

CuZn40

C28000



Industrial Rolled

Alloy Designation	CuZn40
EN	CuZn40 (2.0402)
DIN CEN/TS 13388	CW617N
JIS	C 3771
BS	CZ 122
UNS	C28000

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	59 .. 61	%
Zn	Rest	%
Ni	≤ 0.3	%
Sn	≤ 0.3	%
Fe	≤ 0.05	%

Characteristics

CuZn40 is an economical brass alloy with high Zinc content, good forming properties and medium strength.

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

Main Applications

Architecture: Decoration, Architectural Panels, Hardware, Door Frames, Large Architectural Trim, Structural, Heavy Plate, Sheet, Large Sheets.

Builders Hardware: Decorative Hardware

Fasteners: Bolts.

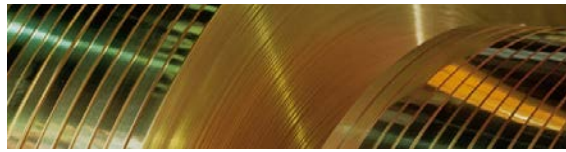
Industrial: Condenser Tube, Valve Stems, Hot Forgings, Heat Exchanger Tube, Large Nuts and Bolts, Evaporator Tubes, Brazing Rod, Condenser Plates.

Typical Application: Locks and metal fittings, Keys, Architecture.

Preferred Applications		
Locks and Metal Fittings	Keys	Architecture
xx	xx	xx

x = well suited xx = particularly well suited

Physical Properties		
Typical values in annealed temper at 20 °C		
Density		8.41 g/cm ³
Thermal expansion coefficient	20 .. 100 °C	20.0 10 ⁻⁶ /K
	20 .. 300 °C	21.0 10 ⁻⁶ /K
Specific heat capacity		0.375 5J/(g·K)
Thermal conductivity		117 W/(m·K)
Electrical conductivity (1 MS/m = 1 m/(Ω mm ²))		≥ 15 MS/m
Electrical conductivity (IACS)		25.9 %
Thermal coefficient of electrical resistance (0 .. 100 °C)		1.7 10 ⁻³ /K
Modulus of elasticity (1 GPa = 1 kN/mm ²)	cold formed	99 .. 115 GPa
	annealed	102 GPa

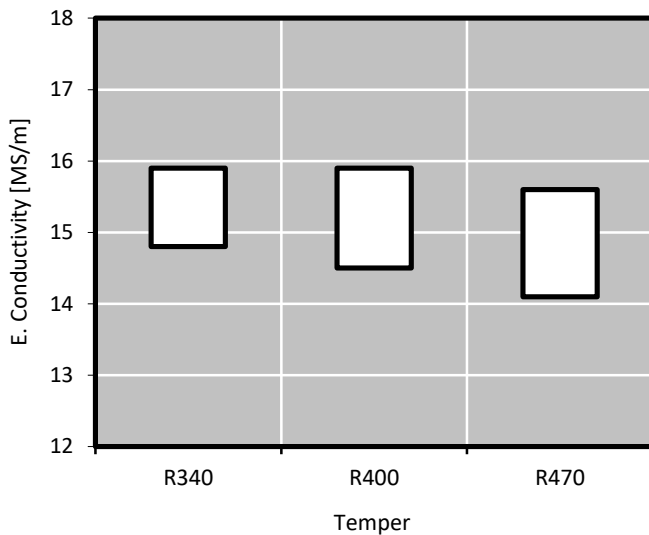


Mechanical Properties (EN 1652)

Temper	Tensile Strength Rm	Yield Strength Rp0.2*	Elongation Minimum A50mm	Hardness HV *
R340 annealed	340..420	< 240	33	85..115
R400	400..480	> 200	15	110..140
R470	> 470	> 390	6	> 140

* 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. 25% between annealings	Fair
Hot Forming Properties at 650 .. 800°C	Excellent
Machinability (Rating 40)	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:
CuZn40 has a good resistance to water, water vapour, different saline solutions, many organic liquids .
Land, sea and industrial atmosphere.

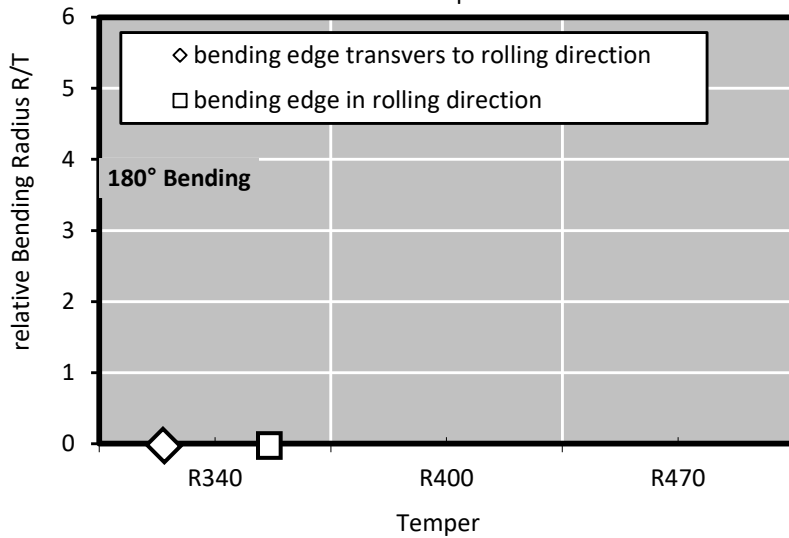
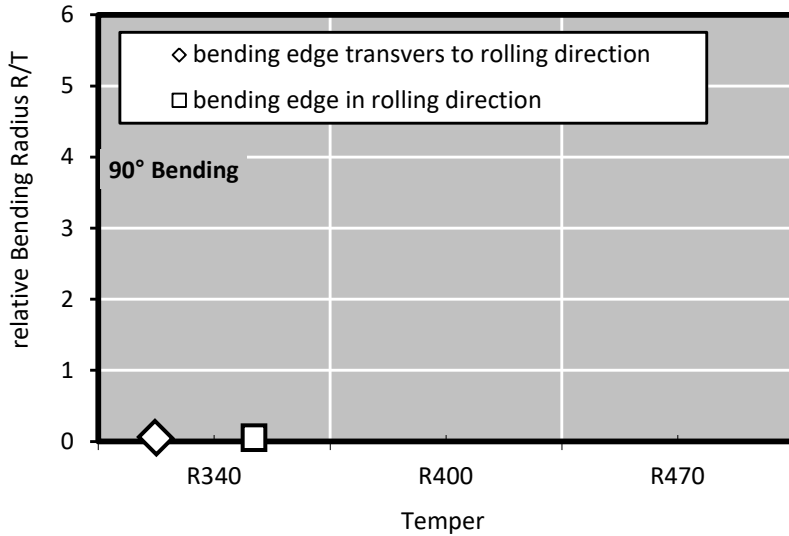
Not resistant to:
Under certain conditions (water with high chlorine-content and low carbonate-hardness) a form of corrosion called "dezincification" can occur.
Furthermore this alloy tends in cold-formed temper under internal and/or external tensile stress when aggressive agents like ammoniac, amine ammonia-salts are present to "stress corrosion cracking". Tensile stress can be applied after fabrication during assembly or installation.

A heat treatment can help to avoid stress corrosion cracking. Semi-finished products can get a stress relieving annealing treatment or softening treatment.

* For more details call our technical service



Bending Properties Thickness: ≤ 0.5 mm

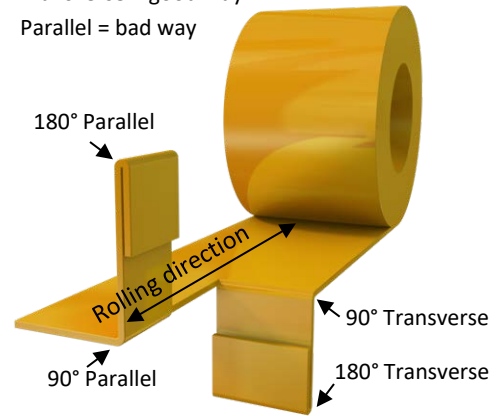


Bending test according to EN ISO 7438 is done with 10 mm wide samples. Smaller samples in general – as well as lower thickness – allow a lower bending radius without cracks. If needed we supply bending optimized temper classes that far exceed standard quality.

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
		R/T	R/T	R/T	R/T
R340	≤ 0.5	0	0	0	0
R400	≤ 0.5	0	0	0	0
R470	≤ 0.5	0	0	-	-

* Measured at sample width 10 mm according to EN 1654

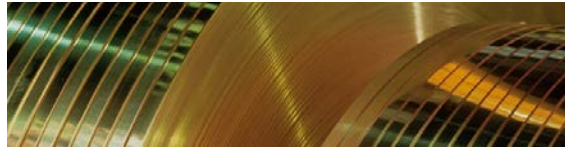
Possible bending radius = (R/T) x thickness

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 10⁷ load cycles without crack is measured. Dependent on the temper class it is approximately 1/3 of the tensile strength R_m.

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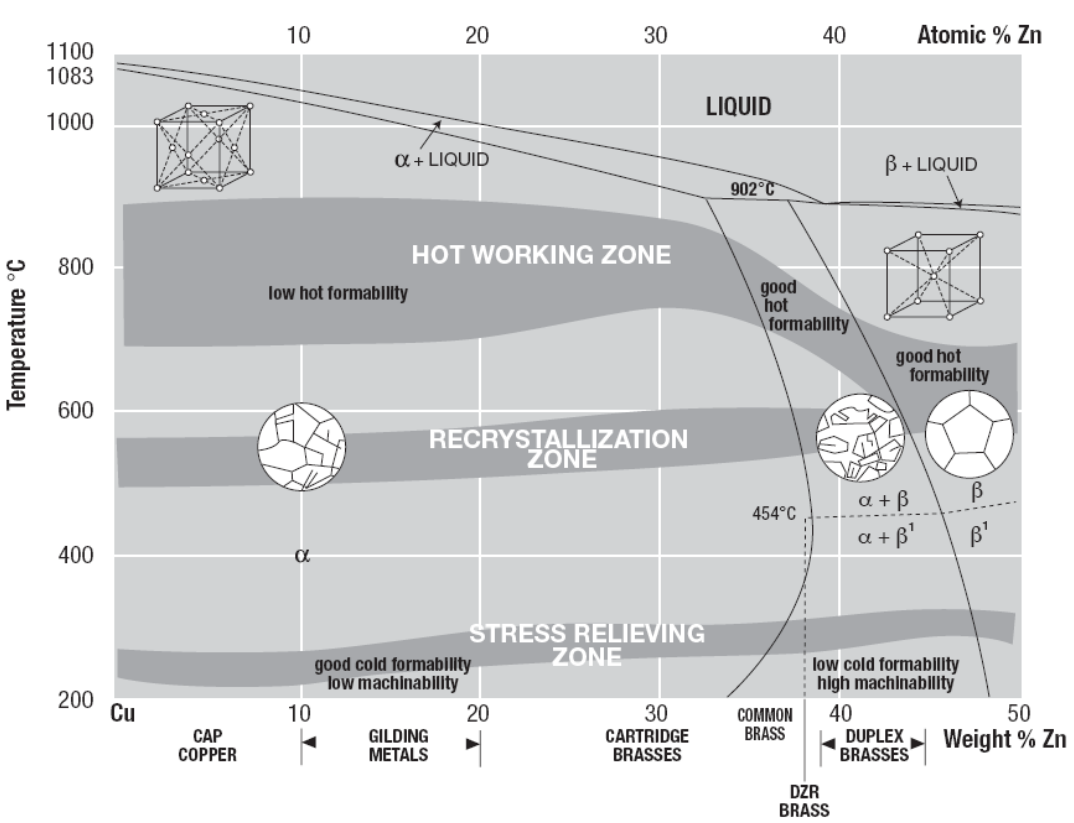


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Brass Processing		Machining	Mechanical Polishing	Electro Polishing	Brazing	Gas Welding	Gas Shielded Arc Welding	Resistance Welding	Laser Welding
KME	Alloy								
305	CuZn5	4	1	1	1	2	2	2	3
310	CuZn10	4	1	1	1	2	2	2	3
315	CuZn15	4	1	1	1	2	2	2	3
320	CuZn20	4	1	1	1	2	2	2	3
328	CuZn28	4	1	1	1	2	3	2	4
330	CuZn30	4	1	1	1	2	3	2	4
333	CuZn33	4	1	1	1	2	3	2	4
336	CuZn36	3	1	2	1	2	3	2	4
337	CuZn37	3	1	3	1	2	3	2	4
339	CuZn39Pb2	1	2	4	3	4	4	3	4
340	CuZn40	3	2	3	2	4	3	2	4
	CuSn3Zn9 CuSn2Zn10	3	1	2	1	2	2	3	3

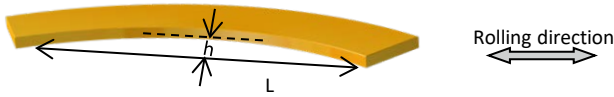
1= excellent 2 = good 3 = fair 4 = less suitable

Phase Diagram Copper Zink (after Struers Scientific Instruments)





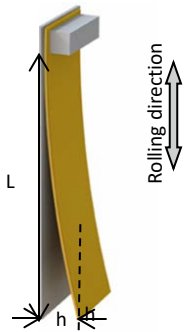
Camber



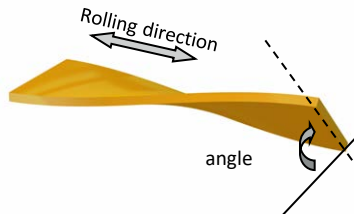
Evenness



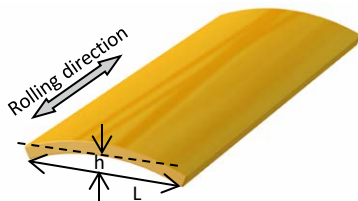
Coil set



Twist



Transverse Flatness



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

Width Tolerance Standard / Precision

Thickness Range [mm]	Width Range [mm]					
	10 .. 50	51 .. 100	101 .. 200	201 .. 350	351 .. 700	700 .. 1,000
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

Customized Tolerances

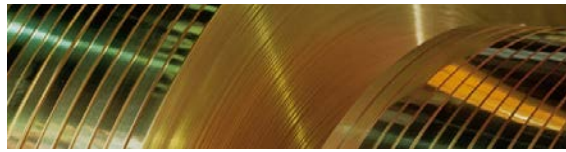
Our products are produced in accordance with relevant norms EN 1652 / EN 1654. Customer specific tolerances for Thickness, Width, Camber, Transverse Flatness, Evenness, Twist and Coil set can be defined. We will be happy to meet your demands. EN 1652 defines only camber.

Thickness Tolerance

Thickness Range [mm]	EN 1652 ≤350 mm [mm]	KME Standard [mm]	KME Precision [mm]
0.05 .. 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

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



Formats	Dimension*			
	Coil	Strip thickness (other thicknesses on request)	≥ 0.05 .. 6.00	mm
		Strip width	≥ 3 .. 1,000	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 .. 1,000	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 .. 1,000	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	≤ 1,000	mm
		Length	≤ 15,000	mm
		Weight	≤ 8,000	kg
	Disc	Thickness	0.3 .. 150	mm
		Diameter	20 .. 1,000	mm
		Weight	≤ 10,000	kg

* Some combinations might not be possible



Surface coatings & Special Treatments *		Dimension	
	Hot-Dip tinned and STOL®28M Tin-Silver STOL®13 Thermic Sn	Width	≤ 330 mm
		Thickness	≤ 1.5 mm
		Tin Layer Thickness	0.4 .. 20 μm
Different thickness per side possible			
	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		
	Bright and polished appearance	Width	≤ 1,000 mm
		Thickness	≤ 1.5 mm
	GS1 Surface Quality	Skin passed material, meaning it has been	
	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