Overview of materials for Bronze

Categories: Metal; Nonferrous Metal; Copper Alloy; Bronze

Material Notes: This property data is a summary of similar materials in the MatWeb database for the category "Bronze". Each property range of values reported is minimum and maximum values of appropriate MatWeb entries. The comments report the average value, and number of data points used to calculate the average. The values are not necessarily typical of any specific grade, especially less common values and those that can be most affected by additives or processing methods.

Vendors: No vendors are listed for this material. Please click here if you are a supplier and would like information on how to add your listing to this material.

Physical Properties	Metric	English	Comments
Density	5.60 - 9.30 g/cc	0.202 - 0.336 lb/in³	Average value: 8.40 g/cc Grade Count:516

Mechanical Properties	Metric	English	Comments
Hardness, Brinell	11.6 - 420	11.6 - 420	Average value: 147 Grade Count:144
Hardness, Rockwell B	26.0 - 133	26.0 - 133	Average value: 81.1 Grade Count:192
Hardness, Rockwell C	25.0 - 44.0	25.0 - 44.0	Average value: 32.8 Grade Count:13
Hardness, Rockwell F	53.0 - 95.0	53.0 - 95.0	Average value: 67.7 Grade Count:39
Hardness, Rockwell 30T	6.00 - 83.0	6.00 - 83.0	Average value: 59.3 Grade Count:53
Hardness, Vickers	80.0 - 125	80.0 - 125	Average value: 103 Grade Count:6
Tensile Strength, Ultimate	55.2 - 1010 MPa	8000 - 147000 psi	Average value: 468 MPa Grade Count:529
Tensile Strength, Yield	69.0 - 800 MPa	10000 - 116000 psi	Average value: 283 MPa Grade Count:440
Elongation at Break	0.000 - 70.0 %	0.000 - 70.0 %	Average value: 22.1 % Grade Count:506
Reduction of Area	0.000 - 63.0 %	0.000 - 63.0 %	Average value: 24.5 % Grade Count:41
Creep Strength	0.0758 - 228 MPa	11.0 - 33000 psi	Average value: 86.6 MPa Grade Count:7
Modulus of Elasticity	72.4 - 138 GPa	10500 - 20000 ksi	Average value: 111 GPa Grade Count:461
Compressive Yield Strength	48.3 - 2400 MPa	7000 - 348000 psi	Average value: 585 MPa Grade Count:87
Poissons Ratio	0.280 - 0.420	0.280 - 0.420	Average value: 0.326 Grade Count:298
Fatigue Strength	75.8 - 352 MPa	11000 - 51100 psi	Average value: 194 MPa Grade Count:104
Machinability	10.0 - 90.0 %	10.0 - 90.0 %	Average value: 38.5 % Grade Count:381
Shear Modulus	37.0 - 46.8 GPa	5370 - 6790 ksi	Average value: 42.4 GPa Grade Count:298
Shear Strength	44.0 - 538 MPa	6380 - 78000 psi	Average value: 306 MPa Grade Count:120
Izod Impact	2.70 - 115 J	1.99 - 85.0 ft-lb	Average value: 33.7 J Grade Count:67

Charpy Impact	2.70 - 94.9 J	1.99 - 70.0 ft-lb	Average value: 34.0 J Grade Count:73

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.00000360 - 0.0000570 ohm-cm	0.00000360 - 0.0000570 ohm-cm	Average value: 0.0000137 ohm-cm Grade Count:456
Magnetic Permeability	1.00 - 2.20	1.00 - 2.20	Average value: 1.12 Grade Count:82
Magnetic Susceptibility	-1.00e-6 - -8.60e-8	-1.00e-6 - -8.60e-8	Average value: -5.43e-7 Grade Count:24

Thermal Properties	Metric	English	Comments
CTE, linear	16.0 - 26.0 µm/m-°C	8.89 - 14.4 µin/in-°F	Average value: 17.7 µm/m-°C Grade Count:277
Specific Heat Capacity	0.293 - 0.450 J/g-°C	0.0700 - 0.108 BTU/lb-°F	Average value: 0.382 J/g-°C Grade Count:387
Thermal Conductivity	1.01 - 208 W/m-K	7.00 - 1440 BTU-in/hr-ft²-°F	Average value: 60.7 W/m-K Grade Count:457
Melting Point	315 - 1180 °C	599 - 2160 °F	Average value: 958 °C Grade Count:388
Solidus	762 - 1140 °C	1400 - 2080 °F	Average value: 963 °C Grade Count:373
Liquidus	888 - 1180 °C	1630 - 2160 °F	Average value: 1030 °C Grade Count:383
Boiling Point	1400 °C	2550 °F	Average value: 1400 °C Grade Count:24
Annealing Point	427 - 899 °C	800 - 1650 °F	Average value: 608 °C Grade Count:253

Processing Properties	Metric	English	Comments
Processing Temperature	260 - 1010 °C	500 - 1850 °F	Average value: 448 °C Grade Count:94
Annealing Temperature	260 - 900 °C	500 - 1650 °F	Average value: 600 °C Grade Count:192
Solution Temperature	774 - 855 °C	1430 - 1570 °F	Average value: 796 °C Grade Count:8
Hot-Working Temperature	621 - 927 °C	1150 - 1700 °F	Average value: 817 °C Grade Count:190
Precipitation Temperature	304 °C	580 °F	Average value: 304 °C Grade Count:7
Recrystallization Temperature	330 - 870 °C	626 - 1600 °F	Average value: 478 °C Grade Count:64

Component Elements Properties	Metric	English	Comments
Aluminum, Al	0.00500 - 14.5 %	0.00500 - 14.5 %	Average value: 5.84 % Grade Count:251
Antimony, Sb	0.000700 - 1.50 %	0.000700 - 1.50 %	Average value: 0.282 % Grade Count:88
Arsenic, As	0.000700 - 0.350 %	0.000700 - 0.350 %	Average value: 0.0805 % Grade Count:12
Beryllium, Be	0.500 %	0.500 %	Average value: 0.500 % Grade Count:4
Boron, B	0.100 %	0.100 %	Average value: 0.100 % Grade Count:4

Carbon, C	0.100 - 1.75 %	0.100 - 1.75 %	Average value: 0.650 % Grade Count:3
Co + Ni	1.50 - 2.55 %	1.50 - 2.55 %	Average value: 2.03 % Grade Count:4
Copper, Cu	55.0 - 100 %	55.0 - 100 %	Average value: 87.2 % Grade Count:545
Iron, Fe	0.00200 - 5.50 %	0.00200 - 5.50 %	Average value: 1.17 % Grade Count:456
Lead, Pb	0.000700 - 27.0 %	0.000700 - 27.0 %	Average value: 1.74 % Grade Count:382
Magnesium, Mg	0.0100 - 0.100 %	0.0100 - 0.100 %	Average value: 0.0360 % Grade Count:5
Manganese, Mn	0.0100 - 14.0 %	0.0100 - 14.0 %	Average value: 1.26 % Grade Count:188
Nickel, Ni	0.000700 - 27.0 %	0.000700 - 27.0 %	Average value: 2.62 % Grade Count:209
Phosphorus, P	0.0100 - 1.00 %	0.0100 - 1.00 %	Average value: 0.160 % Grade Count:253
Silicon, Si	0.00300 - 5.00 %	0.00300 - 5.00 %	Average value: 0.980 % Grade Count:196
Sulfur, S	0.00100 - 0.650 %	0.00100 - 0.650 %	Average value: 0.0795 % Grade Count:72
Tin, Sn	0.0200 - 20.0 %	0.0200 - 20.0 %	Average value: 4.89 % Grade Count:323
Zinc, Zn	0.0500 - 43.5 %	0.0500 - 43.5 %	Average value: 5.01 % Grade Count:398
Zirconium, Zr	0.100 %	0.100 %	Average value: 0.100 % Grade Count:4