

# ELEKTRISOLA

## CuSn6

### Copper Tin Alloy

#### General Description

ELEKTRISOLA bronze wire CuSn6 has very good mechanical and chemical properties. This binary alloy is made of copper alloyed with 6% tin. Advantages of this product include a very high corrosion resistance and good solderability. The bronze wire CuSn6 can be used for a wide range of electro technical applications, such as heating elements.

Bronze wire CuSn6 is available as litz wire or single wire with all insulation and self-bonding enamels. Bare wire is available upon request.

#### Features

- Very good mechanical properties
- Excellent bending proof performance
- Very high corrosion resistance

#### Applications

- Heating applications
- Resistance wires
- Other applications with high mechanical and corrosion resistance requirements

#### Electrical Characteristics (Note 1)

Symbol	Parameter	Min (Note 3)	Typ (Note 2)	Max (Note 3)	Units
$\chi$	Conductivity		7.5		S*m/mm <sup>2</sup>
$\rho$	Resistivity		0.1333		$\Omega$ *mm <sup>2</sup> /m
$\alpha$	Thermal coefficient of resistance	600	650	700	10E-6/K
	Resistance (IACS)		13		%

#### Mechanical Characteristics (Note 1)

Symbol	Parameter	Min (Note 3)	Typ (Note 2)	Max (Note 3)	Units
$\sigma_T$	Tensile strength	470	500	530	N/mm <sup>2</sup>
$\sigma_{Y1\%}$	Yield strength at 1%	380	420	460	N/mm <sup>2</sup>
$\varepsilon$	Elongation	20	35	45	%
	Bending proof performance (Note 4)		2900		%

#### Physical Characteristics (Note 1)

Symbol	Parameter	Min (Note 3)	Typ (Note 2)	Max (Note 3)	Units
$\rho$	Density		8.8		kg/dm <sup>3</sup>

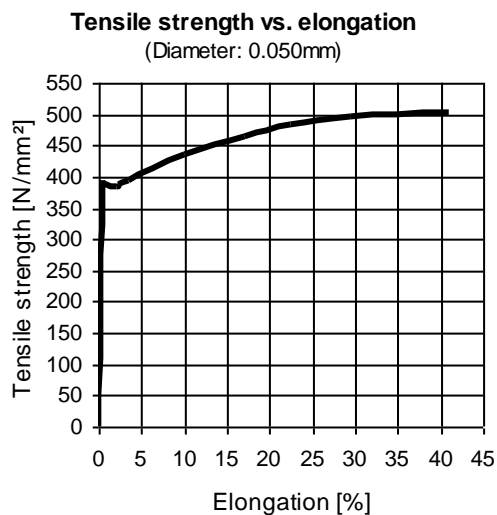
**Note 1:** Unless otherwise specified, all limits are guaranteed for annealed and enameled wire at  $T_A = 20^\circ\text{C}$  and measured according international standard IEC 851 as far as applicable.

**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:** The bending fatigue strength tests are conducted with a 0.08mm annealed and enameled 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]
0.0098	58	1591	1768	1944
0.0101		1498	1664	1831
0.0109	57	1286	1429	1572
0.0113		1197	1330	1462
0.0120		1061	1179	1297
0.0125	56	977.8	1086	1195
0.0130	55.5	904.1	1005	1105
0.0135	55	838.3	931.5	1025
0.0140		779.5	866.1	952.8
0.0145	54.5	726.7	807.4	888.2
0.0155	54	636.0	706.6	777.3
0.0160		596.8	663.1	729.5
0.0165	53.5	561.2	623.6	685.9
0.0170		528.7	587.4	646.2
0.0175	53	498.9	554.3	609.8
0.0180		471.6	524.0	576.4
0.0185	52.5	446.4	496.0	545.6
0.0190		423.2	470.3	517.3
0.0195	52	401.8	446.5	491.1
0.0200		382.0	424.4	466.9
0.0210	51.5	346.5	385.0	423.5
0.0215		330.5	367.3	404.0
0.0220	51	315.7	350.8	385.8
0.0230	50.5	288.8	320.9	353.0
0.0240		265.3	294.7	324.2
0.0245	50	254.5	282.8	311.1
0.0250		244.5	271.6	298.8
0.0260	49.5	226.0	251.1	276.2
0.0270		209.6	232.9	256.2
0.0275	49	202.0	224.5	246.9
0.0280		194.9	216.5	238.2
0.0290	48.5	181.7	201.9	222.0
0.0300		169.8	188.6	207.5
0.0310	48	159.0	176.7	194.3
0.0320		149.2	165.8	182.4
0.0330	47.5	140.8	155.9	171.0
0.0340		132.6	146.9	161.1
0.0350	47	125.1	138.6	152.0
0.0360		118.3	131.0	143.7
0.0370	46.5	112.0	124.0	136.0
0.0380		106.2	117.6	129.0
0.0381	46.1	105.6	116.9	128.3
0.0390	46.0	100.8	111.6	122.4
0.0400		95.81	106.1	116.4

Nom. Diameter [mm]	AWG	Min [Ω/m]	Nominal [Ω/m]	Max [Ω/m]
0.0410	45.5	91.19	101.0	110.8
0.0420		86.90	96.24	105.6
0.0430		82.91	91.81	100.7
0.0437		80.27	88.90	97.52
0.0440	45	79.18	87.69	96.19
0.0450		75.70	83.83	91.97
0.0460		72.45	80.23	88.01
0.0470	44.5	69.93	76.85	83.77
0.0480		67.05	73.68	80.31
0.0490		64.34	70.71	77.07
0.0500	44	61.79	67.91	74.02
0.0520	43.5	57.13	62.78	68.43
0.0530		55.00	60.44	65.88
0.0550	43	51.07	56.12	61.17
0.0560		49.26	54.13	59.01
0.0580		45.92	50.47	55.01
0.0600	42.5	43.38	47.16	50.93
0.0620		40.63	44.16	47.70
0.0630	42	39.35	42.77	46.19
0.0650	41.5	36.40	40.18	44.54
0.0670		34.35	37.82	41.80
0.0680		33.39	36.71	40.52
0.0700	41	31.58	34.65	38.14
0.0710		30.74	33.68	37.03
0.0740		28.39	31.00	33.96
0.0750	40.5	27.67	30.18	33.03
0.0780	40	25.65	27.90	30.44
0.0800		24.43	26.53	28.88
0.0830	39.5	22.76	24.64	26.75
0.0850		21.73	23.50	25.46
0.0880	39	20.33	21.92	23.70
0.0900		19.46	20.96	22.62
0.0930	38.5	18.26	19.63	21.14
0.0950		17.53	18.81	20.23
0.1000		15.87	16.98	18.20
0.101	38.0	15.56	16.64	17.83
0.106	37.5	14.17	15.11	16.14
0.110		13.18	14.03	14.95
0.112		12.73	13.53	14.41
0.113	37	12.51	13.30	14.15
0.115		12.09	12.84	13.65
0.118	36.5	11.50	12.19	12.95
0.120		11.13	11.79	12.51
0.125		10.27	10.86	11.50

## Annex A

### Electrical Resistance (Continued)

Nom. Diameter [mm]	AWG	Min [Ω/m]	Nominal [Ω/m]	Max [Ω/m]
0.126	36	10.11	10.69	11.32
0.130		9.515	10.05	10.62
0.132		9.235	9.743	10.29
0.134	35.5	8.968	9.455	9.977
0.138		8.466	8.914	9.395
0.140		8.231	8.661	9.122
0.141	35	8.117	8.539	8.991
0.149	34.5	7.285	7.647	8.032
0.150		7.190	7.545	7.923
0.159	34.0	6.413	6.715	7.036
0.160		6.335	6.631	6.946
0.169	33.5	5.689	5.944	6.213
0.170		5.624	5.874	6.139
0.179	33	5.081	5.298	5.527
0.180		5.026	5.240	5.465
0.189		4.566	4.753	4.949
0.190	32.5	4.519	4.703	4.896
0.200		4.084	4.244	4.412
0.202	32	4.005	4.161	4.324
0.210		3.710	3.850	3.996
0.212	31.5	3.641	3.777	3.920
0.220		3.385	3.508	3.636
0.222		3.325	3.445	3.570
0.224		3.266	3.383	3.506
0.225	31	3.210	3.353	3.506
0.230		3.074	3.209	3.352
0.236		2.922	3.048	3.181
0.239		2.850	2.972	3.100
0.240	30.5	2.827	2.947	3.074
0.250		2.609	2.716	2.829
0.253	30	2.548	2.652	2.762
0.260		2.415	2.511	2.613

Nom. Diameter [mm]	AWG	Min [Ω/m]	Nominal [Ω/m]	Max [Ω/m]
0.265		2.326	2.417	2.513
0.268	29.5	2.275	2.364	2.457
0.270		2.242	2.329	2.420
0.280		2.087	2.165	2.248
0.286	29	2.001	2.075	2.153
0.290		1.947	2.019	2.093
0.295		1.883	1.951	2.022
0.300		1.821	1.886	1.954
0.301	28.5	1.809	1.874	1.941
0.315		1.654	1.711	1.770
0.319	28	1.613	1.668	1.726
0.335		1.465	1.513	1.563
0.339	27.5	1.431	1.477	1.526
0.345		1.382	1.426	1.472
0.350		1.343	1.386	1.430
0.355		1.306	1.347	1.390
0.360	27	1.263	1.310	1.359
0.375		1.166	1.207	1.251
0.380	26.5	1.136	1.176	1.218
0.383		1.118	1.157	1.198
0.390		1.079	1.116	1.155
0.400		1.026	1.061	1.097
0.402	26	1.016	1.051	1.086
0.420		0.9318	0.9624	0.9941
0.425		0.9103	0.9399	0.9706
0.427	25.5	0.9019	0.9311	0.9614
0.450		0.8130	0.8383	0.8646
0.453	25	0.8024	0.8273	0.8531
0.475		0.7305	0.7524	0.7751
0.481	24.5	0.7126	0.7338	0.7557
0.500		0.6600	0.6791	0.6988
0.508	24	0.6371	0.6578	0.6794