



## Hard-rolled bronze strip, mat. no. 2.1020 (CuSn6)

### 1. Applications:

With zinc content of 6%, the bronze alloy CuSn6 is the most frequently used type of bronze. Examples of typical applications are connectors, contact pins and general sheet metal parts and springs that require good electrical conductivity. Unlike brass, bronze can also be used in vacuum technology.

Further applications:  
pieces for electrical engineering and precision mechanics

Bronze is suitable for springs (see DIN EN 1654). At high demands on the mechanical strength or electrical conductivity we suggest Copper-Beryllium.

### 2. Material codes:

German Norm:	2.1020
EN:	CuSn6
UNS:	C 51900
Engl. Norm:	CW452K
AFNOR:	CuSN6P-
Japan. Norm:	JIS C5191

### 3. Chemical composition: \*

Cu:	balance
Zn:	max. 0.30%
Ni:	max. 0.30%
Pb:	max. 0.05%
Fe:	max. 0.10 %
Sn:	max. 5.5-7.0 %
P:	max. 0.35 %

\* 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:	temper rolled, not hardenable
Surface:	bright
Flatness:	according to EN-Norms
Ultimate tensile str.:	> 560 N/mm <sup>2</sup>

Further mechanical data: see chapter 7 and 8.

### 5. Sizes:

Thicknesses:	0.05 – 0,30mm
Standard sizes:	150 + 300-305mm

Edges: cut  
 Lengths: individual lengths from 5 to 10 000mm or as coil

The following sizes are available from stock (without obligation),  
 status: October 2015:

<b>Thickness in mm</b>	<b>Width in mm</b>	<b>Tensile strength</b>	<b>Annotation</b>
0,05	150+305	> 800 N/mm <sup>2</sup>	HV 225
0,10	150+305	> 650 N/mm <sup>2</sup>	HV 180-210
0,15	150+305	560-650 N/mm <sup>2</sup>	HV 180-210
0,20	150+305	560-650 N/mm <sup>2</sup>	HV 180-210
0,25	150+305	560-650 N/mm <sup>2</sup>	HV 180-210
0,30	150+305	560-650 N/mm <sup>2</sup>	HV 180-210

### 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. 1mm

### 7. Further mechanical data:

Yield str. Rp0,2 : >530 N/mm<sup>2</sup> at R560

Elongation A 50: >5% at R560

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<sup>3</sup>

Thermal conductivity: 75 W/(m °C) depending on the temperature

Spec. heat capacity: 377 J/(kg °C) mean value at 50 – 100 °C

Thermal expansion: 18.5 x 10<sup>-6</sup> (between 30 - 100 °C)

Electric conductivity: 9 mS/m (equivalent to 16% IACS)

Modus of elasticity: 118 000 MPa at 20 °C

Relative permeability  $\mu_r$ : bronze is not magnetisable

## 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

Bronze can be etched easily.

## 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 0,50 mm	0,5 x t	1 x t	1 x t	2 x t
0,50-1,00 mm	No data available	No data available	No data available	No data available

t = strip thickness

Bending parallel to the rolling direction:

	R500	R560	R640	R720
Up to 0,50 mm	0,5 x t	1 x t	4 x t	c9a. 6,0 x t
0,50-1,00 mm	No data available	No data available	No data available	No data available

t = strip thickness

## 13. Flat grinding

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

## 14. Welding

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.