

KANTHAL® D
Wire
Ferritic Resistance Alloy

1995-11-08
 Issue 4

KANTHAL D is a ferritic FeCrAl alloy which is used at wire temperatures up to 1300°C (2370°F). It is used in domestic appliances as well as in industrial applications.

Typical applications for KANTHAL D are in metal sheathed tubular elements for dishwashers, in elements embedded in ceramics for panel heaters, in cartridge elements in metal dies, in heating cables and rope heaters in defrosting and de-icing elements, in mica elements used in irons, in quartz tube heaters for space heating, industrial infrared dryers, in coils on molded ceramic fibre for boiling plates with ceramic hobs, in bead insulated coils for panel heaters, in suspended coil elements for air heaters in laundry dryers. In industrial applications such as terminals to furnace elements, in porcupine elements for air heating, and in furnace heating elements.

Chemical composition

	C [%]	Si [%]	Mn [%]	Cr [%]	Al [%]	Fe [%]
Nominal composition					4.8	Balance
Min	–	–	–	20.5	–	
Max	0.08	0.7	0.5	23.5	–	

Mechanical properties

Wire size Ø [mm]	Yield strength R _p 0.2 [Mpa]	Tensile strength R _m [Mpa]	Elongation A [%]	Hardness [Hv]
1.0	485	670	23	230
4.0	450	650	18	230

Young's modulus

Temperature [°C]	20	100	200	400	600	800	1000
× 10 ³ MPa	220	210	205	190	170	150	130

Poisson's ratio 0.30

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Mechanical properties at elevated temperature

Ultimate tensile strength – deformation rate $6.2 \times 10^{-2} \text{ min}^{-1}$

Temperature [°C]	900
[Mpa]	34

Creep strength -1% elongation in 1000 h

Temperature [°C]	800	1000
[Mpa]	1.2	0.5

Physical properties

Density g/cm^3 7.25
 Electrical resistivity at 20°C (68°F) $\Omega \text{ mm}^2 \text{ m}^{-1}$ 1.35

Temperature factor of resistivity

Temperature [°C]	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300
$\times 10^3 \text{ MPa}$	1.00	1.01	1.01	1.02	1.03	1.04	1.05	1.06	1.07	1.07	1.07	1.08	1.08

Coefficient of thermal expansion

Temperature [°C]	Thermal expansion $\times 10^{-6} \text{ K}^{-1}$
20–250	11
20–500	12
20–750	14
20–1000	15

Thermal conductivity

Temperature [°C]	50	600	800	1000	1200
$\text{W m}^{-1} \text{ K}^{-1}$	11	20	22	26	27

Specific heat capacity

Temperature [°C]	20	200	400	600	800	1000	1200
$\text{kJ kg}^{-1} \text{ K}^{-1}$	0.46	0.56	0.63	0.75	0.71	0.72	0.74

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Melting point	[°C]	1500
Max. continuous operating temperature in air	[°C]	1300

Magnetic properties

The material is magnetic up to approximately 600°C (1112°F) (the Curie point)

Emissivity – fully oxidized material 0.70

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