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Alloy Data Table –
ADT2001.12.17.KAF.MET

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

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

I = Current
C_t = Temperature factor
p = Surface load W/in^2

Common Names: Kanthal AF, Resistohm Y, Aluchrom Y, Alloy 837, AF

Uses: Ideal choice when you need good form stability at elevated temperatures. Uses: Open mica elements for toasters and hair dryers, meander shaped elements for fan heaters, open coil elements on fiber insulating material, ceramic glass top heaters in ranges, boiling (hot) plates, suspended coil and straight wire elements for radiators, convection heaters, as porcupine elements for hot air guns, radiators, and tumble dryers.

Composition

Ni	Cr	Fe	Al	Si	Mn	Cu	C	Ti	Mo	W
None/Trace	22%	Balance	5.3%	None/Trace	None/Trace	None/Trace	None/Trace	None/Trace	None/Trace	None/Trace

Technical Data

Resistivity (Ω/cmf)	836	**Resistivity (Ω/sqmf)**	656
Resistivity (μΩ/cm)	139	**Nom. Temp. Coeff. of Resistance (TCR)**	0.00850
Std. Res. Tol. <.020"	3%	**Std. Res. Tol. >.020"**	5%
Thermal EMF vs. Cu	-0.022	**Specific Heat (20°C)**	0.1099 cal/g
Density (g/cm^3)	7.15	**Density (lb/in^3)**	0.258
Thermal Conductivity	0.11 W/cm/°C	**Coeff. of Linear Expansion (X 10^{-6})**	11.00 in/in/°C
Approx. Melting Point	1500°C	**Max. Continuous Operating Temp.**	1300°C
UTS – Hard (KPSI)		**YTS Tensile – Hard (KPSI)**	
UTS – Stress Relieved (KPSI)		**YTS Tensile – Stress Relieved (KPSI)**	
UTS – Annealed (KPSI)	101.50	**YTS Tensile – Annealed (KPSI)**	72.50
Magnetic Attraction	Strong	**Emissivity – fully oxidized**	0.70
Designations/Specifications		**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
KAF C_t	1.00	1.00	1.01	1.01	1.02	1.03	1.04	1.04	1.05	1.05	1.06	1.06	1.06	1.06

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
10.4049	0.0163	0.0269	607.2285	326.8804	19998.9905
9.2658	0.0206	0.0428	481.5534	291.0952	14123.6368
8.2515	0.0260	0.0681	381.8887	259.2276	9974.3592
7.3481	0.0328	0.1082	302.8510	230.8486	7044.0669
6.5437	0.0413	0.1721	240.1715	205.5765	4974.6432
5.8273	0.0521	0.2736	190.4643	183.0710	3513.1800
5.1894	0.0657	0.4350	151.0449	163.0293	2481.0691
4.6213	0.0829	0.6917	119.7839	145.1817	1752.1744
4.1154	0.1045	1.0999	94.9928	129.2880	1237.4162
3.6648	0.1317	1.7489	75.3326	115.1342	873.8850
3.2636	0.1661	2.7809	59.7414	102.5299	617.1528
2.9063	0.2095	4.4218	47.3770	91.3054	435.8441
2.5882	0.2642	7.0309	37.5716	81.3098	307.8007
2.3048	0.3331	11.1797	29.7956	72.4084	217.3743
2.0525	0.4200	17.7764	23.6290	64.4815	153.5135
1.8278	0.5297	28.2657	18.7386	57.4224	108.4139
1.7249	0.5948	35.6424	16.6872	54.1881	91.1075
1.6277	0.6679	44.9443	14.8604	51.1361	76.5638
1.5360	0.7500	56.6738	13.2335	48.2559	64.3417

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
1.4495	0.8422	71.4645	11.7848	45.5380	54.0707
1.3679	0.9457	90.1151	10.4946	42.9731	45.4393
1.2908	1.0620	113.6333	9.3457	40.5527	38.1857
1.2181	1.1925	143.2891	8.3226	38.2686	32.0900
1.1495	1.3391	180.6845	7.4115	36.1132	26.9674
1.0848	1.5038	227.8392	6.6001	34.0792	22.6625
1.0237	1.6886	287.3004	5.8776	32.1597	19.0448
0.9660	1.8962	362.2796	5.2341	30.3483	16.0047
0.9116	2.1293	456.8268	4.6611	28.6390	13.4498
0.8603	2.3911	576.0488	4.1508	27.0260	11.3028
0.8118	2.6850	726.3852	3.6964	25.5038	9.4985
0.7661	3.0151	915.9561	3.2918	24.0673	7.9822
0.7229	3.3858	1155.0010	2.9314	22.7117	6.7080
0.6822	3.8020	1456.4314	2.6105	21.4325	5.6372
0.6438	4.2694	1836.5288	2.3247	20.2254	4.7373
0.6075	4.7942	2315.8233	2.0702	19.0862	3.9811
0.5733	5.3836	2920.2035	1.8436	18.0112	3.3456
0.5410	6.0454	3682.3139	1.6417	16.9967	2.8115
0.5106	6.7886	4643.3187	1.4620	16.0394	2.3627
0.4818	7.6232	5855.1252	1.3020	15.1360	1.9855
0.4547	8.5603	7383.1871	1.1594	14.2835	1.6686
0.4291	9.6126	9310.0404	1.0325	13.4790	1.4022
0.4049	10.7943	11739.7609	0.9195	12.7198	1.1784
0.3821	12.1213	14803.5864	0.8188	12.0034	0.9903
0.3606	13.6114	18667.0045	0.7292	11.3273	0.8322
0.3403	15.2847	23538.6917	0.6493	10.6893	0.6993
0.3211	17.1637	29681.7847	0.5783	10.0873	0.5877
0.2859	21.6431	47196.0215	0.4586	8.9830	0.4151
0.2546	27.2915	75044.8285	0.3637	7.9996	0.2931
0.2268	34.4140	119326.2928	0.2884	7.1238	0.2070
0.2019	43.3953	189736.7807	0.2287	6.3439	0.1462
0.1798	54.7205	301694.1622	0.1814	5.6494	0.1032
0.1601	69.0014	479713.8813	0.1438	5.0310	0.0729
0.1426	87.0092	762777.1326	0.1141	4.4802	0.0515
0.1270	109.7168	1212866.6203	0.0905	3.9897	0.0364
0.1131	138.3505	1928538.9873	0.0717	3.5529	0.0257
0.1007	174.4570	3066505.8821	0.0569	3.1640	0.0181
0.0897	219.9865	4875949.3000	0.0451	2.8176	0.0128
0.0799	277.3983	7753085.2670	0.0358	2.5092	0.0090
0.0711	349.7933	12327923.7456	0.0284	2.2345	0.0064
0.0633	441.0818	19602222.6822	0.0225	1.9898	0.0045
0.0564	556.1947	31168844.1631	0.0178	1.7720	0.0032
0.0502	701.3495	49560545.3634	0.0142	1.5780	0.0022
0.0447	884.3867	78804579.4662	0.0112	1.4053	0.0016
0.0398	1115.1926	125304548.1906	0.0089	1.2514	0.0011
0.0355	1406.2339	199242606.2496	0.0071	1.1144	0.0008
0.0316	1773.2308	316809060.1528	0.0056	0.9924	0.0006
0.0281	2236.0059	503747579.3162	0.0044	0.8838	0.0004
0.0251	2819.5554	800992318.6685	0.0035	0.7870	0.0003