

Material Description

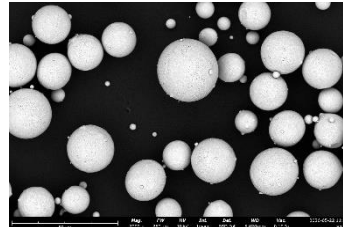
GMP 17-4PH metal powders have been specifically designed and optimised for use in Additive Manufacturing (AM).

GMP 17-4PH metal powders are widely used and successfully proven in AM. **GMP 17-4PH** processes well across the broad spectrum of AM machines and technologies and offers good machinability.

GMP 17-4PH is a martensitic precipitation hardening stainless steel, often used for surgical components, tooling, and prototyping. **GMP 17-4PH** after solution annealing and ageing delivers excellent mechanical properties including high strength and excellent corrosion resistance.

Powder Images

Typical microscopy image of **GMP 17-4PH -45+15**



Powders are supplied in a variety of standard and custom sizes.

Part Example

Awaiting part image

Material Properties

- Excellent corrosion resistance
- High strength
- Good ductility
- High wear resistance
- Good machinability

Typical Applications

- Corrosion resistant components
- Surgical instruments
- Tooling
- Valves

Relevant Sectors

- Oil & Gas
- Medical
- Aerospace
- Industrial

Powder Properties

| | | | |
|--------------------|------------------------|-------------|-----|
| item no. | GMP 17-4PH -45+15 | | |
| PSD | 15-45µm | Application | PBF |
| item no. | GMP 17-4PH -53+20 | | |
| PSD | 20-53µm | Application | PBF |
| item no. | GMP 17-4PH -53+15 | | |
| PSD | 15-53µm | Application | PBF |
| item no. | GMP 17-4PH -150+45 | | |
| PSD | 45-150µm | Application | DED |
| item no. | GMP 17-4PH -106+45 | | |
| PSD | 45-106µm | Application | EBM |
| item no. | GMP 17-4PH -300 | | |
| PSD | <300µm | Application | HIP |
| General Properties | | | |
| PSD | d10, d50, d90 reported | | |
| Apparent Density | Measured and reported | | |
| Flow | Measured and reported | | |

Chemical Composition

| Fe | bal. |
|-------|-------------|
| Cr | 15.0 – 17.5 |
| Cu | 3.0 – 5.0 |
| Ni | 3.0 – 5.0 |
| Mn | ≤1.0 |
| Si | ≤1.0 |
| Mo | ≤0.5 |
| Nb+Ta | 0.15 – 0.45 |
| Co | ≤0.40 |
| Al | ≤0.05 |
| C | ≤0.07 |
| P | ≤0.04 |
| O | ≤0.04 |
| N | ≤0.03 |
| S | ≤0.03 |

- wt%

Industry Powder Names

| | |
|-------------------------|------------------------|
| Generic name | 17-4PH |
| Generic name | 1.4542 |
| Colibrium (GE) Additive | 17-4PH |
| SLM Solutions | 17-4PH / 1.4542 |
| Renishaw | Stainless Steel 17-4 |
| EOS | Stainless Steel 17-4PH |

Atomisation Process

- Vacuum inert gas atomisation
- Anti-Satellite technology
- Argon gas atomised

Powder Quality

- Highly Spherical
- Very few satellites
- Excellent flowability

Applicable Specification

- DIN 1.4542
Other specifications: ASTM A705, UNS S17400 AMS7012

Mechanical Properties

| GMP 17-4PH -45+15, L-PBF specimens | Condition | Yield, 0.2 (MPa) | UTS (MPa) | Elongation (%) | Charpy toughness (J) |
|--------------------------------------|--------------|------------------|-----------|----------------|----------------------|
| Vertical, room temperature average | Heat treated | 1241 | 1384 | 13.8 | 23.8 |
| Horizontal, room temperature average | Heat treated | 1183 | 1381 | 14.8 | |

Samples printed using an EOS M280 machine

Physical Properties*

| | |
|----------------------------------|---------------------------------------|
| True Density | 7.8 g/cm ³ |
| Thermal Conductivity @ 21°C | 14.9 W/mK |
| Melting Point | 1400°C - 1440°C |
| Coefficient of thermal expansion | 11.9 10 ⁻⁶ K ⁻¹ |

*typical data

Heat Treatment

Solution annealing and age hardening (H900) to ASTM A564/A564M.

Further information on heat treatment and stress relieving can be provided by our technical experts by contacting: gmp@globusmetalpowders.com

Contact

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Globus Metal Powders offers a diverse range of metal powders and alloys for Additive Manufacturing (AM) and Hot Isostatic Pressing (PM-HIP), along with next generation alloy development maximising the potential benefits and solutions that AM and PM-HIP can deliver.

Our core range of metal powders includes steel, stainless steel, nickel, cobalt and bespoke alloys.

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Further information available at www.globusmetalpowders.com

Mechanical and physical properties are provided for guidance only and depict typically achievable properties and are not provided as guaranteed values or design data.

Results achieved can vary significantly depending on AM processes, parameters, and part design/geometry.

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