KANTHAL

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Nikrothal 80

(Resistance heating wire and resistance wire)

Nikrothal 80 is an austenitic nickel-chromium alloy (NiCr alloy) for use at temperatures up to 1200°C (2190°F). The alloy is characterized by high resistivity, good oxidation resistance and very good form stability. It has good ductility after use and excellent weldability.

Nikrothal 80 is used for electric heating elements in home appliances and industrial furnaces. Typical applications are flat irons, ironing machines, water heaters, plastic moulding dies, soldering irons, metal sheathed tubular elements and cartridge elements.

Due to extremely good adhesion properties of the surface oxide, Nikrothal 80 offers superior service life compared to competitive nickel-chromium alloys.

CHEMICAL COMPOSITION

	C %	Si %	Mn %	Cr %	Ni %	Fe %	Trace elements
Nominal composition					Bal.		Added
Min	-	1.0	-	19.0	-	-	-
Max	0.10	1.7	1.0	21.0	-	2.0*	-

* Fe< 1.0 on request

MECHANICAL PROPERTIES

Wire size	Yield strength	Tensile strength	Elongation	Hardness
Ø	$R_{p0.2}$	R_m	A	
mm	MPa	MPa	%	Hv
1.0	420	810	30	180
4.0	300	725	30	160

MECHANICAL PROPERTIES AT ELEVATED TEMPERATURE

Temperature °C	**900**
MPa	100

Ultimate tensile strength - deformation rate 6.2 x 10^{-2}/min

CREEP STRENGTH - 1% ELONGATION IN 1000 H

Temperature °C	**800**	**1000**
MPa	15	4

PHYSICAL PROPERTIES

Density g/cm^3	8.30
Electrical resistivity at 20°C Ω mm^2/m	1.09

TEMPERATURE FACTOR OF RESISTIVITY

Temperature°C	**100**	**200**	**300**	**400**	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**
Ct	1.01	1.02	1.03	1.04	1.04	1.04	1.04	1.04	1.04	1.05	1.06	1.07

COEFFICIENT OF THERMAL EXPANSION

Temperature °C	Thermal Expansion x 10^{-6}/K
20 - 250	14.1
20 - 500	14.9
20 - 750	16.0
20 - 1000	17.2

THERMAL CONDUCTIVITY

Temperature °C	**20**	**100**	**200**	**300**	**400**	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**
W m^{-1} K^{-1}	15	15	15	15	17	19	21	22	24	26	28	30

SPECIFIC HEAT CAPACITY

Temperature °C	**20**	**100**	**200**	**300**	**400**	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**
kJ kg^{-1} K^{-1}	0.46	0.46	0.48	0.50	0.52	0.54	0.56	0.60	0.63	0.65	0.67	0.70

Melting point °C	1400
Max continuous operating temperature in air °C	1200
Magnetic properties	The material is non-magnetic
Emissivity - fully oxidized material	0.88