



Brand Name	ALLOY 127				
Material Code	1)				
Abbreviation	CuNi15				
Chemical Composition (mass components) in %. Average values of alloy components					
Cu Rem.	Ni 15	Mn 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 $+400 \text{ }^\circ\text{C}$.

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 $+20 \text{ }^\circ\text{C}$ and $+60 \text{ }^\circ\text{C}$ $10^{-6}/\text{K}$	Electrical resistivity in: $\mu\Omega \times \text{cm}$ (first line) and Ω/CMF (second line) Reference Values					
	$+20 \text{ }^\circ\text{C}$ tolerance $\pm 5 \%$	$+100 \text{ }^\circ\text{C}$	$+200 \text{ }^\circ\text{C}$	$+300 \text{ }^\circ\text{C}$	$+400 \text{ }^\circ\text{C}$	$+500 \text{ }^\circ\text{C}$
approx. +300	21	21.5	22.1	22.8	23.4	
	126	129	133	137	141	

Physical Characteristics (Reference Values)

Density at $+20 \text{ }^\circ\text{C}$		Melting point $^\circ\text{C}$	Specific heat at $+20 \text{ }^\circ\text{C}$ J/g K	Thermal conductivity at $+20 \text{ }^\circ\text{C}$ W/m K	Average linear thermal expansion coefficient between $+20 \text{ }^\circ\text{C}$ and		Thermal EMF against copper at $+20 \text{ }^\circ\text{C}$ $\mu\text{V/K}$
g/cm^3	lb/cub in				$+100 \text{ }^\circ\text{C}$	$+400 \text{ }^\circ\text{C}$	
8.90	0.32	+1,130	0.38	45.00	16.00	17.50	-29.00

Strength Properties at $+20 \text{ }^\circ\text{C}$ in Annealed Condition

Tensile Strength ²⁾ MPa	Elongation ($L_0 = 100 \text{ mm}$) % at nominal diameter in mm 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 can be worked very easily. The alloy can be soldered and brazed; all known welding processes can be used.

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 mm	Cross Section mm ²	Weight per 1.000 m g	DC Resistance Referred to Length at +20 °C Ω/m			
			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	±6 %	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		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 mm	Cross Section mm ²	Weight per 1.000 m g	DC Resistance Referred to Length at +20 °C Ω/m			
			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