

## C511 (CuSn4)

### Composition

Cu* (%)	Sn (%)	Zn (%)	Fe (%)	P (%)	Pb (%)
rem.	3.5-4.9	0.30 max	0.10 max	0.03-0.35	0.05 max

\*) Cu+Sn+Fe+P min 99.5%

### Physical Properties

Temper	Melting point (liquidus)	Density	Specific heat cap. at 68 F (20 °C)	Electrical cond. Nom in black	Thermal cond. at 68 F (20 °C)	Mod. of elasticity	Coef. of therm.exp at 68 F (20 °C)
	°F °C						
All	1945 1063	0.32 8.86	0.09 0.38	20 20	48 84	16 110	9.9 17.8

### Mechanical Properties

At max 0.040"  
(1 mm)

Temper	R <sub>p0.2</sub> Yield strength ksi N/mm <sup>2</sup>	R <sub>m</sub> Tensile strength ksi N/mm <sup>2</sup>	A <sub>50</sub> Elongation 2" %	Hardness for reference HR30T HV	Min bend ratio 90°		Min bend ratio 180°	
					GW	BW	GW	BW
Soft	22 152	46-54 317-373	47	80	0.0	0.0	0.0	0.0
H02 (1/2H)	50 345	55-70 379-483	31	65 125	0.0	0.0	0.0	0.0
H04 (H)	75 517	72-87 497-600	11	74 185	0.0	1.0	0.0	1.0
H06 (EH)	87 600	84-99 579-683	5	78 225	0.5	2.0	0.5	3.0
H08 (SH)	93 642	91-105 623-724	2	79 245				
H10 (ES)	97 669	96-109 662-752	1	80 250				

Other tempers are available upon request.

Data for information only and not for use as purchase specification.

Yield strength, Elongation and Hardness are typical values for each temper.

### Stress relaxation resistance

Typical temperature for min 70 % remaining stress after 3000 h: 125 °C

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### Alloy attributes

Phosphor Bronze, 4.2% - 511 alloy with a nominal composition of 95.6% copper and 4.2% tin, deoxidized with phosphorus, possesses mechanical properties and fabricating characteristics similar to Phosphor Bronze 5% - 510 alloy but with 35% higher electrical and thermal conductivity by virtue of the lower tin content. 511 alloy offers a combination of high strength and ductility, excellent spring properties, good bearing qualities and wear resistance, excellent corrosion resistance and good resistance to stress relaxation. The improved electrical conductivity as compared to 510 alloy allows for miniaturization of electric current-carrying contacts and connectors. 511 alloy is fast becoming the most widely used Phosphor Bronze for electrical, electronic and communication current-carrying contact and connector applications.

**High strength**  
**Excellent spring properties**  
**Good stress relaxation resistance**  
**Good formability**  
**Good electrical and thermal conductivity**

### Typical applications

Bridge bearing plates, bellows, clutch discs, electrical connectors, switches, terminals, contacts, diaphragms, fuse, clips, fasteners, lock washers, sleeve bushings, mechanical springs, switch parts, terminal brackets, chemical hardware, kettles, pots, perforated sheets, textile machinery parts.

### Design limitations

### Applicable specifications

ASTM B103, B888