



416 Stainless, UNS S41600

Square, Round, Fine Wire, Plated and Un-plated (Rectangular cross sections: Inquiry with [Ulbrich Shaped Wire Sales](#))
ASTM A484, ASTM A 582, AMS 5610, QQ-S-764, Mil-W-5263

416 Alloy Description

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Alloy 416 is a free machining martensitic grade of stainless.

Parts can be fabricated in the soft condition then hardened

by heat treating to increase strength and hardness. The addition of sulfur increases the machinability over austenitic grades but alloy 416 sacrifices corrosion resistance.

Applications

Shafts

Gears

Screws

Bolts

Any part that requires considerable machining

Chemistry Typical

Carbon: 0.15 max

Phosphorus: 0.060 max

Silicon: 1.00 max

Manganese: 1.25 max

Sulfur: 0.150 min

Chromium: 12.00-14.00

Physical Properties

Density: .282 lb/in³, 7.80 g/cm³

Electrical Resistivity: ohm-cir-mil/ft:

At 70 °F (21°C): 343.0

Specific Heat: BTU/lb-°F (J/g-°C):

32-212°F (0-100°C): 0.110 (0.460)

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

At 200 °F (94 °C): 172.8 (24.9)

At 1000 °F (538 °C): 198 (28.5)

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

32-212 °F (0-100 °C): 5.50 (9.90)

32-600 °F (0-316 °C): 5.60 (10.1)

32-1200 °F (0-649 °C): 6.5 (11.7)

Modulus of Elasticity: KSI (MPa)

29.0 x 10³ (200 x 10³) in tension

Melting Range: °F (°C): 2700-2790 (1488-1530)

Mechanical Properties at Room Temperature

Properties: Annealed Typical

Ultimate Tensile Strength: 75 KSI min (517 MPa min)

Yield Strength: 40 KSI min (276 MPa min)

Elongation: 30 % min

Properties: Tempered

Alloy 416 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

Heat Treatment

Alloy 416 can be hardened by cold working and by heat treatment.

Welding

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

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