

TECHNICAL DATA SHEET



PLA Carbon Fiber

Smart Print PLA Carbon Fiber is a premium composite filament engineered for users who demand higher stiffness, refined surface quality, and reliable dimensional accuracy while maintaining the simplicity of PLA-based printing. By reinforcing plant-based PLA with carbon fibers, the material delivers enhanced rigidity, reduced weight, and controlled deformation during printing. This filament is designed for functional prototypes and lightweight structural components where both mechanical performance and visual quality are important. The matte carbon-fiber finish provides a professional appearance, making Smart Print PLA Carbon Fiber suitable for advanced technical and design-oriented applications.

Product features

Enhanced Stiffness with Reduced Weight

Carbon fiber reinforcement significantly increases rigidity while keeping parts lightweight. Smart Print PLA Carbon Fiber offers up to 30–50% higher stiffness compared to standard PLA, improving load-bearing capability and shape retention.

Premium Surface Finish

The composite formulation produces a smooth, matte surface with a natural carbon-fiber texture. Layer lines are less visible, resulting in parts that look clean and professional straight off the printer.

Stable and Predictable Printing

Optimized melt flow and controlled shrinkage allow for consistent extrusion and reliable results across a wide range of printing speeds. The material maintains good dimensional accuracy even in larger or more detailed prints.

Eco-Conscious Performance Material

Based on renewable PLA, Smart Print PLA Carbon Fiber retains the environmental advantages of standard PLA while delivering superior mechanical performance. Carbon fibers used are non-toxic and recyclable.

Printing guidelines

Based on a 0.4 mm nozzle. Printing conditions may vary with different nozzle diameters.

Nozzle temperature 215–245°C	Build surface material soft magnetic sheet, PEI, glass	Build surface treatment none required
Build plate 50–60°C	Cooling fan 100% / on	Printing speed: 50–200 mm/s
Raft separation distance 0.4–0.6 mm	Retraction distance 5 mm	Retraction speed 50 mm/s

Drying guidelines

If the filament has absorbed moisture, dry it at 50°C for 4–6 hours before printing. Proper drying improves surface finish and extrusion consistency. Store the filament in a sealed container with desiccant to preserve material quality over time.

Available colors



Precautions

Printer Compatibility

Works with most FDM printers supporting PLA temperatures. For frequent printing, use a hardened steel nozzle to minimize abrasion from carbon fibers.

Cooling Settings

This filament prints best with 100% cooling, which supports sharp details and clean edges.

Shrinkage & Warping Control

PLA Carbon Fiber has a moderate shrinkage rate but is generally stable. For large parts, ensure consistent airflow and room temperature to prevent edge lifting.

Filament Storage

Store the filament in a cool, dry place. Although PLA absorbs less moisture than nylon, the carbon-fiber blend benefits from proper storage to maintain smooth extrusion.

Printing & Handling Guidelines

Smart Print PLA Carbon Fiber is compatible with most FDM/FFF printers operating at PLA temperatures. For frequent or long-term use, a hardened steel nozzle is recommended to minimize wear caused by carbon fiber particles.

Active cooling (100%) is advised to maintain sharp edges, surface detail, and dimensional stability. Consistent ambient conditions help achieve optimal print quality, especially for larger parts.

Important Notes

- Premium PLA composite reinforced with carbon fiber
- Hardened nozzle recommended for extended printing
- Active cooling required for best results
- Not suitable for high-temperature applications (PLA softens above ~60°C)
- Print parameters may vary depending on printer and environment

Property	Test Standard	Unit	Typical Value
Density	ASTM D792	g/cm ³	1.2
Tensile Strength	ASTM D638	MPa	44.8
Young's Modulus	ASTM D638	MPa	3530
Elongation at Break	ASTM D638	%	4.1
Flexural Strength	ASTM D790	MPa	64
Flexural Modulus	ASTM D790	MPa	2432
Izod Impact Strength (Notched, 23°C)	ASTM D256	J/m	32
Heat Deflection Temperature (0.45 MPa)	ASTM D648	°C	53
Glass Transition Temperature (T _g)	ASTM D7426	°C	59
Melting Temperature	ASTM D7426	°C	168.6
Vicat Softening Temperature	ASTM D1525	°C	54
Melt Flow Rate (190°C / 2.16 kg)	ASTM D1238	g/10 min	7
Mold Shrinkage	ASTM D955	%	0.3–1.1

Disclaimer

The information in this document is based on internal testing and provided for general reference. Actual results may vary due to printer settings, environmental conditions, and part geometry. Carbon-fiber-reinforced materials may cause accelerated nozzle wear; users are responsible for ensuring proper hardware maintenance. Smart Print is not liable for equipment damage, print failures, or performance deviations resulting from operation outside recommended parameters. Always store and dispose of materials responsibly and in accordance with local regulations.