Material data sheet

HOVADUR® CCNB

Issue No. 02EN 2006-04-01

Material designation SCHMELZMETALL
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

Material properties

Chemical composition in % of weight (guaranteed ranges)

<table>
<thead>
<tr>
<th></th>
<th>Co</th>
<th>Ni</th>
<th>Be</th>
<th>Fe</th>
<th>Si</th>
<th>others</th>
<th>total</th>
<th>Cu</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.8–1.3</td>
<td>0.8–1.3</td>
<td>0.4–0.7</td>
<td>max. 0.2</td>
<td>max. 0.2</td>
<td>0.5</td>
<td>Remainder</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Condition</th>
<th>Hardness Brinell HB</th>
<th>Electrical conductivity MS/m</th>
<th>Electrical conductivity % IACS</th>
</tr>
</thead>
<tbody>
<tr>
<td>hardened</td>
<td>min. 220 *)</td>
<td>min. 25</td>
<td>max. 13</td>
</tr>
<tr>
<td>solution heat treated</td>
<td>max. 110 *)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Condition</th>
<th>Tensile strength (1) N/mm² (MPa)</th>
<th>0.2% yield strength (1) N/mm² (MPa)</th>
<th>Elongation (AS) (1) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>hardened</td>
<td>min. 680</td>
<td>min. 550</td>
<td>min. 8</td>
</tr>
<tr>
<td>solution heat treated</td>
<td>max. 500</td>
<td>max. 400</td>
<td>min. 25</td>
</tr>
</tbody>
</table>

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

Material information (nominal values)

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elastic modulus</td>
<td>135,000</td>
</tr>
<tr>
<td>Softening temperature</td>
<td>°C</td>
</tr>
<tr>
<td>Specific weight</td>
<td>g/cm³</td>
</tr>
<tr>
<td>Thermal conductivity</td>
<td>W/mK</td>
</tr>
<tr>
<td>Thermal expansion coefficient</td>
<td>x 10⁻⁶/K</td>
</tr>
<tr>
<td>Melting interval</td>
<td>°C</td>
</tr>
</tbody>
</table>
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.