CuFe2P

20 04

Comparable standards: UNS C19400 • EN CW107C • JIS C1940
Aurubis designations: C194 • PNA 212

Description

CuFe2P is a precipitation hardened alloy. It combines good strength levels with good electrical and thermal conductivity. It is suited for applications at elevated temperatures and has decent relaxation properties.
The alloy is well formable, corrosion resistant and non-tarnishing and suited for joining techniques.
Fields of application are electrical engineering, spring components with moderate requirements to springiness and relaxation properties or semiconductor substrates.

Composition

Cu [%]	Fe [%]	P [%]	Zn [%]	Pb [%]
rem	2.1-2.6	0.015-0.15	0.05-0.20	max 0.03

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]
1088	8.8	0.386	123	265	≥ 37	≥64	17.6

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
R300	300-340	≤ 240	≥ 20	80-100	0	0	0	0
R340	340-390	≥ 240	≥ 16	100-120	0	0	0	0
R370	370-430	≥ 330	≥ 8	120-140	0	0	0	0
R420	420-480	≥ 380	≥ 6	130-150	0.5	0.5	0.5	1.5
R470	470-530	≥ 440	≥ 4	140-160	0.5	0.5	0.5	5
R530	530-580	≥ 470	≥ 4	150-165	1	2		

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	good
Gas shielded arc welding	excellent
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.

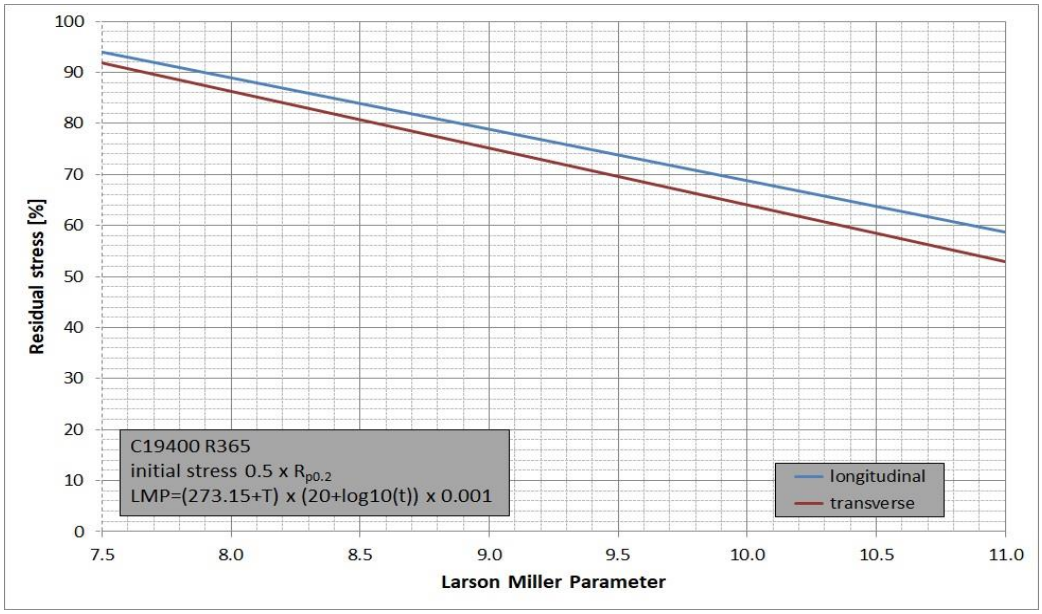
Corrosion Resistance

CuFe2P 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.
CuFe2P is not resistant to: Ammonia, halogenide, cyanide and hydrogen sulfide solutions and atmospheres, oxidizing acids and sea water (especially at high flow rates).
Cu alloys containing Fe have an improved corrosion resistance compared to pure copper, especially towards salt bearing and alkaline water. More over these alloys are more resistant to pitting- and erosion corrosion.

Typical uses

Automotive, components of electrical engineering, connectors, contact springs, semiconductor substrates

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.