



800-722-5029
www.nks.com

321 Stainless Steel

DESCRIPTION

Type 321 Stainless Steel is a stabilized austenitic stainless steel similar to Type 304 but with a titanium addition of at least five times the carbon content. This titanium addition reduces or prevents carbide precipitation during welding and in 800 – 1500°F service. It also improves the elevated temperature properties of the alloy. Type 321 provides excellent resistance to oxidation and corrosion and possesses good creep strength. It is used primarily in applications involving continuous and intermittent service temperatures within the carbide precipitation range of 800 – 1500°F.

PRODUCT FORMS

Sheet, Strip

SPECIFICATIONS

ASTM A240

TYPICAL APPLICATIONS

Annealing covers, high-temperature tempering equipment, diesel and heavy duty automotive exhaust systems, firewalls, stack liners, boiler casings, welded pressure vessels, jet aircraft components, radiant super heaters, bellows and oil refinery equipment

PROCESSING

Type 321 is non-hardenable by heat treatment. Annealing: Heat to 1750 – 2050°F, then water quench or air cool. Forming: Type 321 can be readily formed and drawn. Like most austenitic stainless steels, Type 321 work hardens and may require annealing after severe forming.

WELDING

This particular alloy is generally considered to have comparable weldability to Types 304 and 304L. A major difference is the titanium addition that reduces or prevents carbide precipitation during welding. When a filler is needed, either AWS E/ER 347 or E/ER 321 is most often specified.

CORROSION

Type 321 exhibits excellent resistance to organic chemicals, dyestuffs, and a wide range of inorganic chemicals. It resists nitric acid well and the sulfur acids moderately. Long-time exposure in the 900 -1500°F range may lower its general corrosion resistance, but the grade still shows improved resistance to intergranular corrosion compared to unstabilized grades.



800-722-5029
www.nks.com

321 Stainless Steel

CHEMICAL COMPOSITION: (ASTM A167, A240)

Element	Type 321
Carbon	0.08 max.
Manganese	2.00 max.
Sulfur	0.030 max.
Phosphorus	0.045 max.
Silicon	0.75 max.
Chromium	17.00 - 19.00
Nickel	9.00 - 12.00
Titanium	5x(C+N)min. - 0.70 max.
Nitrogen	0.10 max.

MECHANICAL PROPERTIES: (ASTM A167, A240)

Type	Yield Strength 0.2% offset (KSI)	Tensile Strength (KSI)	% Elongation (2" Gauge Length)
321	30 min.	75 min.	40 min.



800-722-5029
www.nks.com

321 Stainless Steel

PHYSICAL PROPERTIES

Density (lb./in ²) @ RT		0.29
Modulus of Elasticity in Tension (psi x 10 ⁶)		28.0
Specific Heat (BTU/o F/lb.)	32 to 212 oF	0.12
Thermal Conductivity (BTU/hr/ft ² /ft)	212 oF	9.3
	932 oF	12.8
Mean Coefficient of Thermal Expansion (in. x 10 ⁻⁶ per o F)	32 to 212 oF	9.2
	32 to 600 oF	9.5
	32 to 1,000 oF	10.3
	32 to 1,200 oF	10.7
Electrical Resistivity (micro ohms - cm)	at 70 oF	28.4
Melting Point Range (oF)		2500 - 2550