

ELEKTRISOLA

CuNi6

Copper Nickel Alloy

General Description

Due to its high tensile strength and resistance values, ELEKTRISOLA copper nickel alloy wires are the first choice for applications as resistance wires. With the different nickel content of our products, the characteristics of the wire can be chosen according to your requirements. Copper nickel alloy wires are available in diameters from 0.025mm to 0.500mm (AWG 50 – 24) as bare wire, or enameled wire with any insulation and self-bonding enamel. Furthermore litz wire made of enameled copper nickel alloy wire are available.

Features

- Higher resistance than copper
- High tensile strength
- Good bending proof performance

Applications

- Heating applications
- Resistance wire
- Applications with high mechanical requirements
- Others

Electrical Characteristics (Note 1)

Symbol	Parameter	Min (Note 3)	Typ (Note 2)	Max (Note 3)	Units
χ	Conductivity		10.0		S*m/mm ²
ρ	Resistivity		0.1000		Ω *mm ² /m
α	Thermal coefficient of resistance	500	700	900	10E-6/K
	Resistance (IACS)		17		%

Mechanical Characteristics (Note 1)

Symbol	Parameter	Min (Note 3)	Typ (Note 2)	Max (Note 3)	Units
σ_T	Tensile strength	270	330	370	N/mm ²
$\sigma_{Y1\%}$	Yield strength at 1%	160	190	220	N/mm ²
ε	Elongation	15	20	30	%
<i>BPP</i>	Bending proof performance (Note 4)		145		%

Physical Characteristics (Note 1)

Symbol	Parameter	Min (Note 3)	Typ (Note 2)	Max (Note 3)	Units
ρ	Density		8.9		kg/dm ³

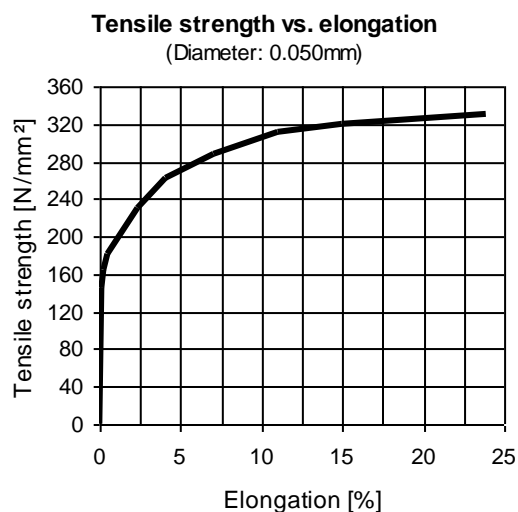
Note 1: Unless otherwise specified, all limits are guaranteed for annealed and enameled wire at $T_A = 20^\circ\text{C}$ and measured according international standard IEC 851 as far as applicable.

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

Note 3: All limits are evaluated by testing or statistical analysis but are not guaranteed.

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



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]	Nom. Diameter [mm]	AWG	Min [Ω/m]	Nominal [Ω/m]	Max [Ω/m]
0.0098	58	1193	1326	1458	0.0430		62.18	68.86	75.54
0.0101		1123	1248	1373	0.0437		60.21	66.67	73.14
0.0109	57	964.5	1072	1179	0.0440	45	59.39	65.77	72.15
0.0113		897.4	997.1	1097	0.0450		56.78	62.88	68.98
0.0120		795.8	884.2	972.6	0.0460		54.34	60.17	66.01
0.0125	56	733.4	814.9	896.4	0.0470	44.5	52.45	57.64	62.83
0.0130	55.5	678.1	753.4	828.7	0.0480		50.29	55.26	60.24
0.0135	55	628.8	698.6	768.5	0.0490		48.26	53.03	57.80
0.0140		584.7	649.6	714.6	0.0500	44	46.35	50.93	55.51
0.0145	54.5	545.0	605.6	666.1	0.0520	43.5	42.85	47.09	51.33
0.0155	54	477.0	530.0	583.0	0.0530		41.25	45.33	49.41
0.0160		447.6	497.4	547.1	0.0550	43	38.30	42.09	45.88
0.0165	53.5	420.9	467.7	514.4	0.0560		36.95	40.60	44.25
0.0170		396.5	440.6	484.6	0.0580		34.44	37.85	41.26
0.0175	53	374.2	415.8	457.3	0.0600	42.5	32.54	35.37	38.20
0.0180		353.7	393.0	432.3	0.0620		30.47	33.12	35.77
0.0185	52.5	334.8	372.0	409.2	0.0630	42	29.51	32.08	34.65
0.0190		317.4	352.7	388.0	0.0650	41.5	27.30	30.14	33.41
0.0195	52	301.4	334.8	368.3	0.0670		25.76	28.36	31.35
0.0200		286.5	318.3	350.1	0.0680		25.04	27.54	30.39
0.0210	51.5	259.8	288.7	317.6	0.0700	41	23.69	25.98	28.61
0.0215		247.9	275.4	303.0	0.0710		23.05	25.26	27.77
0.0220	51	236.8	263.1	289.4	0.0740		21.29	23.25	25.47
0.0230	50.5	216.6	240.7	264.8	0.0750	40.5	20.75	22.64	24.77
0.0240		198.9	221.0	243.2	0.0780	40	19.24	20.93	22.83
0.0245	50	190.9	212.1	233.3	0.0800		18.32	19.89	21.66
0.0250		183.3	203.7	224.1	0.0830	39.5	17.07	18.48	20.06
0.0260	49.5	169.5	188.3	207.2	0.0850		16.30	17.62	19.10
0.0270		157.2	174.7	192.1	0.0880	39	15.24	16.44	17.77
0.0275	49	151.5	168.4	185.2	0.0900		14.60	15.72	16.97
0.0280		146.2	162.4	178.6	0.0930	38.5	13.70	14.72	15.85
0.0290	48.5	136.3	151.4	166.5	0.0950		13.14	14.11	15.17
0.0300		127.3	141.5	155.6	0.1000		11.90	12.73	13.65
0.0310	48	119.2	132.5	145.7	0.101	38.0	11.67	12.48	13.37
0.0320		111.9	124.3	136.8	0.106	37.5	10.63	11.33	12.10
0.0330	47.5	105.6	116.9	128.3	0.110		9.886	10.52	11.22
0.0340		99.46	110.1	120.8	0.112		9.545	10.15	10.81
0.0350	47	93.86	103.9	114.0	0.113	37	9.381	9.971	10.61
0.0360		88.71	98.24	107.8	0.115		9.066	9.628	10.24
0.0370	46.5	83.98	93.01	102.0	0.118	36.5	8.622	9.144	9.710
0.0380		79.62	88.17	96.73	0.120		8.344	8.842	9.381
0.0381	46.1	79.20	87.71	96.22	0.125		7.705	8.149	8.628
0.0390	46.0	75.59	83.71	91.83	0.126	36	7.586	8.020	8.488
0.0400		71.86	79.58	87.30	0.130		7.136	7.534	7.962
0.0410	45.5	68.40	75.74	83.09	0.132		6.927	7.307	7.717
0.0420		65.18	72.18	79.18	0.134	35.5	6.726	7.091	7.483

Annex A

Electrical Resistance (Continued)

Nom. Diameter [mm]	AWG	Min [Ω/m]	Nominal [Ω/m]	Max [Ω/m]
0.138		6.350	6.686	7.046
0.140		6.173	6.496	6.842
0.141	35	6.088	6.404	6.743
0.149	34.5	5.464	5.735	6.024
0.150		5.393	5.659	5.943
0.159	34.0	4.810	5.036	5.277
0.160		4.751	4.974	5.210
0.169	33.5	4.267	4.458	4.660
0.170		4.218	4.406	4.604
0.179	33	3.811	3.974	4.146
0.180		3.769	3.930	4.099
0.189		3.424	3.564	3.712
0.190	32.5	3.389	3.527	3.672
0.200		3.063	3.183	3.309
0.202	32	3.004	3.120	3.243
0.210		2.782	2.887	2.997
0.212	31.5	2.731	2.833	2.940
0.220		2.538	2.631	2.727
0.222		2.494	2.583	2.677
0.224		2.450	2.538	2.629
0.225	31	2.407	2.515	2.629
0.230		2.305	2.407	2.514
0.236		2.192	2.286	2.386
0.239		2.138	2.229	2.325
0.240	30.5	2.120	2.210	2.306
0.250		1.957	2.037	2.122
0.253	30	1.911	1.989	2.071
0.260		1.811	1.883	1.959
0.265		1.745	1.813	1.885
0.268	29.5	1.706	1.773	1.842

Nom. Diameter [mm]	AWG	Min [Ω/m]	Nominal [Ω/m]	Max [Ω/m]
0.270		1.681	1.747	1.815
0.280		1.565	1.624	1.686
0.286	29	1.501	1.557	1.615
0.290		1.460	1.514	1.570
0.295		1.412	1.463	1.516
0.300		1.366	1.415	1.466
0.301	28.5	1.357	1.405	1.456
0.315		1.241	1.283	1.328
0.319	28	1.210	1.251	1.294
0.335		1.098	1.135	1.172
0.339	27.5	1.073	1.108	1.144
0.345		1.036	1.070	1.104
0.350		1.007	1.039	1.073
0.355		0.9795	1.010	1.042
0.360	27	0.9475	0.9824	1.019
0.375		0.8742	0.9054	0.9380
0.380	26.5	0.8516	0.8817	0.9132
0.383		0.8385	0.8680	0.8987
0.390		0.8091	0.8371	0.8663
0.400		0.7696	0.7958	0.8230
0.402	26	0.7621	0.7879	0.8148
0.420		0.6989	0.7218	0.7456
0.425		0.6827	0.7049	0.7280
0.427	25.5	0.6764	0.6983	0.7211
0.450		0.6098	0.6288	0.6485
0.453	25	0.6018	0.6205	0.6398
0.475		0.5479	0.5643	0.5813
0.481	24.5	0.5345	0.5503	0.5668
0.500		0.4950	0.5093	0.5241
0.508	24	0.4778	0.4934	0.5096