

Wieland-N59

CuNi9Zn41FeMn | Lead free nickel silver for machining

Material designation

EN	not standardized
UNS	not standardized

Chemical composition*

Cu	49 %
Pb	≤ 0.1000 %
Ni	9 %
Fe+Mn+Si	1 %
Zn	balance

*Reference values in % by weight

Physical properties*

Electrical conductivity	MS/m	6
	%IACS	10
Thermal conductivity	W/(m·K)	40
Thermal expansion coefficient (0–300 °C)	10 ⁻⁶ /K	20
Density	g/cm ³	8.35
Modulus of elasticity	GPa	110

*Reference values at room temperature

Corrosion resistance

Nickel silver generally exhibits good corrosion resistance to atmospheric influences, organic substances (perspiration, environmental influences) as well as alkaline and neutral saline solutions.

Product standards

not standardized

Material properties and typical applications

Wieland-N59 has been developed to provide the market with a lead-free nickel silver exhibiting good machining properties. The addition of Fe, Mn and Si leads to the formation of hard silicides which act as chip breakers, on the one hand, and increase the strength of the material, on the other hand. N59 is suitable for connector housings with increased corrosion resistance requirements. Compared to the typical housing material CuNi7Zn39Pb3Mn2 (Wieland-N31), N59 has a much higher electrical conductivity.

The higher strength raises the wear resistance of ball pen tips. This enables longer writing flows of the pen. The corrosion resistance of N59 is comparable to the ball pen tips alloy CuNi12Zn38Mn5Pb2 (Wieland-N48).

The material is lead free according to RoHS and ELV.

Types of delivery

The BU Extruded Products supplies bars, wire, sections and tubes. Please get in touch with your contact person regarding the available delivery forms, dimensions and tempsers.

Fabrication properties

Forming

Machinability (CuZn39Pb3 = 100 %)	50 %
Capacity for being cold worked	fair
Capacity for being hot worked	good

Surface treatment

Polishing	
mechanical	good
electrolytic	poor
Electroplating	good

Joining

Resistance welding (butt weld)	good
Inert gas shielded arc welding	fair
Hard soldering	fair
Soft soldering	good

Heat treatment

Melting range	870–900 °C
Hot working	680–750 °C
Soft annealing	600–650 °C 1–3 h
Thermal stress relieving	300 °C 1–3 h

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Dimensions and mechanical properties, typical values

Round wires for ball pen tips

Temper	Diameter		Tensile strength R_m	Yield strength $R_{p0.2}$		Elongation %	Hardness
	mm		MPa	MPa		A100	HV1
	from	to	min.	min.	max.	min.	min.
drawn	1	3	approx. 730	approx.. 640		>2	approx. 210

Round rods

Temper	Diameter		Tensile strength R_m	Yield strength $R_{p0.2}$		Elongation %	Hardness
	mm		MPa	MPa		A11.3	HV1
	from	to	min.	min.	max.	min.	min.
drawn	6	8	approx. 730	approx. 560		approx. 11	approx. 200