Wieland-K14

Cu-PHC | C10300 | CW020A

PHC stands for phosphorus-deoxidized high conductive copper, which provides 100 % IACS conductivity as pure coppers are expected to do. It is considered an oxygen-free copper. This copper provides batch-independent consistently excellent formability and can be arc-welded without hydrogen embrittlement. Thus, it is used in electronics and electrical engineering components, the production of which contain respective processing requirements.

Chemical composition (Reference)	
Cu	≥ 99.95 %
P	0.001-0.006 %

Physical properties (Reference values at room temperature)				
Electrical conductivity	58	MS/m	100	%IACS
Thermal conductivity	390	W/(m·K)	226	Btu·ft/(ft²·h·℉)
Coefficient of electrical resistance*	3.7	10^{-3}/K	2.1	10^{-3}/℉
Coefficient of thermal expansion*	17.7	10^{-6}/K	9.8	10^{-6}/℉
Density	8.94	g/cm³	0.322	lb/in³
Modulus of elasticity	115	GPa	17,000	ksi
Specific heat	0.385	J/(g·K)	0.092	Btu/(lb·℉)
Poisson´s ratio	0.34		0.34	

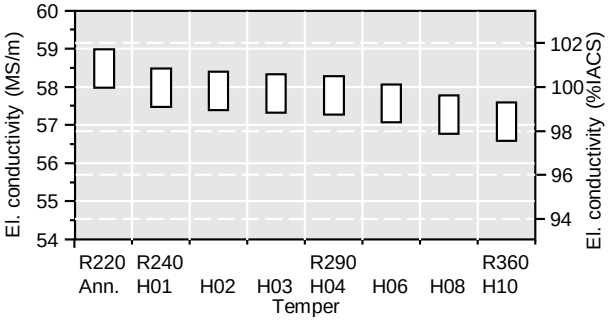
* Between 0 and 300 ℃

Mechanical properties (values in brackets are for information only)

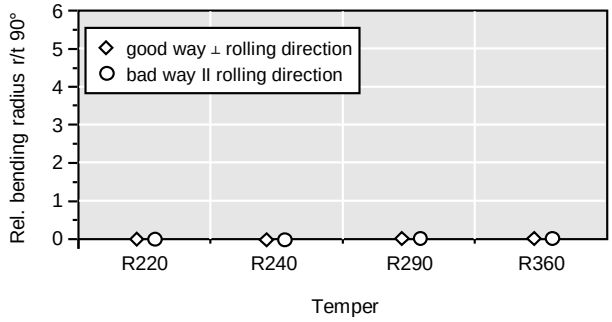
Temper	Tensile strength R_m		Yield strength $R_{p0.2}$		Elongation A_{50}	Hardness HV
	MPa	ksi	MPa	ksi	%	
R220	220-260	32-38	≤ 140	≤ 20	≥ 33	(40-70)
R240	240-300	35-44	≥ 180	≥ 26	≥ 8	(65-95)
R290	290-360	42-52	≥ 250	≥ 36	≥ 4	(90-110)
R360	≥ 360	≥ 52	≥ 320	≥ 46	≥ 2	(≥ 110)
Annealed	180-260	26-38	(70)	(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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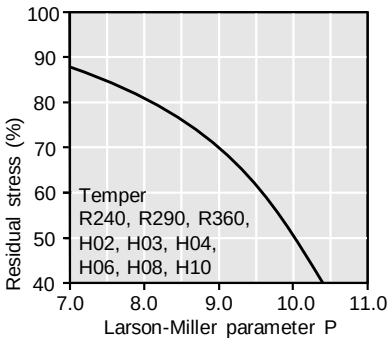
Thermal stress relaxation

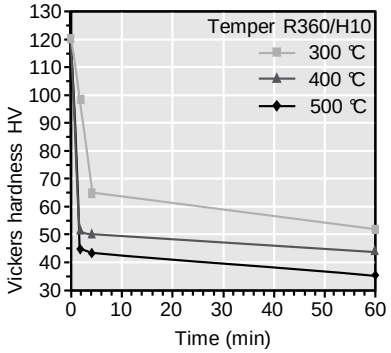


Stress remaining after thermal relaxation as a function of Larson-Miller parameter P
(F. R. Larson, J. Miller, Trans ASME74 (1952) 765–775) given by:
P = (20 + log(t))*(T + 273)*0.001.
Time t in hours, temperature T in ℃.
Example: P = 9 is equivalent to 1,000 h/118 ℃.
Measured on rolled to temper specimens 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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