

TECHNICAL DATA SHEET (TDS)

Thermoplastic Polyurethane (TPU) Filament – 85A

1. Product Identification

Parameter	Specification
Material Type	Thermoplastic Polyurethane (TPU)
Hardness	Shore A 85
Filament Diameter	1.75 mm
Processing Method	Fused Deposition Modeling (FDM / FFF)
Appearance	Solid / Translucent (depending on grade)

2. Mechanical Properties

Property	Typical Value	Test Method
Tensile Strength	30 – 40 MPa	ASTM D412 / ISO 37
Elongation at Break	400 – 500 %	ASTM D412 / ISO 37
Tear Strength	80 – 100 kN/m	ASTM D624
Hardness	85 Shore A	ASTM D2240
Abrasion Resistance	≤ 50 mm ³	ISO 4649
Compression Set (23°C, 24h)	≤ 30 %	ASTM D395

3. Physical Properties

Property	Typical Value	Test Method
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Density	1.18 – 1.22 g/cm ³	ASTM D792
Melt Flow Index (190°C / 2.16 kg)	20 – 30 g/10 min	ASTM D1238
Moisture Absorption (24h)	≤ 0.8 %	ASTM D570

4. Thermal Properties

Property	Typical Value	Test Method
Glass Transition Temperature (T _g)	~ -30°C	DSC (ISO 11357)
Vicat Softening Temperature	80 – 100°C	ASTM D1525
Service Temperature Range	-30°C to 80°C	Internal Method

5. Printing Parameters (Recommended)

Parameter	Recommended Setting
Nozzle Temperature	210 – 240°C
Build Plate Temperature	40 – 60°C
Print Speed	20 – 50 mm/s
Retraction	Minimal / Disabled
Cooling Fan	30 – 60 %
Nozzle Diameter	≥ 0.4 mm
Extruder Type	Direct Drive Recommended (limited Bowden compatibility)

6. Rheological & Processing Notes

- TPU 85A exhibits **viscoelastic flow behavior**, requiring controlled extrusion conditions
- Balanced hardness allows:
 - Good flexibility with improved dimensional stability
 - Reduced risk of filament buckling compared to softer TPU grades
- Recommended adjustments:
 - Lower acceleration and jerk settings

- Smooth filament path with minimal resistance
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7. Chemical Resistance

Exposure	Performance
Oils & Greases	Excellent
Aliphatic Hydrocarbons	Good
Acids (Dilute)	Moderate
UV Resistance	Moderate (stabilization recommended)
Water	Good

8. Applications

- Functional flexible components
 - Protective housings and covers
 - Footwear components (mid-soles, grips)
 - Automotive interior parts
 - Cable management and strain reliefs
 - Vibration damping elements
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9. Storage & Drying Conditions

Parameter	Recommendation
Storage Environment	Sealed, dry container
Relative Humidity	< 20 % RH
Drying Temperature	45 – 55°C
Drying Time	4 – 6 hours

Note: TPU is hygroscopic. Excess moisture may result in:

- Stringing and oozing
- Surface bubbling

- Reduced interlayer adhesion
 - Inconsistent extrusion
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10. Advantages & Limitations

Advantages

- Excellent balance of flexibility and strength
- High abrasion and wear resistance
- Strong layer adhesion
- Easier to print than softer TPU (e.g., 65A)

Limitations

- Moisture sensitive
 - Lower rigidity compared to rigid polymers (PLA, PETG, ABS)
 - Requires controlled print speed and extrusion settings
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11. Disclaimer

The values provided in this Technical Data Sheet are **typical values obtained under controlled laboratory conditions** and are intended for reference only. They should not be considered as guaranteed specifications. Users are responsible for verifying suitability for their specific application and processing conditions.