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Alloy Data Table –

ADT2001.12.17.KAPM.MET.STOCK

Resistance Heating Wire Iron-Chrome-Aluminum (Fe-Cr-Al) Alloy - KAPM

$$in^2/\Omega = \frac{I^2 C_t}{p}$$

I = Current

C_t = Temperature factor

p = Surface load W/in^2

Common Names: KAPM, Alloy 875 PM, Kanthal APM

Uses: Typical applications are in furnaces for firing of high temperature ceramics, heat treatment furnaces, laboratory furnaces, diffusion furnaces, and high temperature kilns. Produced from powder metallurgy technology this alloy has demonstrated significant improvements in both physical and mechanical properties. Its advantages are better form stability, high temperature strength, and the ability to be self-supporting at temperatures above 1300º C. It has an excellent surface oxide, which gives good protection in corrosive atmospheres as well as in atmospheres with high carbon potential, and no scaling.

Composition

Ni	Cr	Fe	Al	Si	Mn	Cu	C	Ti	Mo	W
None/Trace	22%	Balance	5.8%	None/Trace	None/Trace	None/Trace	None/Trace	None/Trace	None/Trace	None/Trace

Technical Data

Resistivity (Ω/cmf)	872	**Resistivity (Ω/sqmf)**	684
Resistivity (μΩ/cm)	147.47	**Nom. Temp. Coeff. of Resistance (TCR)**	0.00002
Std. Res. Tol. <.020"	3%	**Std. Res. Tol. >.020"**	5%
Thermal EMF vs. Cu	-6.4	**Specific Heat (20°C)**	0.11 cal/g
Density (g/cm^3)	7.10	**Density (lb/in^3)**	0.256
Thermal Conductivity	0.187 W/cm/°C	**Coeff. of Linear Expansion (X 10^{-6})**	15.00 in/in/°C
Approx. Melting Point	1500°C	**Max. Continuous Operating Temp.**	1400°C
UTS – Hard (KPSI)	200	**YTS Tensile – Hard (KPSI)**	
UTS – Stress Relieved (KPSI)	175	**YTS Tensile – Stress Relieved (KPSI)**	
UTS – Annealed (KPSI)	115	**YTS Tensile – Annealed (KPSI)**	
Magnetic Attraction	Strong	**Emissivity – fully oxidized**	0.70
Designations/Specifications	ASTM = B603	**Forms Available**	Wire, Ribbon, Insul.

Temperature Factor – To obtain resistance at working temperature multiply by the factor C_t, in the following table:

°C	20	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400
KAPM C_t	1.00	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

Alloy Data

Diameter mm	Resistance at 20° C Ω/m	Resistance at 20° C Ω/kg	Weight kg/1000 m	Surface area cm^2/m	cm^2/Ω at 20°C
10.0000	0.0185	0.0332	556.5375	314.1593	17020.8372
9.5000	0.0205	0.0407	502.2751	298.4513	14593.2403
8.2500	0.0271	0.0716	378.7933	259.1814	9557.4660
8.0000	0.0288	0.0810	356.1840	251.3274	8714.6686
7.3500	0.0342	0.1136	300.6555	230.9071	6758.3851
7.0000	0.0377	0.1381	272.7034	219.9115	5838.1472
6.5000	0.0437	0.1858	235.1371	204.2035	4674.3474
6.0000	0.0513	0.2559	200.3535	188.4956	3676.5008
5.5000	0.0610	0.3624	168.3526	172.7876	2831.8418
5.0000	0.0738	0.5306	139.1344	157.0796	2127.6046
4.7500	0.0818	0.6515	125.5688	149.2257	1824.1550
4.5000	0.0911	0.8088	112.6988	141.3717	1551.0238
4.2500	0.1022	1.0165	100.5246	133.5177	1306.6152
4.0000	0.1154	1.2955	89.0460	125.6637	1089.3336
3.7500	0.1313	1.6771	78.2631	117.8097	897.5832
3.5000	0.1507	2.2101	68.1758	109.9557	729.7684
3.2500	0.1747	2.9726	58.7843	102.1018	584.2934
3.0000	0.2051	4.0944	50.0884	94.2478	459.5626
2.8000	0.2354	5.3956	43.6325	87.9646	373.6414

Diameter mm	Resistance at 20° C Ω/m	Resistance at 20° C Ω/kg	Weight kg/1000 m	Surface area cm^2/m	cm^2/Ω at 20°C
2.6000	0.2730	7.2574	37.6219	81.6814	299.1582
2.5000	0.2953	8.4901	34.7836	78.5398	265.9506
2.3000	0.3489	11.8512	29.4408	72.2566	207.0925
2.2000	0.3813	14.1574	26.9364	69.1150	181.2379
2.0000	0.4614	20.7279	22.2615	62.8319	136.1667
1.7000	0.6387	39.7081	16.0839	53.4071	83.6234
1.5000	0.8203	65.5103	12.5221	47.1239	57.4453
1.2000	1.2818	159.9372	8.0141	37.6991	29.4120
1.0000	1.8457	331.6458	5.5654	31.4159	17.0208