Raise3D Industrial PET CF Technical Data Sheet

Raise3D Industrial PET CF is a carbon fiber-reinforced composite filament based on PET (Polyethylene terephthalate). Well-dispersed 15wt% carbon fibers enhance the rigidity, strength, heat and chemical resistance of PET matrix. After annealing, PET CF stabilizes its heat resistance at around 150^{o}C and tensile modulus and strength of over 6 GPa and 80 MPa respectively. Compared to carbon fiber-reinforced Nylon filament, the high printability, dimensional stability, high creep resistance and low moisture absorption makes PET CF an ideal choice for reliable carbon fiber composite printing for strong and cost-effective end-use applications, such as jigs & fixtures and functional parts.

Filament Specifications

Property	Testing Method	Typical Value
Density (g/cm^3)	ISO 1183, GB/T 1033	1.30
Heat Deflection Temperature (°C)	ISO75 1.8MPa ISO75 0.45 MPa	112 149
Melt index (g/10 min)	270 °C, 2.16 kg	4.7
Water absorption	ISO 62: Method 1	0.5%
Odor	/	Almost odorless
Solubility	/	Insoluble in water

Mechanical Properties

Property	Testing Method	Typical value
Young's modulus (X-Y)	ISO 527, GB/T 1040	6030 ± 350 MPa
Young's modulus (Z)	ISO 527, GB/T 1040	3200 ± 75 MPa
Tensile strength (X-Y)	ISO 52 7, GB/T 1040	87 ± 4 MPa
Tensile strength (Z)	ISO 527, GB/T 1040	34 ± 2 MPa
Elongation at break (X-Y)	ISO 527, GB/T 1040	2.01 ± 0.17 %
Elongation at break (Z)	ISO 527, GB/T 1040	1.25 ± 0.09 %

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Bending modulus (X-Y)	ISO 178, GB/T 9341	5300 ± 200 MPa
Bending strength (X-Y)	ISO 178, GB/T 9341	123 ± 5 MPa
Charpy impact strength (X-Y)	ISO 179, GB/T 1043	5.60 ± 0.58 KJ/m^2

Note:
All testing specimens were printed under the following conditions:
Nozzle temp. 300℃; Bed temp. 80℃; Print speed 45mm/s; Infill 100%; Infill angle ±45°
All specimens were annealed at 80˚C for 8h.

Note：

1. Dry PET CF at 70-80°C for 8-12 hours before printing, as low moisture content is crucial for final printed part quality.

2. After drying, we recommend storing PET CF filaments inside Raise3D Filament Dry Box during the printing process.

3. Abrasion of the brass nozzle happens frequently when printing PET CF. Using an abrasion-resistant nozzle, such as hardened steel or a ruby nozzle, is highly recommended.

4. After printing, it is recommended to anneal the model in an oven at 80-100°C for 8-12 hours.

5. For a small size model (side length <50 mm), annealing at 80°C for 8 hours is recommended; For a medium-size model (50mm<side length <150 mm), annealing at 80°C for 12 hours is recommended; For a large size model, 100°C for at least 12 hours is recommended.

6. After annealing, a maximum of 0.1 % dimensional shrinkage could be observed along the Z-axis, depending on infill and layer height, and no significant dimensional shrinkage along the XY-axes

7. If PET CF is also used as the support material, please remove the support structure after annealing.

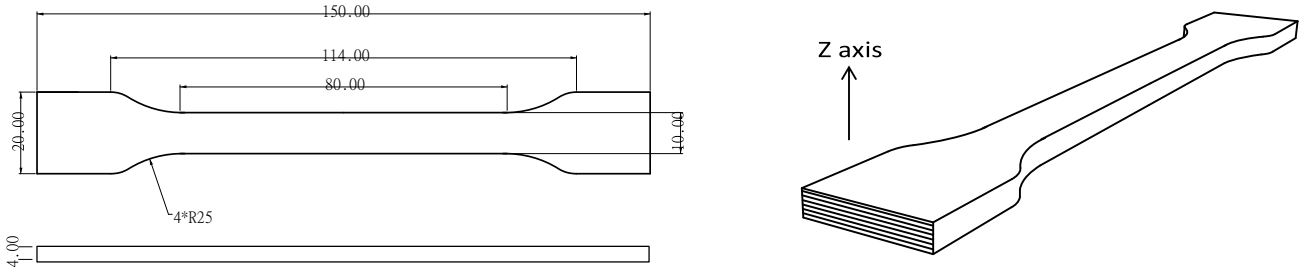

Fig 1. Tensile testing specimen

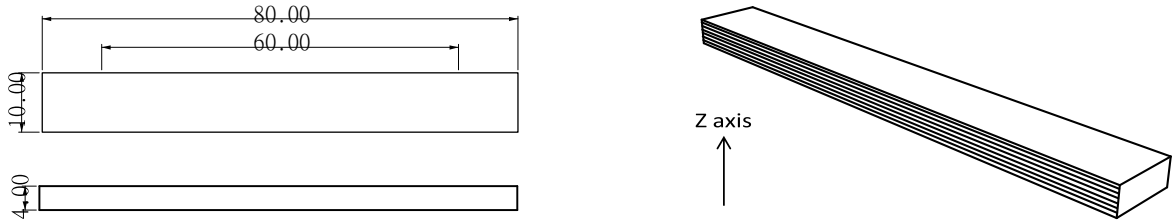

Fig 2. Flexural testing specimen

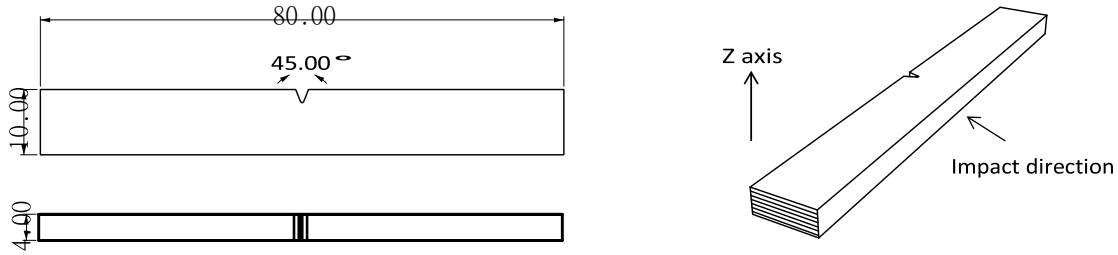

Fig 3. Impact testing specimen

Disclaimer

The typical values presented in this data sheet are intended for reference and comparison purposes only. They should not be used for design specifications or quality control purposes. Actual values may vary significantly with printing conditions. End-use performance of printed parts depends not only on materials, but also on part design, environmental conditions, printing conditions, etc. Product specifications are subject to change without notice.

Each user is responsible for determining the safety, lawfulness, technical suitability, and disposal/recycling practices of Raise3D materials for the intended application. Raise3D makes no warranty of any kind, unless

announced separately, to the fitness for any particular use or application. Raise3D shall not be made liable for any damage, injury or loss induced from the use of Raise3D materials in any particular application.