

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: Rolled Alloys 330, Stainless 330, 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 ²)	616	Resistivity (Ω/sqmf)	483
Resistivity (μΩ/cm)	102.41	Nom. Temp. Coeff. of Resistance (TCR)	
Std. Res. Tol. <.020"	3%	Std. Res. Tol. >.020"	5%
Thermal EMF vs. Cu		Specific Heat (20°C)	0.117 cal/g
Density (g/cm ³)	7.944	Density (lb/in ³)	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.	1230°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

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	0.0120	0.0178	675.4829	326.8804	27141.4871
9.2658	0.0152	0.0284	535.6815	291.0952	19167.7927
8.2515	0.0192	0.0451	424.8141	259.2276	13536.6304
7.3481	0.0241	0.0717	336.8924	230.8486	9559.8051
6.5437	0.0304	0.1140	267.1675	205.5765	6751.3015
5.8273	0.0384	0.1812	211.8731	183.0710	4767.8871
5.1894	0.0484	0.2882	168.0228	163.0293	3367.1653
4.6213	0.0611	0.4582	133.2479	145.1817	2377.9510
4.1154	0.0770	0.7286	105.6703	129.2880	1679.3506
3.6648	0.0971	1.1585	83.8002	115.1342	1185.9867
3.2636	0.1224	1.8420	66.4565	102.5299	837.5646
2.9063	0.1544	2.9289	52.7023	91.3054	591.5027
2.5882	0.1946	4.6572	41.7948	81.3098	417.7296
2.3048	0.2454	7.4053	33.1447	72.4084	295.0079
2.0525	0.3095	11.7749	26.2849	64.4815	208.3398
1.8278	0.3903	18.7228	20.8449	57.4224	147.1332
1.7249	0.4383	23.6091	18.5629	54.1881	123.6459
1.6277	0.4921	29.7706	16.5307	51.1361	103.9080
1.5360	0.5526	37.5400	14.7210	48.2559	87.3209
1.4495	0.6206	47.3372	13.1094	45.5380	73.3817

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	0.6969	59.6912	11.6743	42.9731	61.6676
1.2908	0.7825	75.2693	10.3962	40.5527	51.8234
1.2181	0.8787	94.9129	9.2581	38.2686	43.5507
1.1495	0.9867	119.6832	8.2446	36.1132	36.5986
1.0848	1.1080	150.9179	7.3420	34.0792	30.7563
1.0237	1.2443	190.3042	6.5382	32.1597	25.8466
0.9660	1.3972	239.9696	5.8225	30.3483	21.7206
0.9116	1.5690	302.5965	5.1850	28.6390	18.2533
0.8603	1.7619	381.5676	4.6174	27.0260	15.3395
0.8118	1.9784	481.1486	4.1119	25.5038	12.8908
0.7661	2.2217	606.7180	3.6618	24.0673	10.8330
0.7229	2.4948	765.0584	3.2609	22.7117	9.1037
0.6822	2.8015	964.7222	2.9039	21.4325	7.6505
0.6438	3.1459	1216.4940	2.5860	20.2254	6.4292
0.6075	3.5326	1533.9728	2.3029	19.0862	5.4029
0.5733	3.9669	1934.3068	2.0508	18.0112	4.5404
0.5410	4.4545	2439.1193	1.8263	16.9967	3.8156
0.5106	5.0021	3075.6771	1.6264	16.0394	3.2065
0.4818	5.6171	3878.3628	1.4483	15.1360	2.6947
0.4547	6.3076	4890.5321	1.2898	14.2835	2.2645
0.4291	7.0830	6166.8560	1.1486	13.4790	1.9030
0.4049	7.9537	7776.2730	1.0228	12.7198	1.5992
0.3821	8.9315	9805.7132	0.9108	12.0034	1.3439
0.3606	10.0295	12364.7937	0.8111	11.3273	1.1294
0.3403	11.2624	15591.7393	0.7223	10.6893	0.9491
0.3211	12.6470	19660.8484	0.6433	10.0873	0.7976
0.2859	15.9475	31262.0630	0.5101	8.9830	0.5633
0.2546	20.1095	49708.7696	0.4045	7.9996	0.3978
0.2268	25.3576	79040.2658	0.3208	7.1238	0.2809
0.2019	31.9754	125679.3053	0.2544	6.3439	0.1984
0.1798	40.3204	199838.4951	0.2018	5.6494	0.1401
0.1601	50.8431	317756.5632	0.1600	5.0310	0.0990
0.1426	64.1121	505254.1725	0.1269	4.4802	0.0699
0.1270	80.8439	803387.9026	0.1006	3.9897	0.0494
0.1131	101.9425	1277440.4588	0.0798	3.5529	0.0349
0.1007	128.5473	2031215.7062	0.0633	3.1640	0.0246
0.0897	162.0953	3229768.7276	0.0502	2.8176	0.0174
0.0799	204.3987	5135548.1358	0.0398	2.5092	0.0123
0.0711	257.7424	8165864.7660	0.0316	2.2345	0.0087
0.0633	325.0076	12984270.7368	0.0250	1.9898	0.0061
0.0564	409.8276	20645858.2647	0.0199	1.7720	0.0043
0.0502	516.7839	32828294.4898	0.0157	1.5780	0.0031
0.0447	651.6533	52199182.2908	0.0125	1.4053	0.0022
0.0398	821.7209	83000188.5319	0.0099	1.2514	0.0015
0.0355	1036.1724	131975847.0151	0.0079	1.1144	0.0011
0.0316	1306.5911	209850417.2514	0.0062	0.9924	0.0008
0.0281	1647.5833	333676188.6100	0.0049	0.8838	0.0005
0.0251	2077.5672	530567440.8639	0.0039	0.7870	0.0004

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