Raise3D Industrial PPS CF Technical Data Sheet

Raise3D Industrial PPS CF is a carbon fiber-reinforced (10 wt.%) polyphenylene sulfide (PPS) composite filament designed for high-performance applications. It stands out with its peerless heat resistance (HDT 260 °C) and chemical stability against the corrosion of various acids, alkalis, and organic solvents. Additionally, PPS CF possesses good flame-retardant property and is certified to UL94 V0 level. In terms of mechanical performance, final parts and components printed from PPS CF exhibits metal-like strength and rigidity, along with excellent long-term dimensional stability and very low moisture absorption. More importantly, thanks to the specially optimized carbon fiber distribution and length, PPS CF is well compatible with non-heated printing camber and high-speed printing (L1, 150 mm/s, or faster to L2) with lower warpage, good surface finishing and lower nozzle abrasion. Raise3D Industrial PPS CF is an ideal choice for industrial-grade application scenarios, meeting all demands and requirements for high-performance material with precision, reliability and cost efficiency.

General Properties

Property	Testing Method	Typical Value
Density (g/cm³)	ISO 1183, GB/T 1033	1.29
Water absorption (%)	70% RH, 30 days	0.23
Diameter (mm)	/	1.75
Net weight (kg)	/	0.5
Color	/	Black
Odor	/	Almost odorless
Solubility	/	Insoluble in water
Flame retardancy	UL94, 1.5mm	V0
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	5500 ± 150	2800 ± 150
Tensile strength (MPa)	ISO 527	60 ± 1.3	32.0 ± 5.0
Elongation at break (%)	ISO 527	1.8 ± 0.1	1.9 ± 0.2
Bending modulus (MPa)	ISO 178	4600 ± 140	2600 ± 150

Bending strength (MPa)	ISO 178	95 ± 2	30.0 ± 5
Charpy impact strength (kJ/m²)	ISO 179	11.4 ± 0.7 (Un-notched)	4.1± 1.3 (Un-notched)

[1]All testing specimens were printed under the following conditions:
Nozzle temp. = 340 ºC; Bed temp.= 90 ºC; Infill= 100%.
All specimens were annealed at 125 ºC for 16h.

Mechanical Properties (Conditioned, before annealed)[2]

Property	Testing Method	Typical Value (XY, Flat)	Typical Value (ZX, Upright)
Young's modulus (MPa)	ISO 527	4700 ± 280	2600 ± 120
Tensile strength (MPa)	ISO 527	5 ± 2	22 ± 4
Elongation at break (%)	ISO 527	1.2 ± 0.5	1.1 ± 0.1
Bending modulus (MPa)	ISO 178	5000 ± 200	2500 ± 320
Bending strength (MPa)	ISO 178	100 ± 4.0	52 ± 4.0
Charpy impact strength (kJ/m²)	ISO 179	5 ± 0.4	3 ± 0.8

[1]All testing specimens were printed under the following conditions:
Nozzle temp. = 340 ºC; Bed temp.= 90 ºC; Infill= 100%.

Thermal Properties

Property	Testing Method	Typical Value
Melt flow index (g/10 min)	300 °C, 2.16 kg	28
Heat distortion temperature[3] (°C)	ISO 75 @0.45 MPa	251
	ISO 75 @1.8 MPa	132

[3]The specimens of HDT test were annealed at 125 ºC for 16h.

Other Information

Color	Color Code
Black	6c

Note:

1. Abrasion of the brass nozzle happens frequently when printing Industrial PPS CF. A wear-resistance nozzle, such as hardened steel and ruby nozzle, is highly recommended to be used with Industrial PPS CF.
2. Industrial PPS CF should always be stored and used under dry conditions (relative humidity below 20%).

Testing Geometries

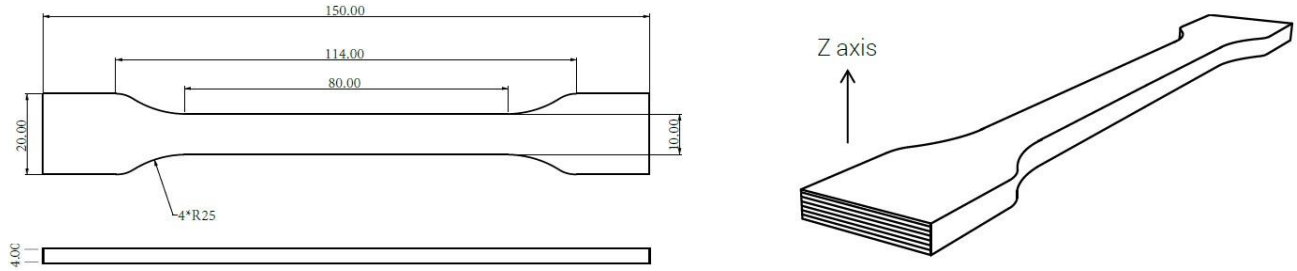


Fig 1. Tensile testing specimen

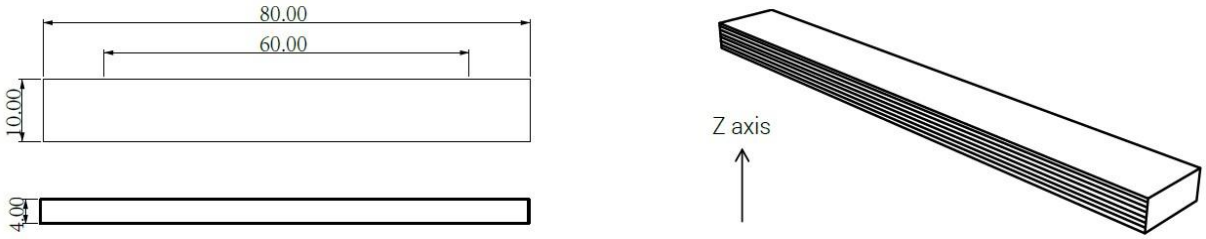


Fig 2. Flexural testing specimen

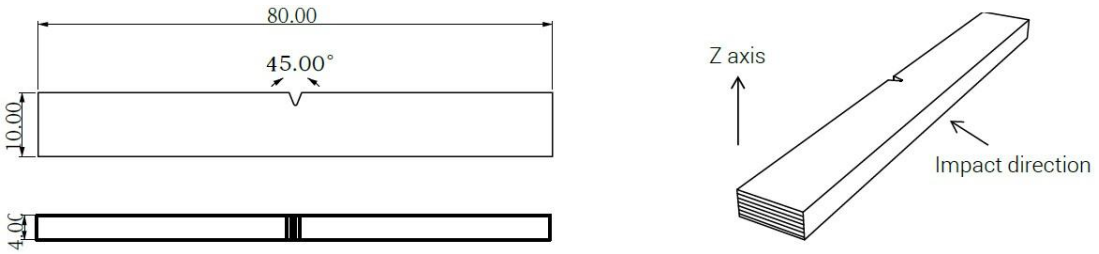
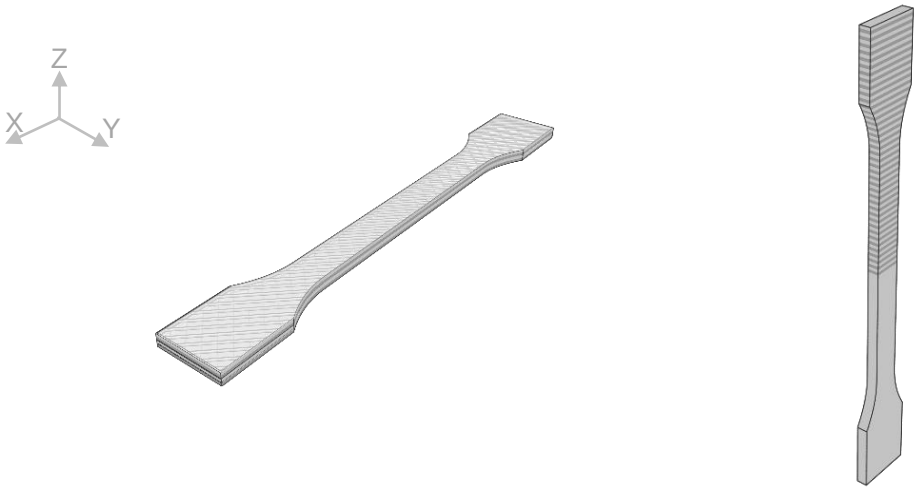


Fig 3. Impact testing specimen



XY, Flat **ZX, Upright**

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.