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# 201 STAINLESS STEEL, UNS S20100

## Strip, Coil, Foil & Wire, ASTM A666, ASTM A240

### Applications

Springs, Fasteners, Utensils, Food Service, Appliances, Automotive Trim, Clamps

### Description

Type 201 stainless steel is an austenitic chromium-nickel-manganese stainless alloy. It was developed mid century to conserve nickel and it is used as an alternative to type 301 in some tempered applications. Because of 201's relatively high yield strength in the annealed condition, use of 201 is limited. Type 201 is generally used in the tempered condition particularly for springs and fasteners. 201 Stainless will retain a comparable ductility to 301 even with the higher yield strength.

### Chemistry Typical

Carbon: 0.15 max  
Manganese: 5.50- 7.50 max  
Phosphorus: 0.060 max  
Sulfur: 0.030 max  
Silicon: 0.75 max  
Chromium: 18.00- 20.00 max  
Nickel: 3.50- 5.50  
Nitrogen: 0.25 max  
Iron: Balance

### Physical Properties

Density: 0.283 lbs/in<sup>3</sup> 7.81 g/cm<sup>3</sup>

Electrical Resistivity: microhm-in, (microhm-cm): 27.0 (68.5)

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

Thermal Conductivity, BTU/hr/ft²/°F (W/m/K):  
At 212 °F (100 °C): 9.4 (16.2)  
At 932 °F (500 °C): 12.4 (21.4)

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Mean Coefficient of Thermal Expansion, in./in./ °F (µm/m/K))

32 - 212 °F (0 – 100 °C)  $8.7 \times 10^{-6}$  (15.7)

32 - 600 °F (0 – 315 °C)  $9.7 \times 10^{-6}$  (17.5)

32 - 1000 °F (0 – 538 °C)  $10.2 \times 10^{-6}$  (18.4)

32 - 1200 °F (0 – 649 °C)  $10.5 \times 10^{-6}$  (18.9)

32 - 1600 °F (0 – 871 °C)  $11.3 \times 10^{-6}$  (20.3)

Modulus of Elasticity, ksi (MPa)

$28.6 \times 10^3$  ( $197 \times 10^3$ )

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

Melting Range: 2550 - 2650 °F (1399 - 1454 °C)

## Forms

Coil - Strip, Foil, Ribbon

Wire - Profile, Round, Flat, Square

## Mechanical Properties at Room Temperature

### Annealed Condition

Ultimate Tensile Strength: 95 KSI min (655 MPA min)

Yield Strength (0.2% Offset): 38 KSI min (260 MPA min)

Elongation: 40% min

Hardness: B95 max

### Tempered 1/16 Hard

Ultimate Tensile Strength: 95 KSI min (655 MPA min)

Yield Strength (0.2% Offset): 45 KSI min (310 MPA min)

Elongation: 40% min

### Tempered 1/8 Hard

Ultimate Tensile Strength: 100 KSI min (690 MPA min)

Yield Strength (0.2% Offset): 55 KSI min (380 MPA min)

Elongation: 45% min

### 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

### Tempered 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% < 0.15" 18% > 0.15"

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**Tempered 3/4 Hard**

Ultimate Tensile Strength: 175 KSI min (1205 MPA min)  
 Yield Strength (0.2% Offset): 135 KSI min (930 MPA min)  
 Elongation: 10% < 0.15" 12% > 0.15"

**Tempered Full Hard**

Ultimate Tensile Strength: 185 KSI min (1275 MPA min)  
 Yield Strength (0.2% Offset): 140 KSI min (965 MPA min)  
 Elongation: 8% < 0.15" 9% > 0.15"

**Additional Properties****Corrosion Resistance**

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

**Finishes for Strip & Foil**

#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 – Please contact Ulbrich sales for more information.*

**Finishes - Wire**

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 with special wire finishes.*

**Cold Forming**

201 is considered a formable stainless and is often drawn, stamped and headed. It work hardens easily and should be followed by anneal.

**Heat Treatment**

201 cannot be heat treated for hardness. Hardness can only be achieved by cold working.

**Welding**

Refer SSINA for Welding Recommendations.

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