

## STAINLESS STEEL PLATE, SHEET & COIL 310/310S Technical Data

### Summary

310 is a highly alloyed austenitic stainless steel used for high-temperature applications. The high chromium and nickel contents give the steel excellent oxidation resistance as well as high strength at high temperatures. This grade is also very ductile, and has good weldability enabling its widespread usage in many applications.

310S is the low carbon version of 310 and is suggested for applications where sensitisation, and subsequent corrosion by high temperature gases or condensates during shutdown may pose a problem.

310 is manufactured in accordance with ASTM A 167 and 310S to ASTM A 240.

### Typical Applications

310/310S find wide application in all high-temperature environments where scaling and corrosion resistance, as well as high temperature strength and good creep resistance, are required.

### Chemical Composition

	C	Mn	P	S	Si	Cr	Ni
310	0.25 max	2.0 max	0.045 max	0.030 max	1.5 max	24.0 - 26.0	19.0 - 22.0
310S	0.08 max	2.0 max	0.045 max	0.030 max	1.5 max	24.0 - 26.0	19.0 - 22.0

### Typical Properties in the Annealed Condition

The properties quoted in this publication are typical of mill production and unless indicated should not be regarded as guaranteed minimum values for specification purposes.

## 1. Mechanical Properties at Room Temperature

	310		310S	
	Typical	Minimum	Typical	Minimum
Tensile Strength, MPa	625	515	575	515
Yield Stress (0.2 % offset), MPa	350	205	290	205
Elongation (Percent in 50mm)	50	40	50	40
Hardness (Brinell)	172	-	156	-
Endurance (fatigue) limit, MPa	260	-	260	-

## 2. Properties at Elevated Temperatures

The values quoted are those for 310.

Enquire for data on 310S .

### Short Time Elevated Temperature Tensile Strength

Temperature, °C	550	650	750	850	950	1050
Tensile Strength, MPa	550	430	280	180	90	50

### Creep data

Stress to develop a creep rate of 1% in the indicated time at the indicated temperature.

Time	Temperature °C	550	600	650	700	750	800
10 000 h	Stress MPa	110	90	70	40	30	15
100 000 h	Stress MPa	90	75	50	30	20	10

## Creep Rupture Stress

Time	Temperature °C	600	700	800	900	1000
1 000 h	Stress MPa	190	110	50	35	15
10 000 h	Stress MPa	170	70	35	20	10
100 000 h	Stress MPa	110	55	25	10	2

## Recommended Maximum Service Temperature (Oxidising Conditions)

Continuous            1150°C  
Intermittent            1035°C

## Thermal Processing

1. Annealing. Heat from 1050 to 1150°C and water quench. This treatment ensures that all carbides are in solution.
2. Hot working  
    Initial forging and pressing:- 1150 - 1200°C  
    Finishing temperature:- above 950°C

*Note: Soaking times to ensure uniformity of temperature are up to 12 times that required for the same thickness of mild steel.*