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

NITRONIC 50[®], UNS S20910

Strip, Coil, Foil & Wire, AMS 5764, AMS 5861, ASTM A193, ASTM A194, ASTM A240 (XM-19), ASTM A276 (XM-19), ASTM A479 (XM-19), ASTM A580 (XM-19)

Applications

Nitronic 50[®] Stainless Steel is for the petroleum, petrochemical, chemical, fertilizer, nuclear fuel recycling, pulp and paper, textile, food processing and marine industries. Components where the combination of excellent corrosion resistance and high strength are required including pumps, valves and fittings, fasteners, cables, chains, screens and wire cloth, marine hardware, boat and pump shafting, heat exchanger parts, springs and photographic equipment.

Description

Nitronic 50[®] is an austenitic stainless steel that provides a combination of corrosion resistance and strength not found in any other commercial material available. It has corrosion resistance greater than that provided by Types 316 and 316L, plus approximately twice the yield strength at room temperature. In addition, Armco Nitronic 50[®] Stainless has very good mechanical properties at both elevated and sub-zero temperatures. And, unlike many austenitic stainless steels, the alloy does not become magnetic when cold worked.

Chemistry Typical

Carbon: 0.06 max
Manganese: 4.00-6.00
Silicon: 1.00 max
Chromium: 20.5-23.50
Nickel: 11.5-13.50
Molybdenum: 1.50-3.00
Phosphorus: 0.040 max
Columbium: 0.10-0.30
Vanadium: 0.10-0.30
Sulfur: 0.030 max
Nitrogen: 0.20-0.40
Iron: Balance

Nitronic 50[®] is a registered Trademark of AK Steel

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Physical Properties

Density: 0.285 lbs/in³ 7.88 g/cm³

Electrical Resistivity: microhms-cm

At 70 °F (21 °C): 82

Thermal Conductivity: BTU-in/hr-ft²/°F (W/m•K):

At 300 °F (149 °C): 108 (15.6)

At 600 °F (316 °C): 124 (17.9)

At 900 °F (482 °C): 141 (20.3)

At 1200 °F (649 °C): 160 (23.0)

At 1500 °F (816 °C): 175 (25.2)

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

70 - 200 °F (21 - 93 °C): 9.0 (16.2)

70 - 400 °F (21 - 205 °C): 9.2 (16.6)

70 - 600 °F (21 - 315 °C): 9.6 (17.3)

70 - 800 °F (21 - 427 °C): 9.9 (17.8)

70 - 1000 °F (21 - 540 °C): 10.2 (18.4)

70 - 1200 °F (21 - 650 °C): 10.5 (18.9)

70 - 1400 °F (21 - 760 °C): 10.8 (19.4)

70 - 1600 °F (21 - 870 °C): 11.1 (20.0)

Modulus of Elasticity: ksi (MPa)

26.2 x 10³ (180 x 10³) in tension

Magnetic Permeability: Nitronic 50® does not become magnetic with cold work

Melting Range: 2579 - 2642 °F (1415 - 1452 °C)

Forms

Coil – Sheet, Strip, Foil

Wire – Profile, Round, Flat, Square

Mechanical Properties at Room Temperature

Properties: Annealed Typical

Ultimate Tensile Strength: 117 KSI (806 MPa)

Yield Strength: 60 KSI (413 MPa)

Elongation: 45%

Properties: Tempered

Nitronic 50® can be cold worked to various temper ranges. Contact Ulbrich Wire Technical Service for additional information.

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Additional Properties

Corrosion Resistance

Refer to NACE (National Association 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 – 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 is not removed from tempered wire to act as a lubricant.

** Contact Ulbrich Wire with special finish requests.*

Heat Treatment

Nitronic 50® 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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