



Brand Name	NICROSIL				
Material Code					
Abbreviation	NP (X)				
Chemical Composition (mass components) in %.					
Average values of alloy components					
Ni	Cr	Si			
Balance	14.6	1.3			

Features and Application Notes

NICROSIL is used as positive leg of the thermocouple N. For extension leads, NICROSIL is used for type NX. The standardized temperature range of the different application possibilities of NICROSIL is available in the tables of the glossary.

Form of Delivery

NICROSIL (NP and NPX) is supplied in the form of bare wire with dimensions from 0.10 to 6.00 mm Ø, coated wires from 0.10 to 1.50 mm Ø. NICROSIL is also available in the form of stranded wire, ribbon, flat wire and rods. Please contact us for the range of dimensions.

Thermoelectrical¹⁾ and Electrical Values in Soft-Annealed Condition

EMF versus Cu/NIST 175 at +100 °C / mV ²⁾	EMF versus Pt67/NIST 175 at +100 °C / mV ²⁾	EMF versus Pt67/NIST 175 at +1,000 °C / mV ²⁾	Electrical resistivity in μΩ x cm at +20 °C
1.011	1.785	26.046	95

Physical Characteristics (Reference Values)

Density at +20 °C	Melting point	Specific heat at +20 °C	Thermal conductivity at +20 °C	Average linear thermal expansion coefficient between +20 °C and +100 °C	Magnetic at room temperature
g/cm³	°C	J/g K	W/m K	10⁻⁶/K	
8.50	+1,394	0.43	13	13.10	no

Mechanical Properties at +20 °C in Annealed Condition³⁾

	Tensile strength MPa	Elongation %	Hardness HV10
hard	> 1.300	< 2	400
soft	650	30	160

Notes on Treatment // NICROSIL can be brazed without difficulty. All known welding methods are applicable. However, the alloy is difficult to soft-solder. The thermoelectric voltage of NICROSIL may change as a result of mechanical or thermal stress, see also "Special Remarks on the Alloy".

Special Remarks on the Alloy // NICROSIL has been developed to eliminate known disadvantages with reference to the positive leg of thermocouple type K (ISATHERM® PLUS, CHROMEL®-P or NiCr10). An increase in the chromium concentration to approx. 14.6 % versus KP will essentially reduce the change in EMF due to the ordering state in the metal lattice.

Thermoelectrically, the alloy therefore is considerably more stable against temperature changes below +600 °C. NICROSIL reacts corrosively at higher temperatures in the presence of varying oxidizing/reducing gases. Partial oxidation of the chromium will cause green rot. Sulphur and carbon favor the development of the green rot. As a consequence, the thermoelectric voltage may change dramatically. This oxidation will also lead to brittleness of the material. An increase in silicon concentration will result in higher oxidation stability versus the positive leg of thermocouple type K.

1) The exact EMF values can be calculated with a "EMF-Software", which can be downloaded from our homepage.

2) Reference at 0 °C.

3) The mechanical values considerably depend on dimension. The indicated values refer to a dimension of 1.0 mm diameter.