C 510 Phosphor Bronze – Grade A

Bronze Family: Phosphor Bronze

510 Color Code

C 510 Phosphor Bronze – Grade A is a Morgan standard alloy and finds use in electrical applications, as well as fasteners and industrial applications. Uses include various electrical connectors, fasteners, cotter pins and lock washers, sleeve bushings, welding rod, springs, perforated sheets and clutch disks.

Available from stock at Morgan Bronze in:

Rounds

Equivalent Specifications

ASTM B139/ B139M

Reference Specifications

SAE J461; SAE J463
AMS 4625
Copper Alloy UNS 51000

Equivalent specifications are verified and updated annually.
Specifications shown are current as of May 4, 2010.

Chemical Composition (%)

Cu	Sn	P	Fe	Pb	Zn
Remainder	4.2 – 5.8	0.03 – 0.35	0.10 max.	0.05 max.	0.30 max.

Sum of all named elements = 99.5%

Mechanical Properties

Minimum Tensile Properties, English/Metric

Temper HO4 hard

Nominal Diameter	Tensile Strength		Elongation**
Inches/mm	ksi	MPa	%
¼"– ½" incl./6 - 12 mm. incl.	70	485	13
Over ½" to 1" incl./12-25 mm incl.	60	415	15
Over 1.00"/25 mm	55	380	18

**Elongation in 4D
Chemical Composition and Mechanical Properties shown pertain to ASTM B139/B139 M only.

Machinability Rating 20 (Free Cutting Brass = 100)

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MORGAN
Bronze Products, Inc.

510 Color Code

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Bronze Family: Phosphor Bronze

(continued)

Physical Properties		
	English	**Metric**
Melting Point – Liquidus	1920° F	1049° C
Melting Point – Solidus	1750° F	954° C
Density	0.320 lb/in³ at 68° F	8.86 gm/cm³ @ 20° C
Specific Gravity	8.860	8.86
Electrical Resistivity (Annealed)	69.10 ohms-cmil/ft @ 68°F	11.49 microhm-cm @ 20° C
Electrical Conductivity (Annealed)	15%IACS @ 68° F	0.088 MegaSiemens/cm @ 20° C
Thermal Conductivity	40 Btu · ft/(hr · ft²·°F) @ 68° F	69.2 W/m · °K @20° C
Coefficient of Thermal Expansion	9.90 · 10^{-6} per °F (68-572° F)	17.8 ·10^{-6} per °C (20-300° C)
Specific Heat Capacity	0.090 Btu/lb/°F @ 68° F	377.1 J/kg · °K @293° K
Modulus of Elasticity in Tension	16,000 ksi	110,000 MPa

Physical Properties provided by CDA

Fabrication Practices			
Soldering	Excellent	**Capacity for Being Cold Worked**	Excellent
Brazing	Excellent	**Capacity for Being Hot Formed**	Poor
Oxyacetylene Welding	Fair		
Gas Shielded Arc Welding	Good	**Annealing Temperature – Minimum**	900° F or 483° C
Coated Metal Arc Welding	Fair	**Annealing Temperature – Maximum**	1250° F or 677° C
Resistance Welding – Spot	Good		
Resistance Welding – Seam	Fair		
Resistance Welding – Butt	Excellent		

Fabrication Practices provided by CDA