

COPPER BERYLLIUM (M25)

Free machining Cu-Be alloy with addition of Pb

Main technical properties and features

The Alloy M25, CuBe2Pb, offers the strength properties of Alloy 25, CuBe2, with the added benefit of being "free machining". It achieves the highest strength and hardness available among all copper alloys after age hardening, and is consequently very widely used. Delivered in the form of rod and wire, M25 is mainly used for screw machined parts. A small addition of lead (0.2 to 0.6 %) greatly improves machinability by reducing chip length and increasing tool life. Best machinability is obtained in the cold worked temper (H or TD 04), which is the most commonly used temper. M25 is generally hardened after machining. It can be locally annealed to allow crimping after ageing and is easily plated. The M25 alloy is characterized by its high fatigue strength, its excellent thermal stress relaxation and by a unique combination of mechanical resistance and conductivity.

Typical uses

Thanks to its unique combination of high strength, electrical conductivity and low thermal stress relaxation, the alloy M25 is very frequently used for manufacturing machined male or female contacts in the electronics, aircraft and automotive industries. Another typical application is the production of turned parts for the watch industry.

Normes

Material number	CuBe2Pb
EN	EN 12164-12166
DIN	2.1248
UNS (ASTM)	C17300

Chemical composition

Cu*	Be	Co + Ni	Co + Ni + Fe	Pb
balance	1.80 - 2.00	≤ 0.20	≤ 0.60	0.20 - 0.60

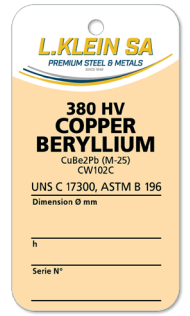
Values (Weight %). In order to achieve maximum homogeneity and consistent quality, the actual manufacturing tolerances are tighter and more precisely than the composition indicated. *Copper plus additions > 99.5%

Mechanical properties of rods

Rods	Temper	Heat Treatment	Rp _{0.2} [N/mm ²]	R _m [N/mm ²]	A _{50mm} [%]	Hardness HV
T004 R620	hard		510 - 815	620 - 900	8 min	190 - 280

After age hardening (by the customer)

Rods	Temper	Heat Treatment	Rp _{0.2} [N/mm ²]	R _m [N/mm ²]	A _{50mm} [%]	Hardness HV
TH04 R1300	hard + hardened	2h à 325°C	1100 - 1380	1280 - 1550	2 min	380 ±20



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Physical properties

Properties	Unit	
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 de 20 à 200 °C
Thermal conductivity at 20°C	W/m °K	110
Electrical resistivity	μΩcm	11 - 9, 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.

Dimensional tolerances (rod and wire)

	Standard tolerances			Specific tolerances
Diameter	≤ 3.0mm	h6	+ 0 / - 6 μm	Upon request, the rods can be delivered with tighter tolerances (h5 for ex.) by means of additional drawing and/or grinding processes.
	> 3.0 et ≤ 6.0mm	h6	+ 0 / - 8 μm	
	> 10.00 et ≤ 18.0mm	h6	+ 0 / - 11 μm	
	> 18.0 et ≤ 30.0mm	h6	+ 0 / - 13 μm	
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 2mm are delivered pointed and chamfered.			
Straightness	Straightness of the delivered rods complies with the EN 12164 standard.			