

201 STAINLESS STEEL



Cooking Utensils

Restaurant Equipment

Appliances

Automotive Trim

Architectural Applications

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 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, railway cars, trailers and hose clamps.

PRODUCT DESCRIPTION

SPECIFICATIONS

Type 201 Stainless Steel is covered by the following specifications:
 ASTM A240
 ASTM A666

AVAILABLE FORMS

AK Steel produces Type 201 Stainless Steel in thicknesses from 0.010 in. to 0.187 in. (0.25 to 4.75 mm) and widths up to 48 in. (1219 mm). For other thicknesses and widths, inquire.

COMPOSITION	(WT %)
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, lbs./in. ³ (g/cm ³)	0.283 (7.81)
Electrical Resistivity, $\mu\Omega\cdot\text{in.}$ ($\mu\Omega\cdot\text{cm}$)	27.0 (68.5)
Thermal Conductivity, BTU/hr./ft. ² /°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 ($\mu\text{m/m/K}$)	
32 - 212 °F (0 - 100 °C)	8.7×10^{-6} (15.7)
32 - 600 °F (0 - 315 °C)	9.7×10^{-6} (17.5)
32 - 1000 °F (0 - 538 °C)	10.2×10^{-6} (18.4)
32 - 1200 °F (0 - 649 °C)	10.5×10^{-6} (18.9)
32 - 1600 °F (0 - 871 °C)	11.3×10^{-6} (20.3)
Modulus of Elasticity, ksi (MPa)	28.6×10^3 (197×10^3)
Magnetic Permeability, (H/m at 200 Oersteds)	Annealed 1.02
Specific Heat, BTU/lbs./°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, in most mild environments. The scaling resistance of Type 201 is less than that of Type 301. Type 201 resists destructive scaling up to about 1500 °F (816 °C), about 50 °F (28 °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. As with other chrome-nickel austenitic stainless steel grades where carbon is not restricted to 0.03% or below, the weld heat affected zone may be sensitized and subject to intergranular corrosion in some environments. 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.



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TABLE 1 – TYPICAL MECHANICAL PROPERTIES*

UTS ksi (MPa)	0.2% YS ksi (MPa)	Elongation % in 2" (50.8 mm)	Hardness Rockwell
110 (758)	52 (360)	55	B87

**Annealed condition*

TABLE 2 – IMPACT STRENGTH

Izod V-Notch Rockwell ft-lbs. (J)	120 (163)
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TABLE 3 – COLD-WORKED PROPERTIES*

Condition	UTS ksi (MPa) min.	0.2% YS ksi (MPa) min.	Elongation % in 2" (50.8 mm)		Hardness Rockwell C
			< 0.015 in.	≥ 0.015 in.	
1/4 hard	125 (862)	75 (517)	25	25	30
1/2 hard	150 (1034)	110 (150)	15	18	35
3/4 hard	175 (1207)	135 (931)	10	12	37
Full hard	185 (1276)	140 (965)	8	9	41

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



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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.

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