Wieland-S12
CuSn3Zn9
C42500

Rolled Products

Wieland

Material Designation

EN	CuSn3Zn9
UNS*	C42500

** Unified Numbering System (USA)*

Chemical Composition (Reference)

Sn	3 %
Zn	9 %
Cu	balance

Typical Applications

- Components for the electrical industry
- Connectors

Physical Properties*

Electrical Conductivity	MS/m %IACS	16 28
Thermal Conductivity	W/(m·K)	120
Coefficient of Electrical Resistance**	10^{-3}/K	1.0
Coefficient of Thermal Expansion**	10^{-6}/K	18.4
Density	g/cm³	8.75
Modulus of Elasticity	GPa	126
Specific Heat	J/(g·K)	0.380
Poisson's Ratio		0.34

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

Fabrication Properties

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

Corrosion Resistance

Wieland-S12 has a low sensitivity to stress corrosion cracking. It is resistant to sea water and industrial atmosphere.

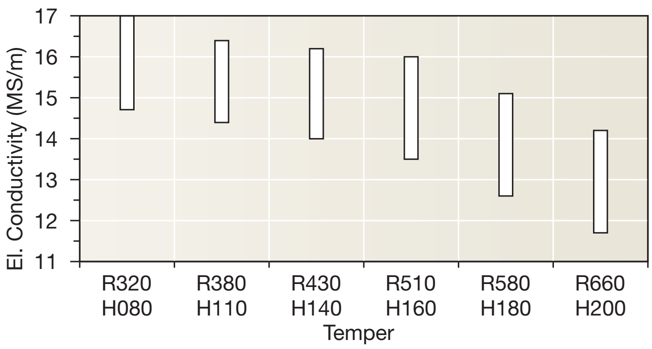
Mechanical Properties

Temper		R320	R380	R430	R510	R580	R660
Tensile Strength R_m	MPa	320–380	380–430	430–520	510–600	580–690	≥ 660
Yield Strength $R_{p0.2}$	MPa	≤ 230	≥ 200	≥ 330	≥ 430	≥ 520	≥ 610
Elongation A_{50mm}	%	≥ 25	≥ 16	≥ 6	≥ 3	–	–

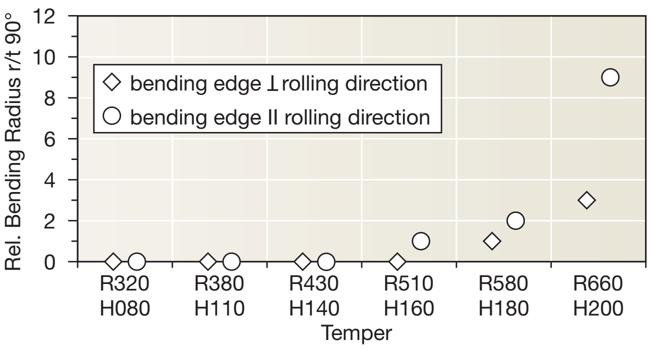
Intermediate tempers are feasible. Higher elongation values can be obtained by additional heat treatments.

Temper	H080	H110	H140	H160	H180	H200
Hardness HV	80–110	110–140	140–170	160–190	180–210	≥ 200

Electrical Conductivity



Bendability (Strip Thickness t ≤ 0.5 mm)



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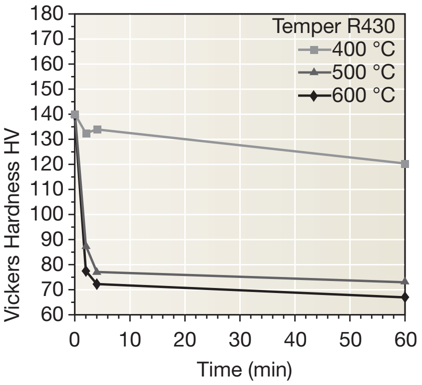
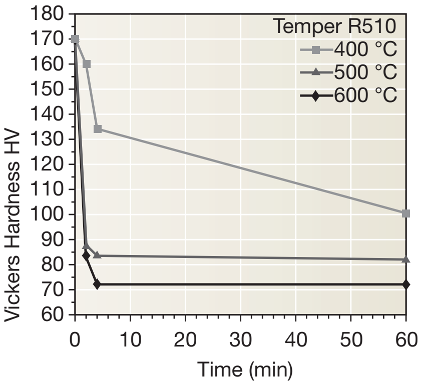
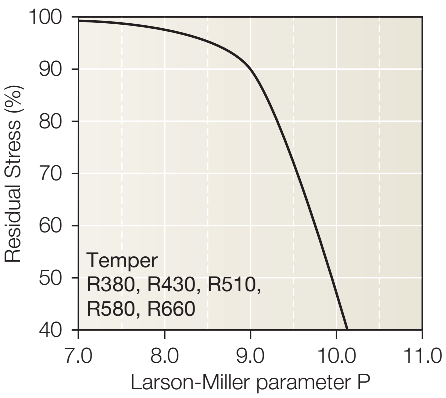
Resistance to Softening





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:
$P = (20 + \log(t)) \cdot (T + 273) \cdot 0.001$.
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 1/3 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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10/14 Bm (R+G)