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## Wire Products - Divisions of Ulbrich Stainless Steels & Special Metals, Inc.

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## Monel® 401, (Nickel 401), UNS N04401

Forms: Shaped, Flat, Square, Round, Fine Wire, Plated and Un-plated

Specifications: DIN 17471

### Nickel 401 Alloy Description

Alloy 401 is a nickel-copper alloy with a very low coefficient of electrical resistivity and resistance to a wide variety of corrosive conditions. Like with commercially pure Nickel, Alloy 401 is low in strength in the annealed condition and can only be cold worked to a maximum of 120 KSI.

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### Applications

Specialized electrical and electronic applications

Resistance heaters and circuits

## **Chemistry Typical**

Nickel + Cobalt: 43.0-45.0

Manganese: 2.25 max

Cobalt: 0.25 max

Iron: 0.75 max

Carbon: 0.10 max

Sulfur: 0.015 max

Silicon: 0.25 max

Copper: Balance

## **Physical Properties**

Density: 0.321 lbs/in<sup>3</sup>, 8.88 g/cm<sup>3</sup>

Thermal Conductivity: BTU/hr/ft<sup>2</sup>/ft/°F(W/m•K)

70°F (21°C): 13.3 (21.0)

Electrical Resistivity, ohm•circ mil/ft( $\mu\Omega\bullet m$ ):

70°F: 294

Mean Coefficient of Thermal Expansion: in/in/°F

70-200°:  $7.6 \times 10^{-6}$

70-500°F:  $8.5 \times 10^{-6}$

70-1000°F:  $9.2 \times 10^{-6}$

Modulus of Elasticity: KSI (MPa)

$26 \times 10^3$ ( $179 \times 10^3$ ) in tension

Melting Point: 2335°F (1280°C) approx.

## **Mechanical Properties at Room Temperature**

**Properties: Annealed \*\***

Ultimate Tensile Strength: 50-60 KSI (345-414 MPa)

Yield Strength (0.2% offset): 30-40 KSI (207-276 MPa)

Elongation: Report

Hardness: Rb 60-75

\*\* These values are based on typical capability data and can be adjusted by control of process variables as needed

### **Properties Tempered**

Alloy 401 can be cold rolled to achieve the temper properties required by specific customers and/or manufacturing requirements. Contact Ulbrich Wire for details.

### **Additional Properties**

#### **Corrosion Resistance**

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

#### **Standard Wire Finishes**

Extra Clean: (XC) Extra clean is also referred to as “bright annealed” or “bright annealed and cold rolled”

Grease (round wire only): Drawn in a heavy grease produces an “Ultra bright” finish for decorative applications

Soap (round wire only): Soap is used as a lubricant in the drawing process and is not removed. It acts as a lubricant during customer part forming operation. A soap finish is available in tempered products.

Plated: Many plating options are available.

- Special finishes are available: Contact Ulbrich Wire Sales with special finish and plating requests.

#### **Forms**

Continuous Coils

Cut to lengths

Precision cutting

Alloy 401 is non hardenable by heat treatment.

#### **Welding**

For best results refer to: SSINA’s “Welding of Stainless Steels and Other Joining Methods”

\*Monel® 401 is a registered trademark of Special Metals Corp

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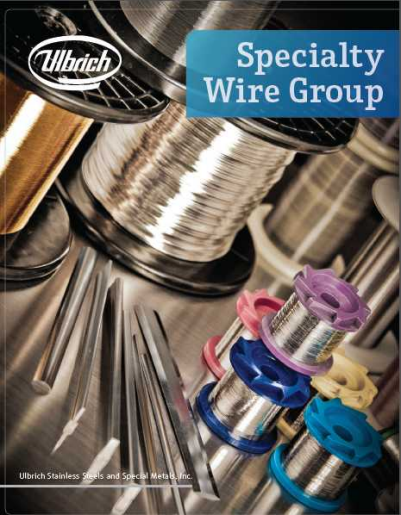
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