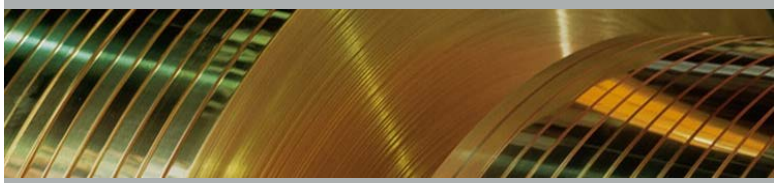
C26800
CuZn33

KME

Industrial Rolled

Alloy Designation	
EN	CuZn33
DIN CEN/TS 13388	CW506L
JIS	C 2680
BS	CZ 103
UNS	C26800

Brass Rolled Products



KME offers a wide range of brass rolled products in the form of strips, sheets and discs in order to meet our customer's needs for industrial manufacturing or for the production of gift articles and decorative objects.

Chemical Composition Weight percentage		
Cu	66 .. 68	%
Zn	Rest	%
Ni	≤ 0.3	%
Sn	≤ 0.1	%
Fe	≤ 0.05	%

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

Characteristics

CuZn33, as well as CuZn28 and CuZn30 is combining excellent cold forming properties with good mechanical strength. CuZn30 has good hot forming properties and excellent soldering and brazing properties. Due to the outstanding deep drawing properties CuZn33 and the other two mentioned alloys are called "deep-draw" or "cartridge" brass.

We produce qualities with grain sizes below 5 µm if needed.

Main Applications

Architecture: Handrails, Grillwork
Automotive: Tanks, Radiator Cores
Builders Hardware: Locks, Push Plates, Finish Hardware, Kick Plates, Stencils.
Electrical: Socket Shells, Wire Flashlight Shells, Clips, Lamp Sockets, Lamp Fixtures, Screw Shells, Reflectors. Fasteners Grommets, Eyelets, Screws, Rivets, Pins, Fasteners. Industrial Air Pressure Conveyer Systems, Bead Chain, Springs.
Marine: Fasteners.
Plumbing: Plumbing Accessories, Sanitary Traps, Sink Strainers, Bathroom Fixtures.
Typical Application: Metal goods, Deep drawn parts, Components for the electrical industry, stamped parts, Connectors.

Preferred Applications

Jewellery and Metall Goods	Deep Drawn Parts	Components for the Electrical Industry	Stamped Parts	Connectors
xx	xx	xx	xx	x

x = well suited xx = particularly well suited

Physical Properties Typical values in annealed temper at 20 °C			
Density		8.5	g/cm³
Thermal expansion coefficient	-128 .. 20 °C	9.0	10^{-6}/K
	20 .. 300 °C	19.9	10^{-6}/K
Specific heat capacity		0.377	J/(g·K)
Thermal conductivity		121	W/(m·K)
Electrical conductivity (1 MS/m = 1 m/(Ω mm²)		≥ 15	MS/m
Electrical conductivity (IACS)		26	%
Thermal coefficient of electrical resistance (0 .. 100 °C)		1.6	10^{-3}/K
Modulus of elasticity (1 GPa = 1 kN/mm²) cold formed		99 .. 115	GPa
annealed		112	GPa

C26800
CuZn33

KME

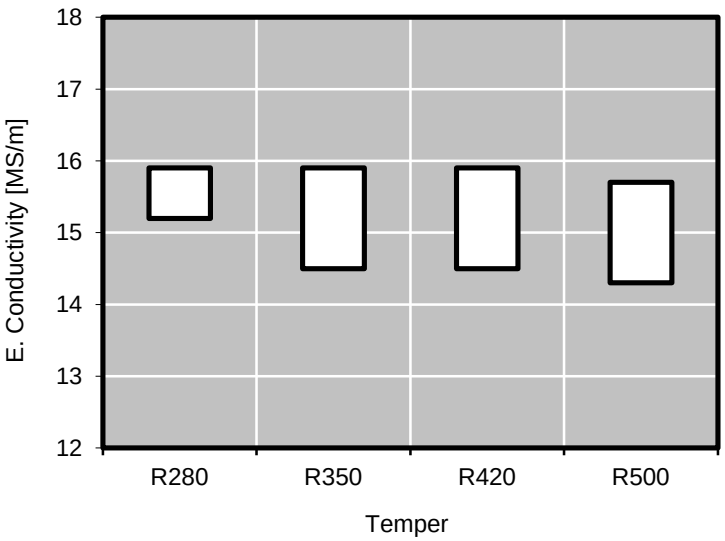
Industrial Rolled

Mechanical Properties (EN 1652)

Temper		Tensile Strength Rm	Yield Strength $Rp_{0.2}$*	Elongation Minimum A_{50mm}	Grain Size	Hardness HV *
		MPa	MPa	%	µm	HV
R280	**G010** Annealed	280 .. 380	≤ 170	40	<15	≤120
	G020 Annealed				15 .. 30	≤95
	G030 Annealed				20 .. 40	≤90
	G050 Annealed				35 .. 70	≤80
R350		350 .. 430	170	23		95 .. 125
R420		420 .. 500	300	6		125 .. 155
R500		> 500	450	3		> 155

* 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 Max. 90% between annealings	Excellent
Hot Forming Properties at 750 .. 870°C	Good
Machinability (Rating 30)	Fair
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Good
Gas Shielded Arc Welding	Fair
Laser Welding	Less Suitable
Soft Annealing	450 .. 680°C
Stress Relieving Annealing	200 .. 300°C

* For more details call our technical service

Corrosion Resistance*

Resistant to:

CuZn33 has a good resistance to water, water vapour, different saline solutions, many organic liquids. Industrial-, maritime- and country air.

CuZn33 in cold formed temper, as well as under internal and external tension, tends to stress corrosion cracking, when in contact with e.g. hydrous ammonia, ammoniac salt or amine and others.

Trough a heat-treatment of semi-finished or finished products the risk of stress corrosion can be reduced.

Not resistant to:

Acids, hydrous sulphur components, hydrous ammonia (stress corrosion cracking) in non-stress-relieved condition.

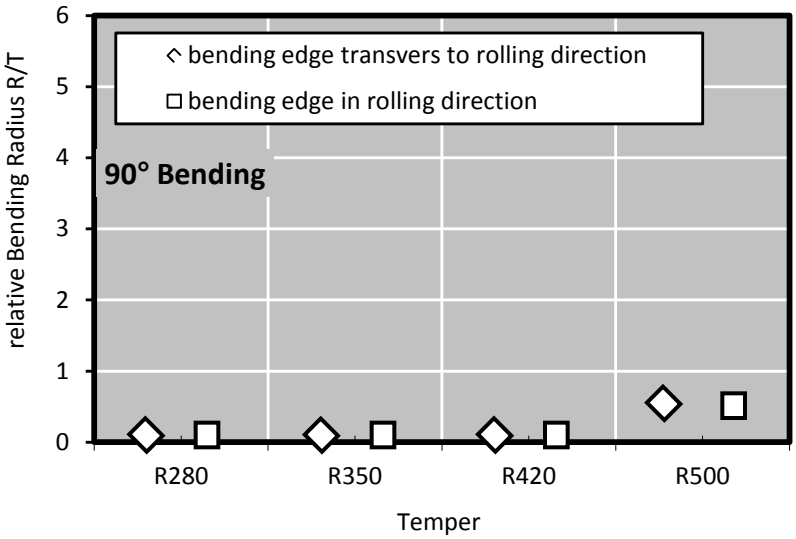
* For more details call our technical service

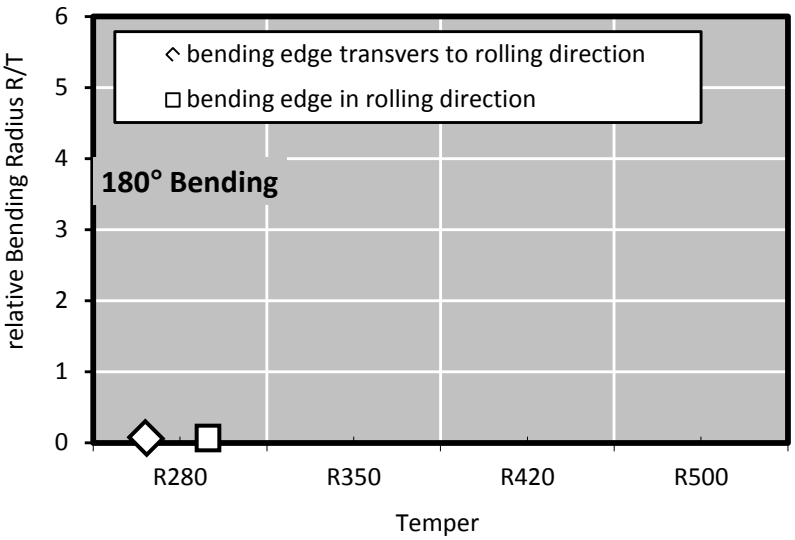
C26800
CuZn33

KME

Industrial Rolled

Bending Properties **Thickness: ≤ 0.5 mm**



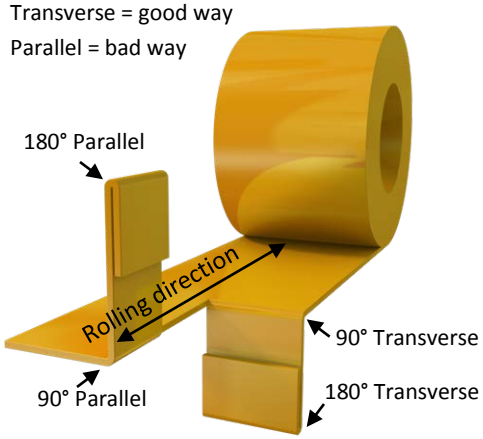


Bending test according to EN ISO 7438 is done with 10 mm wide samples. Smaller samples in general – as well as lower thickness – allow a lower bending radius without cracks. If needed we supply bending optimized temper classes that far exceed standard quality.

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

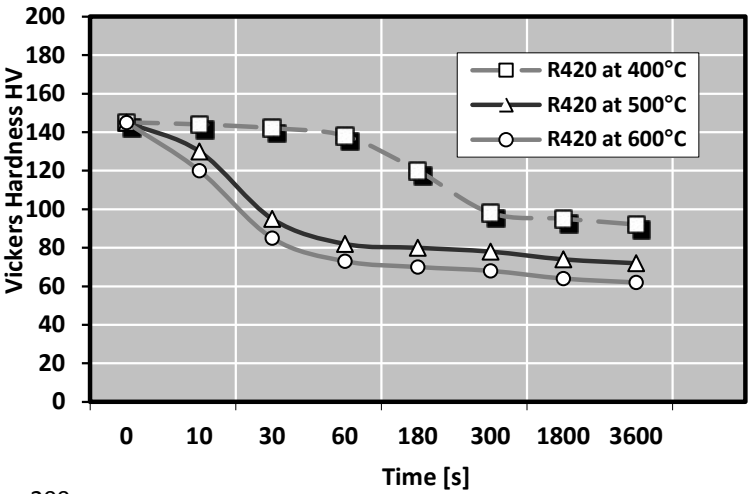
Minimum radius = (R/T) x thickness
= 0.5 x 0.3 mm = 0.15 mm

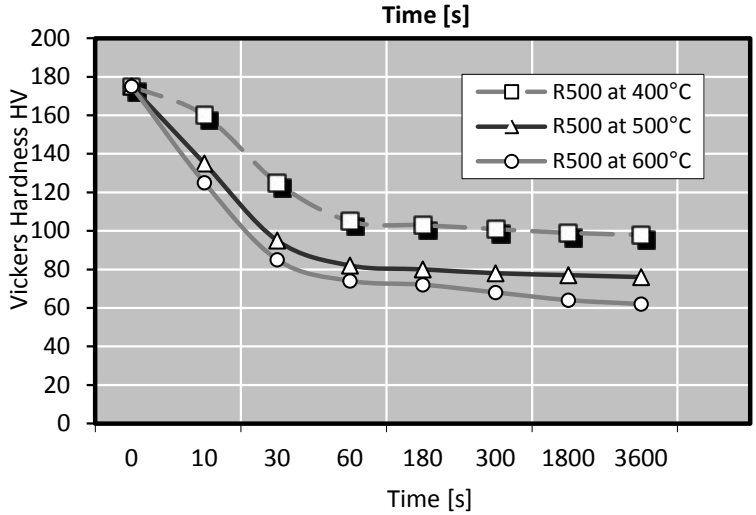
Bending Properties*

Temper	Thickness Range	Bending 90°		Bending 180°	
		Trans-vers	Parallel	Trans-vers	Parallel
	mm	R/T	R/T	R/T	R/T
R280	≤ 0.5	0	0	0	0
R350	≤ 0.5	0	0	0	0
R420	≤ 0.5	0	0	-	-
R500	≤ 0.5	0.5	0,5	-	-

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

Softening Resistance





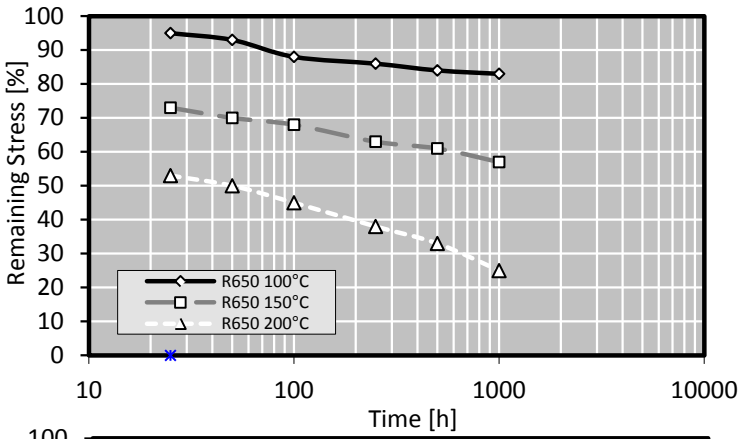
After short time heat treatment Vickers Hardness is measured. The diagram shows typical values.

Bend Fatigue (at room temperature)

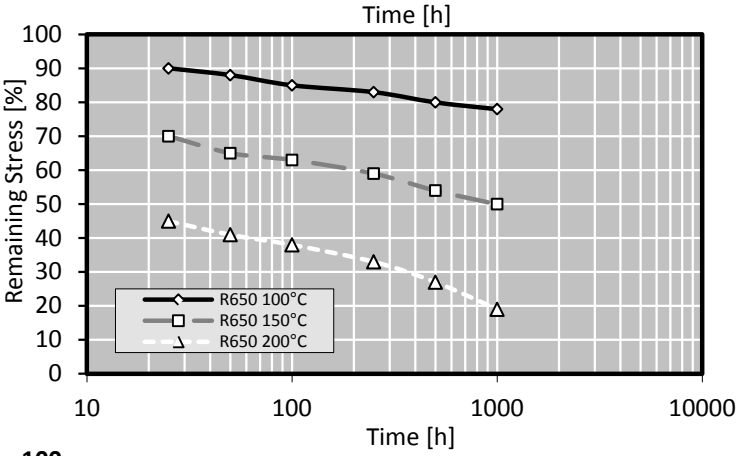
The fatigue strength gives an indication about the resistance to variations in applied tension. It is measured under symmetrical alternating load. The maximum bending load for 10^7 load cycles without crack is measured. Dependent on the temper class it is approximately 1/3 of the tensile strength R_m.

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

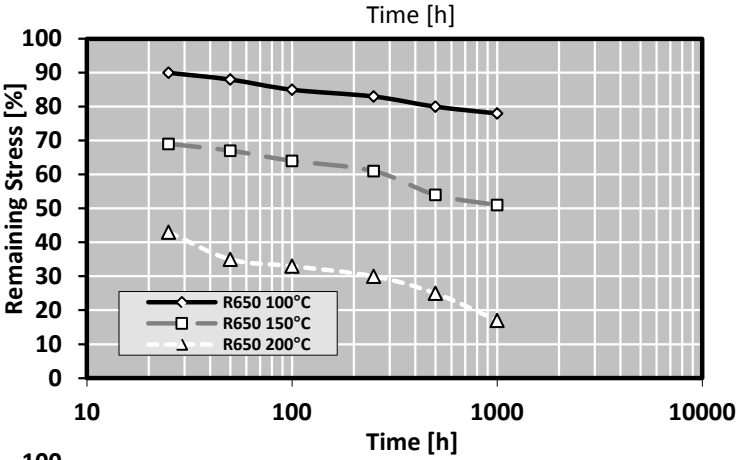
Relaxation Properties **Values from CuZn30** Thermal stress relieved, CuZn33 will have lower values



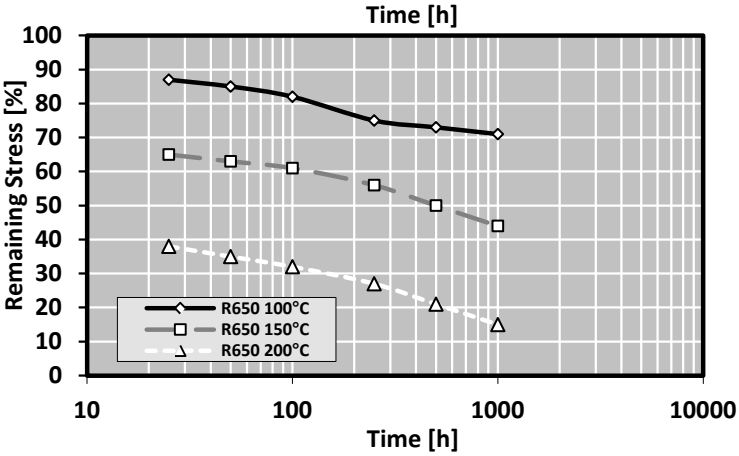
Initial Stress:
50% of Rp0.2
Parallel
Rolling Direction



Initial Stress:
50% of Rp0.2
Transverse
Rolling Direction



Initial Stress:
80% of Rp0.2
Parallel
Rolling Direction



Initial Stress:
80% of Rp0.2
Transverse
Rolling Direction

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.

C26800
CuZn33

Industrial Rolled

Brass Processing

Alloy	Machining	Mechanical Polishing	Electro Polishing	Brazing	Gas Welding	Gas Shielded Arc Welding	Resistance Welding	Laser Welding
CuZn5	4	1	1	1	2	2	2	3
CuZn10	4	1	1	1	2	2	2	3
CuZn15	4	1	1	1	2	2	2	3
CuZn20	4	1	1	1	2	2	2	3
CuZn28	4	1	1	1	2	3	2	4
CuZn30	4	1	1	1	2	3	2	4
CuZn33	4	1	1	1	2	3	2	4
CuZn36	3	1	2	1	2	3	2	4
CuZn37	3	1	3	1	2	3	2	4
CuZn39Pb2	1	2	4	3	4	4	3	4
CuZn40	3	2	3	2	4	3	2	4
CuSn3Zn9 CuSn2Zn10	3	1	2	1	2	2	3	3

1= excellent **2 = good** **3 = fair** **4 = less suitable**

Phase Diagram Copper Zink (after Struers Scientific Instruments)