CuSn6

EN_2024_06

Comparable standards: UNS C51900 • EN CW452K • JIS C5191

Aurubis designations: C519 • PNA 282

Description

CuSn6 is a solid solution strengthened copper alloy (bronze) with 6% tin. The alloy has high strength and good spring properties at an adequate conductivity and is well suited for cold forming operations. The alloy is wear-resistant, has very good corrosion resistance and can be readily soldered.

Composition

Cu [%]	Sn [%]	P [%]	Zn [%]	Fe [%]	Ni [%]	Pb [%]
rem	5.5-7.0	0.01-0.4	max 0.2	0.1 max	0.2 max	0.02 max

Composition of this alloy is in accordance with RoHS for electric & electronic components and ELV for the automotive industry.

Physical properties

Melting point [°C]	Density [g/cm³]	c_p @ 20°C [kJ/kgK]	Young's modulus [GPa]	Thermal cond. [W/mK]	Electrical cond. [MS/m]	Electrical cond. [%IACS]	α @20-300°C [10^{-6}/K]
1040	8.8	0.377	118	75	≥ 9	≥16	18.5

Note: The specified conductivity applies to the soft condition only.

c_p specific heat capacity

α coefficient of thermal expansion

Mechanical properties

	Tensile Strength [MPa]	Yield Strength [MPa]	Elongation A_{50} [%]	Hardness HV [-]	Bend ratio 90° [r] GW	Bend ratio 90° [r] BW	Bend ratio 180° [r] GW	Bend ratio 180° [r] BW
R350	350-420	≤ 300	≥ 45	80-110	0	0	0	0
R420	420-520	≥ 360	≥ 17	125-165	0	0	0	0
R500	500-590	≥ 460	≥ 8	160-190	0	0	1	2
R560	560-650	≥ 530	≥ 5	180-210	0.5	1	2	3
R640	640-730	≥ 610	≥ 3	200-230	1	3.5	3	4
R720	≥ 720	≥ 690	-	≥ 220	-	-	-	-

r = x * t (thickness t ≤ 0.5mm)

GW bend axis transverse to rolling direction. BW bend axis parallel to rolling direction.

Fabrication properties

Cold formability	excellent
Hot formability	not recommended
Soldering	excellent
Brazing	excellent
Oxyacetylene welding	fair
Gas shielded arc welding	good
Resistance welding	good
Machinability	not recommended

Electrical conductivity

The electrical conductivity depends on chemical composition, the level of cold deformation and the grain size. A high level of deformation as well as a small grain size decrease the conductivity.

Corrosion Resistance

Bronce is resistant to: Natural and industrial atmospheres as well as maritime air, drinking and service water (if the flow rate is not excessive), seawater, non oxidizing acids, alkaline solutions and neutral saline solutions.
Bronce is not resistant to: Ammonia, halogenide, cyanide and hydrogen sulfide solutions and atmospheres, oxidizing acids.
Bronce alloys have an improved resistivity towards seawater and pitting corrosion.

Typical uses

Automotive, components of electrical engineering, connectors, relays and conductor springs, retaining clamps, springs, metal hose, bushings, paper-, textile- and chemical indsutry as well as mechanical and apparatus engineering and shipbuilding

Relaxation Behaviour