Cu-OF

EN_2024_06

Comparable standards: UNS C10200 • EN CW008A • JIS 1020

Aurubis designations: C102 • OF-OK • PNA 400

Description

Cu-OF is an oxygen-free, high conductivity copper with 99.99% minimum Cu. It offers the advantages of both electrolytic tough pitch copper (ETP) and phosphor deoxidized copper. The high purity and absence of deoxidizers accounts for 100% IACS electrical conductivity as well as no susceptibility to hydrogen embrittlement. Cu-OF has a very good formability and can be soldered and welded, which makes it superior to Cu-ETP in these aspects.

Composition

Cu [%]	Bi [%]	Pb [%]	O [%]
min 99.95	0.0005 max	0.005 max	max 0.001

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]
1083	8.94	0.394	127	394	≥ 58	≥100	17.7

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
R220	220-260	≤ 140	≥ 33	40-65	0	0
R240	240-300	≥ 180	≥ 8	65-95	0	0
R290	290-360	≥ 250	≥ 4	90-110	0	0
R360	≥ 360	≥ 320	≥ 2	≥ 110	0	0

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	excellent
Soldering	excellent
Brazing	excellent
Oxyacetylene welding	fair
Gas shielded arc welding	good
Resistance welding	not recommended
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	Copper is resistant to: Natural and industrial atmospheres as well as maritime air, drinking and service water, non oxidizing acids, alkaline solutions and neutral saline solutions. Copper is not resistant to: Ammonia, halogenide, cyanide and hydrogen sulfide solutions and atmospheres, oxidizing acids and sea water (especially at high flow rates).
Typical uses	Radar components, components of electrical engineering, conductors, contacts and terminals, printed circuits, carrier tapes, flat-type cables, flexible circuits, terminal lugs, copper ceramic substrates