KANTHAL®

Part of Sandvik Group

KANTHAL® A-1

RESISTANCE HEATING WIRE AND RESISTANCE WIRE

DATASHEET

Kanthal® A-1 is a ferritic iron-chromium-aluminium alloy (FeCrAl alloy) for use at temperatures up to 1400°C (2550°F). The alloy is characterized by high resistivity and very good oxidation resistance.

Typical applications for Kanthal® A-1 are electrical heating elements in high-temperature furnaces for heat treatment, ceramics, glass, steel, and electronics industries.

CHEMICAL COMPOSITION

	C %	Si %	Mn %	Cr %	Al %	Fe %
†Nominal composition					5.8	Bal.
Min	-	-	-	20.5	-	
Max	0.08	0.7	0.4	23.5	-	

†Note: Composition listed is nominal. Actual composition may vary to meet standard electrical resistance and dimensional tolerances.

MECHANICAL PROPERTIES

Wire size	Yield strength	Tensile strength	Elongation	Hardness
Ø	$R_{p0.2}$	R_m	A	
mm	MPa	MPa	%	Hv
1.0	545	760	20	240
4.0	475	680	18	230

MECHANICAL PROPERTIES AT ELEVATED TEMPERATURE

Temperature °C	900	1000	1100	1200	1300
MPa	34	18	10	6	4

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

CREEP STRENGTH - 1% ELONGATION IN 1000 H

Temperature °C	800	1000

Datasheet updated 7/6/2018 2:16:15 PM (supersedes all previous editions)

CREEP STRENGTH - 1% ELONGATION IN 1000 H

Temperature °C	800	1000
MPa	1.2	0.5

PHYSICAL PROPERTIES

Density g/cm^3	7.10
Electrical resistivity at 20°C Ω mm^2/m	1.45
Poisson's ratio	0.30

YOUNG'S MODULUS

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

TEMPERATURE FACTOR OF RESISTIVITY

Temp. °C	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400
Ct	1.00	1.00	1.00	1.00	1.01	1.02	1.02	1.03	1.03	1.04	1.04	1.04	1.04	1.05

COEFFICIENT OF THERMAL EXPANSION

Temperature °C	Thermal Expansion x 10^{-6}/K
20 - 250	11
20 - 500	12
20 - 750	14
20 - 1000	15

THERMAL CONDUCTIVITY

Temperature °C	50	600	800	1000	1200	1400
W m^{-1} K^{-1}	11	20	22	26	27	35

SPECIFIC HEAT CAPACITY

Temperature °C	20	200	400	600	800	1000	1200	1400
kJ kg^{-1} K^{-1}	0.46	0.56	0.63	0.75	0.71	0.72	0.74	0.80

Melting point °C	1500
Max continuous operating temperature in air °C	1400
Magnetic properties	The material is magnetic up to approximately 600°C (Curie point).
Emissivity - fully oxidized material	0.70

Datasheet updated 7/6/2018 2:16:15 PM (supersedes all previous editions)

KANTHAL®

Part of Sandvik Group