

Wieland-K81

CuSn0.15 | C14415 | CW117C

CuSn0.15 is a micro-alloyed material belonging to the family of phosphor bronzes. Its tin content of 0.15 % results in modified product properties compared to pure coppers. Mechanical stability is increased while electrical and thermal conductivity remain very high. Formability is excellent. Furthermore, the thermal softening temperature is significantly increased. CuSn0.15 is considered to have excellent welding properties for arc welding processes, resistance welding as well as ultrasonic welding. Strip made of CuSn0.15 is very popular for components which carry high currents, such as high-current connector tabs and central electric units in conventional and electric vehicles.

Chemical composition (Reference)

Sn	0.1 %
Cu	remainder

Physical properties (Reference values at room temperature)

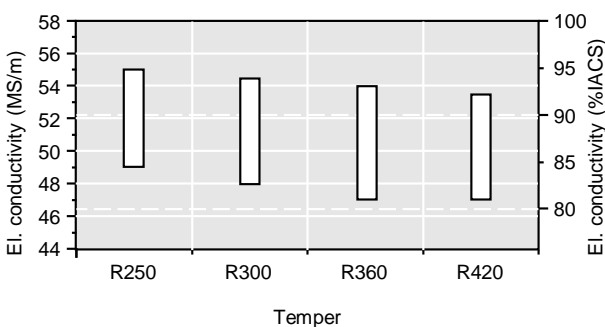
Electrical conductivity	51 MS/m	88 %IACS
Thermal conductivity	350 W/(m·K)	202 Btu·ft/(ft ² ·h·°F)
Coefficient of electrical resistance*	3.2 10 ⁻³ /K	1.8 10 ⁻³ /°F
Coefficient of thermal expansion*	18.0 10 ⁻⁶ /K	10.0 10 ⁻⁶ /°F
Density	8.93 g/cm ³	0.323 lb/in ³
Modulus of elasticity	125 GPa	18,000 ksi
Specific heat	0.385 J/(g·K)	0.092 Btu/(lb·°F)
Poisson's ratio	0.34	0.34

* Between 0 and 300 °C

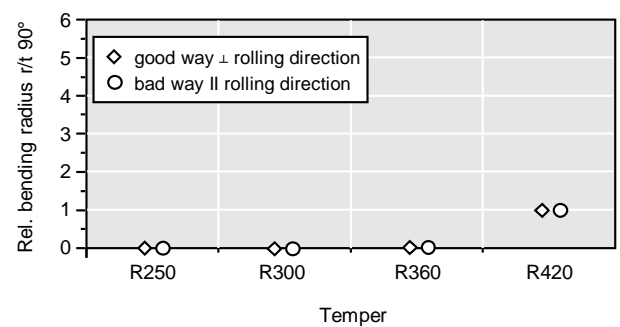
Mechanical properties (values in brackets are for information only)

Temper	Tensile strength R _m		Yield strength R _{p0.2}		Elongation A ₅₀ %	Hardness HV
	MPa	ksi	MPa	ksi		
R250	250-320	36-46	≥ 200	≥ 29	≥ 9	(60-90)
R300	300-370	44-54	≥ 250	≥ 36	≥ 4	(85-110)
R360	360-430	52-62	≥ 300	≥ 44	≥ 3	(105-130)
R420	420-490	61-71	≥ 350	≥ 51	≥ 2	(120-140)

Electrical conductivity



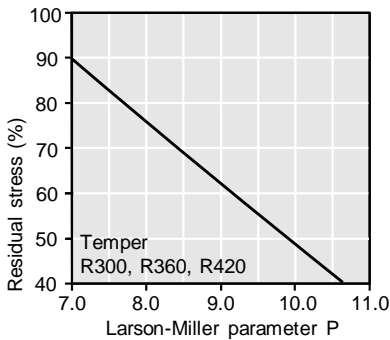
Bendability (Strip thickness t ≤ 0.5 mm)



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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:

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

Time t in hours, temperature T in °C.

Example: P = 9 is equivalent to 1,000 h/118 °C.

Measured on rolled to temper specimens parallel to rolling direction.

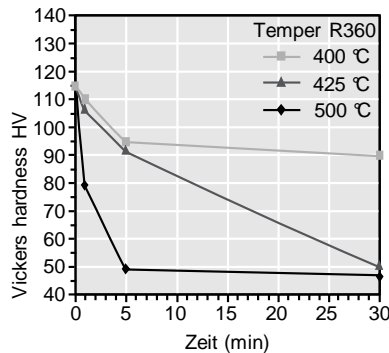
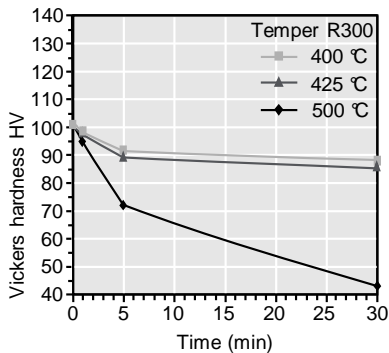
Total stress relaxation depends on the applied stress level.

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 .

Softening resistance



Vickers hardness after heat treatment (typical values)

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
- Contour-milled strip

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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