

Material data sheet

Issue No. 02EN

2006-04-01

HOVADUR® CCZ

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Cold formed bars (hardened)

Material designation SCHMELZMETALL	HOVADUR® CCZ
Material designation, EN standard	CuCr1Zr
Material No., EN standard	CW106C
Material No., former DIN standard	2.1293 (CuCrZr)
Material No., UNS system (ASTM)	C18400
Classification RWMA (USA)	Class 2

Information about standards

EN	EN12163 (Round bars), EN12167 (Flat bars, profiles), EN12420 (Forged products)
DIN (former)	(DIN17666/DIN17672/DIN17673/DIN17678)
ASTM	–

Description of material

HOVADUR® CCZ is a thermally precipitation hardenable copper alloy. In heat treated condition, the alloy is characterized by especially high electrical and thermal conductivity with sufficient hardness and good resistance to softening.

Material properties

Chemical composition in % of weight (guaranteed ranges)

Cr	Zr	Fe	Si	others total	Cu
0.5–1.2	0.03–0.3	max. 0.08	0.1	max. 0.2	Remainder

Agreed properties at 20 °C (Condition: hardened)

Round bars, diameter (mm)	13 to 25	> 25 to 39	> 39 to 50	–	> 50 to 70	–
Hexagonal bars, size (mm)	–	–	–	10 to 25	> 25 to 50	–
Square bars, size (mm)	–	–	–	10 to 25	> 25 to 60	–
Flat bars, thickness (mm)	–	–	–	–	up to 20	> 20

Hardness Brinell HB	min. 150 *)	min. 150 *)	min. 140 *)	min. 135 *)	min. 135 *)	min. 125 *)
Electrical conductivity	min. 44 MS/m (min. 75.8% IACS)					

*) In case of different opinions, hardness is calculated as the average of 3 randomly located measurements (section).

Associated properties at 20 °C (Condition: hardened) +)

Tensile strength N/mm ²	min. 470	min. 450	min. 430	min. 440	min. 420 ¹⁾	min. 400
0.2% yield strength N/mm ²	min. 380	min. 360	min. 350	min. 350	min. 350 ²⁾	min. 310
Elongation (A5) %	min. 8	min. 10	min. 10	min. 10	min. 12 ³⁾	min. 10

1) Round bars: min. 400 N/mm² / square bars, size > 50 to 60 mm: min. 400 N/mm²

2) Round bars: min. 310 N/mm² / hexagonal bars: min. 330 N/mm² / square bars, size > 25 to 50 mm: min. 330 N/mm², size > 50 to 60 mm: min. 310 N/mm²

3) Flat bars: min. 8 % / profile bars: min. 8 %

+) Strength values will only be proved if ordered by the customer.

Material information (nominal values)

Elastic modulus	N/mm ² (MPa)	125,000	
Softening temperature	°C	500	
Specific weight	g/cm ³	8.9	
Thermal conductivity	W/mK	310–340	(Average 20 °C–300 °C)
Thermal expansion coefficient	x 10 ⁻⁶ /°K	17.0	(Average 20 °C–300 °C)
Melting interval	°C	1075–1085	

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Processing instructions

Hot forming

HOVADUR® CCZ is very well suitable for hot forming at temperatures of about 950–700 °C. After forming, quick cooling in water is recommended.

Advice: After a hot forming executed by the customer, the properties of HOVADUR® CCZ bars according to page 1 will normally no longer be achieved.

Cold forming

HOVADUR® CCZ in hardened condition is suitable for cold forming only to a limited extent. Round bars can be cold bended without problems. Other types of bars are not intended for cold forming.

In case, a more important cold forming has to be executed, HOVADUR® CCZ in solution heat treated condition has to be used. After forming, as a rule, the part has to be heat treated.

Heat treatment

A heat treatment changes the agreed properties. If a heat treatment is executed after supply of the material, we cannot guarantee any properties.

Advice for heat treatments (they always depend to a large degree on the kind and the function of the furnace)

Solution heat treatment: 950–990 °C, about 30 minutes followed by quenching in water

Hardening: 450–500 °C, 2–5 h followed by cooling at the air

Machining

HOVADUR® CCZ is very suitable for machining. We recommend hard metal cutting tools with positive cutting geometry. For drilling, attention must be paid to good removal of chips. Cooling with emulsion is recommended. **In case of dry machining, this has to be done with strong suction. Outgoing air has to be cleaned by a particle filter.**

Thread moulding is possible to a limited extent. Bigger inside threads should be executed by circular thread milling.

Joining

HOVADUR® CCZ is suitable for soft as well as hard soldering. Concerning hard soldering (even at limited time of effect of the temperature), a loss in hardness in the area of heating is to be expected. A very low melting silver brazing should be used and the brazing process itself should be as short as possible. HOVADUR® CCZ is suited for welding. **Attention must be paid to sufficient extraction and filtering of welding fume.**

Application examples

Electrodes, holders, shafts for spot and seam welding of mainly plain steel. Clamping jaws, inserts for butt welding. Live parts for electrical engineering.

Details of the properties or application of materials are for descriptive purposes only. Confirmation of suitability with regard to specific properties or application require written agreement.