

Material Designation	
EN	Cu-ETP
UNS*	C11000

* Unified Numbering System (USA)

Chemical Composition (Reference)	
Cu	≥ 99.90 %
O	0.005–0.040 %

Typical Applications

- Main material for general electrical applications
- Stamped parts
- Transformer coils
- Cable strip
- Heat sinks

Physical Properties*		
Electrical Conductivity***	MS/m %IACS	58 100
Thermal Conductivity	W/(m·K)	390
Coefficient of Electrical Resistance**	10 ⁻³ /K	3.7
Coefficient of Thermal Expansion**	10 ⁻⁶ /K	17.7
Density	g/cm ³	8.94
Modulus of Elasticity	GPa	127
Specific Heat	J/(g·K)	0.386
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*	less suitable
Laser Welding	less suitable

* During heating in reducing atmosphere hydrogen embrittlement occurs

Corrosion Resistance

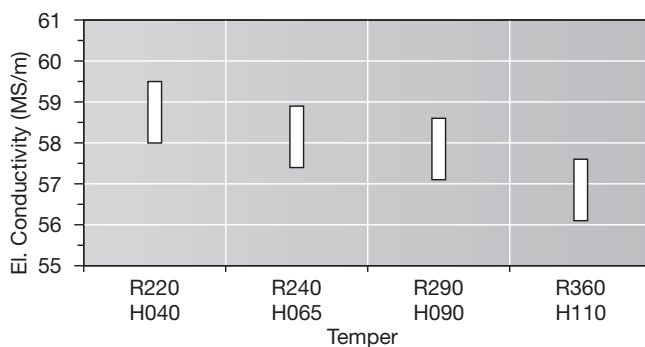
Resistant to: industrial atmosphere (formation of dark resp. green protective layers), industrial and drinking water (max. flow rate approx. 1.5 to 2 m/s), pure water vapour, non oxidizing acids, alkalis (except for ammonia and cyanide-containing compounds), neutral saline solutions.

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

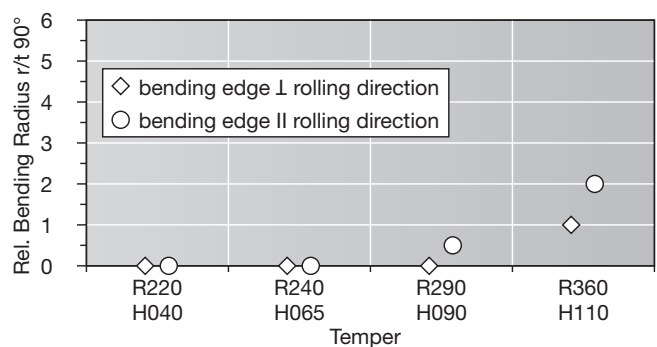
Mechanical Properties					
Temper		R220	R240	R290	R360
Tensile Strength R _m	MPa	220–260	240–300	290–360	≥ 360
Yield Strength R _{p0.2}	MPa	≤ 140	≥ 180	≥ 250	≥ 320
Elongation A _{50mm}	%	≥ 33	≥ 8	≥ 4	≥ 2

Temper		H040	H065	H090	H110
Hardness HV		45–65	65–95	90–110	≥ 110

Electrical Conductivity



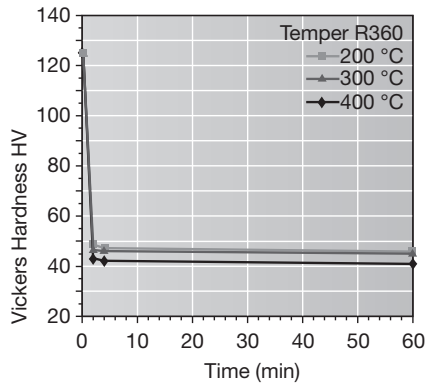
Bendability (Strip Thickness t ≤ 0.5 mm)



Wieland-K32[®]

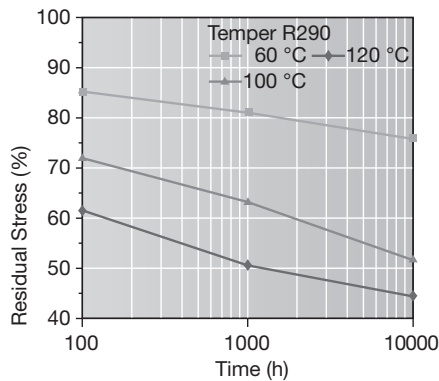
E-Cu58
C11000

Resistance to Softening



Vickers hardness
after heat treatment
(typical values)

Stress Relaxation



Stress remaining as a function
of service temperature and time.
Measured on rolled-to-temper
specimens parallel to rolling direction.
Values extrapolated according to
F. R. Larson, J. Miller, Trans ASME74
(1952) 765-775.
Total stress relaxation depends on
the applied stress level.

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 1400 mm
- Traverse-wound coils with drum weights up to 1.5 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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