C510 (CuSn5)

Composition

Cu* (%)	Sn (%)	Zn (%)	Fe (%)	P (%)	Pb (%)
rem.	4.5-5.8	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) °F °C	Density lb/in^3 g/cm3	Specific heat cap. at 68 F (20 °C) Btu/lb°F kJ/(kg°K)	Electrical cond. Nom in black % IACS	Thermal cond. at 68 F (20 °C) Btu/ft h °F W/(m°K)	Mod. of elasticity X1000 ksi GPa	Coef.of therm.exp at 68 F (20 °C) 10^{-6}/°F 10-6/°C
All	1920 1049	0.32 8.86	0.09 0.38	15 15	40 69	16 110	9.9 17.8

Mechanical Properties

At max 0.040" (1 mm)

Temper	$R_{p0.2}$ Yield strength ksi N/mm^2	R_m Tensile strength ksi N/mm^2	A_{50} Elongation 2" %	Hardness for reference HR30T HV	Min bend ratio 90°		Min bend ratio 180°	
					GW	BW	GW	BW
Soft	24 166	45-56 310-386	55	 85	0.0	0.0	0.0	0.0
H02 (1/2H)	51 352	58-73 400-504	32	69 145	0.0	0.0	0.0	0.0
H04 (H)	77 531	76-91 524-626	7	75 200	0.0	1.0	0.0	1.0
H06 (EH)	90 621	88-103 607-710	5	78 230	0.0	2.0	0.0	2.0
H08 (SH)	98 676	95-110 655-759	2	79 245				
H10 (ES)	102 704	100-114 690-786	1	80 250				

Other tempers are avaliable 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

C510 (CuSn5)

Alloy attributes

Phosphor Bronze, 5% - 510 alloy with a nominal composition of 95% copper and 5% tin, deoxidized with 0.2% phosphorus is the most widely used of the phosphor bronze offering an optimum combination of such engineering properties as high strength and ductility, superior fatigue and spring characteristics, excellent corrosion resistance, durability for severe service, good bearing qualities with low friction and high wear resistance, superior forming, deep drawing and spinning, resistance to stress relaxation and good joining properties. In most cases 510 alloy has adequate electrical and thermal properties for many current-carrying and heat transfer requirements.

Flat springs made of 510 alloy have the following important advantages over steel springs (1) being non-magnetic (2) having higher electrical and thermal conductivity (3) greater resistance to corrosion (4) less susceptible to combined corrosion and fatigue (5) higher ratio of safe stress to modules allowing larger deflections with lower bending stresses and (6) more easily fabricated or formed.

High strength
Superior spring properties
Good stress relaxation resistance
Good formability

Typical applications

Bridge bearing plates, bellows, diaphragms, clutch discs, fasteners, mechanical springs, electrical contacts, switches, connectors, chemical hardware, textile machinery parts, fuse clip, lock washers, sleeve bushing, perforated sheets, friction springs, wear guides, sprinkler parts.

Design limitations

Applicable specifications

ASTM B103, B888