



Technical Data

Ferguson Metals, Inc. ♦ Hamilton, Ohio

Stainless Steel

Type 301

(UNS Designation S30100)

GENERAL PROPERTIES

Type 301 (S30100) is an austenitic stainless steel with a nominal composition of 17 percent chromium and 7 percent nickel. The high strengths of this grade of steel in the six available conditions or tempers, its resistance to atmosphere corrosion and its bright, attractive surface make it an excellent choice for decorative structural applications.

Automobile molding and trim, wheel covers, conveyor belts, kitchen equipment, roof drainage systems, hose clamps, springs, truck and trailer bodies, railway and subway cars are some of the major applications for this versatile grade. By varying the chemical composition within the limits set by the ASTM specifications and by temper rolling, a broad range of magnetic and mechanical properties can be obtained for a variety of applications.

Type 301 is available as cold rolled strip, sheets, and plates.

CHEMICAL COMPOSITION

Represented by ASTM A240 and A666

Element	Percent by Weight
	Maximum Unless Range is Specified
Carbon	0.15 maximum
Manganese	2.00 maximum
Phosphorus	0.045 maximum
Sulfur	0.030 maximum
Silicon	1.00 maximum
Chromium	16.00-18.00
Nickel	6.00-8.00
Nitrogen	0.10 maximum

RESISTANCE TO CORROSION

Type 301 is resistant to a variety of corrosive media. However, the corrosion properties are not as good as the 18-8 chromium-nickel steels. Its susceptibility to carbide precipitation during welding restricts its use in many applications in favor of Types 304 or 304L.

RESISTANCE TO OXIDATION

Type 301 possesses good resistance to oxidation at temperatures up to 1550°F (840°C). At 1600°F (871°C), Type 301 exhibits an oxidation weight gain of 10 mg/cm² in 1,000 hours. Therefore, this stainless steel is not suggested for use at 1600°F or above. As the rate of oxidation is greatly affected by the atmosphere to which the metal is exposed by the heating and cooling cycle, and by the structural design, no data can be presented which will apply to all service conditions.

PHYSICAL PROPERTIES

The values reported below are representative for average composition in the annealed condition.

Melting Range	2550-2590°F (1399-1421°C)
Density	0.285 lb/in ³ (7.88g/cm ³)
Specific Gravity	8.03
Modulus of Elasticity in Tension	28 x 10 ⁶ psi (193 GPa)*

*In the cold worked condition, the modulus is lowered.

LINEAR COEFFICIENT OF THERMAL EXPANSION

Temperature Range		Coefficients	
°C	°F	cm/cm/°C	in/in/°F
20-100	62-212	16.6 x 10 ⁻⁶	9.2 x 10 ⁻⁶
20-300	68-572	17.6 x 10 ⁻⁶	9.8 x 10 ⁻⁶
20-500	68-932	18.6 x 10 ⁻⁶	10.3 x 10 ⁻⁶
20-700	68-1292	19.5 x 10 ⁻⁶	10.8 x 10 ⁻⁶
20-871	68-1600	19.8 x 10 ⁻⁶	11.0 x 10 ⁻⁶

Since the expansion coefficient is higher than that of many other metals and alloys, this characteristic should be considered in the design of equipment involving Type 301 and other materials of construction.

THERMAL CONDUCTIVITY

Temperature Range		W/m-K	Btu/ft ² /hr/°F/ft
°C	°F		
20-100	62-212	16.3	9.4
20-500	62-932	21.4	12.4

SPECIFIC HEAT

°C	°F	J/kg °K	Btu/lb/°F
0-100	32-212	500	0.12

MAGNETIC PERMEABILITY

H/m Annealed

1.02 Max @ 200 H

ELECTRICAL RESISTIVITY

°C	°F	Microhm-cm	Microhm-in.
20	68	72	28.3
100	212	78	30.7
200	392	86	33.8
400	752	100	39.4
600	1112	111	43.7
800	1472	121	47.6
900	1652	126	49.6

MECHANICAL PROPERTIES

Type 301 is used in the annealed and cold rolled conditions. In the work-hardened condition, Type 301 develops higher tensile strength than the other stable austenitic grades. Minimum properties for plate, sheet and strip per ASTM A240 and A666 follow.

MINIMUM ROOM TEMPERATURE MECHANICAL PROPERTIES, ASTM A240 AND A666 SPECIFICATIONS

Condition	Tensile Strength, Min.		0.2% Yield Strength, Min.		Elong. In 2" (50mm) %, Min.
	Ksi	(MPa)	Ksi	(Mpa)	
Annealed	75	(515)	30	(205)	40
1/4 Hard	125	(862)	75	(517)	25
1/2 Hard	150	(1,034)	110	(758)	18*
3/4 Hard	175	(1,207)	135	(931)	12*
Full Hard	185	(1,276)	140	(965)	9*

*Value shown for thickness greater than 0.015 in. (.038mm).