

ELEKTRISOLA

CCA15

Copper Clad Aluminum 15 %

General Description

The ELEKTRISOLA copper clad aluminum wire (CCA) is a bimetallic compound consisting of an aluminum core and a concentric copper cladding. This combination of copper and aluminum provides a wire with optimum properties of both metals. The aluminum core reduces the weight of the CCA to almost that of pure aluminum wire. Furthermore, the copper cladding increases the conductivity and provides good solderability. These properties provide a conductor optimal for high quality coils used in headphones, headsets, loudspeakers and many other applications in which coil weight reduction is desired.

Features

- Low density allows coil weight reduction
- Easy soldering due to copper cladding
- Higher conductivity compared to aluminum

Applications

- Voice coils (e.g. in headphone, headset, ...)
- VCM coils for HDD actuator
- Loudspeakers

Electrical Characteristics (Note 1)

Symbol	Parameter	Min (Note 3)	Typ (Note 2)	Max (Note 3)	Units
χ	Conductivity		38.5		S*m/mm ²
ρ	Resistivity		0.0260		Ω *mm ² /m
α	Thermal coefficient of resistance	3800	4000	4200	10E-6/K
	Resistance (IACS)		66		%

Mechanical Characteristics (Note 1)

Symbol	Parameter	Min (Note 3)	Typ (Note 2)	Max (Note 3)	Units
σ_T	Tensile strength	140	190	240	N/mm ²
$\sigma_{Y1\%}$	Yield strength at 1%	110	150	190	N/mm ²
ε	Elongation	5	15	25	%
<i>BPP</i>	Bending proof performance (Note 4)		80		%

Physical Characteristics (Note 1)

Symbol	Parameter	Min (Note 3)	Typ (Note 2)	Max (Note 3)	Units
ρ	Density		3.6		kg/dm ³
<i>CC</i>	Copper cladding in percentage of cross-section		15		%

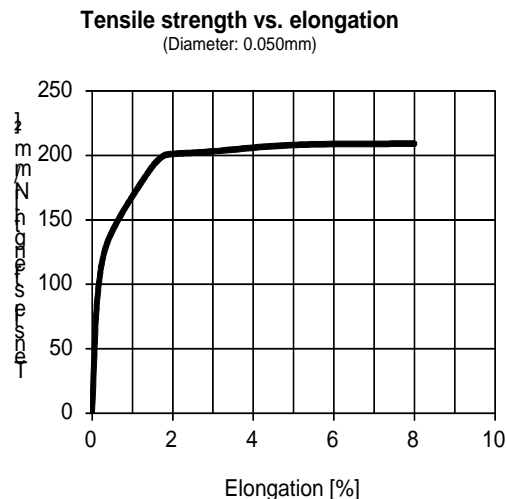
Note 1: Unless otherwise specified, all limits are guaranteed for annealed and enameled wire at $T_A = 20^\circ\text{C}$ and measured according international standard IEC 851 as far as applicable.

Note 2: Typical Values represent the most likely parametric norm.

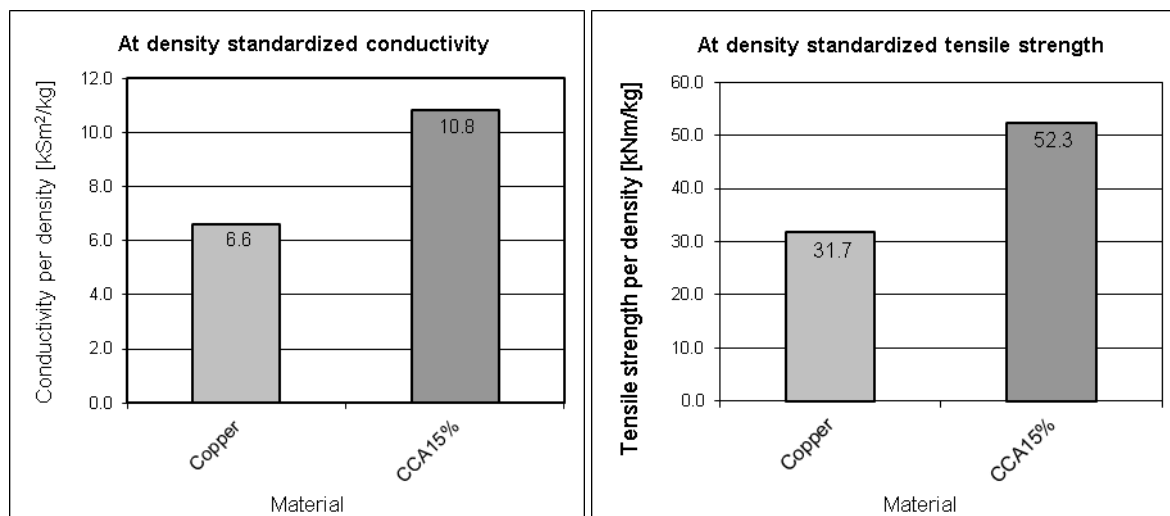
Note 3: All limits are guaranteed by testing or statistical analysis.

Note 4: BPP tests are conducted with a 0.100mm hard drawn bare wire according ELEKTRISOLA internal specification. The value specifies the Time To Fracture (TTF) compared to copper (100%) under these test conditions.

Typical Performance Characteristics



CCA15% vs. Copper



BANNED SUBSTANCES COMPLIANCE

ELEKTRISOLA FEINDRAHT AG certifies that the products and packing materials meet the provision from the European Union for the Restriction of certain Hazardous Substances (RoHS) and the directive for Waste from Electrical and Electronic Equipment (WEEE).

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Annex A

Electrical Resistance

The limits of electrical resistance are derived from the calculations made in IEC standard 317-0-1 Annex C.1 "Method for the calculation of linear resistance" for copper wire and are restricted by a factor of 2.

Nom. Diameter [mm]	AWG	Min [Ω/m]	Nominal [Ω/m]	Max [Ω/m]
0.0098	58	304.8	338.6	372.5
0.0101		286.9	318.8	350.7
0.0109	57	246.4	273.7	301.1
0.0113		229.2	254.7	280.2
0.0120		203.3	225.8	248.4
0.0125	56	187.3	208.1	229.0
0.0130	55.5	173.2	192.4	211.7
0.0135	55	160.6	178.4	196.3
0.0140		149.3	165.9	182.5
0.0145	54.5	139.2	154.7	170.2
0.0155	54	121.8	135.4	148.9
0.0160		114.3	127.0	139.7
0.0165	53.5	107.5	119.5	131.4
0.0170		101.3	112.5	123.8
0.0175	53	95.58	106.2	116.8
0.0180		90.34	100.4	110.4
0.0185	52.5	85.52	95.02	104.5
0.0190		81.08	90.09	99.10
0.0195	52	76.98	85.53	94.08
0.0200		73.17	81.31	89.44
0.0210	51.5	66.37	73.75	81.12
0.0215		63.32	70.36	77.39
0.0220	51	60.47	67.19	73.91
0.0230	50.5	55.33	61.48	67.63
0.0240		50.82	56.46	62.11
0.0245	50	48.76	54.18	59.60
0.0250		46.83	52.04	57.24
0.0260	49.5	43.30	48.11	52.92
0.0270		40.15	44.61	49.07
0.0275	49	38.70	43.00	47.30
0.0280		37.33	41.48	45.63
0.0290	48.5	34.80	38.67	42.54
0.0300		32.52	36.14	39.75
0.0310	48	30.46	33.84	37.23
0.0320		28.58	31.76	34.94
0.0330	47.5	26.97	29.86	32.76
0.0340		25.40	28.13	30.86
0.0350	47	23.97	26.55	29.12
0.0360		22.66	25.09	27.53
0.0370	46.5	21.45	23.76	26.06
0.0380		20.34	22.52	24.71
0.0381	46.1	20.23	22.40	24.58
0.0390	46.0	19.31	21.38	23.46
0.0400		18.35	20.33	22.30
0.0410	45.5	17.47	19.35	21.22
0.0420		16.65	18.44	20.22

Nom. Diameter [mm]	AWG	Min [Ω/m]	Nominal [Ω/m]	Max [Ω/m]
0.0430		15.88	17.59	19.30
0.0437		15.38	17.03	18.68
0.0440	45	15.17	16.80	18.43
0.0450		14.50	16.06	17.62
0.0460		13.88	15.37	16.86
0.0470	44.5	13.40	14.72	16.05
0.0480		12.85	14.12	15.39
0.0490		12.33	13.55	14.76
0.0500	44	11.84	13.01	14.18
0.0520	43.5	10.94	12.03	13.11
0.0530		10.54	11.58	12.62
0.0550	43	9.784	10.75	11.72
0.0560		9.437	10.37	11.30
0.0580		8.798	9.668	10.54
0.0600	42.5	8.311	9.034	9.757
0.0620		7.784	8.460	9.137
0.0630	42	7.539	8.194	8.850
0.0650	41.5	6.973	7.698	8.533
0.0670		6.580	7.245	8.008
0.0680		6.396	7.033	7.763
0.0700	41	6.051	6.637	7.307
0.0710		5.888	6.452	7.093
0.0740		5.438	5.939	6.507
0.0750	40.5	5.300	5.782	6.327
0.0780	40	4.915	5.346	5.831
0.0800		4.681	5.082	5.532
0.0830	39.5	4.360	4.721	5.125
0.0850		4.164	4.501	4.878
0.0880	39	3.894	4.200	4.540
0.0900		3.728	4.015	4.333
0.0930	38.5	3.499	3.760	4.049
0.0950		3.357	3.604	3.875
0.1000		3.039	3.252	3.486
0.101	38.0	2.981	3.188	3.415
0.106	37.5	2.714	2.894	3.092
0.110		2.525	2.688	2.865
0.112		2.438	2.593	2.761
0.113	37	2.396	2.547	2.711
0.115		2.316	2.459	2.615
0.118	36.5	2.202	2.336	2.480
0.120		2.131	2.258	2.396
0.125		1.968	2.081	2.204
0.126	36	1.938	2.049	2.168
0.130		1.823	1.924	2.034
0.132		1.769	1.867	1.971
0.134	35.5	1.718	1.811	1.911

CCA15 Copper Clad Aluminium 15%

Annex A

Electrical Resistance (Continued)

Nom. Diameter [mm]	AWG	Min [Ω/m]	Nominal [Ω/m]	Max [Ω/m]
0.138		1.622	1.708	1.800
0.140		1.577	1.659	1.748
0.141	35	1.555	1.636	1.722
0.149	34.5	1.396	1.465	1.539
0.150		1.377	1.445	1.518
0.159	34.0	1.229	1.286	1.348
0.160		1.214	1.270	1.331
0.169	33.5	1.090	1.139	1.190
0.170		1.077	1.125	1.176
0.179	33	0.9734	1.015	1.059
0.180		0.9628	1.004	1.047
0.189		0.8747	0.9104	0.9481
0.190	32.5	0.8656	0.9009	0.9380
0.200		0.7825	0.8131	0.8452
0.202	32	0.7673	0.7970	0.8283
0.210		0.7107	0.7375	0.7655
0.212	31.5	0.6975	0.7236	0.7509
0.220		0.6484	0.6719	0.6966
0.222		0.6369	0.6599	0.6839
0.224		0.6257	0.6482	0.6716
0.225	31	0.6149	0.6424	0.6716
0.230		0.5889	0.6148	0.6422
0.236		0.5598	0.5839	0.6094
0.239		0.5461	0.5694	0.5939
0.240	30.5	0.5416	0.5646	0.5889
0.250		0.4998	0.5204	0.5420
0.253	30	0.4882	0.5081	0.5290
0.260		0.4626	0.4811	0.5005
0.265		0.4456	0.4631	0.4815
0.268	29.5	0.4358	0.4528	0.4706

Nom. Diameter [mm]	AWG	Min [Ω/m]	Nominal [Ω/m]	Max [Ω/m]
0.270		0.4295	0.4461	0.4636
0.280		0.3998	0.4148	0.4306
0.286	29	0.3834	0.3976	0.4125
0.290		0.3730	0.3867	0.4010
0.295		0.3607	0.3737	0.3873
0.300		0.3489	0.3614	0.3744
0.301	28.5	0.3466	0.3590	0.3718
0.315		0.3169	0.3278	0.3391
0.319	28	0.3091	0.3196	0.3306
0.335		0.2806	0.2898	0.2994
0.339	27.5	0.2741	0.2830	0.2923
0.345		0.2647	0.2732	0.2821
0.350		0.2573	0.2655	0.2740
0.355		0.2502	0.2581	0.2662
0.360	27	0.2420	0.2509	0.2603
0.375		0.2233	0.2313	0.2396
0.380	26.5	0.2175	0.2252	0.2332
0.383		0.2142	0.2217	0.2296
0.390		0.2067	0.2138	0.2213
0.400		0.1966	0.2033	0.2102
0.402	26	0.1947	0.2012	0.2081
0.420		0.1785	0.1844	0.1904
0.425		0.1744	0.1801	0.1859
0.427	25.5	0.1728	0.1784	0.1842
0.450		0.1557	0.1606	0.1656
0.453	25	0.1537	0.1585	0.1634
0.475		0.1399	0.1441	0.1485
0.481	24.5	0.1365	0.1406	0.1448
0.500		0.1264	0.1301	0.1339
0.508	24	0.1220	0.1260	0.1302

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