

WIRBALIT® CA11 - High-performance sintering material

Aluminium dispersion-strengthened copper

Chemical composition: 1,1 wt.% Al₂O₃ - rest Cu

WIRBALIT® CA11 consists of pure copper with ultra-fine aluminium oxide particles (10nm), which are homogeneously distributed in a copper matrix. The alumina is separated by an internal oxidation process, as a result of a reaction of oxygen and aluminium in a solid copper grid structure.

The resulting Al₂O₃ shows high hardness and high thermal stability. The Al₂O₃ particles are not soluble in copper and do not tend to grow or diffuse at higher temperatures. The copper structure is reinforced by the Al₂O₃ particles, (almost) without affecting the electrical and thermal conductivity negatively.

Compared with other copper alloys, this material is characterised by a high hardness and tensile strength, even at increased temperatures. This is sustainably ensured by a specially developed production process.

Through the Al₂O₃ particles in the copper structure a recrystallisation of the copper structure is prevented up to close to the melting point of copper.

In welding technology, no tendency of the material to alloyage can be observed in coated sheets.

Due to its high temperature resistance, Wirbalit® CA11 represents an alternative for the substitution of Beryllium material in many applications.

Material properties WIRBALIT® CA11			
Physical properties		Mechanical properties	
Density	8,81 c/cm ³ at 20 °C	Hardness	160 HB
Melting point	1.083 °C	Tensile strength R _m	540 MPa
Electrical conductivity	≥80% IACS, ≥44,8MS/m	Yield strength R _a	510 MPa
Therm. conductivity	320 W/mK at 20 °C	Elongation A ₅	20%
Electrical resistance	2,15 μΩcm at 20 °C		
E-Module	125 GPa		

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Properties in short

- high electrical and thermal conductivity
- Recrystallisation and thermal softening only near the melting point (1083°C)
- High tensile and yield strength at room temperature
- High strength at increased temperatures
- High stress cracking resistance at increased temperatures
- No tendency to alloyance during resistance welding
- Resistance to deterioration of properties due to exposure to radiation

Availability:

Round bars in mm \varnothing 10 to \varnothing 20 – length 3m
Square profiles up to max. 18x18mm
Other dimensions available upon request

Processing information:

Metal machining:
Metal cutting – carbide tools with chip breaker
Cutting speed $v_c = 70\text{--}90$ m/min
Feed $f = 0.07\text{--}0.15$ mm/rev

Cold forming:

Degrees of deformation within the yield/strain limits
Higher overall forming rates should be divided into several forming steps

