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HAYNES® 263, UNS N07263

(Alloy 263) Strip & Foil, AMS 5872, MSSR 7036

Applications

Heat treat equipment

Description

Haynes® 263 is an age-hardenable nickel-cobalt-chromium-molybdenum alloy designed specifically to combine very good strength properties with excellent fabrication characteristics in the annealed condition, While its strength at elevated temperatures is not quite as high as materials such as Waspaloy or alloy R-41, it is far easier to form or weld than these alloys. Alloy 263 exhibits excellent intermediate temperature tensile ductility, and is not normally subject to strain age cracking problems common for gamma prime strengthened alloys.

Chemistry Typical

Nickel: Balance
Cobalt: 19.00 – 21.00
Chromium: 19.00 – 21.00
Molybdenum: 5.60 – 6.10
Titanium: 1.9-2.4
Titanium + Carbon: 0.04-0.08
Aluminum: .0.60 max
Manganese: 0.60 max
Silicon: 0.40 max
Iron: 0.70 max
Boron: 0.005 max
Copper: 0.20 max
Sulfur: 0.007 max
Silver: 0.0005 max
Bismuth: 0.0001 max

Physical Properties

Density: 0.302 lbs/in³, 8.36 g/cm³

Electrical Resistivity: micro-ohm-in, (micro-ohm-cm):
70 °F (21 °C): 45.3 (115)

Mean Coefficient of Thermal Expansion: µin/in-°F (µm/m-°C)
70 - 200 °F (25 - 100 °C): 6.2 (11.1)
70 - 400 °F (25 - 200 °C): 6.7 (12.1)
70 - 600 °F (25 - 300 °C): 7.1 (12.7)
70 - 800 °F (25 - 400 °C): 7.2 (12.8)
70 - 1000 °F (25 - 500 °C): 7.6 (13.6)
70 - 1200 °F (25 - 600 °C): 7.9 (13.9)
70 - 1400 °F (25 - 700 °C): 8.3 (14.7)
70 - 1600 °F (25 - 800 °C): 9.0 (15.4)
70 - 1800 °F (25 - 900 °C): 9.9 (17.0)

Thermal Conductivity: BTU-in/ft-°F (W/m-°K)
70 °F (21 °C): 81 (11.7)
200 °F (100 °C): 89 (13.0)
400 °F (200 °C): 103 (14.7)
600 °F (300 °C): 115 (16.3)
800 °F (400 °C): 128 (18.0)
1000 °F (500 °C): 141 (19.7)
1200 °F (600 °C): 154 (21.2)
1400 °F (700 °C): 167 (23.0)
1600 °F (800 °C): 182 (24.7)
1800 °F (900 °C): 195 (26.8)

Modulus of Elasticity: KSI (MPa)
32.1 x 10³ (221 x 10³) in tension

Melting Range: 2370 - 2470 °F (1300 - 1355 °C)

Forms

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

Mechanical Properties at Room Temperature

Annealed: Typical

Ultimate Tensile Strength: *
Yield Strength: (0.2% offset) *
Elongation: *
Hardness:
Gauges up to 0.010 inches: HV 256 max
Gauges over 0.010 inches: Rb 100 max

** Contact Ulbrich Technical Service for additional information.*

Properties: Tempered

Haynes® 263 can be cold rolled to various tempers. Contact Ulbrich Technical Service for additional information.

Heat Treat Capabilities: Typical

Aged at 1472 °F
Yield Strength: (0.2% offset): 87 KSI nom (600 MPa nom)
Elongation: 37% nom

Additional Properties

Corrosion Resistance

Haynes® 263 exhibits good resistance to oxidizing combustion gas environments at temperatures up to about 1600 °F (870 °C).
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 – Consult Sales for applicable finishes.*

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 with special finish requests.*

Cold Forming

Haynes® 263 has excellent forming characteristics. The alloy has excellent ductility in the annealed condition, and thus may also be formed by cold working. Intermediate annealing in the temperature range from 1900 to 2000 °F may be needed for complex component forming operations. All hot or cold-worked parts should be annealed and rapidly cooled in order to restore the best balance of properties.

Welding

Haynes® 263 can be welded by both manual and automatic welding methods, including gas tungsten arc (TIG), gas metal arc (MIG), electron beam and resistance welding. Matching composition filler wire is generally used for welding alloy 263.
For best results refer to: SSINA's "Welding of Stainless Steels and Other Joining Methods".