

Material Data sheet

Issue: July 2023

Cold-rolled bronze foils and bronze strips W.-Nr. 2.1020 CuSn6**1. Application examples**

The bronze alloy CuSn6 with about 6% tin content is the most commonly used type of bronze.

Typical application examples are connectors, contact pins and general stamped and bent parts as well as springs where good electrical conductivity is important. In contrast to brass, bronze can also be used in vacuum technology.

The material is approved as a spring material (cf. DIN 1654).

Copper beryllium should be used if there are high demands on the mechanical load or on the electrical conductivity.

2. Material codes

German Norm:	2.1020
EN:	CuSn6
UNS:	C 51900
AFNOR:	CuSN6P
English Norm:	CW452K
Japanese Norm:	JIS C5191

3. Alloy Composition *

Cu:	balance
Fe:	<0,1%
Pb:	<0,05%
Ni:	<0,3%
P:	<0,35%
Sn:	5,5-7,0%
Zn:	<0,3%

* the exact composition of each batch can be documented by a material certificate 2.2 or 3.1 according to DIN EN 10 204.

4. Delivery condition

Condition:	cold rolled, not hardenable
Surface:	bright
Ultimate tensile strength:	>560 N/mm ²

Further mechanical data: see chapter 7 and 8.

5. Sizes

thicknesses:	0,025 - 0,30 mm
raw material width:	300-305 mm
standard widths:	150 and 300-305 mm
edges:	cut
Lengths:	individual lengths from 5 to 10 000mm or as coil

The following sizes are available from stock (without obligation):

<i>thickness</i>	<i>width</i>	<i>Annotation</i>
0,025	150mm	> 500 N/mm ²
0,05	150mm + ca.305mm	> 500 N/mm ²
0,10	150mm + ca.300-305mm	500-590 N/mm ² (R500)
0,15	150mm + ca.300-305mm	500-590 N/mm ² (R500)
0,20	150mm + ca.300-305mm	500-590 N/mm ² (R500)
0,25	150mm + ca.300-305mm	500-590 N/mm ² (R500)
0,30	150mm + ca.300-305mm	500-590 N/mm ² (R500)

without obligation, Issue: July 2023

6. Tolerances

thickness tolerance:	+/- 10% at 0,05mm, +/- 0,004mm at 0,10mm, +/- 0,015 mm at 0,15-0,30mm
width tolerance:	-0/+0,40mm
straightness:	normal
flatness:	wave height max. 1,0 mm

7. Further mechanical data

Yield strength Rp0,2 :	> 450 N/mm ² at R500
Dehnung A 50:	> 8% at R500
Hardness:	160-190 HV at R500

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 brass 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.

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 maximum temperature depends on the load of the springs and is between 150 – 200 ° Celsius (see datasheet of the Deutsches Kupferinstitut).

8. Physical properties

Density:	8,80 g/cm ³
Thermal conductivity:	75 W/(m °C) depending on the temperature
Heat capacity:	0,377 J/(kg °C) medium value at 50 – 100 °C

Thermal expansion: $18,5 \times 10^{-6}$ (between 0 - 300 °C)
 Electric conductivity: 9 mS/m (equivalent to 16% IACS)
 Modus of elasticity: 118 000 MPa at 20 °C
 Relative permeability μ_r : 1,00 (non magnetizable)

9. Blanking

We recommend a punch-to-die clearance of 4-10 % of the strip thickness.
 The corner radius should be at least 0.25 mm and the punching die should be at least twice the strip thickness.
 The pieces should then be tumbled to receive a good edge roundness.

10. Laser cutting

This alloy can be laser cut by solid state lasers.

11. Photo etching

This alloy is very easy to etch.

12. Bending

As this material is supplied in the temper rolled condition, the rolling direction is important regarding the bending. The suggested minimum bending radius depends on the tensile strength of the material.

Bending at right angle (90°) to the rolling direction:

	R500	R560	R640	R720
Up to 0,5 mm	0,5 x t	1 x t	1 x t	2 x t

t = strip thickness

Bending parallel to the rolling direction:

	R500	R560	R640	R720
up to 0,5 mm	0,5 x t	1 x t	4 x t	9 x t

t = strip thickness

13. Flat grinding und polieren

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

Bronze can be polished easily.

14. Welding und soldering

Brass is suitable for welding, but a lower hardness can occur at the welding seam.

Hard and soft soldering can be done easily.

15. Corrosion resistance

Bronze is resistant against sea water and industrial atmospheres, and also relatively insensitive to stress corrosion cracking.

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.