FusRock® FDM Printing Material

Technical Data Sheet

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FusForce™ PAHT

未增强特种高温尼龙 3D 打印材料。

Ufilled High temperature Polyamide material.

产品亮点

Product Advantages

- **低吸湿敏感性**

  FusForce™ PAHT 基材使用高温尼龙，饱和吸湿率仅为普通 PA6 的五分之一，彻底解决尼龙材料吸湿前后机械性能与尺寸稳定性变化极大的缺陷。

- **Low Mositure Sensitivity**

  FusForce™ PAHT based on modified high temperature nylon, whose saturated moisture absorption rate is only one fifth of ordinary PA6, completely solving the defects of the mechanical properties and dimensional stability of nylon materials that change greatly after absorbed moisture.

- **超强耐磨性**

  FusForce™ PAHT 摩擦系数低，具有自润滑性，耐磨性极佳。轻松实现各类高强度齿轮和耐磨要求工业应用。

- **Super Abrasive Resistance**

  FusForce™ PAHT has a low coefficient of friction, self-lubricating properties and excellent wear resistance, which can easily meet all kinds of high-strength gears or industrial applications with high wear requirements.

产品介绍

Product Description

FusForce™ PAHT 专为 FDM 3D 打印工艺开发，基材选用高温尼龙原料，具有低吸湿，高强度，高耐磨性，耐化学性优异和高耐热性的特点。打印过程中尺寸稳定性好，无翘边无收缩现象，并且可以与 FusFree™ S-PAHT 易剥离支撑材料配合使用，解决复杂模型支撑面成型效果差的难题。

FusForce™ PAHT is specially developed for FDM 3D printing process, and its substrate material is high temperature nylon, which has low density, low moisture absorption, high strength, high abrasion resistance, excellent chemical resistance and high heat resistance. It also has good dimensional stability, no warpage and no shrinkage during the printing process, and can be used with FusFree™ S-PAHT Quick-Remove Support material to solve the problem of poor molding effect on the support surface of complex models.

产品详情

Available

颜色 Color：本色 Natrual/ 黑色 Black

线径 Diameter：1.75mm

净重 Net Wet : 1kg

物性表（v1.0）

Material Properties

测试项目 Property	测试方法 Test Method	典型值 Typical value
密度 Density	ISO 1183	1.21 g/cm³
吸湿率 Water absorption	ISO 62: Method 1	2.59 %
熔点 Melting Temperature	ISO 11357	231 °C
熔融指数 Melt index	280°C, 2.16kg	9.4 g/10min

		干燥状态 Dry Condition	饱和吸湿状态 Saturation hygroscopic conditions
热变形温度 Determination of temperature	ISO 75: Method A	72.5°C (1.80MPa)	48°C (1.80MPa)
	ISO 75: Method B	79.6°C (0.45MPa)	60.0°C (0.45MPa)
拉伸强度（X-Y） Tensile strength(X-Y)	ISO 527	69.29±1.17 MPa	57.63±2.14 MPa
拉伸模量（X-Y） Young's modulus(X-Y)		3329.72±235.60 MPa	2896.78±152.93 MPa
断裂伸长率（X-Y） Elongation at break (X-Y)		9.77±1.68 %	> 50 %
弯曲强度（X-Y） Bending strength (X-Y)	ISO 178	112.64±1.60 MPa	82.23±7.36 MPa
弯曲模量 （X-Y） Bending modulus (X-Y)		3202.24±115.78 MPa	2408.32±274.58 MPa
缺口冲击强度 （X-Y） Charpy impact strength（X-Y）	ISO 179	9.74±0.84 KJ/㎡	13.10±1.70 KJ/㎡
单层拉伸强度（Z） Single layer Adhesion tensile strength（Z）	Custom Method: Nozzle diameter 0.6mm Layer Height 0.3mm Volumetric Speed 10.8mm³/s	50.03±2.30 MPa	/

试样打印参数：喷嘴温度 280°C，底板加热 80°C，打印速度 45mm/s，填充率 100%，填充角度±45°

Specimens printed under the following conditions: Nozzle temp 280°C, Bed temp 80°C, Print speed 45mm/s, Infill 100%, Infill angle ±45°

建议打印参数

Recommended printing conditions

喷头温度 Nozzle Temperature	280-300 °C
建议喷嘴大小 Recommended Nozzle Diameter	0.4-1.0 mm

建议底板材质 Recommended build surface treatment	PEI 底板或者涂抹 PVP 固体胶 PEI or Coating with PVP glue
底板温度 Build plate temperature	70-80 °C
Raft 间距 Raft separation distance	0.12-0.16 mm
冷却风扇 Cooling fan speed	20%-60%
打印速度 Print speed	30-200 mm/s
回抽距离 Retraction distance	1-3 mm
回抽速度 Retraction speed	1800-3600 mm/min
建议支撑材料 Recommended support material	FusFree™ S-PAHT Quick-Remove Support

其他建议：

1. 尼龙材料非常容易吸收环境内的水分，吸湿后打印会出现拉丝，挤出有气泡等现象，降低打印质量。建议您打开 FusForce™ 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。
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°C 烘箱内干燥 4-6h，即可恢复 FusForce™ PAHT 的打印质量。
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。

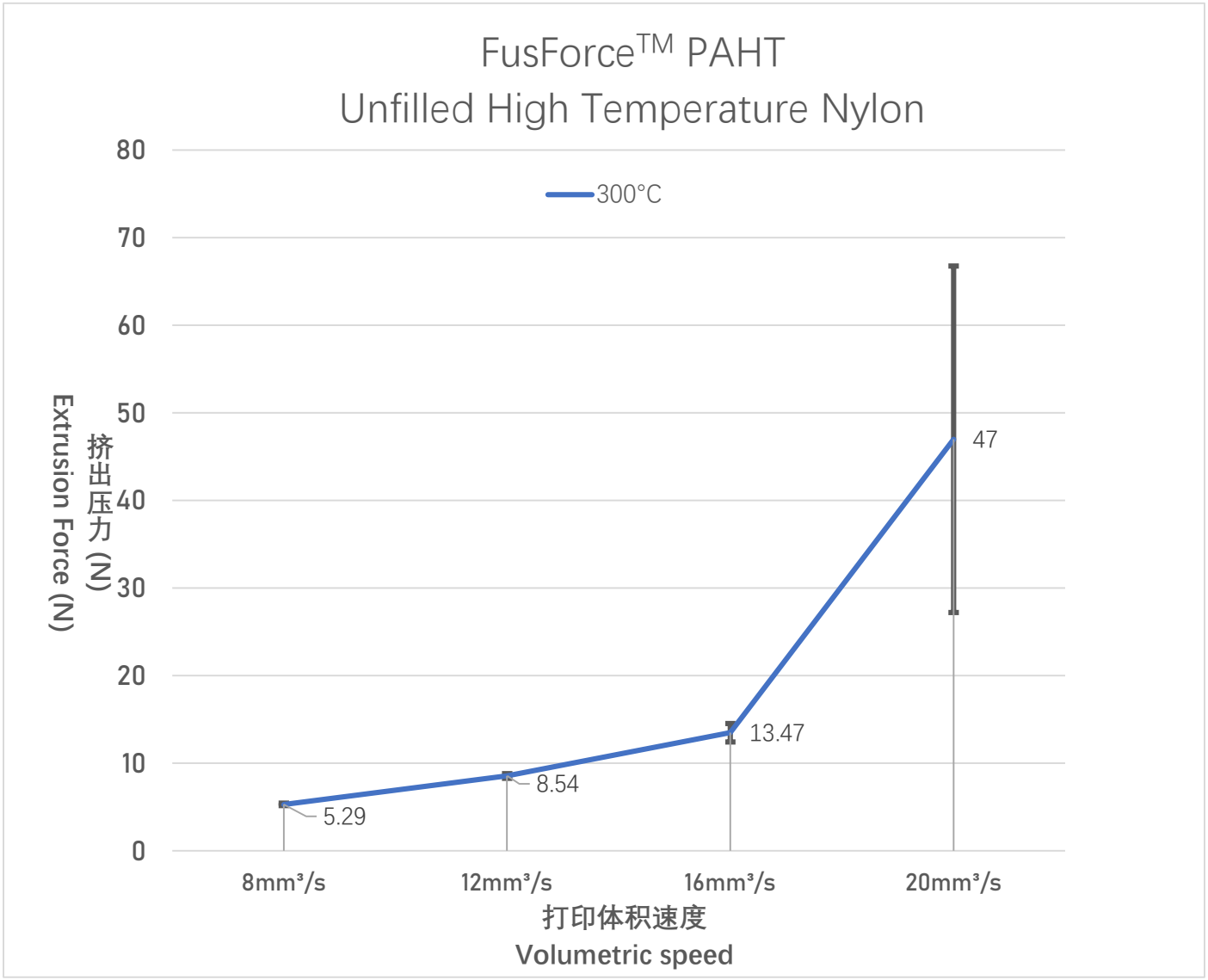
Additional suggestion

1. **Nylon material is 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 FusForce™ PAHT vacuum foil bag for printing. Please put the unused filament back into the original aluminum foil bag for sealed storage.**
2. **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°C for 4-6h to restore the printing quality of FusForce™ PAHT.**

3. **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.**

挤出压力与打印体积速度测试

Extrusion Force vs Print Volumetric Speed Test



测试参数：20mm 长度铜制加热块，BMG 挤出机，Phaetus 硬化钢喷头，喷嘴大小 0.4mm，层高 0.2mm。

Test parameters: 20mm length brass heat block, BMG extruder, Phaetus Hardened Steel Nozzle, Nozzle size 0.4mm, Layer Height 0.2mm.