

# TECHNICAL DATA SHEET

## PET-GF

15% chopped glass fiber reinforced Polyethylene Terephthalate FDM material

### BRIEF INTRODUCTION

PET-GF is specially developed for FDM 3D printing process, and its substrate material is PET engineering plastic with low moisture absorption, high strength, creep resistance, excellent chemical resistance and high heat resistance. With good dimensional stability, no warpage and no shrinkage and no smell, no heating chamber are required during the printing process. It can be used with S-PET Quick-Remove Support Material to solve the problem of poor molding effect of supporting surface of complex model.

### CHARACTERISTIC

#### Smart Fiber Reinforced Technology

controlling the dispersion and distribution of chopped carbon fibers within the material matrix during the extrusion process, the fibers form a mesh skeleton structure within the material and bear most of the load transferred by the material matrix. Smart Fiber Reinforced Technology greatly improves the mechanical properties and heat resistance of the material, and releases the internal stress during the printing process through the fiber mesh structure, resulting in good dimensional stability of the printed part and no warpage.

#### Low creep

The molecular chain structure of PET is highly regular and has a rigid benzene ring structure, so that PET has better mechanical properties and less deformation under long-term load. Compared with PA and PC materials, PET has better creep-resistance.

### IDENTIFICATION OF THE MATERIAL

<b>Trade name</b>	PET-CF
<b>Application</b>	3D PRINTING

### GUIDELINE FOR PRINT SETTINGS

<b>Nozzle temperature</b>	280-320°C
<b>Bed temperature</b>	60~80°C
<b>Bed material</b>	PEI or PVP solid glue
<b>Active cooling fan</b>	OFF
<b>Recommend nozzle size</b>	0.4mm-1.0mm
<b>Raft distance</b>	0.08-0.12mm
<b>Print speed</b>	30-90mm/s
<b>Retraction Distance</b>	1-3mm
<b>Retraction Speed</b>	1800-3600mm/min
<b>Recommended support material</b>	S-PET

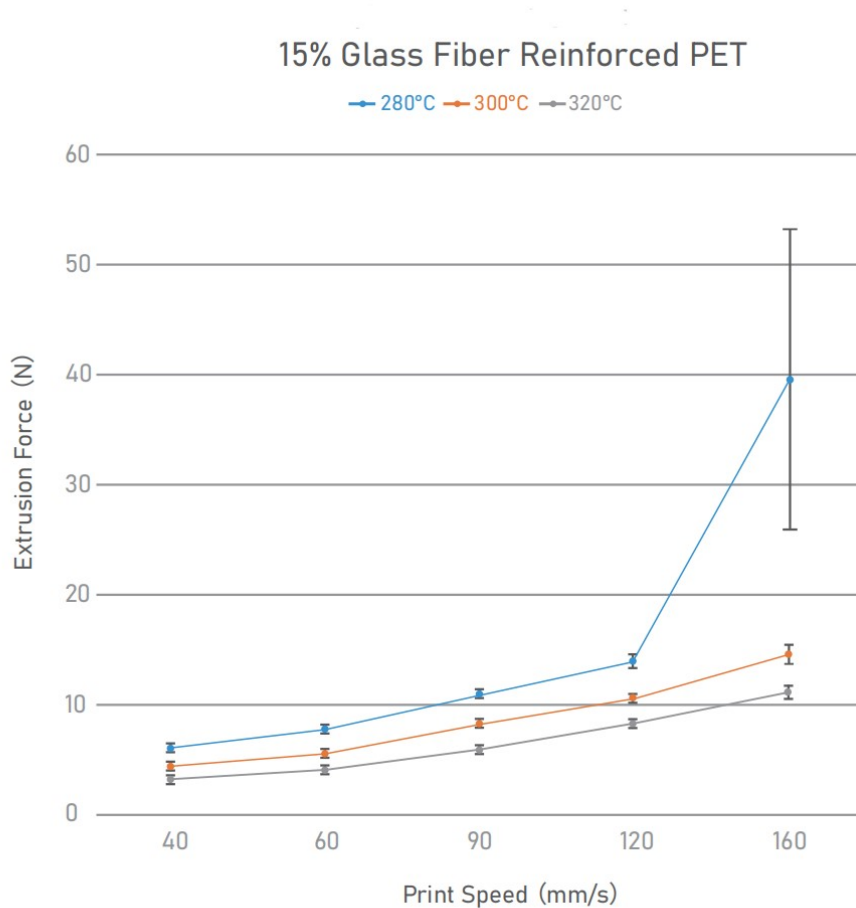
Settings are based on Nozzle temp.:320°C, Bed temp.:80°C, Printing speed:45mm/s, filling rate:100%, filling angle: +/-45°  
 Annealing conditions:100°C 8hrs.

MATERIAL PROPERTIES	Typical value	Test Method
<b>Melt index</b>	5.3	270°C 2.16kg
<b>Density</b>	1.38g/cm <sup>3</sup>	ISO 1183
<b>Thermal deformation temperature</b>	99.1 ° C (1.80MPa) 120.3 ° C (0.45MPa)	ISO 75,Method A/ISO 75,Method B
<b>Tensile strength(X-Y)</b>	70.86 ± 2.86 MPa	
<b>Young's modulus(X-Y)</b>	4130.13 ± 107.0 MPa	
<b>Elongation at break (X-Y)</b>	2.56 ± 0.30 %	ISO527
<b>Bending strength (X-Y)</b>	114.87 ± 3.0 MPa	ISO 178
<b>Bending modulus (X-Y)</b>	3650.32 ± 65.81 Mpa	
<b>Charpy impact strength (X-Y)</b>	6.56 ± 0.68 KJ/m <sup>2</sup>	ISO 179
<b>Tensile strength (Z)</b>	33.95 ± 2.38 MPa	
<b>Young's modulus (Z)</b>	3322.37 ± 94.04 MPa	ISO 527

Elongation at break (Z)

1.14 ± 0.11 %

## Extrusion Force vs Print Speed Test



Test parameters: 12mm length brass heat block, BMG extruder, Phaetus Hardened Steel Nozzle, Nozzle size 0.4mm, Layer Height 0.2mm.

### Other Suggestions:

1. Although the moisture absorption of PET material is very low, it is very sensitive to moisture. Printing after absorbing moisture will result in oozing, 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 PET-GF vacuum bag for printing.
2. After the material is damp, there will be more printing oozing, bubbles extruded and rough printing surface. Please dry the filament in an oven at 100-120 for 4-6h to restore the printing quality of PET-GF.
3. Hardened steel and above grade nozzles shall be selected, which can effectively improve the print quality. Besides, it is recommended that the thickness of the heating block should no less than 12mm.
4. After the printing, the printed part can be annealed to further improve the strength of PET-GF print part. Annealing conditions: place the printed part at 80-100 for 4-8 hours and cool to room temperature naturally.

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