CuFe0.7MgP

EN_2024_06

Comparable standards: UNS C19700

Aurubis designations: C197 • PNA 205

Description

CuFe0.7MgP is an age hardening copper alloy. It combines very high electrical conductivity with good strength and relaxation behaviour, similar to CuFe2P (C194). This is possible due to the reduction of the iron content and the addition of magnesium.
The alloy exhibits a very good formability, can be soldered and welded and has a good corrosion resistance.

Composition

Cu [%]	Fe [%]	P [%]	Mg [%]
rem	0.3-1.2	0.1-0.4	0.01-0.2

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]
1086	8.84	0.385	115	320	≥ 46	≥79	17.3

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
R300	300-380	≥ 110	≥ 20	≥ 100	0	0
R360	360-430	≥ 250	≥ 6	120-145	0	0
R410	410-480	≥ 360	≥ 2	130-150	0	0.5
R460	460-510	≥ 440	≥ 2	140-155	0.5	1
R500	500-550	≥ 480	≥ 2	150-170	1	1.5

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	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.

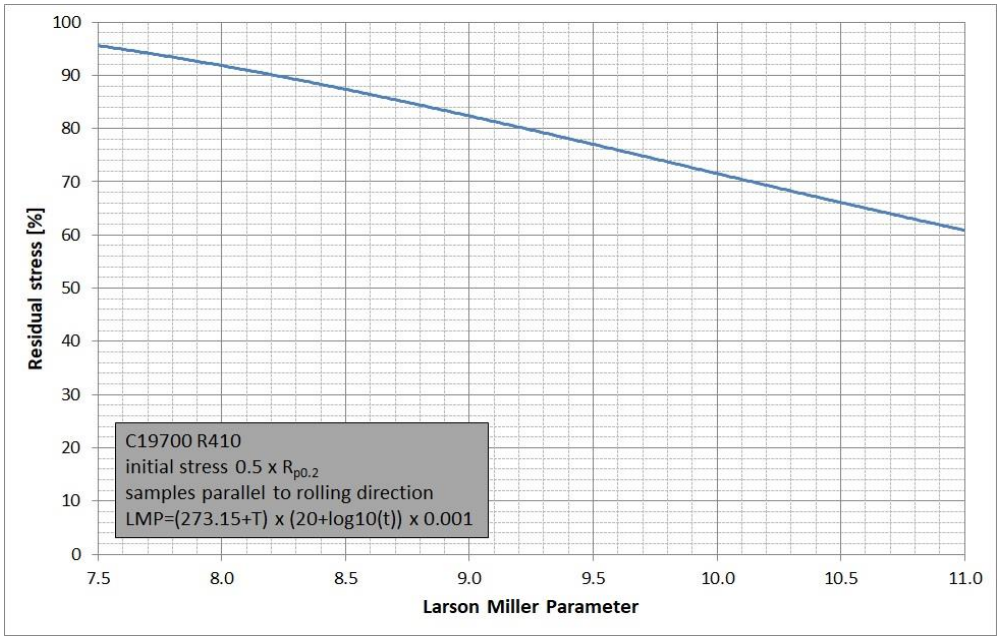
Corrosion Resistance

CuFe0.7MgP 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.
CuFe0.7MgP 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, clamp ports, clamp connections, leadframes, relays- and conductor springs, spring rings, pressure gauge springs, retaining clamps

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.