

Alloy Designation	
EN	Cu-DHP (SF-Cu)
DIN CEN/TS 13388	CW024A
JIS	C 1220
UNS*	C12200

* Unified Numbering System (USA)

Chemical Composition	
Weight percentage in %	
Cu	≥ 99.90
P	0.015 – 0.040

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

Copper Rolled Products

<p>We produce a vast assortment of copper rolled products that vary in chemical composition, size and format, all suited to the many types of final processing. KME can offer various types of copper rolled products to its industrial customers, all with a minimum 99.9% purity:</p>

Characteristics
<p>Cu-DHP is a phosphorus-deoxidized copper with a limited, high amount of residual Phosphorus. It has excellent welding and soldering properties and is resistant against hydrogen embrittlement. It can be deformed excellent, either hot or cold.</p>

Main Applications
<p>Architecture Downspouts, Gutters, Flashing, Roofing Building Heater Units, Condenser Sheets Consumer Air Conditioners, Refrigerators Electrical Wire Connectors, Heater Elements Industrial Construction, Rotating Bands, Kettles, Anodes for Electroplating, Heat Exchanger Shells, Oil Coolers in Airplanes, Tanks, Casting Molds, LP Gas Service, Medical Gas- Oxygen, Plating Anodes, Plating Racks, Plating Hangers, Marine Oil Coolers</p>

Preferred Applications					
Apparatus Industry	Pipelines	Mineral Insulated Cables	Strip for Plating	Heat Exchanger	Transistors
xx	xx	xx	xx	xx	xx

x = well suited xx = particularly well suited

Physical Properties			
Typical values in annealed temper at 20 °C			
Density		8.9	g/cm ³
Thermal expansion coefficient	-191 .. 16 °C	14.1	10 ⁻⁶ /K
	20 .. 300 °C	17.7	10 ⁻⁶ /K
Specific heat capacity		0.386	J/(g·K)
Thermal conductivity		330	W/(m·K)
Electrical conductivity	(1 MS/m = 1 m/(Ω mm ²))	≥ 47	MS/m
Electrical conductivity	(IACS)	81	%
Thermal coefficient of electrical resistance	(0 .. 200 °C)	3.4	10 ⁻³ /K
Modulus of elasticity	(1 GPa = 1 kN/mm ²) cold formed	130	GPa
	annealed		GPa

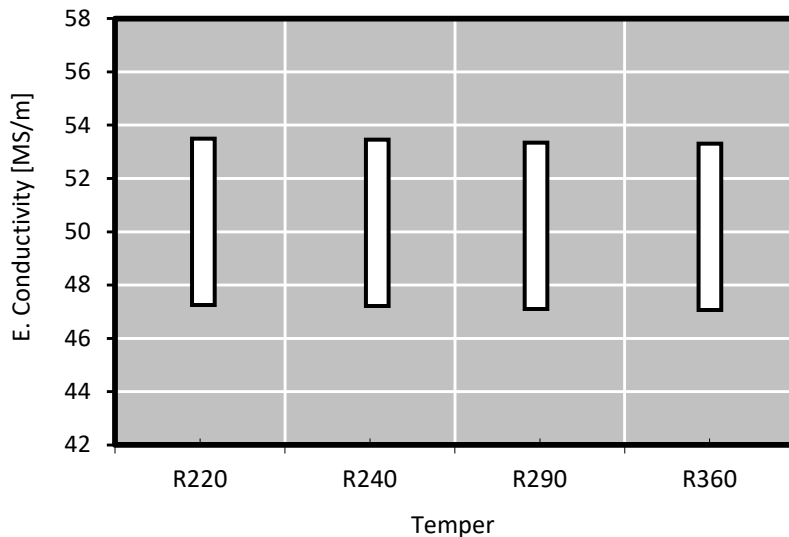


Mechanical Properties (According EN 1652)

Temper	Tensile Strength	Yield Strength	Elongation	Hardness
	R _m	R _{p0.2} Minimum	A _{50mm} Minimum	HV**
	MPa	MPa	%	HV
R220	220 .. 260	< 140*	33	40 .. 65
R240	240 .. 300	180	8	65 .. 95
R290	290 .. 360	250	4	90 .. 110
R360	≥ 360	320	2	≥ 110

* only information. ** only for reference.

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*

Capacity for Being Cold Worked	Excellent
Capacity for Being Hot Worked at 750 -950°C	Good
Machinability (Rating 20)	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	Good
Soft annealing	250 - 500°C
Stress relaxation annealing	150 – 200°C

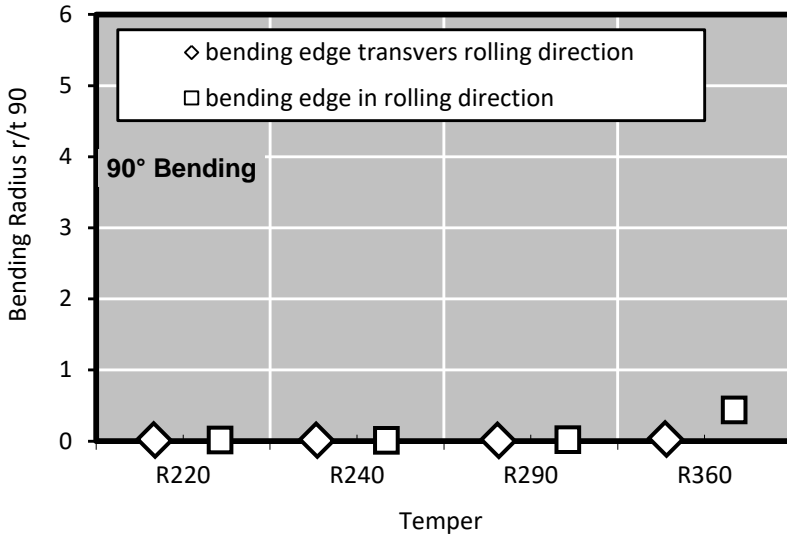
Corrosion Resistance*

Water (industrial and drinking): up to flow rate of 1,5 – 2 m/s
Pure water vapour
Industrial atmosphere: under formation of dark green protective layers.
Non oxidizing acids
Alkalis: With the exception of ammonia and cyanide-containing compounds
Neutral saline solutions
Biological properties: ?
Household compatibility: ?

* For more details call our technical service



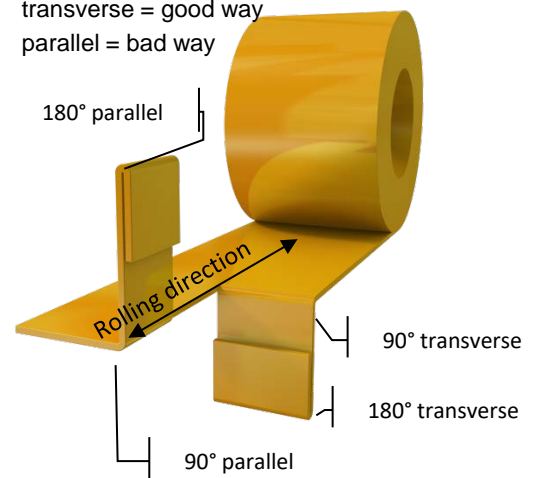
Bending Properties Thickness: ≤ 0.5 mm



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

Bending Definition

transverse = good way
parallel = bad way

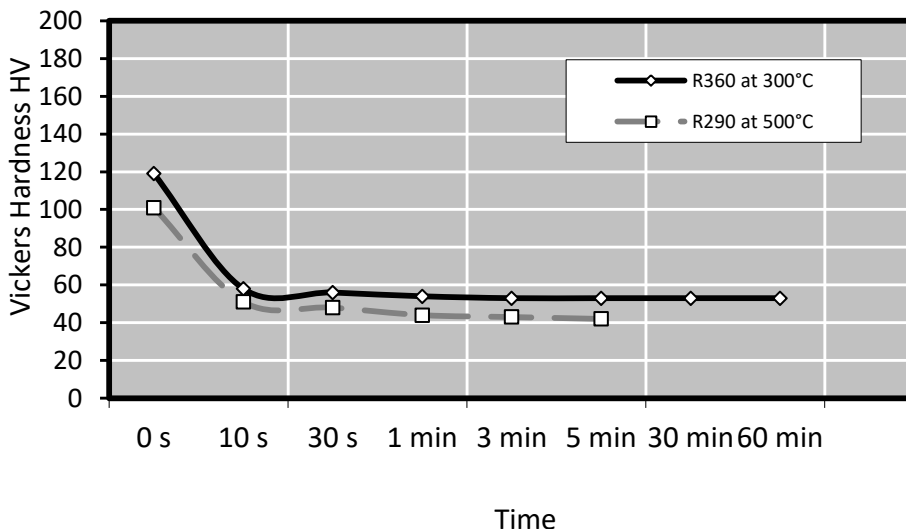


Bending Properties*

Temper	Thickness Range	Bending 90°		Bending 180°	
		Trans-vers	Parallel	Trans-vers	Parallel
	mm	R/T	R/T	R/T	R/T
R220	≤ 0.5	0	0		
R240	≤ 0.5	0	0		
R290	≤ 0.5	0	0		
R360	≤ 0.5	0	0.5		

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

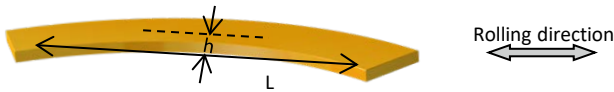
Softening Resistance



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



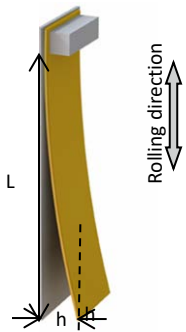
Camber



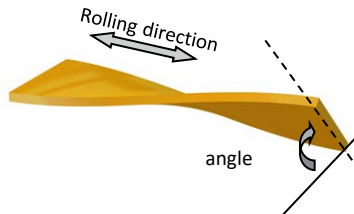
Evenness



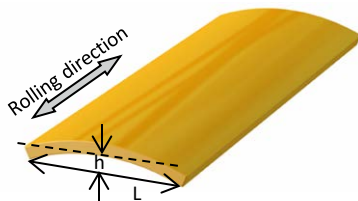
Coil set



Twist



Transverse Flatness



Customized Tolerances

Our products are produced in accordance with relevant norms EN 1652 / EN 1654. Customer specific tolerances for Thickness, Width, Camber, Transverse Flatness, Evenness, Twist and Coil set can be defined. We will be happy to meet your demands. EN 1652 defines only camber.

Thickness Tolerance

Thickness Range [mm]	EN 1652 ≤350 mm [mm]	KME Standard [mm]	KME Precision [mm]
0.10 .. 0.20	± 0.018	± 0.005	± 0.004
0.21 .. 0.30	± 0.022	± 0.007	± 0.005
0.31 .. 0.40	± 0.025	± 0.015	± 0.006
0.41 .. 0.50	± 0.030	± 0.015	± 0.008
0.51 .. 0.60	± 0.040	± 0.017	± 0.010
0.61 .. 0.70	± 0.040	± 0.020	± 0.010
0.71 .. 0.85	± 0.040	± 0.022	± 0.012
0.86 .. 1.30	± 0.050	± 0.025	± 0.015
1.31 .. 2.00	± 0.060	± 0.030	± 0.020
2.01 .. 3.00	± 0.070	± 0.045	± 0.025
3.00 .. 4.00	± 0.100	± 0.050	± 0.025
4.00 .. 6.00	± 0.120	± 0.060	± 0.030

Evenness Tolerance

Thickness Range [mm]	Width Range [mm]		
	7 .. 20	21 .. 50	51 .. 100
0.10 .. 0.50	+0.10	+0.20	+0.30
0.50 .. 1.00	+0.15	+0.25	+0.35

Roughness

Ra [μm]	Thickness [mm]
0.13 .. 0.18	0.1 .. 2.0
0.20 .. 0.30	0.1 .. 2.0
0.35 .. 0.46	0.1 .. 2.0
On request	> 2.0

Width Tolerance Standard / Precision

Thickness Range [mm]	Width Range [mm]						* Only R200 and R220
	10 .. 50	51 .. 100	101 .. 200	201 .. 350	351 .. 700	700 .. 1.250	
0.10 .. 1.00	+0.2 / +0.1	+0.3 / +0.2	+0.4 / +0.3	+0.6 / +0.4	+1.0 / +0.5	-	
0.20 .. 1.00	+0.2 / +0.1	+0.3 / +0.2	+0.4 / +0.3	+0.6 / +0.4	+1.0 / +0.5	+2.0	
1.01 .. 2.00	+0.3 / +0.2	+0.4 / +0.2	+0.5 / +0.4	+1.0 / +0.6	+1.5 / +0.7	+2.0	
2.01 .. 3.00	+0.5 / +0.3	+0.6 / +0.3	+0.7 / +0.5	+1.2 / +0.7	+2.0 / +0.9	+3.0	
3.01 .. 6.00	+2.0 / -	+2.3 / -	+2.5 / -	+3.0 / -	+4.0 / -	+6.0	



Formats	Dimension*			
	Coil	Strip thickness (other thicknesses on request)	≥ 0.1 .. 6.00	mm
		Strip width	≥ 3 .. 1,250	mm
		Outside diameter	≤ 1,400	mm
		Weight (Standard)	≤ 8,400	kg
		Weight (Deep-Drawing Quality)	≤ 8,000	kg
		Weight per mm	≤ 12.0	kg
	Traverse wound strip	Thickness	≥ 0.2 .. ≤ 1.50	mm
		Width	≥ 8 .. ≤ 60.0	mm
		Weight	300 .. 1,500	kg
		Drums: wood, plastic, metal, flangeless		
	TECSTRIP® _multicoil	Thickness	0.18 .. 0.80	mm
		Width	15 .. 50	mm
		Inner diameter 300 mm for thickness	0.15 .. 0.80	mm
		Inner diameter 400 mm for thickness	0.41 .. 0.80	mm
		Maximum weight	5,000	kg
		Outer diameter maximum	1,600	mm
	Sheet ≤ 6.35 mm	Thickness	0.3 .. 6.35	mm
		Width	50 .. 1,250	mm
		Length	200 .. 6,500	mm
		Weight	2,800 .. 8,000	kg
		Sheets in standard dimensions e.g. 1,000 x 2,000 mm on stock		
	Sheet > 6.35 mm	Thickness	6.35 .. 9.50	mm
		Width	50 .. 2,450	mm
		Length	200 .. 7,500	mm
		Weight	≤ 10,000	kg
		Sheets in standard dimensions e.g. 1,000 x 2,000 mm		
	Plate	Thickness	9.5 .. 150	mm
		Width	≤ 4,500	mm
		Length	≤ 15,000	mm
		Weight	≤ 8,000	kg
	Disc	Thickness	0.3 .. 150	mm
		Diameter	20 .. 3,100	mm
		Weight	≤ 10,000	kg

* Some combinations might not be possible



Surface coatings & Special Treatments *		Dimension	
	Hot-Dip tinned and STOL®28M Tin-Silver	Width	≤ 330 mm
	STOL®13 Thermic Sn	Thickness	≤ 1.5 mm
		Tin Layer Thickness	0.4 .. 20 μm
	Different thickness per side possible	R360 on request	
	Electroplating	Width	≤ 400 mm
		Thickness	≤ 2.5 mm
	Tin, Silver, Gold, Cu-Flash, Ni-Flash, Selective plating	Other coatings on request	
	Profiled strips STOL®Multigauge	Width	15 .. 90 mm
		Thickness	0.23 .. 1 mm
		Other width on request	
	Deburred and rounded edges	Width	≥ 200 .. 1,250* mm
	(e.g. for Transformer Strips)	Thickness	0.3 .. 2.0* mm
		* 0.3 - 2.0 mm Width ≤ 700 mm and 0.4 - 2.0 mm Width ≥ 700 mm	
	Precision Strip	Fully Integrated Fast Fourier Transformation (FFT) Analysis per coil	
	With low periodic thickness variation for e.g. High Frequency Cable Applications		
	Surface with extra low residual carbon content possible.		
	Protection with oil or adhesive foil on request		

* Further details you find at www.kme.com

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