

Material Data sheet

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Cold-rolled copper foils and copper strips W.-Nr. 2.0070**1. Application examples**

The alloy 2.0070 (SE-Kupfer) is superior to the commonly used copper grades E-Cu (UNS C11000) and SF-Cu (UNS C12200) with a minimum copper content of 99.95% and low oxygen and phosphorus content.

This material is used in general electrical engineering such as cable ties and connectors, transformer coils, semiconductor carriers and stamped and bent parts (e.g. for seals).

Further application examples:

Heat dissipation plates and heat exchangers as well as vacuum technology.

The material is **not** approved as a spring material. Brass or bronze should be used for springs, and copper-beryllium for very high spring forces.

If there are high demands on purity, the material 2.00 = OFE copper with a copper content of at least 99.99% should be used.

2. Material codes

German Norm: 2.0070 SE-Kupfer58

UNS: C10300

English Norm: CW020A

English Norm: CU-PHC

French Norm:

Japanese Norm: -

3. Alloy Composition *

Pb: ca. 4ppm

Bi: < 1ppm

As: ca. 3ppm

Sb: ca. 3ppm

Sn: < 1ppm

Zn: <3ppm

Fe: ca. 8ppm

Ni: ca. 8ppm

Ag: ca. 10ppm

Se: ca. 1ppm

Te: <1ppm

S: ca. 8ppm

P: ca. 30ppm

4. Delivery condition

Condition: cold rolled, not hardenable
Surface: no data available
Ultimate tensile strength: >360 N/mm² (at thickness 0,50mm only >300N/mm²)

Further mechanical data: see chapter 7 and 8.

5. Sizes

thicknesses: 0,01 to 0,50mm
Raw material width: 305mm
standard widths: 150 und 305mm
edges: cut
Lengths: individual lengths from 5 to 10 000mm or as Coil

The following maximum widths are available from stock:

<i>thickness</i>	<i>widths</i>	<i>Annotation</i>
0,005	ca. 100	
0,01	150 + 305mm	
0,02	150 + 305mm	
0,035	150mm	
0,05	150 + 305mm	
0,06	ca. 300mm	
0,10	150 + 305mm	
0,15	150 + 305mm	
0,20	150 + 305mm	
0,25	150 + 305mm	
0,30	150 + 305mm	
0,40	150 + 305mm	
0,50	150 + 305mm	currently only ultimate tensile strength>300N/mm ² available

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6. Tolerances

thickness tolerance: +/- 10%
width tolerance: -0/+0,40mm
straightness: normal
flatness: wave height max. 1,0mm

7. Further mechanical data

Yield strength Rp0,2 : usually > 320 N/mm²
Dehnung A 50: no information possible
Hardness: > 110 HV

If good tumbling is done, the following values can be achieved:

Reversed bending stress (Mean stress = 0):

The maximum value is approx. 30% of the tensile strength for temper rolled copper if bending direction is at a 90° angle to the rolling direction

Fluctuating bending stress (Minimum stress = 0):

no data available, but the maximum value is lower than for the reversed bending stress.

As the fatigue strength depends on different factors like the corrosive conditions and the edge treatment, no definitive endurance limit values can be guaranteed.

We suggest the use of brass for springs instead of copper.

At high forces or bending not in the right angle to the rolling direction the alloy CuBe2 is recommended (or hardened steels like 1.1274 or 1.4031Mo).

The highest application temperature is around 120° Celsius, depending on the load.

Please note that Young's modulus values drop as temperature increases.

8. Physical properties

Density: 8,94 g/cm³
Thermal conductivity: 390 W/(m°C) depending on the temperature
Heat capacity: 0,385 J/(kg°C) medium value at 50 – 100°C
Thermal expansion: 17,7 x 10⁻⁶ (between 0 - 300°C)
Electric resistance: 58 mS/m (equivalent to 99% IACS) in the temper rolled condition

Modus of elasticity: 127 000 MPa at 20°C

Relative permeability μ_r : 1,000 non magnetizable (please see chapter 13 for more details)

9. Blanking

We recommend a punch-to-die clearance of 4-10% of the strip thickness.

The corner radius should be at least 0.25mm and the punching die should be at least twice the strip thickness.

10. Laser cutting

This alloy can be laser cut by solid state lasers.

Due to the high thermal conductivity of copper the laser cutting is difficult.

11. Photo etching

This alloy is very easy to etch.

12. Bending

Copper can be bended in the soft condition without any limitations. However, in the temper rolled condition supplied by h+s a minimum bending radius of 1 x strip thickness should be used.

13. Flat grinding

Copper is not magnetic and can not be hold by magnetic clamping devices of flat grinding machines.

14. Welding and soldering

Copper is suitable for gas shielded welding and medium suitable for laser welding.

Electric resistance welding should be avoided.

Hard and soft soldering of copper can be done easily.

15. Corrosion resistance

Copper has a good resistance against normal industrial atmosphere (creation of dull or green protective layer), water (maximum flow velocity 1.5-2 m/s), pure water steam, non oxidising acids, alkali (except ammoniac alkali and cyanide containing chemical

compounds) and neutral saline solutions.

Not resistant against: oxidising acids, humid ammoniac and halogenated gases, hydrogen sulphide and seawater (especially at high flow velocity).

Important Annotation

The specifications which are given in this technical information sheet about the condition and application of the alloys are only for reference and are no confirmation about certain performances and characteristics.

The information correspond to our own experiences and experiences of our suppliers.

We can not guarantee for the results during processing and utilisation.