

# CuNiSi

20 08

Comparable standards: UNS C19005

Aurubis designations: PNA 326

## Description

PNA 326 is an optimized version of CuNi1.5Si, which is a precipitation-hardened copper alloy. It combines medium electrical conductivity (min. 47% IACS) with high strength and good relaxation behaviour. This is achieved by the application of a special process consisting of cold working and heat treatment. It also has excellent spring properties and good corrosion resistance.

Fields of application are automotive, connectors, leadframes and electrical engineering.

## Composition

Cu	Ni	Si	Zn	Sn	P
[%]	[%]	[%]	[%]	[%]	[%]
rem	1.4-1.7	0.2-0.35	0.2-0.7	0.02-0.3	0.01-0.03

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

## Physical properties

Melting point	Density	c <sub>p</sub> @ 20°C	Young's modulus	Thermal cond.	Electrical cond.		α @20-300°C
					[MS/m]	[%IACS]	
[°C]	[g/cm <sup>3</sup> ]	[kJ/kgK]	[GPa]	[W/mK]			[10 <sup>-6</sup> /K]
1062	8.9	0.377	135	250	≥ 27	≥47	16.8

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]		Bend ratio 180° [r]	
					GW	BW	GW	BW
	[MPa]	[MPa]	[%]	[-]				
R360	360-430	≥275	≥ 8	100-130	0	0	0	0.5
R410	410-470	≥370	≥ 7	120-140	0	0.5	0.5	1
R460	460-520	≥410	≥ 5	140-160	0.5	1	1	3
R490	490-560	≥435	≥ 4	150-170	1	1.5	2	3.5
R520	520-590	≥460	≥ 3	155-180	1	2	2.5	4
R490S*	490-560	≥410	≥ 10	150-170	0	0	1	1
R520S*	520-590	≥440	≥ 8	155-180	0.5	0	1.5	1.5
R580S*	580-650	≥510	≥ 7	170-200	0.5	0.5	1.5	2
R620S	620-700	≥560	≥ 6	180-210	1	1.5	3	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**

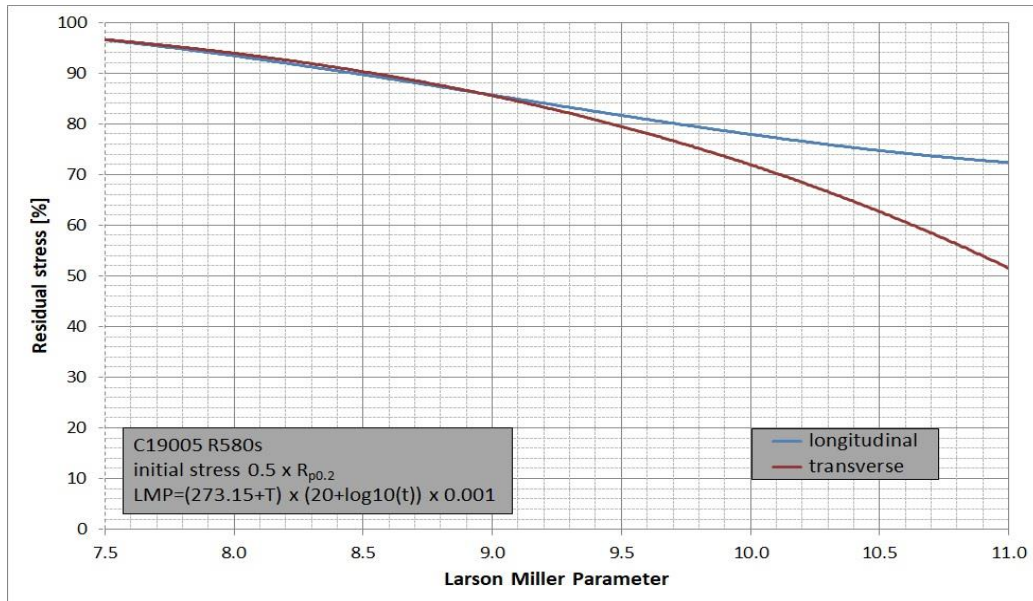
CuNiSi is resistant to: Natural and industrial atmospheres as well as maritime air, drinking and service water, non oxidizing acids, alkaline solutions and neutral saline solutions.

CuNiSi 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, springs, relays, sockets, clips, leadframes, pins

**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.

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