

Special Alloy Wire for Heating, Corrosion Resistance or Strength Applications - RA330

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

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

Common Names: RA330®, SS330

Uses: Used for everything from resistors, heating applications, mechanical components, and springs. A heat and corrosion resisting stainless steel alloy with good corrosion resistance and ductility and an exceptional combination of strength and resistance to carburization, oxidation, and thermal shock. It resists the absorption of carbon and nitrogen, making it an excellent alloy for furnace components. Austenitic, non-hardenable, heat and corrosion resistant alloy, weldable, and machinable. Has good resistance to carburization, thermal shock, and high temperature oxidation. The alloy has been used in low stress applications to temperatures as high as 1230°C and moderate resistance to creep to 870°C.

Composition

Ni	Cr	Fe	Al	Si	Mn	Cu	C	Ti	Mo	W
34 - 37%	18 - 20%	Balance	None/Trace	1 - 1.5%	2% Max.	1% Max.	None/Trace	None/Trace	None/Trace	None/Trace

Technical Data

Resistivity (Ω/cm)	616	Resistivity (Ω/sqmf)	483
Resistivity (μΩ/cm)	102.41	Nom. Temp. Coeff. of Resistance (TCR)	
Std. Res. Tol. <.020"	5%	Std. Res. Tol. >.020"	3%
Thermal EMF vs. Cu		Specific Heat (20°C)	0.117 cal/g
Density (g/cm³)	7.944	Density (lb/in³)	0.287
Thermal Conductivity	0.125 W/cm/°C	Coeff. of Linear Expansion (X 10⁻⁶)	14.90 in/in/°C
Approx. Melting Point	1370°C	Max. Continuous Operating Temp.	1200°C
UTS – Hard (KPSI)		YTS Tensile – Hard (KPSI)	
UTS – Stress Relieved (KPSI)		YTS Tensile – Stress Relieved (KPSI)	
UTS – Annealed (KPSI)	85	YTS Tensile – Annealed (KPSI)	39
Magnetic Attraction	None	Emissivity – fully oxidized	
Designations/Specifications	ASTM = B511, B512, B535	Forms Available	Wire, Ribbon, Square

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	0.0037	0.0081	453.9035	15.4432	4206.9389
00	0.3648	0.0046	0.0129	359.9613	13.7525	2971.0138
0	0.3249	0.0058	0.0204	285.4619	12.2470	2098.1819
1	0.2893	0.0074	0.0325	226.3813	10.9062	1481.7727
2	0.2576	0.0093	0.0517	179.5283	9.7123	1046.4538
3	0.2294	0.0117	0.0822	142.3722	8.6490	739.0240
4	0.2043	0.0148	0.1307	112.9061	7.7022	521.9117
5	0.1819	0.0186	0.2078	89.5385	6.8590	368.5831
6	0.1620	0.0235	0.3305	71.0071	6.1081	260.2999
7	0.1443	0.0296	0.5255	56.3111	5.4394	183.8283
8	0.1285	0.0373	0.8355	44.6567	4.8439	129.8228
9	0.1144	0.0470	1.3285	35.4143	4.3136	91.6831
10	0.1019	0.0593	2.1125	28.0848	3.8414	64.7482
11	0.0907	0.0748	3.3590	22.2722	3.4209	45.7263
12	0.0808	0.0943	5.3410	17.6627	3.0464	32.2927
13	0.0720	0.1190	8.4925	14.0071	2.7129	22.8057
13.5	0.0679	0.1336	10.7089	12.4737	2.5601	19.1652
14	0.0641	0.1500	13.5037	11.1081	2.4159	16.1058
14.5	0.0605	0.1684	17.0279	9.8921	2.2798	13.5348
15	0.0571	0.1891	21.4718	8.8091	2.1514	11.3742
15.5	0.0539	0.2124	27.0755	7.8447	2.0302	9.5585
16	0.0508	0.2385	34.1416	6.9859	1.9159	8.0326
16.5	0.0480	0.2678	43.0518	6.2212	1.8080	6.7504
17	0.0453	0.3008	54.2874	5.5401	1.7061	5.6728
17.5	0.0427	0.3377	68.4552	4.9336	1.6100	4.7672
18	0.0403	0.3792	86.3206	4.3935	1.5194	4.0062
18.5	0.0380	0.4259	108.8484	3.9125	1.4338	3.3667

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	0.4782	137.2554	3.4842	1.3530	2.8293
19.5	0.0339	0.5370	173.0762	3.1028	1.2768	2.3776
20	0.0320	0.6030	218.2453	2.7631	1.2049	1.9981
20.5	0.0302	0.6772	275.2027	2.4606	1.1370	1.6791
21	0.0285	0.7604	347.0247	2.1912	1.0730	1.4111
21.5	0.0269	0.8539	437.5906	1.9513	1.0126	1.1858
22	0.0253	0.9589	551.7924	1.7377	0.9555	0.9965
22.5	0.0239	1.0767	695.7984	1.5475	0.9017	0.8374
23	0.0226	1.2091	877.3868	1.3781	0.8509	0.7038
23.5	0.0213	1.3577	1106.3659	1.2272	0.8030	0.5914
24	0.0201	1.5246	1395.1037	1.0929	0.7578	0.4970
24.5	0.0190	1.7121	1759.1958	0.9732	0.7151	0.4177
25	0.0179	1.9226	2218.3081	0.8667	0.6748	0.3510
25.5	0.0169	2.1589	2797.2388	0.7718	0.6368	0.2950
26	0.0159	2.4243	3527.2581	0.6873	0.6009	0.2479
26.5	0.0150	2.7223	4447.7967	0.6121	0.5671	0.2083
27	0.0142	3.0570	5608.5761	0.5451	0.5351	0.1751
27.5	0.0134	3.4328	7072.2940	0.4854	0.5050	0.1471
28	0.0126	3.8548	8918.0108	0.4322	0.4766	0.1236
29	0.0113	4.8608	14180.2333	0.3428	0.4244	0.0873
30	0.0100	6.1294	22547.5186	0.2718	0.3779	0.0617
31	0.0089	7.7290	35852.0615	0.2156	0.3366	0.0435
32	0.0080	9.7461	57007.1739	0.1710	0.2997	0.0308
33	0.0071	12.2896	90645.2166	0.1356	0.2669	0.0217
34	0.0063	15.4970	144131.9526	0.1075	0.2377	0.0153
35	0.0056	19.5414	229179.4376	0.0853	0.2117	0.0108
36	0.0050	24.6412	364410.6228	0.0676	0.1885	0.0076
37	0.0045	31.0721	579437.2453	0.0536	0.1679	0.0054
38	0.0040	39.1812	921343.9462	0.0425	0.1495	0.0038
39	0.0035	49.4067	1464998.4517	0.0337	0.1331	0.0027
40	0.0031	62.3007	2329445.4502	0.0267	0.1185	0.0019
41	0.0028	78.5599	3703973.9523	0.0212	0.1056	0.0013
42	0.0025	99.0623	5889566.1363	0.0168	0.0940	0.0009
43	0.0022	124.9155	9364803.7810	0.0133	0.0837	0.0007
44	0.0020	157.5157	14890663.9007	0.0106	0.0746	0.0005
45	0.0018	198.6239	23677150.8074	0.0084	0.0664	0.0003
46	0.0016	250.4605	37648252.2267	0.0067	0.0591	0.0002
47	0.0014	315.8253	59863237.2305	0.0053	0.0526	0.0002
48	0.0012	398.2490	95186548.1068	0.0042	0.0469	0.0001
49	0.0011	502.1834	151352973.2045	0.0033	0.0418	0.0001
50	0.0010	633.2425	240661342.9468	0.0026	0.0372	0.0001

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