

THERMOTHAL® KM THERMOCOUPLE WIRE

DATASHEET

Thermothal® KM is an austenitic nickel-chromium alloy (NiCr alloy) used for the positive leg of thermocouples type K. Thermothal® KM is an alloy optimized for manufacturing of mineral insulated cable. In standard condition the Thermothal® KM is delivered in stabilized condition. The tabulated list describes the temperature characteristic in standard condition. Thermocouples of type K have good resistance to oxidation, and better than other base metal combinations.

Thermothal KM cannot be exposed to reducing or alternately oxidizing and reducing atmospheres or vacuum.

CHEMICAL COMPOSITION

	Ni %	Cr %	Si %
Nominal composition	Bal.	10.0	0.5

MECHANICAL PROPERTIES

Wire size	Yield strength	Tensile strength	Elongation	Hardness
∅	R _{p0.2}	R _m	A	
mm	MPa	MPa	%	Hv
2.0	220	580	35	140

Mechanical properties at elevated temperature

Temperatur	Yield strength	Tensile strength	Elongation
	R _{p0.2}	R _m	A ₅₀
°C	MPa	MPa	%
100	272	596	41
300	244	594	39
500	217	563	39

Ultimate tensile strength - deformation rate $6.2 \times 10^{-6} \text{ min}^{-1}$

PHYSICAL PROPERTIES

Density g/cm ³	8.72
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Electrical resistivity at 20°C Ω mm ² /m	0.706
Temperature coefficient of resistance between 20°C and 100°C x 10 ⁻⁶ / K	300

YOUNG'S MODULUS

Temperature °C	20	100	300	500
GPa	200	132	68	48

COEFFICIENT OF THERMAL EXPANSION

Temperature °C	Thermal Expansion x 10 ⁻⁶ / K
20 - 100	17

THERMAL CONDUCTIVITY

Temperature °C	100
W m ⁻¹ K ⁻¹	19.2

SPECIFIC HEAT CAPACITY

Temperature °C	20
kJ kg ⁻¹ K ⁻¹	0.448

Melting point °C	1430
Magnetic properties	The material is non-magnetic

RECOMMENDED MAXIMUM CONTINUOUS OPERATING TEMPERATURE

Wire size \emptyset	3.26	1.63	1.00	0.50	0.25
Bare wire °C	1050	930	900	800	710
Protected wire °C	1150	1080	1050	910	820

Note that the indicated temperatures should be considered as guide values

THERMOELECTRIC PROPERTIES

NOMINAL EMF VALUES VS PT 67 - REFERENCE JUNCTION 0°C

°C	100	200	300	400	500	600	700	800	900	1000	1100	1200
mV	2.814	5.970	9.323	12.764	16.214	19.618	22.951	26.205	29.386	32.499	35.544	38.508

Reference junction 0°C

NOMINAL EMF VALUES VS THERMOTHAL® N

°C	100	200	300	400	500	600	700	800	900	1000	1100	1200
mV	4.096	8.139	12.209	16.397	20.644	24.906	29.129	33.275	37.326	41.276	45.119	48.839

(ITS 90) - Reference junction 0°C

Disclaimer: Recommendations are for guidance only, and the suitability of a material for a specific application can be confirmed only when we know the actual service conditions. Continuous development may necessitate changes in technical data without notice. This datasheet is only valid for materials under the trademark Kanthal®.