

# Copper-Nickel Alloys

## Wire • Strip

JLC Mang series is of copper-nickel alloys that are used for electrical and controlled resistance applications. These alloys have very low temperature coefficient of resistance, and offer uniform electrical resistance over long periods of time. Additionally, they have very low thermal electromotive force (EMF) against copper. These alloys have good workability, can be soldered, as well as welded.

In addition to the two grades listed below, other variants of copper-nickel alloys are also available. Please contact JLC for more details.

Specifications			
Alloy	British Standard	Werkstoff Nr	UNS designation
JLC Mang 38	-	-	-
JLC Mang 43	-	2.1362	-

Nominal Chemical Composition (%)			
Alloy	Ni	Mn	Cu
JLC Mang 38	2-4	10-12	Balance
JLC Mang 43	2-4	11-13	Balance

Physical Properties (at room temperature)					
Alloy	Density g/cm <sup>3</sup>	Specific Resistance (Electrical Resistivity) μΩ-cm	Thermal Linear Expansion Coeff. between 20-1000°C 10 <sup>-6</sup> /°C	Temp Coeff of Resistance x10 <sup>-6</sup> /°C	Thermal EMF against Copper at 20°C μV/K
JLC Mang 38	8.40	38.5	18	± 15 (Range 40-60 °C)	
JLC Mang 43	8.41	43.0	18	± 15 (Range 15-35 °C)	Standard: -1.00; Special ±0.20

Mechanical Properties (for cold drawn annealed wire)				
Alloy	Tensile strength N/mm <sup>2</sup>		Elongation % at L <sub>0</sub> =100 mm	
	Min	Max	Min	Max
JLC Mang 38	350	450	15	30
JLC Mang 43	350	450	15	30

Size Range			
Form	Dia (mm)	Width (mm)	Thickness (mm)
Wire	12.0-0.15	-	-
Strip	-	0.4-80	≥ 0.10

### Applications

These alloys are used for manufacturing resistance standards, precision electrical measurement instruments such as potentiometers, and are standard materials for precision, standard, and shunt resistors. Due to their low EMF against copper, they are used in electrical circuits where an erratic thermal EMF can lead to malfunctioning of the circuit.