



E STEEL SDN BHD (891338-A)

NO 3, Lorong Sungai Puloh 7/KU 6,
Kawasan Perindustrian Sungai Puloh, 42100 Selangor D.E
Tel : 03-3292 8686 / 32928666 / 32928777
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Stainless Steel - Grade SUS321, UNS S32100, 1.4541

Chemical Formula

Fe, <0.08% C, 17-19% Cr, 9-12% Ni, <2% Mn, <1% Si, 0.3-0.7% Ti, <0.045% P, <0.03% S

Background

SUS321 and SUS347 are the basic austenitic 18/8 steel (SUS 304) stabilised by Titanium (SUS321) or Niobium (SUS347) additions. These grades are used because they are not sensitive to intergranular corrosion after heating within the carbide precipitation range of 425-850°C. Grade 321 is the grade of choice for applications in the temperature range of up to about 900°C, combining high strength, resistance to scaling and phase stability with resistance to subsequent aqueous corrosion.

SUS321H is a modification of SUS321 with a higher carbon content, to provide improved high temperature strength.

A limitation with SUS321 is that titanium does not transfer well across a high temperature arc, so is not recommended as a welding consumable. In this case grade SUS347 is preferred - the niobium performs the same carbide stabilisation task but can be transferred across a welding arc. SUS 347 is therefore the standard consumable for welding SUS 321. Grade 347 is only occasionally used as parent plate material.

Like other austenitic grades, SS321 and SS347 have excellent forming and welding characteristics, are readily brake or roll formed and have outstanding welding characteristics. Post-weld annealing is not required. They also have excellent toughness, even down to cryogenic temperatures. SUS321 does not polish well, so is not recommended for decorative applications.

Grade SUS304L is more readily available in most product forms, and so is generally used in preference to SUS321 if the requirement is simply for resistance to intergranular corrosion after welding. However SUS304L has lower hot strength than SUS321 and so is not the best choice if the requirement is resistance to an operating environment over about 500°C.



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Composition

Grade		C	Mn	Si	P	S	Cr	Mo	Ni	N	Other
SUS321	min.	-	2.00	0.75	0.045	0.030	17.0	-	9.0	0.10	Ti=5(C+N) 0.70
	max	0.08					19.0		12.0		
SUS321H	min.	0.04	2.00	0.75	0.045	0.030	17.0	-	9.0	-	Ti=4(C+N) 0.70
	max	0.10					19.0		12.0		
SUS347	min.	0.08	2.00	0.75	0.045	0.030	17.0	-	9.0	-	Nb=10(C+N) 1.0
	max						19.0		13.0		

Mechanical Properties

Grade	Tensile Strength (MPa) min	Yield Strength 0.2% Proof (MPa) min	Elongation (%) in 50mm) min	Hardness	
				Rockwell B (HR B) max	Brinell (HB) max
SUS 321	515	205	40	95	217
SUS 321H	515	205	40	95	217
SUS 347	515	205	40	92	201

SUS 321H also has a requirement for a grain size of ASTM No 7 or coarser.

Physical Properties

Grade	Density (kg/m ³)	Elastic Modulus (GPa)	Mean Coefficient of Thermal Expansion (µm/m/°C)			Thermal Conductivity (W/m.K)		Specific Heat 0-100°C (J/kg.K)	Electrical Resistivity (nΩ.m)
			0-100°C	0-315°C	0-538°C	at 100°C	at 500°C		
SUS321	8027	193	16.6	17.2	18.6	16.1	22.2	500	720

Grade Specification Comparison

Grade	UNS No	Old British		Euronorm No	Euronorm Name	Swedish SS	Japanese JIS
		BS	En				
SS 321	S32100	321S31	58B, 58C	1.4541	X6CrNiTi18-10	2337	SUS 321
SS 321H	S32109	321S51	-	1.4878	X10CrNiTi18-10	-	SUS 321H
SS 347	S34700	347S31	58G	1.4550	X6CrNiNb18-10	2338	SUS 347

These comparisons are approximate only. The list is intended as a comparison of functionally similar materials **not** as a schedule of contractual equivalents. If exact equivalents are needed original specifications must be consulted.



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Corrosion Resistance

Equivalent to Grade SUS304 in the annealed condition, and superior if a weldment in these grades has not been post-weld annealed or if the application involves service in the 425-900°C range. Subject to pitting and crevice corrosion in warm chloride environments, and to stress corrosion cracking above about 60°C. Considered resistant to potable water with up to about 200mg/L chlorides at ambient temperatures, reducing to about 150mg/L at 60°C.

Heat Resistance

Good oxidation resistance in intermittent service to 900°C and in continuous service to 925°C. These grades perform well in the 425-900°C range, and particularly where subsequent aqueous corrosive conditions are present. SUS321H has higher hot strength, and is particularly suitable for high temperature structural applications.

Heat Treatment

Solution Treatment (Annealing) - heat to 950-1120°C and cool rapidly for maximum corrosion resistance.

Stabilising - heat to 870-900°C for 1 hour per 25mm of thickness and air cool. Stabilisation is recommended for most severe service conditions (above 425°C) and particularly for material annealed at the upper side of the annealing temperature range.

Stress Relief - Heat to 700°C for 1 to 2 hours and air cool.

These grades cannot be hardened by thermal treatment.

Welding

Excellent weldability by all standard fusion methods, both with and without filler metals. AS 1554.6 pre-qualifies welding of SS321 and SS347 with Grade SS347 rods or electrodes; high silicon version of SS347 is also pre-qualified for welding of SS321.