C52100
CuSn8

KME

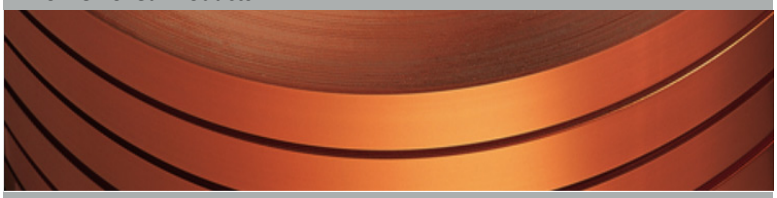
Industrial Rolled

Alloy Designation	
EN	CuSn8
DIN CEN/TS 13388	CW453K
JIS	C 5210
BS	PB 104
UNS	C52100

Chemical Composition Weight percentage		
Cu	Rest	
Sn	7.5 – 8.5	%
P	0.01 – 0.4	%

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

Bronze Rolled Products



KME provides highest quality bronze strips for an extremely wide range of industrial applications: from connectors to electrical contacts, from membranes to spring elements and switches.

Characteristics

CuSn8 strips provide a better corrosion resistance compared to bronze with lower tin-content, combined with higher strength and good slip properties. It is wear resistant, has excellent spring properties, good cold forming and soldering properties.

CuSn8 is used for springy applications where high strength and wear-resistance are required.

Special characteristics such as superfine particle size or thermal-mechanical stress relieving improve mechanical properties and provide increased strength and greater malleability.

Main Applications

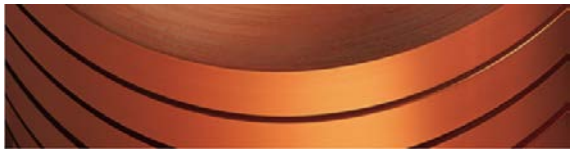
Architecture Bridge Bearing Plates
Building Thermostat Bellows
Consumer Power Conductor for Electro-Surgical Pencil, Coinage, Cymbals
Electrical Miniaturized Connectors, Contact Springs, Relais Springs, Electronic Connectors, Electrical Connectors, Cold Headed Parts, Electrical Flexing Contact Blades, Wire Brushes, Switch Parts, Fuse Clips
Fasteners Cotter Pins, Fasteners, Heavy Duty, Lock Washers
Industrial Cold Headed Parts, Thrust Bearings, Truss Wire, Pneumatic Hammers, Doctor Blades, Paper Industry, Bourdon Tubing, Well Drill Equipment, Clutch Disks, Welding Wire, Diaphragms, Beater Bar, Bellows, Springs, Helical Extension, Helical Torsion, Clips, Heavy Duty, Gears, Pinions, Textile Machinery, Perforated Sheets, Chemical Hardware, Heavy Duty, Sleeve Bushings
Marine Marine Parts

Preferred Applications		
Spring Contact	Pin Contact	Switches; Relays
xx	x	xx

x = well suited xx = particularly well suited

Physical Properties Typical values in annealed temper at 20 °C			
Density		8.79	g/cm³
Thermal expansion coefficient	20 .. 100 °C	18.0	10^{-6}/K
	20 .. 400 °C	18.7	10^{-6}/K
Specific heat capacity		0.377	J/(g·K)
Thermal conductivity		67	W/(m·K)
Electrical conductivity (1 MS/m = 1 m/(Ω mm²)		≥ 7.5	MS/m
Electrical conductivity (IACS)		≥ 13	%
Thermal coefficient of electrical resistance (0 .. 100 °C)		0.65	10^{-3}/K
Modulus of elasticity (1 GPa = 1 kN/mm²)	cold formed	109	GPa
	annealed	115	GPa

C52100
CuSn8



KME

Industrial Rolled

Mechanical Properties (EN 1652)							
Temper		**Tensile Strength**	**Yield Strength Standard**	**Elongation Standard**	**Yield Strength Bending optimized**	**Elongation Thermal Stress Relieved**	**Hard-ness**
		Rm	**$Rp_{0.2}$**	**A_{50mm} Minimum**	**$Rp_{0.2}$ Minimum**	**A_{50mm} Minimum**	**HV***
		MPa	MPa	%		%	HV
R370	annealed	370 .. 450	≤ 300*	50	-	-	80 .. 120
R450		450 .. 550	≥ 370	28	350	35	120 .. 175
R540		540 .. 630	≥ 460	22	440	27	170 .. 200
R600		600 .. 690	≥ 520	16	480	20	180 .. 210
R660		660 .. 750	≥ 600	10	580	14	200 .. 240
R740		740 .. 810	≥ 680	5	660	8	210 .. 260
R800**		800 .. 930	≥ 720	-	700	4	230 .. 290
R850**		≥ 850	-	-	800	1,5	≥ 240

* only for information ** Thickness: 0,15 - 0,60 mm

Fabrication Properties*	
Cold Forming Properties Max. 60 % between annealings	Excellent
Hot Forming Properties at 700 .. 800°C	Limited
Machinability (Rating 20)	Less suitable
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft soldering, Brazing	Excellent
Resistance Welding	Good
Gas Shielded Arc Welding	Good
Laser Welding	Good
Soft Annealing	450 .. 700°C
Stress Relieving Annealing	200 .. 350°C

* For more details call our technical service

Corrosion Resistance*

Resistant to:

CuSn8 has a good resistance to seawater, different agents and industrial atmosphere and has an excellent resistance to tarnishing.

It is in a large extend resistant to pitting corrosion. Even in seawater the laminar attack is higher than localized corrosion.

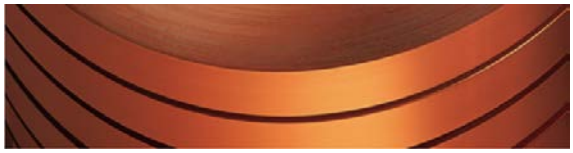
Largely insensitive to stress corrosion cracking

* For more details call our technical service

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.

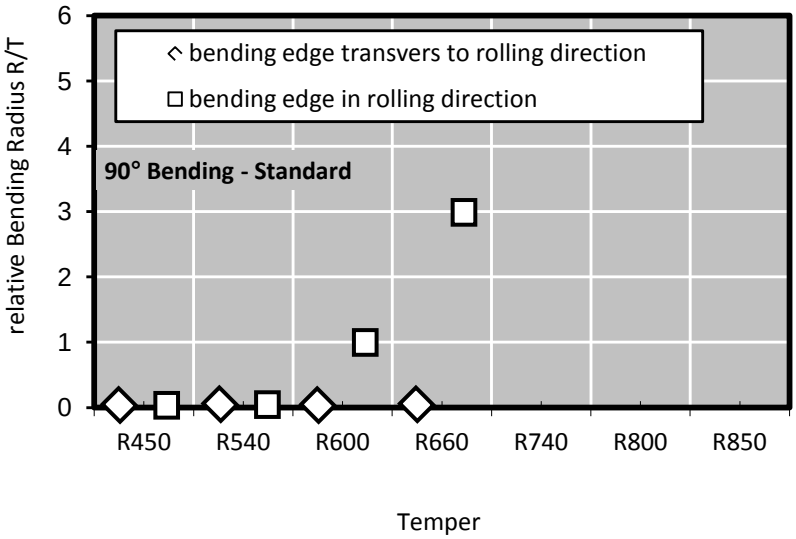
C52100
CuSn8

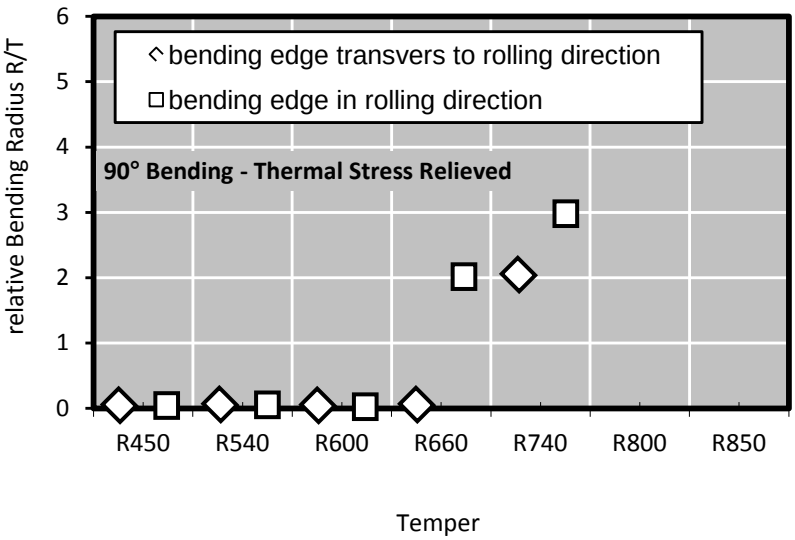


KME

Industrial Rolled

Bending Properties Standard & Thermal Stress Relieved Thickness: ≤ 0.5 mm



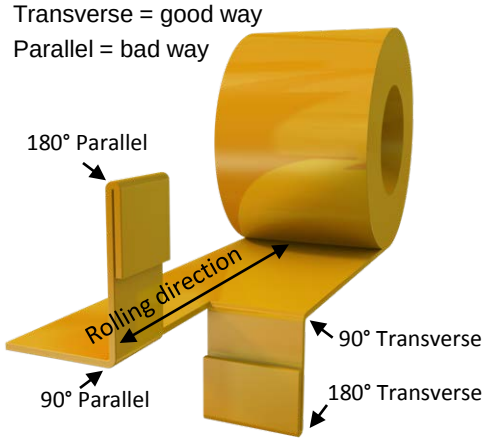


Bending test according to EN ISO 7438 is done with 10 mm wide samples. Smaller samples in general – as well as lower thickness – allow a lower bending radius without cracks. If needed we supply bending optimized temper classes that far exceed standard quality.

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.

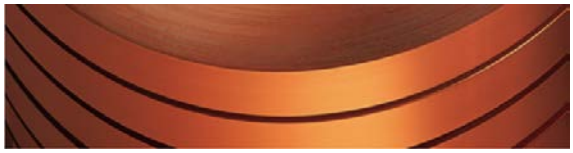
Example: R/T = 0.5 and thickness 0.3 mm

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

Bending Properties* (Thickness t ≤ 0.5 mm)

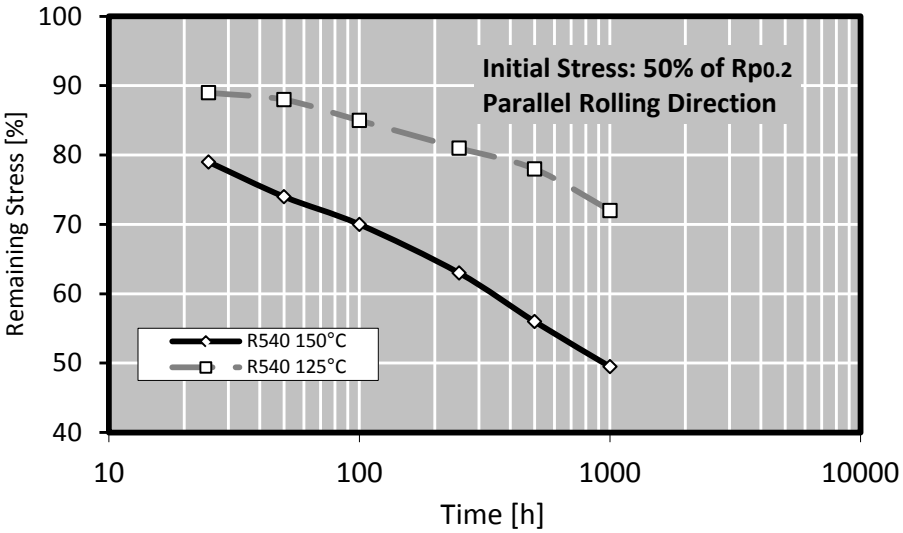
	Standard		Thermal Stress Relieved	
Temper	**Bending 90°**		**Bending 90°**	
	Transverse	**Parallel**	**Transverse**	**Parallel**
	R/T	R/T	R/T	R/T
R450	0	0	0	0
R540	0	0	0	0
R600	0	1	0	0
R660	0	3	0	0
R740	-	-	2	3
R800	-	-	-	-
R850	-	-	-	-

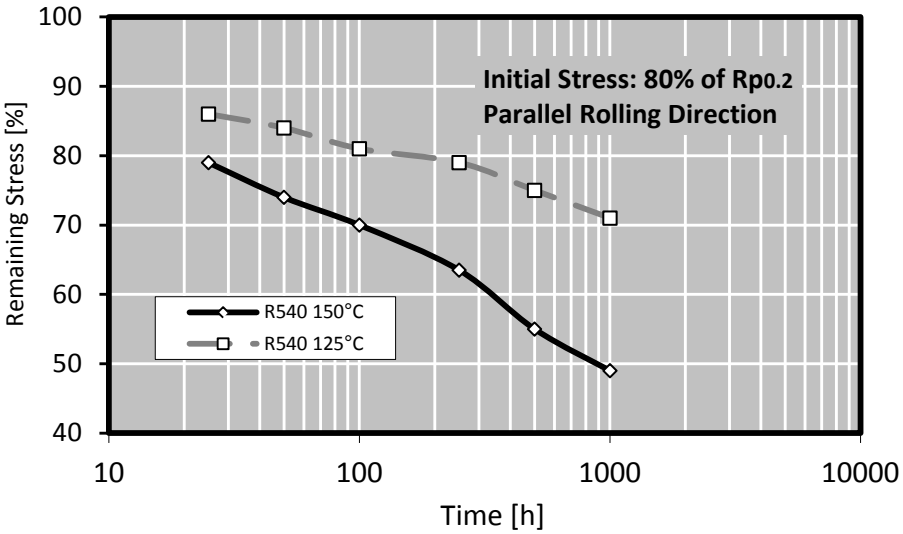
* Measured at sample width 10 mm. according EN 1654; Possible bending radius = (R/T) x thickness



Relaxation Properties

Mechanical stretch levelled

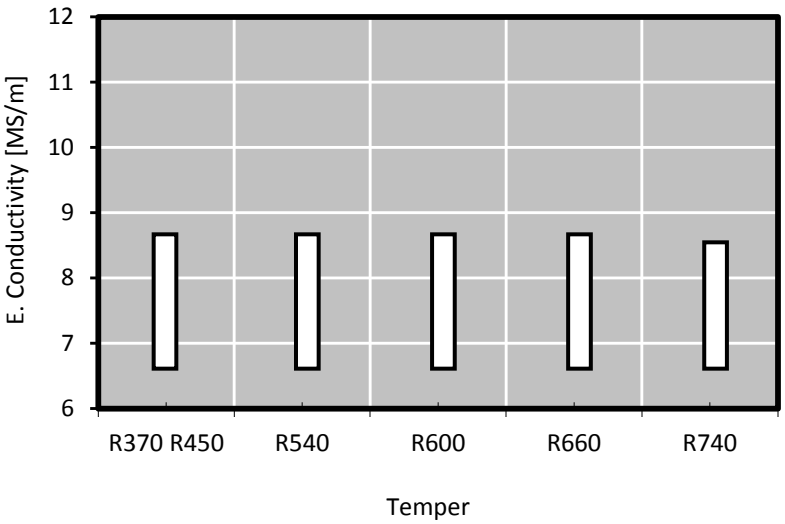




Stress relaxation is tested with cantilever bending test equipment. This method is taking short time relaxation into account. so that the values achieved are very realistic, while other test methods like tube test pretend better properties from the achieved values. Relaxation values give an indication about stress relieve of strip under tension for a certain time and temperature. As it is measured on plain strip. the behaviour of deformed parts may differ. nevertheless the ratio between the different tempers remains the same.

Typical test sample thickness is 0.3 – 0.6 mm.

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.