MANGANIN 13

Type analysis

Single figures are nominal except where noted.

Copper	86.00 %	**Manganese (Maximum)**	9.50 %	**Nickel**	4.50 %

Forms manufactured

Strip	**Wire**

Description

Manganin 13 shunt material is a copper-nickel based alloy used in electrical and controlled resistance applications. Manganin 13 is an alloy with moderate resistance and a low thermal EMF versus copper. Known applications include electrical shunts, which control and measure the actual current through devices. The alloy can be produced as flat rolled strip in either the annealed or 1/4 hard condition.

Key Properties:

- Moderate resistance
- Low thermal EMF

Applications:

- Electrical shunts

> MANGANIN 13

Physical properties

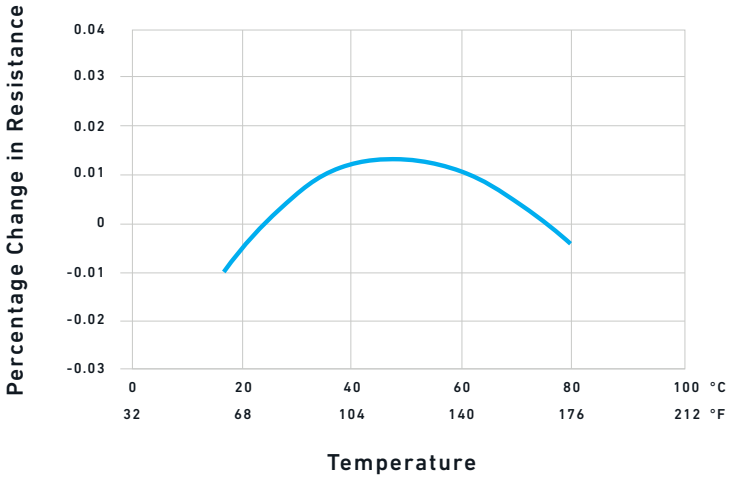
PROPERTY	At or From	English Units	Metric Units
DENSITY	—	0.3040 lb/in^3	8414.7 kg/m^3
MEAN SPECIFIC HEAT	—	0.02318 Btu/lb/°F	97.1 J/kg·K
MEAN COEFFICIENT OF THERMAL EXPANSION	68 to 212°F	10.4 x 10^{-6} length/length/°F	18.72 x 10^{-6} length/length/°C
THERMAL CONDUCTIVITY	—	137.4 Btu-in/hr/ft^2/°F	19.8 W/m·K
ELECTRICAL RESISTIVITY			
ANNEALED	—	219.0 ohm-cir-mil/ft	36.4 microohm·cm
QUARTER HARD	—	229.0 ohm-cir-mil/ft	38.1 microohm·cm
TEMPERATURE COEFF. OF ELECTRICAL RESIST.		0.0833 x 10^{-4} ohm/ohm/°F	—
MELTING RANGE	—	1870°F	1021°C
THERMAL EMF VS COPPER	32 to 212°F	1.7E-3 mV/°F	—

Typical mechanical properties

MANGANIN 13				
HEAT TREATMENT	YIELD STRENGTH	TENSILE STRENGTH	ELONGATION	HARDNESS
	ksi	ksi	%	ROCKWELL B
Annealed	18	47	43	40
Quarter hard	41	59	26	64

> MANGANIN 13

RESISTANCE CHANGE VS. TEMPERATURE



RESISTANCE SAMPLE CALCULATIONS			
RESISTIVITY	**WIDTH**	**THICKNESS**	**RESISTANCE (CALCULATED)**
(Ω sm/f)	**IN**	**IN**	**Ω**
180	2.0	0.060	0.0015
180	2.0	0.030	0.0045

Other information

Applicable specifications	ASTM A480 ASTM B267

For additional information, please contact your nearest sales office:
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