



CORROSION MATERIALS

"Your Corrosion Alloy Specialist"

Alloy B2

UNS N10665/ W.Nr. 2.4617



"ISO 9001-2008 Certified
ISO Registered Since 1993"

Alloy B2 (UNS N10665 / W.Nr. 2.4617) is a solid solution strengthened, nickel-molybdenum alloy, typically used in extreme reducing conditions. B2 has significantly lower carbon, silicon and iron compared to its' predecessor, Alloy B (UNS N10001), making the alloy less susceptible to decreased corrosion resistance in the weld zone, in the as-welded condition. Controlling other alloying elements such as iron and chromium solved other issues concerning fabricability. Stringent chemistry control along with years of development has resulted in the alloy used today, both in Alloy B2 and Alloy B-3[®]. Today, Alloy B2 with restricted chemistry can be used in the welded condition and is less susceptible to SCC under many conditions. As always, care must be taken in selecting the right alloy for the desired application.

Alloy B2 should not be used at temperatures between 1000°F and 1600°F as the alloy forms secondary phases that could decrease the ductility of the material.

Resistance to Corrosion

The high molybdenum content in Alloy B2 gives the alloy excellent resistance to hydrochloric acid over a wide range of concentrations and temperatures.

Chemical Composition

Ni.....	Balance	Cr.....	1.00 Max.
Mo	26.0 to 30.0	Mn	1.00 Max.
Fe	2.00 Max.	Si	0.10 Max.
C	0.02 Max.	P.....	0.040 Max.
Co.....	1.00 Max.	S.....	0.030 Max.

Alloy B2 also shows good resistance to hydrogen chloride, sulfuric acid and phosphoric acids and has excellent resistance to pitting and stress corrosion cracking in the heat-affected zone. Uniform corrosion rates in various environments is very similar compared to the other Ni-Mo alloys such as B-3[®]. The presence of any oxidizing media, even in trace amounts, will significantly increase corrosion. Alloy B2 should not be used in oxidizing media, as these alloys show little to no resistance in such environments.

Fabrication and Heat Treatment

Welding Alloy B2 can be performed by TIG, MIG as well as coated electrode. Dissimilar metal welding Alloy B2 to Alloy B-3[®] is possible using AWS ERNiMo-10 for GTAW and GMAW operations and ENiMo-10 for SMAW welding. The work piece should be thoroughly cleaned with acetone or other suitable cleaners to insure that all contaminants

Physical Properties

Density@ Room Temp.	0.333 lb/in. ³
Melting Range	2430°F to 2520°F
Specific Heat @ 68°F	0.090 Btu/lb•°F
Permeability @ 68°F of Annealed Material	≤1.001 (200 Oersted)
Elastic Modulus @ 68°F¹	31.4 x 10 ⁶ psi
Coefficient of Thermal Expansion (I) - 68°F to 400°F	6.0 μin./in. •°F
Thermal Conductivity @ 68°F	64 Btu/ft•h•°F

1. Properties from 0.500" plate material.

Applicable Specifications

Alloy B2 - Form	ASTM	ASME	European Standard
Bar¹	B335, B564 ²	SB335, SB564 ¹	EN 10204-3.1
Sheet & Plate	B333, A480 ³ , E112 ⁴	SB333	EN 10204-3.1
Welded Pipe^{5, 6}	B619 ⁷ , B775 ⁸	SB619 ⁷	EN 10204-3.1
Seamless Pipe & Tube	B622	SB622	EN 10204-3.1
Welded Tube	B626 ⁹	SB626 ⁹	EN 10204-3.1

1. Size tolerance for material <0.750" is +0.010"/-0.000" and for material >3.500"OD is +0.125"/-0.000". 2. Applies to bar ≥3.500". 3. Flatness specification. 4. Grain size specification. 5. X-Ray per ASME Section VIII, Division 1, #UW-51 for pipe ≥6.000". 6. No addition of filler metal 7. Applies to pipe ≤8.000" schedule 40, Class I or Class II. 8. Applies to pipe >8.000" schedule 40. 9. Class III, bead worked.

Mechanical Properties¹

Product (Annealed)	Tensile Min. (ksi)	0.2% Yield Min. (ksi)	Elongation Min. (%)
Rod & Bar ²	110	51	40
Sheet/Plate ³	110	51	40
Welded Pipe & Tube	110	51	40
Seamless Pipe & Tube	110	45	40

1. According to applicable ASTM specifications. 2. From 0.3125" rod and larger. 3. Up to and including 2.500" plate.

Aqueous Corrosion Data

Media	Common Name	Corrosion Rate (mpy)
10% C ₂ H ₄ O ₂	Acetic Acid	0.5
30% C ₂ H ₄ O ₂	Acetic Acid	0.4
50% C ₂ H ₄ O ₂	Acetic Acid	0.4
70% C ₂ H ₄ O ₂	Acetic Acid	0.3
99% C ₂ H ₄ O ₂	Acetic Acid	0.3
10% CH ₂ O ₂	Formic Acid	0.3
20% CH ₂ O ₂	Formic Acid	0.6
30% CH ₂ O ₂	Formic Acid	0.7
40% CH ₂ O ₂	Formic Acid	0.7
60% CH ₂ O ₂	Formic Acid	0.5
89% CH ₂ O ₂	Formic Acid	0.5
1% HCl	Hydrochloric Acid	0.8
2% HCl	Hydrochloric Acid	3
5% HCl	Hydrochloric Acid	5
10% HCl	Hydrochloric Acid	7
15% HCl	Hydrochloric Acid	11
20% HCl	Hydrochloric Acid	15
10% H ₃ PO ₃	Phosphoric Acid	2
30% H ₃ PO ₃	Phosphoric Acid	3
50% H ₃ PO ₃	Phosphoric Acid	6
85% H ₃ PO ₃	Phosphoric Acid	25
2% H ₂ SO ₄	Sulfuric Acid	0.5
5% H ₂ SO ₄	Sulfuric Acid	3
10% H ₂ SO ₄	Sulfuric Acid	2
20% H ₂ SO ₄	Sulfuric Acid	0.7
30% H ₂ SO ₄	Sulfuric Acid	0.7
40% H ₂ SO ₄	Sulfuric Acid	0.9
50% H ₂ SO ₄	Sulfuric Acid	1

1. Material in the annealed condition and tested at boiling for 120 hours.

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[®], F-255, Alloy 22, 625, 200/201, Alloy 400, 405 and 600. Bar products are also available in K500, Alloy 800H/HT[®], and Alloy 6B as well as various Ti grades.

(800HT[®] is a registered trademark of Special Metals Corporation. B-3[®] is a registered trademark of Haynes International Inc.)

The data and information contained in this pamphlet have been taken from open literature and is believed to be reliable. The information contained is intended to be used as a guide. Corrosion Materials does not make any warranty or assume any legal liability for its accuracy, completeness or usefulness.

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