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Ulbrich Stainless Steels & Special Metals, Inc. • 153 Washington Avenue • North Haven, CT 06473 USA • 800-243-1676 • ULBRICH.com

MONEL® 404 (NICKEL 404), UNS N04404

Strip, Coil, Foil, Wire, ASTM F-96

Applications

Electronic and electrical devices, marine fixtures, chemical processing equipment, gasoline tanks, boiler feed water heaters and other heat exchangers

Description

Monel® 404 (Nickel 404) has high strength and toughness over a wide temperature range with excellent resistance to many corrosive environments. The alloy also has low permeability and good brazing characteristics.

Chemistry Typical

Nickel + Cobalt: 52.0 - 57.0

Manganese: 0.10 max

Silicon: 0.10 max

Cobalt: 1.00 max

Iron: 0.50 max

Sulfur: 0.024 max

Carbon: 0.15 max

Copper: Balance

Aluminum: 0.05 max

Physical Properties

Density: 0.322 lbs/in³, 8.91 g/cm³

Electrical Resistivity: ohm-cir mil/ft (microhm-m)

At 70 °F (21 °C): 294 (0.498)

Specific Heat: Btu/lb-°F (J/g-°C)

At 70 °F (21 °C): 0.0989 (0.414)

Monel® 404 is a registered trademark of the INCO family of companies

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Thermal Conductivity: BTU/hr/ft²/ft/°F (W/m-°C)

At 70 °F (21 °C) – 133 (21)

Mean Coefficient of Thermal Expansion: $\mu\text{in/in-}^\circ\text{F}$, ($\mu\text{m/m}^\circ\text{C}$)

70 - 200 °F (21 - 93 °C) 7.39 (13.3)

70 - 572 °F (21 - 300 °C) 8.50 (15.3)

70 - 1000 °F (21 - 539 °C) 9.22 (16.6)

70 - 1500 °F (21 - 816 °C) 9.78 (17.6)

Modulus of Elasticity: ksi (MPa) in Tension

24.5 x 10³ (169 x 10³)

Magnetic Permeability, H = 200 Oersteds: Annealed 1.0017 max

Melting Point: 2370 °F (1300 °C)

Forms

Coil – Strip, Foil, Ribbon

Wire – Profile, Round, Flat, Square

Mechanical Properties at Room Temperature

Properties: Annealed

Ultimate Tensile Strength: 70 KSI min (483 MPA min)

Yield Strength (0.2% offset): 25 KSI min (172 MPA min)

Elongation: 35% min

Properties: Tempered

Monel® 404 (Nickel 404) 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.

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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 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 for special finish requests.*

Heat Treatment

Monel® 404 (Nickel 404) is non hardenable by heat treatment.

Welding

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

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