



Ultrafuse[®] TPU 64D

Flexible | Consistent | Reliable

Extended TDS

Complete Technical Documentation and
Testing Summary

Version 1.4

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Technical Data Sheet

Seamlessly combines strength and flexibility, offering the best of both worlds in a single filament.

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

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

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	1.0 kg, 2.0 kg, 4.0 kg, 8.0 kg	1.0 kg, 2.0 kg, 4.0 kg, 8.0 kg

Available colors:

	Black	RAL ca. 9005
	White	RAL ca. 9016
	Red	RAL ca. 3020

Spool Properties

Spool size	1.0 kg	2.0 kg	4.0 kg	8.0 kg
Outer diameter	200 mm	300 mm	350 mm	355 mm
Inner diameter	52 mm	51.5 mm	51.7 mm	36 mm
Width	68 mm	103 mm	103 mm	167 mm

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Recommended 3D-Print processing parameters		Used for test specimens
Printer	FFF printer	Zaribo
Nozzle Temperature ¹⁾	230 – 255°C	245°C
Build Chamber Temperature	-	-
Bed Temperature	40 – 60°C	55°C
Bed Material	Glass	Glass
Nozzle Diameter	≥ 0.4 mm	0.4 mm
Print Speed	30 – 60 mm/s	50 mm/s
Max Volumetric Speed ²⁾	8 mm³/s	-

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

Further Recommendations	
Drying recommendations to ensure printability and best mechanical properties	70°C in a hot air dryer or vacuum oven for at least 5 hours Please note: To ensure constant material properties the material should always be kept dry.
Support material compatibility	Single material breakaway, Ultrafuse® BVOH
Warehousing	Ultrafuse® TPU 64D 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 24 months.

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 X1 C with a nozzle diameter of 0.4mm

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General Properties	Standard	Average Values
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Filament Density ³⁾	ISO 1183-1	1149 kg/m ³
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Tensile Properties ⁴⁾	Standard	Average Values		
		XY-Direction	XZ-Direction	ZX-Direction

Tensile strength ⁵⁾	ISO 527	37 MPa	-	19 MPa
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Elongation at Break ⁵⁾	ISO 527	399 %	-	115 %
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Young's Modulus ⁶⁾	ISO 527	205 MPa	-	168 MPa
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Stress at 50% Elongation ⁵⁾	ISO 527	18 MPa	-	17 MPa
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Stress at 100% Elongation ⁵⁾	ISO 527	21 MPa	-	19 MPa
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Stress at 300% Elongation ⁵⁾	ISO 527	32 MPa	-	-
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Impact Properties ⁴⁾	Standard	Average Values		
		XY-Direction	XZ-Direction	ZX-Direction

Impact Strength Charpy (notched)	ISO 179-2	115 kJ/m ²	103 kJ/m ²	34 kJ/m ²
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Impact Strength Charpy (notched), -30°C	ISO 179-2	4.1 kJ/m ²	4.8 kJ/m ²	2.6 kJ/m ²
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Impact Strength Charpy (unnotched), -30°C	ISO 179-2	No break	No break	23.2 kJ/m ²
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Impact Strength Izod (notched)	ISO 180	No break	No break	43 kJ/m ²
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Tensile Notched Impact Strength	ISO 8256/1	No break	No break	No break
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Thermal Properties	Standard	Average Values
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Vicat softening point at 50 N	ISO 306	48°C
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Vicat softening point at 10 N	ISO 306	126°C
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Glass Transition Temperature	ISO 11357-2	-26°C
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Melt Volume-Flow Rate (MVR)	ISO 1133	40.4 cm ³ /10 min / 2.47 in ³ /10 min (210°C, 5 kg)
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³⁾ measured on filament

⁴⁾ Conditioning of the specimens: Tempering (100°C, 20h) Standard climate (23°C, 50% RH, 72h)

⁵⁾ Testing speed: 200 mm/min

⁶⁾ Testing speed: 1 mm/min

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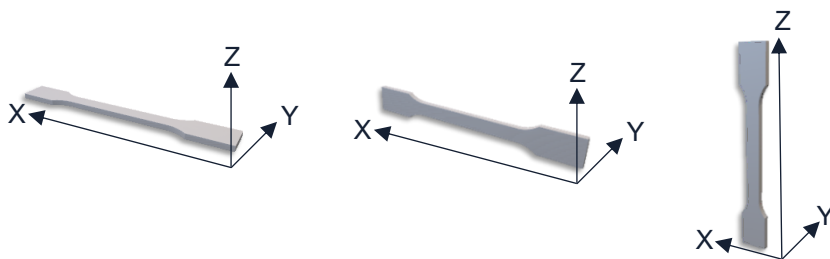
Mechanical Properties ⁷⁾	Standard	Average Values		
		XY-Direction	XZ-Direction	ZX-Direction
Tear Strength	ISO 34-1, A	66 kN/m	37 kN/m	79 kN/m

Hardness and Abrasion	Standard	Average Values
Shore Hardness D (15s)	DIN ISO 7619-1	58
Abrasion Resistance	DIN ISO 4649	43 mm ³
Compression Set at 23°C, 72 h	ISO 815	25%
Compression Set at 70°C, 24 h	ISO 815	55%

Biocompatibility	Standard	Typical Values
Cytotoxicity - Neutral Red	EN ISO 10993-5 (2009)	PASS ⁸⁾
Human Skin Irritation Test	EN ISO 10993-10 (2013)	PASS ⁸⁾
In vitro Sensitization Testing-KeratinoSens™	EN ISO 10993-10 (2020)	PASS ⁸⁾

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.



⁷⁾ Conditioning of the specimens: Tempering (100°C, 20h), Standard climate (23°C, 50% RH 72h)

⁸⁾ For the statement on Biocompatibility data see Chapter [Biocompatibility](#).

Biocompatibility

Product: Ultrafuse® TPU 64D

Revision: 28th of January 2025

3D printed test items of the above stated product have fulfilled the requirements of tests as stated below:

- **Cytotoxicity Testing- Neutral Red:**
(EN ISO 10993-5 (2009))
- **Human Skin Irritation Test:**
(EN ISO 10993-23 (2021))⁹⁾
- **In vitro Sensitization Testing- KeratinoSens™**
(prEN ISO 10993-10 (2020))

You need the original test report? Please contact sales@forward-am.com!

⁹ Patch test on 10 volunteers

The biocompatibility tests were recorded on test specimen of the referenced product to show compatibility of the material in general. The biocompatibility tests listed are not part of any continuous production protocol. The test assessments reflect only the test specimen and have to be retested on the final product. It remains the responsibility of the device manufacturers and /or end-users to determine the suitability of all printed parts for their respective application.

For notice:

We give no warranties, expressed or implied, concerning the suitability of mentioned product for use in any medical device and pharmaceutical applications.

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