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HAYNES® 214, UNS N07214

(Nickel Alloy 214) Strip, Coil, Foil, Wire, ROLLS ROYCE MSRR7238 IS2

Applications

Furnace parts, Honeycombs

Description

Haynes® 214 is a nickel-chromium-aluminum-iron alloy, designed to provide the optimum in high-temperatures oxidation resistance for a wrought austenitic material, while at the same time allowing for conventional forming and joining. Intended principally for use at temperatures of 1750 °F and above, alloy 214 exhibits resistance to oxidation that far exceeds virtually all conventional heat-resisting wrought alloys at these temperatures. This is attributable to the formation of a tightly adherent Al2O3-type protective oxide scale, which forms in preference to chromium oxide scales at these temperatures. At temperatures below 1750 °F, alloy 214 develops an oxide scale which is a mixture of chromium and aluminum oxides. This mixed scale is somewhat less protective, but still affords alloy 214 oxidation resistance equal to the best nickel-base alloys.

Chemistry Typical

Nickel: Balance
Chromium: 15.00-17.00
Iron: 2.00-6.00
Aluminum: 4.00-5.00
Cobalt: 2.00 max
Tungsten: 1.00 max
Manganese: 1.00 max
Molybdenum: 1.00 max
Yttrium: .002-.040
Carbon: 0.15 max
Silicon: 0.50 max
Phosphorus: 0.15 max
Sulfur: 0.015 max
Titanium: 0.50 max
Boron: 0.015 max
Zirconium: 0.20 max

Physical Properties

Density: 0.291 lbs/in³, 8.05 g/cm³

Electrical Resistivity: microhm-in.(microhm-cm)
70 °F (21 °C): 53.5 (135.9)

Specific Heat: Btu/lb.-°F(J/Kg-K):
At 70 °F (21 °C): 0.108 (452)

Mean Coefficient of Thermal Expansion: in/in/°F (mm/m/°C):
70 - 212 °F (20 - 100 °C): 7.2 x 10^{-6} (13.0)

Thermal Conductivity: BTU-in/h-ft-°F (W/m-°K):
70 °F (21 °C): 83 (12.0)

Modulus of Elasticity: KSI (MPa)
31.6 x 10³ (218 x 10³) in tension

Melting Range: 2475 - 2550 °F (1355 - 1400 °C)

Forms

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

Mechanical Properties at Room Temperature

Properties: Annealed

Ultimate Tensile Strength: 110 KSI min (758 MPa min)
Yield Strength (0.2% offset): 65 KSI min (438 MPa min)
Elongation: 25% min (gauges > .003 inches)
Hardness: Rc 30 max

Properties: Tempered

Haynes® 214 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 for 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

Haynes® 214 can be hardened by:
Cold working
Aging at 1472 °F to 1562 °F

Welding

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