

SOUTHERLY ALLOY

Monel K-500 Bar and Rod | UNS N05500 | Werkstoff Nr. 2.4375 / NiCu30Al

ASTM B865 / ASME SB865 — Age-Hardened Nickel-Copper Alloy Bar and Rod

Product Description

Monel K-500 is a precipitation-hardened nickel-copper alloy that adds aluminium and titanium to the Monel 400 base for roughly three times the yield strength. Southerly Alloy supplies UNS N05500 bar and rod to ASTM B865 in annealed, age-hardened and cold-drawn conditions, with custom sizes, NACE hardness control and mill test documentation.

Chemical Composition (ASTM B865)

Element	Content
Nickel (Ni) plus Cobalt (Co), min.	63.0%
Copper (Cu)	27.0–33.0%
Aluminium (Al)	2.30–3.15%
Titanium (Ti)	0.35–0.85%
Iron (Fe), max.	2.0%
Manganese (Mn), max.	1.5%
Carbon (C), max.	0.25%
Silicon (Si), max.	0.50%
Sulfur (S), max.	0.010%

Aluminium and titanium are the age-hardening additions; the purchase specification and mill test certificate decide final acceptance.

Mechanical Properties (minimum values, per ASTM B865)

Condition	Tensile Strength, min.	Yield Strength (0.2%), min.	Elongation, min.
Annealed (Condition A)	≥90 ksi (621 MPa)	≥40 ksi (276 MPa)	25%
Age-Hardened (Condition AH)	≥140 ksi (965 MPa)	≥100 ksi (690 MPa)	15%

Annealed stock is soft and formable; age-hardened stock reaches full strength for direct assembly. The applicable edition decides final acceptance.

Physical Properties (typical room-temperature values)

Property	Value
Density	Approx. 8.44 g/cm³
Melting range	Approx. 1300–1350 °C
Modulus of elasticity	Approx. 179 GPa
Thermal conductivity at 20 °C	Approx. 17 W/m-K
Specific heat at 20 °C	Approx. 410 J/kg-K
Electrical resistivity at 20 °C	Approx. 0.62 µΩ-m
Thermal expansion, 20–100 °C	Approx. 14.0 µm/m-K
Magnetic behaviour	Low permeability; essentially non-magnetic at ambient

Values support design calculations rather than acceptance testing.

Applicable Standards

Standard / Designation	Scope
ASTM B865	Nickel-copper alloy bar, rod and forgings — UNS N05500
ASME SB865	ASME edition for bar, rod and forgings
AMS 4676	Nickel-copper alloy bars, forgings and rings
QQ-N-286	Federal specification for K-500 bolting and fasteners
UNS N05500	Material designation for Monel K-500
W.Nr. 2.4375 / NiCu30Al	European designation for Monel K-500
JIS NW 5500	Japanese designation
BS 3076 NA18	British nickel-copper bar standard
DIN 17743 / DIN 17752	Nickel-copper wrought alloys — chemistry and bar
NACE MR0175 / ISO 15156	Material guidance for H2S-bearing service

Available Dimensions & Forms

Product Form	Typical Supply	Length
Round Bar	6–500 mm dia.	Cut to length or random
Round Rod	3–50 mm dia.	Cut to length
Bright Bar	6–150 mm dia.	Cut to length or random
Square Bar	10–150 mm	Cut to length or random
Hex Bar	10–150 mm A/F	Cut to length or random
Flat Bar	3–100 mm thick × 10–300 mm wide	Cut to length
Forged Bar	100–500 mm dia. or forged section	Cut to length
Precision-Ground Rod	3–100 mm dia., tight tolerance	Cut to length

Availability depends on delivery condition, surface finish and order quantity; tolerances follow ASTM B865 for the ordered condition.

Surface Finishes

Surface Condition	Typical Use
Hot-worked (as-rolled or forged)	Parts that will be machined to size
Annealed and pickled	Scale-free surface for fabrication
Cold drawn	Close diameter control with a bright surface
Age-hardened	Full-strength bar for shafts, fasteners and trim
Stress relieved	Straightness and dimensional stability for drawn bar
Peeled	Uniform diameter with machined skin for further turning
Centreless ground	Tight diameter and straightness for shafting
Polished	Reduced roughness for product-contact and visible parts

Southerly Alloy — nickel alloy bar, rod, pipe, tube, plate and fittings · www.southerly-alloy.com · Values are for reference; the mill test certificate prevails for final acceptance.