

Technical Data Sheet

Ultrafuse® TPU 85A

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Version No.: 3.0

General information

Components

BASF ether based thermoplastic polyurethane (TPU) based filament for Fused Filament Fabrication.

Product Description

Ultrafuse® TPU 85A comes in its natural white colour. Chemical properties (e.g. resistance against particular substances) and tolerance for solvents can be made available, if these factors are relevant for a specific application. Generally, these properties correspond to publicly available data on polyether based TPUs. This material is not FDA conform. Good flexibility at low temperature, good wear performance and good damping behaviour are the key features of Ultrafuse® TPU 85A.

Delivery form and 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 12 months.

Product safety

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

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.

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.

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 | 750 g | 750 g |
| Available colors | Natural | |

Spool Properties

| | |
|----------------------|---------|
| Available Spool size | 750 g |
| Outer diameter | 200 mm |
| Inner diameter | 50.5 mm |
| width | 55 mm |

Recommended 3D-Print processing parameters

Used for test specimens

| | | |
|---------------------------|-----------------------------|--------------------|
| Printer | FFF printer | German RepRap X400 |
| Nozzle Temperature | 200 – 220 °C / 392 – 428 °F | 210 °C / 410 °F |
| Build Chamber Temperature | - | - |
| Bed Temperature | 40 °C / 104 °F | 40 °C / 104 °F |
| Bed Material | Glass | Glass |
| Nozzle Diameter | ≥ 0.4 mm | 0.4 mm |
| Print Speed | 15 – 40 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 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, Ultrafuse® HIPS |

| General Properties | | Standard |
|--------------------|--|------------|
| Filament Density* | 1114 kg/m ³ / 70 lb/ft ³ | ISO 1183-1 |

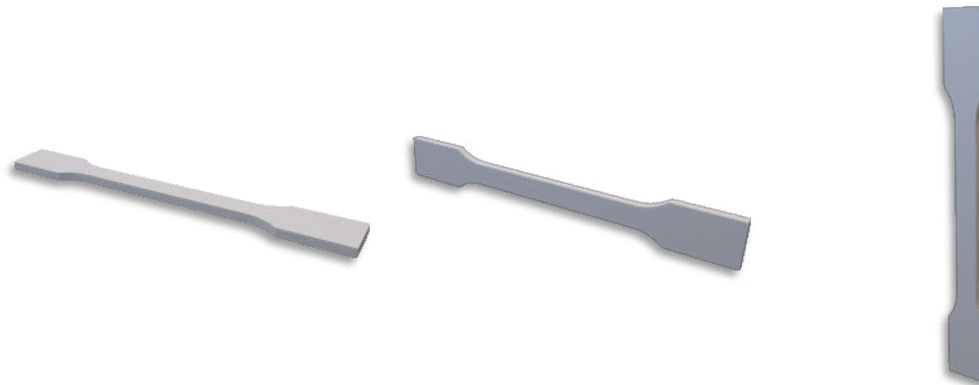
*measured on filament

| Classification and Certification | | Standard |
|----------------------------------|--------|-------------|
| Biocompatibility | | |
| Cytotoxicity XTT neutral red | Passed | ISO 10993-5 |
| Skin irritation | Passed | ISO10993-10 |
| Skin sensitization LLNA | Passed | ISO10993-10 |
| KretinoSens | | |

| Thermal Properties | | Standard |
|------------------------------|--|-------------|
| Vicat softening point @ 50 N | 35 °C / 95 °F | ISO 306 |
| Vicat softening point @ 10 N | 114 °C / 237 °F | ISO 306 |
| Glass Transition Temperature | -44 °C / -47 °F | ISO 11357-2 |
| Melt Volume Rate | 10.7 cm ³ /10 min / 0.7 in ³ /10 min (190 °C, 2.16 kg) | ISO 1133 |

| General Mechanical Properties | | Standard |
|--------------------------------|--|------------|
| Compression Set at 23 °C, 72 h | 26% | ISO 815 |
| Compression Set at 70 °C, 24 h | 52% | ISO 815 |
| Abrasion Resistance | 82 mm ³ / 0.005 in ³ | ISO 4649 |
| Shore A Hardness (3 s) | 85 | ISO 7619-1 |
| Shore D Hardness (15 s) | 29 | ISO 7619-1 |

Mechanical Properties¹



| Print direction | Standard | XY Flat | XZ On its edge | ZX Upright |
|---|------------|------------------------|------------------------|-----------------------|
| Stress at 50 % Elongation ² | ISO 527 | 7.2 MPa / 1.0 ksi | - | 6.2 MPa / 0.9 ksi |
| Stress at 100% Elongation ² | ISO 527 | 8.7 MPa / 1.3 ksi | - | 7.5 MPa / 1.1 ksi |
| Stress at 200% Elongation ² | ISO 527 | 10.1 MPa / 1.5 ksi | - | 9 MPa / 1.3 ksi |
| Stress at Break, TPE ² | ISO 527 | 34 MPa / 4.9 ksi | - | 10 MPa / 1.5 ksi |
| Elongation at Break, TPE ² | ISO 527 | 600% | - | 320% |
| Young's Modulus ³ | ISO 527 | 20 MPa / 2.9 ksi | - | 27 MPa / 3.9 ksi |
| Impact Strength Charpy (notched) | ISO 179-2 | No break | No break | No break |
| Impact Strength Charpy (notched) @ -30 °C | ISO 179-2 | 47.3 kJ/m ² | 95.4 kJ/m ² | 9.3 kJ/m ² |
| 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/m ² |
| Tear Strength | ISO 34-1 | 80 kN/m | 18 kN/m | 30 kN/m |

Electrical Properties¹

| | | | | |
|---------------------|---------------|-------------|---|-------------|
| Volume Resistivity | IEC 62631-3-1 | 2.6E+11 Ωcm | - | 2.1E+11 Ωcm |
| Dielectric Strength | IEC 60243-1 | 21 kV/mm | - | 17 kV/mm |

¹Conditioning of the specimens: Tempering (100°C, 20h) Standard climate (23°C, 50% RH, 72h)

²testing speed: 200 mm/min

³testing speed: 1 mm/min