

Wieland-K54

~ CuNi2SiCr | High copper alloy

Material designation

| | |
|-----|--------------------------------------|
| EN | not standardised not standardised |
| UNS | C81540 |

Chemical composition*

| | |
|----|-------|
| Cu | Rest |
| Ni | 2 % |
| Si | 0,6 % |
| Cr | 0,4 % |

*Reference values in % by weight

Physical properties*

| | | |
|------------------------------|---------------------|----------------|
| Electrical conductivity | MS/m %IACS | >17** >29** |
| Thermal conductivity | W/(m·K) | 160 |
| Thermal expansion (0–300 °C) | 10 ⁻⁶ /K | 16 |
| Density | g/cm ³ | 8,8 |
| Modulus of elasticity | GPa | 140 |

* Reference values at room temperature

** Guide value, highly dependent on aging condition.

Corrosion resistance

Pure copper and low-alloyed copper generally have good corrosion resistance to organic and alkaline substances due to their noble character. Oxidizing acids and moist sulphur compounds can attack Cu-Ni-Si alloys. In the hardened state, Cu-Ni-Si alloys are considered almost insensitive to stress corrosion cracking.

Material properties and typical applications

Wieland-K54 is a precipitation hardenable alloy and can be adapted to the application in its delivery condition. The alloy has a good deformation capacity and can be processed by hot forging and cold forming.

Depending on the adjusted microstructure condition, the components can be age-hardened.

Typical applications are wear-resistant contact elements in electrical engineering. Bearing and guide bushes, guide rails and sliding elements, also in areas subject to elevated temperatures. Highly stressed connecting elements with special requirements for corrosion and weather resistance.

Compared to CW111C, the addition of chromium increases the strength and resistance.

Types of delivery

The Extruded and Drawn Products Division supplies bars, wire, sections and tubes. Please get in touch with your contact person regarding the available delivery forms, dimensions and tempers.

Fabrication properties

Forming

| | |
|--------------------------------|-----------------------------|
| Machinability | 30 % (CuZn39Pb3 = 100 %) |
| Capacity for being cold worked | good |
| Capacity for being hot worked | good |

Surface treatment

| | |
|----------------|------|
| Polishing | |
| mechanical | good |
| electrolytic | fair |
| Electroplating | good |

Joining

| | |
|--------------------------------|-------|
| Resistance welding (butt weld) | good* |
| Inert gas shielded arc welding | fair* |
| Gas welding | poor* |
| Hard soldering | fair* |
| Soft soldering | good |

* high temperatures can alter material properties

Heat treatment

| | |
|-------------------------|--------------|
| Melting range | 1040–1060 °C |
| Hot working | 800–900 °C |
| Soft/solution annealing | >850 °C |
| Age hardening | 400–525 °C |

Product standards

| | |
|----------------------------|----------------------|
| not standardised, based on | |
| Rod | EN 12163 EN 12165 |
| Section | EN 12167 |
| Tube | EN 12449 |

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