

Special Alloy Wire for Heating, Corrosion Resistance or Strength Applications - SS304

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

I = Current

 C_t = Temperature factor

 p = Surface load W/in²

Common Names: Stainless Steel 304, SS304

Uses: Used for everything from resistors, heating applications, mechanical components, and springs. Type 304 is the most widely used Chromium-Nickel austenitic stainless steel. It is nonmagnetic in the annealed condition and becomes slightly magnetic when cold worked. It has excellent fabrication and weldability characteristics. Non-hardenable by heat-treating. Low carbon content minimizes problem of carbide precipitation during welding and has permitted this alloy's use in corrosive service in the as-welded condition.

Composition

Ni	Cr	Fe	Al	Si	Mn	Cu	C	Ti	Mo	W
8 - 12%	18 - 20%	Balance	None/Trace	1% Max.	2% Max.	None/Trace	None/Trace	None/Trace	None/Trace	None/Trace

Technical Data

Resistivity (Ω/cmft)	433	Resistivity (Ω/sqmf)	329
Resistivity (μΩ/cm)	70	Nom. Temp. Coeff. of Resistance (TCR)	0.000850
Std. Res. Tol. <.020"	5%	Std. Res. Tol. >.020"	3%
Thermal EMF vs. Cu	-0.022	Specific Heat (20°C)	0.118 cal/g
Density (g/cm ³)	7.93	Density (lb/in ³)	0.286
Thermal Conductivity	1.903 W/cm/°C	Coeff. of Linear Expansion (X 10 ⁻⁶)	9.60 in/in/°C
Approx. Melting Point	1399°C	Max. Continuous Operating Temp.	600°C
UTS – Hard (KPSI)	300	YTS Tensile – Hard (KPSI)	280
UTS – Stress Relieved (KPSI)	280	YTS Tensile – Stress Relieved (KPSI)	260
UTS – Annealed (KPSI)	105	YTS Tensile – Annealed (KPSI)	45
Magnetic Attraction	None (Annealed)	Emissivity – fully oxidized	
Designations/Specifications	ASTM = A580	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	0.0082	0.0122	673.1293	326.8804	39807.5144
9.2658	0.0104	0.0194	533.8150	291.0952	28112.7627
8.2515	0.0131	0.0308	423.3339	259.2276	19853.7245
7.3481	0.0165	0.0490	335.7186	230.8486	14021.0474
6.5437	0.0208	0.0780	266.2366	205.5765	9901.9088
5.8273	0.0262	0.1240	211.1349	183.0710	6992.9011
5.1894	0.0330	0.1972	167.4373	163.0293	4938.5091
4.6213	0.0416	0.3135	132.7837	145.1817	3487.6614
4.1154	0.0525	0.4985	105.3021	129.2880	2463.0475
3.6648	0.0662	0.7926	83.5082	115.1342	1739.4472
3.2636	0.0835	1.2603	66.2249	102.5299	1228.4280
2.9063	0.1052	2.0040	52.5187	91.3054	867.5374
2.5882	0.1327	3.1865	41.6492	81.3098	612.6700
2.3048	0.1673	5.0667	33.0292	72.4084	432.6783
2.0525	0.2110	8.0564	26.1933	64.4815	305.5650
1.8278	0.2661	12.8102	20.7722	57.4224	215.7953
1.7249	0.2988	16.1534	18.4982	54.1881	181.3474
1.6277	0.3355	20.3691	16.4731	51.1361	152.3984
1.5360	0.3768	25.6850	14.6697	48.2559	128.0707
1.4495	0.4231	32.3882	13.0637	45.5380	107.6264
1.3679	0.4751	40.8408	11.6336	42.9731	90.4458
1.2908	0.5335	51.4994	10.3600	40.5527	76.0077
1.2181	0.5991	64.9396	9.2258	38.2686	63.8744
1.1495	0.6728	81.8875	8.2158	36.1132	53.6779
1.0848	0.7555	103.2584	7.3164	34.0792	45.1092
1.0237	0.8484	130.2066	6.5155	32.1597	37.9083
0.9660	0.9526	164.1877	5.8022	30.3483	31.8569
0.9116	1.0698	207.0372	5.1670	28.6390	26.7715

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
0.8603	1.2013	261.0694	4.6013	27.0260	22.4979
0.8118	1.3489	329.2029	4.0976	25.5038	18.9065
0.7661	1.5148	415.1178	3.6490	24.0673	15.8884
0.7229	1.7010	523.4546	3.2495	22.7117	13.3521
0.6822	1.9101	660.0650	2.8938	21.4325	11.2207
0.6438	2.1449	832.3278	2.5770	20.2254	9.4295
0.6075	2.4086	1049.5475	2.2949	19.0862	7.9242
0.5733	2.7047	1323.4569	2.0436	18.0112	6.6593
0.5410	3.0372	1668.8507	1.8199	16.9967	5.5962
0.5106	3.4105	2104.3849	1.6207	16.0394	4.7029
0.4818	3.8298	2653.5842	1.4433	15.1360	3.9522
0.4547	4.3006	3346.1127	1.2853	14.2835	3.3213
0.4291	4.8293	4219.3762	1.1446	13.4790	2.7911
0.4049	5.4230	5320.5428	1.0193	12.7198	2.3455
0.3821	6.0897	6709.0902	0.9077	12.0034	1.9711
0.3606	6.8383	8460.0186	0.8083	11.3273	1.6565
0.3403	7.6789	10667.9018	0.7198	10.6893	1.3920
0.3211	8.6229	13451.9950	0.6410	10.0873	1.1698
0.2859	10.8733	21389.5711	0.5083	8.9830	0.8261
0.2546	13.7110	34010.8476	0.4031	7.9996	0.5834
0.2268	17.2893	54079.5207	0.3197	7.1238	0.4120
0.2019	21.8014	85990.0523	0.2535	6.3439	0.2910
0.1798	27.4912	136729.9303	0.2011	5.6494	0.2055
0.1601	34.6658	217409.7274	0.1594	5.0310	0.1451
0.1426	43.7128	345695.9969	0.1264	4.4802	0.1025
0.1270	55.1209	549679.7394	0.1003	3.9897	0.0724
0.1131	69.5062	874027.5231	0.0795	3.5529	0.0511
0.1007	87.6459	1389762.1766	0.0631	3.1640	0.0361
0.0897	110.5195	2209814.7445	0.0500	2.8176	0.0255
0.0799	139.3628	3513753.1349	0.0397	2.5092	0.0180
0.0711	175.7335	5587102.3232	0.0315	2.2345	0.0127
0.0633	221.5961	8883866.1033	0.0249	1.9898	0.0090
0.0564	279.4279	14125940.8502	0.0198	1.7720	0.0063
0.0502	352.3526	22461190.0474	0.0157	1.5780	0.0045
0.0447	444.3091	35714793.3506	0.0124	1.4053	0.0032
0.0398	560.2642	56788908.3964	0.0099	1.2514	0.0022
0.0355	706.4812	90298159.7902	0.0078	1.1144	0.0016
0.0316	890.8576	143580109.0698	0.0062	0.9924	0.0011
0.0281	1123.3523	228301969.4797	0.0049	0.8838	0.0008
0.0251	1416.5231	363015389.8472	0.0039	0.7870	0.0006

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