Hastelloy B-2 Alloy

Heanjia Super Metals Co., Ltd

The **Hastelloy B-2 alloy** is an excellent corrosion resistance alloy in the reducing conditions like hydrogen chloride gas, sulfuric acid, acetic and phosphoric acid. The alloy B-2 offers resistance to the pure sulfuric acid and the various non oxidizing acids. It is not preferred for using in the oxidizing or reducing environments. The corrosion failure may occur when the alloy is employed in the iron or copper medium in the presence of hydrochloric acid.

Chemical composition of Hastelloy B-2 alloy

Ni	Bal.
Mo	30.0
Fe	2.0
Cr	1.0
C	0.02
Si	0.10
Mn	1.0

Corrosion Resistance

In the commercial hubs Hastelloy B-2 alloy is implemented as a resistance material to a large series of organic acids. It offers excellent resistance to chloride-induced stress-corrosion breaking.

Hastelloy B-2 is an ideal material for using in the diverse functions of chemical processes in the as-welded situation. This is because it offers resistance to the arrangement of granule margin carbide precipitates in the weld heating zones that have minimized precipitation of carbides and other forms to ensure the uniform resistance to corrosion. The Hastelloy B-2 alloy also offers resistance to pitting corrosion.

It has superior resistance to hydrochloric acid, aluminum chloride catalyst and other powerful reduction chemicals. The alloy B-2 has outstanding elevated temperature stability in the inert and vacuum conditions. It is suitable for the device maintenance in the reduction and chemical conditions.

The operations in the chemical treatment include sulfuric acid, phosphoric acid, hydrochloric acid and acetic acid. The temperature operations vary from the ambient temperature to 1500oF on the base of environments.

Tensile properties of Hastelloy B-2 alloy

Ultimate Tensile Strength	110 Ksi or 760 MPa
Yield Strength	51 KSi or 350 MPa
Elongation	40 %

The Hastelloy B-2 alloy can be produced when the complete precautions are followed. The alloy sheet in the heat processed condition at the temperature of 1950oF and quickly quenched offers an average cup depth of 14.5mm.

The Hastelloy B-2 alloy provides resistance to the production of grain in the carbide precipitation in the welding heating regions that make it suitable for the various chemical operations in the welded form. The heated region provides limited precipitation of carbides and other phases to retain the symmetric resistance to corrosion.

Machining of Hastelloy B-2 Alloy

The Nickel-Cobalt alloys offering resistance to corrosion at high temperature and wearing resistance are sorted as intermediate to tough while machining however it is emphasized that the alloys are machined inexpensively.

While machining these alloys get toughen quickly and produce broad heat while cutting, welding to the cutting tool offers wide resistance to the metal removal because of large shear forces. The following points provide the necessary machining applications:

Capacity: The device should be strong and extremely overpowered.

Firmness: The sample and tooling should be placed firmly. Decrease the tool overhang.

Sharp Tools: The apparatus should be very sharp during operation. For this the tools should be changed after certain time use.

Machining parameters for Hastelloy B-2 alloy

The machining parameters for the **hastelloy B-2 alloy** are described in the below table:

Tasks	Carbide Tools
Hardening with rigorous interruption	Turning or Facing C2 and C3 grade: Negative rake square insert, 45 degree SCEA1, 1/32 in. nose radius. Tool holder: 5o neg. back rake, 5o neg. side rake. Speed: 30-50 sfm, 0.004-0.008 in. feed, 0.150 in depth of cut. Dry2, oil3, or water-base coolant.
Normal Hardening	Turning or Facing C-2 or C-3 grade: Negative rate square insert, 45 degree SCEA, 1/32 in nose radius. Tool holder: 5 degree neg. back rake, 5 degree neg. side rake. Speed: 90 sfm on the base of firmness of set up, 0.010 in. feed, 0.150 in. depth of cut. Dry, oil, or water-base coolant.
Finishing	Turning or Facing C-2 or C-3 grade: Positive rake square insert, if possible, 45 degree SCEA, 1/32 in. nose radius. Tool holder: 5 degree pos. back rake, 5 degree pos. side rake. Speed: 95-110 sfm, 0.005-0.007 in. feed, 0.040 in. depth of cut. Dry or water-base coolant.
Rough Boring	C-2 or C-3 grade: If insert type boring bar, use regular positive rake tools with largest possible SCEA and 1/16 in. nose radius. If brazed tool bar, grind 0 degree back rake, 10 degree pos. side rake, 1/32 in. nose radius and largest possible SCEA. Speed: 70 sfm depending on the rigidity of setup, 0.005-0.008 in. feed, 1/8 in. depth of cut. Dry, oil or water-base coolant.
Finish Boring	C-2 or C-3 grade: Use standard positive rake tools on insert type bars. Grind brazed tools as for finish turning and facing except back rake may be best at 0 degrees. Speed: 95-110 sfm, 0.002-0.004 in feed. Water-base coolant.

SCEA refers to side cutting edge angle or lead angle of the equipment. Any edge at which the arid cutting is preferred, an air jet is set on the tool to elongate the tool life. The water quenching can also provide effective results. The oil cooling is done of excellent quality. The sulfochlorinated oil with large pressure additional factors. The viscosity at 100 degrees F is from 50 to 125 SSU. The water coolants are also offered with the excellent quality. Additional factors are sulfochlorinated water dissolving oil or chemical emulsion with the large pressure. The diluted water is used to prepare the solution of ratio 15 to 1.

The water coolant may produce chipping and quick breakdown of carbide tools in the interrupted cuts.

The preferred tooling and machining conditions are mentioned as following:

Tasks	Carbide tools
Facing Milling	Carbide tools are normally not successful, C- grade may be better. Use positive axial and radial rake, 45 degree corner angle, 10 degree relief angle. Speed: 50-60 sfm. Feed: 0.005-0.008 in. Oil or waterbase coolants will minimize the thermal shock damage of carbide cutter teeth.
End Milling	Not Preferred, but C-2 levels may be successful on refined setups. Use positive rake. Speed: 50-60 sfm. Feed: Same as high speed steel. Oil or water-base coolants will reduce thermal shock damage.
Drilling	C-2 grade not Preferred, but tipped drills may be unbeaten on rigid setup in case of no large depth. The web must thinned to minimize the thrust. Use 135 degree included angle on point. Gun drill can be employed. Speed: 50 sfm. Oil or water-base coolant. Coolant-feed carbide tipped drills may be economical in some setups.

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