

# Wieland-K09

Cu-OFE | C10100 | CW009A

Cu-OFE is the premium pure copper grade. It is oxygen-free, has a very high purity and thus provides the highest possible electrical conductivity of 101 % IACS. It is suitable for thermal processing like welding and brazing without Precautions because there is no risk of hydrogen embrittlement. It is used in electrical and electronic components, vacuum technology, submarine cables and coaxial cables, semiconductor carriers, heat conducting plates, vacuum gaskets and anodes for vacuum tubes.

### Chemical composition (Reference)

Cu	≥ 99.99 %
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### Physical properties (Reference values at room temperature)

Electrical conductivity	58 MS/m	100 %IACS
Thermal conductivity	391 W/(m·K)	226 Btu·ft/(ft <sup>2</sup> ·h·°F)
Coefficient of electrical resistance*	3.9 10 <sup>-3</sup> /K	2.2 10 <sup>-3</sup> /°F
Coefficient of thermal expansion*	17.7 10 <sup>-6</sup> /K	9.8 10 <sup>-6</sup> /°F
Density	8.94 g/cm <sup>3</sup>	0.322 lb/in <sup>3</sup>
Modulus of elasticity	115 GPa	17,000 ksi
Specific heat	0.385 J/(g·K)	0.092 Btu/(lb·°F)
Poisson's ratio	0.34	0.34

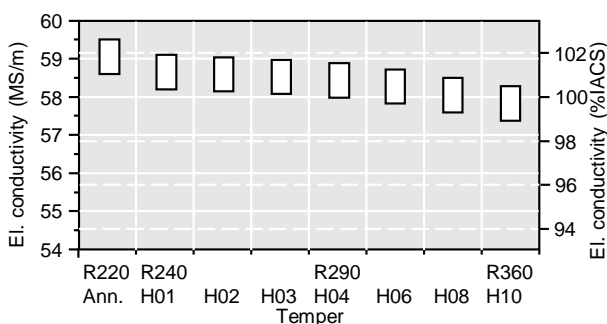
\* Between 0 and 300 °C

### Mechanical properties (values in brackets are for information only)

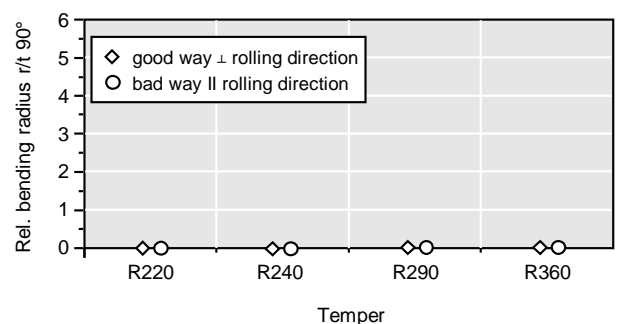
Temper	Tensile strength R <sub>m</sub>		Yield strength R <sub>p0.2</sub>		Elongation A <sub>50</sub> %	Hardness HV
	MPa	ksi	MPa	ksi		
R220	220-260	32-38	≤ 140	≤ 20	≥ 33	(40-70)
R240	240-300	35-44	≥ 180	≥ 26	≥ 8	(65-95)
R290	290-360	42-52	≥ 250	≥ 36	≥ 4	(90-110)
R360	≥ 360	≥ 52	≥ 320	≥ 46	≥ 2	(≥ 110)
Annealed	180-260	26-38	(70)	(10)	(35)	
H01*	235-290	34-42	(220)	(32)	(23)	
H02*	255-315	37-46	(255)	(37)	(20)	
H03*	285-345	41-50	(295)	(43)	(14)	
H04*	295-360	43-52	(310)	(45)	(9)	
H06*	325-385	47-56	(345)	(50)	(4)	
H08*	345-400	50-58	(360)	(52)	(3)	
H10*	≥ 360	≥ 52	(≥ 350)	(≥ 51)	(≤ 3)	

\* According to ASTM B152

### Electrical conductivity



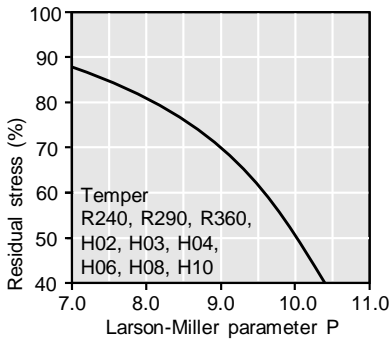
### Bendability (Strip thickness t ≤ 0.5 mm)



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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:  
 $P = (20 + \log(t)) * (T + 273) * 0.001$ .

Time t in hours, temperature T in °C.

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

Measured on rolled to temper specimens parallel to rolling direction.

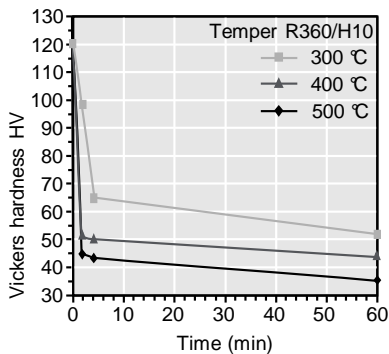
Total stress relaxation depends on the applied stress level.

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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