



BROWN METALS COMPANY

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ALLOY TECHNICAL DATA SHEET

TYPE 321 STAINLESS STEEL

Titanium-Stabilized Austenitic Stainless · UNS S32100

GENERAL PROPERTIES

Type 321 is a stabilized stainless steel with excellent resistance to intergranular corrosion after exposure to the chromium carbide precipitation range of 800–1500 °F (427–816 °C). Titanium additions stabilize it against chromium carbide formation.

Type 321 continues to be used for prolonged service in the 800–1500 °F range, while 304L has replaced it for applications involving only welding or short-time heating. Its higher creep and stress-rupture properties than 304 and 304L allow higher elevated-temperature allowable stresses under the ASME Boiler and Pressure Vessel Code, with a maximum code use temperature of 1500 °F (816 °C) versus 800 °F (426 °C) for 304L.

CHEMICAL COMPOSITION

Percent by weight, maximum unless range is specified – ASTM A240 / ASME SA-240

Element	321
Carbon	0.08
Manganese	2.00
Phosphorus	0.045
Sulfur	0.030
Silicon	0.75
Chromium	17.00–19.00
Nickel	9.00–12.00
Titanium	5 × (C + N) min. to 0.70 max.
Nitrogen	0.10
Iron	Balance

MECHANICAL PROPERTIES

Minimum properties, annealed (2000 °F / 1093 °C, air cooled) – ASTM A240 / ASME SA-240

Condition	Tensile, ksi (MPa)	0.2% Yield, ksi (MPa)	Elong. in 2", %
Annealed	75 (515)	30 (205)	40

Maximum hardness Rockwell B95 for strip and sheet.

PHYSICAL PROPERTIES

Melting range	2550–2635 °F (1398–1446 °C)
Density	0.286 lb/in ³ (7.92 g/cm ³)
Specific gravity	7.92
Modulus of elasticity (tension)	28 × 10 ⁶ psi (193 GPa)
Specific heat, 32–212 °F	0.12 Btu/lb·°F (500 J/kg·K)

Values are typical or specification minimums as noted, provided for information only, and should not be used as design limits or as a guarantee of properties for any particular lot or application. Certified test reports are supplied with each order.

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THERMAL EXPANSION

°F	°C	in/in/°F	cm/cm/°C
68–212	20–100	9.2 × 10 ⁻⁶	16.6 × 10 ⁻⁶
68–1112	20–600	10.5 × 10 ⁻⁶	18.9 × 10 ⁻⁶
68–1832	20–1000	11.4 × 10 ⁻⁶	20.5 × 10 ⁻⁶

THERMAL CONDUCTIVITY

°F	°C	Btu/hr·ft·°F	W/m·K
68–212	20–100	9.4	16.3
68–932	20–500	12.3	21.4

Overall heat transfer depends on more than the conductivity of the metal. Because the austenitic stainless grades keep their surfaces clean, they often transfer heat better in service than metals with higher thermal conductivity.

ELECTRICAL RESISTIVITY

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

MAGNETIC PERMEABILITY

Generally non-magnetic in the annealed condition, with magnetic permeability typically less than 1.02 at 200 H.

CORROSION RESISTANCE

General corrosion resistance is similar to unstabilized Type 304. Long heating in the chromium carbide precipitation range may reduce general resistance in severely corrosive media.