

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/in²

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/cm ²)	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:

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

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	0.0159	0.0258	616.6429	326.8804	20514.3019
9.2658	0.0201	0.0411	489.0193	291.0952	14487.5587
8.2515	0.0253	0.0653	387.8094	259.2276	10231.3673
7.3481	0.0319	0.1039	307.5464	230.8486	7225.5704
6.5437	0.0403	0.1652	243.8950	205.5765	5102.8242
5.8273	0.0508	0.2626	193.4173	183.0710	3603.7037
5.1894	0.0641	0.4176	153.3867	163.0293	2544.9985
4.6213	0.0808	0.6641	121.6410	145.1817	1797.3225
4.1154	0.1019	1.0559	96.4655	129.2880	1269.3005
3.6648	0.1284	1.6789	76.5005	115.1342	896.4022
3.2636	0.1620	2.6696	60.6676	102.5299	633.0549
2.9063	0.2042	4.2449	48.1115	91.3054	447.0745
2.5882	0.2575	6.7497	38.1541	81.3098	315.7318
2.3048	0.3247	10.7324	30.2576	72.4084	222.9753
2.0525	0.4095	17.0653	23.9953	64.4815	157.4691
1.8278	0.5164	27.1350	19.0291	57.4224	111.2074
1.7249	0.5798	34.2166	16.9459	54.1881	93.4551
1.6277	0.6511	43.1464	15.0907	51.1361	78.5366
1.5360	0.7312	54.4067	13.4387	48.2559	65.9996

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	0.8210	68.6056	11.9675	45.5380	55.4639
1.3679	0.9220	86.5102	10.6573	42.9731	46.6101
1.2908	1.0353	109.0876	9.4906	40.5527	39.1696
1.2181	1.1626	137.5571	8.4516	38.2686	32.9169
1.1495	1.3055	173.4565	7.5264	36.1132	27.6623
1.0848	1.4660	218.7249	6.7025	34.0792	23.2465
1.0237	1.6462	275.8074	5.9687	32.1597	19.5356
0.9660	1.8486	347.7872	5.3153	30.3483	16.4171
0.9116	2.0758	438.5523	4.7334	28.6390	13.7964
0.8603	2.3310	553.0050	4.2152	27.0260	11.5940
0.8118	2.6176	697.3274	3.7537	25.5038	9.7432
0.7661	2.9394	879.3149	3.3428	24.0673	8.1879
0.7229	3.3007	1108.7972	2.9768	22.7117	6.8808
0.6822	3.7065	1398.1694	2.6510	21.4325	5.7824
0.6438	4.1621	1763.0616	2.3607	20.2254	4.8594
0.6075	4.6738	2223.1828	2.1023	19.0862	4.0837
0.5733	5.2484	2803.3858	1.8722	18.0112	3.4318
0.5410	5.8936	3535.0092	1.6672	16.9967	2.8839
0.5106	6.6181	4457.5707	1.4847	16.0394	2.4236
0.4818	7.4317	5620.9009	1.3221	15.1360	2.0367
0.4547	8.3453	7087.8353	1.1774	14.2835	1.7116
0.4291	9.3712	8937.6081	1.0485	13.4790	1.4383
0.4049	10.5232	11270.1319	0.9337	12.7198	1.2087
0.3821	11.8168	14211.3943	0.8315	12.0034	1.0158
0.3606	13.2695	17920.2629	0.7405	11.3273	0.8536
0.3403	14.9008	22597.0667	0.6594	10.6893	0.7174
0.3211	16.7326	28494.4158	0.5872	10.0873	0.6029
0.2859	21.0994	45308.0255	0.4657	8.9830	0.4257
0.2546	26.6059	72042.7886	0.3693	7.9996	0.3007
0.2268	33.5495	114552.8489	0.2929	7.1238	0.2123
0.2019	42.3052	182146.6857	0.2323	6.3439	0.1500
0.1798	53.3459	289625.4039	0.1842	5.6494	0.1059
0.1601	67.2681	460523.7491	0.1461	5.0310	0.0748
0.1426	84.8236	732263.5399	0.1158	4.4802	0.0528
0.1270	106.9607	1164347.9686	0.0919	3.9897	0.0373
0.1131	134.8752	1851391.0883	0.0729	3.5529	0.0263
0.1007	170.0747	2943835.5666	0.0578	3.1640	0.0186
0.0897	214.4605	4680895.2998	0.0458	2.8176	0.0131
0.0799	270.4301	7442936.3704	0.0363	2.5092	0.0093
0.0711	341.0066	11834766.2715	0.0288	2.2345	0.0066
0.0633	430.0020	18818069.3386	0.0229	1.9898	0.0046
0.0564	542.2233	29921987.9386	0.0181	1.7720	0.0033
0.0502	683.7319	47577960.6339	0.0144	1.5780	0.0023
0.0447	862.1712	75652137.2419	0.0114	1.4053	0.0016
0.0398	1087.1794	120291954.3630	0.0090	1.2514	0.0012
0.0355	1370.9099	191272247.0511	0.0072	1.1144	0.0008
0.0316	1728.6879	304135656.3348	0.0057	0.9924	0.0006
0.0281	2179.8383	483596020.2291	0.0045	0.8838	0.0004
0.0251	2748.7293	768949992.9071	0.0036	0.7870	0.0003

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