ALLOY DATA

C51100
ASTM B103

wieland

A cost effective alternative to high tin containing phosphor bronze alloys, C511 offer designers many of the same performance advantage. Offering only slightly lower strength and higher conductivity than C510 or C521 this alloy is a great choice for applications requiring functional spring members including: relay contacts, electronic connector, automotive terminals and contacts springs.

Chemical Composition

Copper[1]	**Remainder**
Tin	**3.5-4.9%**
Phosphorous	**0.03-0.35%**
Lead	0.05% Max
Iron	0.10% Max
Zinc	0.30% Max

[1] Cu + Named Elements, 99.5% min

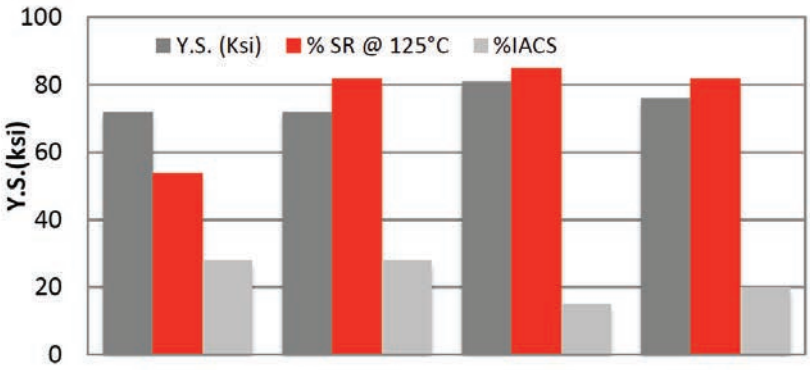

Figure 1: Comparison of Yield Strength , Electrical Conductivity and Stress Relaxation performance (@ 1000hrs) of select high strength spring materials

Physical Properties

	English Units	Metric Units
Density	0.320 lb/in^3 @ 68ºF	8.86 g/cm^3
Thermal Conductivity	48.4 BTU-ft/ft^2-hr-ºF	86 W/mºK
Electrical Resistivity	52.0 ohm circ mils/ft	8.7 microhm-cm
Electrical Conductivity (annealed)	20% IACS*	0.116 megamho/cm
Modulus of Elasticity	16,000,000 psi	110 kN/mm^2
Thermal Capacity(Specific Heat)	0.090 Btu/lb/Fº @ 68ºF	377.1 J/kg · ºC @ 20ºC
Coeff. Of Thermal Expansion		
68-572ºF (20-300ºC)	9.90 PPM/ºF	17.82 PPM/ºC

*International Annealed Copper Standard

Mechanical Properties

Temper[1]	Tensile Strength		Yield Strength[2]		% Elongation[2]	Typical 90º Bend Formability GW/BW[3]	
	ksi	N/mm^2	ksi	N/mm^2			
Annealed	46-54	315-370	22	150	47	-	-
1/4 Hard	46-58	315-400	35	240	36	-	-
1/2 Hard	55-70	380-485	56	385	21	-	-
3/4 Hard	67-82	460-565	72	495	10	0.5	0.8
Hard	72-87	495-600	76	525	7	0.8	1.3
Extra Hard	84-99	580-685	88	605	3	1.3	2.0
Spring Hard	91-105	625-725	94	650	3	1.8	4.5
Extra Spring	96-109	660-750	98	675	2		

[1] Mechanical properties subject to change. All tempers listed are made to a Tensile Strength specification unless otherwise noted.

[2] Nominal Values [3] DATA FOR REFERENCE ONLY. R/T = Bend Radius/Material Thickness <0.016" (0.4mm) thick, 11/16 (17.5mm) wide.