

Resistance Wire for Low Temp Heating or Resistors Nickel-Copper Alloy - A30

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

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

Common Names: Alloy 30, CuNi 30, 30 Alloy, MWS-30, Cuprothal 30, HAI-30, Cu-Ni 2, Alloy 230, Nickel Alloy 30

Uses: Alloy exhibits low resistivity and high temperature coefficient of resistance. Typical applications include voltage regulators, timing devices, temperature sensitive resistors, temperature compensating devices, motor control, heating wires and cables, precision and vitreous resistors, potentiometers, and low temperature heating applications.

Composition

Ni	Cr	Fe	Al	Si	Mn	Cu	C	Ti	Mo	W
2%	None/Trace	None/Trace	None/Trace	None/Trace	None/Trace	98%	None/Trace	None/Trace	None/Trace	None/Trace

Technical Data

Resistivity (Ω/cm ²)	30	Resistivity (Ω/sqmf)	24
Resistivity (μΩ/cm)	4.99	Nom. Temp. Coeff. of Resistance (TCR)	0.00130
Std. Res. Tol. <.020"	5%	Std. Res. Tol. >.020"	3%
Thermal EMF vs. Cu	-0.014	Specific Heat (20°C)	0.092 cal/g
Density (g/cm ³)	8.89	Density (lb/in ³)	0.321
Thermal Conductivity	1.16 W/cm/°C	Coeff. of Linear Expansion (X 10 ⁻⁶)	16.40 in/in/°C
Approx. Melting Point	1190°C	Max. Continuous Operating Temp.	300°C
UTS – Hard (KPSI)	60	YTS Tensile – Hard (KPSI)	
UTS – Stress Relieved (KPSI)		YTS Tensile – Stress Relieved (KPSI)	
UTS – Annealed (KPSI)	30	YTS Tensile – Annealed (KPSI)	
Magnetic Attraction	None	Emissivity – fully oxidized	
Designations/Specifications	ASTM = B267	Forms Available	Wire, Ribbon

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

°C	100	200	300	400
A30 C _t	1.00	1.11	1.25	1.40

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	0.0006	0.0008	755.5052	326.8804	557305.2014
9.2658	0.0007	0.0012	599.1420	291.0952	393578.6775
8.2515	0.0009	0.0020	475.1405	259.2276	277952.1436
7.3481	0.0012	0.0031	376.8030	230.8486	196294.6637
6.5437	0.0015	0.0050	298.8180	205.5765	138626.7237
5.8273	0.0019	0.0079	236.9731	183.0710	97900.6161
5.1894	0.0024	0.0125	187.9279	163.0293	69139.1268
4.6213	0.0030	0.0200	149.0334	145.1817	48827.2602
4.1154	0.0037	0.0317	118.1887	129.2880	34482.6649
3.6648	0.0047	0.0504	93.7278	115.1342	24352.2609
3.2636	0.0060	0.0802	74.3294	102.5299	17197.9924
2.9063	0.0075	0.1275	58.9458	91.3054	12145.5229
2.5882	0.0095	0.2028	46.7461	81.3098	8577.3807
2.3048	0.0120	0.3224	37.0713	72.4084	6057.4962
2.0525	0.0151	0.5127	29.3988	64.4815	4277.9097
1.8278	0.0190	0.8152	23.3143	57.4224	3021.1346
1.7249	0.0213	1.0280	20.7620	54.1881	2538.8633
1.6277	0.0240	1.2963	18.4890	51.1361	2133.5781
1.5360	0.0269	1.6346	16.4650	48.2559	1792.9896
1.4495	0.0302	2.0612	14.6625	45.5380	1506.7702

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
1.3679	0.0339	2.5991	13.0573	42.9731	1266.2406
1.2908	0.0381	3.2774	11.6278	40.5527	1064.1074
1.2181	0.0428	4.1328	10.3549	38.2686	894.2413
1.1495	0.0481	5.2114	9.2213	36.1132	751.4913
1.0848	0.0540	6.5714	8.2118	34.0792	631.5288
1.0237	0.0606	8.2864	7.3128	32.1597	530.7163
0.9660	0.0680	10.4490	6.5122	30.3483	445.9967
0.9116	0.0764	13.1759	5.7993	28.6390	374.8011
0.8603	0.0858	16.6146	5.1644	27.0260	314.9707
0.8118	0.0964	20.9506	4.5991	25.5038	264.6911
0.7661	0.1082	26.4183	4.0956	24.0673	222.4378
0.7229	0.1215	33.3129	3.6472	22.7117	186.9295
0.6822	0.1364	42.0068	3.2479	21.4325	157.0895
0.6438	0.1532	52.9697	2.8924	20.2254	132.0129
0.6075	0.1720	66.7936	2.5757	19.0862	110.9393
0.5733	0.1932	84.2253	2.2937	18.0112	93.2298
0.5410	0.2169	106.2063	2.0426	16.9967	78.3473
0.5106	0.2436	133.9239	1.8190	16.0394	65.8405
0.4818	0.2736	168.8752	1.6199	15.1360	55.3302
0.4547	0.3072	212.9480	1.4425	14.2835	46.4977
0.4291	0.3450	268.5228	1.2846	13.4790	39.0752
0.4049	0.3874	338.6015	1.1440	12.7198	32.8375
0.3821	0.4350	426.9692	1.0188	12.0034	27.5956
0.3606	0.4884	538.3990	0.9072	11.3273	23.1904
0.3403	0.5485	678.9096	0.8079	10.6893	19.4885
0.3211	0.6159	856.0905	0.7195	10.0873	16.3775
0.2859	0.7767	1361.2411	0.5706	8.9830	11.5661
0.2546	0.9794	2164.4643	0.4525	7.9996	8.1682
0.2268	1.2350	3441.6428	0.3588	7.1238	5.7685
0.2019	1.5572	5472.4421	0.2846	6.3439	4.0738
0.1798	1.9637	8701.5487	0.2257	5.6494	2.8770
0.1601	2.4761	13836.0441	0.1790	5.0310	2.0318
0.1426	3.1223	22000.2348	0.1419	4.4802	1.4349
0.1270	3.9372	34981.8437	0.1125	3.9897	1.0133
0.1131	4.9647	55623.4694	0.0893	3.5529	0.7156
0.1007	6.2604	88445.0339	0.0708	3.1640	0.5054
0.0897	7.8943	140633.5151	0.0561	2.8176	0.3569
0.0799	9.9545	223616.6882	0.0445	2.5092	0.2521
0.0711	12.5524	355565.4794	0.0353	2.2345	0.1780
0.0633	15.8283	565372.8762	0.0280	1.9898	0.1257
0.0564	19.9591	898980.6594	0.0222	1.7720	0.0888
0.0502	25.1680	1429439.3310	0.0176	1.5780	0.0627
0.0447	31.7364	2272904.0717	0.0140	1.4053	0.0443
0.0398	40.0189	3614069.3817	0.0111	1.2514	0.0313
0.0355	50.4629	5746611.8603	0.0088	1.1144	0.0221
0.0316	63.6327	9137496.9279	0.0070	0.9924	0.0156
0.0281	80.2394	14529230.8125	0.0055	0.8838	0.0110
0.0251	101.1802	23102448.0410	0.0044	0.7870	0.0078

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