ACIER/STEEL
TAG
RIVE-NORD

Specialty Metals

Technical Data Sheet

Copper, brass, bronze, aluminum bronze, titanium, manganese.

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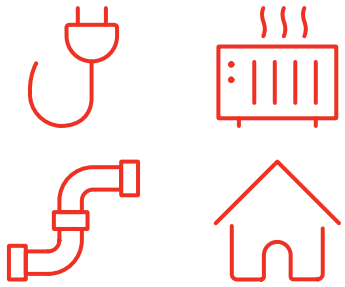
Copper

Copper is a reddish-brown metal known for its exceptional conductivity, corrosion resistance, and excellent formability. It is widely used in the electrical, mechanical, and architectural sectors.

Recommended for

- **Electrical:** wires, connectors, busbars
- **Heat exchange:** exchangers, radiators, pipes
- **Plumbing:** sanitary tubes, fittings
- **Architecture:** roofing, decorative trims



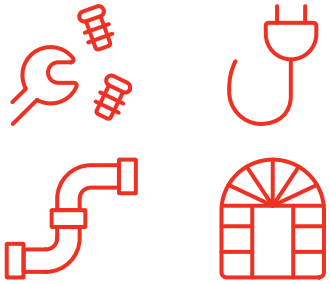
Mechanical Properties

	Typical Value
Tensile Strength	~30,000 to 50,000 psi
Yield Strength	~10,000 to 25,000 psi
Brinell Hardness	~40–110 HB
Elongation (2 in.)	~25–50 %
Corrosion Resistance	Good
Weldability	Excellent
Heat Treatment	No

Brass

Brass is a versatile copper-zinc alloy, valued for its good machinability, golden appearance, and corrosion resistance. It is used in decorative, mechanical, and electrical applications.

Recommended for



- **Precision machining:** fittings, threaded parts, bearings
- **Electrical:** connectors, terminals, switches
- **Plumbing and mechanical:** valves, fittings, bushings
- **Design and architecture:** handles, trims, instruments

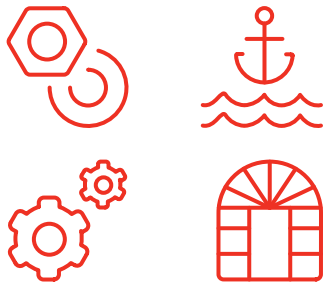
Mechanical Properties

	Typical Value
Tensile Strength	~50,000 to 80,000 psi
Yield Strength	~15,000 to 30,000 psi
Brinell Hardness	~55–100 HB
Elongation (2 in.)	~20–35 %
Corrosion Resistance	Good
Weldability	Medium to good
Heat Treatment	No

Bronze

Bronze is a strong copper-tin alloy, sometimes enriched with phosphorus, aluminum, or lead. It is known for its high wear resistance, dimensional stability, and excellent mechanical properties, even in harsh environments.

Recommended for



- **Industrial mechanics:** bearings, bushings, rings, slides
- **Marine equipment:** propellers, submerged parts, pumps
- **Structural applications:** gears, wear-resistant plates
- **Design and architecture:** sculptures, decorative pieces, hardware

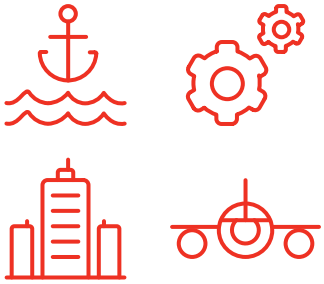
Mechanical Properties

	Typical Value
Tensile Strength	~35,000 to 85,000 psi
Yield Strength	~20,000 to 50,000 psi
Brinell Hardness	~60–150 HB
Elongation (2 in.)	~5–20 %
Corrosion Resistance	Excellent
Weldability	Medium to difficult
Heat Treatment	No

Aluminum Bronze

Aluminum bronze is a copper-aluminum alloy, sometimes enriched with iron, nickel, or manganese. It offers excellent corrosion resistance, especially in marine environments, along with very good mechanical strength.

Recommended for



- **Marine environments:** pumps, valves, propellers, fittings
- **Heavy industrial applications:** gears, bearings, tools
- **Corrosive environments:** refineries, chemical plants, water treatment
- **High–performance structures:** weapon components, aerospace

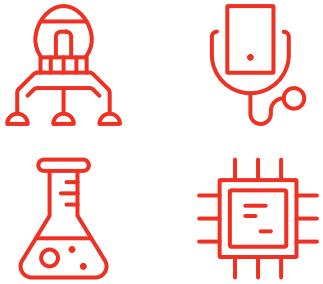
Mechanical Properties

	Typical Value
Tensile Strength	~70,000 to 110,000 psi
Yield Strength	~30,000 to 60,000 psi
Brinell Hardness	~130–200 HB
Elongation (2 in.)	~10–25 %
Corrosion Resistance	Exceptional
Weldability	Medium to good
Heat Treatment	Quenchable (specific alloys)

Titanium

Titanium is a lightweight, corrosion-resistant, very strong, and biocompatible metal. It is used in applications where strength, lightness, and chemical durability are critical, particularly in the aerospace, medical, and chemical industries.

Recommended for



- **Aerospace and transportation:** structural parts, engines
- **Medical industry:** implants, surgical instruments, prosthetics
- **Chemical and corrosive environments:** heat exchangers, reactors
- **High–tech applications:** sports, defense, electronics

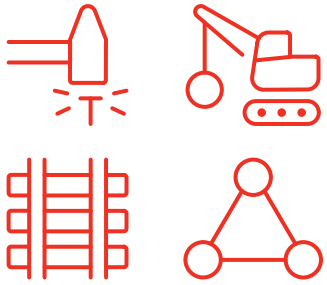
Mechanical Properties

	Typical Value
Tensile Strength	~50,000 to 130,000 psi
Yield Strength	~40,000 to 120,000 psi
Brinell Hardness	~70–300 HB (depending on the alloy)
Elongation (2 in.)	~10–30 %
Corrosion Resistance	Exceptional
Weldability	Good (in inert atmosphere)
Heat Treatment	Quenchable for certain alloys (Grade 5, Ti-6Al-4V)

Manganese

Manganese is a brittle metal, mainly used as an alloying element in steels to improve wear and impact resistance. In its pure form, it is rarely used structurally.

Recommended for



- **High–strength alloys:** quenched, impact, and shock-resistant steels
- **Extreme wear parts:** buckets, crusher jaws, tracks
- **Railway and mining applications:** rails, switches, conveyors
- **Metallurgical industry:** alloys, hardening additive

Mechanical Properties

Typical Value at 12–14% Mn

Tensile Strength	~95,000 to 130,000 psi
Yield Strength	~50,000 to 80,000 psi
Brinell Hardness	~200–600 HB (after work hardening)
Elongation (2 in.)	~20–50 %
Corrosion Resistance	Low (used with coating)
Weldability	Difficult (preheating required)
Heat Treatment	No

Conversion Table

Fractions	Decimals	Millimetres
1/64	0.156	0.3969
1/32	0.313	0.7938
	0.394	1
3/63	0.469	1.1906
1/16	0.625	1.5875
5/64	0.781	1.9844
	0.787	2
3/32	0.938	2.3812
7/64	0.1094	2.7781
	0.1181	3
1/8	0.125	3.175
9/64	0.1406	3.5719
5/32	0.1563	3.9688
	0.1575	4
11/64	0.1719	4.3656
3/16	0.1875	4.7625
	0.1969	5
13/64	0.2031	5.1594
7/32	0.2188	0.5563
15/64	0.2344	5.9531
	0.2362	6
1/4	0.25	6.35
17/64	0.2656	6.7469
	0.2756	7
9/32	0.2813	7.1438
19/64	0.2969	7.5406
5/16	0.3125	7.9375
	0.315	8
21/64	0.3281	8.3344
11/32	0.3438	8.7313
	0.3543	9
23/64	0.3594	9.1281
3/8	0.3750	9.525
25/64	0.3906	9.9219
	0.3937	10
13/32	0.4063	10.3188

Conversion Table (continued)

Fractions	Decimals	Millimetres
27/64	0.4219	10.7156
	0.4331	11
7/16	0.4375	11.1125
29/64	0.4531	11.5094
15/32	0.4688	11.9063
	0.4724	12
31/64	0.4844	12.3031
1/2	0.5	12.7
	0.5118	13
33/64	0.5156	13.0969
17/32	0.5313	13.4938
35/64	0.5469	13.8906
	0.5512	14
9/16	0.5625	14.2875
37/64	0.5781	14.6844
	0.5906	15
19/32	0.5938	15.0813
39/64	0.6094	15.4781
5/8	0.6250	15.875
	0.6299	16
41/64	0.6406	16.2719
21/32	0.6563	16.6688
	0.6693	17
43/64	0.6719	17.0656
11/16	0.6875	17.4625
45/64	0.7031	17.8594
	0.7087	18
23/32	0.7188	18.2563
47/64	0.7344	18.6531
	0.7480	19
3/4	0.75	19.05
49/64	0.7656	19.4469
25/32	0.7813	19.8438
	0.7874	20
51/64	0.7969	20.2406
13/16	0.8125	20.6375
	0.8268	21

Conversion Table (continued)

Fractions	Decimals	Millimetres
53/64	0.8281	21.0344
27/32	0.8438	21.4313
55/64	0.8594	21.8281
	0.8661	22
7/8	0.875	22.225
57/64	0.8906	22.6219
	0.9055	23
29/32	0.9032	23.0188
59/64	0.9219	23.4156
15/16	0.9375	23.8125
	0.9449	24
61/64	0.9531	24.2094
31/32	0.9688	24.6063
	0.9843	25
63/64	0.9844	25.0031
1	1	25.4

Rectangular HSS Tubes

Standard lengths: 12′ and 20′. *Other lengths may be available, please contact your representative to review available options.*

Copper

Dimension (in)	Dimension (mm)	Wall (in)	Wall (mm)	Weight (lb/ft)
1 x 1/2	25.4 x 12.7	0.059	1.5	0.632
1 1/2 x 1	38.1 x 25.4	0.079	2	1.418
1 15/16 x 1	49.2 x 25.4	0.098	2.5	2.11
2 15/16 x 1 15/16	74.6 x 49.2	0.118	3	4.301
3 15/16 x 1 15/16	100 x 49.2	0.138	3.5	6.028

Brass

Dimension (in)	Dimension (mm)	Wall (in)	Wall (mm)	Weight (lb/ft)
1 x 1/2	25.4 x 12.7	0.059	1.5	0.598
1 1/2 x 1	38.1 x 25.4	0.079	2	1.33
1 15/16 x 1	49.2 x 25.4	0.098	2.5	1.931
2 15/16 x 1 15/16	74.6 x 49.2	0.118	3	3.934
3 15/16 x 1 15/16	100 x 49.2	0.138	3.5	5.515

Titanium

Dimension (in)	Dimension (mm)	Wall (in)	Wall (mm)	Weight (lb/ft)
1 x 1/2	25.4 x 12.7	0.059	1.5	0.322
1 1/2 x 1	38.1 x 25.4	0.079	2	0.712
1 15/16 x 1	49.2 x 25.4	0.098	2.5	1.061
2 15/16 x 1 15/16	74.6 x 49.2	0.118	3	2.168
3 15/16 x 1 15/16	100 x 49.2	0.138	3.5	3.031

Round HSS Tubes

Standard lengths: 12′ and 20′. *Other lengths may be available, please contact your representative to review available options.*

Copper

Dimension (in)	Dimension (mm)	Wall (in)	Wall (mm)	Weight (lb/ft)
1/2	12.7	0.059	1.5	0.318
3/4	19.05	0.079	2	0.645
1	25.4	0.098	2.5	1.083
1 1/2	38.1	0.118	3	1.992
2	50.8	0.138	3.5	3.131

Brass

Dimension (in)	Dimension (mm)	Wall (in)	Wall (mm)	Weight (lb/ft)
1/2	12.7	0.059	1.5	0.291
3/4	19.05	0.079	2	0.59
1	25.4	0.098	2.5	0.991
1 1/2	38.1	0.118	3	1.823
2	50.8	0.138	3.5	2.866

Titanium

Dimension (in)	Dimension (mm)	Wall (in)	Wall (mm)	Weight (lb/ft)
1/2	12.7	0.059	1.5	0.147
3/4	19.05	0.079	2	0.299
1	25.4	0.098	2.5	0.503
1 1/2	38.1	0.118	3	0.926
2	50.8	0.138	3.5	1.452

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Round Bars

Standard lengths: 12′ and 20′. *Other lengths may be available, please contact your representative to review available options.*

Copper

Dimension (in)	Dimension (mm)	Weight (lb/ft)
1/4	6.35	0.191
3/8	9.53	0.429
1/2	12.7	0.763
5/8	15.88	1.192
3/4	19.05	1.716
1	25.4	3.057
1 1/4	31.75	4.778
1 1/2	38.1	6.879
2	50.8	12.206

Brass

Dimension (in)	Dimension (mm)	Weight (lb/ft)
1/4	6.35	0.18
3/8	9.53	0.404
1/2	12.7	0.718
5/8	15.88	1.122
3/4	19.05	1.615
1	25.4	2.878
1 1/4	31.75	4.496
1 1/2	38.1	6.474
2	50.8	11.498

Bronze

Dimension (in)	Dimension (mm)	Weight (lb/ft)
1/4	6.35	0.188
3/8	9.53	0.421
1/2	12.7	0.748
5/8	15.88	1.169
3/4	19.05	1.684
1	25.4	3
1 1/4	31.75	4.688
1 1/2	38.1	6.754
2	50.8	11.998

Round Bars (continued)

Aluminum Bronze

Dimension (in)	Dimension (mm)	Weight (lb/ft)
1/4	6.35	0.164
3/8	9.53	0.366
1/2	12.7	0.651
5/8	15.88	1.017
3/4	19.05	1.465
1	25.4	2.61
1 1/4	31.75	4.078
1 1/2	38.1	5.874
2	50.8	10.437

Titanium

Dimension (in)	Dimension (mm)	Weight (lb/ft)
1/4	6.35	0.096
3/8	9.53	0.214
1/2	12.7	0.381
5/8	15.88	0.596
3/4	19.05	0.859
1	25.4	1.531
1 1/4	31.75	2.389
1 1/2	38.1	3.441
2	50.8	6.113

Manganese

Dimension (in)	Dimension (mm)	Weight (lb/ft)
1/4	6.35	0.158
3/8	9.53	0.354
1/2	12.7	0.629
5/8	15.88	0.984
3/4	19.05	1.418
1	25.4	2.523
1 1/4	31.75	3.937
1 1/2	38.1	5.671
2	50.8	10.075

Flat Bars

Standard lengths: 12′ and 20′. *Other lengths may be available, please contact your representative to review available options.*

Copper

Thickness (in)	Thickness (mm)	Width (in)	Width (mm)	Weight (lb/ft)
1/8	3.18	1	25.4	0.486
1/4	6.35	1	25.4	0.971
		2	50.8	1.942
3/8	9.53	2	50.8	2.915
1/2	12.7	2	50.8	3.884
		3	76.2	5.826

Brass

Thickness (in)	Thickness (mm)	Width (in)	Width (mm)	Weight (lb/ft)
1/8	3.18	1	25.4	0.457
1/4	6.35	1	25.4	0.913
		2	50.8	1.826
3/8	9.53	2	50.8	2.739
1/2	12.7	2	50.8	3.648
		3	76.2	5.472

Bronze

Thickness (in)	Thickness (mm)	Width (in)	Width (mm)	Weight (lb/ft)
1/8	3.18	1	25.4	0.481
1/4	6.35	1	25.4	0.962
		2	50.8	1.924
3/8	9.53	2	50.8	2.888
1/2	12.7	2	50.8	3.847
		3	76.2	5.771

Aluminum Bronze

Thickness (in)	Thickness (mm)	Width (in)	Width (mm)	Weight (lb/ft)
1/8	3.18	1	25.4	0.421
1/4	6.35	1	25.4	0.843
		2	50.8	1.686
3/8	9.53	2	50.8	2.532
1/2	12.7	2	50.8	3.377
		3	76.2	5.065

Flat Bars (continued)

Titanium

Thickness (in)	Thickness (mm)	Width (in)	Width (mm)	Weight (lb/ft)
1/8	3.18	1	25.4	0.247
1/4	6.35	1	25.4	0.494
		2	50.8	0.988
3/8	9.53	2	50.8	1.482
1/2	12.7	2	50.8	1.977
		3	76.2	2.966

Manganese

Thickness (in)	Thickness (mm)	Width (in)	Width (mm)	Weight (lb/ft)
1/8	3.18	1	25.4	0.407
1/4	6.35	1	25.4	0.814
		2	50.8	1.627
3/8	9.53	2	50.8	2.441
1/2	12.7	2	50.8	3.255
		3	76.2	4.882

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Square Bars

Standard lengths: 12′ and 20′. *Other lengths may be available, please contact your representative to review available options.*

Copper

Dimension (in)	Dimension (mm)	Weight (lb/ft)
1/4	6.35	0.243
3/8	9.53	0.547
1/2	12.7	0.971
5/8	15.88	1.518
3/4	19.05	2.185
1	25.4	3.885

Brass

Dimension (in)	Dimension (mm)	Weight (lb/ft)
1/4	6.35	0.229
3/8	9.53	0.517
1/2	12.7	0.918
5/8	15.88	1.434
3/4	19.05	2.064
1	25.4	3.670

Bronze

Dimension (in)	Dimension (mm)	Weight (lb/ft)
1/4	6.35	0.241
3/8	9.53	0.544
1/2	12.7	0.964
5/8	15.88	1.507
3/4	19.05	2.169
1	25.4	3.848

Aluminum Bronze

Dimension (in)	Dimension (mm)	Weight (lb/ft)
1/4	6.35	0.211
3/8	9.53	0.476
1/2	12.7	0.842
5/8	15.88	1.316
3/4	19.05	1.893
1	25.4	3.359

Square Bars (continued)

Titanium

Dimension (in)	Dimension (mm)	Weight (lb/ft)
1/4	6.35	0.119
3/8	9.53	0.267
1/2	12.7	0.474
5/8	15.88	0.741
3/4	19.05	1.065
1	25.4	1.891

Manganese

Dimension (in)	Dimension (mm)	Weight (lb/ft)
1/4	6.35	0.196
3/8	9.53	0.441
1/2	12.7	0.782
5/8	15.88	1.222
3/4	19.05	1.757
1	25.4	3.122

Hexagonal Bars

Standard length: 12'. *Other lengths may be available, please contact your representative to review available options.*

Copper

Dimension (in)	Dimension (mm)	Weight (lb/ft)
1/4	6.35	0.21
3/8	9.53	0.474
1/2	12.7	0.841
3/4	19.05	1.892
1	25.4	2.364

Brass

Dimension (in)	Dimension (mm)	Weight (lb/ft)
1/4	6.35	0.198
3/8	9.53	0.446
1/2	12.7	0.792
3/4	19.05	1.779
1	25.4	3.162

Bronze

Dimension (in)	Dimension (mm)	Weight (lb/ft)
1/4	6.35	0.206
3/8	9.53	0.464
1/2	12.7	0.823
3/4	19.05	1.848
1	25.4	3.287

Aluminum Bronze

Dimension (in)	Dimension (mm)	Weight (lb/ft)
1/4	6.35	0.18
3/8	9.53	0.405
1/2	12.7	0.718
3/4	19.05	1.612
1	25.4	2.867

Hexagonal Bars (continued)

Titanium

Dimension (in)	Dimension (mm)	Weight (lb/ft)
1/4	6.35	0.105
3/8	9.53	0.237
1/2	12.7	0.419
3/4	19.05	0.941
1	25.4	1.672

Manganese

Dimension (in)	Dimension (mm)	Weight (lb/ft)
1/4	6.35	0.173
3/8	9.53	0.39
1/2	12.7	0.689
3/4	19.05	1.547
1	25.4	2.75

Plates

Standard formats: 4'×8' and 5'×10'. *Other formats may be available, please contact your representative to review available options.*

Copper

Thickness (in)	Thickness (mm)	Weight (lb/ft)
1/8	3.18	1.95
3/16	4.76	2.91
1/4	6.35	3.88
3/8	9.53	5.83
1/2	12.7	7.77
5/8	15.88	9.72
3/4	19.05	11.66
1	25.4	15.54

Brass

Thickness (in)	Thickness (mm)	Weight (lb/ft)
1/8	3.18	1.84
3/16	4.76	2.74
1/4	6.35	3.66
3/8	9.53	5.5
1/2	12.7	7.33
5/8	15.88	9.17
3/4	19.05	11.01
1	25.4	14.67

Bronze

Thickness (in)	Thickness (mm)	Weight (lb/ft)
1/8	3.18	1.92
3/16	4.76	2.86
1/4	6.35	3.82
3/8	9.53	5.73
1/2	12.7	7.64
5/8	15.88	9.55
3/4	19.05	11.46
1	25.4	15.27

Plates (continued)

Aluminum Bronze

Thickness (in)	Thickness (mm)	Weight (lb/ft)
1/8	3.18	1.68
3/16	4.76	2.5
1/4	6.35	3.35
3/8	9.53	5.03
1/2	12.7	6.71
5/8	15.88	8.38
3/4	19.05	10.06
1	25.4	13.41

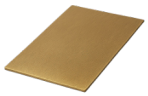
Titanium

Thickness (in)	Thickness (mm)	Weight (lb/ft)
1/8	3.18	0.98
3/16	4.76	1.47
1/4	6.35	1.96
3/8	9.53	2.94
1/2	12.7	3.92
5/8	15.88	4.91
3/4	19.05	5.89
1	25.4	7.86

Manganese

Thickness (in)	Thickness (mm)	Weight (lb/ft)
1/8	3.18	1.62
3/16	4.76	2.43
1/4	6.35	3.25
3/8	9.53	4.87
1/2	12.7	6.49
5/8	15.88	8.11
3/4	19.05	9.74
1	25.4	12.98

Sheets



Standard formats: 4'×8' and 5'×10'. *Other formats may be available, please contact your representative to review available options.*

Copper

Gauges	Thickness (in)	Thickness (mm)	Weight (lb/ft²)
24 AWG	0.02	0.508	0.31
20 AWG	0.032	0.813	0.5
18 AWG	0.04	1.016	0.62
16 AWG	0.05	1.27	0.78
	0.06	1.524	0.93
12 AWG	0.08	2.032	1.24
10 AWG	0.1	2.54	1.55

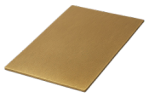
Brass

Gauges	Thickness (in)	Thickness (mm)	Weight (lb/ft²)
24 AWG	0.02	0.508	0.29
20 AWG	0.032	0.813	0.47
18 AWG	0.04	1.016	0.58
16 AWG	0.05	1.27	0.73
	0.06	1.524	0.87
12 AWG	0.08	2.032	1.16
10 AWG	0.1	2.54	1.45

Bronze

Thickness (in)	Thickness (mm)	Weight (lb/ft²)
0.02	0.508	0.31
0.032	0.813	0.49
0.04	1.016	0.61
0.05	1.27	0.76
0.06	1.524	0.91
0.08	2.032	1.22
0.1	2.54	1.52

Sheets (continued)



Aluminum Bronze

Thickness (in)	Thickness (mm)	Weight (lb/ft²)
0.02	0.508	0.27
0.032	0.813	0.43
0.04	1.016	0.54
0.05	1.27	0.68
0.06	1.524	0.82
0.08	2.032	1.1
0.1	2.54	1.37

Titanium

Thickness (in)	Thickness (mm)	Weight (lb/ft²)
0.02	0.508	0.16
0.032	0.813	0.26
0.04	1.016	0.32
0.05	1.27	0.4
0.06	1.524	0.47
0.08	2.032	0.63
0.1	2.54	0.79

Manganese

Thickness (in)	Thickness (mm)	Weight (lb/ft²)
0.02	0.508	0.26
0.032	0.813	0.41
0.04	1.016	0.51
0.05	1.27	0.63
0.06	1.524	0.76
0.08	2.032	1.02
0.1	2.54	1.27

Threaded Rods

Standard lengths: 3', 6' and 12'. *Other lengths may be available, please contact your representative to review available options.*

Bronze and Brass

Diameter (in)	Thread (TPI)	Standard Length (in)	Weight (lb)
#10-24	24	36	0.15
1/4	20	36	0.2
5/16	18	36	0.28
3/8	16	36	0.42
1/2	13	36	0.8
5/8	11	36	1.3
3/4	10	36	2