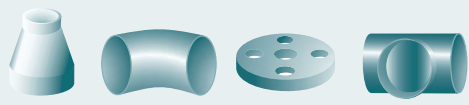


Specifications Alloy K-500

	Page
Designation and Standards	1
Chemical Composition	2-3
Mechanical Properties	
Metallurgical Structure	3-4
Corrosion Resistance	
Applications	4
Stock Size Range	5



PHILIPCORNES

Tel: +44 (0) 1527 555000
Fax: +44 (0) 1527 547000

Alloy K-500

Alloy K-500 (UNS N05500) is a nickel-copper alloy with age-hardening properties imparted by alloying additions of aluminium and titanium. Its basic composition is similar to that of Alloy 400 but the alloying additions make it age hardenable under controlled conditions of temperature and time.

The alloy can be delivered in the annealed, stress equalised, hot finished or age-hardened conditions.

This alloy is characterised by:

- excellent corrosion resistance in an extensive range of natural and chemical environments
- excellent resistance to chloride-ion stress-corrosion cracking
- very high strength and hardness

Designation and Standards

Country National Standards	Material Designation	Chem. composition	Specification						
			Tube and pipe seamless	pipe welded	Sheet and plate	Rod and bar	Strip	Wire	Forgings
France AFNOR	NU30AT								
Germany DIN WL	W.-Nr.2.4375 NiCu30Al W.-NR.2.4374*	17743 Blatt 1,2				17752 Blatt 1		Blatt 2	17754
United Kingdom BS	NA18		3074		3072	3076	3073	3075	
USA AMS QQ-N-286	UNS N05500	4676 Table I			Form 3,6	4676 Form 1,2	Form 4	Form 5	Form 1,2
ISO	NiCu30Al3Ti								

*Aerospace applications only

After age-hardening Alloy K-500 has:

- approximately 2 to 3 times higher mechanical properties than nickel-copper Alloy 400
- high tensile properties up to about 650°C (1200°F)
- good fatigue and corrosion fatigue resistance
- low permeability; non-magnetic down to -135°C (-210°F)

Chemical Composition(%)

Alloy K-500	Ni	Fe	C	Mn	Si	Cu	Al	Ti	S	P	Zn	Pb	Sn
min	63.0	0.5	-	-	-	27.0	2.30	0.35	-	-	-	-	-
max	-	2.0	0.25	1.5	0.50	33.0	3.15	0.85	0.010	0.020	0.020	0.006	0.006

Mechanical Properties

The following properties are applicable to Alloy K-500 in the stated conditions and forms as well as the indicated size ranges (according to QQ-N-286). Specified properties of material outside these ranges are subject to special enquiry.

Form	Condition		Dimensions		Tensile strength		0.2% Yield Strength		Elong. A5 %	Brinell hardness max. HB
			mm	in	N/mm ²	ksi	N/mm ²	ksi		
Rod, bar, forgings	0	hf								245
Hexagon	4	cd								260
Rod	4	cd	6-25	1/4-1						280
			>25-75	>1-3						265
			>75-100	>3-4						240
Rod, bar, forgings	1/5	an	30-160		620**		270**		25**	185
Rod, bar, forgings	3	hf-ag	all sizes		965	140	690	100	20	<265>
Rod	7	cd-ag	6-25	1/4-1	1000	145	760	110	15	<300>
			>25-75	>1-3	965	140	690	100	17	<280>
			>75-100	>3-4	930	135	655	95	20	<255>

hf = hot formed, hr= hot rolled, cd = cold drawn, cr= cold rolled, an = annealed, ag = aged, hh = half hard, fh= full hard, sp = spring temper <>informative only **DIN17752

Mechanical Properties continued

Form	Condition		Dimensions		Tensile strength		0.2% Yield Strength		Elong. A5 %	Brinell hardness max. HB
			mm	in	N/mm ²	ksi	N/mm ²	ksi		
Hexagon	7	cd-ag	6-50	1/4-2	965	140	690	100	15	<265>
Rod, bar, forgings	2/6	an-ag	≤ 25	≤ 1	895	130	620	90	20	<250>
			>25	>1			585	85		
Plate	15	hr-an	≤ 100	≤ 4						185
	16	hr-an-ag	≤ 100	≤ 4	895	130	550	80	20	<233>
Sheet	11	cr-an								165
	12	cr-an-ag			895	130	620	90	15	<250>
Strip	21	cr-an								165
	22	cr-an-ag	≥ 0.5	≥ 0.020	895	130	620	90	15	<250>
	24	hh								<230>
	27	hh-ag	≥ 0.5	≥ 0.020	1000	145	760	110	8	<300>
	28	fh								<255>
	29	fh-ag	≥ 0.5	≥ 0.020	1170	170	895	130	5	<310>
Wire	30	cd	all sizes		760	110				
	31	cd-an			760	110				
	32	cd-an-ag			895	130				
	33	cd-ag			1070	155				
	34	sp	from 1.0 up to 14	from 0.04 up to 0.56	1070 to 830	155 to 120				
	37	sp-ag	from 1.0 up to 14	from 0.04 up to 0.56	1240 to 1100	180 to 160				

hf = hot formed, hr= hot rolled, cd = cold drawn, cr= cold rolled, an = annealed, ag = aged, hh = half hard, fh= full hard, sp = spring temper <>informative only

Minimum mechanical properties at room temperature

Please Note: The figures quoted are intended for guidance only. For further information, please refer to the standards listed or contact our sales or QA Departments.

Metallurgical Structure

Alloy K-500 has a face-centred cubic structure. In the age-hardened condition a Ni₃Al phase is formed with similar structure.

Corrosion Resistance

In general the corrosion resistance of Alloy K-500 is similar to that of Alloy 400.

Corrosion Resistance continued:

Excellent resistance is shown to a wide range of media from pure water to mineral acids, salts and alkalis. Alloy K-500 is virtually immune to chloride-ion stress corrosion cracking. In the aged condition, the alloy may be susceptible to stress-corrosion cracking in moist, aerated hydrofluoric acid vapour at stresses near the yield strength.

In high velocity seawater and in marine atmospheres, good resistance is shown but, in slow moving or stagnant seawater, pitting may occur. Alloy K-500 also shows good resistance in sour-gas environments.

Applications

Alloy K-500 finds wide application in the marine, chemical, petrochemical and shipbuilding industries.

Typical applications include:

- valve seals, pump sleeves and wear rings in marine environments - high strength and resistance to seawater
- pump shafts for fire-fighting pumps - high strength (resulting in smaller diameter shafts) and resistance to flowing seawater
- propeller shafts - high strength (resulting in smaller diameter shafts and thus smaller bearings) and resistance to seawater
- fasteners e.g. bolts, used in marine atmospheres and tidal waters - resistance to chloride - containing environments
- doctor blades and scrapers
- towing cable armouring - high strength, non-magnetic properties and resistance to seawater
- springs - resistance to a variety of corrosive media
- oil well drilling equipment such as non-magnetic drill collars, valves and instrumentation sleeves - resistance to chloride-containing media and sour gas environments
- aviation instrument components - non-magnetic properties

Stock Size Range

Alloy K-500 - Bar, Tube, Pipe and Fittings

Bar mm dia	Tube mm o/d	Pipe nb	Seamless fittings nb
12.0 - 75.0	(1)	(1)	-

(1) Tube and pipe in this alloy are available by request.

The above table represents our standard stock range.

Other sizes can be manufactured to order, often with short lead times.