Wieland-B14

CuSn4 | C51100 | CW450K

CuSn4 exhibits a useful combination of cold formability, strength and reasonable electrical conductivity. It is used in electronics components which are produced by stamping and bending processes, especially for signal connectors. It is also used for press-fit connectors/compliant pins. It even provides a reasonable thermal stability. The temperature stability of this alloy allows application even at elevated service temperatures. Thermal relaxation is negligible at 100 °C and acceptable up to 120 °C.

Chemical composition (Reference)	
Sn	4 %
Cu	remainder

Physical properties (Reference values at room temperature)				
Electrical conductivity	13	MS/m	22	%IACS
Thermal conductivity	84	W/(m·K)	48	Btu·ft/(ft²·h·°F)
Coefficient of electrical resistance*	1.3	10^{-3}/K	0.7	10^{-3}/°F
Coefficient of thermal expansion*	17.8	10^{-6}/K	9.9	10^{-6}/°F
Density	8.85	g/cm³	0.320	lb/in³
Modulus of elasticity	120	GPa	17,500	ksi
Specific heat	0.377	J/(g·K)	0.090	Btu/(lb·°F)
Poisson´s ratio	0.34		0.34	

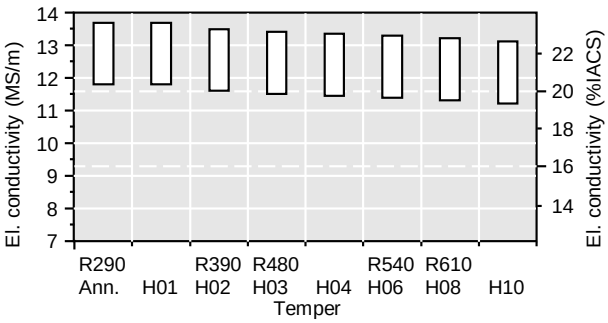
* Between 0 and 300 °C

Mechanical properties (values in brackets are for information only)

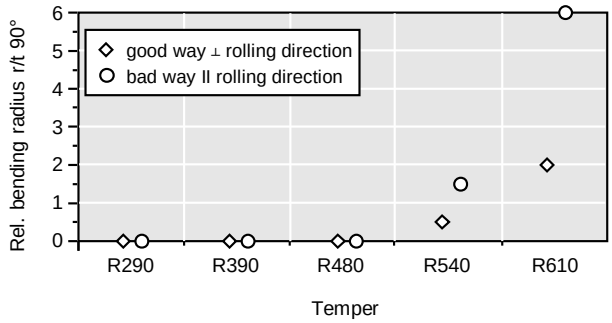
Temper	Tensile strength R_m		Yield strength $R_{p0.2}$		Elongation A_{50}	Hardness HV
	MPa	ksi	MPa	ksi	%	
R290	290-390	42-57	≤ 190	≤ 28	≥ 40	(70-100)
R390	390-490	57-71	≥ 320	≥ 46	≥ 11	(115-155)
R480	480-570	70-83	≥ 440	≥ 64	≥ 4	(150-180)
R540	540-630	78-91	≥ 510	≥ 74	≥ 3	(170-200)
R610	≥ 610	≥ 88	≥ 580	≥ 84	-	(≥ 190)
Annealed*	315-370	46-54	≥ 110	≥ 16	≥ 45	
H01*	315-400	46-58	≥ 140	≥ 20	≥ 25	
H02*	380-485	55-70	≥ 290	≥ 42	≥ 12	
H03*	460-565	67-82	≥ 440	≥ 64	≥ 6	
H04*	495-600	72-87	≥ 485	≥ 70	≥ 2	
H06*	580-685	84-99	≥ 560	≥ 81	≥ 1	
H08*	625-725	91-105	≥ 605	≥ 88	≥ 1	
H10*	660-750	96-109	≥ 635	≥ 92	≥ 1	

* According to ASTM B888

Electrical conductivity



Bendability (Strip thickness t ≤ 0.5 mm)



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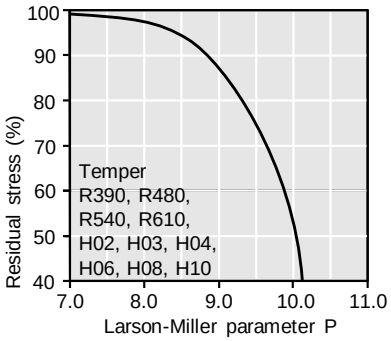
Thermal stress relaxation

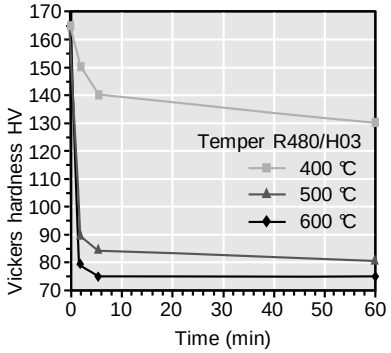


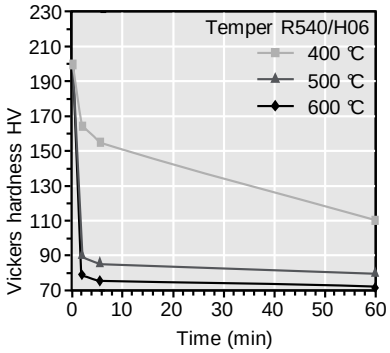
Stress remaining after thermal relaxation as a function of Larson-Miller parameter P
(F. R. Larson, J. Miller, Trans ASME74 (1952) 765–775) given by:
P = (20 + log(t))*(T + 273)*0.001.
Time t in hours, temperature T in ℃.
Example: P = 9 is equivalent to 1,000 h/118 ℃.
Measured on stress relief annealed specimens parallel to rolling direction.
Total stress relaxation depends on the applied stress level.
Furthermore, it is increased to some extent by cold deformation.

Fatigue strength

The fatigue strength is defined as the maximum bending stress amplitude which a material withstands for 10^7 load cycles under symmetrical alternate load without breaking. It is dependent on the temper tested and is about 1/3 of the tensile strength R_m.

Resistance to softening





Vickers hardness after heat treatment (typical values)

Types and formats available

- Standard coils with outside diameters up to 1,400 mm
- Traverse-wound coils with drum weights up to 1.5 t
- Multicoil up to 5 t
- Hot-dip tinned strip
- Contour-milled strip
- Sheet
- Strip and sheet with protective coating

Dimensions available

- Strip thickness from 0.10 mm, thinner gauges on request
- Strip width from 3 mm, however min. 10 x strip thickness

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06.21 | RP.TMA.UL/Bm