

# CuNi3SiMg

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Comparable standards: UNS C70250  
 Aurubis designations: PNA 370

**Description** CuNi3SiMg is a precipitation-hardened copper alloy. It combines moderate electrical conductivity (min. 40% IACS) with very high strength and very good relaxation behaviour. This is achieved by the application of a special process consisting of cold working and heat treatment. CuNi3SiMg also has excellent spring properties and good corrosion resistance.

**Composition**

Cu	Ni	Si	Mg	Zn	Pb
[%]	[%]	[%]	[%]	[%]	[%]
rem	2.2-4.2	0.25-1.2	0.05-0.3	<1.0	≤0.05

Composition of this alloy is in accordance with RoHS for electric & electronic components and ELV for the automotive industry.

**Physical properties**

Melting point	Density	c <sub>p</sub> @ 20°C	Young's modulus	Thermal cond.	Electrical cond.		α @20-300°C
					[MS/m]	[%IACS]	
[°C]	[g/cm³]	[kJ/kgK]	[GPa]	[W/mK]			[10 <sup>-6</sup> /K]
1095	8.82	0.399	130	169	≥ 23	≥40	17.6

Note: The specified conductivity applies to the soft condition only.

c<sub>p</sub> specific heat capacity  
 α coefficient of thermal expansion

**Mechanical properties**

	Tensile Strength	Yield Strength	Elongation A <sub>50</sub>	Hardness HV	Bend ratio 90° [r]	
	[MPa]	[MPa]	[%]		GW	BW
R620	620-760	≥450	≥ 10	180-240	0	0
R650	650-830	≥590	≥ 7	190-250	1	1
R690	690-860	≥650	≥ 5	220-260	1.5	1

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.

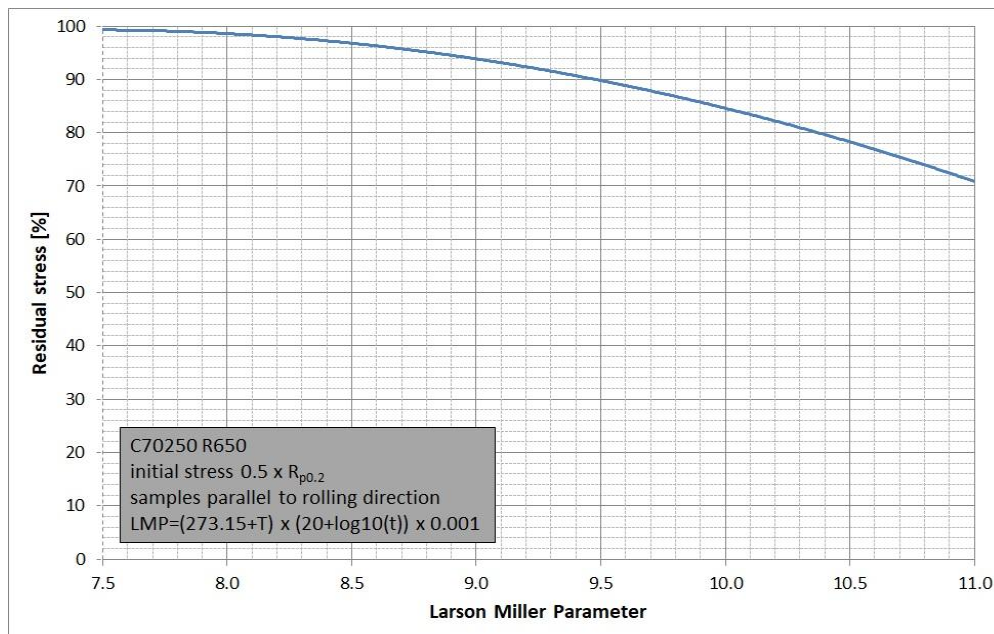
**Corrosion Resistance**

CuNi3SiMg 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.  
 CuNi3SiMg 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**

Automotive, components of electrical engineering, connectors, contact springs, relays, sockets, clips, leadframes, pins

**Relaxation Behaviour**



Stress relaxation data of CuNi3SiMg shown as residual stress against Larson Miller Parameter. The Larson Miller Parameter represents temperature and time.  
 Test method: Mandrel test according to ASTM E328.

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