Material data sheet HOVADUR® CNCS

Material designation SCHMELZMETALL	**HOVADUR® CNCS**
Material designation, EN standard	not standardized (similar to CuNi2Si/CuNi3Si)
Material No., EN standard	not standardized (similar to CW111C/CW112C)
Material No., former DIN standard	not standardized (similar to 2.0855/2.0857)
Material No., UNS system (ASTM)	C18000

Information about standards

EN	not standardized
DIN (former)	(DIN17666/DIN17672, for similar alloys CuNi2Si/CuNi3Si)
ASTM	not standardized

Description of material

HOVADUR® CNCS is a thermally precipitation hardenable copper-nickel-silicium alloy with addition of chromium. The material shows high electrical and thermal conductivity as well as great hardness and strength. These properties are combined with good resistance to corrosion and abrasion. Furthermore, the alloy is excellent for cold and hot forming. HOVADUR® CNCS is applied in many cases which require a Be-free alloy.

Material properties

Chemical composition in % of weight (guaranteed ranges)

Ni	Si	Cr	Fe	Mn	Pb	others total	Cu
2.0–3.0	0.5–0.8	0.2–0.5	max. 0.15	max. 0.1	max. 0.02	max. 0.1	Remainder

Agreed properties at 20 °C (Condition: hardened)

Hardness Brinell HB		**min. 190 *)**	
Electrical conductivity	**MS/m**	**min. 22**	**(min. 38% IACS)**

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

Associated properties at 20 °C (Condition: hardened)

Tensile strength	1)	N/mm² (MPa)	min. 650
0.2% yield strength	1)	N/mm² (MPa)	min. 500
Elongation (A5)	1)	%	min. 10

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

Material information (nominal values)

Elastic modulus	N/mm² (MPa)	140,000	
Softening temperature	°C	480	
Specific weight	g/cm³	8.84	
Thermal conductivity	W/mK	220 (190–240)	**(Average 20 °C–300 °C)**
Thermal expansion coefficient	x 10^{-6}/°K	16.2	**(Average 20 °C–300 °C)**
Melting interval	°C	1060–1085	

Processing instructions

Hot forming
HOVADUR® CNCS is very well 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® CNCS will normally no longer be achieved.

Cold forming
HOVADUR® CNCS in hardened condition is not intended for cold forming, at least only to a very limited extent. In case, a cold forming has to be executed, HOVADUR® CNCS 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 by SCHMELZMETALL, 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: 910–970 °C, about 30 minutes followed by quenching in water
Hardening: 460–500 °C, 2–5 h followed by cooling at the air

Machining
HOVADUR® CNCS is well suitable for machining. We recommend standard hard metal tools and cooling with emulsion.
HOVADUR® CNCS is suited for eroding. But due to its relatively high electrical conductivity, conditions are more difficult.
No special measures are necessary for grinding and polishing. Surface may be coated according to all usual procedures.

Joining
HOVADUR® CNCS is suited for soldering. Concerning hard soldering, a loss in hardness is to be expected. A very low melting silver brazing should be used.
HOVADUR® CNCS is very well suited for joining by welding. Build-up welding by MIG/MAG arc welding as well as TIG welding is very suitable, too.

Application examples

Die casting pistons in cold chamber die casting machines, cooling inserts in moulds, moulds for non-ferrous metal casting (e. g. low pressure casting).
Hot-pressed parts for electrical engineering, fittings, braces and fixing elements for high strain, especially for aerial wire and marine applications.

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.