

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)	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/cm³)	7.28	Density (lb/in³)	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:

°C	20	100	200	300	400	500	600	700	800	900	1000	1100
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

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	0.0147	0.0238	618.9965	326.8804	22232.9203
9.2658	0.0185	0.0378	490.8858	291.0952	15701.2770
8.2515	0.0234	0.0601	389.2896	259.2276	11088.5164
7.3481	0.0295	0.0955	308.7203	230.8486	7830.9041
6.5437	0.0372	0.1518	244.8259	205.5765	5530.3214
5.8273	0.0469	0.2414	194.1555	183.0710	3905.6097
5.1894	0.0591	0.3839	153.9721	163.0293	2758.2098
4.6213	0.0745	0.6104	122.1053	145.1817	1947.8960
4.1154	0.0940	0.9706	96.8337	129.2880	1375.6382
3.6648	0.1185	1.5433	76.7925	115.1342	971.4998
3.2636	0.1494	2.4539	60.8992	102.5299	686.0901
2.9063	0.1884	3.9019	48.2952	91.3054	484.5288
2.5882	0.2376	6.2042	38.2997	81.3098	342.1827
2.3048	0.2996	9.8652	30.3730	72.4084	241.6554
2.0525	0.3778	15.6863	24.0869	64.4815	170.6613
1.8278	0.4764	24.9422	19.1017	57.4224	120.5240
1.7249	0.5350	31.4516	17.0106	54.1881	101.2844
1.6277	0.6008	39.6598	15.1483	51.1361	85.1161
1.5360	0.6746	50.0101	13.4900	48.2559	71.5288
1.4495	0.7576	63.0617	12.0132	45.5380	60.1105
1.3679	0.8507	79.5194	10.6980	42.9731	50.5149
1.2908	0.9553	100.2723	9.5269	40.5527	42.4511
1.2181	1.0727	126.4412	8.4839	38.2686	35.6745
1.1495	1.2046	159.4397	7.5551	36.1132	29.9797
1.0848	1.3527	201.0500	6.7280	34.0792	25.1940
1.0237	1.5190	253.5197	5.9915	32.1597	21.1722

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
0.9660	1.7057	319.6829	5.3356	30.3483	17.7924
0.9116	1.9154	403.1133	4.7515	28.6390	14.9522
0.8603	2.1508	508.3172	4.2313	27.0260	12.5653
0.8118	2.4152	640.9771	3.7681	25.5038	10.5595
0.7661	2.7122	808.2583	3.3556	24.0673	8.8738
0.7229	3.0456	1019.1964	2.9882	22.7117	7.4573
0.6822	3.4200	1285.1848	2.6611	21.4325	6.2669
0.6438	3.8404	1620.5904	2.3698	20.2254	5.2665
0.6075	4.3125	2043.5297	2.1103	19.0862	4.4258
0.5733	4.8427	2576.8470	1.8793	18.0112	3.7193
0.5410	5.4380	3249.3487	1.6736	16.9967	3.1256
0.5106	6.1065	4097.3590	1.4903	16.0394	2.6266
0.4818	6.8572	5166.6817	1.3272	15.1360	2.2073
0.4547	7.7002	6515.0746	1.1819	14.2835	1.8550
0.4291	8.6468	8215.3692	1.0525	13.4790	1.5588
0.4049	9.7097	10359.4041	0.9373	12.7198	1.3100
0.3821	10.9034	13062.9860	0.8347	12.0034	1.1009
0.3606	12.2438	16472.1448	0.7433	11.3273	0.9251
0.3403	13.7489	20771.0209	0.6619	10.6893	0.7775
0.3211	15.4391	26191.8112	0.5895	10.0873	0.6534
0.2859	19.4684	41646.7303	0.4675	8.9830	0.4614
0.2546	24.5493	66221.0846	0.3707	7.9996	0.3259
0.2268	30.9561	105295.9504	0.2940	7.1238	0.2301
0.2019	39.0350	167427.5985	0.2331	6.3439	0.1625
0.1798	49.2223	266221.0716	0.1849	5.6494	0.1148
0.1601	62.0682	423309.2965	0.1466	5.0310	0.0811
0.1426	78.2667	673090.0729	0.1163	4.4802	0.0572
0.1270	98.6926	1070258.2013	0.0922	3.9897	0.0404
0.1131	124.4492	1701782.0700	0.0731	3.5529	0.0285
0.1007	156.9278	2705947.2284	0.0580	3.1640	0.0202
0.0897	197.8826	4302636.9430	0.0460	2.8176	0.0142
0.0799	249.5257	6841480.3026	0.0365	2.5092	0.0101
0.0711	314.6466	10878410.9258	0.0289	2.2345	0.0071
0.0633	396.7626	17297400.4216	0.0229	1.9898	0.0050
0.0564	500.3091	27504022.7280	0.0182	1.7720	0.0035
0.0502	630.8790	43733234.3462	0.0144	1.5780	0.0025
0.0447	795.5249	69538765.4853	0.0114	1.4053	0.0018
0.0398	1003.1398	110571284.6879	0.0091	1.2514	0.0012
0.0355	1264.9377	175815732.5947	0.0072	1.1144	0.0009
0.0316	1595.0593	279558765.3256	0.0057	0.9924	0.0006
0.0281	2011.3355	444517120.9481	0.0045	0.8838	0.0004
0.0251	2536.2508	706811931.2441	0.0036	0.7870	0.0003

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