SCHMELZMETALL goes ADDITIVE

data sheet of additively manufactured components made of

HOVADUR® CCZ

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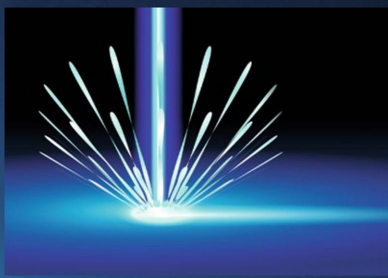

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Material data sheet

of additively manufactured components made of 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

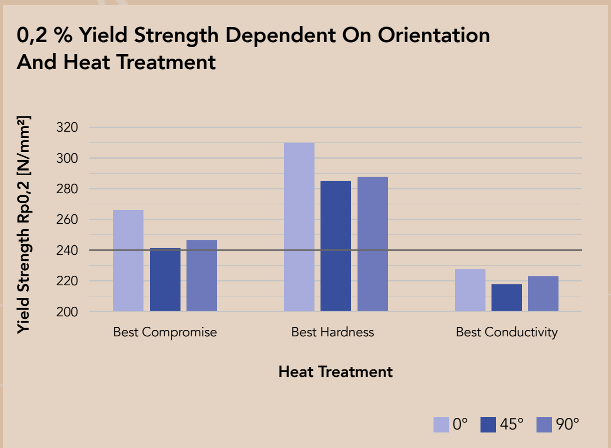
Powder designation:	HOVADUR® CCZ
Batch purity/use condition:	2A (used powder of one batch)
Particle size distribution in µm:	d_{10} = 20-30; d_{50} = 35-45; d_{90} = 50-60
Measuring according to:	EN ISO 13320

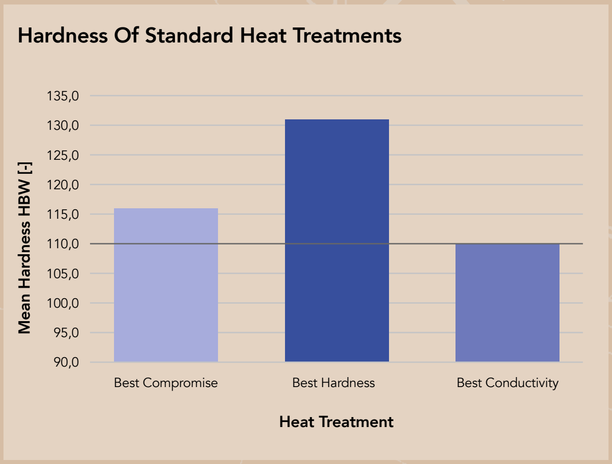
4. Post-Processing Performed

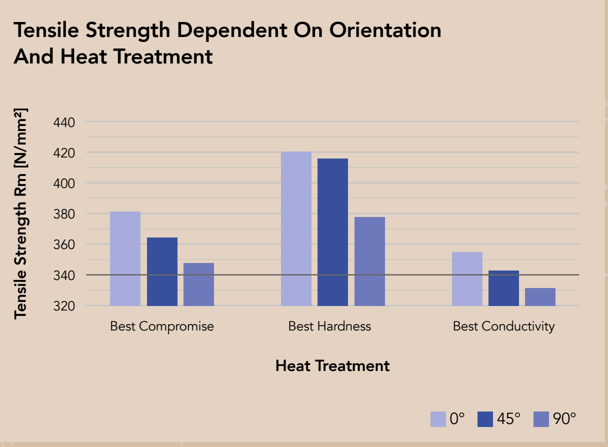
Separation process:	Sawing
Thermal post-treatment:	Solution annealing and precipitation hardening
Specimen preparation:	
Tensile specimen (θ = 0°; θ = 45°; θ = 90°)	Turning to B10 x 50 (DIN 50125)
Density cube	Milling off the edge layer by 0,5 mm
Hardness and conductivity sample	Grinding of the test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

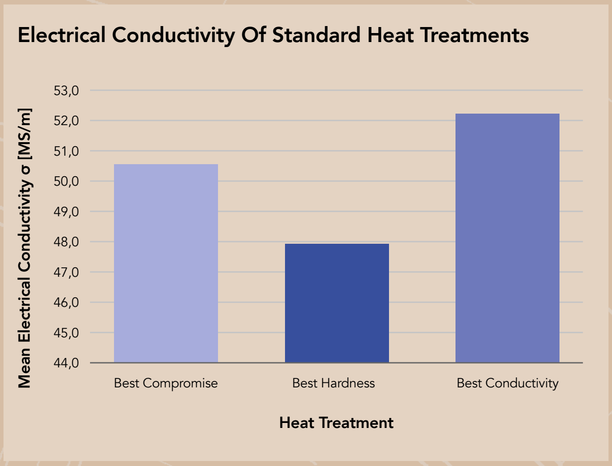
5. Heat Treatment Options

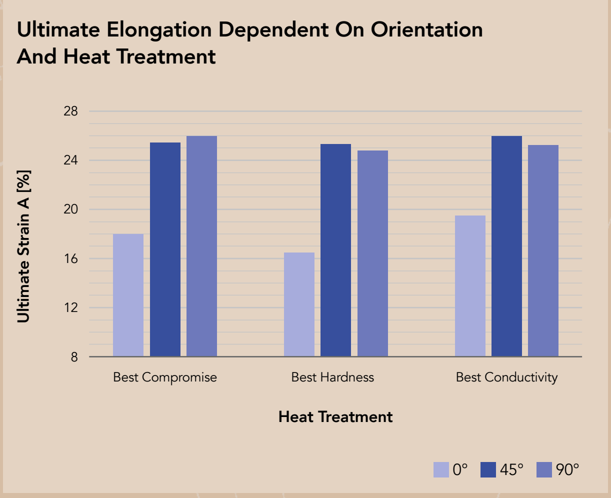
WB 1 = Heat Treatment „Best Compromise“
WB 2 = Heat Treatment „Best Hardness“
WB 3 = Heat Treatment „Best Electrical Conductivity“











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