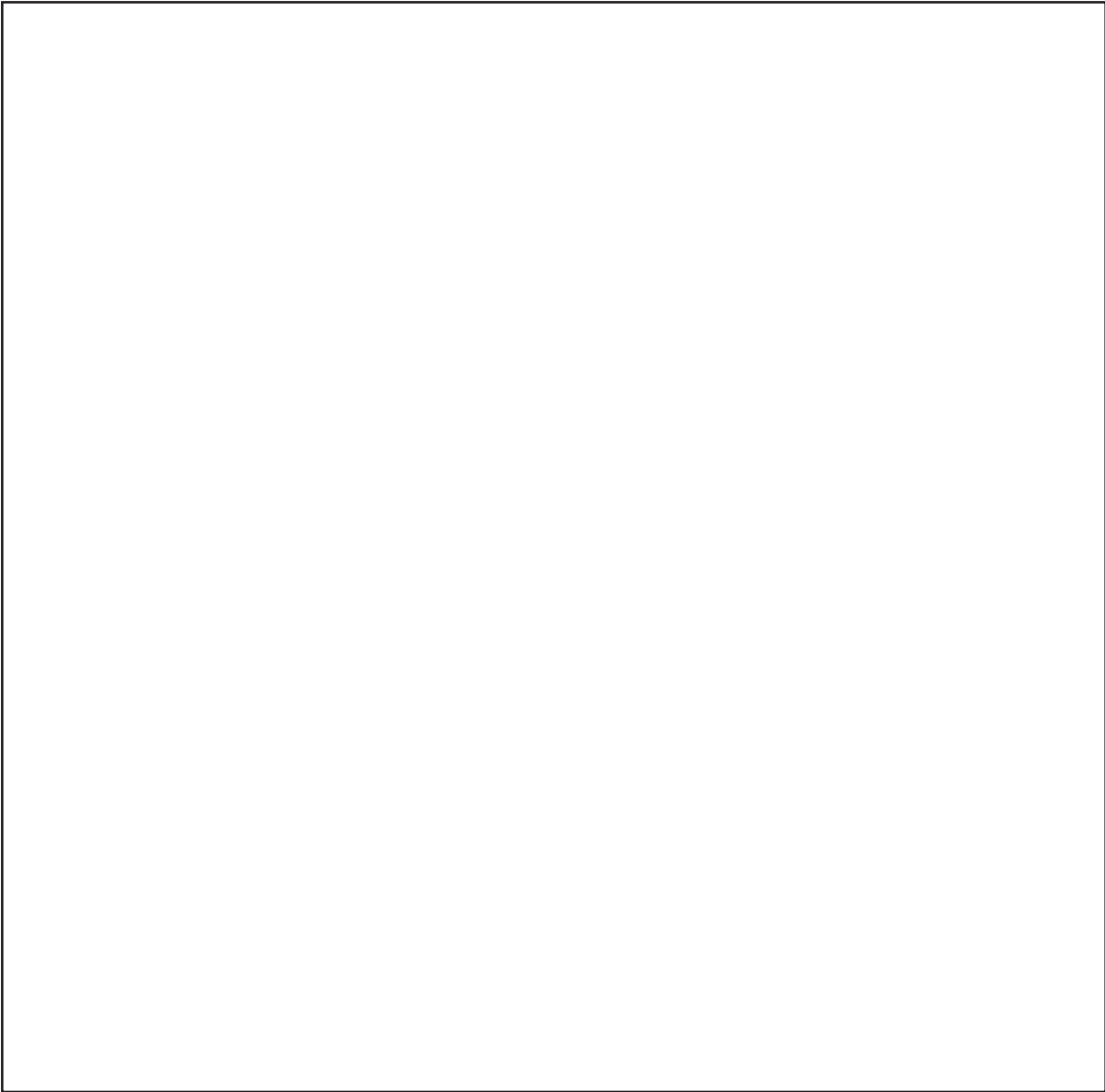


Atlas Metal Sales was founded in 1975 as an aluminum ingot distributor and has steadily grown to a specialty metals warehouse distributing aluminum, brass, bronze, copper, lead, nickel, pewter, tin and zinc in various forms.

Atlas has established a reputation for quality and competitive pricing and is a warehouse distributor for Revere Copper & Brass Co., Olin Brass Corp., and Ansonia Brass & Copper carrying bronze sheet, plate, rod, bar, tubing, welding rod, etc.

Atlas is also a distributor of foundry alloys for casting purposes for such well known companies as Belmont Metals, Co.; H. Kramer & Co.; and Vista Metals. The Company stocks lead-free American Pewter, pure tin, tin/lead alloys, lead sheet and solders, and is a distributor for Victory White Metals, Oster Alloys, and Mayco Industries.

Atlas has provided a unique service for many years to the art community throughout the U.S. by supplying specialty alloys in a variety of shapes and forms required by bronze sculptors, fabricators, foundries, blacksmiths, artists and craftsmen. Located in Denver, Atlas serves customers in all 50 states, as well as Canada and Mexico. Customer satisfaction, prompt shipment, personal service and locating the hard-to-find items are the primary goals of the company. Shipments are generally made within 24 hours after receipt of order.



COPPER ALLOY No. C65500 (HIGH SILICON BRONZE A)*

Composition - percent

	Nominal	Minimum	Maximum
Copper	97	Remainder	
Lead	....	....	.05
Iron	....	....	0.80
Zinc	....	....	1.50
Manganese	....	0.50	1.30
Silicon	3	2.80	3.80
Nickel	....	....	0.60

Nearest Applicable A S T M Specifications

Bolts	F468
Flat Products	B96, B98, B100, B124, B432
Nuts	F467
Pipe	B315
Rod	B98, B124
Screws	F468
Shapes	B98, B124, B283
Studs	F468
Tube	B315
Wire	B99, B105

Physical Properties

	English Units	C.G.S. Units
Melting Point (Liquidus)	1880 F	1025 C
Melting Point (Solidus)	1780 F	970 C
Density	.308 lb / cu in @ 68 F	8.53 gm / cu cm @ 20 C
Specific Gravity	8.53	8.53
Coefficient of Thermal Expansion	per ° F from 68 F to 212 F	per ° C from 20 C to 100 C
Coefficient of Thermal Expansion	per ° F from 68 F to 392 F	per ° C from 20 C to 200C
Coefficient of Thermal Expansion	.0000100 per ° F from 68 F to 572 F	.0000180 per ° C from 20 C to 300 C
Thermal Conductivity	21 Btu /sq ft /ft /hr /°F @ 68 F	0.9 cal /sq cm /cm /sec /°C @ 20 C
Electrical Resistivity (Annealed)	148 Ohms (circ mil /ft) @ 68 F	24.6 Microhm-cm @ 20 C
Electrical Conductivity* (Annealed)	7.0 % IACS @ 68 F	.0406 Megmho-cm @ 20 C
Thermal Capacity (Specific Heat)	09 Btu /lb °F @ 68 F	.09 cal /gm / °C @ 20 C
Modulus of Elasticity (Tension)	15,000 ksi	10,500 Kg /sq mm
Modulus of Rigidity	5,600 ksi	3,900 Kg /sq mm

*Volume Basis

Typical Uses

AIRCRAFT:	hydraulic pressure lines
HARDWARE:	bolts, burrs, butts, clamps, cotter pins, hinges, marine hardware, nails, nuts, pole line hardware, screws
INDUSTRIAL:	bearing plates, bushings, cable, channels, chemical equipment, heat exchanger tubes, kettles, piston rings, tanks, rivets, screen cloth and wire, screen plates, shafting
MARINE:	propeller shafts

Common Fabrication Processes

Blanking, drawing, forming and bending, heading and upsetting, hot forging and pressing, roll threading and knurling, shearing, squeezing and swaging

Fabrication Properties

Capacity for Being Cold Worked	Excellent	Suitability for being joined by:	
Capacity for Being Hot Formed	Excellent	Soldering	Good
Hot Forgeability Rating (Forging Brass = 100)	40	Brazing	Excellent
Hot Working Temperature	1300-1600 F or 700-875 C	Oxyacetylene Welding	Good
Annealing Temperature	900-1300 F or 475-700 C	Gas Shielded Arc Welding	Excellent
Machinability Rating (Free Cutting Brass = 100)	30	Coated Metal Arc Welding	Fair
		Resistance Welding {	
		Spot	Excellent
		Seam	Excellent
		Butt	Excellent

The values listed above represent reasonable approximations suitable for general engineering use. Due to commercial variations in composition and to manufacturing limitations, they should not be used for specification purposes. See applicable A.S.T.M. specification references.

* Source: Standards Handbook published by the Copper Development Association, Inc.

SILICON BRONZE SHEET AND PLATE - CDA 655

<u>Thickness</u>	<u>Weight Per Sq. Ft.</u>	<u>Weight Per Sheet</u>	<u>Standard Sheet Size</u>
.025" (22 ga.)	1.1 lbs.	22 lbs.	24 x 120
.047" (3/64")	2.2 lbs.	44 lbs.	24 x 120
.063" (1/16")	2.9 lbs.	58 lbs.	24 x 120
.094" (3/32")	4.2 lbs.	84 lbs.	24 x 120
.125" (1/8")	5.7 lbs.	114 lbs.	24 x 120
.187" (3/16")	8.6 lbs.	172 lbs.	24 x 120
.250" (1/4")	11.4 lbs.	228 lbs.	24 x 120
.125" (1/8")	5.7 lbs.	182 lbs.	48 x 96
.187" (3/16")	8.6 lbs.	276 lbs.	48 x 96
.250" (1/4")	11.4 lbs.	365 lbs.	48 x 96
.375" (3/8")	17.1 lbs.	547 lbs.	48 x 96
.500" (1/2")	22.8 lbs.	730 lbs.	48 x 96
.750" (3/4")	34.2 lbs.	1,075 lbs.	48 x 96
1.00" (1")	44.8 lbs.	1,434 lbs.	48 x 96

SILICON BRONZE - CDA 655

ROUND ROD

<u>Size</u>	<u>Lbs. Per Foot</u>	<u>Lbs. Per Length</u>
1/16"	.012	** .036
3/32"	.027	** .081
1/8"	.046	** .138
3/16"	.103	** .309
1/4"	.181	2.170
5/16"	.285	3.420
3/8"	.408	4.900
7/16"	.555	6.660
1/2"	.726	8.710
9/16"	.943	11.33
5/8"	1.134	13.610
3/4"	1.632	19.580
7/8"	2.261	27.132
1"	2.890	34.720
1-1/8"	3.740	44.880
1-1/4"	4.520	54.230
1-3/8"	5.587	67.046
1-1/2"	6.510	78.100
1-3/4"	8.860	106.32
2"	11.580	138.910

Standard Length - 12 Ft.

SQUARE ROD

<u>Size</u>	<u>Lbs. Per Foot</u>	<u>Lbs. Per Length</u>
1/2" x 1/2"	.96	11.52
5/8" x 5/8"	1.49	17.90
3/4" x 3/4"	2.16	25.92
1" x 1"	3.79	45.48
1.5" x 1.5"	8.68	104.16

Standard Length - 12 Ft.

** Denotes: Available in 3 Ft. Lengths only

Standard Length - 12 Ft.

SILICON BRONZE ROUND PIPE - CDA 651

<u>Size</u>	<u>Wt. Per Ft.</u>
.500 OD x .078 Wall x .344 ID	.40 lbs./ft.
.750 OD x .094 Wall x .562 ID	.73 lbs./ft.
1.000 OD x .125 Wall x .750 ID	1.31 lbs./ft.
1.250 OD x .125 Wall x 1.000 ID	1.71 lbs./ft.
1.500 OD x .156 Wall x 1.188 ID	2.50 lbs./ft.
1.750 OD x .156 Wall x 1.438 ID	2.92 lbs./ft.
2.000 OD x .172 Wall x 1.656 ID	3.75 lbs./ft.
2.500 OD x .172 Wall x 2.156 ID	4.83 lbs./ft.

Standard Length - 12 Ft.

SILICON BRONZE SQUARE TUBING - CDA 651

<u>Size Wt.</u>	<u>Per Ft.</u>
1.0" X 1.0" X .100" Wall	1.5 lbs./ft.
1.5" X 1.5" X .100" Wall	2.3 lbs./ft.
2.0" X 2.0" X .100" Wall	3.2 lbs./ft.

Standard Lengths - 12 Ft.

6 Ft. Increments Required

SILICON BRONZE RECTANGULAR FLAT BAR - CDA 655

<u>Size</u>	<u>Weight Per. Ft.</u>	<u>Weight Per. Length</u>
1/8" x 1"	.48	5.7 lbs.
3/16" x 1"	.72	8.6 lbs.
3/16" x 1-1/2"	1.07	12.8 lbs.
1/4" x 1"	.98	11.5 lbs.
1/4" x 2"	1.94	23.3 lbs.
1/2" x 1"	1.94	23.3 lbs.
1/2" x 2"	3.88	46.5 lbs.

Standard Lengths - 12 Ft.

6 Ft. Increments Required

Will cut to length

COPPER ALLOY No. C65100 (LOW SILICON BRONZE B)*

Composition - percent

	Nominal	Minimum	Maximum
Copper (incl. Silver)	98.5	Remainder	
Lead	....	....	.05
Iron	....	....	.8
Zinc	....	....	1.5
Manganese	....	....	.7
Silicon	1.5	.8	2.0

Nearest Applicable A S T M Specifications

Bolts	F468
Flat Products	B96, B98, B432
Nuts	F467
Pipe	B315
Rod	B98
Screws	F468
Shapes	B98
Studs	F468
Tube	B315
Wire	B99, B105

Physical Properties

	English Units	C.G.S. Units
Melting Point (Liquidus)	1940 F	1060 C
Melting Point (Solidus)	1890 F	1030 C
Density	.316 lb / cu in @ 68 F	8.75 gm / cu cm @ 20 C
Specific Gravity	8.75	8.75
Coefficient of Thermal Expansion	per ° F from 68 F to 212 F	per ° C from 20 C to 100 C
Coefficient of Thermal Expansion	per ° F from 68 F to 392 F	per ° C from 20 C to 200C
Coefficient of Thermal Expansion	.0000099 per ° F from 68 F to 572 F	.0000179 per ° C from 20 C to 300 C
Thermal Conductivity	33 Btu /sq ft /ft /hr /°F @ 68 F	0.14 cal /sq cm /cm /sec /°C @ 20 C
Electrical Resistivity (Annealed)	86.4 Ohms (circ mil /ft) @ 68 F	14.4 Microhm-cm @ 20 C
Electrical Conductivity* (Annealed)	12 % IACS @ 68 F	.0696 Megmho-cm @ 20 C
Thermal Capacity (Specific Heat)	.09 Btu /lb °F @ 68 F	.09 cal /gm / °C @ 20 C
Modulus of Elasticity (Tension)	17,000 ksi	12,000 Kg /sq mm
Modulus of Rigidity	6,400 ksi	4,500 Kg /sq mm

*Volume Basis

Typical Uses

AIRCRAFT:	hydraulic pressure lines
HARDWARE:	anchor screws, bolts, cable clamps, cap screws, machine screws, marine hardware, nuts, pole line hardware, rivets, U-bolts
INDUSTRIAL:	electrical conduits, heat exchanger tubes, welding rod

Common Fabrication Processes

Forming and bending, heading and upsetting, hot forging and pressing, roll threading and knurling, squeezing and swaging

Fabrication Properties

Capacity for Being Cold Worked	Excellent	Suitability for being joined by:		
Capacity for Being Hot Formed	Excellent	Soldering	Excellent	
Hot Forgeability Rating (Forging Brass = 100)		Brazing	Excellent	
Hot Working Temperature	1300-1600 F or 700-875 C	Oxyacetylene Welding	Good	
Annealing Temperature	900-1250 F or 475-675 C	Gas Shielded Arc Welding	Excellent	
Machinability Rating (Free Cutting Brass = 100)	30	Coated Metal Arc Welding	Fair	
		Resistance Welding {	Spot	Excellent
			Seam	Good
			Butt	Excellent

The values listed above represent reasonable approximations suitable for general engineering use. Due to commercial variations in composition and to manufacturing limitations, they should not be used for specification purposes. See applicable A.S.T.M. specification references.

SILICON BRONZE WELDING ROD

<u>Size</u>	<u>Wt. / Ft.</u>
1/16"	.012 lb.
3/32"	.027 lb.
1/8"	.046 lb.
3/16"	.103 lb.

Standard Lengths - 36"

SILICON BRONZE WIRE FOR MIG

<u>Size</u>	<u>Ft. Per Lb.</u>	<u>Coil Sizes</u>
.035" diam.	289 ft.	10 lb. spool
.035" diam.	289 ft.	25 lb. spool

"NICKEL-SILVER" WELDING ROD - CDA 773

<u>Size</u>	<u>Wt. Per Ft.</u>
3/32"	.025 lb.
1/8"	.042 lb.
3/16"	.094 lb.
1/4"	.188 lb.

NAVAL BRASS ROD (NON-LEADED) - CDA 464

<u>Size</u>	<u>Wt. Per Ft.</u>	<u>Lbs. Per Length</u>	<u>Composition - Nominal</u>	
1/2" diam	.716 lb.	8.59	Copper	60.0%
3/4" diam.	1.612 lb.	19.34	Tin	.8%
1" diam.	2.865 lb.	34.38	Zinc	39.2%

FABRICATION PROPERTIES - CDA 46400

Forgeability Rating	90	Oxyacetylene Welding	Good
Capacity for Being Cold Worked	Fair	Gas Shielded Arc Welding	Fair
Capacity for Being Hot Formed ...	Excellent	Resistance Welding - Spot	Good

EVERDUR - SILICON BRONZE INGOT - CDA 873

Composition - Nominal

Copper	95
Silicon	4
Manganese	1

Physical Properties

Melting Point (Liquidus)	1790F
Melting Point (Solidus)	1590F
Pouring Temperature (Light)	2000-2150F
Pouring Temperature (Heavy)	1850-1950F
Density	.302 lb/cu. in.

Suitability for Being Joined by:

Brazing	Good
Oxyacetylene Welding	Good
Carbon Arc Welding	Fair
Gas Shield Arc Welding	Good
Coated Metal Arc Welding	Good
Machinability Rating	40
Patternmakers' Shrinkage (in./ft)	1/4"

SIZES: Polished Shot, 1/2" Cubes, 2" Cut Lengths, 5 lb Bars, 20 lb Ingots

HERCULOY - SILICON BRONZE INGOT - CDA 876

Composition - Nominal

Copper	92
Silicon	4
Zinc	4

Physical Properties

Melting Point (Liquidus)	1780F
Melting Point (Solidus)	1580F
Pouring Temperature (Light)	1975-2100F
Pouring Temperature (Heavy)	1850-1950F
Density	.301 lb/cu. in.

Suitability for Being Joined by:

Brazing	Fair
Oxyacetylene Welding	Good
Carbon Arc Welding	Poor
Gas Shield Arc Welding	Fair
Coated Metal Arc Welding	Fair
Machinability Rating	40
Patternmakers' Shrinkage (in./ft)	3/16"

SIZES: Polished Shot, 1/2" Cubes, 2" Cut Lengths, 5 lb Bars, 20 lb Ingots

This information is not a standard and should not be used for specification purposes. It is a reference for locating standards and specifications where available. Since the information above is not verified by AMS, but has been obtained from other sources, Atlas Metal Sales assumes no responsibility or liability for it and makes no warranties.

BRASS AND BRONZE ALLOYS

FOUNDRY ALLOYS:

<u>No.</u>	<u>C.D.A. No.</u>
115	836
123	844
205	907
205	916
215	926
225	903
245	922
305	937
315	932
319	938
403	854
415 "9A"	952

FOUNDRY ALLOYS:

<u>No.</u>	<u>C.D.A. No.</u>
415 "9B"	953
415 "9C"	954
415 "9D"	955
421	865
423	862
424	863
Everdur Silicon Bronze (501)	873
Herculoy Silicon Bronze	876
Silicon Brass	875
White Tombasil	997.0
White Bronze	997.5

SPECIAL COPPER-BASE ALLOYS

- | | |
|------------------------------------|---------------------|
| • Art Casters Yellow Brass | Shot and 1/2" cubes |
| • Beryllium Copper AMS 4890 (20-C) | Shot and 1/2" cubes |
| • Jewelers Manganese Bronze | Shot and 1/2" cubes |
| • Phos. Copper Shot (15% Phos) | |
| • Silicon Bronze | Shot and 1/2" cubes |
| • White Bronze | Shot and 1/2" cubes |

COPPER SHEET

<u>Ounces Per Sq. Ft.</u>	<u>Gauge</u>	<u>Size In Inches</u>	<u>Weight Per Sq. Ft.</u>	<u>Weight Per Sheet - Lbs</u>
16	24	.021" x 36" x 96"	1.00 lbs.	24 lbs.
20	22	.027" x 36" x 96"	1.25 lbs.	30 lbs.
24	20	.032" x 36" x 96"	1.50 lbs.	36 lbs.
32	18	.043" x 36" x 96"	2.00 lbs.	48 lbs.

AMERICAN PEWTER SHEETS - LEAD FREE

<u>Gauge</u>	<u>Size</u>	<u>Weight Per Sheet</u>
22	.025" x 12" x 24"	1 lbs. 15 ozs.
20	.032" x 12" x 24"	2 lbs. 8 ozs.
18	.040" x 12" x 24"	3 lbs. 4 ozs.
16	.050" x 12" x 24"	3 lbs. 15 ozs.
14	.063" x 12" x 24"	4 lbs. 13 ozs.

Standard Chemical Composition: (Nominal)

Tin: 91.75%

Antimony: 8.00%

Copper: .25%

NOTE: Circles and Squares are available on special order.

PEWTERS, TIN/LEAD ALLOYS & BABBITTS

For Casting Purposes

353	(Sn 35%; Sb 3%; Pb 62%)
157	(Sn 4%; Sb 12%; Pb 84%)
5877	(Sn 3%; Sb 10%; Pb 87%)
7722	(Sn 72%; Sb 3.5%; Pb 23%; Cd 2%)
924	(Sn 92%; Sb 4%; Pb 4%)
926	(Sn 92%; Sb 2% Pb 6%)
592*	(Sn 92%; Sb 7.75%; Cu .25%)
902*	(Sn 90%; Sb 8.00%; Cu 2%)
No. 2 Babbitt	(Sn 89%; Sb 7.5% Cu 3.5%)
No. 3 Babbitt	(Sn 84%; Sb 8.0% Cu 8%)
No. 7 Babbitt	(Sn 10%; Sb 15% Pb 75%)

*Denotes Lead Free Pewters

ALUMINUM

Foundry Alloys

319.1	(Al 90.5%; Si 6%; Cu 3.5%)
355.2	(Al 94 %; Si 5%; Cu 1%)
356.1	(Al 92.5%; Si 7%; Fe .30%)
A356.2	(Al 93%; Si 7%; Fe .10%)
360.1	(Al 90%; Si 9.5%; Mg .50%)
380.1	(Al 85.5%; Si 8.5%; Cu 3.5%; Zn 2.5%)
383.1	(Al 84.5%; Si 10.5%; Cu 2.5%; Zn 2.5%)
535.2	(Al 93%; Mg 7%; Mn .20%)
713.1	(Al 91.5%; Zn 9.5%; Cu .70%; Mg .40%)

356 ALUMINUM CASTING ALLOY

<u>Fabricating Characteristics</u>	<u>Rating</u>	<u>Chemical Composition</u>	
Resistance to Hot Cracking	E	Silicon	6.5% to 7.5%
Pressure Tightness	E	Iron	.50% max.
Fluidity	E	Copper	.25% max.
Solidification Shrinkage	E	Manganese	.35% max.
Elev. Temperature Strength	G	Magnesium	.25% to .45%
Corrosion Resistance	VG	Zinc	.35% max.
Machining	F	Titanium	.25% max.
Polishing	G	Aluminum	91.0% to 93.0%
Gas Welding	E		
Arc Welding	E		
Brazing	No		
Normally Heat Treated	Yes		

Ratings

E - Excellent VG - Very Good G - Good F - Fair P - Poor

OUTSTANDING CHARACTERISTICS:
EXCELLENT CASTABILITY, WELDABILITY AND PRESSURE TIGHTNESS.

STAINLESS STEEL ROUND ROD

ALLOY 304

<u>Size</u>	<u>Weight Per Foot/Lbs.</u>	<u>Weight Per Bar</u>
1/8"	.04	.50
1/4"	.17	2.00
3/8"	.38	4.50
7/16"	.51	6.13
1/2"	.67	8.01
9/16"	.85	10.14
5/8"	1.04	12.52
3/4"	1.50	18.02
7/8"	2.05	24.54
1"	2.67	32.04
1-1/8"	3.38	40.56
1-1/4"	4.17	50.08
1-3/8"	5.05	60.59
1-1/2"	6.01	72.10
1-5/8"	7.05	84.62
1-3/4"	8.18	98.14
2"	10.68	128.20
2-1/4"	13.52	162.20
2-1/2"	16.69	200.30
2-3/4"	20.19	242.30
3"	24.03	288.40
3-1/2"	32.71	392.50

STANDARD LENGTHS: 12 FEET

Chemical Composition: 304

Chrome: 18.0% to 20.0%; Nickel: 8.0% to 10.0%; Manganese: 2.0% max.;
Silicon: 1.0% max.; Carbon: .08% max.; Nitrogen: .10% max.

STAINLESS STEEL ANGLE - ALLOY 304

<u>Size</u>	<u>Weight Per Ft/Lbs.</u>	<u>Weight Per Bar</u>
1" x 1" x 1/8"	0.80	16#
1" x 1" x 3/16"	1.16	23#
1-1/4" x 1 1/4" x 1/8"	1.01	20#
1-1/4" x 1 1/4" x 3/16"	1.48	30#
1-1/2" x 1-1/2" x 1/8"	1.23	25#
1-1/2" x 1-1/2" x 3/16"	1.80	36#
1-1/2" x 1-1/2" x 1/4"	2.34	47#
2" x 2" x 1/8"	1.65	33#
2" x 2" x 3/16"	2.44	49#
2" x 2" x 1/4"	3.19	64#
3" x 3" x 1/4"	4.90	98#
3" x 3" x 3/8"	7.20	144#

Standard Lengths: 20 ft. Randoms
Minimum Size: 10 ft.

STAINLESS STEEL FLAT BAR - ALLOY 304

<u>Size</u>	<u>Weight Per Ft.</u>	<u>Weight Per Bar</u>
3/16" x 2" x 12 ft.	1.275 lbs.	15.30 lbs.
1/4" x 2" x 12 ft.	1.700 lbs.	20.40 lbs.

Standard Lengths: 12 ft.
Minimum Size: 6 ft.

PURE METALS (99.9% Purity)

Aluminum	Fine Chopping
Copper	Fine Chopping
Lead	Bars
Nickel	Crowns and Rounds
Tin	1 # Bars
Zinc	Balls and Slabs

MISCELLANEOUS METALS AND ALLOYS

Lead Sheet and Plate	from .016 to 1.5" thickness
No. 77 Degassifier	for Silicon Bronze
Stainless Steel Ingots	316 L
Zinc Alloys	No. 2, 3, 5, 8, 12 and 27
Zinc Sheets .....	.027" x 39" x 96" 24 lbs/sheet
	.027" x 36" x 120" 30 lbs/sheet

