



Quick Facts

- Nickel Copper alloy
- Available in a range of conditions
- Good corrosion resistance and strength in a range of chemical and marine environments
- Low magnetic permeability
- High fatigue strength in seawater
- Commonly referred to as Monel® K500

Alloy K500 is a nickel-copper alloy which combines the excellent corrosion resistance of Alloy 400 with higher strength and hardness obtained through the addition of aluminium and titanium to the nickel-copper base. It has excellent low temperature properties with tensile and yield strengths increasing with decrease in temperature, while ductility and toughness are virtually unimpaired. There is no ductile-to-brittle transformation even at temperatures as low as liquid hydrogen, making it suitable for cryogenic applications.

The corrosion resistance of Alloy K500 is equivalent to that of Alloy 400 except that in the aged condition, it has a greater tendency towards stress-corrosion cracking in some environments. It is resistant to a sour gas environment and has very low corrosion rates in high velocity seawater, making it ideal for marine applications.

Typical Applications

Typical applications are fasteners and springs for marine, pump and valve components for oil and gas and chemical processing, valve stems, drill collars, propellers, shafts and impellers.

Stock Range

We stock a comprehensive range of round bar sizes between 9.52mm (3/8") and 254mm (10") diameter. We can also supply flat bar, rings, blocks and slabs.

Primarily manufactured in Europe and USA



Industry Specifications

- ASTM B865
- BS 3076 NA18 1989
- UNS N05500
- NACE MR0175/ISO15156 (Hot worked only)
- Werkstoff Nr. 2.4375

Material may also be supplied to Customer specifications, subject to enquiry

Chemical Analysis

Typical Analysis:

	C	Mn	Si	S	Ni	Cu	Ti	Al	Fe	-
Min	-	-	-	-	63.0	27.0	0.35	2.3	-	%
Max	0.25	1.5	0.5	0.01	-	33.0	0.85	3.2	2.0	%

Material Condition

The majority of our material is supplied in one of four conditions:

- Cold worked and aged
- Hot worked and aged
- Cold worked, solution annealed and aged
- Hot worked, solution annealed and aged

Heat Treatment

Solution annealing temperatures vary depending upon whether material is in the hot or cold finished condition. Soak times are kept to a minimum to avoid grain growth.

Again, aging procedures are dependent upon the degree of cold working a material has had in order to maximise properties. An effective water quench is required to optimise the aging response and maximum softness.



Mechanical Properties

Typical properties:

Condition	Diameter Size Range	Tensile (PSI (MPA))	Yield (0.2% offset), (PSI (MPA) Min)	Elongation in 2" or 4D min%	Reduction of Area	Rockwell Hardness HRC Max	Charpy Impacts at -29°C (-20°F) Joules (ftlb)
Cold Worked and aged	≤25mm	145,000 (1000)	110,000 (760)	14		40	
	26 ≤55mm	140,000 (970)	100,000 (690)	16			
Cold Worked, Solution Annealed and Aged	≤25mm	130,000 (900)	90,000 (690)	20		40	
	26 ≤55mm	130,000 (900)	85,000 (585)	20			
Hot worked and Aged	≤110mm	140,000 (970)	100,000 (690)	15	25	35	Ave Min 27 (20) Ave Single 20 (15)
	111 ≤300mm	120,000 (830)	80,000 (550)	15			
Hot Worked, Solution Annealed and Aged	≤25mm	130,000 (900)	90,000 (620)	20	25	35	Ave Min 27 (20) Ave Single 20 (15)
	26 ≤110mm	130,000 (900)	85,000 (585)	20			
	110 ≤300mm	120,000 (830)	72,000 (500)	15			



Machinability

Alloy K500 can be readily machined in the annealed or hot worked and quench condition. Aged material can be finished machined to close tolerances and fine finishes. The recommended practice is to machine slightly oversize, age harden and finish to size. There is a slight permanent contraction during the aging cycle, but little warpage occurs because of the low temperatures and slow cooling rates involved.

Physical Properties

Typical properties at room temperature:

Melting Range	1315°C - 1350°C (2400°F- 2460°F)
Room Temp Density	8.44 g/cm ³ (0.305 lb/in ³)
Young's Modulus	179 x 10 ³ MPa
Poisson's Ratio (Aged)	0.32
Thermal Conductivity	17.2 W/m. °C
Specific Heat (annealed)	418.7 Joules/kg°C
Curie Temperature	-90°C (-130°F)
Mean Coefficient of expansion Annealed 20-100°C (70-212°F)	13.4 x 10 ⁻⁶
Magnetic Permeability @ 200 Oersted (Hot worked and aged)	1.0018

All material we supply has full traceability with inspection certification in accordance with BS EN 10402 3.1. We can supply material with intent of BS EN 10402 3.2 inspection certification on request. We have onsite PCN and SNT Level II inspectors who can test material to your requirements.

All information included in this sheet is intended as a guide only and is correct to the best of our knowledge.