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Ultrafuse® TPU 85A

Flexible | Low-temperature flexibility | High wear resistance

Extended TDS

Complete Technical Documentation and Testing Summary

Version 1.4

Contents

Technical Data Sheet 3

Biocompatibility 8

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Technical Data Sheet

Material with excellent low-temperature flexibility, wear resistance and damping performance.

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	1.0 kg, 2.0 kg
Available colors:		
	Black (matt)	RAL ca. 9004
	Natural White	N.A.

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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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.

Recommended 3D-Print processing parameters		Used for test specimens
Printer	FFF printer	German RepRap X400
Nozzle Temperature[1)]	200 – 220°C	210°C
Build Chamber Temperature	-	-
Bed Temperature	40°C	40°C
Bed Material	Glass	Glass
Nozzle Diameter	≥ 0.4 mm	0.4 mm
Print Speed	15 – 40 mm/s	25 mm/s
Max Volumetric Speed[2)]	12 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	Ultrafuse® BVOH
Warehousing	Ultrafuse® TPU 85A 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
Filament Density[3)]	ISO 1183-1	1114 kg/m³

Tensile Properties[4)]	Standard	Average Values		
		XY-Direction	XZ-Direction	ZX-Direction
Tensile strength[5)]	ISO 527	34 MPa	-	10 MPa
Elongation at Break[5)]	ISO 527	600 %	-	320 %
Young's Modulus[6)]	ISO 527	20 MPa	-	27 MPa
Stress at 50% Elongation[5)]	ISO 527	7.2 MPa	-	6.2 MPa
Stress at 100% Elongation[5)]	ISO 527	8.7 MPa	-	7.5 MPa
Stress at 200% Elongation[5)]	ISO 527	10.1 MPa	-	9 MPa

Impact Properties[4)]	Standard	Average Values		
		XY-Direction	XZ-Direction	ZX-Direction
Impact Strength Charpy (notched)	ISO 179-2	No break	No break	16.8 kJ/m²
Impact Strength Charpy (notched), -30°C	ISO 179-2	47.3 kJ/m²	95.4 kJ/m²	9.3 kJ/m²
Impact Strength Izod (notched)	ISO 180	No break	No break	No break
Tensile Notched Impact Strength	ISO 8256/1	No break	No break	111 kJ/m²

Thermal Properties	Standard	Average Values
Vicat softening point at 50 N	ISO 306	35°C
Vicat softening point at 10 N	ISO 306	114°C
Glass Transition Temperature	ISO 11357-2	-44°C
Melt Volume-Flow Rate (MVR)	ISO 1133	10.7 cm³/10 min / 0.7 in³/10 min (190°C, 2.16 kg)

[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	80 kN/m	18 kN/m	30 kN/m

Electrical Properties[7)]	Standard	Average Values		
		XY-Direction	XZ-Direction	ZX-Direction
Dielectric Strength	IEC 60243-1	21 kV/mm	-	17 kV/mm
Volume Resistivity	IEC 62631-3-1	2.6E+11 Ω cm	-	2.1+11 Ω cm

Hardness and Abrasion	Standard	Average Values
Shore Hardness A (3s)	DIN ISO 7619-1	85
Shore Hardness D (15s)	DIN ISO 7619-1	29
Abrasion Resistance	DIN ISO 4649	82 mm^3
Compression Set at 23°C, 72 h	ISO 815	26%
Compression Set at 70°C, 24 h	ISO 815	52%

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

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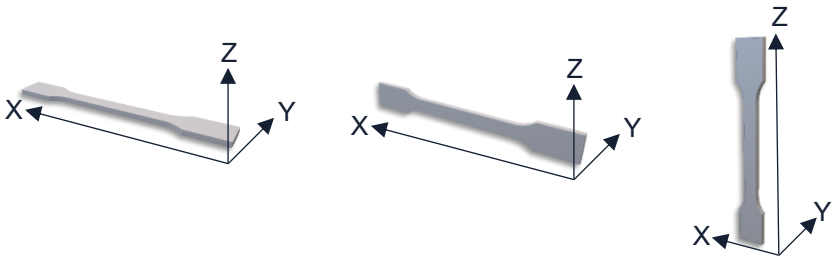
Biocompatibility	Standard	Typical Values
Cytotoxicity - XTT	-	PASS[8)]
In Vitro Skin Irritation Testing	OECD Guideline No. 439	PASS[8)]
In Vivo Sensitization Testing-Local Lymph Node Assay	ISO 10993-10 (2013); OECD Guideline No. 429	PASS[8)]

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.



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

Biocompatibility

Product: Ultrafuse® TPU 85A

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- XTT**
- **In Vitro Skin Irritation Testing:**
  (OECD Guideline No. 439)
- **In Vivo Sensitization Testing- Local Lymph Node Assay:**
  (ISO 10993-10 (2013); OECD Guideline No. 429)

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

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 deter-mine the suitability of all printed parts for their respective application.

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