

# 201 STAINLESS STEEL



Type 201 is an austenitic chromium-nickel-manganese stainless steel that was developed originally to conserve nickel. It provides properties similar to Type 301 and can be used in most applications for Type 301. This alloy is non-magnetic in the annealed condition, but becomes slightly magnetic when cold worked. The rate of work hardening is similar to Type 301, although Type 201 develops somewhat higher yield strength while retaining equal ductility when cold worked. Toughness at low temperatures is excellent.

Typical uses include appliances, restaurant equipment, cooking utensils, sinks, automotive trim, architectural applications such as windows and doors, rail-way cars, trailers and hose clamps.

## SPECIFICATIONS

Type 201 Stainless Steel is covered by the following specifications:

- ASTM A 240
- ASTM A 666

## AVAILABLE FORMS

AK Steel produces Type 201 Stainless Steel in thicknesses from 0.010" to 0.25" (0.25 to 6.35 mm) and widths up to 48" (1219 mm). For other thicknesses and widths, inquire.

## MECHANICAL PROPERTIES

Table 1

Typical Mechanical Properties\*

UTS ksi (MPa)	0.2% YS ksi (MPa)	Elongation % in 2" (50.8 mm)	Hardness Rockwell	Impact Strength Izod V-Notch ft-lbs (J)
110 (758)	55 (379)	52	B87	120 (163)

\*Annealed condition

Table 2

Cold-Worked Properties\*

Condition	UTS ksi (MPa)	0.2% YS ksi (MPa)	Elongation % in 2" (50.8 mm)	Hardness Rockwell C
1/4 hard	125 (862)	75 (517)	25	25
1/2 hard	150 (1034)	110 (150)	15	32
3/4 hard	175 (1207)	135 (931)	12	37
Full hard	185 (1276)	140 (965)	8	41

\*Standard practice is to produce to either minimum tensile strength, minimum yield strength or minimum hardness, but not to combinations of these properties.

## COMPOSITION

	%
Carbon	0.15 max.
Manganese	5.50 - 7.50
Phosphorus	0.060 max.
Sulfur	0.030 max.
Silicon	1.00 max.
Chromium	16.00 - 18.00
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)

Thermal Conductivity, BTU/hr/ft<sup>2</sup>/ft/°F  
(W/m•K)  
212°F (100°C) 9.4 (16.2)  
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) 8.7 x 10<sup>-6</sup> (15.7)  
32 - 600°F (0 - 315°C) 9.7 x 10<sup>-6</sup> (17.5)  
32 - 1000°F (0 - 538°C) 10.2 x 10<sup>-6</sup> (18.4)  
32 - 1200°F (0 - 649°C) 10.5 x 10<sup>-6</sup> (18.9)  
32 - 1600°F (0 - 871°C) 11.3 x 10<sup>-6</sup> (20.3)

Modulus of Elasticity, ksi (MPa)  
28.6 x 10<sup>3</sup> (197 x 10<sup>3</sup>)

Magnetic Permeability, (H = 200  
Oersteds), Annealed 1.02

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

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

**CORROSION RESISTANCE**

The general level of corrosion resistance of Type 201 is similar to Type 301. Type 201 should perform adequately as a replacement for Type 301, except in the most demanding environments. The scal-

ing resistance of Type 201 is less than that of Type 301. Type 201 resists destructive scaling up to about 1550°F (843°C), about 100°F (56°C) less than Type 301.

**FABRICATION**

Type 201 Stainless Steel can be fabricated by bench forming, roll forming and brake bending in much the same manner as Type 301. However, because of its higher strength, it may exhibit greater springback. This material can be drawn similarly to Type 301 in most drawing operations if more power is used and the hold-down pressure is increased.

**WELDABILITY**

The austenitic class of stainless steels is generally considered to be weldable by the common fusion and resistance techniques. Special consideration is required to avoid weld "hot cracking" by assuring formation of ferrite in the weld deposit. This particular alloy is generally considered to have poorer weldability to the most common alloy of this stainless class, Type 304L Stainless Steel. When a weld filler is needed, AWS E/ER 308 is most often specified. Type 201 Stainless Steel is well known in reference literature and more information can be obtained in this way.

**HEAT TREATMENT**

Type 201 is not hardenable by heat treatment.

Annealing: Anneal at 1850 - 1950°F (1010 - 1066°C), then water quench or rapidly air cool. The annealing temperature should be kept as low as possible, consistent with the desired properties, because Type 201 tends to scale more than Type 301.

**METRIC CONVERSION**

Data in this publication are presented in U.S. customary units. Approximate metric equivalents may be obtained by performing the following calculations:

Length (inches to millimeters) –  
Multiply by 25.4

Strength (ksi to megapascals or  
meganewtons per square meter) –  
Multiply by 6.8948

Temperature (Fahrenheit to Celsius) –  
(°Fahrenheit - 32) – Multiply by 0.5556

Density (pounds per cubic inch to  
kilograms per cubic meter) – Multiply  
by 27,670

The information and data in this product data sheet are accurate to the best of our knowledge and belief, but are intended for general information only. Applications suggested for the materials are described only to help readers make their own evaluations and decisions, and are neither guarantees nor to be construed as express or implied warranties of suitability for these or other applications.

Data referring to mechanical properties and chemical analyses are the result of tests performed on specimens obtained from specific locations with prescribed sampling procedures; any warranty thereof is limited to the values obtained at such locations and by such procedures. There is no warranty with respect to values of the materials at other locations.

AK Steel and the AK Steel logo are registered trademarks of AK Steel Corporation.



Customer Service 800-331-5050

AK Steel Corporation  
9227 Centre Pointe Drive  
West Chester, OH 45069

www.aksteel.com

