ELECTRON

Physical & Mechanical Properties

		KANTHAL APM™	KANTHAL® A-1	KANTHAL A	KANTHAL AF	KANTHAL AE	KANTHAL D
Max continuous operating temp. (element temperature in air)	°C (°F)	1425 (2600)	1400 (2550)	1350 (2460)	1300 (2370)	1300 (2370)	1300 (2370)
Nominal composition (See Note), %	Cr Al Fe Ni	22 5.8 balance –	22 5.8 balance –	22 5.3 balance –	22 5.3 balance –	22 5.3 balance –	22 4.8 balance –
Density ρ	g/cm³ (lb/in³)	7.10 (0.256)	7.10 (0.256)	7.15 (0.258)	7.15 (0.258)	7.15 (0.258)	7.25 (0.262)
Resistivity at 20°C at 68°F	Ω mm²/m (Ω/cmf)	1.45 (872)	1.45 (872)	1.39 (836)	1.39 (836)	1.39 (836)	1.35 (812)
Temperature factor of the resistivity, Ct							
250°C (480°F)		1.00	1.00	1.01	1.01	1.01	1.01
500°C (930°F)		1.01	1.01	1.03	1.03	1.03	1.03
800°C (1470°F)		1.03	1.03	1.05	1.05	1.05	1.06
1000°C (1830°F)		1.04	1.04	1.06	1.06	1.06	1.07
1200°C (2190°F)		1.05	1.04	1.06	1.06	1.06	1.08
Linear thermal expansion coefficient α, × 10-6/K							
20 – 100°C (68 – 210°F)		–	–	–	–	–	–
20 – 250°C (68 – 480°F)		11	11	11	11	11	11
20 – 500°C (68 – 930°F)		12	12	12	12	12	12
20 – 750°C (68 – 1380°F)		14	14	14	14	14	14
20 – 1000°C (68 – 1840°F)		15	15	15	15	15	15
Thermal conductivity λ at 50°C at 122°F	W/m K (Btu in/ft2 h °F)	11 (76)	11 (76)	11 (76)	11 (76)	11 (76)	11 (76)
Specific heat capacity at 20°C at 68°F	kJ/kg K (Btu/lb °F)	0.46 (0.110)	0.46 (0.110)	0.46 (0.110)	0.46 (0.110)	0.46 (0.110)	0.46 (0.110)
Melting point (approx.)	°C (°F)	1500 (2730)	1500 (2730)	1500 (2730)	1500 (2730)	1500 (2730)	1500 (2730)
Mechanical properties* (approx.)							
Tensile strength	N/mm² (psi)	680** (98600**)	680 (98600)	725 (105200)	700 (101500)	720 (104400)	670 (97200)
Yield point	N/mm² (psi)	470** (68200**)	545 (79000)	550 (79800)	500 (72500)	520 (74500)	485 (70300)
Hardness	Hv	230	240	230	230	230	230
Elongation at rupture	%	20**	20	22	23	20	22
Tensile strength at 900°C at 1650°F	N/mm² (psi)	40 (5800)	34 (4900)	34 (4900)	37 (5400)	34 (4900)	34 (4900)
Creep strength*							
at 800°C	N/mm²	8.2	1.2	1.2	–	1.2	1.2
at 1470°F	(psi)	(1190)	(170)	(170)	–	(170)	(170)
at 1000°C	N/mm²	–	0.5	0.5	–	–	0.5
at 1830°F	(psi)	–	(70)	(70)	–	–	(70)
at 1100°C	N/mm²	–	–	–	0.7	–	–
at 2010°F	(psi)	–	–	–	(100)	–	–
at 1200°C	N/mm²	–	–	–	0.3	–	–
at 2190°F	(psi)	–	–	–	(40)	–	–
Magnetic properties		1)	1)	1)	1)	1)	1)
Emissivity, fully oxidized condition		0.70	0.70	0.70	0.70	0.70	0.70

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

* The values given apply for sizes of approx. 1.0 mm diameter (0.039 in)
** 4.0 mm (0.157 in) Thinner gauges have higher strength and hardness values while the corresponding values are lower for thicker gauge
*** Calculated from observed elongation in a Kanthal standard furnace test. 1% elongation after 1000 hours
**** Composition listed is nominal. Actual composition may vary to meet standard electrical resistance and dimensional tolerances.

ALKROTHAL®	NIKROTHAL® 80	NIKROTHAL TE	NIKROTHAL 70	NIKROTHAL 60	NIKROTHAL 40	NIKROTHAL 20	NIFETHAL™ 70	NIFETHAL 52
1100 (2010)	1200 (2190)	1200 (2190)	1250 (2280)	1150 (2100)	1100 (2010)	1050 (1920)	600 (1110)	600 (1110)
15	20	22	30	16	20	24	–	–
4.3	–	–	–	–	–	–	–	–
balance	–	9	–	balance	balance	balance	balance	balance
–	80	balance	70	60	35	20	72	52
7.28 (0.263)	8.30 (0.300)	8.10 (0.293)	8.10 (0.293)	8.20 (0.296)	7.90 (0.285)	7.80 (0.281)	8.45 (0.305)	8.20 (0.296)
1.25 (744)	1.09 (655)	1.19 (716)	1.18 (709)	1.11 (668)	1.04 (626)	0.95 (572)	0.20 (120)	0.376 (220)
1.02	1.02	1.04	1.02	1.04	1.08	1.12	2.19	1.93
1.05	1.05	1.06	1.05	1.08	1.15	1.21	3.66	2.77
1.10	1.04	1.06	1.04	1.10	1.21	1.28	–	–
1.11	1.05	1.07	1.05	1.11	1.23	1.32	–	–
–	1.07	1.07	1.06	–	–	–	–	–
–	–	–	–	–	–	–	–	10
11	15	14	14	16	16	16	–	–
12	16	15	15	17	17	17	13	–
14	17	16	16	18	18	18	–	–
15	18	17	17	18	19	19	15	–
16 (110)	15 (104)	14 (97)	14 (97)	14 (97)	13 (90)	13 (90)	17 (120)	17 (120)
0.46 (0.110)	0.46 (0.110)	0.46 (0.110)	0.46 (0.110)	0.46 (0.110)	0.50 (0.119)	0.50 (0.119)	0.52 (0.120)	0.52 (0.120)
1500 (2730)	1400 (2550)	1380 (2515)	1380 (2515)	1390 (2535)	1390 (2535)	1380 (2515)	1430 (2610)	1435 (2620)
630 (91400)	810 (117500)	800 (116000)	820 (118900)	730 (105900)	675 (97900)	675 (97500)	640 (92800)	610 (88500)
455 (66000)	420 (60900)	390 (56600)	430 (62400)	370 (53700)	340 (49300)	335 (48600)	340 (49300)	340 (49300)
220	180	190	185	180	180	160	–	–
22	30	30	30	35	35	30	–	30
30 (4300)	100 (14500)	– –	120 (17400)	100 (14500)	120 (17400)	120 (17400)	– –	– –
1.2 (170)	15 (2160)	15 (2160)	– –	15 (2160)	20 (2900)	20 (2900)	– –	– –
1 (140)	4 (560)	4 (560)	– –	4 (560)	4 (560)	4 (560)	– –	– –
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
1)	2)	2)	2)	3)	2)	2)	4)	5)
0.70	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88

1) Magnetic (Curie point approx. 600°C (1100°F))
2) Non- magnetic
3) Slightly magnetic
4) Magnetic up to 610°C (1130°F) (Curie point)
5) Magnetic up to 530°C (990°F) (Curie point)
6) ± 10%