Material data sheet

SCHMELZMETALL goes ADDITIVE

data sheet of additively manufactured components made of

HOVADUR® CCZ

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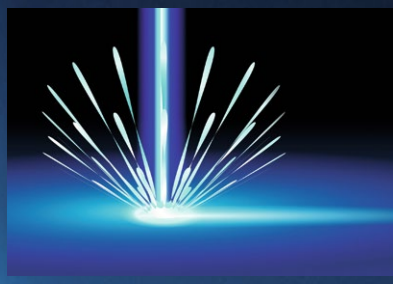

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HOVADUR® CCZ

1. Material Description

HOVADUR® CCZ 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 SCHMELZMETALL:	**Hovadur® CCZ**
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:	HOVADUR® CCZ
Batch purity/use condition:	2A (used powder of one batch)
Particle size distribution in µm:	d_{10} = 20-30; d_{50} = 35-45; d_{90} = 50-60
Measuring according to:	EN ISO 13320

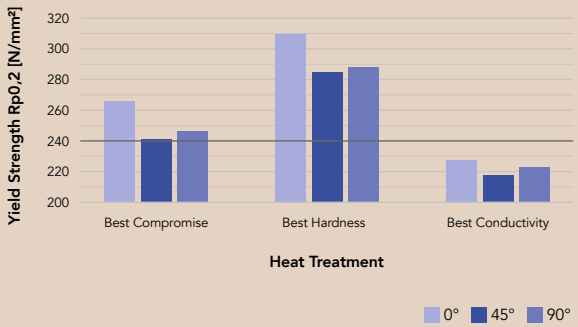
4. Post-Processing Performed

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

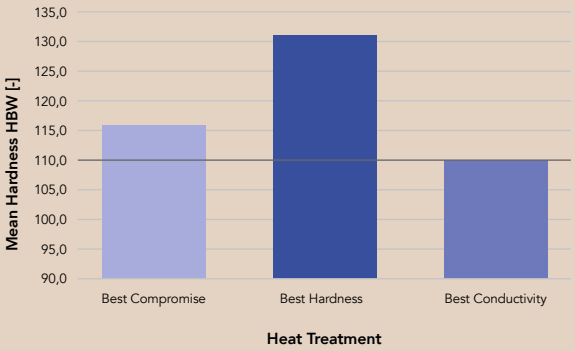
5. Heat Treatment Options

WB 1 = Heat Treatment „Best Compromise“
WB 2 = Heat Treatment „Best Hardness“
WB 3 = Heat Treatment „Best Electrical Conductivity“

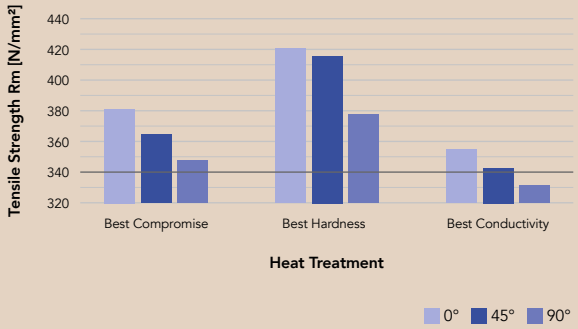
0,2 % Yield Strength Dependent On Orientation And Heat Treatment



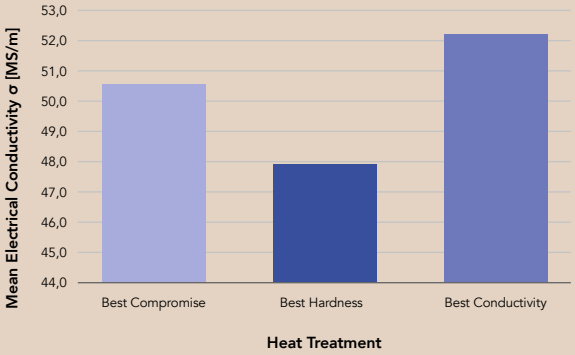
Hardness Of Standard Heat Treatments



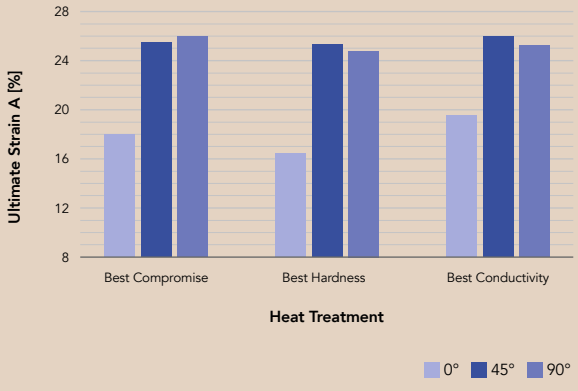
Tensile Strength Dependent On Orientation And Heat Treatment



Electrical Conductivity Of Standard Heat Treatments



Ultimate Elongation Dependent On Orientation And Heat Treatment



6. Material Properties

6.1 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

6.2 Properties At 20°C, Heat Treated

Modulus of elasticity:	E	=	125 000	MPa
Coefficient of expansion ($\bar{x}_{(20°C - 300°C)}$):	α	=	17,0	$\cdot 10^{-6} \cdot K^{-1}$
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	$R_{p0,2}$	θ = 0°	1_1_3	266	4	310	4	229	1
		θ = 45°	1_1_3	242	3	285	3	218	2
		θ = 90°	1_1_3	246	5	288	2	223	1
Tensile Strength, MPa	R_m	θ = 0°	1_1_3	382	3	420	2	355	1
		θ = 45°	1_1_3	364	5	396	1	343	6
		θ = 90°	1_1_3	348	4	378	2	332	1
Elongation A_{50} %	A_{50}	θ = 0°	1_1_3	18	2	17	4	20	6
		θ = 45°	1_1_3	26	1	25	1	26	4
		θ = 90°	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/cm³	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