

Alloy K-500 is a nickel-copper alloy, which combines the excellent corrosion resistance of alloy 400 with the added advantages of greater strength and hardness. Alloy K-500 provides roughly three times the yield strength of alloy 400. The increased properties are obtained by adding aluminum and titanium to the nickel-copper base and age hardening. The aging process precipitates submicroscopic particles of Ni<sub>3</sub> (Ti, Al) throughout the matrix.

The combination of low magnetic permeability, high strength and good corrosion resistance have been used in a number of applications, notably oil-well surveying equipment and electronic components. A useful characteristic of the alloy is that it is virtually nonmagnetic, even at quite low temperatures. Age hardening causes an initial volume contraction. An annealed rod contracted  $2.5 \times 10^{-4}$  in/in during aging. The following is a typical age-hardening procedure to achieve optimal properties.

Anneal at 1800°F for 30 minutes followed by a water quench. Hold for 16 hours at 1100-1125°F followed by furnace cooling at a rate of 15-25°F per hour to 900°F. Cooling from 900°F to room temperature may be carried out by furnace or air cooling, or by quenching, without regard to cooling rate.

Specifications

UNS: N05500 W. Nr./EN: 2.4375 ASTM: B 865 ASME: Bolting Code Case 1192 NACE: MR0175 ISO: 15156-3

Chemical Composition, %

	Ni	Mn	Cu	Si	C	S	Ti	Al	Fe
MIN	63.0	—	27.0	—	—	—	0.35	2.3	—
MAX	70.0	1.5	33.0	0.5	0.25	0.01	0.85	3.15	2.0

Features

- High strength
- Corrosion resistance similar to Alloy 400

Applications

- Pump shafts and impellers
- Valve trim
- Oil well drill collars
- Marine fasteners
- Marine propeller shafts

Physical Properties

Density: 0.306 lb/in<sup>3</sup> Melting Range: 2400 - 2460°F Poisson's Ratio: 0.32

Temperature, °F	-320	-250	-100	70	200	400	600	800	1000	1200
Coefficient of Thermal Expansion* in/in°F x 10 <sup>-6</sup>	6.2	6.5	6.8	—	7.6	8.1	8.3	8.5	8.7	9.1
Thermal Conductivity Btu • ft/ft <sup>2</sup> • hr • °F	—	7.2	8.6	10.1	11.3	13.0	14.8	16.5	18.3	20.0

\* 70°F to indicated temperature.

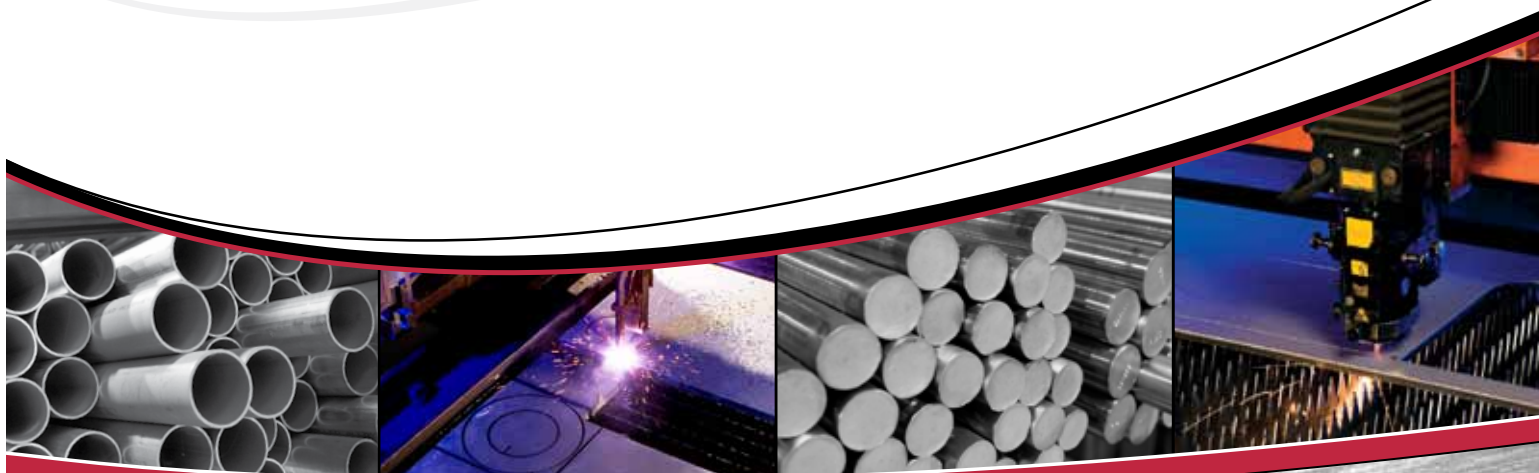
## Mechanical Properties

## Minimum Specified Properties, ASTM B 865 Bar

Ultimate Tensile Strength, ksi	110
0.2% Yield Strength, ksi	80
Elongation, %	20
Hardness MAX, Brinell	310

## Typical Tensile Properties

Temperature, °F	212	302	392	482
Ultimate Tensile Strength, ksi	98.6	95.7	92.8	91.3
0.2% Yield Strength, ksi	65.3	60.9	58.0	55.1



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