



## Technical Data

Ferguson Metals, Inc. ♦ Hamilton, Ohio

### Stainless Steels

### Chromium-Nickel

### Types 302 (S30200), 304 (S30400), 304L (S30403) 305 (S30500)

#### GENERAL PROPERTIES

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. These alloys may be considered for a wide variety of applications where one or more of the following properties are important: resistance to corrosion, prevention of product contamination, resistance to oxidation, ease of fabrication, excellent formability, beauty of appearance, ease of cleaning, high strength with low weight, good strength and toughness at cryogenic temperatures, ready availability of a wide range of product forms.

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. Type 304 represents the largest volume followed by Type 304L. Types 302 and 305 are used in smaller quantities. Types 304 and 304L are available in a wide range of product forms including sheet, strip, foil and plate. The alloys are covered by a variety of specifications and codes relating to, or regulating, construction or use of equipment manufactured from these alloys for specific conditions. Food and beverage, sanitary, cryogenic, and pressure-containing applications are examples.

#### CHEMICAL COMPOSITION

##### Chemistries per ASTM A240 and ASME SA-240:

Element	Percent by Weight			
	Maximum Unless Range is Specified			
	302	304	304L	305
Carbon	0.15	0.08	0.030	0.12
Manganese	2.00	2.00	2.00	2.00
Phosphorus	0.045	0.045	0.045	0.045
Sulfur	0.030	0.030	0.030	0.030
Silicon	0.75	0.75	0.75	0.75
Chromium	17.00	18.00	18.00	17.00
	19.00	20.00	20.00	19.00
Nickel	8.00	8.00	8.00	10.50
	10.00	10.50	12.00	13.00
Nitrogen	0.10	0.10	0.10	--

#### RESISTANCE TO GENERAL 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.

#### PHYSICAL PROPERTIES

**Density** 0.29 lb/in<sup>3</sup> (8.03 g/cm<sup>3</sup>)  
**Modulus of Elasticity in Tension** 29 x 10<sup>6</sup> psi (200 GPa)

#### LINEAR COEFFICIENT OF THERMAL EXPANSION

Temperature Range		Coefficients	
°C	°F	cm/cm/°C	in/in/°F
20-100	68-212	16.6x10 <sup>-6</sup>	9.2 x 10 <sup>-6</sup>
20-870	68-1600	19.8 x 10 <sup>-6</sup>	11.0 x 10 <sup>-6</sup>

#### THERMAL CONDUCTIVITY

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

The overall heat transfer coefficient of metals is determined by factors in addition to the thermal conductivity of the metal. The ability of the 18-8 stainless grades to maintain clean surfaces often allows better heat transfer than other metals having higher thermal conductivity.

#### 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

##### Room Temperature 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 MECHANICAL PROPERTIES REQUIRED BY, ASTM A 240 AND ASME SA-240

Property	302,304	304L	305
0.2% Offset Yield Strength,	psi	25,000	25,000
	MPa	170	170
Ultimate Tensile Strength,	psi	70,000	70,000
	MPa	485	485
Percent Elongation in 2 in. or 51 mm	40.0	40.0	40.0
Hardness, Max.,	201	201	183
	Brinell RB	92	92