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HASTELLOY® B-3, UNS N010675

(Nickel B-3) Strip, Foil, Wire, ASTM B333

Applications

Aircraft, furnace and chemical process components, honeycombs and gas turbine combustion section components

Description

Hastelloy® B-3 is a nickel- molybdenum alloy with excellent resistance to pitting, corrosion and stress-corrosion cracking, plus thermal stability superior to that of alloy B-2. This alloy has also great resistance to knife-line and heat-affected zone attack. The improved thermal stability of B-3 alloy minimizes the problems associated with fabrication of B-2 alloy components. This is due to the reduced tendency to precipitate deleterious inter-metallic phases in B-3 alloy, thereby, affording it greater ductility than B-2 alloy during and following various thermal cycling conditions.

Chemistry Typical

Nickel: 65.0 min
Chromium: 1.00-3.00
Molybdenum: 27.00-32.00
Iron: 1.0-3.0
Cobalt: 3.0 max
Tungsten: 3.0 max
Manganese: 3.0 max
Aluminum: 0.50 max
Titanium: 0.20 max
Silicon: 0.10 max
Carbon: 0.01 max
Copper: 0.20 max

Physical Properties

Density: 0.333 lbs/in³, 9.22 g/cm³

Hastelloy® B-3 is a registered trademark of Haynes Alloys

Electrical Resistivity: microhm-in, (microhm-cm):
70 °F (21 °C) – 53.8 (137)

Specific Heat: BTU/lb/°F (J/kg•K):
32 - 212 °F (0 - 100 °C): 0.089 (373)

Mean Coefficient of Thermal Expansion: in/in/°F (mm/m/°C):
70 - 212 °F (20 - 100 °C): 5.7 x 10^{-6} (10.6)

Thermal Conductivity: BTU-in/h-ft-°F (W/m-°K):
70 °F (21 °C): 78 (11.2)

Modulus of Elasticity: ksi (MPa)
31.4 x 10^3 (216 x 10^3) in tension

Melting Point: 2500 - 2585 °F (1370 - 1418 °C)

Forms

Coil – Strip, Foil, Ribbon
Wire – Profile, Round, Flat, Square

Mechanical Properties at Room Temperature

Annealed: Typical

Ultimate Tensile Strength: 125 KSI (860 MPa)
Yield Strength: (0.2% offset) 60 KSI (420 MPa)
Elongation: 50%

Tempered

Hastelloy® B-3 can be cold rolled to various tempers. Contact Ulbrich Technical Service for additional information.

Additional Properties

Corrosion Resistance

Refer to NACE (National Associate of Corrosion Engineers) for recommendations.

Finishes

#1 – Hot rolled annealed and descaled. It is available in strip, foil and ribbon. It is used for applications where a smooth decorative finish is not required.
#2D – Dull finish produced by cold rolling, annealing and descaling. Used for deep drawn parts and those parts that need to retain lubricants in the forming process.
#2B – Smooth finish produced by cold rolling, annealing and descaling. A light cold rolling pass is added after anneal with polished rolls giving it a brighter finish than 2D.

#BA – Bright annealed cold rolled and bright annealed
#CBA – Course bright annealed cold rolled matte finish and bright anneal
#2 – Cold Rolled
#2BA – Smooth finish produced by cold rolling and bright annealing. A light pass using highly polished rolls produces a glossy finish. A 2BA finish may be used for lightly formed applications where a glossy finish is desired in the formed part.
Polished – Various grit finish for specific polish finished requirements.

** Not all finishes are available in all alloys – Contact Ulbrich Sales for more information.*

Wire Finishes

XC – Extra Clean Bright Annealed or Bright Annealed and Cold Rolled
Grease – Ultra bright finish (for decorative applications)
Soap – Soap coating on tempered wire to act as lubricant.

** Contact Ulbrich Wire for custom wire finishes.*

Heat Treatment

Hastelloy® B-3 cannot be hardened heat treating.

Welding

For best results refer to: SSINA's "Welding of Stainless Steels and Other Joining Methods".