

Inconel® 718 Nickel Alloy - AMS 5662 - UNS N07718

Nickel Alloy 718, frequently called Inconel® 718, is a precipitation hardenable corrosion and heat-resistant nickel alloy available in bars, forgings, sheets and plates. AMS 5662 and AMS 5663 limit sizes 10" and less between parallel sides with maximum cross-section area of 78 in² for bars and finished forgings. It is a multiple melted alloy including VIM and/or VAR processes.

The alloy has high strength and creep rupture properties up from cryogenic temperatures to 1300° F, along with corrosion resistance and weldability with resistance to cracking. Nickel Alloy 718 has good resistance to oxidation and corrosion at temperatures and atmospheres in jet engine and gas turbine operations. It is also corrosion resistant to acids, sea water and sour oil and/or gas.

Chemical Composition:

Symbol	Element	Min %	Max %
C	Carbon	-	0.08%
Mn	Manganese	-	0.35%
Si	Silicon	-	0.35%
P	Phosphorus	-	0.015%
S	Sulfur	-	0.015%
Cr	Chromium	17.00%	21.00%
Ni	Nickel	50.00%	55.00%
Mo	Molybdenum	2.80%	3.30%
Cb (Nb)	Columbium (Niobium)	4.75%	5.50%
Ti	Titanium	0.65%	1.15%
Al	Aluminum	0.20%	0.80%
Co	Cobalt	-	1.00%
B	Boron	-	0.006%
Cu	Copper	-	0.30%
Pb	Lead	-	0.0005% (5 ppm)
Bi	Bismuth	-	0.00003% (0.3 ppm)
Fe	Iron	remainder	-

Minimum Tensile Properties at Room Temperature:

Sample Orientation per Diameter or Least Distance between Parallel Sides	Tensile Strength	Yield Strength 0.2% Offset	Elongation in 4D	Reduction of Area
Longitudinal Size 10" and under	185 ksi	150 ksi	12%	15%
Long Transverse Forgings 5" and under	180 ksi	150 ksi	10%	12%
Long Transverse Forgings Over 5" & ≤ 10"	180 ksi	145 ksi	10%	12%
Transverse Bars 5" and under	180 ksi	150 ksi	6%	8%
Transverse Bars Over 5" & ≤ 10"	180 ksi	145 ksi	6%	8%

* Precipitation Heat Treated per AMS 5662 Paragraph 3.5.1.2

Tensile Properties at 1200°F:

Sample Orientation per Diameter or Least Distance between Parallel Sides	Tensile Strength	Yield Strength 0.2% Offset	Elongation in 4D	Reduction of Area
Longitudinal Size 5" and under	145 ksi	125 ksi	12%	15%
Longitudinal Size over 5" and ≤ 10"	145 ksi	122 ksi	12%	15%
Long Transverse Forgings 5" and under	140 ksi	125 ksi	10%	12%
Long Transverse Forgings Over 5" & ≤ 10"	140 ksi	122 ksi	10%	12%
Transverse Bars 5" and under	140 ksi	125 ksi	6%	8%
Transverse Bars Over 5" & ≤ 10"	140 ksi	122 ksi	6%	8%

* Precipitation Heat Treated per AMS 5662 Paragraph 3.5.1.2

* Samples at 1200° F per AMS 5662 Paragraph 3.5.1.2.1.2

Inconel®718 Nickel Applications:

Nickel Alloy 718 aerospace applications are jet engines, rocket motors, spacecraft, and fasteners. It is also used in oil and gas applications such as logging tools, pump shafts, fishing tools, and wellhead components.

Common Trade Names:

Nickel 718
Inconel® 718

Alloy 718
ATI 718
ATI 718Plus®
Pyrowear® 718
Nicrofer 5219 Nb
DIN 2.4668
W-Nr 2.4668 (Werkstoff Number)

Common Specifications:

AMS 5662 Bars, Forgings, Rings
AMS 5663 Bars, Forgings, Rings
AMS 5664
AMS 5596 Sheet, Plate, Strip
AMS 5597 Sheet, Plate, Strip
AMS 5441 718Plus® ATI
ASTM B637
ASME SB-637
UNS N07718
B50T69
B50TF15
C50TF13
DMD 424.22
EMS 55446
EMS 55476
EMS 52503
NACE MR0175 (Oil & Gas)
API 6A718 (Oil & Gas)
ISO 9723

Fabrication

Forging: 2050°F max for hot-working. Hot-cold working from 1700/1850°F
Machinability: Can be machined in either annealed or age-hardened condition
Welding: Weldable in either the annealed or age-hardened condition

Heat Treatment

Solution Treatment : 1700°- 1850° then air cool
Precipitation Hardening : 1325° F for 8 hours, furnace cool to 1150° F

