CuSn1.2Ni0.8P0.07

20 04

Comparable standards: UNS C19040

Aurubis designations: CAC5* • PNA 325

*CAC5 is a trademark licensed by Kobelco

Description

CAC5 is an alloy developed by Kobe Steel to meet the requirements for the next generation automotive terminals. Downsizing and for some applications increased temperature demands with an excellent combination of formability, stress relaxation resistance, conductivity and strength. CAC5 is designed for small terminals with complicated forming. The good formability makes it possible to use tight 180 degree bends without risk for cracking. The excellent stress relaxation resistance retains high stable normal force. CAC5 is produced by Aurubis under license from Kobe Steel.

Composition

Cu [%]	Ni [%]	Sn [%]	P [%]
97.5 min	0.7-0.9	1.0-2.0	0.02-0.09

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]
1080	8.9	0.38	130	166	≥ 21	≥36	17.5

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
H04	500-590	≥ 480	≥ 7	155-180	0	0	0	0
H06	540-630	≥ 520	≥ 6	160-195	0.2	0.2	0.5	0.5

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	good
Hot formability	excellent
Soldering	good
Brazing	good
Oxyacetylene welding	good
Gas shielded arc welding	good
Resistance welding	good
Machinability	fair

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

CuNi alloys are resistant to: Natural and industrial atmospheres as well as maritime air and sea water, drinking and service water, non oxidizing acids, alkaline and saline solutions, organic acids and dry gases like oxygen, chlorine, hydrogen chloride, hydrogen fluoride, sulfur dioxide and carbon dioxide.
CuNi is not resistant to: Ammonia, halogenide, cyanide and hydrogen sulfide solutions and atmospheres.
CuNi alloys do not show stress corrosion cracking, they are not susceptible to selective or pitting corrosion. This is due to a very stable oxide layer that forms due to the alloying element.
CuNi10Fe1Mn is especially resistant to hot sea water and sea water at high flow rates from 1 to 3.5 m/s.

Typical uses

Automotive, demanding components of electrical engineering, connectors

Relaxation Behaviour