

Material description

IN718 is an iron-nickel base superalloy Ni₃Nb as the hardening precipitate. This a high strength alloy with great resistance to corrosion, thanks to chromium, and exceptional performance at high temperature. These attributes make it possible for it to be used in compressor stage of jet engines, exhaust systems, oil and gas valves and other extreme conditions.

Physical properties¹

Density (based on 8.19 g/cm ³ theoretical density)	> 99.75%
Pore size	< 100 μm
Porosity rate	< 0.25%
Hardness	min. 80 HV10

Mechanical properties

	As Built	Stress Relieved ²
Tensile strength Horizontal (XY) Vertical (Z)	950 MPa ± 40 MPa 950 MPa ± 40 MPa	1400 MPa ± 100 MPa 1400 MPa ± 100 MPa
Proof strength (Rp 0.2%) Horizontal (XY) Vertical (Z)	640 MPa ± 50 MPa 640 MPa ± 50 MPa	1150 MPa ± 100 MPa 1150 MPa ± 100 MPa
Modulus of elasticity Horizontal (XY) Vertical (Z)	150 ± 20 GPa 150 ± 20 GPa	170 ± 20 GPa 170 ± 20 GPa
Elongation at break Horizontal (XY) Vertical (Z)	4.5 ± 2.1% 4.5 ± 2.1%	15 ± 3% 11.6 ± 6.5%

¹ All data gathered using ASTM E8M flat un-machined specimens that were wire EDM to profile with cross section of 2mmx6mm at the gauge section.

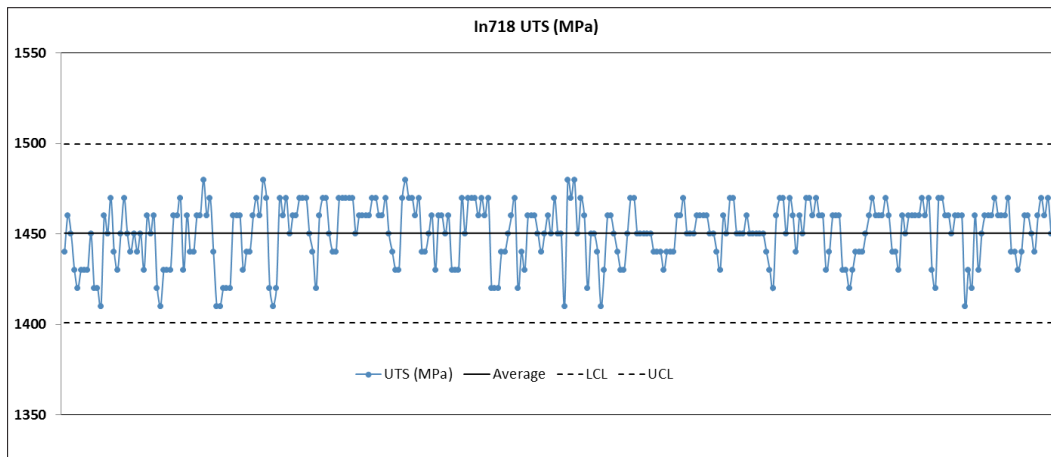
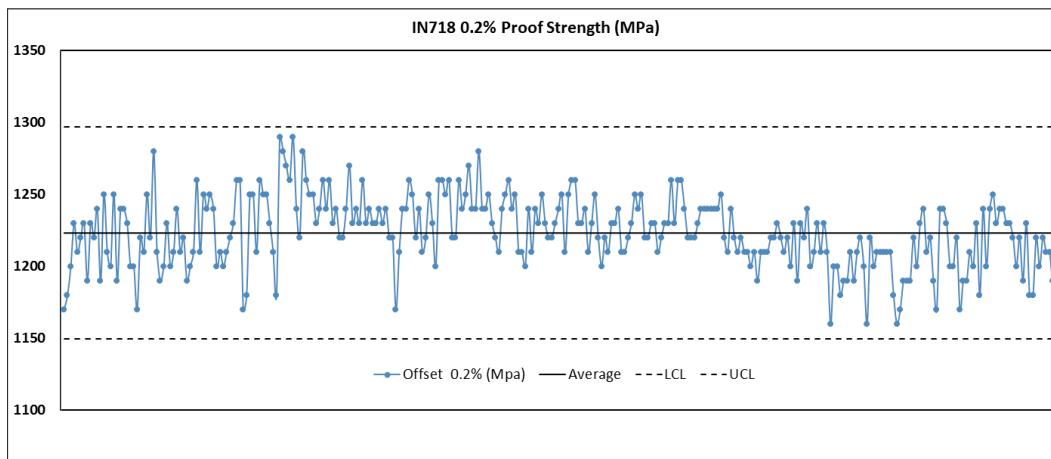
² AMS5662 heat treatment in vacuum furnace as follows: 980°C for 1 hour, quench in Argon. Ramp to 718°C and dwell for 8 hours, furnace cool to 620°C, dwell at 620°C for 8 hours, argon cool. Please contact us for bespoke heat treatment to achieve different mechanical properties. Please contact us for bespoke heat treatment to achieve different mechanical properties.

Nickel IN718

Chemical properties

Material composition wt%	Ni	50.00-55.00	Al	0.20-0.80	C	0.08 max
	Cr	17.00-21.00	Fe	Balance	B	0.006 max
	Co	1.00 max	Ti	0.65-11.5	Cu	0.30 max
	Mo	2.80-3.30	Nb+Ta	4.75-5.50	Mn	0.15 max
	P	0.015 max	S	0.015 max	Si	0.35 max

Statistical Process Control Charts³



Material Properties	Applications	Finishes	Industries
<ul style="list-style-type: none"> • Corrosion Resistant • High Strength • High Temperature Performance 	<ul style="list-style-type: none"> • Prototyping • Engineering • Turbomachinery • Rocket and space application components • Chemical and process industry parts • Oil well, petroleum and natural gas industry parts 	<ul style="list-style-type: none"> • Machined • Spark-eroded • Welded • Micro shot-peened • Polished • Coated 	<ul style="list-style-type: none"> • Automotive • Aerospace • Oil & Gas

³ Data generated in a production environment through calibration builds, production builds and testing of powders during the goods in procedure. Specimen geometry is ASTM E8M flat with cross section of 2mmx6mm at the gauge section.