

# Ni718

## Ni-based Superalloy Powder for Additive Manufacturing 53/20 $\mu\text{m}$ , Gas Atomized Designed for HS-LMD

**Chemical composition similar to UNS N07718, INCONEL® 718**

### DESCRIPTION

Ni718 is a gas atomized nickel-based powder, engineered for additive manufacturing (AM). It is a high-performance superalloy that is characterized by its exceptional performance in strength, corrosion resistance, and creep resistance at both elevated and cryogenic temperatures. The material can also be easily post-hardened by precipitation-hardening heat treatments.

The material is suited for a broad range of industrial applications in scenarios where a combination of tensile strength, creep resistance, and fatigue resistance is required across a range of temperatures.

### KEY PROPERTIES

- Excellent corrosion and oxidation resistance
- Excellent creep and fatigue resistance
- High strength
- Retains properties at elevated temperatures
- Heat treatable to enhance hardness

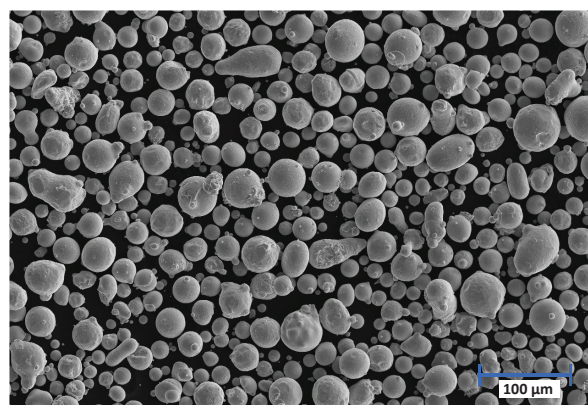
### APPLICATIONS

- Gas turbine components
- Instrumentation components
- Aerospace engine parts
- Cryogenic components
- Oil and gas components

### POWDER CHEMICAL COMPOSITION

Element	Min. (wt%)	Max. (wt%)
Ni	50.0	55.0
Cr	17.0	21.0
Fe	Bal.	Bal.
Nb	4.75	5.5
Mo	2.8	3.3
Ti	0.65	1.15
Al	0.2	0.8
C	-	0.08

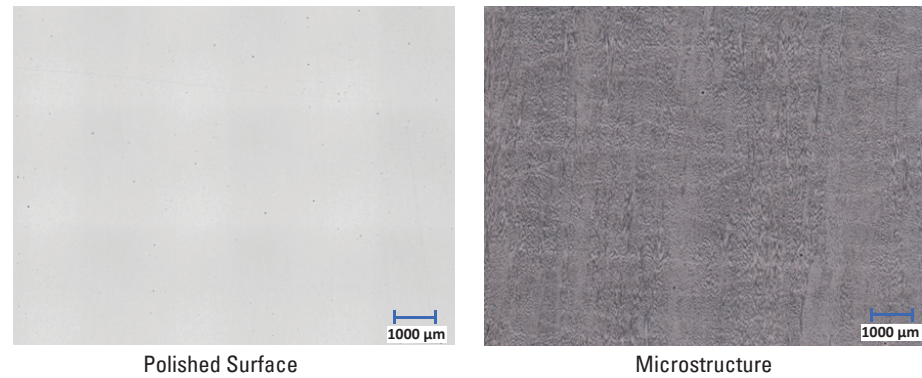
### SEM IMAGE



POWDER PROPERTIES (ISO 4490, ISO 3923-1)

Particle Size Distribution (µm)	Hall Flow (s/50g)	Apparent Density (g/cm³)
20 – 53	21.8	4.3

MICROGRAPHS



PHYSICAL PROPERTIES (ISO 3369)

Average Defect Percentage (%)	Density (g/cm³)
< 0.10	> 8.19

MELTING POINT

Celsius (°C)	Fahrenheit (°F)
1370 - 1430	2500 - 2600

HARDNESS (ISO 6507-1)

HV <sub>0.3</sub>	HRC
476	47

MECHANICAL PROPERTIES (ISO 6892-1)

Condition	Orientation	Ultimate Tensile Strength (MPa)	0.2% Yield Strength (MPa)	Elongation at Break (%)
As-Built	Horizontal	945 ± 8	642 ± 6	24 ± 2
	Vertical	947 ± 23	582 ± 9	26 ± 2
Heat-Treated*	Horizontal	1380 ± 25	1250 ± 11	15 ± 1
	Vertical	1415 ± 16	1186 ± 18	17 ± 3

\*Solutioning temperature at 1065 °C for 1 hour, nitrogen gas quenching. Aging temperature at 720 °C for 8 hours, furnace cool to 620 °C, held at 620 °C for 8 hours, nitrogen gas cooling.

PROCESS INFORMATION:

The properties reported in this Technical Data Sheet are applicable to Makino AM powders tested and distributed by Makino and processed on Makino LMD machine utilizing parameters in accordance with relevant operating guidelines (inclusive of setup conditions and maintenance). The properties are obtained by following recommended protocols. Further information regarding the methods used by Makino can be provided upon inquiry.

DISCLAIMER:

The data and information provided represent, to the best of our knowledge, standard or average values and do not constitute guarantees for upper and lower limit parameters. The recommended applications for the material disclosed are exclusively for illustrative purposes that help the reader to conduct their independent assessments. These suggestions are not intended to be expressed or implied warranties of suitability for the specified applications or any other purposes. The information included may be subject to change at any time without prior notification.

CONTACT US:

Our Safety Datasheet (SDS) is available upon request. For more information or support please contact Makino at sales-am@makino.com.sg or visit [www.makino.com.sg](http://www.makino.com.sg)