

Technical Data Sheet

Ultrafuse® 17-4 PH

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General information

Components

17-4 PH stainless steel composite filament for Fused Filament Fabrication.

Product Description

Ultrafuse® 17-4 PH is a filament for the production of metal components in 17-4 stainless steel on standard Fused Filament Fabrication (FFF) printers. This stainless steel can be fully heat treated to high levels of strength and hardness. It is therefore ideal for Petrochemistry, Aerospace, the Automotive and the Medical Industry. Parts printed with our metal-polymer composite filament Ultrafuse® 17-4 PH obtain their final properties through a catalytic debinding and sintering process known from traditional Metal Injection Molding.

Delivery form and warehousing

Ultrafuse® 17-4 PH filament should be stored at 15 - 25°C in its originally sealed package in a clean and dry environment. If the recommended storage conditions are observed the products will have a minimum shelf life of 12 months.

Product safety

Recommended: Process materials in a well ventilated room, or use professional extraction systems. For further and more detailed information please consult the corresponding material safety data sheets.

For your information

Typical composition after sintering:

C %	Cr %	Ni %	Cu %	Nb %	Mn %	Si %	Fe %
≤ 0.07	15-17.5	3-5	3-5	0.15-0.45	≤ 1	≤ 1	Balance

Standards: DIN 1.4542, X 5 CrNiCuNb 17 4, AISI/UNS S17400 ; SAE J 467 (17-4PH)

Notice

The data contained in this publication are based on our current knowledge and experience. In view of the many factors that may affect processing and application of our product, these data do not relieve processors from carrying out their own investigations and tests; neither do these data imply any guarantee of certain properties, nor the suitability of the product for a specific purpose. Any descriptions, drawings, photographs, data, proportions, weights etc. given herein may change without prior information and do not constitute the agreed contractual quality of the product. It is the responsibility of the recipient of our products to ensure that any proprietary rights and existing laws and legislation are observed.

The safety data given in this publication is for information purposes only and does not constitute a legally binding Material Safety Data Sheet (MSDS). The relevant MSDS can be obtained upon request from your supplier or you may contact BASF 3D Printing Solutions GmbH directly at sales@basf-3dps.com.

Filament Properties

Filament Diameter	1.75 mm	2.85 mm
Diameter Tolerance	±0.050 mm	±0.1 mm
Roundness	±0.050 mm	±0.05 mm
Available Spool size	3.0 kg	3.0 kg
Available colors	natural	

Spool Properties

Available Spool size	3.0 kg
Outer diameter	200 mm
Inner diameter	50.5 mm
width	55 mm

Recommended 3D-Print processing parameters

Used for test specimens

Printer	FFF printer	Ultimaker S5
Nozzle Temperature	230 – 250 °C / 446 – 482 °F	245 °C
Build Chamber Temperature	-	-
Bed Temperature	90 – 100 °C / 194 – 212 °F	100 °C
Bed Material	Glass + approved glues* / polyimide tape (*Magigoo® suggested)	Glass + Magigoo®
Nozzle Diameter	≥ 0.4 mm	0.4 mm
Print Speed	15 - 50 mm/s	25 mm/s

Please check your print profile availability for an easy start at www.forward-am.com.

Further Recommendations

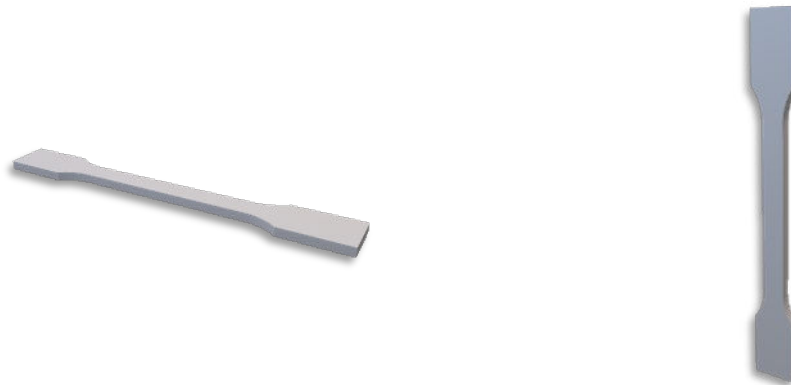
Drying recommendations to ensure printability	Ultrafuse® 17-4 PH is in a printable condition, drying is not necessary
Support material compatibility	Ultrafuse® Support Layer

General Properties

Standard

Sintered Part Density Ultrafuse® 17-4 PH	7600 kg/m ³ / 474.5 lb/ft ³	ISO 3369
Sintered Part Density Catamold 17-4 PH	7650 kg/m ³ / 477.6 lb/ft ³	ISO 3369

Mechanical Properties | sintered



Print direction	Standard	XY Flat		ZX Upright	
Tensile strength	ISO 6892-1				
Ultrafuse® 17-4 PH ¹		990 MPa / 143.6 ksi	1276 MPa / 185.1 ksi ³	1004 MPa / 145.6 ksi	1319 MPa / 191.3 ksi ³
Catamold 17-4PH (MIM)		1060 MPa / 153.7 ksi			
Young's Modulus	ISO 6892-1				
Ultrafuse® 17-4 PH ¹		191 MPa / 27.7 ksi	198 MPa / 28.7 ksi ³	195 MPa / 28.3 ksi	202 MPa / 29.3 ksi ³
Catamold 17-4PH (MIM)		-			
Elongation at Break	ISO 6892-1				
Ultrafuse® 17-4 PH ¹		4 %	6 % ³	4 %	7 % ³
Catamold 17-4PH (MIM)		3 %			
Yield Strength, R_{p0.2}	ISO 6892-1				
Ultrafuse® 17-4 PH ¹		756 MPa / 109.6 ksi	1109 MPa / 160.8 ksi ³	764 MPa / 110.8 ksi	1136 MPa / 164.8 ksi ³
Catamold 17-4PH (MIM)		750 MPa / 108.8 ksi			
Vickers Hardness HV10	ISO 6507-1				
Ultrafuse® 17-4 PH ¹		291	400 ³	309	426 ³
Catamold 17-4PH (MIM)		320			

Testing speed – 0,3 mm/min bis 2 % / 10 mm/min till end of the test

¹milled specimen, specimen shape Form E2x6x20 according to DIN 50125

³H900 heat treatment: annealing at 1030°C for 50 min – gas quenching (Nitrogen) - aging at 482°C for 1 hour – air cooled