Raise3D Hyper Speed PET CF Technical Data Sheet

Raise3D Hyper Speed PET CF is a carbon fiber-reinforced (15 wt.%) polyethylene terephthalate (PET) filament engineered for Hyper FFF® (L2, 300 mm/s) and high-performance applications. Hyper speed PET CF exhibits superior mechanical properties high (*E* >4.5 GPa) and enhanced thermal resistance（HDT > 110 °C), while maintaining low moisture absorption and excellent printability thanks to the optimized carbon fiber length distribution and crystallinity of PET. Printed part from Hyper Speed PET CF is long-term dimensional accurate and stable with smooth matt surface finishing and is an ideal choice for engineering-grade composite parts used in many heavy-duty, humidity and high-temp applications.

General Properties

Property	Testing Method	Typical Value
Density (g/cm³)	ISO 1183, GB/T 1033	1.34
Water absorption (%)	70% RH, 30 days	0.53
Diameter (mm)	/	1.75
Net weight (kg)	/	1.0
Color	/	Black
Odor	/	Almost odorless
Solubility	/	Insoluble in water
Flame retardancy	UL94, 1.5mm	HB
Surface resistivity (Ω)	ANSI ESD S11.11	OL, $>10^{12}$

Mechanical Properties (Conditioned, after annealed) [1]

Property	Testing Method	Typical Value (XY, Flat)	Typical Value (ZX, Flat)
Young's modulus (MPa)	ISO 527	5400 ± 200	3500 ± 300
Tensile strength (MPa)	ISO 527	70 ± 1.0	28 ± 1.1
Elongation at break (%)	ISO 527	2.8 ± 0.5	0.9 ± 0.1
Bending modulus (MPa)	ISO 178	4700 ± 150	2700 ± 450
Bending strength (MPa)	ISO 178	110 ± 2.0	45 ± 8.8
Charpy impact strength (kJ/m²)	ISO 179	27 ± 2.8 (Un-notched)	3.3± 0.7 (Un-notched)

[1]All testing specimens were printed under the following conditions:
Nozzle temp. = 300 ºC; Bed temp.= 70 ºC; Infill= 100%.
All specimens were annealed at 120 ºC for 10h.

Mechanical Properties (Conditioned, before annealed)[2]

Property	Testing Method	Typical Value (XY, Flat)	Typical Value (ZX, Upright)
Young's modulus (MPa)	ISO 527	5000± 170	2600 ± 150
Tensile strength (MPa)	ISO 527	55± 0.3	25± 2.0
Elongation at break (%)	ISO 527	4 ± 0.5	1.5 ± 0.6
Bending modulus (MPa)	ISO 178	4500 ± 35.0	3300± 100.0
Bending strength (MPa)	ISO 178	95 ± 1.0	45 ± 2
Charpy impact strength (kJ/m²)	ISO 179	5.0 ± 0.3	3.0 ± 0.1

[1]All testing specimens were printed under the following conditions:
Nozzle temp. = 300 ºC; Bed temp.= 70 ºC; Infill= 100%.

Thermal Properties

Property	Testing Method	Typical Value
Melt flow index (g/10 min)	270 °C, 2.16 kg	31
Heat distortion temperature[3] (°C)	ISO 75 @0.45 MPa	150
	ISO 75 @1.8 MPa	110

[3]The specimens of HDT test were annealed at 120 ºC for 10h.

Other Information

Color	Color Code
Black	6c

Testing Geometries

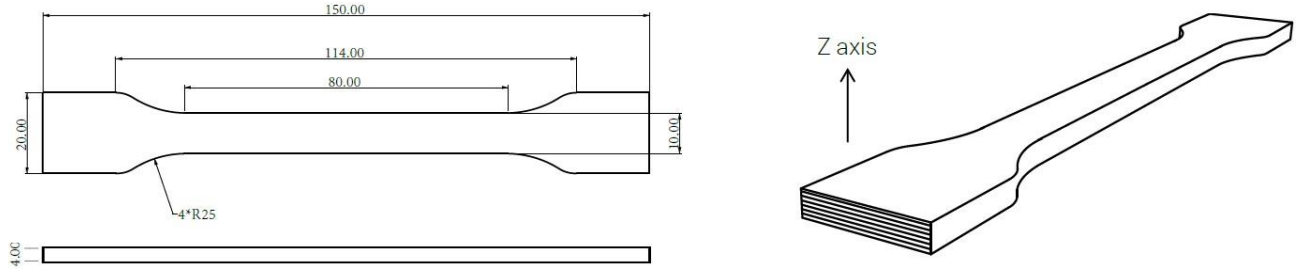

Fig 1. Tensile testing specimen

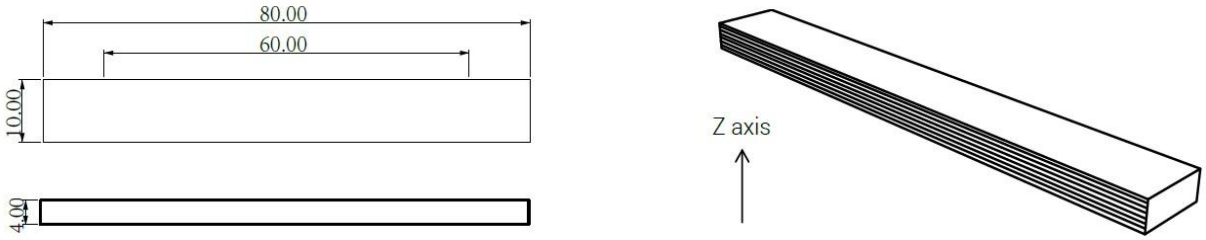

Fig 2. Flexural testing specimen

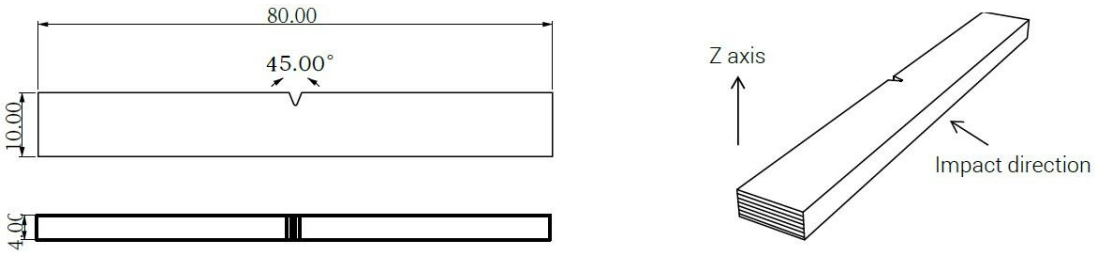

Fig 3. Impact testing specimen

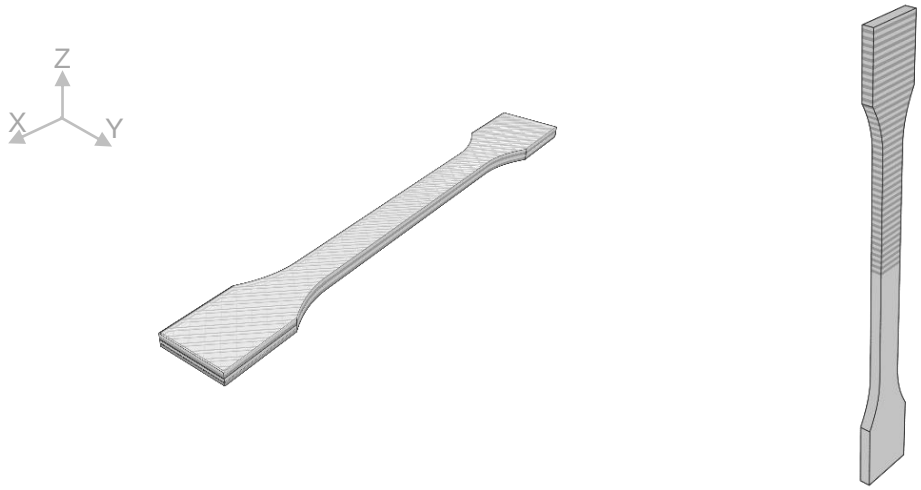

Fig 4. Print Orientation

Fused filament fabrication (FFF)/fused deposition modeling is a layer-by-layer process allows thermoplastic to be printed in various orientations relative to the print direction. Due to anisotropy, the performance has a gap between the different orientation.

Note: All samples are printed with 100% infill; the lines in the Fig 4. indicate typical directionality of infill and walls in a printed part.

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.