



Brand Name	ALLOY 127				
Material Code	1)				
Abbreviation	CuNi15				
Chemical Composition (mass components) in %.					
Average values of alloy components					
Cu	Ni	Mn			
Rem.	15	0.3			

Features and Application Notes

ALLOY 127 is a non-standardized electrical resistance Alloy. With its resistivity of 21 $\mu\Omega \times \text{cm}$ it fills well up the gap between ALLOY 90 with 15 $\mu\Omega \times \text{cm}$ and ISA-ZIN with 30 $\mu\Omega \times \text{cm}$. ALLOY 127 provides high resistance to oxidation and chemical corrosion; the alloy is mainly used for heating wires and mats in heating cords and in heating cables as well as for the production of wire-wound resistors. Flat wires and ribbons can be used for protective switches. The maximum working temperature in air is +400 °C.

Form of Delivery

ALLOY 127 is supplied in the form of round wires in the range of 0.05 to 8.00 mm \varnothing in bare or enamelled condition flat wires, ribbons and sheets.

Electrical Resistance in Annealed Condition

Temperature coefficient of electrical resistance between

Electrical resistivity in: $\mu\Omega \times \text{cm}$ (first line) and Ω/CMF (second line)
Reference Values

+20 °C and +60 °C
10⁻⁶/K

+20 °C
tolerance $\pm 5\%$

+100 °C

+200 °C

+300 °C

+400 °C

+500 °C

approx. +300

21

21.5

22.1

22.8

23.4

126

129

133

137

141

Physical Characteristics (Reference Values)

Density at +20 °C

Melting point

Specific heat
at +20 °C

Thermal conductivity
at +20 °C

Average linear thermal expansion coefficient
between +20 °C and

Thermal EMF
against copper at

+100 °C

+400 °C

+20 °C

g/cm³

lb/cub in

°C

J/g K

W/m K

10⁻⁶/K

10⁻⁶/K

$\mu\text{V}/\text{K}$

8.90

0.32

+1,130

0.38

45.00

16.00

17.50

-29.00

Mechanical Properties at +20 °C in Annealed Condition

Tensile Strength²⁾

Elongation ($L_0 = 100 \text{ mm}$) % at nominal diameter in mm

MPa

psi

0.020 to 0.063

> 0.063 to 0.125

> 0.125 to 0.50

> 0.50 to 1.00

> 1.00

310

45,000

≈ 12

≈ 18

≈ 20

≥ 20

≥ 25

Notes on Treatment // ALLOY 127 is easy to process.

Copper-nickel alloys can be soft and hard soldered as well as welded by the known processes. On request we supply material tested according to DIN EN 60068-2-20.

1) This alloy is not standardized.

2) This value applies to wires of 2.0 mm diameter. For thinner wires, the minimum values will substantially increase, depending on the dimensions.

Nominal Diameter	Cross Section	Weight per 1.000 m	DC Resistance Referred to Length at +20 °C			
mm	mm ²	g	Nominal Value	Tolerance	Minimum Value	Maximum Value
0.050	0.001963	17.50	107.0	±8 %	98.4	116.0
0.056	0.002463	21.90	85.3		78.4	92.1
0.060	0.002827	25.20	74.3		68.3	80.2
0.063	0.003117	27.70	67.4		62.0	72.8
0.070	0.003848	34.30	54.6		50.2	58.9
0.071	0.003959	35.20	53.0		48.8	57.3
0.080	0.005027	44.70	41.8		38.4	45.1
0.090	0.006362	56.60	33.0		30.4	35.7
0.100	0.007854	69.90	26.7		24.6	28.9
0.110	0.009503	84.60	22.1		20.6	23.6
0.112	0.009852	87.70	21.3	19.8	22.8	
0.120	0.01131	101.00	18.6	17.3	19.9	
0.125	0.01227	109.00	17.1	15.9	18.3	
0.130	0.01327	118.00	15.8	±7 %	14.7	16.9
0.140	0.01539	137.00	13.6		12.7	14.6
0.150	0.01767	157.00	11.9		11.1	12.7
0.160	0.02011	179.00	10.44		9.71	11.2
0.180	0.02545	226.00	8.25	7.67	8.83	
0.200	0.03142	280.00	6.68	6.28	7.09	
0.220	0.03801	338.00	5.52	5.19	5.86	
0.224	0.03941	351.00	5.33	±6 %	5.01	5.65
0.250	0.04909	437.00	4.28		4.02	4.53
0.280	0.06158	548.00	3.41		3.21	3.62
0.300	0.07069	629.00	2.97		2.79	3.15
0.315	0.07793	694.00	2.69	2.56	2.83	
0.350	0.09621	856.00	2.18	2.07	2.29	
0.355	0.09898	881.00	2.12	±5 %	2.02	2.23
0.400	0.1257	1,120.00	1.67		1.59	1.75
0.450	0.1590	1,420.00	1.32		1.25	1.39
0.500	0.1963	1,750.00	1.07		1.02	1.12

Nominal Diameter	Cross Section	Weight per 1.000 m	DC Resistance Referred to Length at +20 °C			
mm	mm ²	g	Nominal Value	Tolerance	Minimum Value	Maximum Value
0.550	0.2376	2,110.00	0.884		0.849	0.919
0.560	0.2463	2,190.00	0.853		0.819	0.887
0.600	0.2827	2,520.00	0.743		0.713	0.772
0.630	0.3117	2,770.00	0.674		0.647	0.701
0.650	0.3318	2,950.00	0.633		0.608	0.658
0.700	0.3848	3,430.00	0.546		0.524	0.568
0.710	0.3959	3,520.00	0.530		0.509	0.552
0.800	0.5027	4,470.00	0.418		0.401	0.434
0.900	0.6362	5,660.00	0.330		0.317	0.343
1.000	0.7854	6,990.00	0.267		0.257	0.278
1.120	0.9852	8,770.00	0.213		0.205	0.222
1.200	1.131	10,070.00	0.186		0.178	0.193
1.250	1.227	10,920.00	0.171		0.164	0.178
1.400	1.539	13,700.00	0.136		0.131	0.142
1.500	1.767	15,730.00	0.119		0.114	0.124
1.600	2.011	17,900.00	0.104		0.100	0.109
1.800	2.545	22,650.00	0.0825		0.0792	0.0858
2.000	3.142	27,960.00	0.0668	±4 %	0.0642	0.0695
2.200	3.801	33,830.00	0.0552		0.0530	0.0575
2.240	3.941	35,070.00	0.0533		0.0512	0.0554
2.500	4.909	43,690.00	0.0428		0.0411	0.0445
2.800	6.158	54,800.00	0.0341		0.0327	0.0355
3.000	7.069	62,910.00	0.0297		0.0285	0.0309
3.150	7.793	69,360.00	0.0269		0.0259	0.0280
3.200	8.042	71,580.00	0.0261		0.0251	0.0272
3.500	9.621	85,630.00	0.0218		0.0210	0.0227
3.550	9.898	88,090.00	0.0212		0.0204	0.0221
4.000	12.57	111,840.00	0.0167		0.0160	0.0174
4.500	15.90	141,550.00	0.0132		0.0127	0.0137
5.000	19.63	174,750.00	0.0107		0.0103	0.0111
5.500	23.76	211,450.00	0.00884		0.00849	0.00919
5.600	24.63	219,210.00	0.00853		0.00819	0.00887
6.000	28.27	251,640.00	0.00743		0.00713	0.00772
6.300	31.17	277,440.00	0.00674		0.00647	0.00701
8.000	50.27	447,360.00	0.00418		0.00401	0.00434