WIELAND-K12

Cu-HCP

C10300

ROLLED PRODUCTS

wieland

Material Designation	
EN	CW021A
UNS*	C10300

**Unified Numbering System (USA)*

Chemical Composition (Reference)	
Cu	≥ 99.95 %
Cu	≈ 0.003 %

Typical Applications

- Standard materials for longitudinally welded cables
- Components for the electrical industry

Physical Properties*		
Electrical Conductivity***	MS/m % IACS	57 98
Thermal Conductivity	W/(m·K)	385
Coefficient of Electrical Resistance**	10^{-3}/K	3.7
Coefficient of Thermal Expansion**	10^{-6}/K	17.7
Density	g/cm³	8.94
Modulus of Elasticity	GPa	127
Specific Heat	J/(g·K)	0.385
Poisson's Ratio		0.34

** Reference values at room temperature*
*** Between 0 and 300 °C*
**** Minimum value in soft temper*

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	less suitable
Gas Shielded Arc Welding	excellent
Laser Welding	fair

Corrosion Resistance

Resistant to: industrial atmosphere (formation of dark resp. green protective layers), industrial and drinking water, pure water vapour, non oxidizing acids, alkalis (except for ammonia and cyanide-containing compounds), neutral saline solutions.

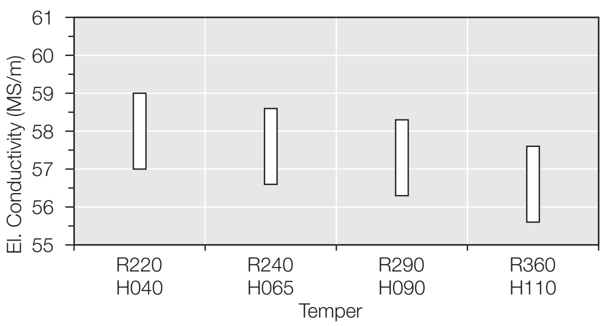
Not resistant to: oxidizing acids, hydrous ammonia and halogenated gases, hydrogen sulfide, seawater, especially with high flow rates.

Mechanical Properties

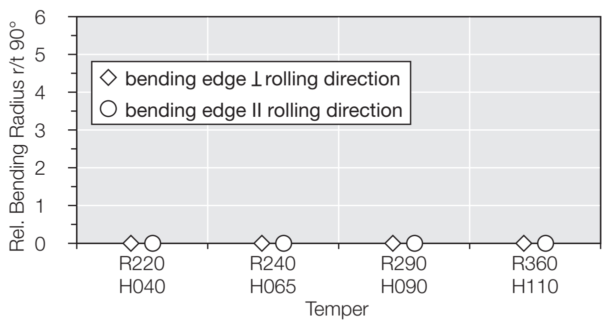
Temper		R220	R240	R290	R360
Tensile Strength R_m	MPa	220–260	240–300	290–360	≥ 360
Yield Strength $R_{p0,2}$	MPa	≤ 140	≥ 180	≥ 250	≥ 320
Elongation A_{50mm}	%	≥ 33	≥ 8	≥ 4	≥ 2

Temper	H045	H065	H090	H110
Hardness HV	45–65	65–95	90–110	≥ 110

Electrical Conductivity



Bendability (Strip Thickness t ≤ 0.5 mm)



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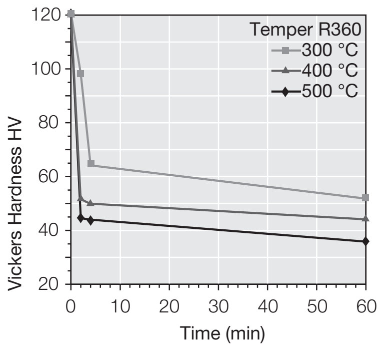
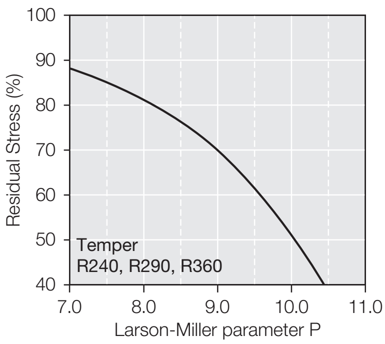
Resistance to Softening



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))*(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 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 ⅓ 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
- 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

Wieland-Werke AG **wieland.com**

Graf-Arco-Str. 36, 89079 Ulm, Germany, P +49 731 944 2030, info@wieland.com

11/18 Bm (MC.ED.UL/Ri)