



# FISK MA19B Leaded Nickel Copper UNS C19150

MA19B is a free machining, precipitation hardened leaded-nickel copper alloy. Like MA19C / C19160, the alloy features high strength, high electrical conductivity, and excellent resistance to thermal stress relaxation, however the lead content is reduced to accommodate forming applications including cold heading. Typical applications are in critical high power components.

Fabrication Indices	
Machinability	75
Cold Working	good
Hot Working	poor
Brazing	good
Soldering	excellent
Welding	poor

Available Forms
Rod and Wire, round

Chemical Composition
99.5% min Copper + Named Elements
0.5-1.0% Lead
0.8-1.2% Nickel
0.15-0.35% Phosphorus
0.05% max Iron & Tin

## Mechanical Properties

### ○ Round Rod

TEMPER NAME	TEMPER CODE	TENSILE STRENGTH	YIELD STRENGTH	ELONGATION	MILL LIMITS
		min, ksi (MPa)	min, ksi (MPa)	min, %	
1/4 HT	TL01	70 (485)	60 (415)	8	0.0394 - 0.3150" (1 - 8 mm)
1/2 HT	TL02	80 (550)	70 (485)	5	
3/4 HT	TL03	85 (585)	75 (515)	3	
HT	TL04	90 (620)	80 (550)	2	

### ○ Round Wire

TEMPER NAME	TEMPER CODE	TENSILE STRENGTH	YIELD STRENGTH	ELONGATION	MILL LIMITS
		min, ksi (MPa)	min, ksi (MPa)	min, %	
1/4 HT	TL01	70 (485)	60 (415)	4	0.0100 - 0.2362" (0.25 - 6 mm)
1/2 HT	TL02	80 (550)	70 (485)	3	
3/4 HT	TL03	85 (585)	75 (515)	2	
HT	TL04	95 (655)	85 (585)	1	

## Physical Properties

Melting Point (Liquidus)	1980 °F	1082 °C
Melting Point (Solidus)	1900 °F	1038 °C
Annealing Range (min - max), 1 hr	1290 - 1380 °F	700 - 750 °C
Density	0.320 lb/in <sup>3</sup>	8.86 gm/cm <sup>3</sup>
Electrical Resistivity (Annealed)	18.9 Ω-cir-mil/ft @ 68 °F	3.13 μΩ-cm @ 20 °C
Electrical Conductivity (Annealed)	55% IACS @ 68 °F	0.320 MS-cm @ 20 °C
Thermal Conductivity	146 Btu/ft <sup>2</sup> /ft-hr/°F @ 68 °F	253 W/m-K @ 20 °C
Coefficient of Thermal Expansion	9.8 x 10 <sup>-6</sup> per °F (68-572 °F)	17.6 x 10 <sup>-6</sup> per °C (20-300 °C)
Modulus of Elasticity (Tension)	18,000 ksi	124,000 MPa
Modulus of Rigidity	6,000 ksi	41,000 MPa

The information provided on this page is for reference purposes only.

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