

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		

## Form of Delivery

ALLOY 127 is supplied in the form of round wires in the range of 8.0 to 0.05 mm Ø in bare or enamelled condition and/or with silk covering. On limited scale, flat

wires,

stranded wires, ribbons and sheets are also available.

## Properties 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<sup>®</sup>-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. Ribbons for instance are used for heating of bimetals. The maximum working temperature in air is 400 °C.

## Electrical Resistance in Annealed Condition

Temperature coefficient of electrical resistance between 20 °C and 60 °C 10 <sup>-6</sup> /K	Electrical resistivity in: $\mu\Omega \times \text{cm}$ (first line) and $\Omega/\text{CMF}$ (second line) Reference Values					
	20 °C	100 °C	200 °C	300 °C	400 °C	500 °C
approx. 300	tolerance $\pm 5\%$					
	21.0	21.5	22.1	22.8	23.4	-
	126	129	133	137	141	-

## Physical Characteristics (Reference Values)

Density at 20 °C		Melting Point °C	Specific heat at 20 °C J/g K	Thermal conductivity at 20 °C W/m K	Average linear thermal expansion coefficient between 20 °C and		Thermal EMF against copper at 20 °C $\mu\text{V}/\text{K}$
g/cm <sup>3</sup>	lb/cub in				100 °C 10 <sup>-6</sup> /K	400 °C 10 <sup>-6</sup> /K	
8.9	0.32	1130	0.38	45	16	17.5	- 29

## Strength Properties at 20 °C in Annealed Condition

Tensile Strength <sup>1)</sup>		Elongation ( $L_0 = 100 \text{ mm}$ ) % at nominal diameter in mm				
MPa	psi	0.02 to 0.063	>0.063 to 0.125	> 0.125 to 0.5	> 0.5 to 1	> 1
310	45000	$\approx 12$	$\approx 18$	$\approx 20$	$\geq 20$	$\geq 25$

1) This alloy is not standardized.

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

## Notes on Treatment

ALLOY 127 can be worked very easily. The alloy can be soldered and brazed; all known welding processes can be used.

Nominal Diameter d mm	Cross Section mm <sup>2</sup>	Weight per 100 m g	DC Resistance Referred to Length at 20 °C Ω / m			
			Nominal Value	Tolerance	Minimum Value	Maximum Value
0.04	0.001257	1.12	167	± 8 %	154	181
0.045	0.001590	1.42	132		122	143
0.05	0.001963	1.75	107		98.4	116
0.056	0.002463	2.19	85.3		78.4	92.1
0.06	0.002827	2.52	74.3		68.3	80.2
0.063	0.003117	2.77	67.4		62.0	72.8
0.07	0.003848	3.43	54.6		50.2	58.9
0.071	0.003959	3.52	53.0		48.8	57.3
0.08	0.005027	4.47	41.8		38.4	45.1
0.09	0.006362	5.66	33.0		30.4	35.7
0.10	0.007854	6.99	26.7	24.6	28.9	
0.11	0.009503	8.46	22.1	± 7 %	20.6	23.6
0.112	0.009852	8.77	21.3		19.8	22.8
0.12	0.01131	10.1	18.6		17.3	19.9
0.125	0.01227	10.9	17.1		15.9	18.3
0.13	0.01327	11.8	15.8		14.7	16.9
0.14	0.01539	13.7	13.6		12.7	14.6
0.15	0.01767	15.7	11.9		11.1	12.7
0.16	0.02011	17.9	10.44		9.71	11.2
0.18	0.02545	22.6	8.25	7.67	8.83	
0.20	0.03142	28.0	6.68	± 6 %	6.28	7.09
0.22	0.03801	33.8	5.52		5.19	5.86
0.224	0.03941	35.1	5.33		5.01	5.65
0.25	0.04909	43.7	4.28		4.02	4.53
0.28	0.06158	54.8	3.41		3.21	3.62
0.30	0.07069	62.9	2.97		2.79	3.15
0.315	0.07793	69.4	2.69	± 5 %	2.56	2.83
0.35	0.09621	85.6	2.18		2.07	2.29
0.355	0.09898	88.1	2.12		2.02	2.23
0.40	0.1257	112	1.67		1.59	1.75
0.45	0.1590	142	1.32		1.25	1.39
0.50	0.1963	175	1.07		1.02	1.12
0.55	0.2376	211	0.884	± 4 %	0.849	0.919
0.56	0.2463	219	0.853		0.819	0.887
0.60	0.2827	252	0.743		0.713	0.772
0.63	0.3117	277	0.674		0.647	0.701
0.65	0.3318	295	0.633		0.608	0.658
0.70	0.3848	343	0.546		0.524	0.568
0.71	0.3959	352	0.530		0.509	0.552
0.80	0.5027	447	0.418		0.401	0.434
0.90	0.6362	566	0.330		0.317	0.343
1.0	0.7854	699	0.267		0.257	0.278
1.12	0.9852	877	0.213		0.205	0.222
1.2	1.131	1007	0.186		0.178	0.193
1.25	1.227	1092	0.171		0.164	0.178
1.4	1.539	1370	0.136		0.131	0.142
1.5	1.767	1573	0.119		0.114	0.124
1.6	2.011	1790	0.104		0.100	0.109
1.8	2.545	2265	0.0825		0.0792	0.0858
2.0	3.142	2796	0.0668		0.0642	0.0695
2.2	3.801	3383	0.0552		0.0530	0.0575
2.24	3.941	3507	0.0533		0.0512	0.0554
2.5	4.909	4369	0.0428		0.0411	0.0445
2.8	6.158	5480	0.0341		0.0327	0.0355
3.0	7.069	6291	0.0297		0.0285	0.0309
3.15	7.793	6936	0.0269		0.0259	0.0280
3.2	8.042	7158	0.0261		0.0251	0.0272
3.5	9.621	8563	0.0218		0.0210	0.0227
3.55	9.898	8809	0.0212		0.0204	0.0221
4.0	12.57	11184	0.0167		0.0160	0.0174
4.5	15.90	14155	0.0132	0.0127	0.0137	
5.0	19.63	17475	0.0107	0.0103	0.0111	
5.5	23.76	21145	0.00884	0.00849	0.00919	
5.6	24.63	21921	0.00853	0.00819	0.00887	
6.0	28.27	25164	0.00743	0.00713	0.00772	
6.3	31.17	27744	0.00674	0.00647	0.00701	
8.0	50.27	44736	0.00418	0.00401	0.00434	