Wieland-N39

CuNi13Zn25Pb1 | C79200

This leaded nickel silver is designed for machining operations of parts which are used in daily life, such as keys, watches and musical instrument keys. These applications require a valuable-looking surface – especially if the color is silver. In addition, this alloy has very good mechanical stability, corrosion and tarnish resistance, which allows survival in atmospheric humidity and during contact with household fluids and perspiration.

Chemical composition (Reference)	
Cu	62 %
Ni	13 %
Pb	1 %
Zn	remainder

Fabrication properties	
Machinability	90 %**

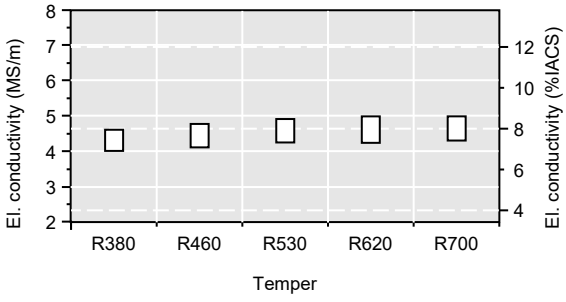
** Value derived from planing test (Reference CuZn39Pb2 = 100 %)

Physical properties (Reference values at room temperature)				
Electrical conductivity	4.4	MS/m	8	%IACS
Thermal conductivity	34	W/(m·K)	20	Btu·ft/(ft²·h·°F)
Coefficient of electrical resistance*	0.4	10^{-3}/K	0.2	10^{-3}/°F
Coefficient of thermal expansion*	18.0	10^{-6}/K	10.0	10^{-6}/°F
Density	8.67	g/cm³	0.313	lb/in³
Modulus of elasticity	130	GPa	18,800	ksi
Specific heat	0.380	J/(g·K)	0.091	Btu/(lb·°F)
Poisson´s ratio	0.34		0.34	

* Between 0 and 300 °C

Mechanical properties (values in brackets are for information only)						
Temper	**Tensile strength R_m**		**Yield strength $R_{p0.2}$**		**Elongation A_{50}**	**Hardness HV**
	MPa	**ksi**	**MPa**	**ksi**	**%**	
R380	380-470	55-68	≥ 260	≥ 38	≥ 15	(110-140)
R460	460-540	67-78	≥ 320	≥ 46	≥ 6	(130-160)
R530	530-610	77-88	≥ 420	≥ 61	≥ 3	(155-185)
R620	620-700	90-102	≥ 530	≥ 77	-	(180-210)
R700	≥ 700	≥ 102	≥ 630	≥ 91	-	(≥ 200)

Electrical conductivity



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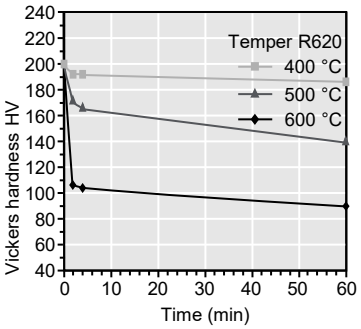
Fatigue strength

The fatigue strength is defined as the maximum bending stress amplitude which a material withstands for 10^7 load cycles under symmetrical alternate load without breaking. It is dependent on the temper tested and is about 1/3 of the tensile strength R_m.

Information on the planing test

The machinability value expressed as a percentage is based on data generated in a so-called planing test. In this test, a cutting tool is guided across the material surface while various parameters are measured, including surface roughness, bending moment, chip morphology, as well as burr formation. The reference material used for comparison is Wieland-Z30 (CuZn39Pb2) in the hard temper.

Resistance to softening



Vickers hardness after heat treatment (typical values)

Types and formats available

- Standard coils with outside diameters up to 1,200 mm
- Sheet

Dimensions available

- Strip thickness from 1.5 mm – 4.0 mm
- Strip width from 20 mm – 360 mm, others on request
- Sheet thickness from 1.5 mm – 4.0 mm, width 25 mm – 360 mm, length 300 – 3,000 mm

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