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## 301 STAINLESS STEEL STRIP, UNS S30100

**Strip, Coil, Foil & Wire, AMS 5901 (ANN), AMS 5902 (3/4H),  
AMS 5517 (1/4H), AMS 5518 (1/2H), AMS 5519 (FH), ASTM A666**

### Applications

Springs, Fasteners, Washers, Zippers, Clips, Clamps, Computer Parts, Contacts, Stampings of a wide variety of parts, Pins.

### Description

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.

### 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  
Sulphur: 0.030 max  
Copper: 0.75 max  
Nitrogen: 0.10 max  
Iron: Balance

### Physical Properties

Density: 0.285 lbs/in<sup>3</sup> 7.88 g/cm<sup>3</sup>

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

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

Thermal Conductivity: BTU/hr/ft<sup>2</sup>/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<sup>-6</sup> (16.9)  
32 – 600 °F (0 - 315 °C) – 9.9 x 10<sup>-6</sup> (17.8)  
32 – 1000 °F (0 - 538 °C) – 10.2 x 10<sup>-6</sup> (18.4)  
32 – 1200 °F (0 - 649 °C) – 10.4 x 10<sup>-6</sup> (18.7)

Modulus of Elasticity: ksi (MPa)  
In tension: 28.0 x 10<sup>3</sup> (193 x 10<sup>3</sup>)  
In torsion: 11.2 x 10<sup>3</sup> (78 x 10<sup>3</sup>)

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

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

## Forms

Coil - Strip, Foil, Ribbon  
Wire - Profile, Round, Flat, Square

## 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

#### 1/16 Hard

Ultimate Tensile Strength: 90 KSI min (629 MPA min)  
Yield Strength: (0.2% Offset) 45 KSI min (310 MPA min)  
Elongation: 40% Min

#### 1/8 Hard

Ultimate Tensile Strength: 100 KSI min (690 MPA)  
Yield Strength: (0.2% Offset) 55 KSI min/380 MPA min  
Elongation: 40% Min

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1/4 Hard

Ultimate Tensile Strength: 125 KSI min (860 MPA)  
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% < .015"  
18% > .015"

3/4 Hard

Ultimate Tensile Strength: 175 KSI min (1205 MPA min)  
Yield Strength: (0.2% Offset) 135 KSI MIN/515 MPA MIN  
Elongation: 10% < .015"  
12% > .015"

Full Hard

Ultimate Tensile Strength: 185 KSI min (1275 MPA min)  
Yield Strength: (0.2% Offset) 140 KSI min (965 MPA min)  
Elongation: 8% < .015"  
9% > .015"

Extra Full Hard

Ultimate Tensile Strength:  
270 KSI min < .014" (1860 MPA min)  
250 KSI min .015" to .017" (1720 MPA min)  
225 KSI min .0171" to .019" (1552 MPA min)  
205 KSI min .0191 to .021 (1435 MPA min)  
185 KSI min > .0211 (1275 MPA min)

Spring Tempered

Ultimate Tensile Strength: 185 KSI min (1275 MPA min)  
Yield Strength: (0.2% Offset) 140 KSI min (965 MPA min)  
Elongation: 8% < .015"  
9% > .045"

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## Additional Properties

### Corrosion Resistance

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

### 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 – Contact Ulbrich Sales for more information.*

### Wire – Finishes

XC – Extra clean bright annealed or bright annealed and cold rolled

Grease – Ultra-bright finish (for decorative applications)

Soap – Soap coating on tempered wire to act as lubricant

*\*Contact Ulbrich Wire for custom finishes.*

### 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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