

## UNS N07718 – Alloy 718

### Related Specifications

API 6A 718

ASTM B637 UNS N07718

Alloy 718 is a high strength, corrosion resistant nickel chromium alloy designed to combine excellent strength with good fabrication characteristics. Its welding characteristics, especially its resistance to post-weld cracking, are outstanding.

This material is generally supplied in the solution treated and precipitation hardened condition giving yield strengths in excess of 120 KSI (827Mpa).

Typical applications include both aircraft turbine engines and land-based turbines as well as liquid rocket components involving cryogenic temperatures.

The alloy is also used in various applications for oil/gas well down-hole and well head components. It is also used for fasteners and instrumentation parts.

### Typical Chemical composition (Values are maximums unless otherwise stated)

Ni	50.0 - 55.0	Si	0.35
Cr	17.0 - 21.0	P	0.015
Fe	Balance	S	0.015
Nb + Ta	4.75 - 5.50	B	0.006
Mo	2.80 - 3.30	Cu	0.30
Ti	0.65 - 1.15	Pb	10 ppm
Al	0.20 - 0.80	Se	5 ppm
C	0.08	Bi	0.5 ppm
Co	1.0	Ca	30 ppm
Mn	0.35	Mg	60 ppm

### Mechanical Property Requirements – Solution Annealed & Precipitation Hardened Condition

Yield	Tensile Strength	Elongation	Charpy Impact @ -60°C J	Hardness
>827Mpa (120KSI)	>1034Mpa (150KSI)	20%	47 Av / 41 Sin	298-363 HBW

### Forging

Forging temperature for this material should be 950 - 1120oC  
Reheat as often as necessary and cool in still air.

### Heat Treatment

**Solution Treat** - Heat to 1021 - 1052oC. Cooling in air, oil or water to ambient temperature.

**Precipitation Harden** - 774 - 802°C. Air cool

### Machining

Alloy 718 is readily machined in both the solution treated and fully precipitation hardened conditions.

### Welding

Alloy 718 is readily welded using various methods. Alloy 718 can be welded without hardening during the heating and cooling cycles, and the aged alloy can be repair welded several times without cracking.