

OptiPowder SS17-4PH: Precipitation-Hardening Stainless Steel for High-Strength Applications

Overview

OptiPowder SS17-4PH is a precipitation-hardening martensitic stainless steel powder designed for applications requiring high strength, good toughness, and corrosion resistance. Based on UNS S17400 (AISI 17-4 PH), the alloy delivers consistent mechanical performance and responds well to heat treatment, enabling a range of strength and hardness profiles depending on processing conditions.

All Continuum OptiPowders are tested and qualified by our in-house quality team before release, unless customer requirements call for additional third-party testing. Each lot is supported by a Continuum Certificate of Analysis (COA), providing documented quality data and traceability for the material supplied.

Typical Applications

OptiPowder SS17-4PH is engineered for high-strength components requiring corrosion resistance and reliable mechanical performance, including:



Aerospace and defense hardware requiring strength and durability



Tooling, molds, and industrial components exposed to mechanical stress



Oil and gas components operating in moderate corrosive environments



Medical and dental tools (non-implant applications)

Nominal Composition (wt.%)

Element	Min	Max
Cr	15.0	17.5
Ni	3.0	5.0
Cu	3.0	5.0
Nb + Ta	0.15	0.45
Mn	-	≤1.0
Si	-	≤1.0

Element	Min	Max
C	-	≤0.07
P	-	≤0.04
S	-	≤0.03
Fe	Balance	Balance
Oxygen	-	<0.1
Nitrogen	-	<0.03

Typical chemistry aligned with UNS S17400 and AMS 7012 Class C.

Powder Physical Properties

Property	Specification
PSD percentile	D ₁₀ , D ₅₀ , D ₉₀ will be reported
Apparent density (g/cc)	Measured according to ASTM B212 ³ and reported
Hall flow (s/50g)	Measured according to ASTM B213 ⁴ and reported

Measured per ASTM B212 and ASTM B213. Data representative of applicable PSD

Additive Manufacturing Process Compatibility

OptiPowder SS17-4PH supports a range of AM and advanced manufacturing processes, including:

Laser Powder Bed Fusion (LPBF):

High-strength, near-net-shape components with complex geometries

Conventional routes:

Where controlled PSD and chemistry are required

Binder Jetting (MBJ):

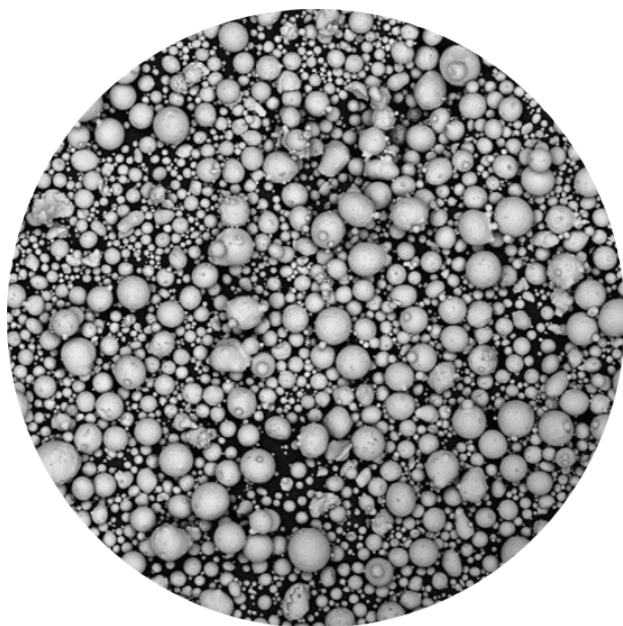
Cost-effective production of tooling and industrial parts

Directed Energy Deposition (DED):

Repair and build-up of worn or high-value components

Available PSDs & Customization

OptiPowder SS17-4PH is available in multiple particle size distributions, including 15–45 µm, 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 ~300× magnification.

Blending

Multiple heats may be blended into a single lot provided each heat independently meets chemical and interstitial requirements and exhibits similar PSD. Composition adjustment by blending is not permitted.

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.