



# E STEEL SDN BHD (891338-A)

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Stainless Steel - Grade 310, SUS310, SUS310S, UNS S31008, 1.4840, 104845

## Chemical Formula

Fe, <0.25% C, 24-26% Cr, 19-22% Ni, <2% Mn, <1.5% Si, <0.45% P, <0.3% S

## Background

SUS310, combining excellent high temperature properties with good ductility and weldability, is designed for high temperature service. It resists oxidation in continuous service at temperatures up to 1150°C provided reducing sulphur gases are not present. It is also used for intermittent service at temperatures up to 1040°C.

SUS310S (UNS S31008) is used when the application environment involves moist corrodents in a temperature range lower than that which is normally considered "high temperature" service. The lower carbon content of 310S does reduce its high temperature strength compared to SUS310.

Like other austenitic grades these have excellent toughness, even down to cryogenic temperatures, although other grades are normally used in this environment.

## Chemical Composition of Grade 310/310S Stainless Steel

Grade		C	Mn	Si	P	S	Cr	Mo	Ni	N
SS310	min.	-	-	-	-	-	24.0	-	19.0	-
	max.	0.25	2.00	1.50	0.045	0.030	26.0	-	22.0	-
SS310S	min.	-	-	-	-	-	24.0	-	19.0	-
	max.	0.08	2.00	1.50	0.045	0.030	26.0	-	22.0	-

## Mechanical Properties Typical mechanical properties for SUS310 stainless steels

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
SS 310	515	205	40	95	217
SS 310S	515	205	40	95	217

## Comparison Approximate grade for 310 stainless steels.

Grade	UNS No	Old British			Euronorm No	Swedish SS	Japanese JIS
		BS	En	Name			
SS310	S31000	310S24	-	1.4840	X15CrNi25-20	-	SUH 310
SS310S	S31008	310S16	-	1.4845	X8CrNi25-21	2361	SUS 310S

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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Alternative grades to grade 310 stainless steels are given .

Grade	Why it might be chosen instead of SS310
3CR12	Heat resistance is needed, but only to about 600°C.
SS304H	Heat resistance is needed, but only to about 800°C.
SS321	Heat resistance is needed, but only to about 900°C. Subsequent aqueous corrosion resistance also required.
253MA (2111HTR)	A slightly higher temperature resistance is needed than can be provided by 310. Better resistance to reducing sulphide atmosphere needed. Higher immunity from sigma phase embrittlement is required.

**Corrosion Resistance** The high chromium content - intended to increase high temperature properties - also gives these grades good aqueous corrosion resistance. The PRE is approximately 25, and seawater resistance about 22°C, similar to that of SS316. Excellent resistance at normal temperatures, and when in high temperature service exhibits good resistance to oxidising and carburising atmospheres. Resists fuming nitric acid at room temperature and fused nitrates up to 425°C.

Subject to stress corrosion cracking but more resistant than Grades SS304 or SS316.

### Heat Resistance

Good resistance to oxidation in intermittent service in air at temperatures up to 1040°C and 1150°C in continuous service. Good resistance to thermal fatigue and cyclic heating. Widely used where sulphur dioxide gas is encountered at elevated temperatures. Continuous use in 425-860°C range not recommended due to carbide precipitation, if subsequent aqueous corrosion resistance is needed, but often performs well in temperatures fluctuating above and below this range.

SUS310 is generally used at temperatures starting from about 800 or 900°C - above the temperatures at which SS304H and SS321 are effective.

**Heat Treatment** Solution Treatment (Annealing) - heat to 1040-1150°C and cool rapidly for maximum corrosion resistance. This treatment is also recommended to restore ductility after each 1000 hours of service above 650°C, due to long term precipitation of brittle sigma phase.

These grades cannot be hardened by thermal treatment.

Applications include:

- Furnace parts
- Oil burner parts
- Carburising boxes
- Heat Treatment baskets and jigs
- Heat Exchangers
- Welding filler wire and electrodes