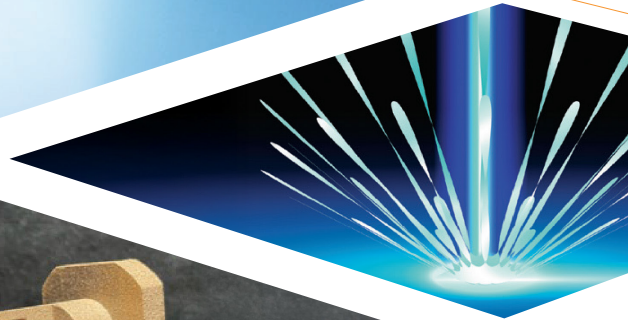




ADDITIVELY MANUFACTURED COMPONENTS MADE OF **AMPCOLOY[®] 972**

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Material data sheet

ADDITIVELY MANUFACTURED COMPONENTS MADE OUT OF AMPCOLOY® 972

1. MATERIAL DESCRIPTION

AMPCOLOY® 972 is a thermally precipitation hardenable copper alloy. The material is characterized by a particularly high electrical and thermal conductivity in the age-hardened state with still good hardness and good softening resistance.

2. DESIGNATIONS

Material designation:	AMPCOLOY® 972
Material designation, EN standards:	CuCr1Zr
Material number, EN standards:	CW106C
Material number, former DIN standards:	2.1293 (CuCrZr)
Material number, UNS system (ASTM):	C18400

3. POWDER MATERIAL USED

Powder designation:	AMPCOLOY® 972
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

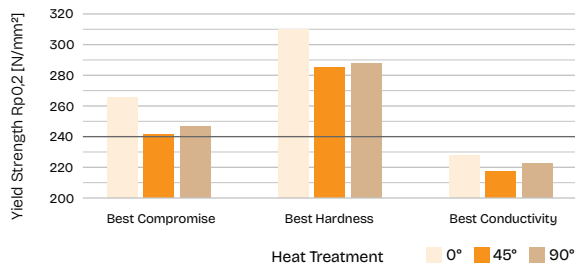
Separation process:	Sawing
Thermal post-treatment:	Solution annealing and precipitation hardening
Specimen preparation:	
Tensile specimen ($\theta = 0^\circ, \theta = 45^\circ, \theta = 90^\circ$):	Turning to B10 x 50 (DIN 50125)
Density cube:	Milling off the edge layer by 0,5mm
Hardness and conductivity samples:	Grinding of the test surface

5. HEAT TREATMENT OPTIONS

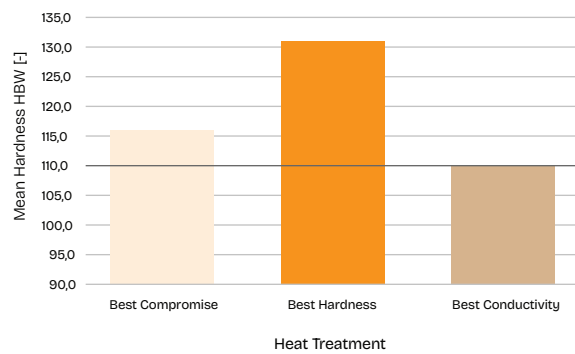
WB 1 = Heat treatment	Best compromise
WB 2 = Heat treatment	Best hardness
WB 3 = Heat treatment	Best electrical conductivity

Due to the only minor differences in terms of adjustable material properties, the standard “Best compromise” heat treatment is recommended.

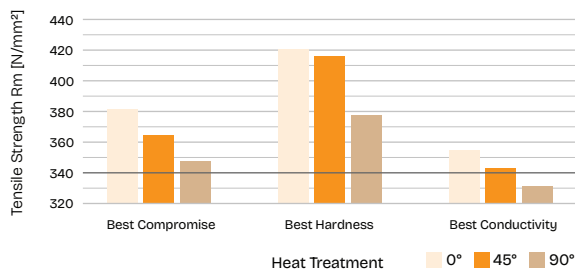
0,2 % Yield Strength Dependent On Orientation And Heat Treatment



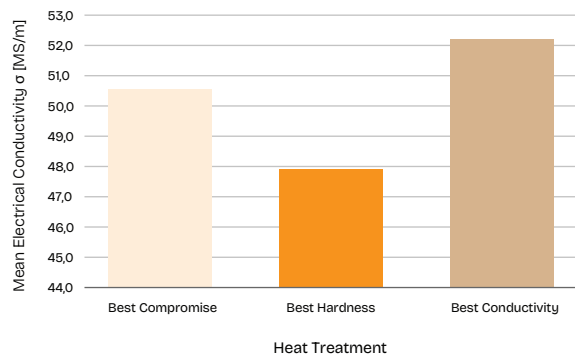
Hardness Of Standard Heat Treatments



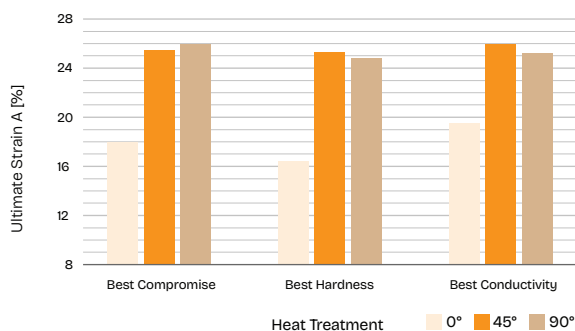
Tensile Strength Dependent On Orientation And Heat Treatment



Electrical Conductivity Of Standard Heat Treatments



Ultimate Elongation Dependent On Orientation And Heat Treatment



6. MATERIAL PROPERTIES

Chemical composition (percent by weight)

Cu	Cr	Zr	Fe	Si	Others
Residual	0,5 – 1,2	0,03 – 0,3	≤ 0,08	≤ 0,1	≤ 0,2

Properties At 20°C, Heat Treated

Modulus of elasticity:	E	125 000 MPa
Coefficient of expansion ($\alpha_{(20^{\circ}\text{C} - 300^{\circ}\text{C})}$):	α	$17,0 \cdot 10^{-6} \cdot \text{K}^{-1}$
Softening temperature:	T_{Soft}	500 °C
Melting interval:	T_{Melt}	1075 - 1085 °C

Criteria	Orientation/ Reference *	Coding **	WB 1		WB 2		WB 3		
			\bar{x}	S	\bar{x}	S	\bar{x}	S	
0,2% Yield Strength, MPa	$R_{p0,2}$	$\theta = 0^{\circ}$	1_1_3	266	4	310	4	229	1
		$\theta = 45^{\circ}$	1_1_3	242	3	285	3	218	2
		$\theta = 90^{\circ}$	1_1_3	246	5	288	2	223	1
Tensile Strength, MPa	R_m	$\theta = 0^{\circ}$	1_1_3	382	3	420	2	355	1
		$\theta = 45^{\circ}$	1_1_3	364	5	396	1	343	6
		$\theta = 90^{\circ}$	1_1_3	348	4	378	2	332	1
Elongation A_{50} %	A_{50}	$\theta = 0^{\circ}$	1_1_3	18	2	17	4	20	6
		$\theta = 45^{\circ}$	1_1_3	26	1	25	1	26	4
		$\theta = 90^{\circ}$	1_1_3	26	2	25	2	25	2
Hardness Brinell	HBW	2	1_1_3	116	2	131	0	110	5
Electr. Conductivity, MS/m ***	σ	2	1_1_3	51	0	48	0	52	0
Therm. Conductivity, W/(m K)****	λ	2	1_1_3	364	0	346	1	376	1
Spec. Weight, % (Archimedes)	ρ_{ar}	8,90 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.

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LOCATION

