

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

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

I = Current
 C_t = Temperature factor
 p = Surface load W/in²

Common Names: Alkrothal® 14, Alloy 750, Alferon 902, Alchrome 750, Resistohm® 125, Aluchrom® W, Stablohm 750

Uses: Relatively low-temperature applications such as heating cables, resistors, terminal pins, etc.

Composition

Ni	Cr	Fe	Al	Si	Mn	Cu	C	Ti	Mo	W
None/Trace	15%	Balance	4.3%	None/Trace						

Technical Data

Resistivity (Ω/cm ²)	752	Resistivity (Ω/sqmf)	591
Resistivity (μΩ/cm)	124.69	Nom. Temp. Coeff. of Resistance (TCR)	0.00009
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)	7.28	Density (lb/in ³)	0.263
Thermal Conductivity	0.21 W/cm/°C	Coeff. of Linear Expansion (X 10 ⁻⁶)	15.00 in/in/°C
Approx. Melting Point	1500°C	Max. Continuous Operating Temp.	1100°C
UTS – Hard (KPSI)	120	YTS Tensile – Hard (KPSI)	
UTS – Stress Relieved (KPSI)	100	YTS Tensile – Stress Relieved (KPSI)	
UTS – Annealed (KPSI)	90	YTS Tensile – Annealed (KPSI)	
Magnetic Attraction	Strong	Emissivity – fully oxidized	0.70
Designations/Specifications		Forms Available	Wire, Ribbon, Square

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
ALK C _t	1.00	1.00	1.02	1.03	1.04	1.05	1.08	1.09	1.10	1.11	1.11	1.12

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	0.0045	0.0108	415.9464	15.4432	3446.1095
00	0.3648	0.0057	0.0171	329.8600	13.7525	2433.7028
0	0.3249	0.0071	0.0272	261.5905	12.2470	1718.7235
1	0.2893	0.0090	0.0433	207.4504	10.9062	1213.7926
2	0.2576	0.0113	0.0689	164.5154	9.7123	857.2015
3	0.2294	0.0143	0.1095	130.4665	8.6490	605.3707
4	0.2043	0.0180	0.1741	103.4645	7.7022	427.5234
5	0.1819	0.0227	0.2769	82.0509	6.8590	301.9245
6	0.1620	0.0286	0.4402	65.0693	6.1081	213.2244
7	0.1443	0.0361	0.7000	51.6022	5.4394	150.5828
8	0.1285	0.0455	1.1131	40.9223	4.8439	106.3442
9	0.1144	0.0574	1.7699	32.4528	4.3136	75.1021
10	0.1019	0.0724	2.8142	25.7362	3.8414	53.0384
11	0.0907	0.0913	4.4748	20.4097	3.4209	37.4567
12	0.0808	0.1152	7.1152	16.1856	3.0464	26.4526
13	0.0720	0.1452	11.3136	12.8358	2.7129	18.6813
13.5	0.0679	0.1631	14.2662	11.4306	2.5601	15.6991
14	0.0641	0.1831	17.9894	10.1792	2.4159	13.1930
14.5	0.0605	0.2056	22.6842	9.0648	2.2798	11.0870
15	0.0571	0.2309	28.6043	8.0725	2.1514	9.3171
15.5	0.0539	0.2593	36.0694	7.1887	2.0302	7.8298
16	0.0508	0.2912	45.4828	6.4018	1.9159	6.5799
16.5	0.0480	0.3270	57.3528	5.7009	1.8080	5.5296
17	0.0453	0.3672	72.3206	5.0768	1.7061	4.6469
17.5	0.0427	0.4123	91.1947	4.5210	1.6100	3.9051
18	0.0403	0.4630	114.9946	4.0261	1.5194	3.2817
18.5	0.0380	0.5199	145.0057	3.5853	1.4338	2.7578

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
19	0.0359	0.5838	182.8491	3.1928	1.3530	2.3176
19.5	0.0339	0.6556	230.5688	2.8433	1.2768	1.9476
20	0.0320	0.7362	290.7423	2.5320	1.2049	1.6367
20.5	0.0302	0.8267	366.6198	2.2548	1.1370	1.3754
21	0.0285	0.9283	462.2997	2.0080	1.0730	1.1559
21.5	0.0269	1.0424	582.9500	1.7882	1.0126	0.9714
22	0.0253	1.1706	735.0874	1.5924	0.9555	0.8163
22.5	0.0239	1.3145	926.9295	1.4181	0.9017	0.6860
23	0.0226	1.4760	1168.8381	1.2628	0.8509	0.5765
23.5	0.0213	1.6575	1473.8798	1.1246	0.8030	0.4845
24	0.0201	1.8613	1858.5308	1.0015	0.7578	0.4071
24.5	0.0190	2.0901	2343.5674	0.8918	0.7151	0.3421
25	0.0179	2.3470	2955.1881	0.7942	0.6748	0.2875
25.5	0.0169	2.6355	3726.4288	0.7073	0.6368	0.2416
26	0.0159	2.9595	4698.9466	0.6298	0.6009	0.2031
26.5	0.0150	3.3234	5925.2708	0.5609	0.5671	0.1706
27	0.0142	3.7319	7471.6392	0.4995	0.5351	0.1434
27.5	0.0134	4.1907	9421.5766	0.4448	0.5050	0.1205
28	0.0126	4.7058	11880.4057	0.3961	0.4766	0.1013
29	0.0113	5.9340	18890.6391	0.3141	0.4244	0.0715
30	0.0100	7.4826	30037.3787	0.2491	0.3779	0.0505
31	0.0089	9.4354	47761.4397	0.1976	0.3366	0.0357
32	0.0080	11.8979	75943.8812	0.1567	0.2997	0.0252
33	0.0071	15.0029	120755.8468	0.1242	0.2669	0.0178
34	0.0063	18.9184	192009.8670	0.0985	0.2377	0.0126
35	0.0056	23.8557	305308.5214	0.0781	0.2117	0.0089
36	0.0050	30.0815	485460.9541	0.0620	0.1885	0.0063
37	0.0045	37.9321	771915.3623	0.0491	0.1679	0.0044
38	0.0040	47.8316	1227397.0164	0.0390	0.1495	0.0031
39	0.0035	60.3146	1951643.2882	0.0309	0.1331	0.0022
40	0.0031	76.0554	3103243.2648	0.0245	0.1185	0.0016
41	0.0028	95.9043	4934364.1937	0.0194	0.1056	0.0011
42	0.0025	120.9332	7845968.8521	0.0154	0.0940	0.0008
43	0.0022	152.4942	12475614.8537	0.0122	0.0837	0.0005
44	0.0020	192.2919	19837061.4149	0.0097	0.0746	0.0004
45	0.0018	242.4760	31542253.4434	0.0077	0.0664	0.0003
46	0.0016	305.7570	50154291.0756	0.0061	0.0591	0.0002
47	0.0014	385.5530	79748674.8311	0.0048	0.0526	0.0001
48	0.0012	486.1741	126805722.9186	0.0038	0.0469	0.0001
49	0.0011	613.0551	201629574.3969	0.0030	0.0418	0.0001
50	0.0010	773.0493	320604499.0380	0.0024	0.0372	0.0000

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