ISABELLENHÜTTE
Innovation by Tradition

THERMOCOUPLES **TYPE N** / EXTENSION LEADS **TYPE NX**

TYPE N/NX	NICROSIL NP / NPX	NISIL NN / NNX
Chemical composition*	Ni balance / Cr 14.6 % / Si 1.30 %	Ni balance / Si 4.80 %
EMF at 100 °C vs. Cu Pt (NIST175)*	1.011 mV / 1.785 mV	-1.763 mV / -0.990 mV
Soldering / Welding	difficult to soft-sold / welding without difficulty	
Melting point / Density*	1,394 °C / 8.50 g/cm³	1,341 °C / 8.55 g/cm³
Magnetic at room temperature	no	slight
Electrical resistivity at 20 °C*	95 µOhm x cm	36 µOhm x cm
Tensile strength / elongation at 20 °C*	hard condition: >1,300 MPa / <2 % soft condition: 650 MPa / 30 %	hard condition: >1,300 MPa / <2 % soft condition: 650 MPa / 30 %
Hardness at 20 °C*	hard condition: 400 HV10 soft condition: 160 HV10	hard condition: 450 HV10 soft condition: 130 HV10
Advantages of TYPE N vs. TYPE K for thermocouples	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 is considerably **more stable against temperature changes** below +600 °C.	By increasing the Silicon and reducing the Aluminium contents (versus the *KN*), a higher oxidation stability has been achieved. Consequently, compared to *KN* the corrosive reaction to Sulphur will be lower at higher working temperatures.

APPLICATION NOTES

Thermocouples	for temperature measurement from -40 up to 1,200 °C in: - exhaust systems - turbocharger - casts - furnaces - nuclear power stations/plants
Leads (insulated, extruded)	for extension of thermocouples type N
Mineral insulated cables	for temperature measurement in special atmospheres from -40 °C up to 1,200 °C, depend on sheathing (Inconel, Stainless Steel, …)
Strip material / ribbons	for connectors and plugs

THERMOELECTRIC STANDARD TOLERANCES

TYPE N acc. ASTM E230	temperature range: 0 to 1,260 °C tolerance: Standard ±2.2 °C or 0.75 % (t90) / Special ±1.1 °C or 0.4 % (t90)
TYPE NX acc. ASTM E230	temperature range: 0 to 200 °C tolerance: Standard ±2.2 °C / Special ±1.1 °C
TYPE N acc. IEC 60584	temperature range: -40 °C to 1,000 °C tolerance: **Class 1** ±1.5 °C or 0.4 % (t90) / **Class 2** ±2.5 °C or 0.75 % (t90)
TYPE NX acc. IEC 60584	temperature range: -25 to 200 °C tolerance: **Class 1** ±60 µV (±1.5 °C) / **Class 2** ±100 µV (±2.5 °C)
Special tolerances	possible, depend on customer application, e.g. ½ Special-tolerance acc. ASTM E230

DELIVERY SPECIFICATIONS

Form of delivery	wires: 0.1 to 12.0 mm on spools and coils stranded wires: 0.1 to 0.8 mm (up to 50 strands) on spools flat wires: 0.1 to 1.0 mm thickness and max. 10.0 mm width on spools ribbons: 0.1 to 1.5 mm thickness and max. 110.0 mm width on coils rods: 6.0 / 7.0 / 8.0 / 9.0 / 10.0 mm with max. 2,200 mm length
Measuring range	standard: 0 to 1,000 °C for N and 100/200 °C for NX upon request: -25 °C / -40 °C / for N/NX and 0 to 1,200 °C for N

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