

Monel K-500 (UNS N05500) — Material Data Sheet

ASTM F468 / F467 fasteners · ASTM B865 bar · UNS N05500 · Monel® K-500 (Ni-Cu-Al-Ti alloy 500)

Precipitation-hardenable nickel-copper alloy, solution treated and aged

Monel 400 corrosion resistance with more than twice the strength — 130 ksi tensile, 90 ksi yield and 24 to 37 HRC — for pump shafts, subsea fasteners and oil-tool components.

TENSILE, F468	130 ksi min (130–180 full size)	NUT PROOF STRESS, F467	130 ksi hex · 140 heavy hex
YIELD, F468	90 ksi (≤ 1 in.) · 85 ksi ($1\frac{1}{2}$ in.)	CONDITION	Age hardened
HARDNESS, F468	24–37 HRC	MAGNETIC	No, down to about -150 °F (ferromagnetic below its Curie point)

Nominal composition



■ Cu balance ~ 28.0% ■ Ni ~ 66.50% ■ Al ~ 2.72% ■ Fe ~ 1.00% ■ Mn ~ 0.75% ■ Ti ~ 0.60% ■ C, Si, S trace

Midpoints of the specification ranges, for orientation only. Limits are in the table.

Chemical composition — Monel K-500 (N05500) per ASTM F468 Table 1

Element	Symbol	Min %	Max %
Nickel	Ni	63.0	70.0
Copper	Cu	balance	—
Aluminum	Al	2.30	3.15
Titanium	Ti	0.35	0.85
Iron	Fe	—	2.0
Manganese	Mn	—	1.5
Carbon	C	—	0.25
Silicon	Si	—	0.5
Sulfur	S	—	0.01

Values per ASTM F468-23 Table 1 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

Physical properties (typical)

DENSITY	0.306 lb/in ³ (8.44 g/cm ³)
MODULUS OF ELASTICITY	26.0×10^6 psi (179 GPa)
MELTING RANGE	2400–2460 °F
MAGNETIC	No, to about -150 °F

Heat treatment

Solution treated, then precipitation hardened by ageing (typically 1100 °F for 16 h with a slow cool, per the bar producer's recommended cycle) after machining and threading. The ageing cycle is recorded on the certificate.

Fastener mechanical properties — Monel K-500 per ASTM F468 Table 2 (Ni 500, marking F468W)

Nominal diameter (in.)	Hardness	Full-size tensile (ksi)	Full-size yield, min (ksi)	Machined tensile, min (ksi)	Machined yield, min (ksi)	Elongation in 4D, min (%)
0.250 to 0.875	24–37 HRC	130–180	90	130	90	20
1.000 to 1.500	24–37 HRC	130–180	85	130	85	20

Values per ASTM F468-23 Table 2 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

Nut requirements — Monel K-500 per ASTM F467 Table 2 (marking F467W)

Nut style	Hardness, min	Proof stress, min (ksi)
Hex and hex flange	24 HRC	130
Heavy hex, large hex flange and thick	24 HRC	140

Values per ASTM F467-24 Table 2 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

Applicable standards

ASTM F468 / F468M	Nonferrous bolts, cap screws and studs (Ni 500, F468W)
ASTM F467 / F467M	Nonferrous nuts (Ni 500, F467W)
ASTM B865	Precipitation-hardening nickel-copper alloy bar, wire, forgings
QQ-N-286	Military K-500 bar and forgings
NACE MR0175 / ISO 15156	Alloy K-500 for sour service within its hardness limits

Forms we supply in Monel K-500

- Studs, hex bolts and cap screws to F468
- Hex and heavy hex nuts to F467
- Pump shafts, valve stems and oil-tool components machined to print
- Certified B865 bar, annealed or aged

Typical applications

- Pump shafts and impellers in seawater
- Subsea and wellhead fasteners
- Oil-well sucker-rod pumps and tool joints
- Doctor blades and scrapers in pulp mills
- Marine propeller shafts and hardware
- Springs and non-magnetic components