



Brand Name	ALLOY 90¹⁾				
Material Code	2.0811				
Abbreviation	CuNi10				
Chemical Composition (mass components) in %. Average values of alloy components					
Cu Rem.	Ni 10				

Features and Application Notes

ALLOY 90 is especially noted for low resistivity and high resistance to oxidation and chemical corrosion. It is used for low-value resistors, for heating wires and mats in heating cords and in heating cables with low conductor temperatures, as well as for tube-weldings. Flat wires and stranded wires are used for protective switching. The maximum working temperature in air is +400 °C.

Form of Delivery

ALLOY 90 is supplied in the form of round wires in the range 0.05 to 8.00 mm Ø in bare or enamelled condition, flat wires, stranded wires and ribbons.

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 +105 °C
 $10^{-6}/\text{K}$

+20 °C
tolerance $\pm 10\%$

+100 °C

+200 °C

+300 °C

+400 °C

+500 °C

+400 to +500

15

15.6

16.2

16.9

17.5

90

94

97

102

105

Physical Characteristics (Reference Values)

Density at +20 °C

Melting point

Specific heat
at +20 °C

Thermal conducti-
vity 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

$\mu\text{V/K}$

8.90

0.32

+1,100

0.38

59.00

16.00

17.50

-25.00

Strength 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

290

42,050

≈ 8

≈ 15

≈ 20

≥ 20

≥ 25

Notes on Treatment // ALLOY 90 can be worked easily. This alloy can be soldered and brazed without difficulty. All known welding methods can be used.

1) The number "90" indicates the resistivity, expressed in $\Omega/\text{cir. mil ft.}$ (see Technical Information).

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	76.4	±8%	70.3	82.5
0.056	0.002463	21.90	60.9		56.0	65.8
0.060	0.002827	25.20	53.1		48.8	57.3
0.063	0.003117	27.70	48.1		44.3	52.0
0.070	0.003848	34.30	39.0		35.9	42.1
0.071	0.003959	35.20	37.9		34.9	40.9
0.080	0.005027	44.70	29.8		27.5	32.2
0.090	0.006362	56.60	23.6		21.7	25.5
0.100	0.007854	69.90	19.1		17.6	20.6
0.110	0.009503	84.60	15.8		14.7	16.9
0.112	0.009852	87.70	15.2	14.2	16.3	
0.120	0.01131	101.00	13.3	12.3	14.2	
0.125	0.01227	109.00	12.2	11.4	13.1	
0.130	0.01327	118.00	11.3	10.5	12.1	
0.140	0.01539	137.00	9.74	9.06	10.4	
0.150	0.01767	157.00	8.49	7.89	9.08	
0.160	0.02011	179.00	7.46	6.94	7.98	
0.180	0.02545	226.00	5.89	5.48	6.31	
0.200	0.03142	280.00	4.77	4.49	5.06	
0.220	0.03801	338.00	3.95	3.71	4.18	
0.224	0.03941	351.00	3.81	3.58	4.03	
0.250	0.04909	437.00	3.06	2.87	3.24	
0.280	0.06158	548.00	2.44	2.29	2.58	
0.300	0.07069	629.00	2.12	1.99	2.25	
0.315	0.07793	694.00	1.92	1.83	2.02	
0.350	0.09621	856.00	1.56	1.48	1.64	
0.355	0.09898	881.00	1.52	1.44	1.59	
0.400	0.1257	1,120.00	1.19	1.13	1.25	
0.450	0.1590	1,420.00	0.943	0.896	0.990	
0.500	0.1963	1,750.00	0.764	0.726	0.802	

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	0.631		0.606	0.657
0.560	0.2463	2,190.00	0.609		0.585	0.633
0.600	0.2827	2,520.00	0.531		0.509	0.552
0.630	0.3117	2,770.00	0.481		0.462	0.500
0.650	0.3318	2,950.00	0.452		0.434	0.470
0.700	0.3848	3,430.00	0.390		0.374	0.405
0.710	0.3959	3,520.00	0.379		0.364	0.394
0.800	0.5027	4,470.00	0.298		0.286	0.310
0.900	0.6362	5,660.00	0.236		0.226	0.245
1.000	0.7854	6,990.00	0.191		0.183	0.199
1.120	0.9852	8,770.00	0.152		0.146	0.158
1.200	1.131	10,070.00	0.133		0.127	0.138
1.250	1.227	10,920.00	0.122		0.117	0.127
1.400	1.539	13,700.00	0.0974		0.0935	0.101
1.500	1.767	15,730.00	0.0849		0.0815	0.0883
1.600	2.011	17,900.00	0.0746		0.0716	0.0776
1.800	2.545	22,650.00	0.0589		0.0566	0.0613
2.000	3.142	27,960.00	0.0477	±4%	0.0458	0.0497
2.200	3.801	33,830.00	0.0395		0.0379	0.0410
2.240	3.941	35,070.00	0.0381		0.0365	0.0396
2.500	4.909	43,690.00	0.0306		0.0293	0.0318
2.800	6.158	54,800.00	0.0244		0.0234	0.0253
3.000	7.069	62,910.00	0.0212		0.0204	0.0221
3.150	7.793	69,360.00	0.0192		0.0185	0.0200
3.200	8.042	71,580.00	0.0187		0.0179	0.0194
3.500	9.621	85,630.00	0.0156		0.0150	0.0162
3.550	9.898	88,090.00	0.0152		0.0145	0.0158
4.000	12.57	111,840.00	0.0119		0.0115	0.0124
4.500	15.90	141,550.00	0.00943		0.00905	0.00981
5.000	19.63	174,750.00	0.00764		0.00733	0.00795
5.500	23.76	211,450.00	0.00631		0.00606	0.00657
5.600	24.63	219,210.00	0.00609		0.00585	0.00633
6.000	28.27	251,640.00	0.00531		0.00509	0.00552
6.300	31.17	277,440.00	0.00481		0.00462	0.00500
8.000	50.27	447,360.00	0.00298		0.00286	0.00310