

Material Designation	
EN	Cu-DLP
UNS*	C12000

\* Unified Numbering System (USA)

Chemical Composition (Reference)	
Cu	≥ 99.90 %
P	0.005–0.012 %

Typical Applications
• Apparatus industry
• Leadframes for power semiconductors
• Cable strip

Physical Properties*		
Electrical Conductivity***	MS/m %IACS	52 90
Thermal Conductivity	W/(m·K)	350
Coefficient of Electrical Resistance**	10 <sup>-3</sup> /K	3.6
Coefficient of Thermal Expansion**	10 <sup>-6</sup> /K	17.7
Density	g/cm <sup>3</sup>	8.94
Modulus of Elasticity	GPa	132
Specific Heat	J/(g·K)	0.386
Poisson's Ratio		0.34

\* Reference values at room temperature

\*\* Between 0 and 300 °C

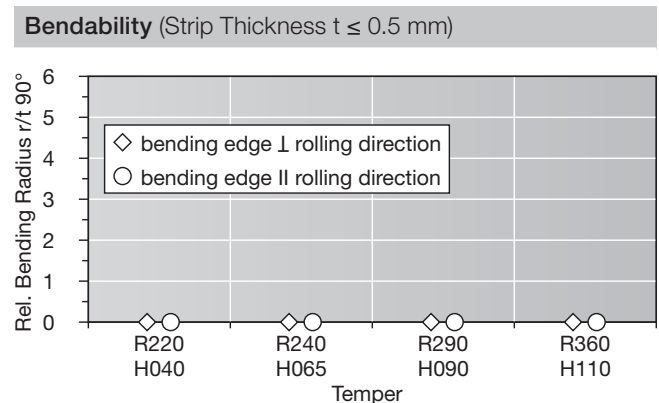
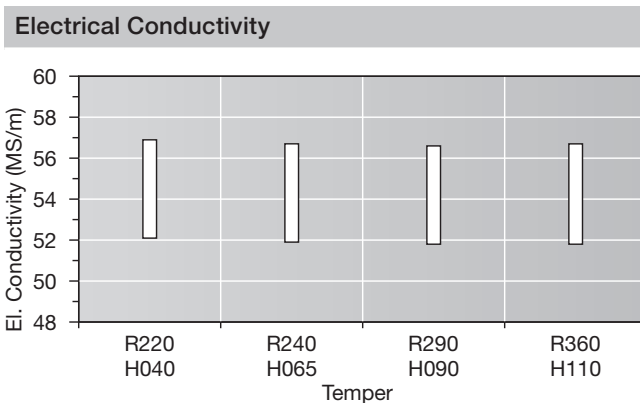
\*\*\* Minimum value in soft temper

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	excellent
Laser Welding	fair

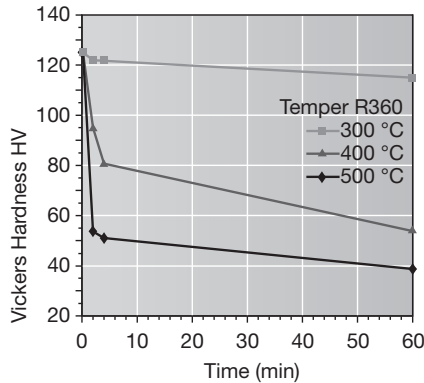
Corrosion Resistance
Resistant to: industrial atmosphere (formation of dark resp. green protective layers), industrial and drinking water (max. flow rate approx. 1.5 to 2 m/s), pure water vapour, non oxidizing acids, alkalis (except for ammonia and cyanide-containing compounds), neutral saline solutions.
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 <sub>m</sub>	MPa	220–260	240–300	290–360	≥ 360
Yield Strength R <sub>p0.2</sub>	MPa	≤ 140	≥ 180	≥ 250	≥ 320
Elongation A <sub>50mm</sub>	%	≥ 33	≥ 8	≥ 4	≥ 2

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

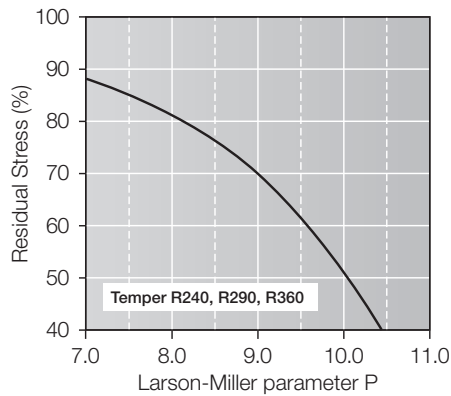


**Resistance to Softening**



Vickers hardness after heat treatment (typical values)

**Thermal Stress Relaxation**



Stress remaining after thermal relaxation as a function of Larson-Miller parameter (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  $\frac{1}{3}$  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