



## Monel 500 - UNS N05500

Henan Sheng He Pipe Industry Co., Ltd., have an experience spanning for over ten years, producing and supplying best-in-class products, minimize cost by getting manufacturing processes under one roof and delivering consignments on a daily basis only because of a diligent and dedicated team. We are manufacturers, suppliers and exporters of Monel 500 material.

**Common Trade Names:** UNS N05500

**Other common names:** Alloy K500

Monel K500 is a precipitation-hardenable nickel-copper alloy that combines the excellent corrosion resistance characteristic of Monel 400 with the added advantage of greater strength and hardness. These amplified properties, strength and hardness, are obtained by adding aluminum and titanium to the nickel-copper base and by a thermal processing used to effect precipitation, typically called age hardening or aging.

When in the age-hardened condition, Monel K-500 has a greater tendency toward stress-corrosion cracking in some environments than Monel 400. Alloy K-500 has approximately three times the yield strength and double the tensile strength when compared with alloy 400. Plus, it can be further strengthened by cold working prior to precipitation hardening. The strength of this nickel steel alloy is maintained to 1200° F but stays ductile and tough down to temperatures of 400° F. Its melting range is 2400-2460° F.

This nickel alloy is spark resistant and non-magnetic to -200° F. However, it is possible to develop a magnetic layer on the surface of the material during processing. Aluminum and copper may be selectively oxidized during heating, leaving a magnetic nickel rich film on the outside. Pickling or bright dipping in acid can remove this magnetic film and restore the non-magnetic properties.

### In what forms is Monel K500 Available?

- Bar
- Rod



## Corrosion Resistant Monel K-500

The corrosion resistance of alloy K-500 is substantially equivalent to that of alloy 400 except that when in the age-hardened condition, nickel alloy K-500 has a greater tendency toward stress-corrosion cracking in some environments. Monel K-500 has been found to be resistant to a sour-gas environment. The combination of very low corrosion rates in high-velocity sea water and high strength make alloy K-500 particularly suitable for shafts of centrifugal pumps in marine service. In stagnant or slow-moving sea water, fouling may occur followed by pitting but this pitting slows down after a fairly rapid initial attack.

### What are the characteristics of Monel K500?

- Corrosion resistance in an extensive range of marine and chemical environments. From pure water to non-oxidizing mineral acids, salts and alkalis.
- Excellent resistance to high velocity sea water
- Resistant to a sour-gas environment
- Excellent mechanical properties from sub-zero temperatures up to about 480C
- Non-magnetic alloy

### Chemical Composition, %

Ni	Cu	Al	Ti	C	Mn	Fe	S	Si
63.0-70.0	Remainder	2.30-3.15	.35-.85	.25 max	1.5 max	2.0 max	.01 max	.50 max



## In what applications is Monel K-500 used?

- Sour-gas service applications
- Oil and gas production safety lifts and valves
- Oil-well tools and instruments like drill collars
- Oil well industry
- Doctor blades and scrapers
- Chains, cables, springs, valve trim, fasteners for marine service
- Pump shafts and impellers in marine service

## Fabrication with Monel K-500

Monel K-500 is readily fabricated by standard commercial procedures.

Welding alloy K-500 is best accomplished by the gas-tungsten-arc welding process. It is recommended that Monel K-500 be annealed when it is welded and that any weldments be stress relieved prior to aging.

Heavy machining of this alloy is best accomplished when the material is in the annealed condition or hot-worked and quenched condition. Age-hardened material however can be finish-machined to close tolerances and fine finishes. Therefore, the recommended practice is to machine slightly oversize, age-harden, then finish to size. During aging, a slight permanent contraction takes place, but little warpage occurs because of the low temperatures and slow cooling rates involved.

## Specifications

Bar	Rod
AMS 4676	AMS 4676



## **Mechanical Properties - Typical Room Temperature Tensile Properties of Annealed Material**

<b>Product Form</b>	<b>Condition</b>	<b>Tensile (ksi)</b>	<b>.2% Yield (ksi)</b>	<b>Elongation %</b>	<b>Hardness</b>
Rod & Bar	Hot-Finished / Aged	140-190	100-150	30-20	27-38 HRC
Rod & Bar	Hot Finished / Annealed	90-110	40-60	45-25	75-90 HRB
Rod & Bar	Hot Finished / Annealed / Aged	130-165	85-120	35-20	24-35 HRC
Rod & Bar	Cold-Drawn / Aged	135-185	95-160	30-15	25-41 HRC
Rod & Bar	Cold-Drawn / Annealed / Aged	130-190	85-120	30-20	24-35 HRC
Plate	Hot-Finished / Aged	140-180	100-135	30-20	27-37 HRC
Sheet	Cold-Rolled / Annealed	90-105	40-65	45-25	85 HRB Max