



Types 302 (S30200), 304(S30400), 304L (S30403), and 305 (S30500) stainless steels are variations of the 18 percent chromium – 8 percent nickel austenitic alloy, the most familiar and most frequently used alloy in the stainless steel family. Each alloy represents an excellent combination of corrosion resistance and fabricability. This combination of properties is the reason for the extensive use of these alloys which represent nearly one half of the total U.S. stainless steel production.

Specifications

ASTM: A167, A240, A276, A313, A314, A368, A473, A478, A479, A492, A493, A511, A554, A580, A666
 UNS: S30200
 AMS: 5515, 5516, 5788

Chemical Composition, %

Element	Percent by Weight Maximum Unless Range is Specified			
	302	304	304L	305
Carbon	0.15	0.08	0.03	0.12
Manganese	2	2	2	2
Phosphorus	0.045	0.045	0.045	0.045
Sulfur	0.03	0.03	0.03	0.03
Silicon	0.75	0.75	0.75	0.75
Chromium	17	18	18	17
	19	20	20	19
Nickel	8	8	8	10.5
	10	10.5	12	13
Aluminum	0.1	0.1	0.1	--

Resistance to Corrosion: Types 302, 304, 304L and 305 austenitic stainless steels provide useful resistance to corrosion on a wide range of moderately oxidizing to moderately reducing environments. The alloys are used widely in equipment and utensils for processing and handling of food, beverages and dairy products. Heat exchangers, piping, tanks and other process equipment in contact with fresh water also utilize these alloys. Building facades and other architectural and structural applications exposed to non-marine atmospheres also heavily utilize the 18-8 alloys. In addition a large variety of applications involve household and industrial chemicals.

Features

- Excellent corrosion resistance
- Ease of fabrication
- Good strength and toughness at cryogenic temperatures
- Excellent formability

Applications

- Food and beverage industry
- Pressure Containing Applications
- Sanitary or Cryogenic Applications

Physical Properties

Density: 0.29 lb/in³ (8.03 g/cm³)

Modulus of Elasticity in Tension: 29 x 10⁶ psi (200 GPa)

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 - 870	68-1600	19.8 x 10 ⁻⁶	11 x 10 ⁻⁶

Thermal Conductivity

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

Electrical Resistivity (Annealed Condition)

Temperature Range			
°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

Specific Heat

Temperature Range			
°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

Mechanical Properties

Minimum mechanical properties for annealed Types 302, 304, 304L, and 305 austenitic stainless steel plate, sheet and strip as required by ASTM specifications A 240 and ASME specification SA-240 are shown below.

Minimum Room Temperature Mechanical Properties, ASTM A240 and A666 Specifications

Property	302,304	304L	305
0.2% Offset Yield Strength, psi (MPa)	30,000 (205)	25,000 (170)	25,000 (170)
Ultimate Tensile Strength, psi (MPa)	75,000 (515)	70,000 (485)	70,000 (485)
Percent Elongation in 2 in. (51 mm)	40	40	40
Hardness, Max., Brinell (RB)	201 (92)	201 (92)	183 (88)