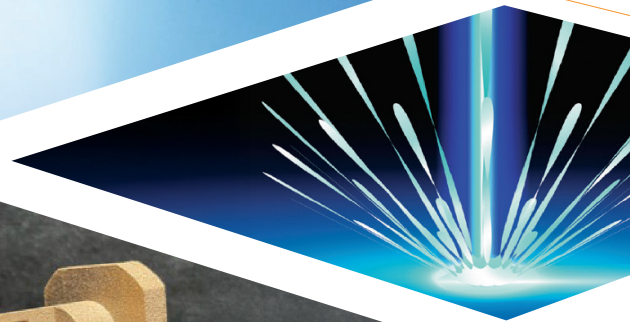




ADDITIVELY MANUFACTURED COMPONENTS MADE OF **AMPCOLOY[®] 89**

PRINT YOUR IDEAS



Material data sheet

ADDITIVELY MANUFACTURED COMPONENTS MADE OUT OF AMPCOLOY® 89

1. MATERIAL DESCRIPTION

AMPCOLOY® 89 is a thermally hardenable copper alloy. The material is characterized by high electrical and thermal conductivity in its hardened state, along with very good hardness and heat resistance.

2. DESIGNATIONS

Material designation:	AMPCOLOY® 89
Material designation, EN standards:	Similar to CuNi2Be
Material number, EN standards:	Similar to CW110C
Material number, former DIN standards:	Similar to 2.0850 (CuNi2Be)
Material number, UNS system (ASTM):	Similar to C17510

3. POWDER MATERIAL USED

Powder designation:	AMPCOLOY® 89
Batch purity/use condition:	2A (used powder of one batch)
Particle size, distribution in μm :	$d_{10}= 20\text{-}30$; $d_{50}= 35\text{-}45$; $d_{90}= 50\text{-}60$;
Measurement according to:	EN ISO 13320

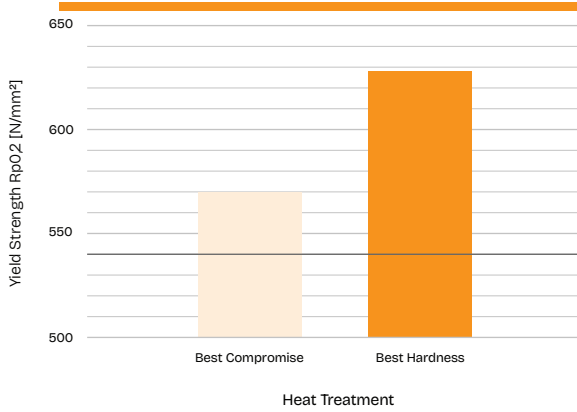
4. POST-PROCESSING PERFORMED

Separation process:	Sawing
Thermal post-treatment:	Solution annealing and precipitation hardening
Specimen preparation:	
Tensile specimen ($\theta = 0^\circ, \theta = 45^\circ, \theta = 90^\circ$):	Turning to B6 x 50 (DIN 50125)
Density cube:	Milling off the edge layer by 0,5mm
Hardness and conductivity samples:	Grinding of the test surface

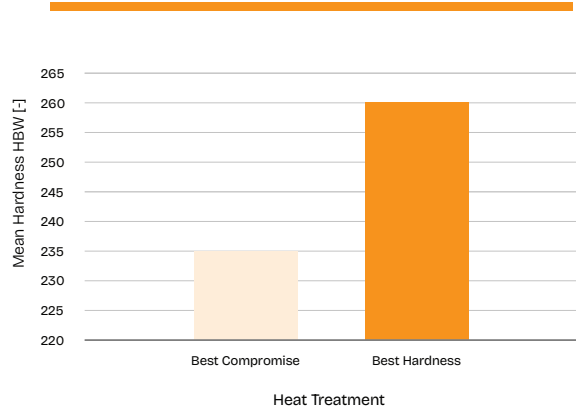
5. HEAT TREATMENT OPTIONS

WB 1 = Heat treatment	Best compromise
WB 2 = Heat treatment	Best hardness

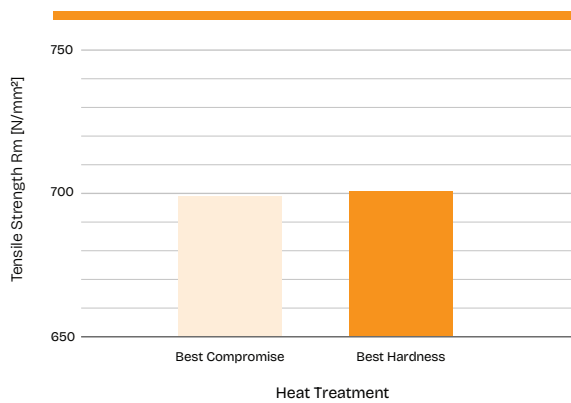
0,2 % Yield Strength Dependent On Heat Treatment



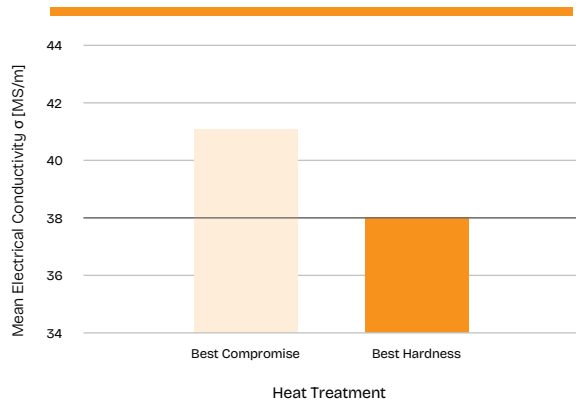
Hardness Dependent On Heat Treatment



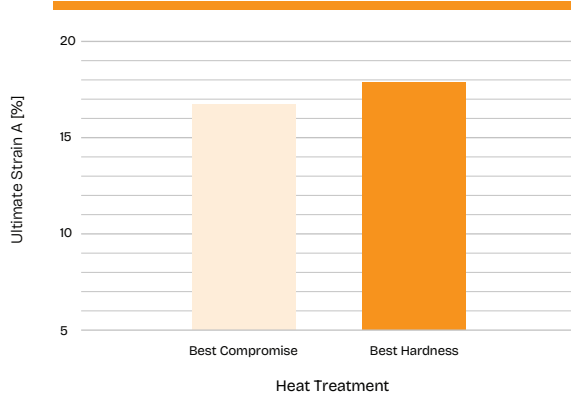
Tensile Strength Dependent On Heat Treatment



Electrical Conductivity Dependent On Heat Treatment



Ultimate Elongation Dependent On Heat Treatment



6. MATERIAL PROPERTIES

Chemical composition (percent by weight)

Cu	Ni	Be	Co	Fe	Others
Residual	1,4 – 2,4	0,2 – 0,6	≤ 0,3	≤ 0,2	≤ 0,5

Properties At 20°C, Heat Treated

Modulus of elasticity:	E	135 000 MPa
Coefficient of expansion ($\alpha_{(20^{\circ}\text{C} - 300^{\circ}\text{C})}$):	α	$17,2 \cdot 10^{-6} \cdot \text{K}^{-1}$
Softening temperature:	T_{Soft}	480 °C
Melting interval:	T_{Melt}	1000 - 1030 °C
Thermal conductivity:	λ	270 W/m · K
Specific weight, 8.85 g/cm ³	ρ_{ar}	≥ 99,5%

The results of the test series regarding the dependence on build direction and heat treatment are not yet fully available.

Criteria	Orientation/ Reference *	Coding **	WB 1		WB 2		WB 3		
			\bar{x}	S	\bar{x}	S	\bar{x}	S	
0,2% Yield Strength, MPa	$R_{p0,2}$	$\theta = 0^{\circ}$	-	-	-	-	-	-	
		$\theta = 45^{\circ}$	-	-	-	-	-	-	
		$\theta = 90^{\circ}$	1_1_5	570	3	628	1	-	-
Tensile Strength, MPa	R_m	$\theta = 0^{\circ}$	-	-	-	-	-	-	
		$\theta = 45^{\circ}$	-	-	-	-	-	-	
		$\theta = 90^{\circ}$	1_1_5	700	6	701	2	-	-
Elongation A_{50} %	A_{50}	$\theta = 0^{\circ}$	-	-	-	-	-	-	
		$\theta = 45^{\circ}$	-	-	-	-	-	-	
		$\theta = 90^{\circ}$	1_1_5	17	2	18	1	-	-
Hardness Brinell	HBW	2	1_1_3	235	3	260	0	-	-
Electr. Conductivity, MS/m ***	σ	2	1_1_3	41	0	38	0	-	-
Therm. Conductivity, W/(m K)****	λ	2	1_1_3	295	0	277	1	-	-
Spec. Weight, % (Archimedes)	ρ_{ar}	8,85 g/cm ³	1_2_5	$\bar{x} \geq 99,50 \%$					

* Reference: 1 = measuring direction in buildup direction, 2 = measuring direction at right angles to buildup direction

** Coding: x_y_z; x = number of used machines, y = number of build jobs per machine, z = number of samples for a distinct property

*** Measured with Fischer Sigmascope SMP10 @ 60 kHz

**** Calculated from electrical conductivity

For any further information – Contact us.

HEADQUARTERS

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