

Nickel-Copper Alloys

Wire • Strip • Bar

JLC 400 is a nickel-copper, solid-solution alloy that offers good strength and toughness over a wide temperature range, including sub-zero temperatures. It provides excellent corrosion resistance and is also resistant to stress corrosion cracking and pitting in most industrial and fresh waters. As a result, it is widely used in marine and chemical industries.

JLC 500 is a precipitation hardened alloy. It is essentially similar to JLC 400, but with minor additions of aluminium and titanium to the nickel-copper matrix. The resulting precipitates of Ni₃(Ti, Al) impart high strength and hardness to the alloy. Another attractive property of this alloy is that it has low magnetic permeability and is practically non-magnetic, even at very low temperatures. As a result of these highly desirable properties, this alloy finds use in applications that demand not only the excellent corrosion resistance offered by JLC 400, but also that require increased strength, hardness, and non-magnetic characteristics.

Specifications			
Alloy	British Standard	Werkstoff Nr	UNS designation
JLC 400	BS 3072-3076 (NA13)	2.4360	N04400
JLC 500	BS 3072-3076 (NA18)	2.4375	N05500

Nominal Chemical Composition (%)								
Alloy	Ni	Mn	Fe	Si	Cu	C	Al	Ti
JLC 400	Min 63	Max 1.25	1.0-2.5	Max 0.50	28-34	Max 0.15	Max 0.50	Max 0.20
JLC 500	Min 63	Max 1.50	Max 2.0	Max 0.50	27-33	Max 0.15	2.30-3.15	0.30-0.85

Physical properties (at room temperature)				
Alloy	Density g/cm ³	Thermal Conductivity W/m K	Thermal Linear Expansion Coeff. b/w 20-95°C 10 ⁻⁶ /K	Electrical Resistivity at 20°C μΩ-cm
JLC 400	8.80	21.8	13.9	51
JLC 500	8.45	17.5	17.5	60

Mechanical Properties (for cold drawn annealed wire)				
Alloy	Tensile strength N/mm ²		Elongation % at L ₀ = 100 mm	
	Min	Max	Min	Max
JLC 400	450	650	20	30
JLC 500	890	950	20	30

Size Range			
Form	Dia (mm)	Width (mm)	Thickness (mm)
Wire	0.12-10.0	-	-
Strip	-	8-100	≥ 0.10
Bar	12.0-60.0	-	-

Applications

JLC 400 typical applications include springs, valves, pumps, propeller shafts, electrical and electronic components, to name a few. It is used as wire mesh and filters for chemical and petrochemical industry, for connecting braids of heating elements, and for mechanical applications in cold-headed parts and fasteners. Another application is for welding core wires and MIG/TIG wires. This alloy is widely used in lamp industry as a fuse wire in lead-in-wires for lamps.

JLC 500 finds use in several industries such as chemical, oil and gas, medical and marine. Typical applications include springs, valves, fasteners, pumps shafts, oil-well drilling collars, surgical blades, non-magnetic housings, sensors, electronic components, etc.