



Ultrafuse[®] BVOH

Water soluble support material | easy to print

Extended TDS

Complete Technical Documentation and
Testing Summary

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Technical Data Sheet

Ultrafuse® BVOH water-soluble filament has been designed to support complex parts with temporary support structures which can be easily dissolve in water after printing.

Filament Properties

Filament Diameter	1.75 mm	2.85 mm
Average diameter Tolerance	±0.050 mm	±0.1 mm
Average ovality	<0.050 mm	<0.050 mm
Available Spool size	350g, 750 g	350g, 750 g
Available colors	natural	

Spool Properties

Spool size	350g / 750 g	2.0 kg	4.0 kg	8.0 kg
Outer diameter	200 mm	300 mm	350 mm	355 mm
Inner diameter	50.5 mm	51.5 mm	51.7 mm	36 mm
Width	55 mm	103 mm	103 mm	167 mm

Recommended 3D-Print processing parameters

Used for test specimens

Printer	FFF printer	Ultimaker S5
Nozzle Temperature ¹⁾	190 – 210°C	210°C
Build Chamber Temperature	-	Closed Chamber, passively heated
Bed Temperature	60 – 100°C	60°C
Bed Material	Glass	Glass + PVA glue
Nozzle Diameter	≥ 0.4 mm	0.4 mm
Print Speed	30 - 60 mm/s	40 mm/s
Max Volumetric Speed ²⁾	-	-

Please check your standard and/or high speed print profile availability for an easy start at www.forward-am.com.

¹ Fast printing might require an additional increase of the nozzle temperature; the stated printing speed is based on current validations. As equipment and technology continues to evolve, it is possible that even higher printing speeds may be attainable in the future.

² Based on Bambu Lab X1C with a nozzle diameter of 0.4 mm

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 extraction systems.

Further Recommendations

Drying recommendations to ensure printability and best mechanical properties³⁾

Ultrafuse® BVOH can be dried at 60°C in a hot air dryer or vacuum oven for 4 to 16 hours

Printing in closed / heated chambers

Ultrafuse® BVOH can show softening effects in environments >60°C. Ensure a proper filament cooling before the filament enters the nozzle to avoid extrusion issues.

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General Properties	Standard	Average Values		
Filament Density ⁴⁾	ISO 1183-1	To be evaluated		

Tensile Properties ⁵⁾	Standard	Average Values		
		XY-Direction	XZ-Direction	ZX-Direction
Tensile strength ⁶⁾	ISO 527	33.7 MPa	-	8.7 MPa
Elongation at Break ⁶⁾	ISO 527	14.8 %	-	0.6%
Young's Modulus ⁷⁾	ISO 527	2339 MPa	-	1426 MPa

Flexural Properties ^{5) 8)}	Standard	Average Values		
		XY-Direction	XZ-Direction	ZX-Direction
Flexural Strength	ISO 178	53.8 MPa	50.3 MPa	11.4 MPa
Flexural Modulus	ISO 178	2236 MPa	1807 MPa	1081 MPa
Flexural Elongation at Break	ISO 178	4.8%	4.4%	1.0%

Thermal Properties ⁶⁾	Standard	Average Values		
Glass Transition Temperature	ISO 11357-2	69°C		
Melting Temperature	ISO 11357-3	175°C		
Melt Volume-Flow Rate (MVR)	ISO 1133	11.4 cm ³ /10 min (210°C, 2.16 kg)		

³⁾ Please note: To ensure constant material properties the material should always be kept dry.

⁴⁾ measured on filament

⁵⁾ Samples were conditioned in standard climate (23°C, 50% RH 72h)

⁶⁾ Testing speed: 5 mm/min

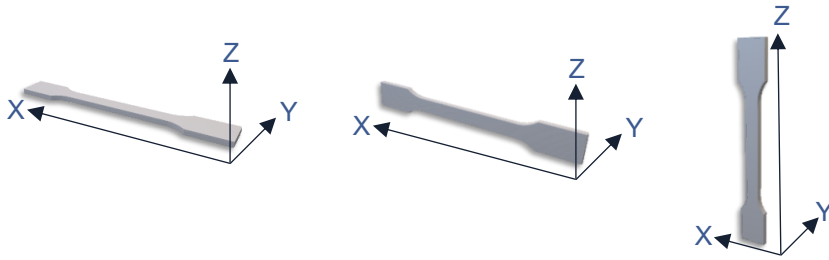
⁷⁾ Testing speed: 1 mm/min

⁸⁾ Testing speed: 2 mm/min

Hardness and Abrasion	Standard	Typical Values
Shore Hardness D (15s)	DIN ISO 7619-1	To be evaluated

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.



Compatibility Tests

A detailed overview of tested support material solutions for all Ultrafuse® model materials is presented in the document [Overvie Ultrafuse® support material compatibility](#). The following table summarizes the tested compatibility of Ultrafuse® BVOH to Ultrafuse model materials

Compatibility to Ultrafuse® model materials

Standard	PLA	Compatible
	PET	Compatible
	ABS	Not compatible, check alternative solution here
	rPET	Compatible
	PP	Not compatible, check alternative solution here
Engineering	PLA Tough	Compatible
	PLA Pro1	Compatible
	ABS Fusion+	Compatible
	ASA	Not compatible, check alternative solution here
	PA	Compatible
	PC/ABS FR	Not compatible, check alternative solution here
Flexible	TPU 85A	Compatible
	TPU 95A	Compatible
	TPU 64D	Compatible
Reinforced	PET CF15	Compatible
	PAHT CF15	Compatible
	PP GF30	Not compatible, check alternative solution here
	PA6 GF30	Compatible
	PC GF30	Not compatible, check alternative solution here

Dissolving in Water

Ultrafuse® BVOH can be dissolved in natural water without adding further substances. The dissolving time can be reduced by

- Removing larger BVOH structures upfront manually.
- Circulation of the water, for example by using an ultrasonic cleaning station or an aquarium pump in combination with a water trough.
- Increasing of the water temperature to 30-40°.

Please note

- An increasing amount of dissolved BVOH in the water (saturation) will lead to an increase of the dissolving time. In this case it is recommended to replace the water.
- Check the temperature stability of the model material. A too high water bath temperature can lead to a deformation of the parts. Use especially for PLA based model materials max. 30°C water temperature.
- Check the material safety data sheet (MSDS) for information about disposal considerations.