C19210
CuFe0,1P

KME

Industrial Rolled

Alloy Designation	
EN	CuFe0.1P
DIN CEN/TS 13388	
UNS	C19210

Copper Rolled Products

We produce a vast assortment of copper rolled products with highest purity in various in chemical compositions, sizes and formats, all suited to many types of final processing.

Chemical Composition Weight percentage		
Cu	Rest	%
Fe	0.05 .. 0.15	%
P	0.025 .. 0.04	%
Other	≤ 0.5	%

This alloy is in accordance with RoHS 2002/96/CE for electric & electronic equipments and 2002/53/CE for automotive industry.

Characteristics

CuFe0.1P is a copper alloy with fine iron precipitations. It has a very high conductivity combined with excellent cold forming properties. Softening resistance of low strength tempers is good.

Main Applications

Automotive: Cooling Fins for Radiators, Connector pins
Building: Air Conditioning Tubing
Electrical: Connectors, Terminals, IC Lead Frames
Industrial: Heat Exchanger Tubing, Cooling Fins for Heavy Duty Radiators, Heat Resistant Applications

Preferred Applications

Connector Pins	Electrical Parts	Leadframes for Power Transistors	Current Carrying Capacity
xx	x	xx	xx

x = well suited xx = particularly well suited

Physical Properties Typical values in annealed temper at 20 °C		
Density	8.9	g/cm³
Thermal expansion coefficient -191 .. 16 °C		10^{-6}/K
20 .. 300 °C	17.0	10^{-6}/K
Specific heat capacity	0.385	J/(g·K)
Thermal conductivity	350	W/(m·K)
Electrical conductivity (1 MS/m = 1 m/(Ω mm²)	46	MS/m
Electrical conductivity (IACS)	80	%
Thermal coefficient of electrical resistance (0 .. 100 °C)	3.2	10^{-3}/K
Modulus of elasticity (1 GPa = 1 kN/mm²) cold formed	125	GPa
annealed		GPa

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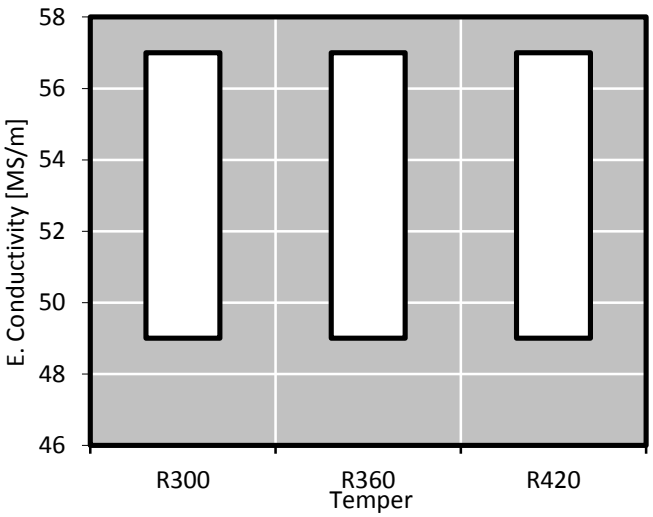
Mechanical Properties				
Temper	**Tensile Strength Rm**	**Yield Strength Minimum $Rp_{0.2}$**	**Elongation Minimum A_{50mm}**	**Hardness HV ***
	MPa	MPa	%	HV
R300	300 .. 380	300	10	80 .. 110
R360	360 .. 440	260	3	100 .. 130
R420	420 .. 500	350	2	120 .. 150

*only for information

Electrical Conductivity



Electrical conductivity is strongly influenced by chemical composition. A high level of cold deformation and small grain size decrease the electrical conductivity moderately. Minimum conductivity level can be specified.

Fabrication Properties*	
Cold Forming Properties	Excellent
Hot Forming Properties	Excellent
Machinability (Rating 20)	Less suitable
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Less suitable
Gas Shielded Arc Welding	Excellent
Laser Welding	Fair
Soft Annealing	
Stress Relieving Annealing	

* For more details call our technical service

Corrosion Resistance*

Resistant to:

Atmospheric corrosion: formation of the a greenish protective patina due to the formation of copper basic salts (such sulphates, chlorides in marine environment, nitrates and carbonates). CuFe0.1P has a good resistance in in natural and industrial atmosphere (maritime air too).

Industrial and drinking water, aqueous and alkaline solutions (not oxidizing), pure water vapour (steam), non oxidizing acids (without oxygen in solution) and salts, neutral saline solutions.

Material can be heat-treated in reducing atmosphere.

Practically resistant against stress corrosion cracking

Not resistant to:

Oxidising acids, solutions containing cyanides, ammonia or halogens, hydrous ammonia and halogenated gases, hydrogen sulfide, seawater.

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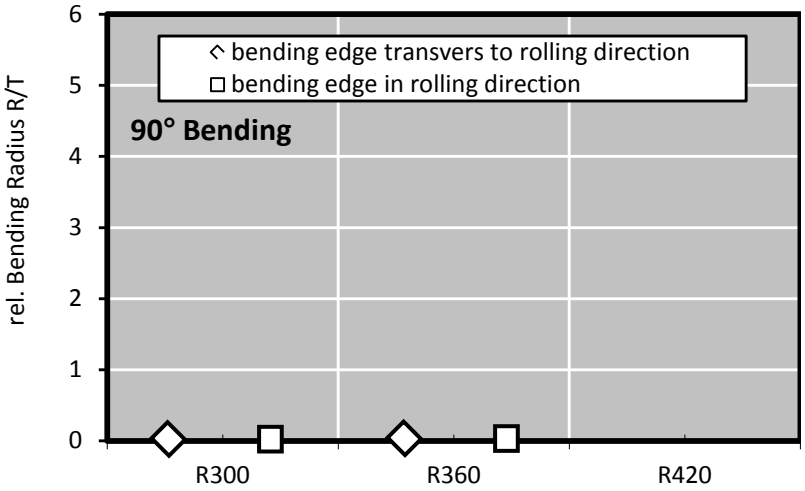
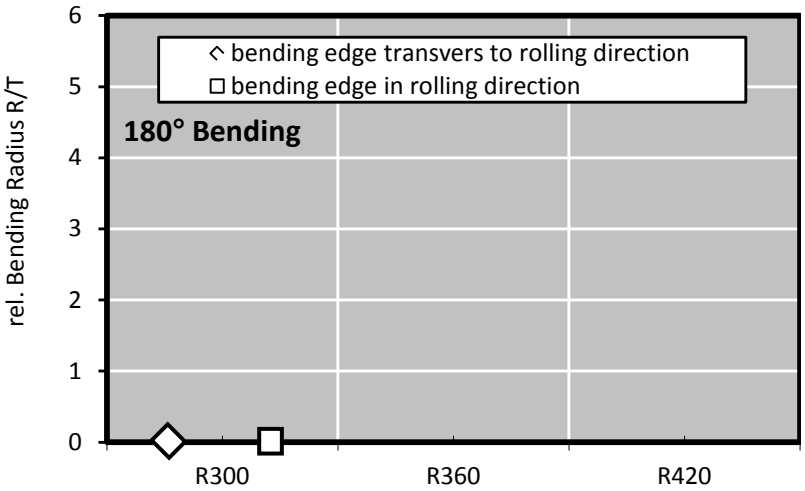
Bending Properties Thickness: ≤ 0.5 mm



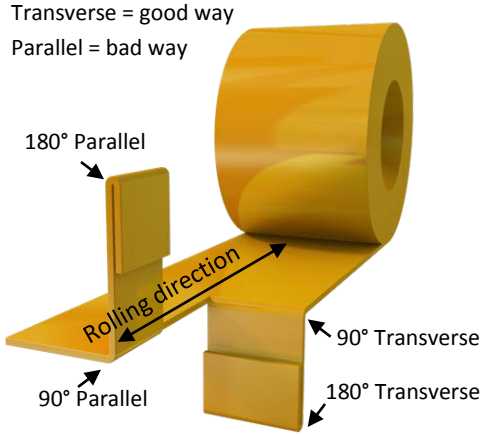


Bending test according to EN ISO 7438 is done with 10 mm wide samples. Smaller samples in general – as well as lower thickness – allow a lower bending radius without cracks. If needed we supply bending optimized temper classes that far exceed standard quality.

Please take care when comparing with ASTM E 290 results, there the bend definition direction is contradictory.

Bending Definition

Transverse = good way
Parallel = bad way



Minimum Bending Radius Calculation

To find out the minimum possible bending radius take the R/T value from the list.

Example: R/T = 0.5 and thickness 0.3 mm

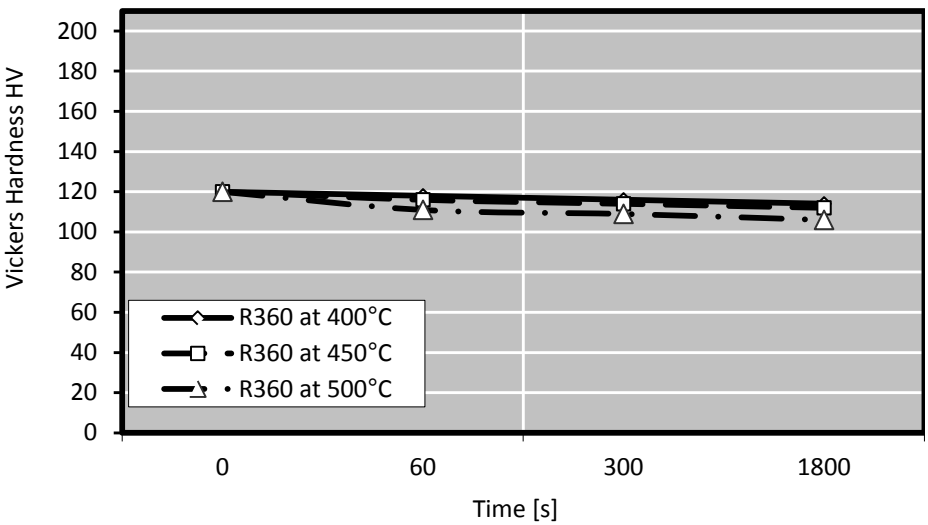
Minimum radius = (R/T) x thickness
= 0.5 x 0.3 mm = 0.15 mm

Bending Properties*

Temper	Thickness Range	Bending 90°		Bending 180°	
		Trans-vers	Parallel	Trans-vers	Parallel
	mm	R/T	R/T	R/T	R/T
R300	≤ 0.5	0	0	0	0
R360	≤ 0.5	0	0	-	-
R420	≤ 0.5	-	-	-	-

* Measured at sample width 10 mm according to EN 1654
Possible bending radius = (R/T) x thickness

Softening Resistance



After short time heat treatment Vickers Hardness is measured. The diagram shows typical values.

Bend Fatigue (at room temperature)

The fatigue strength gives an indication about the resistance to variations in applied tension. It is measured under symmetrical alternating load. The maximum bending load for 10^7 load cycles without crack is measured. Dependent on the temper class it is approximately 1/3 of the tensile strength R_m.

Standards for copper and copper alloys	
EN 1652	Plate, sheet, strip and circles for general purposes
EN 1654	Strip for springs and connectors
EN 1758	Strip for lead frames
EN 13148	Hot-dip tinned strip
EN 13599	Copper plate, sheet and strip for electrical purposes
EN 14436	Electrolytically tinned strip

CuAg0-1_15_08_2017