FUSED DEPOSITION MODELING

PAHT-CF Carbon Fiber Nylon

Carbon Fiber Reinforced Thermoplastic for High-Performance Applications



PAHT-CF Carbon Fiber Nylon combines the strength and lightweight properties of carbon fiber with the design freedom and cost-effectiveness of 3D printing. FDM allows for the creation of complex geometries and internal structures, optimizing part strength and weight distribution. This results in durable, high-performance parts that are ideal for applications that need high stiffness at low weight, such as aerospace, automotive, and sporting goods industries.

BUILD VOLUME	LEAD TIME	LAYER HEIGHT	TOLERANCE
340 × 320 × 340 mm	**4 business days**	**0.08–0.40 mm**	**±0.25 mm or ±0.3%, whichever is greater**

MECHANICAL PROPERTIES

PAHT-CF Carbon Fiber Nylon delivers high tensile strength and rigidity for aerospace brackets and mounts, automotive structural parts and robotic end-of-arm tooling, so prototypes are tested in the same material that goes to production.

FDM parts are strongest along their layers, and the carbon fiber makes the difference larger than in unfilled nylon. X-Y values come from specimens printed along the build plate and Z values from upright specimens loaded across the layers, so orient loaded features along the build plane and size parts against the Z figures. Elongation at break is low, so size flexing features such as spring leaves for small deflections.

PROPERTY	VALUE	TEST STANDARD
Tensile Strength (X-Y / Z)	**92 / 47 MPa**	ISO 527
Tensile Modulus (X-Y / Z)	**3860 / 2180 MPa**	ISO 527
Elongation at Break (X-Y / Z)	**8.4 / 4.1 %**	ISO 527
Flexural Strength (X-Y / Z)	**125 / 61 MPa**	ISO 178
Flexural Modulus (X-Y / Z)	**4230 / 1820 MPa**	ISO 178
Charpy Impact Strength (X-Y / Z)	**57.5 / 13.3 kJ/m²**	ISO 179
Charpy Impact Strength, Notched (X-Y)	**22.8 kJ/m²**	ISO 179

THERMAL PROPERTIES

Heat deflection is measured at two loads, and both sit far above the glass transition temperature, so parts keep their shape under load well above room temperature. Parts are annealed after printing, which raises crystallinity, heat resistance and dimensional stability.

The Vicat softening and melting temperatures mark where the material softens and melts, so size loaded parts for their real service temperature against the heat deflection values.

PROPERTY	VALUE	TEST STANDARD
HDT @ 0.45 MPa	**194 °C**	ISO 75
HDT @ 1.8 MPa	**170 °C**	ISO 75
Vicat Softening Temperature	**220 °C**	ISO 306
Melting Temperature	**225 °C**	DSC, 10 °C/min
Glass Transition Temperature	**70 °C**	DSC, 10 °C/min

PHYSICAL PROPERTIES

Low density keeps parts light, and low moisture absorption, 0.88% at saturation, keeps them dimensionally stable in humid service. The carbon fiber content gives the material its stiffness and its black color.

PROPERTY	VALUE	TEST STANDARD
Density	**1.06 g/cm³**	ISO 1183
Saturated Water Absorption (25 °C, 55% RH)	**0.88 %**	—
Carbon Fiber Content (by weight)	**12–20 %**	Bambu Lab SDS
Color	**Black**	—

CHEMICAL PROPERTIES

PAHT-CF resists most oils and greases, which suits fixtures and brackets around machinery and vehicles. Acids, alkalis and some organic solvents attack it, so keep it away from cleaning chemicals and process fluids in those groups.

Chemical ratings are screening guidance; confirm them with application-specific testing before production release.

CHEMICAL	RATING
Most oils and greases	**Resistant**
Acids	**Not resistant**
Alkalis	**Not resistant**
Some organic solvents	**Not resistant**

COMPLIANCE

Black PAHT-CF meets the EU RoHS directive, including the 2015/863 amendment, tested against the Annex II restricted-substance limits.

STANDARD	STATUS
RoHS Directive 2011/65/EU (amended by EU 2015/863) Black filament tested against the Annex II restricted-substance limits and found compliant	Bambu Lab tested

MANUFACTURING

Colours & finishes	**Black only; annealed as standard, with support removal, bead blasting, painting and threading**

SUPPORTING DOCUMENTS

RoHS declaration