



## FusRock® FDM Printing Material Technical Data Sheet

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### FusFun™ PLA-Aero Pro

轻质发泡型 PLA 3D 打印材料

Lightweight foaming PLA 3D printing material

### 产品亮点

#### Product highlights

##### ● 在线发泡技术

FusFun™ PLA-Aero Pro 是一款在打印过程中进行发泡的 PLA 耗材。在打印前，发泡剂在耗材内处于未发泡状态，在打印过程中通过调整打印温度可以自由控制发泡助剂发泡倍率，最大发泡倍率可达 250%。

##### ● On-Demand Foaming Technology

FusFun™ PLA-Aero Pro is a PLA filament that will start foaming with the aid of a blowing agent during the printing process. The blowing agent is in an unfoamed state in the PLA filament before printing. During the printing process, by adjusting the printing temperature, the foaming ratio of the blowing agent can be easily controlled. The maximum foaming ratio can reach 250%.

### 产品介绍

#### Product Description

FusFun™ PLA-Aero Pro 专为航模、船模、无人机等领域研发，提供了一种轻质的 3D 打印耗材。PLA-Aero Pro 通过在打印过程中温度调节，控制材料的发泡倍率，使喷头挤出的耗材密度可以在一定范围内调节，降低模型重量，最佳情况下可降至普通 PLA 打印模型的 40%；打印件表面的磨砂质感也可以一定程度上降低层纹现象。

FusFun™ PLA-Aero Pro is a type of lightweight 3D printing material specially developed for aircraft model, ship model, drone and other fields. PLA-Aero Pro controls the foaming ratio of the material by adjusting the temperature during the printing process so that the density of the material extruded by the nozzle can be adjusted within a certain range. With this technique, it is easy to reduce the weight of the model. In the best-case scenario, the model weight can be reduced to 40% of a model printed with ordinary PLA. In addition to that, the matte texture of the printed surface can reduce the visibility of



printed layers and thus give a smooth surface finish.

## 产品详情

### Product details

颜色 Color: 白色 White / 红色 Red / 黄色 Yellow / 灰色 Grey

线径 Diameter: 1.75mm

净重 Net Weight: 1kg

## 耗材物性表 (未发泡)

### Filament Physical Properties (unfoamed)

| 测试项目<br>Property                        | 测试方法<br>Test Method | 典型值<br>Typical value  |
|---|---------------------|-----------------------|
| 密度<br>Density                           | ISO 1183            | 1.19g/cm <sup>3</sup> |
| 玻璃化转变温度<br>Glass transition temperature | ISO 11357           | 60°C                  |
| 熔融指数<br>Melt index                      | 200°C, 2.16kg       | 5g/10min              |
| 维卡软温度<br>Vicat softening temperature    | ISO 306             | 65°C                  |



## 热学性能（发泡）

### Thermal Properties Of Filament (Foamed)

| 测试项目<br>Property | 测试方法<br>Test Method     | 典型值<br>Typical value |
|------------------|-------------------------|----------------------|
| 热变形温度            | ISO 75 Method A 1.80MPa | 43°C                 |
| HDT              | ISO 75 Method B 0.45MPa | 50°C                 |

## 打印后机械性能（发泡）

### Mechanical Properties of Printed Specimens (Foamed)

|  |         |                             |
|--|---------|-----------------------------|
| 拉伸断裂强度 (X-Y)<br><b>Tensile breaking strength (X-Y)</b> | ISO 527 | 10.65±0.09 MPa              |
| 断裂伸长率 (X-Y)<br><b>Elongation at break (X-Y)</b>        |         | 9.17±0.61 %                 |
| 杨氏模量 (X-Y)<br><b>Young's modulus (X-Y)</b>             | ISO 527 | 820.31±8.82 MPa             |
| 拉伸断裂强度 (Z)<br><b>Tensile breaking strength (Z)</b>     |         | 5.06±0.19 MPa               |
| 断裂伸长率 (Z)<br><b>Elongation at break (Z)</b>            | ISO 527 | 10.91±2.01 %                |
| 杨氏模量 (Z)<br><b>Young's modulus (Z)</b>                 |         | 419.05±14.60 MPa            |
| 弯曲强度 (X-Y)<br><b>Bending strength(X-Y)</b>             | ISO 178 | 19.27±0.09 MPa              |
| 弯曲模量<br><b>Bending modulus(X-Y)</b>                    |         | 872.93±55.10 MPa            |
| 缺口冲击强度 (X-Y)<br><b>Charpy impact strength (X-Y)</b>    | ISO 179 | 2.93±0.15 kJ/m <sup>2</sup> |

试样打印参数：喷嘴大小 0.4mm，喷嘴温度 260°C，底板加热 50°C，打印速度 60mm/s，填充率 100%，填充角度±45°，流量 0.4

Specimens printed under the following conditions: Nozzle size 0.4mm, Nozzle temp 260°C, Bed temp 50°C, Print speed 60mm/s, Infill 100%, Infill angle ±45°, flow rate 0.4



## 建议打印参数

### Recommended Printing Conditions

|                                    |   |
|------------------------------------|---|
| 喷头温度                               |   |
| 最佳发泡温度                             | 230-270°C   |
| Nozzle temperature                 | 260°C   |
| Optimum foaming temperature        |   |
| 建议喷嘴大小                             | ≥0.4 mm   |
| Recommended nozzle size            |   |
| 建议底板材质                             | 玻璃、PEI 膜、PC 膜或涂抹 PVP 固体胶                              |
| Recommended build surface material | Glass、PEI Film、PC Film or plate applied with PVP glue |
| 底板温度                               | 50°C  |
| Build plate temperature            |   |
| Raft 间距                            | 0.2mm   |
| Raft separation distance           |   |
| 回抽距离                               | 0 mm  |
| Retraction distance                |   |
| 冷却风扇                               | 100%  |
| Cooling fan                        |   |
| 打印速度                               | 30-90 mm/s  |
| Printing speed                     |   |

其他建议：

由于 PLA-Aero Pro 采用了“在线发泡”的技术，打印过程中耗材在喷头内部受热后就会不断膨胀，空走时会造成难以避免的拉丝现象，即使调整切片软件中的回抽设置也无法起到明显的作用，建议关闭回抽设置，模型表面的拉丝非常容易用手去除干净。

Additional suggestions:

Since PLA-Aero Pro adopts the "On-Demand foaming" technology, the filament will continue to expand in the nozzle after being heated during the printing process. Therefore, it will cause unavoidable stringing during the nozzle movement. Even adjusting the retraction setting in the slicing software cannot solve this problem. Based on the above, it is recommended to turn off the retraction setting. The string on the surface of models can easily be removed by hand.