Inconel 718

Inconel 718 is a precipitation-hardenable nickel-chromium-iron alloy containing significant amounts of niobium and molybdenum as well as lesser amounts of aluminium and titanium. The alloy has good ductility in the annealed condition and high strength up to 700℃. It can be delivered in the solution-annealed or precipitation-hardened condition.

Inconel 718 is characterized by:

- good fabrication characteristics in the annealed condition
- good tensile, fatigue and creep-rupture strengths
- high-temperature strength up to 700℃
- good oxidation resistance up to 1000℃
- excellent mechanical properties in cryogenic environments
- excellent corrosion resistance at high and low temperatures and good resistance to stress-corrosion cracking and pitting corrosion
- good weldability by arc and resistance welding processes without susceptibility to post-weld cracking

Chemical Composition, %

element	Cr	Ni	Fe	Nb	Mo	Co	Cu	Al	Ti	B	Mg	C	Mn	Si	P	S
min.	17.0	50.0	bal.	4.75	2.80			0.20	0.65							
max.	21.0	55.0		5.50	3.30	1.0	0.30	0.80	1.15	0.006	0.01	0.08	0.35	0.35	0.015	0.015

Chemical Composition according to ASTM. Some compositional limits of other specifications may vary slightly.

Designation and standards

National Standards	Material designation	Chemical composition	Forgings	Rod and bar	Plate and sheet	Strip	Wire	Seamless tube
ASTM ASME SAE API NACE	UNS N07718	B637 SB637 API 6A 718 MR 0175	B637 SB637 AMS5662 AMS5663 AMS5664	B637 SB637 AMS5662 AMS5663 AMS5664	B670 SB670 AMS5596 AMS5597	B670 SB670 AMS5596 AMS5597		AMS5589 AMS5590
DIN	2.4668 NiCr19Fe19Nb5Mo3	DIN 17744		DIN 17752	DIN 17750	DIN 17750	DIN 17753	DIN 17751
GB/T	GH4169, GH169	GB/T 14992	GB/T 30556 GJB 713	GB/T 14994 GB/T 30556 GJB 712A				

Density 8.20g/cm^3

Corrosion resistance

- excellent resistance to uniform and localized corrosion, such as pitting in many media at both high and low temperatures.
- excellent resistance to chloride-ion stress-corrosion cracking in oil and sour gas (H_2S containing) environments as well as seawater

Applications

Typical applications are:

- turbine disk material in aircraft jet engines due to the high-temperature strength up to 700℃
- highly stressed rotating and static components in gas turbines and rocket engines
- high-strength bolting, springs and fasteners in nuclear reactors and space vehicles
- pump shafts and other highly stressed well head and downhole components in offshore and marine engineering
- drilling equipment in sour oil and gas wells (containing H_2S, CO_2 and chlorides)

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