



Types 321 (S32100) and 347 (S34700) are stabilized stainless steels which offer as their main advantage an excellent resistance to intergranular corrosion following exposure to temperatures in the chromium carbide precipitation range from 800 to 1500°F (427 to 816°C). Type 321 is stabilized against chromium carbide formation by the addition of titanium. Type 347 is stabilized by the addition of columbium and tantalum. While types 321 and 347 continue to be employed for prolonged service in the 800 to 1500°F (427 to 816°C) temperature range, Type 304L has supplanted these stabilized grades for applications involving only welding or short time heating.

Specifications

AMS: 5510, 5557, 5559, 5570, 5576, 5645, 5689

ASTM: A167, A182, A182, A193, A194, A213, A240, A249, A269, A271, A276, A312, A314, A320, A336, A358, A376, A403, A409, A430, A473, A479, A511, A554, A580, A632, A774, A778, A813, A814

UNS: S32100

Chemical Composition, %

Element	Maximum Unless Range is Specified	
	321	347
Carbon	0.08	0.08
Manganese	2	2
Phosphorus	0.040 max	0.045
Sulfur	0.03	0.03
Silicon	1.0 max	0.75
Chromium	17.00-19.00	17.00-19.00
Nickel	9.00-12.00	9.00-13.00
Columbium+Tantalum	-	10xC min to 1.00 max
Titanium	5x(C+N) min to 0.70 max	-
Nitrogen	0.1	-
Iron	Balance	Balance

Resistance to Corrosion: Types 321 and 347 alloys offer similar resistance to general, overall corrosion as the unstabilized chromium nickel Type 304. Heating for long periods of time in the chromium carbide precipitation range may affect the general resistance of Types 321 and 347 in severe corrosive media.



Features

- Advantageous for high temperature service
- Higher creep and stress rupture properties than Type 304
- High resistance to corrosion

Applications

- Aircraft Exhaust Stacks
- Manifolds
- Chemical Processing Equipment
- Welded Equipment
- Jet Engine Parts
- Bellows
- Clamps
- Gaskets

Physical Properties

Grade	Density		Modulus of Elasticity in Tension	Melting Range
	g/cm ³	lb/in ³		
321	7.92	0.286	28 x 106 psi	1398-1446°C
			193 GPa	2550-2635°F
347	7.96	0.288	28 x 106 psi	1398-1446°C
			193 GPa	2550-2635°F

Linear Coefficient of Thermal Expansion

Temperature Range		Coefficients	
°C	°F	cm/cm/°C	in/in/°F
20-100	68-212	16.6 X 10 ⁻⁶	9.2 X 10 ⁻⁶
20-600	38-912	18.9 X 10 ⁻⁶	10.5 X 10 ⁻⁶
20-1000	38-1832	20.5 X 10 ⁻⁶	101.4 X 10 ⁻⁶

Thermal Conductivity

Temperature Range			
°C	°F	W/m·K	Btu-in/hr-ft ² -°F
20-100	68-212	16.3	112.5
20-500	68-932	21.4	147.7



**Magnetic Permeability
 (Annealed Condition)**

H/m Annealed 1.02 Max

**Electrical Resistivity
 (Annealed Condition)**

Temperature Range		
°C	°F	microhm-cm
20	68	72
100	213	78
200	392	86
400	752	100
600	1112	111
800	1472	121
900	1652	126

Mechanical Properties

**Typical Mechanical
 Properties of Sheets and
 Strip – Cold Flattened
 (Annealed)**

Property	Type 321	Type 347
Yield Strength, 0.2% Offset psi MPa	30,000 205	30,000 205
Ultimate Tensile Strength, psi MPa	75,000 515	75,000 515
Percent Elongation in 2 in. or 51 mm	40	40
Hardness, Max., Brinell (Plate) RB (Sheet & Strip)	217 95	201 92