

Designation	CuBe2	DIN	EN	UNS (ASTM)	AISI	LMSA
		2.1247	CW101C	C17200	-	G200 / G250

Chemical composition

Cu*	Be	Co + Ni	Co + Ni + Fe	Pb
Balance	1.80 - 2.00	0.20 min.	0.60 max.	0.02 max.

Values (Weight %). In order to achieve maximum homogeneity and consistent quality, the actual manufacturing tolerances are tighter and more precisely than the composition indicated.
*Copper plus additions > 99.5%

Main technical properties and features

Alloy 25 is a copper-beryllium alloy containing 2% beryllium. After hardening, the alloy achieves the highest mechanical strength and hardness of all copper alloys in the market and is commonly used. This alloy presents an excellent bending properties in the "annealed" temper condition. It can be used for bar turning and machining processes, however with lower performance than the M25 containing lead alloy. After forming, and in the hardened condition this alloy can reach a mechanical strength up to 1400 N/mm². Alloy 25 is characterized by a high fatigue strength, an excellent thermal relaxation and a unique combination of high strength and high conductivity.

The Lamineries MATTHEY offers bars in the standard TD04 condition, and wires in various dimensions.

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.

Typical manufacturing range

		Dimensions
Drawn bar	Bars and wire ^[1]	upon request

^[1] Alloy 25 is generally suitable for applications requiring good machinability. For screw machined parts requiring improved machinability, we recommend the alloy M25 - CuBe2Pb.

Physical properties

Modulus of elasticity	kN/mm ²	125, 131 ^[1]
Poisson ratio		0.285
Density	g/cm ³	8.25, 8.36 ^[1]
Melting point / Melting range	°C	875 - 985
Linear dilatation coefficient	10 ⁻⁶ /°C	17 from 20 to 200°C
Thermal conductivity at 20°C	W/m °K	110
Electrical resistivity	μΩcm	9 - 11, 8 - 6 ^[1]
Electrical conductivity	MS/m	9 - 11, 13 - 16 ^[1]
Electrical conductivity	% IACS	15 - 19, 22 - 28 ^[1]
Magnetic properties		Nonmagnetic (slightly diamagnetic)
Permeability		μ = 1.0006

^[1] Values before and after hardening, respectively.

Mechanical properties of rods

Rods				Temper	Heat Treatment	Rp _{0.2} (N/mm ²)	R _m (N/mm ²)	A _{50mm} (%)	Hardness HV
A ^[1]	TB00	R410	annealed		-	130 - 250	410 - 590	20 min.	100 - 180
H ^[1]	TD04	R620	hard		-	510 - 815	620 - 900	8 min.	190 - 280

After age hardening (by the customer)

AT ^[1]	TF00	R1150	soft + hardened	3h at 325°C	1000 - 1210	1130 - 1380	3 min.	360 - 430
HT ^[1]	TH04	R1300	hard + hardened	2h at 325°C	1100 - 1380	1280 - 1550	2 min.	390 - 470

After hardening by Lamineries MATTHEY ^[2]

HT ^[2]			hard + hardened	Special	750 - 1400	900 - 1500	-	270 - 450
-------------------	--	--	-----------------	---------	------------	------------	---	-----------

^[1] These tempers do not correspond exactly to those of the EN 12164 standard but respect the ASTM B196M standard. The given mechanical properties are valid for diameters lower than 25.0 mm.

^[2] Upon request, Lamineries MATTHEY also delivers mill hardened rods. The requested mechanical properties can be specified individually (Δ HV min. 40, Δ R_m min. 150 N/mm²).

Mechanical properties of wires

Wires				Temper	Heat Treatment	Rp _{0.2} (N/mm ²)	R _m (N/mm ²)	A _{50mm} (%)	Hardness HV
A ^[1]	TB00	R400	annealed		-	130 - 210	400 - 450	30 min.	90 - 170
¼ H ^[1]	TD01	R620	¼ hard		-	510 - 730	620 - 800	3 min.	200 - 250
½ H ^[1]	TD02	R750	½ hard		-	620 - 870	750 - 940	2 min.	230 - 300
¾ H ^[1]	TD03	R890	¾ hard		-	790 - 1040	890 - 1070	2 min.	270 - 340
H ^[1]	TD04	R690	hard		-	890 - 1110	960 - 1140	1 min.	300 - 360

After age hardening (by the customer)

AT ^[1]	TF00		soft + hardened	3h at 325°C	990 - 1250	1100 - 1380	3 min.	340 - 430
¼ HT ^[1]	TH01		¼ hard + hardened	2h at 325°C	1130 - 1380	1200 - 1450	2 min.	370 - 460
½ HT ^[1]	TH02		½ hard + hardened	2h at 325°C	1170 - 1450	1270 - 1490	2 min.	390 - 470
¾ HT ^[1]	TH03		¾ hard + hardened	2h at 325°C	1200 - 1520	1310 - 1590	2 min.	410 - 500
HT ^[1]	TH04		hard + hardened	2h at 325°C	1240 - 1520	1340 - 1590	1 min.	420 - 500

^[1] These tempers do not correspond exactly to those of the EN 12166 standard, but respect the ASTM B197M standard. Values for diameters lower than 4mm.

The following tempers respect the ASTM B197M standard and can be delivered upon request. The wire diameters available from stock have one of the following specific tempers:

Wires				Temper	Heat Treatment	Rp _{0.2} (N/mm ²)	R _m (N/mm ²)	A _{50mm} (%)	Hardness HV
A ^[1]	R420	H090	annealed		-	140 min.	420 min.	35 min.	90 min.
½ H ^[1]	R650	H190	½ hard		-	400 min.	650 - 850	2 min.	190 - 300

Dimensional tolerances (rod and wire)

	Standard tolerances			Specific tolerances
Diameter	≤ 3.0mm	h8	+ 0 / - 14 μm	Upon request, rod and wire can be delivered with tighter tolerances (h5, h6, h7) by means of additional drawing and/or grinding processes.
	> 3.0 et ≤ 6.0mm	h8	+ 0 / - 18 μm	
	> 10.0 et ≤ 10.5mm	h8	+ 0 / - 22 μm	
	> 10.5 et ≤ 18.0mm	h9	+ 0 / - 43 μm	
	> 18.0 et ≤ 30.0mm	h9	+ 0 / - 52 μm	
	Mill-hardened, non-ground bars are available with tolerances h9.			
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 meters ± 30 cm.			
Chamfer	Standard rods with diameters larger than 2 mm are delivered pointed and chamfered.			
Straightness	Straightness of the delivered rods complies with the EN 12164 standard.			

The information in this document is informative only. Information provided does not constitute any contractual commitment or warranty of any kind.