Technical Data Sheet (TDS)

Version 1.0

1. Product Introduction

Filoostry® PETG-CF is a carbon fiber-reinforced Polyethylene Terephthalate Glycol-modified (PETG) 3D printing filament. By incorporating 10% carbon fiber, this product significantly enhances the strength, stiffness, and dimensional stability of PETG while retaining its excellent toughness and water resistance.

Filoostry® PETG-CF features high strength, high modulus, impact resistance, low odor, and easy printability. Its surface has a fine matte texture, making it suitable for printing various types of components, including:

- Structural parts designed to withstand mechanical loads.
- Components used in humid environments, such as boat hulls and flower pots.
- Equipment housings and enclosures requiring an attractive surface finish.

Note: It is recommended to use nozzles made of sufficiently hard materials, such as hardened steel or tungsten carbide.

2. Product Specifications

Item	Specifications
Filament Diameter	1.75 ± 0.03 mm
Net Filament Weight	1000 g
Filament Length	329 ± 5 m(Estimated based on density; not yet measured)
Spool Material	Cardboard (Heat resistance: 120°C)
Spool Weight	146 ± 1 g
Spool Dimensions	Outer diameter: 200 mm; Inner diameter: 88.5 mm; Total width: 65.5 mm; Winding width: 58 mm

3. Recommended Printing Settings

Item	Recommended Settings
Pre-print Drying	65° C for 6 – 12 hours
Compatible Printer	Open-frame and enclosed 3D printers
Compatible Nozzle Materials	Hardened steel, tungsten carbide
Compatible Nozzle Diameters	0.4, 0.6, 0.8 mm
Nozzle Temperature	230-260° C
Chamber Temperature	Below 50° C
Heated Bed Temperature (Textured PEI Build Plate)	60-70° C

Printing Speed	30 – 300 mm/s (Equivalent volumetric flow rate: 3 – 32 mm^3/s)
Cooling Fan Speed	50-100%
Optional Annealing	65 – 70° C in an oven for 6 – 12 hours

4. Physical Properties

Property	Test Method	Value
Density	ISO 1183	1.265 g/cm3
Saturated Water Absorption	25° C, 55% RH	Pending testing
Melt Flow Rate (MFR)	210° C, 2.16 kg	Pending testing
Glass Transition Temperature (Tg)	DSC, 10° C/min	77.2° C
Crystallization Temperature	DSC, 10° C/min	N/A
Melting Temperature	DSC, 10° C/min	N/A
Vicat Softening Temperature	ISO 306, GB/T 1633	80.7° C
Heat Deflection Temperature (HDT) 1	ISO 75, 1.80 MPa	70.5° C
Heat Deflection Temperature (HDT) 2	ISO 75, 0.45 MPa	71.7° C

5. Mechanical Properties

Property	Test Method	Value
Tensile Strength (XY)	ISO 527, GB/T 1040	66 ± 2 MPa
Tensile Strength (Z)	ISO 527, GB/T 1040	19 ± 1 MPa
Young's Modulus (XY)	ISO 527, GB/T 1040	6181 ± 122 MPa
Young's Modulus (Z)	ISO 527, GB/T 1040	1616 ± 189 MPa
Elongation at Break(XY)	ISO 527, GB/T 1040	2.2 ± 0.2%
Elongation at Break(Z)	ISO 527, GB/T 1040	2.6 ± 0.3%
Flexural Strength (XY)	ISO 178, GB/T 9341	96 ± 2 MPa
Flexural Strength (Z)	ISO 178, GB/T 9341	29 ± 1 MPa
Flexural Modulus (XY)	ISO 178, GB/T 9341	5825 ± 101 MPa
Flexural Modulus (Z)	ISO 178, GB/T 9341	1354 ± 31 MPa
Impact Strength (XY)	ISO 179, GB/T 1043	38.3 ± 2.1 kJ/m^2 (Unnotched) 8.2 ± 0.2 kJ/m^2 (Notched)
Impact Strength (Z)	ISO 179, GB/T 1043	14.5 ± 1.6 kJ/m^2

6. Test Specimen Information

Item	Parameter
Specimen Dimensions	As shown below
Nozzle Temperature	255° C
Heated Bed Temperature	70° C
Printing Speed	XY: 150 mm/s; Z: 60 mm/s
Infill Density	100%
Infill Pattern	Concentric
Annealing Treatment	None

Testing and Sample Preparation Notes

The filament was dried in a forced-air oven at 55°C for 6 hours before printing.

Test specimens were printed using a Bambu Lab H2D 3D printer with a 0.4 mm nozzle and a layer height of 0.2 mm. The top and bottom layers were set to one layer each.

Filament Flow Ratio Calibration:

The flow ratio was initially set to 1.0 to print a flexural test specimen (80 mm × 60 mm × 4 mm), after which its thickness was measured. The flow ratio was then reduced to 0.99, and another specimen was printed and measured. This process was repeated until the measured thickness began to fall below 4.20 mm. The flow ratio corresponding to the threshold was selected as the preferred setting.

Tensile and Flexural Testing Conditions:

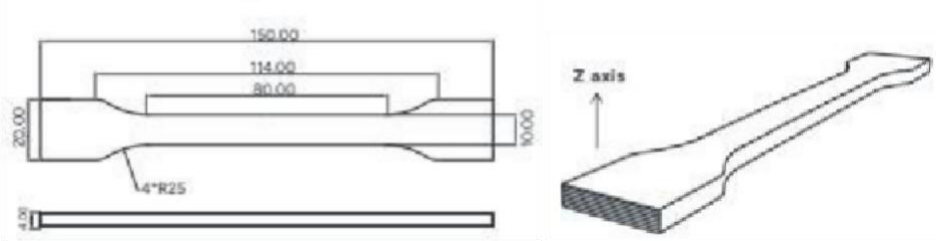
An extensometer was used to measure specimen deformation during tensile testing. When the deformation was below 0.125 mm (equivalent to 0.25% strain), the tensile test was conducted at a speed of 1 mm/s. Once the deformation exceeded this threshold, the speed was increased to 50 mm/s.

Therefore, Young's modulus was measured at a tensile speed of 1 mm/s, while tensile strength was determined at 50 mm/s.

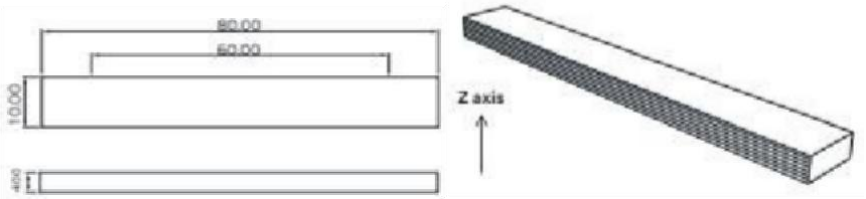
Flexural strength and flexural modulus were measured at a test speed of 2 mm/min.

Disclaimer

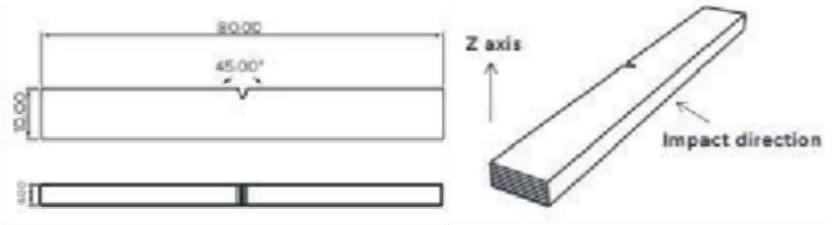
The above test results may vary depending on filament drying conditions, cooling fan settings, other printing parameters, and printer performance. The data provided are for reference purposes only and should not be considered as guaranteed specifications for all printing conditions.



Tensile Test Specimen (XY)



Flexural Test Specimen (XY)



Impact Test Specimen (XY)