



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 316, SUS316, UNS S31600

Chemical Formula

Fe, <0.03% C, 16-18.5% Cr, 10-14% Ni, 2-3% Mo, <2% Mn, <1% Si, <0.045% P, <0.03% S

Background

SUS316 is the standard molybdenum-bearing grade, second in importance to SUS304 amongst the austenitic stainless steels. The molybdenum gives 316 better overall corrosion resistant properties than SUS304, particularly higher resistance to pitting and crevice corrosion in chloride environments. It has excellent forming and welding characteristics. It is readily brake or roll formed into a variety of parts for applications in the industrial, architectural, and transportation fields. SUS316 also has outstanding welding characteristics. Post-weld annealing is not required when welding thin sections.

SUS316L, the low carbon version of SUS316 and is immune from sensitisation (grain boundary carbide precipitation). Thus it is extensively used in heavy gauge welded components (over about 6mm). SUS316H, with its higher carbon content has application at elevated temperatures, as does stabilised grade SUS316Ti.

Composition

Grade		C	Mn	Si	P	S	Cr	Mo	Ni	N
SS316	Min	-	-	-	0	-	16.0	2.00	10.0	-
	Max	0.08	2.0	0.75	0.045	0.03	18.0	3.00	14.0	0.10
SS316L	Min	-	-	-	-	-	16.0	2.00	10.0	-
	Max	0.03	2.0	0.75	0.045	0.03	18.0	3.00	14.0	0.10
SS316H	Min	0.04	0.04	0	-	-	16.0	2.00	10.0	-
	max	0.10	0.10	0.75	0.045	0.03	18.0	3.00	14.0	-

Mechanical Properties

Grade	Tensile Str (MPa) min	Yield Str 0.2% Proof (MPa) min	Elong (% in 50mm) min	Hardness	
				Rockwell B (HR B) max	Brinell (HB) max
SS 316	515	205	40	95	217
SS 316L	485	170	40	95	217
SS 316H	515	205	40	95	217

Corrosion Resistance

Excellent in a range of atmospheric environments and many corrosive media - generally more resistant than SUS304. 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 1000mg/L chlorides at ambient temperatures, reducing to about 500mg/L at 60°C.

SUS316 is usually regarded as the standard "marine grade stainless steel", but it is not resistant to warm sea water. In many marine environments SUS316 does exhibit surface corrosion, usually visible as brown staining. This is particularly associated with crevices and rough surface finish.



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Heat Resistance of SUS316

Good oxidation resistance in intermittent service to 870°C and in continuous service to 925°C. Continuous use of SS316 in the 425-860°C range is not recommended if subsequent aqueous corrosion resistance is important. Grade SS316L is more resistant to carbide precipitation and can be used in the above temperature range. Grade SS316H has higher strength at elevated temperatures and is sometimes used for structural and pressure-containing applications at temperatures above about 500°C.

Heat Treatment

Solution Treatment (Annealing) - Heat to 1010-1120°C and cool rapidly. These grades cannot be hardened by thermal treatment.

Dual Certification

It is common for SS316 and SS316L to be stocked in "Dual Certified" form - mainly in plate and pipe. These items have chemical and mechanical properties complying with both SS316 and SS316L specifications. Such dual certified product does not meet SS316H specification and may be unacceptable for high temperature applications.

Applications

- Food preparation equipment particularly in chloride environments.
- Laboratory benches & equipment.
- Coastal architectural panelling, railings & trim.
- Boat fittings.
- Chemical containers, including for transport.
- Heat Exchangers.
- Woven or welded screens for mining, quarrying & water filtration.
- Threaded fasteners.
- Springs.