



# Nickel Alloy 718

## DIRECT METAL LASER SINTERING 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)	DMLS AS BUILT	DMLS SR*	DMLS HIP'ed*	DMLS SHT*	DMLS PHT*
<b>Tensile Strength</b>	140 ksi	180 ksi	127 ksi	133 ksi	185 ksi	119 ksi	198 ksi
<b>0.02% Yield Strength</b>	80 ksi	150 ksi	112 ksi	75 ksi	135 ksi	46 ksi	153 ksi
<b>Modulus (msi)</b>	-	-	26 msi	28 msi	29 msi	26 msi	28 msi
<b>Elongation</b>	30%	12%	30%	42%	24%	29%	20%
<b>Reduction of Area</b>	-	-	40%	48%	49%	44%	28%
<b>Hardness (HRC)</b>	25	36	TBD	TBD	TBD	TBD	TBD

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

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

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

\*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
<b>Carbon (C)</b>	0.08 max
<b>Silicon (Si)</b>	0.35 max
<b>Manganese (Mn)</b>	0.35 max
<b>Phosphorus (P)</b>	0.015 max
<b>Sulfur (S)</b>	0.015 max
<b>Chromium (Cr)</b>	17.00 - 21.00
<b>Molybdenum (Mo)</b>	3.3 max
<b>Copper (Cu)</b>	0.30 max
<b>Iron (Fe)</b>	Balance
<b>Niobium (Nb)</b>	5.5 max
<b>Aluminum (Al)</b>	0.3 max
<b>Titanium (Ti)</b>	1.15 max
<b>Nickel (Ni)</b>	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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