Wieland-B14

CuSn4
C51100

Rolled Products

Wieland

Material Designation	
EN	CuSn4
UNS*	C51100

** Unified Numbering System (USA)*

Chemical Composition (Reference)	
Sn	4 %
Cu	balance

Typical Applications

- Stamped parts
- Connectors
- Contact springs

Physical Properties*		
Electrical Conductivity	MS/m %IACS	12 21
Thermal Conductivity	W/(m·K)	100
Coefficient of Electrical Resistance**	10^{-3}/K	1.3
Coefficient of Thermal Expansion**	10^{-6}/K	18.0
Density	g/cm³	8.85
Modulus of Elasticity	GPa	120
Specific Heat	J/(g·K)	0.377
Poisson's Ratio		0.34

** Reference values at room temperature*
*** Between 0 and 300 °C*

Fabrication Properties	
Capacity for Being Cold Worked	excellent
Machinability	less suitable
Capacity for Being Electroplated	excellent
Capacity for Being Hot-Dip Tinned	excellent
Soft Soldering	excellent
Resistance Welding	good
Gas Shielded Arc Welding	good
Laser Welding	good

Corrosion Resistance

Resistant to seawater and industrial atmosphere. Largely insensitive to stress corrosion cracking.

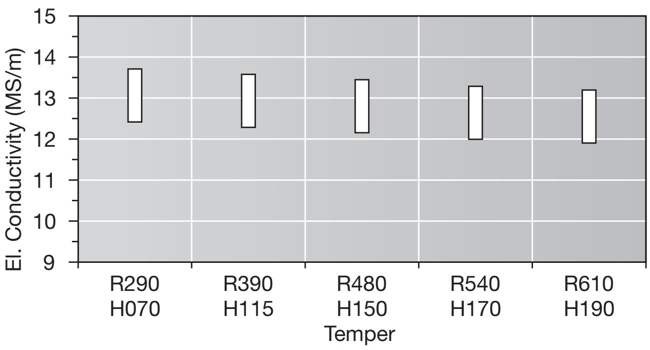
Mechanical Properties

Temper		R290	R390	R480	R540	R610
Tensile Strength R_m	MPa	290–390	390–490	480–570	540–630	≥ 610
Yield Strength $R_{p0.2}$	MPa	≤ 190	≥ 320	≥ 440	≥ 510	≥ 580
Elongation A_{50mm}	%	≥ 40	≥ 11	≥ 4	≥ 3	–

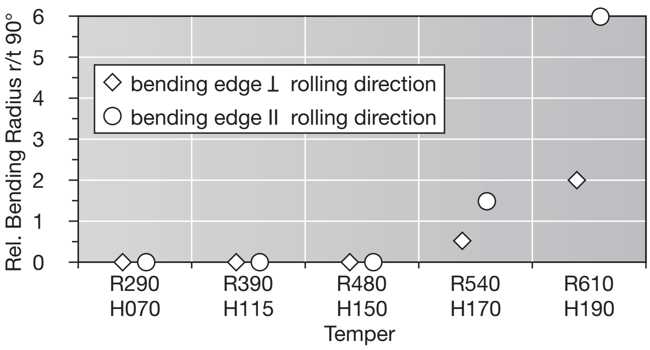
Intermediate tempers are feasible. Higher elongation values can be obtained by additional heat treatments.

Temper	H070	H115	H150	H170	H190
Hardness HV	70–100	115–155	150–180	170–200	≥ 190

Electrical Conductivity



Bendability (Strip Thickness t ≤ 0.5 mm)



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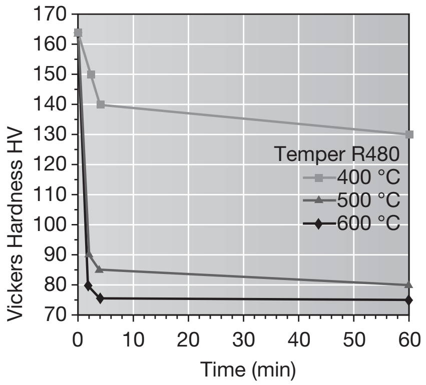
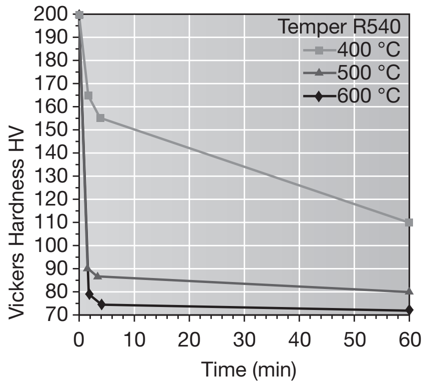
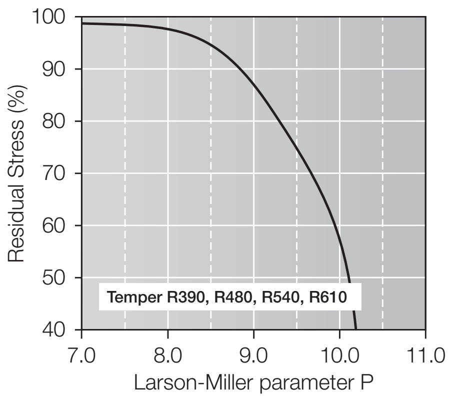
Resistance to Softening





Vickers hardness after heat treatment (typical values)

Thermal Stress Relaxation



Stress remaining after thermal relaxation as a function of Larson-Miller parameter (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 °C.
Example: P = 9 is equivalent to 1.000 h/118 °C.
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 ⅓ of the tensile strength R_m.

Types and Formats Available

- Standard coils with outside diameters up to 1400 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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10/12 Bm (GSW/Ri)