

Alloy Designation	
EN	CuZn5 (2.0220)
DIN CEN/TS 13388	CW500L
JIS	C 2100
BS	CZ 125
UNS	C21000

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	94 .. 96	%
Zn	Rest	%
Ni	≤ 0.3	%
Sn	≤ 0.1	%
Fe	≤ 0.05	%

Characteristics

CuZn5 has very good cold forming properties and is well suited for e.g. coinage, beating, embossing. This alloy has a higher strength as pure copper. CuZn5 has good welding and brazing properties as well as a good corrosion resistant and is not fragile to stress corrosion and dezincification. It is principally used in jewellery, metal goods, watch industry and in electronic industry for installation parts.

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

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

Main Applications

Architecture: Ornamental Trim
Consumer: Jewelry, Emblems, Plaques, Medallions,
Electrical: Components for the Electrical Industry, Connectors, Rotor Bars, AC Motors
Fasteners Industrial: Metal Goods, Base for Vitreous Enamel, Base for Gold Plate
Ordnance: Primers, Small Arm Ammunition: Primer Caps, Bullet Jackets, Fuse Caps, Firing Pin Support Shells, Bullet
Other: Coins, Tokens, Medals,

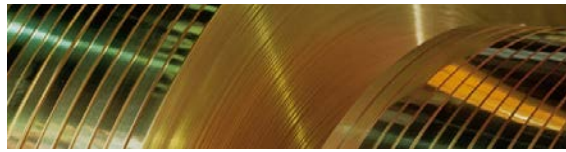
Preferred Applications

Jewellery	Metal Goods	Components for the Electrical Industry	Stamped Parts	Connectors
xx	xx	xx		

x = well suited xx = particularly well suited

Physical Properties
 Typical values in annealed temper at 20 °C

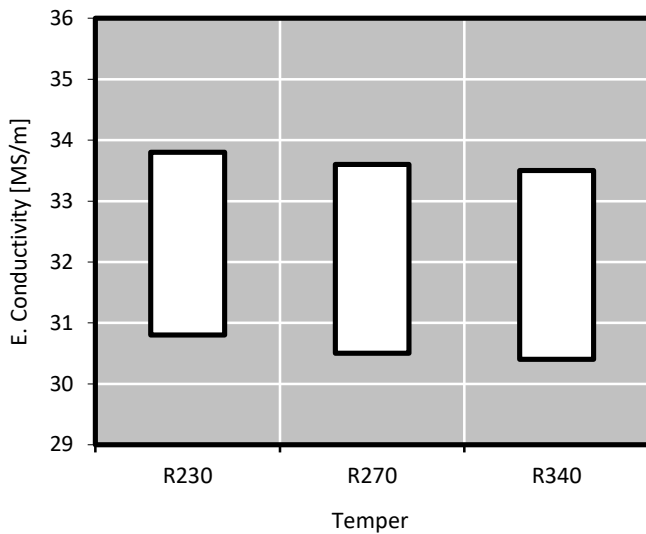
Density		8.86	g/cm ³
Thermal expansion coefficient	20 .. 100 °C	17.0	10 ⁻⁶ /K
	20 .. 300 °C	18.0	10 ⁻⁶ /K
Specific heat capacity		0.380	J/(g·K)
Thermal conductivity		234	W/(m·K)
Electrical conductivity (1 MS/m = 1 m/(Ω mm ²))		≥ 33	MS/m
Electrical conductivity (IACS)		56.9	%
Thermal coefficient of electrical resistance (0 .. 100 °C)		2.3	10 ⁻³ /K
Modulus of elasticity (1 GPa = 1 kN/mm ²) annealed		127	GPa



Mechanical Properties (EN 1652)					
Temper		Tensile Strength	Yield Strength	Elongation Minimum	Hardness
		R _m	R _{p0.2}	A _{50mm}	HV *
		MPa	MPa	%	HV
R230	annealed	230 .. 280	≤ 130	36	45 .. 75
R270		270 .. 350	≥ 200	12	75 .. 110
R340		≥ 340	≥ 280	4	≥ 110

* only for information

Electrical Conductivity



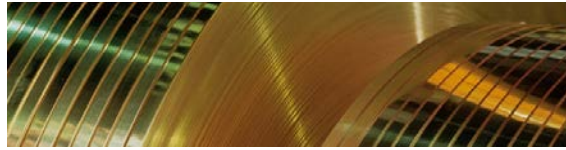
Electrical conductivity is strongly influenced by chemical composition. A high level of cold deformation and small grain size decrease the electrical conductivity moderately. Minimum conductivity level can be specified.

Fabrication Properties*	
Cold Forming Properties Max. 90% between annealings	Excellent
Hot Forming Properties at 750 .. 900°C	Fair .. Good
Machinability (Rating 25-30)	Less suitable
Electroplating Properties	Excellent
Hot Tinning Properties	Excellent
Soft Soldering, Brazing	Excellent
Resistance Welding	Good
Gas Shielded Arc Welding	Good
Laser Welding	Fair
Soft Annealing	450 .. 600°C, 1 .. 3h
Stress Relieving Annealing	200 .. 300°C, 1 .. 3h

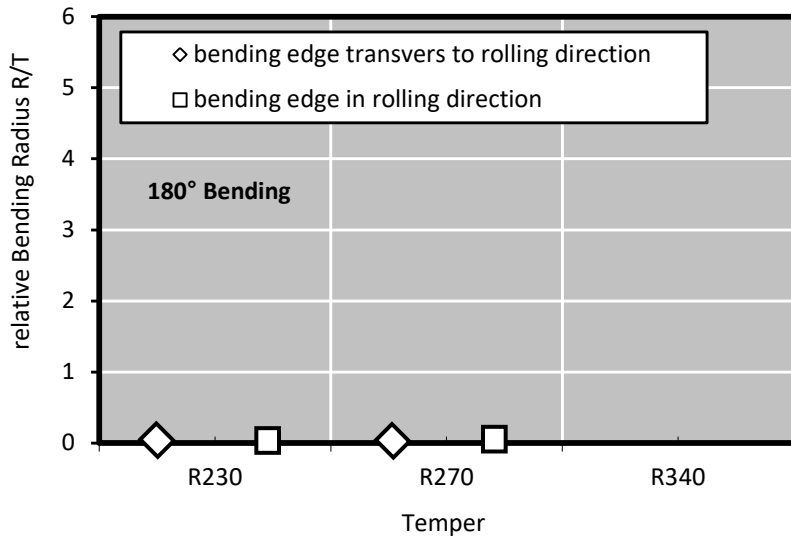
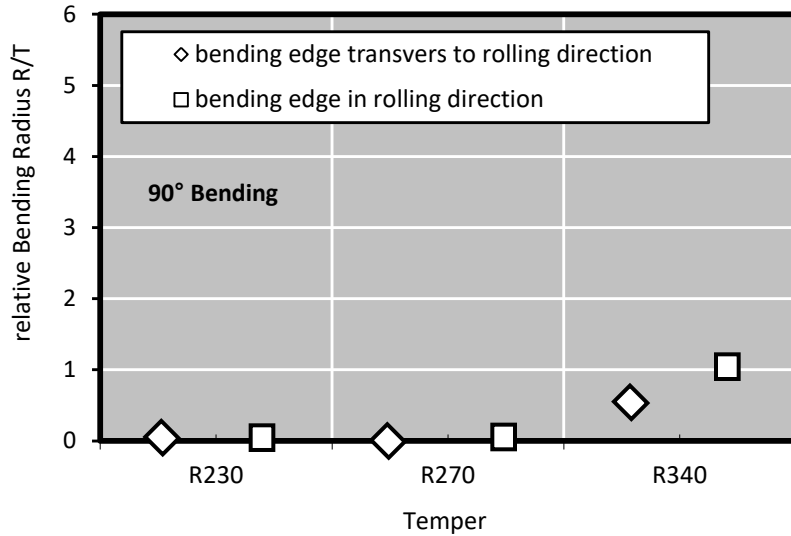
* For more details call our technical service

Corrosion Resistance*
Resistant to: CuZn5 has in general a good resistance to natural-, sea- and industrial atmosphere, water, water vapour, different saline solutions, many organic liquids, neutral- and alkaline bonds.
CuSn5 has a very low sensitivity stress corrosion cracking. To avoid stress corrosion as much as possible, the alloy should be used in a stress relieved temper. CuSn5 is not sensitive to dezincification, that could occur in water with high chlorine content and low carbonat-hardness.
Not resistant to: Oxidizing acids, hydrous sulphur components.

* For more details call our technical service



Bending Properties Thickness: ≤ 0.5 mm

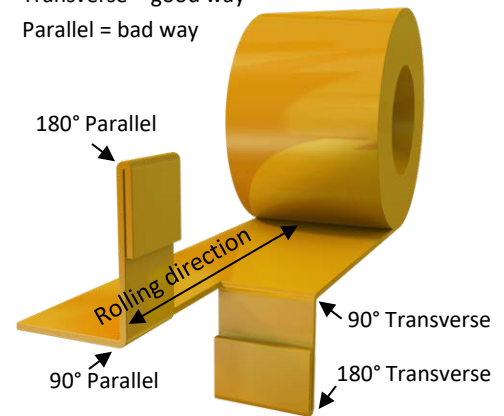


Bending test according to EN ISO 7438 is done with 10 mm wide samples. Smaller samples in general – as well as lower thickness – allow a lower bending radius without cracks. If needed we supply bending optimized temper classes that far exceed standard quality.

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



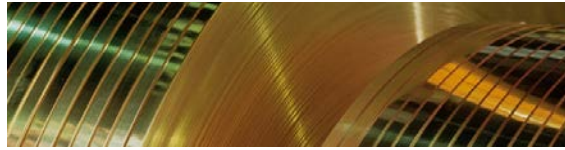
Minimum Bending Radius Calculation

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*

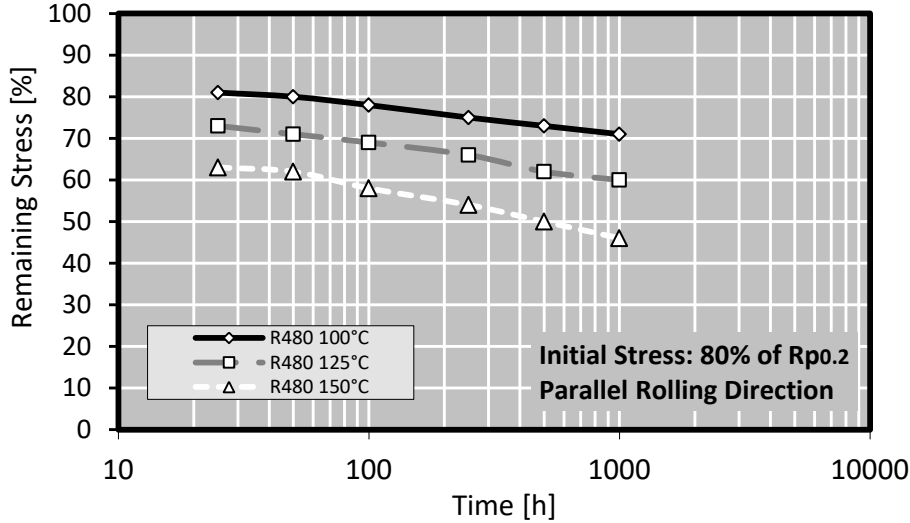
Temper	Thicknes s Range	Bending 90°		Bending 180°	
		Trans- vers	Parallel	Trans- vers	Parallel
	mm	R/T	R/T	R/T	R/T
R230	≤ 0.5	0	0	0	0
R270	≤ 0.5	0	0	0	0
R340	≤ 0.5	0,5	1	-	-

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



Relaxation Properties

Values from CuZn15 Thermal stress relieved
CuZn5 will have lower remaining stress

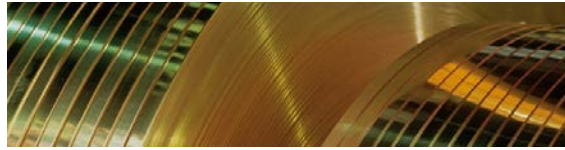


Stress relaxation is tested with cantilever bending test equipment. This method is taking short time relaxation into account, so that the values achieved are very realistic, while other test methods like tube test pretend better properties from the achieved values. Relaxation values give an indication 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.

Bend Fatigue (at room temperature)

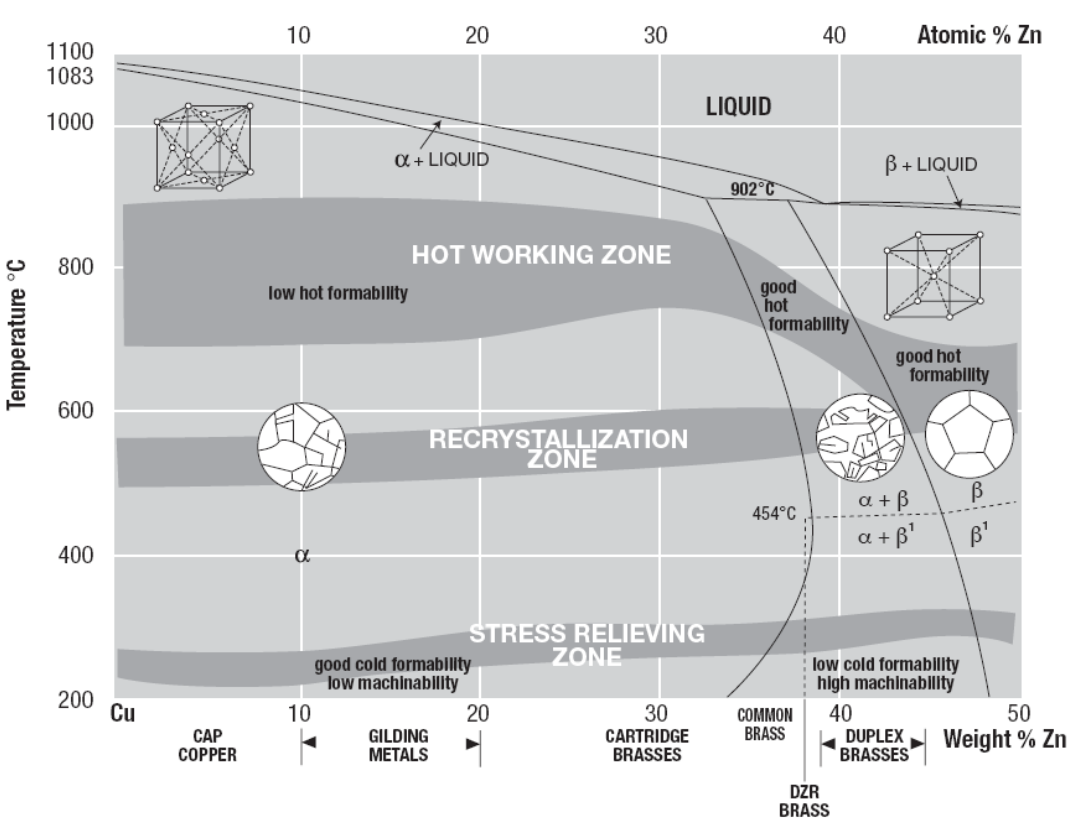
The fatigue strength gives an indication about the resistance to variations in applied tension. It is measured under symmetrical alternating load. The maximum bending load for 10^7 load cycles without crack is measured. Dependent on the temper class it is approximately 1/3 of the tensile strength R_m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

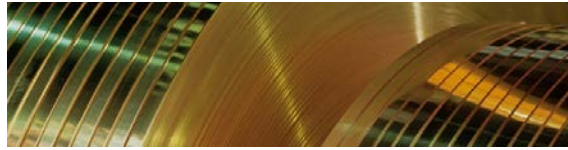


Brass Processing		Machining	Mechanical Polishing	Electro Polishing	Brazing	Gas Welding	Gas Shielded Arc Welding	Resistance Welding	Laser Welding
KME	Alloy								
305	CuZn5	4	1	1	1	2	2	2	3
310	CuZn10	4	1	1	1	2	2	2	3
315	CuZn15	4	1	1	1	2	2	2	3
320	CuZn20	4	1	1	1	2	2	2	3
328	CuZn28	4	1	1	1	2	3	2	4
330	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

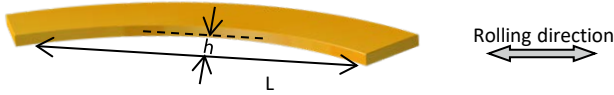
1= excellent 2 = good 3 = fair 4 = less suitable

Phase Diagram Copper Zink (after Struers Scientific Instruments)





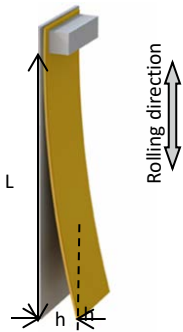
Camber



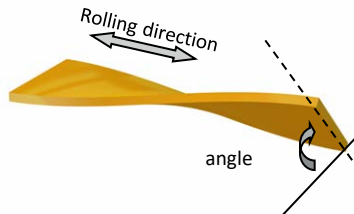
Evenness



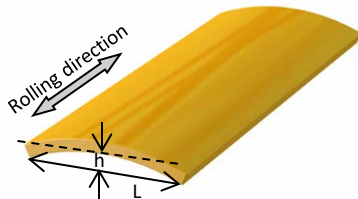
Coil set



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

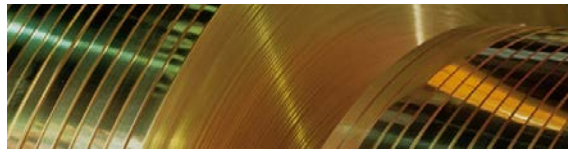
Our products are produced in accordance with relevant norms EN 1652 / EN 1654. Customer specific tolerances for Thickness, Width, Camber, Transverse Flatness, Evenness, Twist and Coil set can be defined. We will be happy to meet your demands. EN 1652 defines only camber.

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

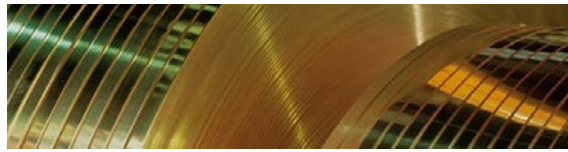
Roughness

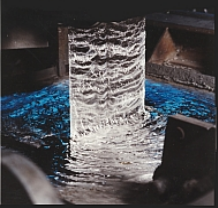


Ra [μm]	Thickness [mm]
0.13 .. 0.18	0.1 .. 2.0
0.20 .. 0.30	0.1 .. 2.0
0.35 .. 0.46	0.1 .. 2.0
On request	> 2.0



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 Thickness Tin Layer Thickness	≤ 330 mm ≤ 1.5 mm 0.4 .. 20 µm
	Different thickness per side possible		
	Electroplating	Width Thickness	≤ 400 mm ≤ 2.5 mm
	Tin, Silver, Gold, Cu-Flash, Ni-Flash, Selective plating	Other coatings on request	
	Profiled strips STOL®Multigauge	Width Thickness	15 .. 90 mm 0.23 .. 1 mm
	Other width on request		
	Bright and polished appearance	Width Thickness	≤ 1,000 mm ≤ 1.5 mm
	GS1 Surface Quality	Skin passed material	
	Surface with extra low residual carbon content possible.		10 mg/m ²
	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