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**Alloy Data Table –**
ADT2001.12.17.ALK.ENG

# 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 $W/in^2$

**Common Names:** Alrkothal 14, Alloy 750, Alferon 902, Alchrome 750, Resistohm 125, Aluchrom W, 750 Alloy, 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 | None/Trace | None/Trace | None/Trace | None/Trace | None/Trace | None/Trace |

**Technical Data**

| | | | |
|---|---|---|---|
| **Resistivity (Ω/cmf)** | 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 | $in^2/\Omega$ 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 |

| 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 |
|---|---|---|---|---|---|---|
| 15.5 | 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 |
| 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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