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MONEL® K500 (ALLOY K500), UNS N05500

Strip, Coil, Foil, Wire, QQN286

Applications

Pump components, doctor blades and scrapers, oil well drill collars and cable wrap, marine instruments, electronic components, springs, valve tray, and submarine parts

Description

Monel® K500 (Alloy K500) is a Nickel Copper alloy which combines the excellent corrosion resistance of Alloy 400 with the added advantages of greater strength and hardness. The increase in strength and hardness is a result of the precipitation hardening capability gained by the additions of titanium and aluminum.

Chemistry Typical

Nickel: 63.0 min
Copper: 27.0-33.0
Aluminum: 2.30-3.15
Titanium: 0.35-0.85
Iron: 2.00 MAX
Phosphorus 0.020 max
Sulfur: 0.010 max
Silicon: 0.050 max
Manganese: 1.50 max
Carbon: 0.25 max

Physical Properties

Density: 0.305 lbs/in³, 8.44 g/cm³

Mean Coefficient of Thermal Expansion: in/in/°F (mm/m/°C):
70 - 212 °F (20 - 100 °C): 7.6 x 10^{-6} (13.7)

Modulus of Elasticity: KSI (MPa)
26 x 10³ (179 x 10³) in Tension

For Reference Only

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Magnetic Permeability, H = 200: Annealed <1.002

Melting Point: 2460 °F (1350 °C) approx.

Forms

Coil – Strip, Foil, Ribbon
Wire – Profile, Round, Flat, Square

Mechanical Properties at Room Temperature

Properties: Annealed

Ultimate Tensile Strength: 90 KSI min (620 MPa min)
Yield Strength: 40 KSI min (275 MPa min)
Elongation: 30% min
Hardness:
HV 170 max: gauges ≤ 0.010 inches
Rb 85 max: gauges > 0.010 inches

Properties: Tempered

Monel® K500 (Alloy K500) can be supplied in half hard a full hard temper. Contact Ulbrich Technical Service for additional information.

Heat Treat Capabilities

Aged

Ultimate Tensile Strength: 130 KSI min (895 MPa min)
Yield Strength (0.2% offset): 90 KSI min (620 MPa min)
Elongation: 15% min
Hardness: Rc 24 min

Half Hard & Aged

Ultimate Tensile Strength: 145 KSI min (1000 MPa min)
Yield Strength (0.2% offset): 110 KSI min (760 MPa min)
Elongation: 8% min
Hardness: Rc 30 min

Full Hard & Aged

Ultimate Tensile Strength: 170 KSI min (1170 MPa min)
Yield Strength (0.2% offset): 140 KSI min
Elongation: 5% min
Hardness: Rc 34 min

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Additional Properties

Corrosion Resistance

Refer to NACE (National Associate of Corrosion Engineers) for recommendations.

Finishes

#1 – Hot rolled annealed and descaled. It is available in strip, foil and ribbon. It is used for applications where a smooth decorative finish is not required.
#2D – Dull finish produced by cold rolling, annealing and descaling. Used for deep drawn parts and those parts that need to retain lubricants in the forming process.
#2B – Smooth finish produced by cold rolling, annealing and descaling. A light cold rolling pass is added after anneal with polished rolls giving it a brighter finish than 2D.
#BA – Bright annealed cold rolled and bright annealed
#CBA – Course bright annealed cold rolled matte finish and bright anneal
#2 – Cold Rolled
#2BA – Smooth finish produced by cold rolling and bright annealing. A light pass using highly polished rolls produces a glossy finish. A 2BA finish may be used for lightly formed applications where a glossy finish is desired in the formed part.
Polished – Various grit finish for specific polish finished requirements.

** Not all finishes are available for all alloys – Contact Ulbrich Sales for more information.*

Wire Finishes

XC – Extra Clean Bright Annealed or Bright Annealed and Cold Rolled
Grease – Ultra bright finish (for decorative applications)
Soap – Soap coating on tempered wire to act as lubricant

** Contact Ulbrich Wire for custom finishes.*

Heat Treatment

Monel® K500 (Alloy K500) can be hardened by cold working and by heat treating.

Welding

For best results refer to: SSINA's "Welding of Stainless Steels and Other Joining Methods".

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