Aurubis Stolberg

CuSn4

EN_2024_03

Comparable standards: UNS C51100 • EN CW450K • JIS C5111

Aurubis designations: C511 • CuSn4 • PNA 284

Description

CuSn4 is a solid solution strengthened copper alloy with 4% tin (bronze). It combines very good cold workability with high strength and hardness. The alloy is corrosion resistant and can be well soldered and brazed, yet it still has good electrical conductivity.
CuSn4 is used in applications where great importance is attached to the combination of conductivity and strength.
Fields of application are connectors, connector springs, springs and components of electrical and mechanical engineering.

Composition

Cu [%]	Sn [%]	P [%]	Zn [%]	Fe [%]	Pb [%]
rem	3.5-4.9	0.03-0.35	0.3 max	0.1 max	0.05 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]
1063	8.9	0.377	120	100	≥ 12	≥21	18

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
R290	290-390	≤ 190	≥ 40	70-100	0	0	0	0
R390	390-490	≥ 210	≥ 11	115-155	0	0	0	0
R480	480-570	≥ 420	≥ 4	150-180	0	0	0	2
R540	540-630	≥ 490	≥ 3	170-200	0	1	2	3
R610	≥ 610	≥ 540	-	≥ 190	1	2	3	4

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.

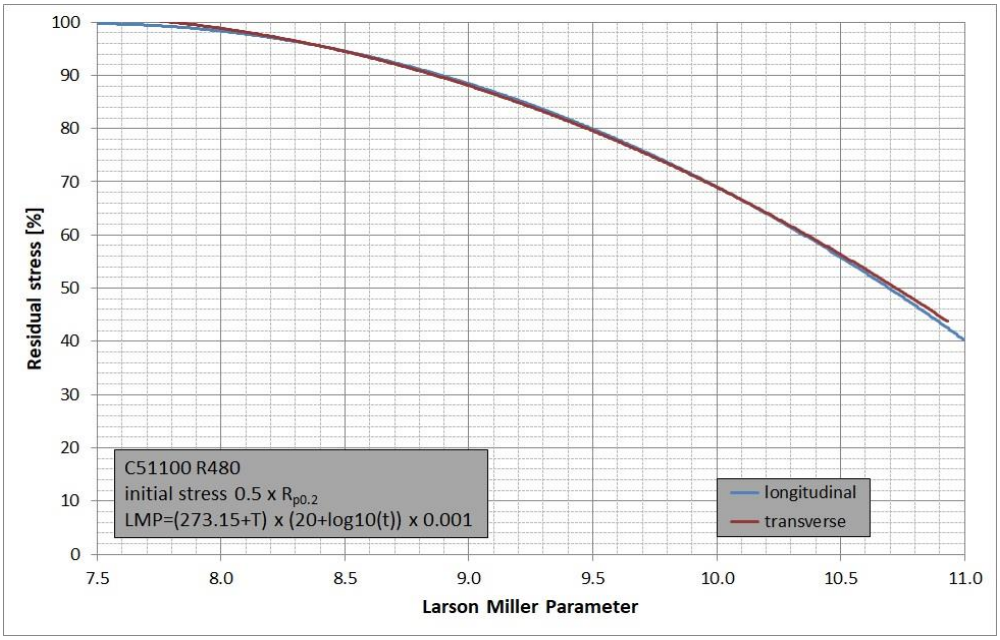
Corrosion Resistance

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 and mechanical and apparatus engineering.

Relaxation Behaviour



Stress relaxation data shown as residual stress against Larson Miller Parameter. The Larson Miller Parameter represents temperature and time.
Test method: Mandrel test according to ASTM E328.