

## Phaetus® FDM Printing Material Technical Data Sheet

### aeWorthy™ PLA-Aero

Lightweight foaming PLA 3D printing material

一种轻质发泡型 PLA 3D 打印材料

### Product highlights

#### 产品亮点

- **On-Demand Foaming Technology**

aeWorthy™ PLA-Aero 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 unexcited 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 200%.

- **在线发泡技术**

aeWorthy™ PLA-Aero 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激发状态，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 200%。

### Product Description

#### 产品介绍

aeWorthy™ PLA-Aero is a type of lightweight 3D printing material specially developed for aircraft model, ship model, drone and other fields. PLA-Aero 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 50% 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.

aeWorthy™ PLA-Aero 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 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 50%；打印件表面的磨砂质感也可以一定程度上降低层纹现象。

Product details

产品详情

Color: White / Red / Yellow / Grey

Diameter: 1.75mm

Net Weight: 1kg

Filament Physical Properties

耗材（未发泡）物性表

测试项目 Property	测试方法 Test Method	典型值 Typical value
密度 Density	ISO 1183	1.1 g/cm³
玻璃化转变温度 Glass transition temperature	ISO 11357	60°C
熔融指数 Melt index	200°C, 2.16kg	10g/10min
维卡软温度 Vicat softening temperature	ISO 306	65°C

Mechanical Properties of Printed Specimens

打印后机械性能

拉伸屈服强度 (X-Y) Tensile yield strength (X-Y)	ISO 527	10.37±0.08MPa
屈服伸长率 (X-Y) Elongation at Yield (X-Y)		2.06±0.04%

拉伸断裂强度 (X-Y) Tensile breaking strength (X-Y)		10.76±0.19MPa
断裂伸长率 (X-Y) Elongation at break (X-Y)		16.87±2.11%
杨氏模量 (X-Y) Young's modulus (X-Y)		893±18MPa
拉伸断裂强度 (Z) Tensile breaking strength (Z)	ISO 527	3.57±0.24MPa
杨氏模量 (Z) Young's modulus (Z)		254±23MPa
断裂伸长率 (Z) Elongation at break (Z)		10.91±1.11%
缺口冲击强度 (X-Y) Charpy impact strength (X-Y)	ISO 179	2.64±0.19KJ/m <sup>2</sup>

Specimens printed under the following conditions: Nozzle size 0.4mm, Nozzle temp 230°C, Bed temp 50°C, Print speed 45mm/s, Infill 100%, Infill angle ±45°

试样打印参数: 喷嘴大小 0.4mm, 喷嘴温度 230° C, 底板加热 50° C, 打印速度 45mm/s, 填充率 100%, 填充角度 ±45°

## Recommended Printing Conditions

建议打印参数

喷头温度 最佳发泡温度 Nozzle temperature Optimum foaming temperature	180-250°C 230°C
建议喷嘴大小 Recommended nozzle size	≥0.4 mm
建议底板材质 Recommended build surface material	玻璃、PEI 膜、PC 膜或涂抹 PVP 固体胶 Glass、PEI Film、PC Film or plate applied with PVP glue
底板温度 Build plate temperature	50°C

Raft 间距 Raft separation distance	0.2mm
回抽距离 Retraction distance	0 mm
冷却风扇 Cooling fan	100%
打印速度 Printing speed	30-90 mm/s

#### Other suggestions:

Since PLA-Aero 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.

#### 其他建议:

由于 PLA-Aero 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。

## Temperature-foaming ratio relationship

温度-发泡倍率关系表

