Wieland-K58

CuNi3Si1Mg | C70250

Wieland-K58 is a high-performance alloy that is produced to very high strength tempers exceeding K55 due to the increased Ni, Si and Mg content. The precipitation of silicides, which are distributed uniformly through the entire length of the strip delivers high strength levels, good conductivity and excellent resistance to thermal stress relaxation. K58 is a superior solution for miniaturized connectors that require high spring forces such as CPU sockets, board to board connectors as well as relays & switches. Thicknesses are produced down to very thin gauges of 0.05 mm.

Chemical composition (Reference)	
Ni	3.8 %
Si	0.75 %
Mg	0.15 %
Cu	remainder

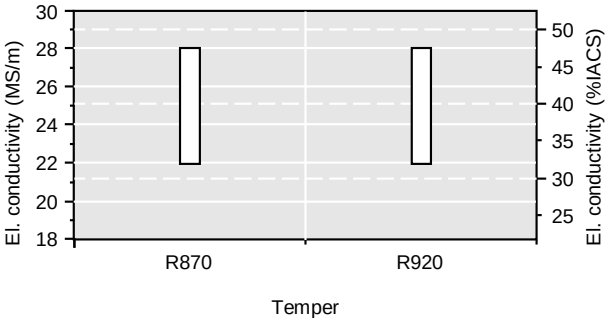
Physical properties (Reference values at room temperature)				
Electrical conductivity	24	MS/m	41	%IACS
Thermal conductivity	181	W/(m·K)	105	Btu·ft/(ft²·h·℉)
Coefficient of electrical resistance*	1.8	10^{-3}/K	1.0	10^{-3}/℉
Coefficient of thermal expansion*	17.6	10^{-6}/K	9.8	10^{-6}/℉
Density	8.80	g/cm³	0.318	lb/in³
Modulus of elasticity	131	GPa	19,000	ksi
Specific heat	0.399	J/(g·K)	0.095	Btu/(lb·℉)
Poisson´s ratio	0.34		0.34	

* Between 0 and 300 ℃

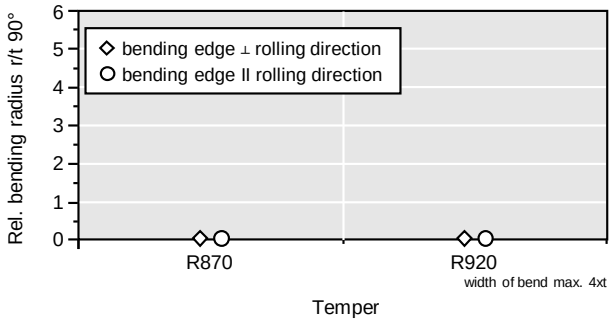
Mechanical properties (values in brackets are for information only)

Temper	Tensile strength R_m		Yield strength $R_{p0.2}$		Elongation A_{50}	Hardness HV
	MPa	ksi	MPa	ksi	%	
R870	870-990	126-144	≥ 850	≥ 123	≥ 1	(240-300)
R920	920-1,080	133-157	≥ 900	≥ 131	≥ 1	(260-320)

Electrical conductivity



Bendability (Strip thickness t ≤ 0.1 mm)



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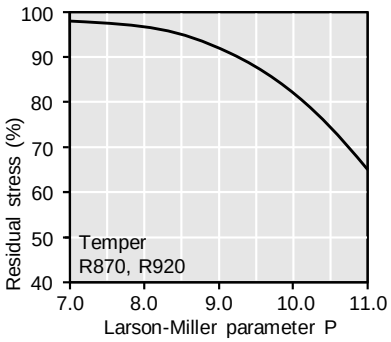
Thermal stress relaxation



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.

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

Dimensions available

- Strip thickness 0.05-0.30 mm, other gauges on request
- Strip width from 3 mm, however min. 10 x strip thickness

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06.21 | RP.TMA.UL/Bm