

# OptiPowder M247LC: High-Performance Nickel Superalloy for Extreme Temperature Applications

## Overview

OptiPowder M247LC is a precipitation-strengthened nickel-based superalloy designed for extreme high-temperature environments. With significant additions of chromium, aluminum, tantalum, and tungsten, the alloy delivers excellent oxidation and corrosion resistance, along with exceptional creep strength and stress rupture performance at temperatures approaching 1,000°C.

The low-carbon variant of Mar-M247 is engineered to improve ductility and fatigue performance, making it particularly well-suited for rotating components and applications requiring extended service life under cyclic loading.

## Typical Applications

OptiPowder M247LC is engineered for high-temperature, high-stress environments, including:



Aerospace turbine blades, vanes, and hot-section components



Industrial gas turbines and power-generation systems



Rotating components such as impellers and turbine wheels



Energy applications requiring creep resistance and thermal stability

## Nominal Composition (wt.%)

### OptiPowder M247 LC

Element	Min	Max
C	0.04	0.09
Co	8.50	9.50
Cr	8.00	9.00
Hf	1.00	1.60
Ni	Balance	Balance
Ta	3.00	3.50
Ti	0.50	1.00
W	9.00	10.50
Al	5.00	6.00

Data representative of 15–45 μm PSD.

# Powder Physical Properties

## OptiPowder M247 LC

Property	Unit	Max
Apparent Density	g/cc	>4
Hall Flow Time	s/50g	<25

\*For LPBF PSD of 15–45  $\mu\text{m}$ . Other PSDs including for MIM, Binderjetting or custom, available on request

## Additive Manufacturing Process Compatibility

OptiPowder M247LC supports a range of AM and advanced manufacturing processes, including:

### Laser Powder Bed Fusion (LPBF):

High-temperature, high-performance components with complex geometries

### DED and other advanced routes:

Where alloy control and thermal performance are critical

### Binder Jetting (MBJ):

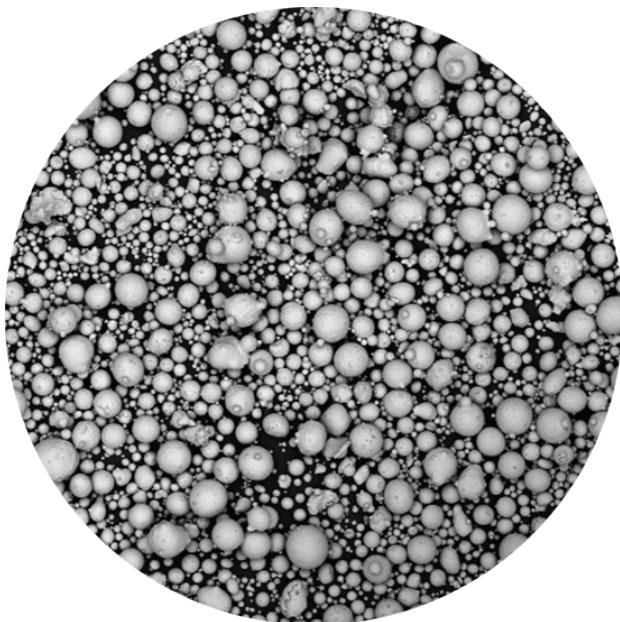
Cost-effective production of turbine and energy components prior to densification

### Hot Isostatic Pressing (HIP):

Full-density consolidation and improved mechanical performance

## Available PSDs & Customization

OptiPowder M247LC is available in multiple particle size distributions, including 0–32  $\mu\text{m}$ , 0–45  $\mu\text{m}$ , 15–45  $\mu\text{m}$ , 45–106  $\mu\text{m}$ , and HIP-grade material, with custom PSDs, blended distributions, and program-based supply available on request to support specific process requirements and qualification needs.



### 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.

### 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.