KOLOFOL
Industry solutions

Kanthal® A-1 resistance wire

Ferritic iron-chromium-aluminium alloy (FeCrAl) | electric heating and resistance wire

PRODUCT OVERVIEW

An alloy with high electrical resistivity and excellent oxidation resistance. Commonly used for heating elements in high-temperature furnaces in heat treatment, ceramics, glass, steel and electronics.

Max. operating temp.	Electrical resistivity	Density	Melting point
1400 °C	**1,45**	**7,10**	**1500 °C**
continuously in air	Ω·mm²/m, 20 °C	g/cm³	typical value

Chemical composition

NOMINAL / LIMIT VALUES

Element	Nominal, %	Min., %	Max., %
Chromium (Cr)	–	20,5	23,5
Aluminium (Al)	5,8	–	–
Carbon (C)	–	–	0,08
Silicon (Si)	–	–	0,7
Manganese (Mn)	–	–	0,4
Iron (Fe)	balance	–	–

Actual composition may vary to meet specified electrical resistance and dimensional tolerances.

Mechanical properties

Wire Ø, mm	Rp0,2, MPa	Rm, MPa	A, %	Hardness, HV
1,0	545	760	20	**240**
4,0	475	680	18	**230**

Tensile strength at elevated temperature

T, °C	900	1000	1100	1200	1300
Rm, MPa	34	18	10	6	**4**

Test condition: strain rate 6.2 × 10^{-2}/min.

Creep strength (1% elongation / 1000 h) — **800 °C: 1,2 MPa | 1000 °C: 0,5 MPa**

Thermal and physical properties

Elasticity, thermal conductivity, expansion and temperature dependence of resistivity

ADDITIONAL PROPERTIES

Poisson's ratio: 0.30 | Emissivity of oxidised surface: 0.70

Magnetic properties: magnetic up to approx. 600 °C (Curie point).

Young's modulus E (GPa)

Temperature	Value
20 °C	220
100 °C	210
200 °C	205
400 °C	190
600 °C	170
800 °C	150
1000 °C	130

Specific heat c_p (kJ/(kg·K))

Temperature	Value
20 °C	0,46
200 °C	0,56
400 °C	0,63
600 °C	0,75
800 °C	0,71
1000 °C	0,72
1200 °C	0,74
1400 °C	0,80

Thermal conductivity λ (W/(m·K))

Temperature	Value
50 °C	11
600 °C	20
800 °C	22
1000 °C	26
1200 °C	27
1400 °C	35

Thermal expansion (10^{-6}/K)

Temperature	Value
20–250 °C	11
20–500 °C	12
20–750 °C	14
20–1000 °C	15

Temperature factor of resistivity (Ct)

T, °C	Ct	T, °C	Ct
100	1,00	800	1,03
200	1,00	900	1,03
300	1,00	1000	1,04
400	1,00	1100	1,04
500	1,01	1200	1,04
600	1,02	1300	1,04
700	1,02	1400	1,05

Source: Kanthal® A-1 manufacturer datasheet, updated 2021-02-04. These values are indicative; suitability must be checked under actual operating conditions. Data are valid only for material supplied under the Kanthal® trademark.