

Material Designation	
EN	CW454K
UNS*	C42500

\* Unified Numbering System (USA)

Chemical Composition (Reference)	
Sn	3 %
Zn	9 %
Cu	balance

Typical Applications
<ul style="list-style-type: none"> <li>• Components for the electrical industry</li> <li>• Connectors</li> </ul>

Physical Properties*		
Electrical Conductivity	MS/m %IACS	16 28
Thermal Conductivity	W/(m·K)	120
Coefficient of Electrical Resistance**	10 <sup>-3</sup> /K	1.0
Coefficient of Thermal Expansion**	10 <sup>-6</sup> /K	18.4
Density	g/cm <sup>3</sup>	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

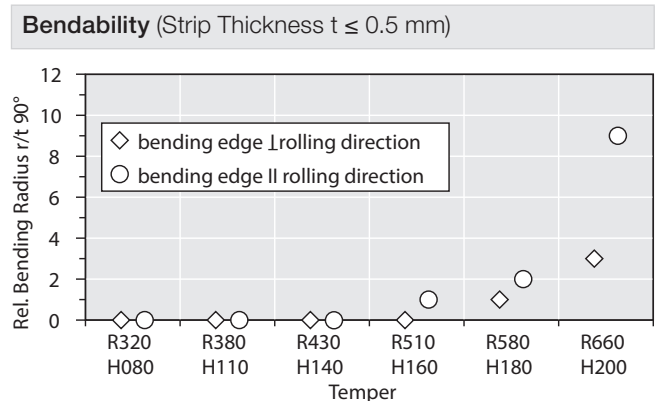
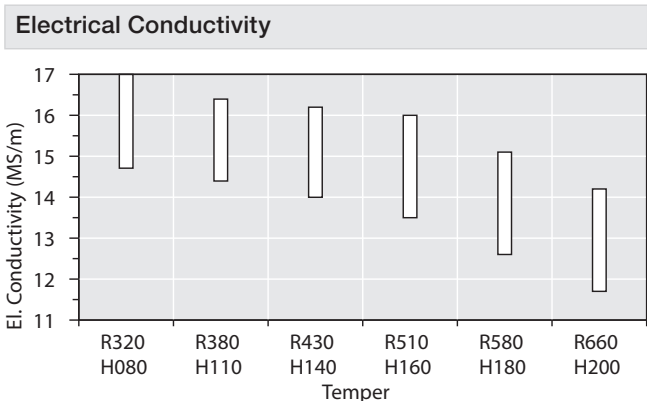
Fabrication Properties	
Capacity for Being Cold Worked	excellent
Machinability	fair
Capacity for Being Electroplated	excellent
Capacity for Being Hot-Dip Tinned	good
Soft Soldering	excellent
Resistance Welding	good
Gas Shielded Arc Welding	good
Laser Welding	fair

**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 <sub>m</sub>	MPa	320–380	380–430	430–520	510–600	580–690	≥ 660
Yield Strength R <sub>p0.2</sub>	MPa	≤ 230	≥ 200	≥ 330	≥ 430	≥ 520	≥ 610
Elongation A <sub>50mm</sub>	%	≥ 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

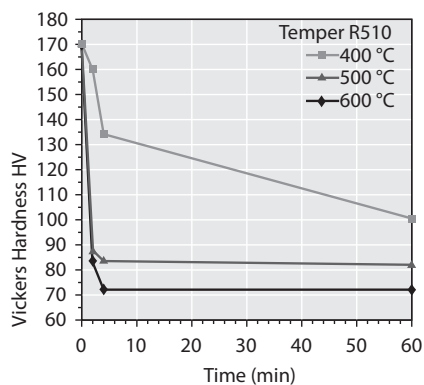
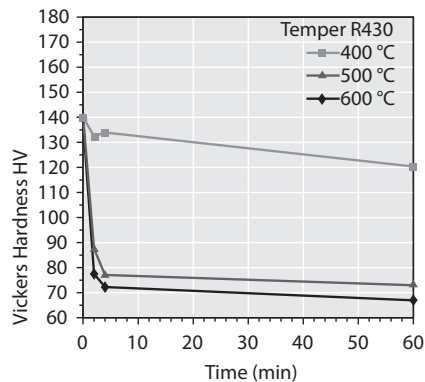


# WIELAND-S12®

CuSn3Zn9

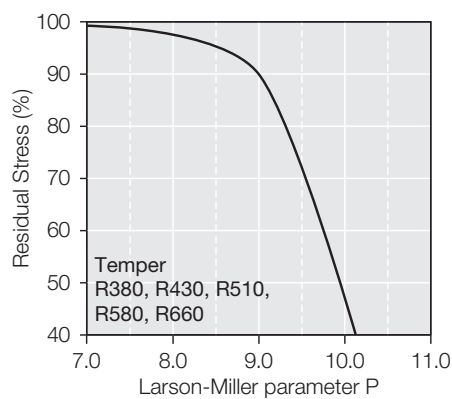
C42500

## 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:  
 $P = (20 + \log(t))(T + 273) \cdot 0.001$   
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  $\frac{1}{3}$  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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