MATERION

DATA SHEET

R270 Resistor Alloy

R270 is a copper-manganese-nickel alloy with high resistivity and very low temperature coefficient of resistance. It is commonly used in low conductivity applications such as shunts and precision resistors in high-power electronics found in electric or electrified vehicles. R270 is produced using a patented casting process that results in homogeneous alloying and consistent, stable performance.

Chemical Composition

Element	Composition (wt%)
Copper	86
Manganese	10
Nickel	4

Typical Physical Properties

Density	Melting Point	Coefficient of Thermal Expansion	Specific Heat	Thermal Conductivity	Maximum Use Temperature
0.296 lb./in^3 (8.19 gm/cm^3)	1760˚F (960˚C)	10.5 µin/in·˚F (18x10^{-6} K^{-1})	0.096 BTU/lb.·˚F (0.4 J/g·K)	130 BTU·in/hr·ft^{2}·˚F (20 W/m·K)	140˚F (60˚C) (Higher temperatures possible with stabilization.)

Typical Mechanical Properties - Nominal

	Yield Strength ksi (MPa)	Tensile Strength ksi (MPa)	Elongation at Break	Young's Modulus ksi (GPa)	Poisson's Ratio	Hardness - Vickers
Annealed	15-20 (102-138)	50-60 (310-380)	40-50%	20,000 (138)	0.33	< 130
Hard	85-95 (586-655)	90-100 (620-690)	2-6%	20,000 (138)	0.33	> 200

Electrical Properties - Nominal

Electrical Resistivity	Temperature Coefficient of Resistance (20˚ to 50˚C)	Thermal EMF vs. Copper
Annealed: 38 +/- 2 µΩ·cm Hard: 40 +/- 2 µΩ·cm	+/- 10 ppm/˚C	1 µV/˚C

Forms Available

R270 Resistor Alloy is available in wire, formed wire, strip and sheet.

Usage Guidelines

To provide the most stable resistivity over time, resistors should have a thermal stabilization to reduce internal stresses. Contact our engineers for assistance with your application at +1-800-375-4205.

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