# FusRock™ FDM Printing Material

# Technical Data Sheet

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## FusFree™ S-PAHT

FusFree™ S-PAHT 快速易剥离支撑材料。

FusFree™ S-PAHT Quick-Remove Support Material

## 产品亮点

- **Smart Adhesion Technology**
  FusFree™ S-PAHT 通过配方与工艺调节与主体材料具有适中的粘接强度，既确保主体材料可以在支撑面上成型，又可以在拆除支撑过程中轻松与主体材料支撑面分离。
  FusFree™ S-PAHT can provide a moderate bond strength to the body material through formulation and process modifications, which ensures that the body material can be molded to the support surface and can be easily separated from the support surface of the body material during removal of the support.

- **Quick Remove Technology**
  FusFree™ S-PAHT 通过配方与工艺调节大幅降低了自身的层间粘接强度，可以在拆除过程中被轻松撕除。
  FusFree™ S-PAHT has dramatically reduced its own interlayer bond strength through formulation and process modifications, and can be easily teared apart during removal process.

- **ECO Friendly**
  FusFree™ S-PAHT 使用过程无需使用水或溶剂，不产生水污染，安全环保。
  The FusFree™ S-PAHT does not require the use of water or solvents during the use process, does not produce water pollution, and is safe and environmentally friendly.

## 产品详情

## Available

颜色：纯色 Natural

线径：1.75mm

净重：500g，1kg，2.5kg

## 产品介绍

## Product Description

FusFree™ S-PAHT 快速易剥离支撑材料，通过调节与主体材料的支撑面粘接强度与 S-PAHT 的自身粘接强度实现快速易剥离功能。S-PAHT 快速易剥离支撑材料在拆除支撑过程中无需使用水或溶剂，不产生水污染，安全环保。可以应用于双喷头 FDM 打印机或二进一出 FDM 打印机。

FusFree™ S-PAHT Quick-Remove Support Material can achieve fast and easy peeling by adjusting the bonding strength to the support surface of the body material and the bonding strength of S-PAHT itself. S-PAHT Quick-Remove Support Material does not require the use of water or solvents during the removal of the support and does not produce water pollution, which is safe and environmentally friendly. It can be used in dual printhead FDM printers or 2-in/1-out FDM printers.

FusFree™ S-PAHT 快速易剥离支撑材料，适配以下 FusRock®工业级材料产品：

FusFree™ S-PAHT Quick-Remove Support Material is compatible with the following FusRock® industrial grade material products.

**FusForce™ PAHT-GF**
**FusForce™ PAHT-CF**
**FusCoating™ NexPA-GF25**
**FusCoating™ NexPA-CF25**

## 物性表（v1.2）

## Material Properties

| 测试项目<br>Test item | 测试方法<br>Test method | 典型值<br>Typical value |
|---|---|---|
| 密度<br>Density | ISO 1183 | 1.26 g/cm³ |
| 吸湿率<br>Water absorption | ISO 62:<br>Method 1 | 0.4 % |
| 熔点<br>Melting Temperature | ISO 11357 | 218°C |
| 熔融指数<br>Melt index | 270°C，2.16kg | 9.8 |

## 建议打印参数
## Recommended printing conditions

| | |
|---|---|
| 喷头温度<br>Nozzle Temperature | 270-280°C |
| 建议喷嘴大小<br>Recommended Nozzle Diameter | 0.4-1.0mm |
| 建议底板材质<br>Recommended build surface treatment | 涂抹 PVP 固体胶<br>Coating with PVP glue |
| 底板温度<br>Build plate temperature | 80-90°C |
| Raft 间距<br>Raft separation distance | 0 mm |
| 建议支撑密度<br>Recommended Support Infill Ratio | 15%-25% |
| 建议致密层厚度<br>Recommended Dense Support Layers | 3-5 |
| 支撑 Z 方向上/下表面距离<br>Vertical Offset Top/Down Layers | 0 |
| 支撑 X/Y 方向距离<br>Horizontal offset | 0.3-0.6 mm |
| 支撑边框圈数<br>Support infill outlines | 0-1 |
| 冷却风扇<br>Cooling fan speed | 关闭<br>OFF |
| 打印速度<br>Print speed | 30-120 mm/s |
| 回抽距离<br>Retraction distance | 1-3 mm |
| 回抽速度<br>Retraction speed | 1800-3600 mm/min |
| 适配本体材料<br>Suitable materials | FusForce™ PAHT-GF<br>FusForce™ PAHT-CF<br>FusCoating™ NexPA-GF25<br>FusCoating™ NexPA-CF25 |

其他建议：
Additional Suggestions:

1. FusFree™ S-PAHT 非常容易吸收环境内的水分，吸湿后打印会出现拉丝，挤出有气泡，打印表面粗糙等现象，降低打印质量。建议您打开 FusFree™ S-PAHT 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。
   FusFree™ S-PAHT very easy to absorb moisture within the environment, and printing after absorbing moisture will result ozzing, extruding with bubbles and rough surface appearance, thus reducing print quality. It is recommended that put the filament into a dry box (humidity below 15%) immediately after opening the FusFree™ S-PAHT vacuum foil bag for printing. Please put the unused filament back into the original aluminum foil bag for sealed storage.

2. 材料受潮后会出现打印拉丝增多，挤出有气泡，打印表面质量粗糙等现象。请将线材放入 80-100℃ 烘箱内干燥 4-6h，即可恢复 FusFree™ S-PAHT 的打印质量。
   After the material is damp, there will be more printing ozzing, bubbles extruded and rough printing surface. Please dry the filament in an oven at 80-100℃ for 4-6h to restore the printing quality of FusFree™ S-PAHT.

3. 建议选用 Phaetus 硬化钢及以上等级喷嘴，可以有效提高打印质量，建议加热块厚度不小于 12mm。
   It is recommended to use hardened steel and above grade nozzles made by Phaetus, which can effectively improve the print quality. Besides, it is recommended that the thickness of the heating block is longer 12mm.

4. 在双喷头打印模式下，待机喷头内的材料会因为长时间加热而老化，在打印喷头切换前需要将喷头内已老化的材料挤出干净，所以必需使用切片软件内的隔离墙（Wipe wall）或擦除塔（Wipe tower）功能。
   In dual-extruder printing mode, the material in the standby nozzle will deteriorate due to prolonged heating, and the deteriorated material needs to be squeezed out before the print nozzle is switched, so it is necessary to use the Wipe wall or Wipe tower function in the slicing software.

5. 打印完成后可以先对打印件进行退火处理，然后进行拆除 FusFree™ S-PAHT 步骤。在退火过程中 FusFree™ S-PAHT 可以起到支撑本体材料的作用，减少主体材料的尺寸变形，提高主体材料的机械性能。退火条件：按主体材料要求进行设置。
   After the printing is completed, the printed part can be annealed and then the FusFree™ S-PAHT removal step can be performed. During the annealing process, FusFree™ S-PAHT can play the role of supporting the body material, reducing the dimensional deformation of the body material and improving the mechanical properties of the body material. Annealing conditions: set according to the requirements of the body material.