Material data sheet HOVADUR® CCNB

Material designation SCHMELZMETALL	**HOVADUR® CCNB**
Material designation, EN standard	CuCo1Ni1Be
Material No., EN standard	CW103C
Material No., former DIN standard	None. Comparable to 2.1285 (CuCo2Be)
Material No., UNS system (ASTM)	None. Comparable to C17500 (CuCo2Be)
Classification RWMA (USA)	Class 3

Information about standards

EN	**EN12163** (Round bars), **EN12167** (Flat bars, profiles), **EN12420** (Forged products)
DIN (former)	(DIN17666/DIN17672)
ASTM	(B441. B534)

Description of material

HOVADUR® CCNB is a thermally precipitation hardenable copper alloy. In heat treated condition, the alloy combines high hardness and high resistance to heat with good electrical and thermal conductivity.
The technological properties are improved by replacing part of the cobalt according to former DIN standard CuCo2Be (2.1285) by nickel.
We also produce the alloy HOVADUR® CCNB eh, which is based on the same chemical composition as HOVADUR® CCNB. Its even higher quality is due to vacuum technology and special processes.

Safety data sheet SCHMELZMETALL No. 07.02E (Issue 30.07.2002)

Material properties

Chemical composition in % of weight (guaranteed ranges)

Co	Ni	Be	Fe	Si	others total	Cu
0.8–1.3	0.8–1.3	0.4–0.7	max. 0.2	max. 0.2	0.5	Remainder

Agreed properties at 20 °C (Condition: hardened, solution heat treated respectively)

Condition		hardened	solution heat treated
Hardness Brinell HB		min. 220 *)	max. 110 *)
Electrical conductivity	MS/m	min. 25	max. 13
Electrical conductivity	% IACS	min. 43.0	max. 22.5

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

Associated properties at 20 °C (Condition: hardened, solution heat treated respectively)

Condition			hardened	solution heat treated
Tensile strength	1)	N/mm² (MPa)	min. 680	max. 500
0.2% yield strength	1)	N/mm² (MPa)	min. 550	max. 400
Elongation (A5)	1)	%	min. 8	min. 25

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

Material information (nominal values)

Elastic modulus	N/mm² (MPa)	135,000	
Softening temperature	°C	480	
Specific weight	g/cm³	8.85	
Thermal conductivity	W/mK	230–250	**(Average 20 °C–300 °C)**
Thermal expansion coefficient	x 10⁻⁶/°K	17.2	**(Average 20 °C–300 °C)**
Melting interval	°C	1000–1030	

Processing instructions

Hot forming
HOVADUR® CCNB is suitable for hot forming at temperatures of about 900–700 °C. After forming, quick cooling in water is recommended.
Advice: After a hot forming executed by the customer, the properties of HOVADUR® CCNB will normally no longer be achieved.

Cold forming
HOVADUR® CCNB in hardened condition is not intended for cold forming. In case, a cold forming has to be executed, HOVADUR® CCNB 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: 920–970 °C, about 30 minutes followed by quenching in water
Hardening: 460–520 °C, 2–5 h followed by cooling at the air

Machining
HOVADUR® CCNB 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® CCNB 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. HOVADUR® CCNB is suited for welding. **Attention must be paid to sufficient extraction and filtering of welding fume.**

Application examples

Electrodes, holders, shafts for spot, seam, butt and projection welding of (preferably) materials of higher strength and greater electrical resistance (e.g. stainless and heat-resistant steels), welded wire mesh.
Moulds for non-ferrous metal casting, inserts in steel moulds at spots requiring a faster cooling speed.
Die casting pistons for horizontal cold chamber casting machines for light metal casting.
Thermally highly strained parts susceptible to fire cracks.