

Raise3D Industrial PA12 CF Technical Data Sheet

Raise3D Industrial PA12 CF Filament is a carbon fiber reinforced composite filament material based on Nylon 12 (Polyamide 12). Thanks to the reinforcement of short carbon fibers, it exhibits excellent rigidity and strength, heat resistance, low warpage, and low water absorption. Meanwhile, this material has outstanding strength to weight ratio, which makes it suitable to replace metal in the manufacturing of certain lightweight components.

Filament Specifications

Property	Testing Method	Typical Value
Density (g/cm ³ at 21.5 °C)	ASTM D792 (ISO 1183, GB/T 1033)	1.06
Heat Deflection Temperature (°C)	ISO75 1.8MPa	105
	ISO75 0.45 MPa	131
Melt index (g/10 min)	280 °C, 2.16 kg	25
Moisture content (%)	Thermogravimetric	≤ 0.6%
Odor	/	Almost odorless
Solubility	/	Insoluble in water

Mechanical Properties (Dry state)

Property	Testing Method	Typical value
Young's modulus (X-Y)	ISO 527, GB/T 1040	3320 ± 145 MPa
Young's modulus (Z)	/	1830 ± 80 MPa
Tensile strength (X-Y)	ISO 527, GB/T 1040	72 ± 2 MPa
Tensile strength (Z)	/	43 ± 3 MPa
Elongation at break (X-Y)	ISO 527, GB/T 1040	3.6 ± 0.3 %
Elongation at break (Z)	/	3.3 ± 0.5%

All specimens were annealed at 80°C for 24h and dried for 48h prior to testing.



Mechanical Properties (Conditioned)

Property	Testing Method	Typical value
Young's modulus (X-Y)	ISO 527, GB/T 1040	3040 ± 130 MPa
Young's modulus (Z)	/	1530 ± 70 MPa
Tensile strength (X-Y)	ISO 527, GB/T 1040	73 ± 1 MPa
Tensile strength (Z)	/	42 ± 2 MPa
Elongation at break (X-Y)	ISO 527, GB/T 1040	6.1 ± 0.6 %
Elongation at break (Z)	/	3.5 ± 0.5%
Bending modulus (X-Y)	ISO 178, GB/T 9341	3336 ± 292 MPa
Bending strength (X-Y)	ISO 178, GB/T 9341	100 ± 4 MPa
Charpy impact strength (X-Y)	ISO 179, GB/T 1043	9.2 ± 0.6 kJ/m ²

All specimens were annealed at 80 °C for 24h, and immersed in ambient temperature for 3 days prior to testing.

Note:

1. Abrasion of the brass nozzle happens frequently when printing PA12 CF. Using abrasion resistance nozzle, such as hardened steel and ruby nozzle, is highly recommended.
2. After the printing, it is recommended to anneal the model in the oven at at 80°C for 6-8 hours.
3. If PA12 CF is used as the support material for itself, please remove the support structure after annealing. Otherwise, the support structure could be permanently bonded to the model after moisture absorption.



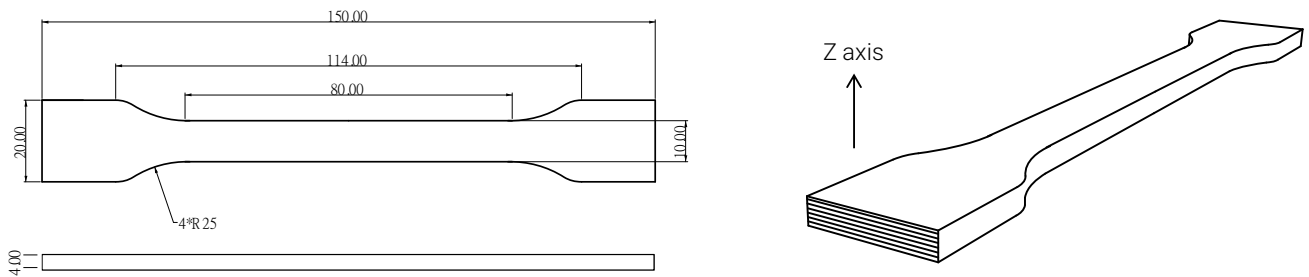


Fig 1. Tensile testing specimen

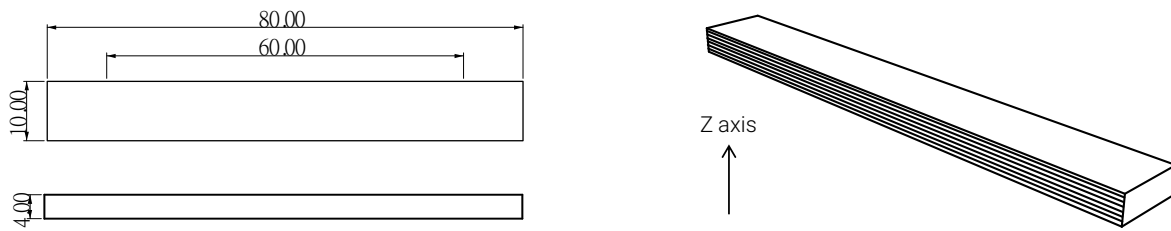


Fig 2. Flexural testing specimen

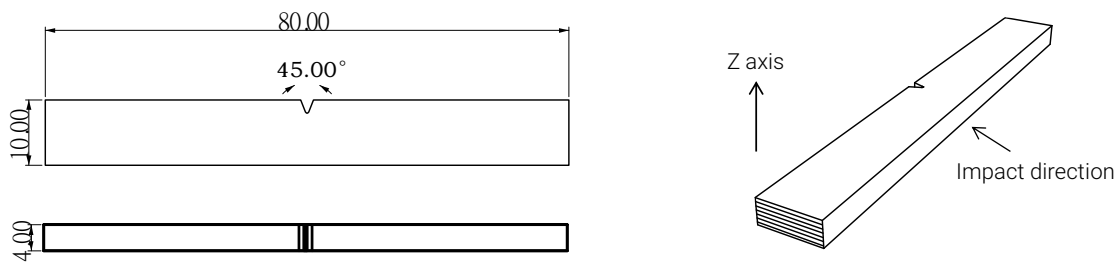


Fig 3. Impact testing specimen

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.

