

## F316 Austenitic Stainless Steel

### Related Specifications

ASTM A182 F316

ASTM A276 316

UNS S31600

W.Nr. 1.4401

BS EN 10088-3 1.4401

F316 is an Austenitic Cr-Ni stainless steel second only to F304 in commercial importance. F316 contains an addition of Molybdenum that gives improved corrosion resistance, particularly pitting and crevice corrosion in Chloride environments.

The Material is always supplied in the Solution Annealed condition.

Initially developed for use in paper mills, F316 is now typically used in many industries including Food processing, Brewing, Marine, Automotive, Aerospace, Mining, Medical, Oil and Gas, in fact in all applications where enhanced corrosion resistance is required.

### Typical Chemical composition

Carbon	0.08% Max
Silicon	1.00% Max
Manganese	2.00% Max
Phosphorous	0.045
Sulphur	0.030
Chromium	16.0 - 18.0
Nickel	10.0 - 14.0
Molybdenum	2.00-3.00

### Mechanical Property Requirements - Solution Annealed condition

Yield	Tensile Strength	Elongation	Hardness
205 Mpa Min	515 Mpa Min	30% Min	215 HB Max

### Forging

This alloy can be readily forged at temperatures 1000 - 1200Deg.C

Hot working below 927Deg.C should be avoided.

The low carbon content of these alloys ensures no heavy scale but excessive soak times should still be avoided to avoid enlarged grain size, suggest 15minutes per inch (25mm) of maximum ruling section

### Heat Treatment

This alloy is not hardenable by heat treatment and is therefore supplied in the Annealed condition.

Anneal 1040Deg.C minimum, ensuring that sufficient time is allowed for the centre to achieve furnace temperature and hold for a time commensurate with the ruling section, followed by rapid cooling in Water.

### Machining

F316 is readily machinable in the annealed condition by milling, drilling, turning, etc as required.

Cutting edges should be kept sharp and cuts should be kept light but deep enough to avoid work hardening.

Coolants and lubricants should be used in large quantity.

### Corrosion Resistance

F316 has excellent corrosion resistance when exposed to a range of corrosive environments. It is usually regarded as Marine grade stainless, however it is not resistant to warm sea water. Warm Chloride environments can cause pitting and crevice corrosion. F316 will also suffer from stress corrosion cracking above 60Deg.C

### Oxidation Resistance

This alloy has good resistance to oxidation in intermittent service upto 870Deg.C and in continuous service upto 925Deg.C. However continuous use between 425 - 860Deg.C is not recommended if corrosion resistance in water is required. In this instance the lower carbon variant F316L is recommended due to its resistance to carbide precipitation.

When high strength at temperatures above 500Deg.C is required, grade F316H is recommended.

### Welding

Austenitic stainless steels are generally considered to be weldable by the common fusion and resistance techniques but special consideration is required to avoid hot cracking of the weld metal.