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Alloy Data Table –
ADT2001.12.17.KD.ENG

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

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

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

Common Names: Kanthal D, Kanthal, Alloy 815, Alchrome DK, Alferon 901, Resistohm 135, Aluchrom S, Aluchrom I, Stablohm 812

Uses: Metal sheathed tubular elements, elements embedded in ceramics for panel heaters, cartridge heaters, heating cables and rope heaters for defrosting and de-icing, mica elements used in irons, quartz tube heaters for space heating, infrared dryers, heating plates, ceramic hobs, bead insulated coils for panel heaters, air heaters, laundry dryers, furnace element terminals, porcupine elements, and furnace heating elements.

Composition

Ni	Cr	Fe	Al	Si	Mn	Cu	C	Ti	Mo	W
None/Trace	22%	Balance	4.8%	None/Trace	None/Trace	None/Trace	None/Trace	None/Trace	None/Trace	None/Trace

Technical Data

Resistivity (Ω/cmf)	815	**Resistivity (Ω/sqmf)**	640
Resistivity (μΩ/cm)	135	**Nom. Temp. Coeff. of Resistance (TCR)**	0.00002
Std. Res. Tol. <.020"	5%	**Std. Res. Tol. >.020"**	3%
Thermal EMF vs. Cu		**Specific Heat (20°C)**	0.11 cal/g
Density (g/cm^3)	7.25	**Density (lb/in^3)**	0.262
Thermal Conductivity	0.11 W/cm/°C	**Coeff. of Linear Expansion (X 10^{-6})**	11.80 in/in/°C
Approx. Melting Point	1500°C	**Max. Continuous Operating Temp.**	1200°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

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

°F	68	212	392	572	752	932	1112	1292	1472	1652	1832	2012	2192	2372
KD C_t	1.00	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

Alloy Data

Gage AWG	Diameter Inch	Resistance at 68° F Ω/ft	Resistance at 68° F Ω/lb	Weight lb/1000 ft	Surface area in^2/ft	in^2/Ω at 68°F
000	0.4096	0.0049	0.0117	414.3649	15.4432	3179.7232
00	0.3648	0.0061	0.0186	328.6058	13.7525	2245.5761
0	0.3249	0.0077	0.0296	260.5959	12.2470	1585.8651
1	0.2893	0.0097	0.0471	206.6616	10.9062	1119.9657
2	0.2576	0.0123	0.0749	163.8899	9.7123	790.9393
3	0.2294	0.0155	0.1191	129.9704	8.6490	558.5752
4	0.2043	0.0195	0.1894	103.0711	7.7022	394.4756
5	0.1819	0.0246	0.3012	81.7390	6.8590	278.5855
6	0.1620	0.0310	0.4789	64.8219	6.1081	196.7420
7	0.1443	0.0391	0.7616	51.4060	5.4394	138.9426
8	0.1285	0.0494	1.2109	40.7667	4.8439	98.1237
9	0.1144	0.0622	1.9255	32.3295	4.3136	69.2967
10	0.1019	0.0785	3.0616	25.6384	3.8414	48.9385
11	0.0907	0.0990	4.8682	20.3321	3.4209	34.5612
12	0.0808	0.1248	7.7407	16.1241	3.0464	24.4078
13	0.0720	0.1574	12.3082	12.7870	2.7129	17.2372
13.5	0.0679	0.1767	15.5204	11.3871	2.5601	14.4856
14	0.0641	0.1985	19.5709	10.1405	2.4159	12.1732
14.5	0.0605	0.2229	24.6785	9.0304	2.2798	10.2300

Gage AWG	Diameter Inch	Resistance at 68° F Ω/ft	Resistance at 68° F Ω/lb	Weight Lb/1000 ft	Surface area in^2/ft	in^2/Ω at 68°F
15	0.0571	0.2503	31.1190	8.0418	2.1514	8.5969
15.5	0.0539	0.2810	39.2404	7.1614	2.0302	7.2246
16	0.0508	0.3156	49.4813	6.3774	1.9159	6.0713
16.5	0.0480	0.3544	62.3948	5.6792	1.8080	5.1021
17	0.0453	0.3979	78.6785	5.0575	1.7061	4.2877
17.5	0.0427	0.4468	99.2120	4.5038	1.6100	3.6032
18	0.0403	0.5018	125.1041	4.0108	1.5194	3.0280
18.5	0.0380	0.5634	157.7536	3.5717	1.4338	2.5446
19	0.0359	0.6327	198.9240	3.1807	1.3530	2.1384
19.5	0.0339	0.7105	250.8388	2.8325	1.2768	1.7971
20	0.0320	0.7978	316.3024	2.5224	1.2049	1.5102
20.5	0.0302	0.8959	398.8505	2.2463	1.1370	1.2691
21	0.0285	1.0061	502.9419	2.0004	1.0730	1.0665
21.5	0.0269	1.1297	634.1990	1.7814	1.0126	0.8963
22	0.0253	1.2686	799.7113	1.5863	0.9555	0.7532
22.5	0.0239	1.4246	1008.4188	1.4127	0.9017	0.6330
23	0.0226	1.5997	1271.5944	1.2580	0.8509	0.5319
23.5	0.0213	1.7964	1603.4532	1.1203	0.8030	0.4470
24	0.0201	2.0172	2021.9201	0.9977	0.7578	0.3757
24.5	0.0190	2.2652	2549.5978	0.8884	0.7151	0.3157
25	0.0179	2.5436	3214.9880	0.7912	0.6748	0.2653
25.5	0.0169	2.8563	4054.0309	0.7046	0.6368	0.2229
26	0.0159	3.2075	5112.0458	0.6274	0.6009	0.1874
26.5	0.0150	3.6018	6446.1800	0.5587	0.5671	0.1574
27	0.0142	4.0445	8128.4945	0.4976	0.5351	0.1323
27.5	0.0134	4.5418	10249.8570	0.4431	0.5050	0.1112
28	0.0126	5.1001	12924.8496	0.3946	0.4766	0.0934
29	0.0113	6.4311	20551.3747	0.3129	0.4244	0.0660
30	0.0100	8.1095	32678.0592	0.2482	0.3779	0.0466
31	0.0089	10.2259	51960.2982	0.1968	0.3366	0.0329
32	0.0080	12.8946	82620.3469	0.1561	0.2997	0.0232
33	0.0071	16.2598	131371.8734	0.1238	0.2669	0.0164
34	0.0063	20.5033	208890.0588	0.0982	0.2377	0.0116
35	0.0056	25.8542	332149.1545	0.0778	0.2117	0.0082
36	0.0050	32.6016	528139.3546	0.0617	0.1885	0.0058
37	0.0045	41.1100	839776.8716	0.0490	0.1679	0.0041
38	0.0040	51.8388	1335301.3516	0.0388	0.1495	0.0029
39	0.0035	65.3676	2123218.3928	0.0308	0.1331	0.0020
40	0.0031	82.4271	3376059.1480	0.0244	0.1185	0.0014
41	0.0028	103.9388	5368159.6815	0.0194	0.1056	0.0010
42	0.0025	131.0646	8535732.6702	0.0154	0.0940	0.0007
43	0.0022	165.2696	13572385.4242	0.0122	0.0837	0.0005
44	0.0020	208.4015	21580999.9238	0.0097	0.0746	0.0004
45	0.0018	262.7898	34315232.2272	0.0077	0.0664	0.0003
46	0.0016	331.3723	54563512.6716	0.0061	0.0591	0.0002
47	0.0014	417.8533	86759631.8554	0.0048	0.0526	0.0001
48	0.0012	526.9041	137953613.1587	0.0038	0.0469	0.0001
49	0.0011	664.4147	219355464.9388	0.0030	0.0418	0.0001
50	0.0010	837.8127	348789849.6950	0.0024	0.0372	0.0000