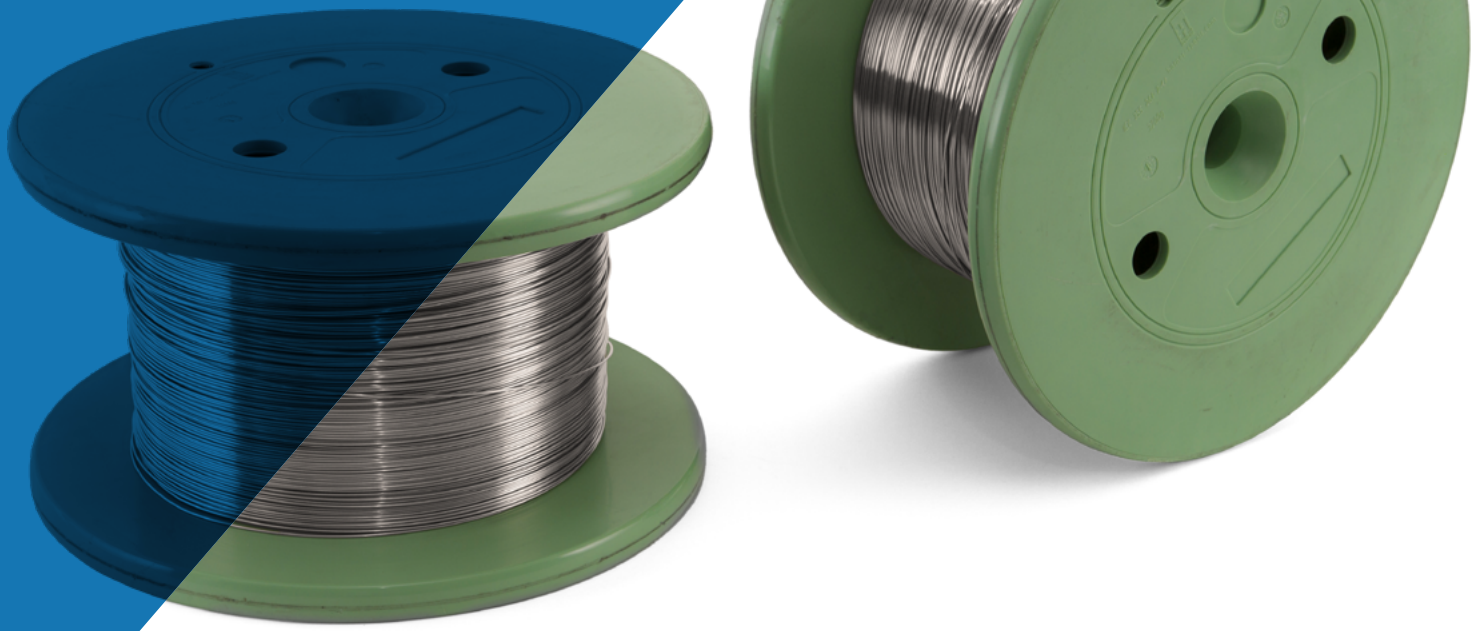
Kamet

Thermocouple wire type **N** (NiCrSi – NiSi)



For **temperatures** between **0°C** to **1200°C**

Kamet ›
your connection to the **high temperature** world

› Thermocouple type N

Type N, also known as a NiCrSil-NiSil thermocouple, is made of two nickel alloy conductors. A Nicorsil (positive) leg and a Nisil (negative) leg.

Type N thermocouple has comparable accuracy and temperature range to that of type K. However, Type N thermocouple, with nicrosil and nisil legs, have been specifically designed to improve upon type K in certain situations:

- At temperatures above 900°C type K tends to show cumulative instability while type N can withstand higher temperatures for more extended periods and, as such, is more thermo-electrically stable.
- Type N has a higher resistance to high temperature oxidation compared to type K.
- Type N functions better in nuclear environments than type K.

It is useful to note that the type N thermocouples stocked by Kamet are manufactured with silicon instead of aluminium which makes them more thermally stable than regular type K thermocouples.

These advantages of type N make it particularly suited for aerospace, nuclear and semiconductor applications. In general it can be used in applications where a longer service life and greater stability are required.

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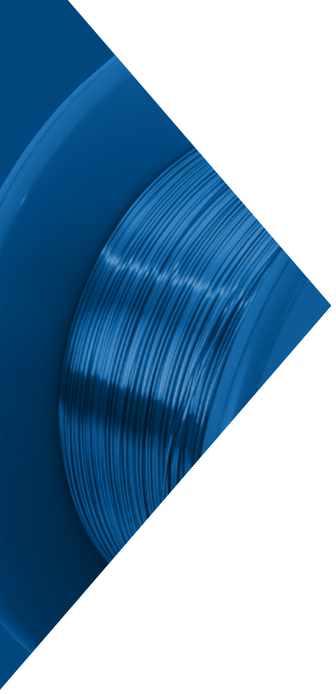


Operating temperature

The maximum temperature of thermocouples is influenced by a variety of factors, including operating conditions, sheathing material, temperature range and whether temperatures are constant and continuous or cyclical.

Another variable that needs to be taken into consideration with regards to operating temperature is the size of the wire. Reaction times improve the smaller the diameter of the wire, however smaller wires have a shorter lifetime and are less stable.

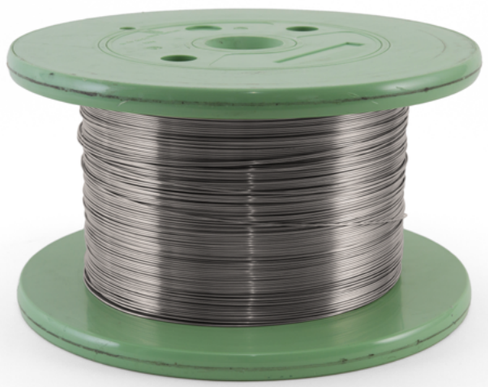
For reasons such as these, the values for thermocouple type N in the table below must be considered indicative. Kamet offers standard diameters of 0.50, 1.30, 2.00, 3.00 and 3.20 mm.

Maximum operating temperatures NP - NN					
Diameter	0.25 mm	0.50 mm	0.80 mm	1.65 mm	3.25 mm
Temperature	760°C	870°C	980°C	1090°C	1260°C

Chemical composition

The Nicorsil positive leg (NP) of our thermocouple type N is approximately 84.3% Nickel, 14% Chromium and 1.4 % Silicon with small traces of Magnesium (0.1%). The Nisil negative leg (NN) is 95.5% Nickel and 4.4% Silicon with small traces of Magnesium (0.1%).

Alloy	Ni	Cr	Si
NP (+)	84.4	14.2	-
NN (-)	95.6	-	4.4



Physical properties

	NP	NN
Density (g/cm³)	8.53	8.58
Melting point (°C)	1420°C	1420°C
Resistivity	100	36.5
Temp. coefficient of resistance (x10-6/°C)	88	678
Linear expansion (coefficient x10-6/°C)	17	17
Thermal Conductivity (W m-1 °C-1 at 20°C)	13	27

Resistivity: micro ohm-cm at 20°C
Temperature coefficient and linear expansion coefficient by °C from 20 up to 100°C.

Mechanical properties

Type N positive leg*		
	hard	soft
Tensile strenght MPa	> 1300	650
Elogation %	< 2	30
Hardness HV10	400	160

Mechanical properties at +20°C in Annealed condition

Type N negative leg*		
	hard	soft
Tensile strenght MPa	> 1200	650
Elogation %	< 2	30
Hardness HV10	450	130

Mechanical properties at +20°C in Annealed condition

** Numbers are approximately*

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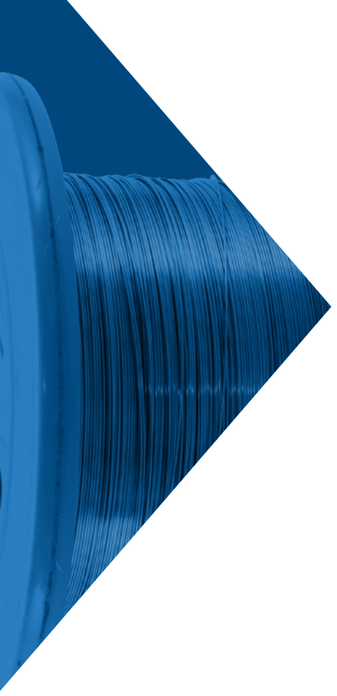

Environment

NiCrSil-NiSil thermocouples are suitable for use in vacuum, inert gas atmospheres, oxidizing atmospheres, or dry reduction atmospheres. They need protective sheathing in the presence of sulfur.

Quality and product range

Type N thermocouples sold by Kamet are of the highest quality:

- Our products are sourced from European manufacturers using only European materials.
- We develop long term relationships with our suppliers.
- Full material traceability is ensured.
- European standards are met in accordance with ISO/EN.

Why choose Kamet for your type N products?

In addition to the quality of our products as mentioned above, Kamet has many years of experience in the high temperature world. Our in-house experts can always be contacted to share their knowledge and expertise with our customers.

Purchases can be done quickly and easily through our webshop or you can email us your requirements or questions. All orders are sent promptly with track & trace offering reliability. The team at Kamet looks forward to meeting your temperature component needs!

Our standard wire items

All our wire is supplied with an 3.1 certificate and a calibration certificate. Wires in stock can be shipped out the same day or the day that is determined as customer specific delivery date.

Thermocouple wire type	Class	Outside Diameter in mm	Delivery time
N wire	Class 1	0.50 mm	5 week
		0.80 mm	5 week
		1.00 mm	5 week
		1.30 mm	5 week
		2.00 mm	In stock
		3.00 mm	In stock
		3.20 mm	In stock

Delivery times stated are workingsdays with delivery to Kamet's warehouse

Please contact us if you need different diameters. We can supply more custom made diameters (combinations) than stated above.

Couple NP/NN EMF reference table

°C	0	10	20	30	40	50	60	70	80	90	100
0	0	0.261	0.525	0.793	1.065	1.340	1.619	1.902	2.189	2.479	2.774
100	2.774	3.072	3.374	3.680	3.989	4.302	4.618	4.937	5.260	5.585	5.913
200	5.913	6.245	6.579	6.916	7.255	7.597	7.941	8.288	8.637	8.988	9.341
300	9.341	9.696	10.054	10.413	10.774	11.136	11.501	11.867	12.234	12.603	12.974
400	12.974	13.346	13.719	14.094	14.469	14.846	15.225	15.604	15.984	16.362	16.748
500	16.748	17.131	17.515	17.900	18.286	18.672	19.059	19.447	19.835	20.224	20.613
600	20.613	21.003	21.393	21.784	22.175	22.566	22.958	23.350	23.742	24.134	24.527
700	24.527	24.919	25.312	25.705	26.098	26.491	26.883	27.276	27.669	28.062	28.455
800	28.455	28.847	29.240	29.632	30.024	30.416	30.807	31.199	31.590	31.981	32.371
900	32.371	32.769	33.151	33.541	33.930	34.319	34.707	35.095	35.482	35.689	36.256
1000	36.256	36.641	37.027	37.411	37.796	38.179	38.562	38.944	39.326	39.706	40.087
1100	40.087	40.466	40.845	41.223	41.600	41.976	42.352	42.727	43.101	43.474	43.846
1200	43.846	44.218	44.588	44.958	45.326	45.694	46.060	46.426	46.789	47.152	47.513
1300	47.513										

Contact us

Kamet ›
your connection to the high temperature world

› As Kamet customers you can rely on:

- our status as an independent partner to thermo component manufacturers
- full product traceability with 3.1 certificate
- quick response time to queries and quotations.
- smart logistics, worldwide
- a large well-stocked warehouse
- a digital, online portal which ensures an easy and efficient purchasing experience for our customers
- generally a very easy business experience due to our automated systems and exceptional levels of service

› Stocking all types of products for temperature sensors

We distinguish ourselves in the market by being one of the only suppliers stocking all types of products for temperature sensors:

- Mineral insulated (MI) thermocouple cable
- Mineral insulated (MI) RTD cable
- High temperature thermocouples
- Temperature detector (RTD) elements
- Extension and compensation cable for thermocouples
- Thermocouple wire and rods
- Connections heads and terminals
- Thermocouple connectors and accessories

Contact us ›

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