

# OptiPowder Ni718: High-Performance Nickel Superalloy for Demanding Applications

## Overview

Ni718 is a nickel-based superalloy designed for high-performance applications. It is easily machinable in the solution-annealed state and achieves exceptional strength after heat treatment. The alloy retains strength at elevated temperatures, resists long-term stress and rupture, remains stable in cryogenic conditions, and offers strong oxidation resistance, making it a proven material for demanding advanced-manufacturing environments.

OptiPowder Ni718 is produced using Continuum's M2P gas-atomization system, a plasma-based process that converts qualified reclaimed metal into high-quality spherical powder in a single step. Powered by green energy and tightly controlled process conditions, this approach reduces the carbon footprint of powder production while delivering consistent quality, flowability, and particle morphology from lot to lot.

## Typical Applications

OptiPowder Ni718 is engineered for high-temperature, high-reliability components, including:



Aerospace turbine blades, vanes, rocket motors, and combustion hardware.



Power-generation and industrial gas-turbine hot-section components.



Oil and gas parts exposed to aggressive, corrosive media.



Energy and fuel-cell structures where stability from cryogenic to elevated temperatures is required.

## Nominal Composition (wt.%)

Element	Min	Max	Element	Min	Max
Ni	50.0	55.0	Si	-	0.35
Cr	17.0	21.0	Ti	0.65	1.15
Mo	2.80	3.30	Al	0.20	0.80
Fe	Balance	Balance	C	-	0.08
Nb + Ta	4.75	5.50	P	-	0.015
Co	-	1.00	S	-	0.015
Mn	-	0.50	B	-	0.006

Conforms to AMS 7006

## Powder Physical Properties

Property	Unit	Min	Max
Flow (Hall)	s/50g	10	20
Apparent Density (Hall)	g/cc	4	-
D10 <sup>1</sup>	µm	15	25
D50 <sup>1</sup>	µm	25	35
D90 <sup>1</sup>	µm	35	50
+63 mm <sup>2</sup>	wt. %	-	0
+53 mm <sup>2</sup>	wt. %	-	1
+45 mm <sup>2</sup>	wt. %	-	5

1. Per ASTM B822 2. Per ASTM B214 - Data representative of 15–45 µm PSD.

## Additive Manufacturing Process Compatibility

OptiPowder Ni718 supports a wide range of AM and advanced-manufacturing processes, including:

### Laser Powder Bed Fusion (LPBF):

complex, high-precision geometries with excellent mechanical properties

### Binder Jetting (MBJ):

cost-effective production of larger parts at lower density prior to consolidation

### Hot Isostatic Pressing (HIP):

full-density consolidation, defect reduction, and property enhancement for additively manufactured or near-net-shape parts

### Electron Beam Melting (EBM):

large, heavily loaded structures requiring high strength

### DED and other advanced routes

where controlled PSD and chemistry are critical



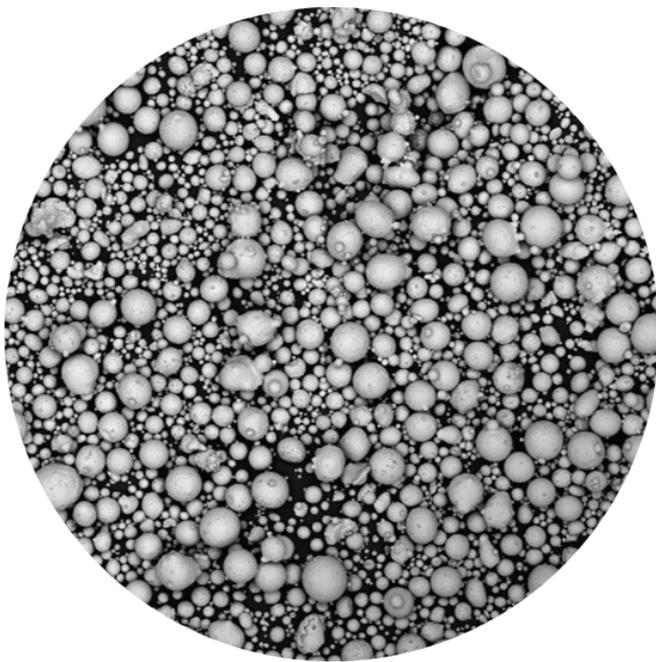
## Printed Properties (at room temperature)

Printed On		Concept Laser	EOS 290	ASTM F3055
	Direction	OptiPowder Ni718	OptiPowder Ni718	
Tensile Strength	XY	1411	1423	1240
MPa	Z	1386	1356	1240
Yield Strength	XY	1225	1218	940
MPa	Z	1179	1170	920
Elongation %	XY	24	37	12
MPa	Z	23	26	12

Conforms to ASTM F3055-14 - Data representative of 15–45  $\mu\text{m}$  PSD.

## Available PSDs & Customization

OptiPowder Ni718 is available in multiple particle size distributions tailored to specific platforms and processes (for example, 15–45  $\mu\text{m}$  and 15–53  $\mu\text{m}$  for LPBF/EBM, and coarser cuts for binder jetting or HIP). Custom PSDs, blends, and program-based supply arrangements are available on request to support unique process windows or qualification requirements.



### Morphology

Powder morphology is predominantly spherical with minimal satellites, with no hollow particles, excessive agglomeration, or foreign-object defects visible at  $\sim 300\times$  magnification, as illustrated in Figure 1.

### Blending

Multiple heats may be blended into a single lot when each heat independently meets all chemical and PSD requirements.

### Certification

Each shipment includes a certificate of analysis reporting chemical composition, particle size distribution, and any additional agreed-upon test results demonstrating conformance to specifications.



For detailed specifications, current availability, or to discuss custom PSDs and program-based supply:

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