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Material Product Data Sheet
High Strength Stainless Steel Powders for Additive Manufacturing

Additive Manufacturing Powder Products: MetcoAdd 17-4PH-A

1 Introduction

MetcoAdd™ 17-4PH-A is a gas atomized FeCrNi-based stainless steel powder designed for use in powder bed type additive manufacturing processes such as Selective Laser Melting (SLM). Upon 3D printing and heat treatment, MetcoAdd 17-4PH-A produces a martensitic structure that can be further enhanced by precipitation hardening. The mechanical properties are similar to cast alloys of similar chemistry per ASTM A747.

The processes used to manufacture MetcoAdd 17-4PH-A are tightly controlled to ensure repeatable and consistent powder quality. This results in consistent printing performance when used with defined parameters and equipment.

These products are of optimized quality for powder bed fusion and SLM additive manufacturing with respect to particle size distribution, tailored chemical composition, outer particle morphology and inner particle condition. The powder particles are quite dense (very low porosity) and have a spherical morphology. Particle size distribution is designed for homogeneous distribution in powder bed processes with excellent packing density and stability that prevents agglomeration to ensure densely printed parts with minimum to no defects. The carbon content of the powders is optimized for aerospace and medical applications.

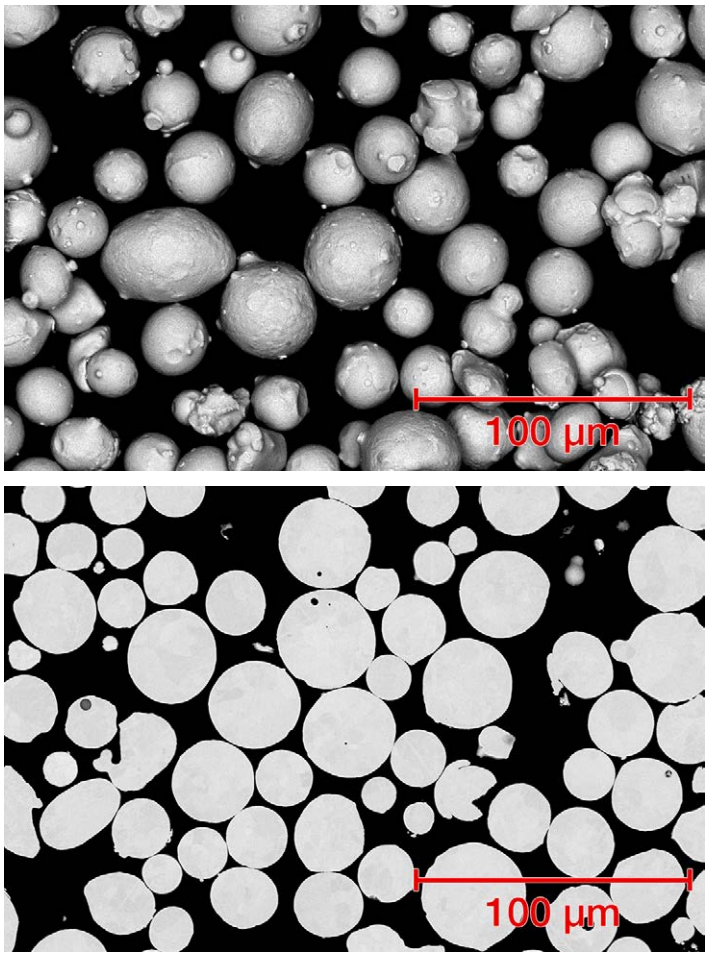
MetcoAdd 17-4PH-A is proven in the market to produce dense parts with mechanical properties (ultimate tensile strength, yield strength and ductility) comparable or better than cast or wrought alloys.

1.1 Typical Uses and Applications:

MetcoAdd 17-4PH-A can be considered as a potential additive manufacturing material for a wide range industry applications such as:

- Aerospace applications
- Chemical processing equipment
- Nuclear applications
- Oil and petrochemical refining equipment
- Food processing equipment
- Surgical parts

Quick Facts	
Classification	Alloy, iron-based
Chemistry	FeCrNiCu
Similar To	17-4PH / EN 1.4542 / UNS S17400
Manufacture	Gas atomized
Morphology	Spheroidal
Purpose	Additive Manufacturing
Process	Powder-bed type additive manufacturing processes



MetcoAdd 17-4PH-A gas-atomized powder. Top: outer morphology. Bottom: cross-section showing fully dense inner structure.

2 Material Information

2.1 Chemical Composition

Product	Weight Percent (nominal)						
	Fe	Cr	Ni	Cu	Nb+Ta	C	Other
MetcoAdd 17-4PH-A	Balance	17	4.5	4.0	0.3	< 0.07	< 1.0

2.2 Particle Size Distribution

Product	Nominal Range [µm]	D90 [µm]	D50 [µm]	D10 [µm]
MetcoAdd 17-4PH-A	-45 +15	45	30	19

For the nominal range, particle size analysis 45 µm or above measured by sieve (ASTM B214), analysis below 45 µm by laser diffraction (ASTM C 1070, Microtrac). Fractional analysis (D90, D50, D10) by laser diffraction.

2.3 Other Properties

Product	Solidus	Liquidus	Similar To	Manufacturing Method
MetcoAdd 17-4PH-A	1456 ± 10 °C (2652.8 ± 18 °F)	1491 ± 10 °C (2716.8 ± 18 °F)	17-4PH ASTM A747 EN 1.4542 UNS S17400	Gas Atomization

2.4 Key Selection Criteria

- MetcoAdd 17-4PH-A has been engineered for the manufacture of stainless steel components using SLM.
- The powder is optimized so that the required component mechanical properties can be obtained after post heat-treatment processing.
- MetcoAdd 17-4PH-A is designed for the manufacture of surgical tools using SLM.
- MetcoAdd 17-4PH-A is field-proven to repeatability and reliable production of dense printed parts when used in powder bed manufacturing processes.
- Powder beds of MetcoAdd 17-4PH-A are stable and resist agglomeration in powder bed fusion processes.

2.5 Related Products

- Oerlikon Metco offers other nickel-based and cobalt-based powders designed for additive manufacturing that have been optimized for either powder fed or powder bed processes. Please contact your Oerlikon Metco Account Representative for more information.
- Oerlikon Metco can produce powders with chemistries similar to MetcoAdd 17-4PH-A, but with particle size distributions optimized for specific additive manufacturing processes or equipment. Please contact us for more information.

3 Commercial Information

3.1 Ordering Information and Availability

Product	Order No.	Package Size	Availability	Distribution
MetcoAdd 17-4PH-A	1093744	10 lb (approx. 4.5 kg)	Stock	Global

3.2 Handling Recommendations

- Store in the original, closed container in a dry location
- Tumble contents prior to use to prevent segregation
- Open containers should be stored in a drying oven to prevent moisture pickup

3.3 Safety Recommendations

See the SDS (Safety Data Sheet) in the version localized for the country where the material will be used. SDS are available from the Oerlikon web site at www.oerlikon.com/metco (Resources – Safety Data Sheets).

Product	SDS No.
MetcoAdd 17-4PH-A	50-2005

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