



420 Stainless Steel, UNS S42000

Shaped, Flat, Square, Round, Fine Wire, Plated and Bare Wire
AMS 5506, AMS 5621, ASTM A-176, ASTM A 580

420 Alloy Description

Alloy 420 is a martensitic stainless steel that provides good corrosion resistance similar to alloy 410 with an increase in strength and hardness. It is magnetic in both the annealed and hardened conditions. Maximum corrosion resistance is attained only in the fully hardened condition.

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Applications

Cutlery
Surgical and dental instruments
Firearm parts
Scissors
Tapes
Straight edges

Chemistry Typical

Carbon: 0.30-0.40
Manganese: 1.00 max
Silicon: 1.00 max
Chromium: 12.00-14.00
Nickel: 0.50 max
Molybdenum: 0.50 max
Phosphorus: 0.040 max

Sulfur: 0.030 max

Copper: 0.50 max

Aluminum: 0.15 max

Tin: 0.050 max

Iron: Balance

Physical Properties

Density: 0.28 lbs/in³, 7.74 g/cm³

Electrical Resistivity: microhm-in (microhm-cm):

68°F (20°C): 21.71 (55.0)

Specific Heat: BTU/lb/°F (kJ/kg•K):

32-212°F (0-100°C): 0.11 (0.46)

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

At 212°F (100°C): 14.4 (24.9)

At 932°F (500°C): 16.6 (28.7)

Mean Coefficient of Thermal Expansion:in/in/°F (μm/m•K)

32 – 212°F (0 -100°C): 5.7×10^{-6} (10.2)

32 – 1200°F (0 -649°C): 6.8×10^{-6} (12.1)

Modulus of Elasticity: KSI (MPa)

29.0×10^3 (200×10^3) in tension

Magnetic Permeability: Magnetic

Melting Range: °F (°C) 2723 (1495)

Mechanical Properties at Room Temperature

Properties: Annealed Typical

Ultimate Tensile Strength: 100 KSI max (690 MPa max)

Yield Strength (0.2% offset): 60 KSI max (414 MPa max)

Elongation: 15% min

Hardness: B 96 max

Properties: Tempered

Alloy 420 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

Alloy 420 provides full corrosion resistance only in the hardened or hardened and tempered. In these conditions, its corrosion resistance is similar to type 410. Refer to NACE (National Association of Corrosion Engineers) for recommendations.

Standard Wire Finishes

Extra Clean: 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

Cold Forming

Alloy 420 can be moderately drawn and formed in the annealed condition.

Heat Treatment

Alloy 420 can be hardened by cold working and by heat treating. Please refer to Ulbrich

Technical Services Department for more information. Alloy 420 is capable of being heat treated to a hardness of HRC 51 minimum.

Welding

The martensitic class of stainless steels has limited weldability due to its hardenability. For best results refer to: SSINA's "Welding of Stainless Steels and Other Joining Methods".

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