



Nickel Alloy 718

DIRECT METAL LASER MELTING MATERIAL SPECIFICATIONS

Highlights

- Nickel based super alloy
- Non-Magnetic
- Corrosion resistant

Applications

- High heat
- Turbine engine components, fasteners & instrumentation parts
- Oil well, petroleum, and natural gas industry

TYPICAL PHYSICAL PROPERTIES

MECHANICAL PROPERTIES	AMS 5596, 5663 SHT (MAX)	AMS 5596, 5663 PHT (MIN)	DMLM AS BUILT	DMLM SR*	DMLM HIP'ed*	DMLM SHT*	DMLM PHT*
Tensile Strength	140 ksi	180 ksi	127 ksi	133 ksi	185 ksi	119 ksi	198 ksi
0.02% Yield Strength	80 ksi	150 ksi	112 ksi	75 ksi	135 ksi	46 ksi	153 ksi
Modulus (msi)	-	-	26 msi	28 msi	29 msi	26 msi	28 msi
Elongation	30%	12%	30%	42%	24%	29%	20%
Reduction of Area	-	-	40%	48%	49%	44%	28%
Hardness (HRC)	25	36	TBD	TBD	TBD	TBD	TBD

*SR - Stress Relief, 1950°F for 1.5 hours

*SHT - Solution Heat Treat, (Per AMS5596K) Heat to 1725°F to 1850°F, hold for time commensurate with product thickness air cool (or faster)

*HIP'ed - Hot Isostatic Press, 2125°F for 240 min at 14.75 ksi

*PHT - Precipitation Heat Treatment, (Per AMS5596K) Heat to 1325°F to 1400°F, hold for approx 8 hours, cool at 100°F/hr to 1150°F, hold for approx 8 hrs, air cool

NICKEL ALLOY 718 COMPOSITION

ELEMENT	TYPICAL PERCENTAGE
Carbon (C)	0.08 max
Silicon (Si)	0.35 max
Manganese (Mn)	0.35 max
Phosphorus (P)	0.015 max
Sulfur (S)	0.015 max
Chromium (Cr)	17.00 - 21.00
Molybdenum (Mo)	3.3 max
Copper (Cu)	0.30 max
Iron (Fe)	Balance
Niobium (Nb)	5.5 max
Aluminum (Al)	0.3 max
Titanium (Ti)	1.15 max
Nickel (Ni)	50.00 - 55.00

The information presented represents typical values intended for reference and comparison purposes only. It should not be used for design specifications or quality control purposes. End-use material performance can be impacted (+/-) by, but not limited to, part design, end-use conditions, test conditions, color etc. Actual values will vary with build conditions. Product specifications are subject to change without notice. *Chemical analysis for specific lots available upon request.

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