

# Conductor Alloys



## Copper (C102/110)

Copper is the "standard" metal used for electrical conductors. Copper has extremely high electrical conductivity, surpassed only by pure silver, and it has excellent tensile, solderability and corrosion characteristics.

C102 is an oxygen free (OF) copper that has better drawing and resistance to hydrogen embrittlement than C110 (ETP). OF copper contains less dissolved oxygen than ETP, which gives OF its performance advantage. In most applications, ETP is an acceptable conductor material and is more economical than OF copper.

Both OF and ETP copper conductors are available bare or plated with silver, nickel or tin.

	<b>SOFT TEMPER</b>	
Tensile	32,000 psi (221 MPa)	Reference Specs ASTM B 3, B 8, B 286, B 33, B 298, B 355 and NEMA WC-67.
Elongation	10 - 20%	
Electrical Conductivity	100% IACS	
Electrical Resistivity	10.37 $\Omega$ -cmil/ft (1.724 $\mu\Omega$ -cm)	
Melting Point	1981°F (1083°C)	
Density	0.323 lb/in <sup>3</sup> (8.94 g/cm <sup>3</sup> )*	
Thermal Coefficient of Resistance	0.00393/°C	

\*ASTM recognizes the density of copper as 0.321 lb/in<sup>3</sup>. CDA recognizes the density of C102 as 0.323 lb/in<sup>3</sup> and C110 as 0.321 - 0.323 lb/in<sup>3</sup>.

### Single End - Silver Plated Copper - Soft (40 micro-inch silver thickness)

AWG	Std Plate %	Diameter					Resistance max		Weight max		Length nom	
		nom	inch min	max	min	mm max	$\Omega$ /mft	$\Omega$ /km	lb/mft	kg/km	ft/lb	m/kg
30	2	0.0100	0.0099	0.0101	0.251	0.257	105.8	347.2	0.310	0.461	3,293	2,213
31	2.5	0.0089	0.0088	0.0090	0.224	0.229	133.9	439.4	0.246	0.366	4,155	2,792
32	2.5	0.0080	0.0079	0.0081	0.201	0.206	166.2	545.2	0.199	0.297	5,142	3,455
33	3	0.0071	0.0070	0.0072	0.178	0.183	211.7	694.4	0.159	0.236	6,486	4,358
34	3	0.0063	0.0062	0.0064	0.157	0.163	269.8	885.2	0.125	0.185	8,285	5,567
35	4	0.0056	0.0055	0.0057	0.140	0.145	342.8	1,125	0.0990	0.147	10,470	7,035
36	4	0.0050	0.0049	0.0051	0.124	0.130	431.9	1,417	0.0792	0.118	13,133	8,825
37	5	0.0045	0.0044	0.0046	0.112	0.117	535.7	1,757	0.0645	0.0961	16,189	10,878
38	5	0.0040	0.0039	0.0041	0.099	0.104	681.9	2,237	0.0513	0.0763	20,489	13,768
39	6.1	0.0035	0.0034	0.0036	0.086	0.091	897.1	2,943	0.0396	0.0589	26,716	17,952
40	6.1	0.0031	0.0030	0.0032	0.076	0.081	1,152	3,781	0.0313	0.0466	34,055	22,883
41	8	0.0028	0.0027	0.0029	0.069	0.074	1,423	4,667	0.0258	0.0384	41,621	27,967
42	8	0.0025	0.0024	0.0026	0.061	0.066	1,801	5,907	0.0207	0.0308	52,209	35,082
43	10	0.0022	0.0021	0.0023	0.053	0.058	2,352	7,715	0.0163	0.0242	67,210	45,162
44	10	0.0020	0.0019	0.0021	0.048	0.053	2,873	9,425	0.0136	0.0202	81,324	54,645
45**	10*	0.00176	0.00166	0.00186	0.042	0.047	3,962	12,998	0.0107	0.0159	104,240	70,045
46**	10*	0.00157	0.00147	0.00167	0.037	0.042	5,052	16,575	0.0086	0.0129	130,997	88,024
47**	10*	0.00140	0.00130	0.00150	0.033	0.038	6,460	21,193	0.0070	0.0104	164,742	110,699
48**	10*	0.00124	0.00114	0.00134	0.029	0.034	8,400	27,560	0.0056	0.0083	209,999	141,110
49**	10*	0.00111	0.00101	0.00121	0.026	0.031	10,702	35,111	0.0045	0.0067	262,069	176,098
50**	10*	0.00099	0.00089	0.00109	0.023	0.028	13,782	45,217	0.0037	0.0055	329,451	221,376

Notes: \*These single end sizes will not have 40 micro-inches of silver \*\*These single end sizes will be hard temper

**Custom constructions are available, please contact the sales department.**

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Fisk Alloy Conductors, Inc. • P.O. Box 26 • 10 Thomas Road • Hawthorne, NJ 07507 • U.S.A.

Phone (973) 427-7550 • Fax (973) 427-4585 • E-mail:sales@fiskalloy.com

Single End - Nickel Plated Copper - Soft (50 micro-inch nickel thickness)

AWG	Std Plate %	Diameter					Resistance max		Weight max		Length nom	
		nom	inch min	max	min	mm max	$\Omega$ /mft	$\Omega$ /km	lb/mft	kg/km	ft/lb	m/kg
30	2	0.0100	0.0099	0.0103	0.251	0.262	110.2	361.6	0.321	0.478	3,304	2,220
31	4	0.0089	0.0088	0.0092	0.224	0.234	142.5	467.4	0.256	0.381	4,171	2,802
32	4	0.0080	0.0079	0.0083	0.201	0.211	176.8	580.0	0.208	0.310	5,162	3,469
33	4	0.0071	0.0070	0.0074	0.178	0.188	225.2	738.7	0.166	0.247	6,557	4,406
34	4	0.0063	0.0062	0.0066	0.157	0.168	287.0	941.7	0.132	0.196	8,324	5,593
35	4	0.0056	0.0055	0.0059	0.140	0.150	364.7	1,197	0.105	0.157	10,534	7,079
36	4	0.0050	0.0049	0.0053	0.124	0.135	459.5	1,508	0.0850	0.126	13,214	8,879
37	7	0.0045	0.0044	0.0048	0.112	0.122	588.7	1,931	0.0697	0.104	16,314	10,962
38	7	0.0040	0.0039	0.0043	0.099	0.109	749.3	2,458	0.0560	0.0833	20,648	13,874
39	7	0.0035	0.0034	0.0038	0.086	0.097	985.9	3,235	0.0437	0.0650	26,968	18,121
40	7	0.0031	0.0030	0.0034	0.076	0.086	1,266	4,155	0.0350	0.0521	34,377	23,099

7-Strand Constructions - Silver Plated Copper - Soft (40 micro-inch silver thickness)

AWG	Construction	Diameter					Resistance max		Weight max	
		min	inch max	mm min	max	$\Omega$ /mft	$\Omega$ /km	lb/mft	kg/km	
22	7/30	0.0293	0.0300	0.744	0.762	15.5	50.8	2.15	3.20	
24	7/32	0.0234	0.0241	0.594	0.612	24.2	79.4	1.38	2.05	
26	7/34	0.0183	0.0190	0.465	0.483	39.4	129.3	0.861	1.28	
28	7/36	0.0145	0.0151	0.368	0.384	63.0	206.7	0.547	0.814	
30	7/38	0.0115	0.0122	0.292	0.310	99.0	324.8	0.353	0.525	
32	7/40	0.00887	0.00950	0.210	0.241	168	551.2	0.216	0.321	
34	7/42	0.00710	0.00772	0.180	0.196	262	859.6	0.143	0.213	
36	7/44	0.00562	0.00624	0.143	0.159	420	1378	0.0943	0.140	

7-Strand Constructions - Nickel Plated Copper - Soft (50 micro-inch nickel thickness)

AWG	Construction	Diameter					Resistance max		Weight max	
		min	inch max	mm min	max	$\Omega$ /mft	$\Omega$ /km	lb/mft	kg/km	
22	7/30	0.0293	0.0350	0.744	0.889	15.8	51.8	2.19	3.26	
24	7/32	0.0234	0.0243	0.594	0.617	25.0	82.0	1.41	2.10	
26	7/34	0.0183	0.0193	0.465	0.490	40.7	133.5	0.884	1.32	
28	7/36	0.0145	0.0154	0.368	0.391	65.1	213.6	0.566	0.842	
30	7/38	0.0115	0.0124	0.292	0.315	105	344.5	0.368	0.548	
32	7/40	0.00828	0.00947	0.210	0.241	204	669.3	0.214	0.318	

19-Strand Unilay Constructions - Silver Plated Copper - Soft (40 micro-inch silver thickness)

AWG	Construction	Diameter					Resistance max		Weight max	
		min	inch max	mm min	max	$\Omega$ /mft	$\Omega$ /km	lb/mft	kg/km	
18	19/30	0.0462	0.0471	1.173	1.196	5.79	19.0	5.73	8.53	
20	19/32	0.0368	0.0377	0.935	0.958	9.19	30.1	3.69	5.49	
22	19/34	0.0289	0.0298	0.734	0.757	15.0	49.2	2.32	3.45	
24	19/36	0.0228	0.0238	0.579	0.605	23.9	78.4	1.46	2.17	
26	19/38	0.0182	0.0191	0.462	0.485	37.7	123.7	0.948	1.41	
28	19/40	0.0140	0.0149	0.356	0.366	63.7	209.0	0.578	0.860	
30	19/42	0.0112	0.0121	0.284	0.307	99.0	324.8	0.381	0.567	
32	19/44*	0.0094	0.0104	0.238	0.263	154.2	506.0	0.257	0.383	

\*True Concentric

19-Strand Unilay Constructions - Nickel Plated Copper - Soft (50 micro-inch nickel thickness)

AWG	Construction	Diameter					Resistance max		Weight max	
		min	inch max	mm min	max	$\Omega$ /mft	$\Omega$ /km	lb/mft	kg/km	
18	19/30	0.0462	0.0480	1.173	1.219	5.97	19.6	5.94	8.84	
20	19/32	0.0368	0.0387	0.935	0.983	9.52	31.2	3.86	5.74	
22	19/34	0.0289	0.0307	0.734	0.780	15.4	50.5	2.43	3.62	
24	19/36	0.0228	0.0247	0.579	0.627	24.7	81.0	1.57	2.34	
26	19/38	0.0182	0.0200	0.462	0.508	40.0	131.2	1.037	1.54	
28	19/40	0.0140	0.0159	0.356	0.404	67.5	221.5	0.648	0.964	

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