

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

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

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/cm)	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/cm³)	7.93	Density (lb/in³)	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

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	0.0025	0.0055	452.3220	15.4432	6170.1771
00	0.3648	0.0032	0.0088	358.7071	13.7525	4357.4869
0	0.3249	0.0040	0.0140	284.4673	12.2470	3077.3335
1	0.2893	0.0050	0.0222	225.5925	10.9062	2173.2667
2	0.2576	0.0063	0.0354	178.9027	9.7123	1534.7989
3	0.2294	0.0080	0.0562	141.8761	8.6490	1083.9018
4	0.2043	0.0101	0.0894	112.5127	7.7022	765.4704
5	0.1819	0.0127	0.1422	89.2265	6.8590	540.5886
6	0.1620	0.0160	0.2261	70.7597	6.1081	381.7731
7	0.1443	0.0202	0.3595	56.1149	5.4394	269.6149
8	0.1285	0.0254	0.5717	44.5011	4.8439	190.4067
9	0.1144	0.0321	0.9090	35.2909	4.3136	134.4686
10	0.1019	0.0405	1.4454	27.9869	3.8414	94.9640
11	0.0907	0.0510	2.2982	22.1946	3.4209	67.0653
12	0.0808	0.0643	3.6543	17.6011	3.0464	47.3627
13	0.0720	0.0811	5.8106	13.9583	2.7129	33.4483
13.5	0.0679	0.0911	7.3271	12.4302	2.5601	28.1089
14	0.0641	0.1023	9.2393	11.0694	2.4159	23.6218
14.5	0.0605	0.1148	11.6505	9.8576	2.2798	19.8510
15	0.0571	0.1290	14.6910	8.7784	2.1514	16.6821
15.5	0.0539	0.1448	18.5251	7.8174	2.0302	14.0191
16	0.0508	0.1626	23.3597	6.9616	1.9159	11.7812
16.5	0.0480	0.1826	29.4561	6.1995	1.8080	9.9005
17	0.0453	0.2051	37.1435	5.5208	1.7061	8.3201
17.5	0.0427	0.2303	46.8372	4.9164	1.6100	6.9919
18	0.0403	0.2586	59.0607	4.3782	1.5194	5.8758
18.5	0.0380	0.2904	74.4743	3.8989	1.4338	4.9378
19	0.0359	0.3261	93.9105	3.4721	1.3530	4.1496

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
19.5	0.0339	0.3661	118.4191	3.0919	1.2768	3.4872
20	0.0320	0.4112	149.3239	2.7535	1.2049	2.9305
20.5	0.0302	0.4617	188.2943	2.4520	1.1370	2.4627
21	0.0285	0.5185	237.4350	2.1836	1.0730	2.0696
21.5	0.0269	0.5822	299.4005	1.9445	1.0126	1.7392
22	0.0253	0.6538	377.5376	1.7317	0.9555	1.4616
22.5	0.0239	0.7341	476.0668	1.5421	0.9017	1.2283
23	0.0226	0.8244	600.3100	1.3733	0.8509	1.0322
23.5	0.0213	0.9257	756.9780	1.2229	0.8030	0.8674
24	0.0201	1.0395	954.5329	1.0890	0.7578	0.7289
24.5	0.0190	1.1673	1203.6455	0.9698	0.7151	0.6126
25	0.0179	1.3108	1517.7712	0.8637	0.6748	0.5148
25.5	0.0169	1.4720	1913.8769	0.7691	0.6368	0.4326
26	0.0159	1.6529	2413.3576	0.6849	0.6009	0.3636
26.5	0.0150	1.8561	3043.1921	0.6099	0.5671	0.3055
27	0.0142	2.0843	3837.3999	0.5432	0.5351	0.2568
27.5	0.0134	2.3405	4838.8788	0.4837	0.5050	0.2158
28	0.0126	2.6283	6101.7223	0.4307	0.4766	0.1813
29	0.0113	3.3142	9702.1462	0.3416	0.4244	0.1281
30	0.0100	4.1791	15427.0610	0.2709	0.3779	0.0904
31	0.0089	5.2698	24530.0580	0.2148	0.3366	0.0639
32	0.0080	6.6451	39004.4316	0.1704	0.2997	0.0451
33	0.0071	8.3793	62019.6531	0.1351	0.2669	0.0319
34	0.0063	10.5661	98615.3935	0.1071	0.2377	0.0225
35	0.0056	13.3237	156805.0666	0.0850	0.2117	0.0159
36	0.0050	16.8008	249330.5358	0.0674	0.1885	0.0112
37	0.0045	21.1855	396452.2156	0.0534	0.1679	0.0079
38	0.0040	26.7145	630385.5194	0.0424	0.1495	0.0056
39	0.0035	33.6864	1002355.1072	0.0336	0.1331	0.0040
40	0.0031	42.4778	1593811.6120	0.0267	0.1185	0.0028
41	0.0028	53.5636	2534266.9842	0.0211	0.1056	0.0020
42	0.0025	67.5425	4029653.8806	0.0168	0.0940	0.0014
43	0.0022	85.1696	6407418.9887	0.0133	0.0837	0.0010
44	0.0020	107.3971	10188224.4267	0.0105	0.0746	0.0007
45	0.0018	135.4254	16199957.7600	0.0084	0.0664	0.0005
46	0.0016	170.7685	25759015.5493	0.0066	0.0591	0.0003
47	0.0014	215.3355	40958556.3060	0.0053	0.0526	0.0002
48	0.0012	271.5334	65126841.9580	0.0042	0.0469	0.0002
49	0.0011	342.3978	103556031.4122	0.0033	0.0418	0.0001
50	0.0010	431.7562	164661011.0277	0.0026	0.0372	0.0001

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