

FDM Printing Material Technical Data Sheet

aeFlex™ TPU-Aero

Active foaming low weight TPU 3D print material

主动发泡轻量化柔性 3D 打印材料

Product Description

产品介绍

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

aeFlex™ 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。aeFlex™ TPU-Aero 打印件表面硬度可控制在 85A-65A 之间。在最大发泡率下，aeFlex™ 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。

Product Advantages

产品亮点

- **Active Foaming Technology**

aeFlex™ TPU-Aero is a flexible TPU material that is foamed during the printing process. Phaetus' special extrusion process realizes that the foamed components are uniformly distributed inside the TPU substrate in an inactive state, so that the weight of the whole roll of the product is still maintained at 1kg, without any reduction. By adjusting the printing temperature during the printing process, the expansion rate of the foam components can be freely controlled to realize different weight reduction and softness effects to meet different application requirements.

- **主动发泡技术**

aeFlex™ TPU-Aero 是一款在打印过程中进行发泡的柔性 TPU 材料。Phaetus 通过特殊的挤出加工工艺，实现了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。

● Easy to print

With a special extrusion processing technology, aeFlex™ TPU-Aero overcomes the drawback that foaming components in the filaments would cause a significant reduction in the filaments' hardness after foaming. The unactivated foaming components, acting as rigid particles, are evenly distributed within the TPU matrix. This effectively enhances the surface hardness of aeFlex™ TPU-Aero filaments and simplifies the printing process. aeFlex™ TPU-Aero is compatible with most 3D printers and can achieve a maximum extrusion flow rate of 12 mm³/s.

● 易于打印

aeFlex™ 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 aeFlex™ TPU-Aero 线材的表面硬度，降低了打印难度。aeFlex™ TPU-Aero 兼容大部分打印机打印，最大挤出流量可达 12mm³ /s。

Available

产品详情

Color: White/ Black

Diameter: 1.75mm

Net Wet: 1KG

Filament Material Properties

材料（线材）物性表

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	200°C, 2.16kg	/

Mechanical Properties of Printed Specimens

打印件机械性能

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 ³	0.74 g/cm ³	0.62 g/cm ³	0.54 g/cm ³
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
拉伸屈服强度 (X-Y) Tensile yield strength (X-Y)	ISO 527	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 %

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

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°

Recommended printing conditions

建议打印参数

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	玻璃底板, PC 膜或不锈钢板 Glass, PC Film or Steel Plate
底板温度 Build plate temperature	30-45°C
冷却风扇 Cooling fan speed	On
打印速度 Print speed	< 150 mm/s
回抽距离 Retraction distance	0mm or Off

Other suggestions:

1. TPU material is easy to absorb moisture when exposed to the air, we suggest that you put the filaments into a dry box (humidity control below 15%) for printing immediately after you open the aeFlex™ TPU-Aero vacuum foil pouch, and put the unused filament back into the original foil pouch for sealing and storage.
2. For the aeFlex™ TPU-Aero filaments that has been exposed to air for a long time, please put the filaments into the 70-80°C oven to dry it for 4-6h before printing, to avoid the material from being humid and making the extruded line with air bubbles, holes, stringing appear and other problems.
3. As foaming materials expand continuously when heated in the hot-end melt chamber, material leakage is inevitable during idle moves. Even adjusting the retraction distance and speed cannot improve this situation. It is recommended to turn off the retraction function in the slicing software, print only one model at a time, or use the print-one-by-one function. This can reduce stringing and material leakage defects caused by long-distance idle moves and jumps.

其他建议:

1. TPU 材料暴露在空气中容易吸收水分,建议您打开 aeFlex™ 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。
2. 长时间暴露于空气中的 aeFlex™ 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。
3. 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。