



## **FusRock® FDM Printing Material Technical Data Sheet**

**Data / Revised: 05.2025**

**Version No: 1.6**

### **FusFlex™ TPU-Aero**

主动发泡轻量化柔性 3D 打印材料

Active foaming low weight TPU 3D print material

### **产品介绍**

#### **Product Description**

FusFlex™ TPU-Aero 是一款专为 FFF 打印技术开发的中等硬度主动发泡型柔性材料，通过控制打印温度，可以实现不同的挤出发泡倍率，最终呈现出不同的减重和柔软度效果。FusFlex™ TPU-Aero 打印件表面硬度可控制在 65A-85A 之间。在最大发泡率下，FusFlex™ TPU-Aero 相比普通 TPU 材料可以减重 50%，打印表面具有出色的类布艺质感。

FusFlex™ TPU-Aero is a medium-hardness, active foaming flexible material specifically developed for FFF printing technology. By controlling the printing temperature, different extrusion foaming ratios can be achieved, resulting in varying weight reduction and softness effects. The surface hardness of FusFlex™ TPU-Aero printed parts can be controlled between 65A and 85A. At the maximum foaming rate, FusFlex™ TPU-Aero can reduce weight by 50% compared to ordinary TPU materials, with the printed surface exhibiting an excellent fabric-like texture.

### **产品亮点**

#### **Product Advantages**

- 主动发泡技术

FusFlex™ TPU-Aero 是一款在打印过程中进行发泡的柔性 TPU 材料。FusRock® 通过特殊的挤出加工工艺，将发泡组分在未激活的状态下均匀分布在 TPU 基材内部，使得整卷产品重量仍然保持在 1kg，未有减少。在打印过程中通过调节打印温度可以自由控制发泡组分的膨胀倍率，实现不同的减重和柔软度效果，满足不同应用要求。

FusFlex™ TPU-Aero is a flexible TPU material that foams during the printing process. FusRock® uses a special extrusion processing technique to uniformly distribute the foaming components within the TPU matrix in an unactivated state, ensuring that the entire spool of material remains at 1kg without weight reduction. By adjusting the printing temperature, the expansion ratio of the foaming



components can be freely controlled, achieving different weight reduction and softness effects to meet various application requirements.

- 易于打印

FusFlex™ TPU-Aero 通过特殊的挤出加工工艺，避免了发泡组分在线材内发泡后会大幅度降低线材硬度的缺陷。未激活的发泡组分充当刚性颗粒均匀分布在 TPU 基材内，有效提高了 FusFlex™ TPU-Aero 线材的表面硬度，降低了打印难度。FusFlex™ TPU-Aero 兼容大部分打印机打印，最大挤出流量可达 12mm³/s。

FusFlex™ TPU-Aero avoids the defect of significantly reduced filament hardness after foaming by using a special extrusion processing technique. The unactivated foaming components act as rigid particles uniformly distributed within the TPU matrix, effectively increasing the surface hardness of the FusFlex™ TPU-Aero filament and reducing printing difficulty. FusFlex™ TPU-Aero is compatible with most printers, with a maximum extrusion flow rate of 12mm³/s.

## 产品详情

### Available

颜色 Color: 白色 White/ 黑色 Black/ 鲜绿色 Bright Green

线径 Diameter: 1.75mm

净重 Net Wet: 1KG

## 材料（线材）物性表

### Filament Material Properties

测试项目 Property	测试方法 Testing method	典型值 Typical value
线材密度 Filament Density	ISO 1183	1.15 g/cm³
熔融指数 Melt index	190°C, 2.16kg	8
饱和吸湿率 Water absorption	ISO 62: Method 1	5.82 %



## 打印件机械性能

### Mechanical Properties of Printed Specimens

样条打印温度/Specimens print temperature		240°C	250°C	260°C	270°C
设定挤出量/ Flow ratio		0.88	0.68	0.58	0.50
打印件密度 Print parts density	ISO 845	0.93 g/cm <sup>3</sup>	0.74 g/cm <sup>3</sup>	0.62 g/cm <sup>3</sup>	0.54 g/cm <sup>3</sup>
维卡软化点 Vicat softening temperature	ISO 306	78.8 °C	70.4 °C	61.8 °C	50.3 °C
硬度 Hardness	ISO 7619	82A	75A	72A	66A
回弹性 Bayshore rebound	ASTM D2632	40 %	40 %	39 %	40 %
拉伸屈服强度 (X-Y) Tensile yield strength (X-Y)	ISO 1798	5.98±0.10 MPa	4.23±0.04 MPa	3.22±0.05 MPa	3.59±0.11 MPa
拉伸断裂强度 (X-Y) Tensile breaking strength (X-Y)		9.80±0.42 MPa	6.81±0.11 MPa	4.77±0.16 MPa	3.59±0.11 MPa
断裂伸长率(X-Y) elongation at break (X-Y)		598.69±72.20 %	576.27±8.48 %	520.54±32.31 %	452.13±19.40 %

试样打印参数：喷嘴大小 0.4mm，底板加热 45°C，打印速度 60mm/s，填充率 100%，填充角度±45°

Specimens printed under the following conditions: Nozzle size 0.4mm, Bed temp 45°C, Print speed 60mm/s, Infill 100%, Infill angle ±45°



## 建议打印参数

### Recommended printing conditions

喷头温度 Nozzle temperature	230-270°C
建议喷嘴大小 Recommended nozzle diameter	0.4mm-0.8mm
建议底板材质 Recommended build surface	PEI 涂层或 PEI 贴膜底板（取件时需配合喷洒酒精） PEI film or PEI coated build surface(Spray alcohol to help remove print parts)
底板温度 Build plate temperature	30-45°C
冷却风扇 Cooling fan speed	On
打印速度 Print speed	< 100 mm/s
回抽距离 Retraction distance	0mm or Off

#### 其他建议：

- TPU 材料暴露在空气中容易吸收水分，建议您打开 FusFlex™ TPU-Aero 真空铝箔袋包装后立即将线材放入干燥盒内（湿度控制在 15%以下）进行打印，不用的线材请放回原包装铝箔袋内密封保存。  
TPU materials are prone to absorb moisture when exposed to air. It is recommended to place the FusFlex™ TPU-Aero filament into a dry box (humidity controlled below 15%) immediately after opening the vacuum aluminum foil packaging. Unused filament should be sealed back in the original aluminum foil packaging.
- 长时间暴露于空气中的 TPU-Aero 线材，请先将线材放入 70-80°C 烘箱内干燥 4-6h 后进行打印，避免材料潮湿使得挤出线条中存在气泡、孔洞，拉丝等问题。  
For FusFlex™ TPU-Aero filament that has been exposed to air for a long time, it is recommended to dry the filament in an oven at 70-80°C for 4-6 hours before printing to avoid issues such as bubbles, holes, or stringing caused by moisture.
- 由于发泡类材料在热端融腔内受热会不断膨胀，空驶时会不可避免的出现漏料情况，即使调节回抽距离和回抽速度也无法改善，建议在切片软件中关闭回抽功能，一次仅打印单个模型或使用逐件打印功能，减少因长距离



空驶和跳跃造成的拉丝和漏料缺陷。

Due to the continuous expansion of foaming materials in the hot end chamber, leakage is inevitable during travel movement. Even adjusting retraction distance and speed cannot improve this. It is recommended to disable retraction in the slicing software, print only one model at a time, or use the print-by-part function to reduce stringing and leakage caused by long-distance idle movements and jumps.

4. 部分 PEI 涂层或 PEI 贴膜的打印底板可能会对 TPU 类材料粘接力过牢，取件时请不要用力拉扯模型，容易造成打印件底部破损，请喷洒少量酒精在打印件底部边缘，稍等数秒钟，待酒精液体渗透进打印件与 PEI 底板间的缝隙后即可轻松取下模型。或者建议使用无涂层的不锈钢板并涂抹少量 PVP 胶水后作为构建底板。

Some of PEI textured or PEI film build plates may exhibit excessive adhesion to TPU materials, avoid forceful removal to prevent base layer damage. Apply a small amount of isopropyl alcohol (99%) to the edge regions of the model's base. Wait 10-20 seconds to allow capillary penetration between the model and PEI surface, enabling non-destructive release. Alternatively, use an uncoated stainless steel build plate with a thin layer of polyvinylpyrrolidone (PVP) adhesive for controlled interfacial separation.

#### 免责声明

##### Disclaimer

Fusrock® 3D 打印耗材适用于通用打印用途，已在标准条件下进行测试。然而，打印成品的性能与安全性受多种因素影响，包括打印参数、模型设计、使用环境及实际用途。使用 Fusrock® 材料即表示用户已知悉并同意，自行评估打印件是否适用于其具体应用，并承担由此产生的全部风险。Fusrock® 对使用本公司耗材打印的产品在实际应用中可能导致的任何损害、伤害或损失不承担任何责任，包括但不限于结构失效、功能异常或使用环境中的安全隐患。在将打印件应用于关键、功能性或商业性场景前，请务必进行充分测试。除 Fusrock® 已标明材料所获得的各项认证资质外，Fusrock® 产品未取得医疗、航天或生命支持系统认证资质。

Fusrock® 3D printing filaments are suitable for general printing applications and have been tested under standard conditions. However, the performance and safety of printed products are influenced by multiple factors, including printing parameters, model design, operating environment, and intended use. By using Fusrock® materials, users acknowledge and agree to independently evaluate the suitability of printed items for their specific applications and assume all associated risks. Fusrock® shall not be held liable for any damages, injuries, or losses resulting from the practical use of products printed with its materials, including but not limited to structural failures, malfunctions, or safety hazards in operational environments. Thorough testing must be conducted before applying printed components to critical, functional, or commercial scenarios. Fusrock® products are not certified for medical, aerospace, or life-support systems, except for certifications explicitly stated by Fusrock® for specific materials.