

CuSn5

C51000

Material Designation	
EN	CuSn5
UNS*	C51000

\*Unified Numbering System (USA)

Chemical Composition (Reference)	
Sn	5 %
Cu	balance

Typical Applications
<ul style="list-style-type: none"> <li>• Stamped parts</li> <li>• Connectors</li> <li>• Contact springs</li> </ul>

Physical Properties*		
Electrical Conductivity	MS/m	11
	% IACS	19
Thermal Conductivity	W/(m·K)	96
Coefficient of Electrical Resistance**	10 <sup>-3</sup> /K	0.9
Coefficient of Thermal Expansion**	10 <sup>-6</sup> /K	18.0
Density	g/cm <sup>3</sup>	8.85
Modulus of Elasticity	GPa	120
Specific Heat	J/(g·K)	0.380
Poisson's Ratio		0.34

\* Reference values at room temperature

\*\* Between 0 and 300 °C

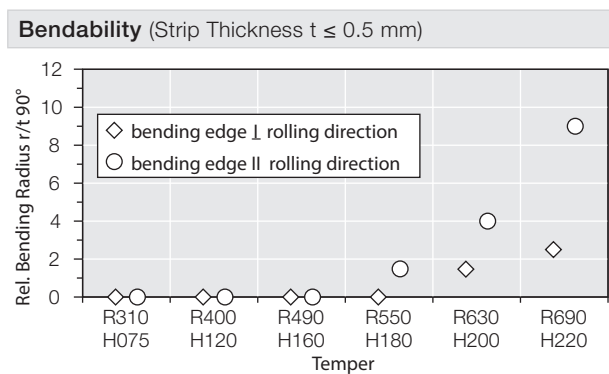
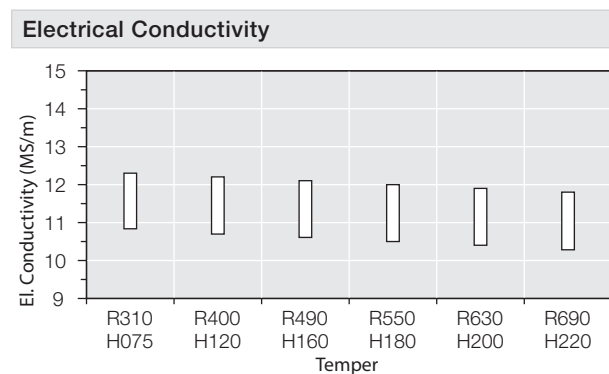
Fabrication Properties	
Capacity for Being Cold Worked	excellent
Machinability	less suitable
Capacity for Being Electroplated	excellent
Capacity for Being Hot-Dip Tinned	excellent
Soft Soldering	excellent
Resistance Welding	good
Gas Shielded Arc Welding	good
Laser Welding	good

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

Mechanical Properties							
Temper		R310	R400	R490	R550	R630	R690
Tensile Strength R <sub>m</sub>	MPa	310–390	400–500	490–580	550–640	630–720	≥ 690
Yield Strength R <sub>p0.2</sub>	MPa	≤ 250	≥ 340	≥ 450	≥ 520	≥ 600	≥ 670
Elongation A <sub>50mm</sub>	%	≥ 45	≥ 14	≥ 8	≥ 4	≥ 3	–

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

Temper	H075	H120	H160	H180	H200	H220
Hardness HV	75–105	120–160	160–190	180–210	200–230	≥ 220

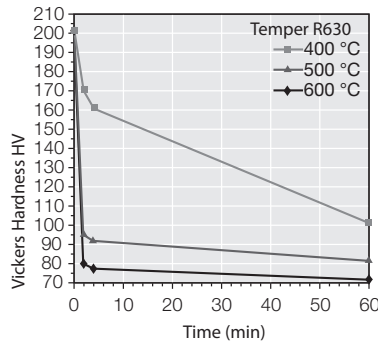
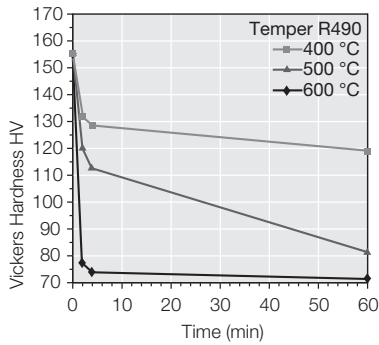


# WIELAND-B15

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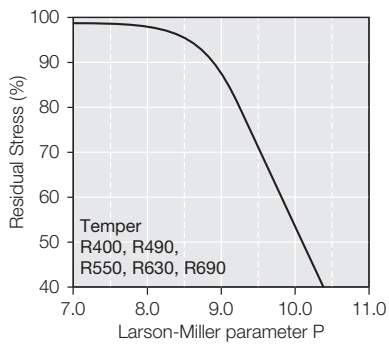
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## Resistance to Softening



Vickers hardness after heat treatment (typical values)

## Thermal Stress Relaxation



Stress remaining after thermal relaxation as a function of Larson-Miller parameter P (F. R. Larson, J. Miller, TransASME74 (1952) 765–775) given by:

$P = (20 + \log(t)) \cdot (T + 273) \cdot 0.001$

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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 1.400 mm
- Traverse-wound coils with drum weights up to 1.5 t
- Multicoils 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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