Wieland-L96

CuNi9Sn6

CuNi9Sn6 is a high-strength / low conductivity alloy. The high strength and excellent resistance to thermal relaxation are derived from spinodal decomposition. The combination of strength and formability is similar to beryllium copper and titanium copper alloys. Due to these unique properties, the electronic industry uses CuNi9Sn6 for springs, miniaturized signal connectors and EMI shields. In addition, the high strength allows Wieland-L96 for use in eyeglass arms and hinges as well as mechanical components in wristwatches.

Chemical composition (Reference)	
Ni	9 %
Sn	6 %
Cu	remainder

Physical properties (Reference values at room temperature)				
Electrical conductivity	6	MS/m	10	%IACS
Thermal conductivity	54	W/(m·K)	31	Btu·ft/(ft²·h·°F)
Coefficient of electrical resistance*	0.4	10^{-3}/K	0.2	10^{-3}/°F
Coefficient of thermal expansion*	17.3	10^{-6}/K	9.6	10^{-6}/°F
Density	8.89	g/cm³	0.321	lb/in³
Modulus of elasticity	130	GPa	18,800	ksi
Specific heat	0.381	J/(g·K)	0.091	Btu/(lb·°F)
Poisson´s ratio	0.34		0.34	

* Between 0 and 300 °C

Mechanical properties – Non mill age hardened (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	%	
TB00*	420-520	61-75	≥ 180	≥ 26	≥ 15	(95-130)
TH00**	≥ 750	≥ 109	≥ 700	≥ 102	≥ 7	(260-330)
TD02*	600-700	87-102	≥ 550	≥ 80	≥ 3	(180-230)
TH02**	≥ 880	≥ 128	≥ 800	≥ 116	≥ 3	(280-340)
TD04*	675-775	98-112	≥ 600	≥ 87	≥ 1	(210-240)
TH04**	≥ 930	≥ 135	≥ 900	≥ 131	≥ 1	(300-350)

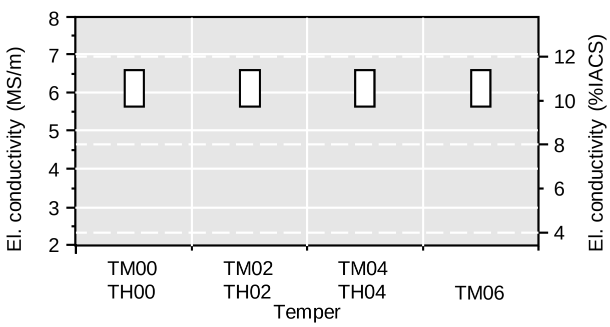
* As delivered condition, prior to heat treatment

** Properties expected after heat treatment (for information only). Heat treatment conditions will be advised by Wieland to meet your requirements

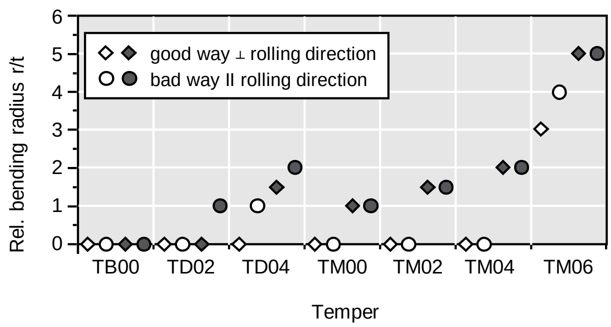
Mechanical properties – Mill age hardened (values in brackets are for information only)

Temper	Tensile strength R_m		Yield strength $R_{p0.2}$		Elongation A_{50}	Hardness HV
	MPa	ksi	MPa	ksi	%	
TM00	600-840	87-122	≥ 500	≥ 73	≥ 10	(200-300)
TM02	800-900	116-131	≥ 750	≥ 109	≥ 7	(260-300)
TM04	850-950	123-138	≥ 800	≥ 116	≥ 3	(280-330)
TM06	≥ 900	≥ 131	≥ 850	≥ 123	≥ 3	(≥ 310)

Electrical conductivity



Bendability (Strip thickness t ≤ 0.4 mm) ◇○ 90° ◆● 180°



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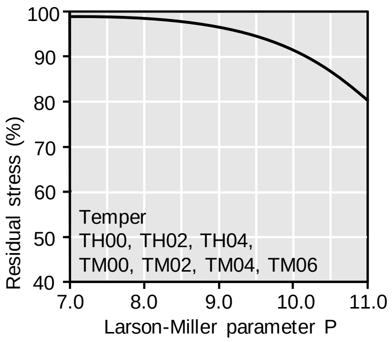
Thermal stress relaxation



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.

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
- Contour-milled strip
- Sheet

Dimensions available

- Strip thickness from 0.08 mm, thinner gauges on request
- Strip width from 3 mm, however min. 10 x strip thickness

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