



## ATI K-500™

### Age-Hardenable Nickel-Copper Alloy

(UNS N05500)

#### INTRODUCTION

ATI K-500™ Alloy (UNS N05500) is an age-hardenable nickel-copper alloy characterized by the good general corrosion resistance of ATI 400 Alloy with the added advantage of increased strength and hardness. The alloy maintains good strength up to 1,200°F (648°C) and is strong and ductile to temperatures as low as -423°F (-217°C). As with ATI 400 Alloy, the alloy has excellent resistance to flowing brines, brackish water, and seawater. The alloy also has low magnetic permeability to -210°F (-99°C).

This alloy is commonly used in the oil and gas, and the marine industries. Applications for ATI K-500™ alloy include pumps and drive shafts, impellers, valve components, springs, fasteners, oil well packers, and subsurface safety valves. Standard mill forms for ATI K-500™ alloy include bar, tube, shapes, and forgings.

#### SPECIFICATIONS & CERTIFICATES

- QQ-N-286, Rod and Bar
- BS 3076-NA-18, Bar



## Technical Data Sheet

Physical Properties				
	Temp, °F	British Units	Temp, °C	Metric Units
Density	70	0.306 lb/in <sup>3</sup>	21	8.47 g/cc
Modulus of Elasticity	70	26.0 x 10 <sup>6</sup> psi	21	179 GPa
Electrical Resistivity	70	24.1 microhm-in	21	0.61 microhm-m
	200	24.4 microhm-in	93	0.62 microhm-m
	400	24.8 microhm-in	204	0.63 microhm-m
	600	25.2 microhm-in	316	0.64 microhm-m
	800	25.6 microhm-in	427	0.65 microhm-m
Mean Coefficient of Thermal Expansion	70-200	7.6 microinches/in-°F	21-93	13.7 microns/m-°K
	70-400	8.1 microinches/in-°F	21-204	14.6 microns/m-°K
	70-600	8.3 microinches/in-°F	21-316	14.9 microns/m-°K
	70-800	8.5 microinches/in-°F	21-427	15.3 microns/m-°K
Thermal Conductivity	70	121 Btu-in/ft <sup>2</sup> -hr-°F	21	17.4 W/m-°K
	200	136 Btu-in/ft <sup>2</sup> -hr-°F	93	19.6 W/m-°K
	400	136 Btu-in/ft <sup>2</sup> -hr-°F	204	22.5 W/m-°K
	600	136 Btu-in/ft <sup>2</sup> -hr-°F	316	25.7 W/m-°K
	800	136 Btu-in/ft <sup>2</sup> -hr-°F	427	28.6 W/m-°K
Specific Heat	70	0.096 Btu/lb-°F	21	408 J/Kg-°K
Magnetic Permeability	70	1.002 (H=200 oerstads)	21	1.002 (H=16 KA/m)

Corrosion Resistance								
H <sub>2</sub> SO <sub>4</sub>	HCl	H <sub>3</sub> PO <sub>4</sub>	HNO <sub>3</sub>	Organic Acids	Alkalies	Salts	Seawater	Chloride Cracking
G	G	E	NR	G	G	G	G	A

KEY: E - Excellent G - Good A - Acceptable NR - Not Recommended



Technical Data Sheet

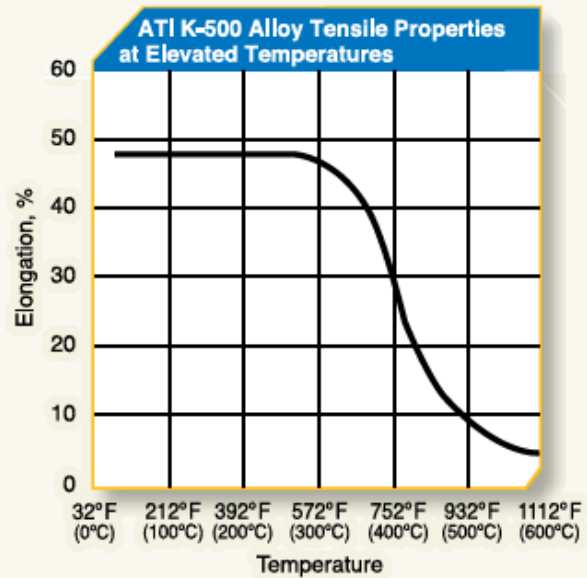
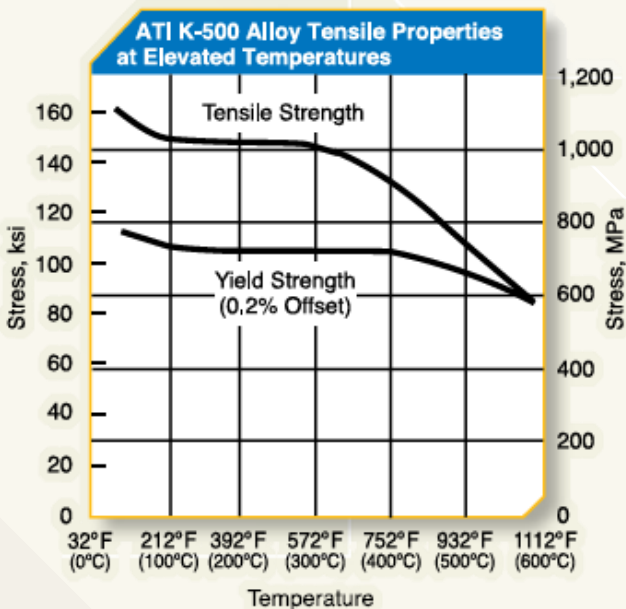
Chemical Composition

	Ni	Fe	Ti	Al	Mn	C	Cu
wt %, nominal	66.0	1.00	0.60	2.7	0.70	0.10	Bal

Mechanical Properties and Machinability

Metallurgical Condition	Tensile Strength psi (MPa)	Yield Strength 0.2% Offset psi (MPa)	Elongation %	Hardness	Speed Sfpm (Smpm)	Feed lpr (mmpr)	Tool Material
Hot Finished	100 (690)	45 (310)	47	85 Rb	200 (61.0)	0.020 (0.506)	C-6
Hot Finished Age Hardened	150 (1,040)	115 (795)	30	33 Rc	100 (30.5)	0.015 (0.381)	C-2
Cold Drawn	125 (860)	100 (690)	18	95 Rb	180 (54.9)	0.20 (0.508)	C-6
Cold Drawn Age Hardened	170 (1,175)	145 (1,000)	22	38 Rc	60 (18.3)	0.010 (0.254)	C-2
Annealed	90 (620)	40 (275)	42	88 Rb	225 (68.6)	0.020 (0.508)	C-6
Annealed & Age Hardened	145 (1,000)	95 (665)	22	27 Rc	80 (24.4)	0.010 (0.254)	C-2

\* Room Temperature Values



Data are typical and should not be construed as maximum or minimum values for specification or for final design. Data on any particular piece of material may vary from those herein. U.S. and foreign patents; other patents pending. © 2011 ATI. All rights reserved.

Allegheny Technologies Incorporated  
1000 Six PPG Place  
Pittsburgh, PA 15222-5479 U.S.A.  
www.ATImetals.com