301 Stainless Steel, UNS S30100

Shaped, Flat, Square, Round, Fine Wire, Plated and Un-plated Wire
AMS 5518 AMS 5519, AMS 5901, AMS 5902, AMS 5901, AMS 5902, ASTM A240, ASTM A666

301 Alloy Description

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Type 301 is an austenitic stainless steel capable of attaining high strengths and ductility by cold working. It is not hardenable by heat treatment. Type 301 is non-magnetic in the annealed condition and becomes increasingly magnetic with cold working. It is preferable over types 302 and 304 in the tempered condition because the higher elongations (which are attainable at a given strength level) facilitate fabrication

Applications

Blender blades
Small appliance components
Medical applications
Springs
Fasteners, etc.

Chemistry Typical

Carbon: 0.15 max
Manganese: 2.00 max
Silicon: 1.00 max
Chromium: 16.00- 18.00
Nickel: 6.00- 8.00
Aluminum: 0.75 max

Phosphorus: 0.040 max

Sulfur: 0.030 max

Copper: 0.75 max

Nitrogen: 0.10 max

Iron: Balance

Physical Properties

Density: 0.285 lbs/in^3, 7.88 g/cm^3

Electrical Resistivity: microhm-in (microhm-cm):
At 68°F (20°C): 27.4 (69.5)

Specific Heat: BTU/lb/°F (kJ/kg•K):
32-212°F (0-100°C): 0.12 (0.50)

Thermal Conductivity: BTU/hr/ft^2/ft/°F (W/m•K):
At 212°F (100°C): 9.4 (16.2)
At 932°F (500°C): 12.4 (21.4)

Mean Coefficient of Thermal Expansion: in/in/°F (µm/m•K):
32 – 212°F (0 -100°C): 9.4 x 10^6(16.9)
32 – 600°F (0 -315°C): 9.9 x 10^6((17.8)
32 -1000°F (0 -538°C): 10.2 x 10^6(18.4)
32 -1200°F (0 -649°C): 10.4 x 10^6(18.7) 10-6

Modulus of Elasticity: KSI (MPa)
28.0 x 10^3 (193 x 10^3) in tension
11.2 x 10^3 (78 x 10^3) in torsion

Magnetic Permeability: H = 200Oersteds Annealed: 1.02 max.

Melting Range: °F (°C) 2250 – 2590 (1399 – 1421)

Mechanical Properties at Room Temperature

Properties: Annealed

Ultimate Tensile Strength: 75 KSI min (515 MPa min)

Yield Strength (0.2% offset): 30 KSI min (205 MPa min)

Elongation: 40% min

Hardness: B92 or Equiv. max

Properties: Tempered

1/4 Hard

Ultimate Tensile Strength: 125 KSI min (860 MPa min)

Yield Strength: (0.2% Offset) 75 KSI min (515 MPA min)

Elongation: 25% min

1/2 Hard

Ultimate Tensile Strength: 150 KSI min (1035 MPa min)

Yield Strength: (0.2% Offset) 110 KSI min (760 MPa min)

Elongation:

15% min for gauges < 0.015 inches

18%min for gauges > 0.015 inches

3/4 Hard

Ultimate Tensile Strength: 175 KSI min (1205 MPa min)

Yield Strength: (0.2% Offset) 125 KSI min (931 MPamin)

Elongation:

10% min for gauges < 0.015 inches

12% min for gauges > 0.015 inches

Full Hard

Ultimate Tensile Strength: 185 KSI min (1275 MPa min)

Yield Strength: (0.2% Offset) 140 KSI min (965 MPa min)

Elongation:

8% min for gauges < 0.015 inches

9% min for gauges > 0.015 inches

Alloy 301 can be rolled to high mechanical properties than full hard. Contact Ulbrich Wire with special mechanical property requests

Additional Properties

Corrosion Resistance

301 has good corrosion resistance and is used in many food service applications, similar to grade 304.Please 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 andis 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

301 is ductile and easily formed but severe forming or multiple operations may require intermediate anneals due to it’s high work hardening rate. It’s hardness and strength makes it a fit for structural applications. Typically stamped or drawn

Heat Treatment

301 is non hardenable by heat treatment

Stress Relieving

Heat to 400-900°F (260-482°C) and then air cool

Welding

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

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