



Ultrafuse[®] 17-4PH

High Strength | Hard | Heat treatable

Extended TDS

Complete Technical Documentation and
Testing Summary

Contents

Technical Data Sheet 3

Mechanical Propertie Diagrams 7

Are you looking for an updated TDS version? [Check out the latest online version here.](#)

Technical Data Sheet

Ultrafuse® 17-4PH is a filament for the production of metal components on standard Fused Filament Fabrication (FFF) printers and can be fully heat treated to high levels of strength and hardness.

Filament Properties		
Filament Diameter	1.75 mm	2.85 mm
Average diameter Tolerance	±0.05 mm	±0.1 mm
Average ovality	±0.05 mm	±0.05 mm
Available Spool size	1.0 kg, 3.0 kg	1.0 kg, 3.0 kg

Spool Properties		
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	245 °C
Build Chamber Temperature	-	Indirect heating (cover)
Bed Temperature	90 – 100 °C	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 standard and/or high speed print profile availability for an easy start at www.forward-am.com.

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. Values in this document are average values, measured and calculated according to the instructions in the listed standards. The used specimens are produced with the Fused Filament Fabrication method. Measured values can vary depending on used print orientation and print parameters.

Please contact us for further product information, like for example REACH, RoHS, FCS.

The safety data given in this publication is for informational purposes only and does not constitute a legally binding MSDS. The relevant MSDS can be obtained upon request from your supplier or you may contact Forward AM Technologies GmbH directly at sales@forward-am.com.

Process materials in a well-ventilated room, or use professional

Further Recommendations

Drying recommendations to ensure printability and best mechanical properties Ultrafuse® 17-4PH is in a printable condition, drying is not necessary

Support material compatibility [Ultrafuse® Support Layer Metal Filament](#)

General Properties	Standard	Average Values
Sintered Part Density	ISO 3369	7600 kg/m ³
Sintered Part Density Catamold 316L	ISO 3369	7650 kg/m ³

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. Values in this document are average values, measured and calculated according to the instructions in the listed standards. The used specimens are produced with the Fused Filament Fabrication method. Measured values can vary depending on used print orientation and print parameters.

Please contact us for further product information, like for example REACH, RoHS, FCS.

The safety data given in this publication is for informational purposes only and does not constitute a legally binding MSDS. The relevant MSDS can be obtained upon request from your supplier or you may contact Forward AM Technologies gmbH directly at sales@forward-am.com.

Process materials in a well-ventilated room, or use professional

Tensile Properties ^{1) 2)}	Standard	Average Values	
		XY-Direction	ZX-Direction
Tensile strength	ISO 6892 - 1	990 MPa	1004 MPa
Tensile strength (annealed) ³⁾	ISO 6892 - 1	1276 MPa	1319 MPa
Elongation at Break	ISO 6892 - 1	4 %	4 %
Elongation at Break (annealed) ³⁾	ISO 6892 - 1	6 %	7 %
Yield strength, R _{p 0.2}	ISO 6892 - 1	756 MPa	764 MPa
Yield strength, R _{p 0.2} (annealed) ³⁾	ISO 6892 - 1	1109 MPa	1136 MPa
Young's Modulus	ISO 527	191 GPa	195 GPa
Young's Modulus (annealed) ³⁾	ISO 527	198 GPa	202 GPa
Vickers Hardness HV10	ISO 6507 - 1	291	30
Vickers Hardness HV10 (annealed) ³⁾	ISO 6507 - 1	400	426

Tensile Properties Catamold 17-4PH	Standard	Average Values
Tensile strength	ISO 6892 - 1	1060 MPa
Elongation at Break	ISO 6892 - 1	3 %
Yield strength, R _{p 0.2}	ISO 6892 - 1	750 MPa
Vickers Hardness HV10	ISO 6507 - 1	320

For the diagrams on mechanical properties see Chapter: [Mechanical Properties Diagrams](#)

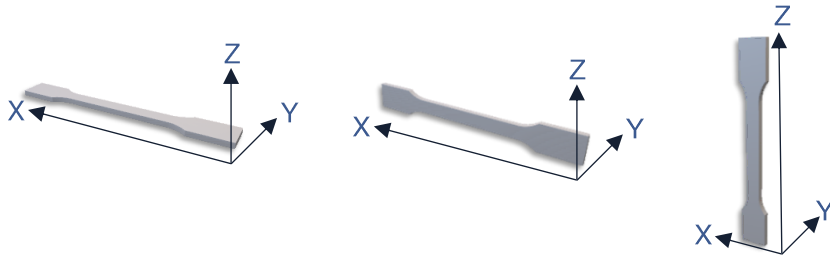
¹⁾ Testing speed – 0,3 mm/min bis 2 % / 10 mm/min till end of the test

²⁾ milled specimen, specimen shape Form E2x6x20 according to DIN 50125

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

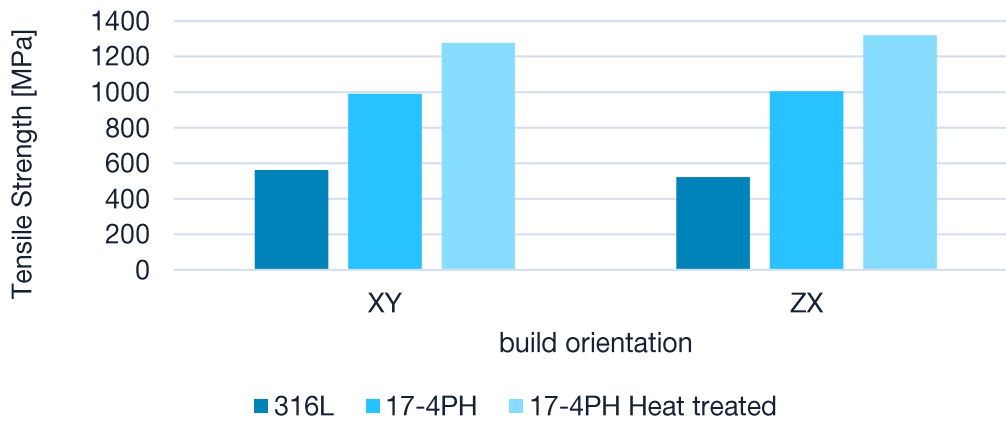
Print direction explanation

The orientation of the 3D printed part in the printer is always aligned with the longest axis first. The print direction is consistently along the Z-axis.



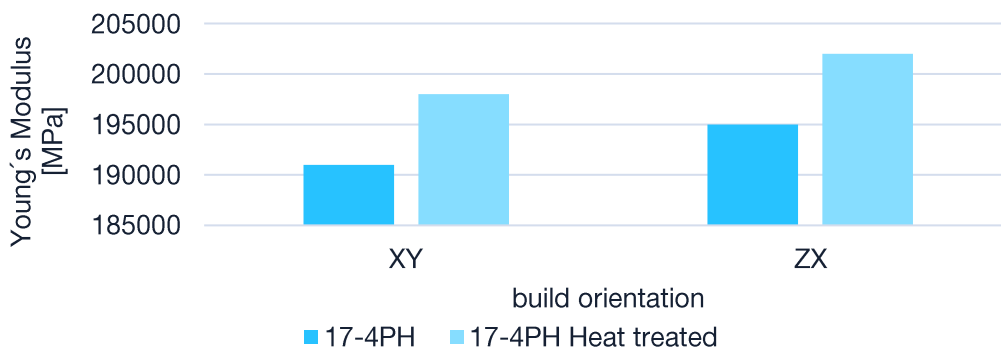
Mechanical Properties Diagrams

Tensile Strength



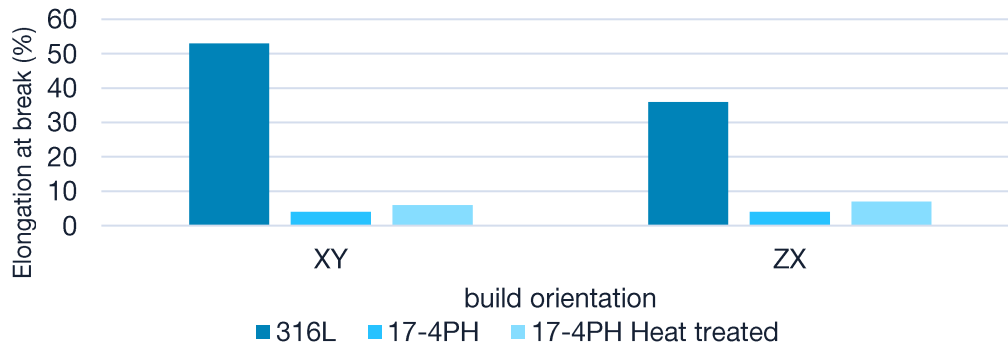
Typical Tensile Strength for the XY and ZX print orientation.

Young's Modulus



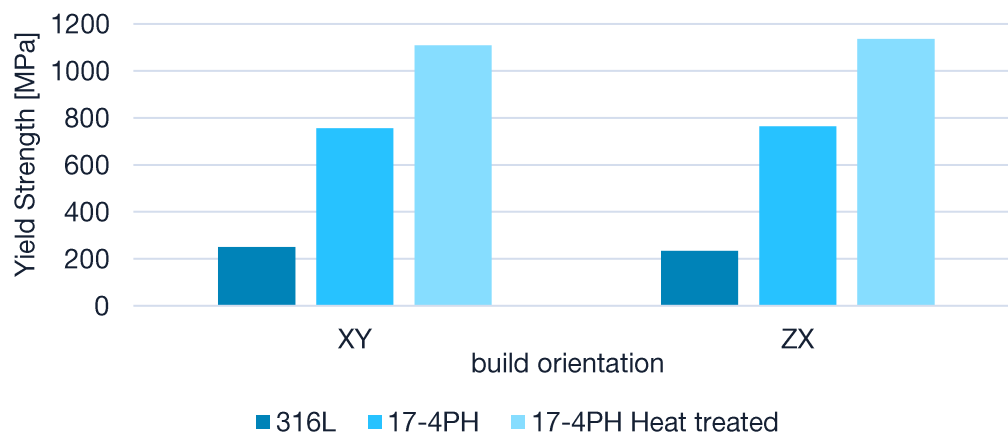
Typical Young's Modulus for the XY and ZX print orientation.

Elongation at Break

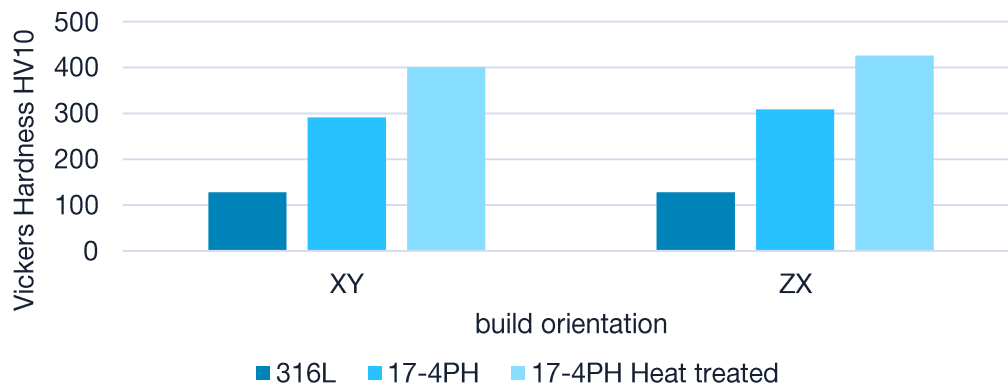


Typical Elongation at Break for the XY and ZX print orientation.

Yield Strength



Typical Yield Strength for the XY and ZX print orientation.

Vickers Hardness

Typical Vickers Hardness for the XY and ZX print orientation.