CORROSION MATERIALS
"Your Corrosion Alloy Specialist"

Alloy 6B

UNS R30016/AMS 5894

Alloy 6B is a Cobalt based alloy with excellent resistance to most types of wear and abrasion. The wear resistance of this alloy is a fundamental characteristic based on the elements that make up this material and not a product of heat treatment or another superficial hardening method. In addition to its excellent wear characteristics, Alloy 6B also retains high hardness at high temperature and has moderate corrosion resistance to a variety of media and superior mechanical properties. Typical application can include wear plates and bars, bearing assemblies, and bushings and sleeves for shafts operating in hot or corrosive atmospheres.

Wear Resistance and High Temperature Properties

Due to the alloys low coefficient of friction, it is resistant to the effects of seizing and galling. This property has proven useful in areas or applications where lubrication is impossible and allows sliding contact with other metals without metal pick up. Applications where Alloy 6B is used have shown outstanding cavitation erosion resistance even under constant erosive conditions.

Exposure to high temperature has little effect on hardness, impact strength and the dimensional stability of this alloy. A unique property of Alloy 6B is its hot hardness. Alloy 6B can be exposed to temperatures approaching 2000 °F and retain a high hardness value. When the alloy is cooled to room temperature it will recover its original hardness.

Fabrication and Heat Treatment

The carbon content in Alloy 6B can make it more difficult to machine compared to other cobalt based alloys, but tungsten carbide tools can still be used to machine this alloy. High speed taps are not recommended but EDM techniques can be used to make threads in this alloy.

Alloy 6B can be welded by a variety of techniques including TIG,MIG, Shielded Metal Arc and Coated Electrode welding. A preheat should be used and maintained at 1000°F to prevent cracking during welding. Ventilation is required to limit exposure to airborne dust, fumes, and particulate when machining, grinding or welding this alloy.

The standard heat treatment for Alloy 6B is 2250°F(1232°C) followed by an air cool.

Chemical Composition

Co..... Balance	C..... ...0.9 to 1.40	Mo.....1.5 max	Si 0.2-0.2
Ni..... 3.0 max	Cr.....28.0 to 32.0	P .....0.04 max	W ..... 3.5 to 5.50
Fe ..... 3.0 max	Mn.....0.5 to 2.0	S .....0.03 max	

Corrosion Resistance

Alloy 6B also has moderate corrosion resistance in a variety of media in addition to being wear resistant. This makes the alloy very versatile in the types of applications where it can be used, where wear and corrosion resistance is needed. If aggressive corrosive conditions are present however, other alloys may need to be considered.

Applicable Specifications and Available Forms

Alloy 6B Form	Specifications
Bar	Deloro W3, AMS 5894
Sheet/Plate	Deloro W1, AMS 5894

Physical Properties @ Room Temp.

Density	0.303 lb/in³
Specific Gravity	8.38
Melting Range	2310°F -2470°F
Specific Heat	0.101 Btu/lb-°F
Magnetic Permeability	<1.2@200 Oersteds
Electrical Conductivity	1.9% IACS
Electrical Resistivity	35.83 micro ohms-inch

Mechanical Properties (min)[1]

Hardness	37-43 HRC
Yield Strength	70 ksi
Tensile Strength	130 ksi
Elongation	5%
Reduction of area	7%

[1]Based on limitations from AMS 5894

Hot Hardness

	Test Temperature °F (°C)	Brinell Hardness at Temperature
Alloy 6B	1000 (538)	226
	1200 (649)	203
	1400 (760)	167
	1600 (871)	102

Aqueous Corrosion Data[1]

Media	Concentration % by weight	Test Temp. °F (°C)	Average Penetration Rate per Year mils	mm
Acetic Acid	10	Boiling	0.08	0.002
Acetic Acid	50	Boiling	0.02	<0.001
Acetic Acid	99	Boiling	0.03	<0.001
Chromic	10	150 (66)	95	2.41
Formic Acid	10	Boiling	20	0.51
Formic Acid	30	Boiling	26	0.66
Formic Acid	70	Boiling	50	1.27
Hydrochloric Acid	2	Room	0.1	<0.003
Hydrochloric Acid	5	Room	63	1.60
Hydrochloric Acid	10	Room	108	2.74
Hydrochloric Acid	2	150(66)	0.1	<0.003
Hydrochloric Acid	5	150(66)	>1000	>25.4
Nitric Acid	10	Boiling	0.15	<0.004
Nitric Acid	30	Boiling	6	0.15
Nitric Acid	50	Boiling	>1000	>25.4
Phosphoric Acid	10	Boiling	Nil	Nil
Phosphoric Acid	30	Boiling	2	0.05
Phosphoric Acid	50	Boiling	19	0.48
Phosphoric Acid	85	Boiling	611	15.5
Sodium Hydroxide	30	Boiling	13	0.33
Sulfuric Acid	10	Room	0.02	<0.001
Sulfuric Acid	50	Room	0.4	0.01
Sulfuric Acid	77	Room	0.7	0.02
Sulfuric Acid	10	150(66)	0.02	<0.001
Sulfuric Acid	30	150(66)	0.09	<0.003
Sulfuric Acid	50	150(66)	>1000	>25.4

[1] Data determined in laboratory tests presented by Deloro Stellite. It is recommended that samples be tested under actual conditions.

Please contact Corrosion Materials for a complete list of available items from inventory.

In-house machine and weld facilities help insure that the most common items will be in stock. Items not in stock can be fabricated in a short period of time either in-house or through our extensive, approved subcontractor and supplier network.

We also supply a complete range of items in the following alloys; Alloy C276, B2, B-3®, Alloy 22, 625, F-255, 200/201, Alloy 400, 405 and 600. Bar products are also available in Alloy 20, K500, 800H/HT®, and Alloy 6B as well as various Ti grades.

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