

Designation	DIN	EN	UNS (ASTM)	AISI	LMSA
CuBe2	2.1247	CW101C	C17200	-	A100 G200 G210 G220

Chemical composition (weight %)

Cu	Be	Co + Ni	Co + Ni + Fe	Pb
Balance	1.80 - 2.00	0.2% min.	0.6% max.	0.02% max.

Copper plus additions equal 99.5% minimum.

In order to achieve maximum homogeneity and consistent quality, the actual tolerances on both alloy components and impurities are significantly tighter and more precisely defined than the standard composition indicated.

Main technical properties and features

Beryllium copper Brush 25 achieves the highest strength and hardness available among all copper alloys after age hardening, and is consequently very widely used. It exhibits excellent bendability and general formability prior to ageing, especially in the tempers A (TB00), ¼ H (TD01) and ½ H (TD02). After forming and in the fully age hardened condition, the alloy Brush 25 provides a unique combination of very high strength and high conductivity, high fatigue strength limit and an excellent thermal strength relaxation behaviour.

Typical manufacturing range

		Thickness (mm)	Width (mm)	Length (mm)
Rolled products	Strip in coils ¹⁾	0.005 - 2.000	1.5 - 200.0	-
	Strip as sheets ¹⁾	0.015 - 2.000	10.0 - 200.0	100 - 3000
Drawn bar	Bars and wire ²⁾	upon request		

1) Not all our production possibilities are presented here. Other dimensions or other product forms available upon request. Certain combinations of thicknesses and widths are not possible.

2) Alloy 25 is generally not used for applications requiring good machinability. For screw machined parts, we recommend the alloy Brush M25, CuBe2Pb. For improved machinability

Mechanical properties of strips

Temper				Heat Treatment	R _{p0.2} (N/mm ²)	R _m (N/mm ²)	A _{50mm} (%)	Hardness HV	R/t (90°) G/B ²⁾
A	R410	H090	dead soft	-/-	190-380	410-540	35-60	90-150	0.0/0.0
A ¹⁾	R430	H100	soft + skin pass	-/-	210-380	430-560	35-60	100-150	0.0/0.0
¼ H	R510	H130	¼ hard	-/-	420-560	510-610	15-35	120-180	0.0/0.0
½ H	R580	H180	½ hard	-/-	530-660	580-690	8-25	180-215	0.5/1.0
H	R680	H215	hard	-/-	650-800	680-830	2-8	215-250	1.0/2.9
H+	R800	H240	aprights	-/-	≥ 750	≥ 800	-/-	≥ 240	-/-

After age hardening (by the customer)

AT	R1130	H350	soft + hardened	3h / 315°C	960-1210	1130-1350	10-3	350-410	-/-
¼ HT	R1190	H360	¼ hard + hardened	2h / 315°C	1050-1300	1190-1420	6-3	360-430	-/-
½ HT	R1270	H370	½ hard + hardened	2h / 315°C	1100-1350	1270-1490	5-1	370-440	-/-
HT	R1310	H380	hard + hardened	2h / 315°C	1150-1420	1310-1520	3-1	380-450	-/-

1) The temper "soft + skin pass" is not given in the EN standard. The skin pass improves the surface quality of the soft temper.

2) Minimum bend radius at 90°. R = radius, t = thickness of the strip, G = "Good way" and B = "Bad way".



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Mechanical properties of rods and wires

Rods	Temper			Heat Treatment	R _{p0.2} (N/mm ²)	R _m (N/mm ²)	A _{50mm} (%)	Hv (N/mm ²)
A ¹⁾	R420	H090	Dead soft	-	140-210	420-600	≥ 35	90-180
H ¹⁾	R600	H200	hard	-	500-750	600-800	≥ 10	200-250

After hardening (at the customer)

AT ¹⁾	R1150	H360	soft + hardened	3h / 325°C	1000-1250	1150-1350	≥ 3	360-390
HT ¹⁾	R1300	H390	hard + hardened	2h / 325°C	1150-1400	1300-1500	≥ 2	390-430

1) These tempers do not correspond exactly to those of the EN standard
Values are valid for diameters < 25 mm

Wire	Temper			Heat Treatment	R _{p0.2} (N/mm ²)	R _m (N/mm ²)	A _{50mm} (%)	Hv (N/mm ²)
A ¹⁾	R400	H090	soft	-	130-210	400-540	≥ 30	90-170
¼H ¹⁾	R620	H200	¼ hard	-	510-730	620-800	≥ 3	200-250
½H ¹⁾	R750	H230	½ hard	-	620-870	750-940	≥ 2	230-300
¾H ¹⁾	R890	H270	¾ hard	-	790-1040	890-1070	≥ 2	270-340
H ¹⁾	R960	H300	hard	-	890-1110	960-1140	≥ 1	300-360

After hardening (by the customer)

AT ¹⁾	R1100	H340	soft + hardened	3h / 325°C	990-1250	1100-1380	≥ 3	340-430
¼HT ¹⁾	R1200	H370	¼ hard + hardened	2h / 325°C	1130-1380	1200-1450	≥ 2	370-460
½HT ¹⁾	R1270	H390	½ hard + hardened	2h / 325°C	1170-1450	1270-1490	≥ 2	390-470
¾HT ¹⁾	R1310	H410	¾ hard + hardened	2h / 325°C	1200-1520	1310-1590	≥ 2	410-500
HT ¹⁾	R1340	H420	hard + hardened	2h / 325°C	1240-1520	1340-1590	≥ 1	420-500

1) These tempers do not correspond exactly to those of the EN standard

Physical properties

Modulus of elasticity	KN/mm ²	125 - 131 (before and after hardening, respectively)
Poisson ratio		0.285
Density	kg/dm ³	8.25 - 8.36 (before and after hardening, respectively)
Melting point / Melting range	°C	875 - 985
Linear dilatation coefficient (20-300°C)	10 ⁻⁶ /°C	17
Thermal conductivity at 20°C	W/m °K	110
Electrical resistivity	μΩcm	11-9, 8-6 (before and after hardening, respectively)
Electrical conductivity	MS/m	9-11, 13-16 (before and after hardening, respectively)
Electrical conductivity	% IACS	15-19, 22-28 (before and after hardening, respectively)
Magnetic properties		Non magnetic (Slightly diamagnetic)
Permeability		μ = 1.0006

Typical uses

Spring contacts, diaphragms, bellows, electric and electronic contacts and connectors, switches, relays, bearings, resistance welding electrodes, various parts for the watch industry such as wheels, watch hands, balances, levers etc.



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Tolerances (strip and foil)

Thickness	Thickness (mm)		EN Standard		Lamineries MATTHEY SA		
	≥	<	10140 Precision	10258 Precision	LMSA Standard	LMSA Precision	LMSA Extrem
<p>The table shown is an outline of our typical thickness tolerances available. They are tighter than industry standards.</p> <p>Our "Precision" and "Extreme" tolerances are available upon request.</p>	0.025	0.025	-	-	-	-	± 0.001
	0.050	0.050	-	-	± 0.003	± 0.002	± 0.0015
	0.065	0.065	-	± 0.003	± 0.003	± 0.0025	± 0.002
	0.100	0.100	-	± 0.004	± 0.004	± 0.0035	± 0.003
	0.125	0.125	± 0.005	± 0.006	± 0.005	± 0.004	± 0.003
	0.150	0.150	± 0.005	± 0.006	± 0.005	± 0.005	± 0.004
	0.250	0.250	± 0.010	± 0.008	± 0.008	± 0.006	± 0.004
	0.300	0.300	± 0.010	± 0.009	± 0.009	± 0.007	± 0.005
	0.400	0.400	± 0.010	± 0.010	± 0.010	± 0.007	± 0.005
	0.500	0.500	± 0.015	± 0.012	± 0.012	± 0.008	± 0.006
	0.600	0.600	± 0.015	± 0.014	± 0.014	± 0.010	± 0.007
	0.800	0.800	± 0.015	± 0.015	± 0.015	± 0.010	± 0.007
	1.000	1.000	± 0.015	± 0.018	± 0.018	± 0.012	± 0.009
	1.200	1.200	± 0.020	± 0.020	± 0.020	± 0.015	± 0.012
1.25	1.25	± 0.020	± 0.020	± 0.020	± 0.015	± 0.012	
1.25	1.500	± 0.020	± 0.020	± 0.020	± 0.015	± 0.014	

Width

Our width tolerance is + 0.2 -0.0 mm (or ± 0.1 mm upon request). They are available for slit widths < 125 mm and thicknesses < 1.00 mm. Special tolerances upon request.

Camber

	Width (mm)		Camber max. (mm/m)			
	>	≤	LMSA standard		LMSA extrêmes	
			≤ 0.5 mm	> 0.5 mm	≤ 0.5 mm	> 0.5 mm
Our tolerance "standard" respects the EN Standard 1654 (Length of measurement 1000 mm).	3	6	12	-	6	-
Other tolerances upon request.	6	10	8	10	4	5
	10	20	4	6	2	3
	20	250	2	3	1	1.5

Surface

Special surface qualities upon request

Flatness

Special requirement on the longitudinal or transversal flatness upon request

Dimensional tolerances (rod and wire)

Diameter	Standard tolerances			Special tolerances
	≤ 3.0mm	h8	+ 0 / - 14 µm	
	> 3.0 and ≤ 6.0mm	h8	+ 0 / - 18 µm	Upon request, rod and wire can be delivered with tighter tolerances (h5, h6, h7) by means of additional drawing and/or grinding processes.
	> 10.0 and ≤ 10.5mm	h8	+ 0 / - 22 µm	
	> 10.5 and ≤ 18.0mm	h9	+ 0 / - 43 µm	
	> 18.0 and ≤ 30.0mm	h9	+ 0 / - 52 µm	
	Mill-hardened, non-ground bars are available with tolerances h9 for diameters ≤ 10.5 mm and h10 for the larger diameters.			
Out-of-roundness	Maximum equals half of the tolerance value of the diameter. Upon request rod and wire can be ordered with tighter out-of-roundness tolerances.			
Length	The standard length of rods is 3 m +/- 30mm. Rod can be ordered pointed and chamfered			