Inconel 718

Nickel superalloy, Alloy 718 (2.4668)

Printer **One Click Metal MPRINTpro**

Layer height **40 µm · 90 µm**

OVERVIEW

Inconel 718 is a high-strength, corrosion-resistant nickel superalloy. Its high chromium and molybdenum content gives excellent corrosion and oxidation resistance, retained even at high temperatures.

As a precipitation-hardenable alloy, it can be heat treated to tailor its properties, with yield strength above 1,200 MPa after full heat treatment.

KEY BENEFITS

- High strength at elevated temperature
- Excellent creep-rupture strength
- Corrosion and oxidation resistant
- Heat treatable for much higher strength

MECHANICAL PROPERTIES

Property	Test method	40 µm as built	90 µm as built	Heat treated ‡
Yield strength ($R_{p0.2}$)	ISO 6892-1	588 MPa 85.3 ksi · ± 17	609 MPa 88.3 ksi · ± 11	1,283 MPa 186.1 ksi · ± 27
Tensile strength (R_m)	ISO 6892-1	952 MPa 138.1 ksi · ± 3	980 MPa 142.1 ksi · ± 6	1,408 MPa 204.2 ksi · ± 31
Elongation at break (A)	ISO 6892-1	37% ± 1%	35% ± 4%	9% ± 2%
Young's modulus	ISO 6892-1	*Not reported*	197 GPa 28.6 Msi · ± 11	215 GPa 31.2 Msi · ± 14

Averages, with standard deviation (±). Typical values, not guaranteed minimums. Design with margin.

‡ Solution annealed and two-step precipitation hardened, per AMS 2774. OCM does not state the layer height of the heat-treated specimens.

PHYSICAL PROPERTIES & SURFACE FINISH

Property · surface measured along Z axis	40 µm	90 µm
Relative density	≥ 99.9%	≥ 99.7%
Average defect (porosity)	< 0.1%	< 0.3%
Surface roughness R_a, as built	3 µm 118 µin	12 µm 472 µin
Surface roughness R_z, as built	15 µm 591 µin	64 µm 2,520 µin
Surface roughness R_a, blasted	2 µm 79 µin	6 µm 236 µin
Surface roughness R_z, blasted	12 µm 472 µin	27 µm 1,063 µin

Heat treatment: Inconel 718 reaches its full strength after a two-stage heat treatment: solution annealing to relieve build stresses, followed by two-step precipitation hardening (aging), carried out under vacuum or high-purity argon per AMS 2774.

GENERAL POWDER PROPERTIES

Nominal particle size	Powder bulk density	Flowability
15–45 µm	**4.25 g/cm³**	**3 s/50 g**
D10 / D50 / D90: 23 / 32 / 43 µm	ø 5.0 mm, static	ø 5.0 mm, static

DIMENSIONAL TOLERANCES

Direction	First inch (25 mm)	Each additional inch (25 mm)
XY (horizontal)	± 0.003–0.005 in ± 0.08–0.13 mm	+ 0.002 in + 0.05 mm
Z (vertical)	± 0.010 in ± 0.25 mm	+ 0.002 in + 0.05 mm

Typical IA3D tolerances; results depend on part size and geometry. For tighter fits, **talk to an engineer**.

POWDER CHEMICAL COMPOSITION

Element	Min. (wt.%)	Max. (wt.%)
Ni	50.0	55.0
Cr	17.0	21.0
Fe	Balance	
Nb	4.7	5.5

Element	Min. (wt.%)	Max. (wt.%)
Mo	2.8	3.3
Ti	0.6	1.25
Al	0.3	0.7
Co	—	1.0

Element	Min. (wt.%)	Max. (wt.%)
Si	—	0.35
Mn	—	0.35
C	—	0.08

TYPICAL APPLICATIONS

- Firearm suppressors and suppressor components
- Defense and firearm components
- Aerospace engine and exhaust hardware
- Energy and turbine components
- High-temperature automotive parts
- Tooling for casting and hot work

GOOD TO KNOW

- **Operating temperature:** Operating range from cryogenic temperatures to 700 °C (1,290 °F), with excellent oxidation resistance up to 1,000 °C (1,830 °F).
- **Surface:** as-built and blasted roughness is shown on page 1.

TEST CONDITIONS & SOURCE

Source: One Click Metal Material Data Sheet, Nickel Alloy 2.4668 / NI718, all layer heights (2026); operating temperatures from OCM's 2023.06 sheet. Mechanical values are One Click Metal averages from tensile testing to ISO 6892-1, as built and after heat treatment, using OCM's standard parameter sets for each layer height on the **One Click Metal MPRINTpro**. Surface roughness was measured along the Z axis.

Disclaimer: Material properties are provided as a general reference to help with material selection. Actual part properties depend on geometry, orientation, wall thickness, build position, heat treatment, post-processing and service conditions, and may differ from the values shown. This sheet does not guarantee specific properties or suitability for a particular application. Validate critical parts under real operating conditions.

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