

Technical data sheet: P-filament Carbon

Carbon fiber reinforced polypropylene (PP CF) does not absorb water, has hardly any warpage, and is therefore easy to print. Carbon fiber reinforced PP is one of the lightest materials and has excellent mechanical and chemical properties.

Material description

Trade name	P-filament Carbon
Manufacturer	PPprint GmbH
Polymer group	Fiber reinforced thermoplastic polymer
Chemical name	Polypropylene carbon fiber reinforced
Use	Extrusion-based 3D printing

Suggested 3D print settings (nozzle diameter 0.4mm)

Nozzle temperature	230 - 250 °C (hardened steel nozzle 235 - 255 °C)
Bed temperature	20 °C (70 - 80 °C recommended for the first layer, 100 – 110 °C for non-destructive removal after completion)
Chamber temperature	not required
Bed modification	P-surface
Active fan cooling	recommended
Layer height	0.1 – 0.4 mm
Print speed	15 – 60 mm/s

Material properties

Melt temperature	166 °C	ASTM D3418
Melt Flow Rate ¹	11.4 g/10 min	ISO 1133
Density	1.16 g/cm ³	ISO 1183
Hardness	64	Shore D
Odor	odorless	-
Color	black	-

¹ Test conditions: T = 230 °C; m = 2.16 kg

Mechanical properties: Tensile test

All specimens were punched out of printed square tubes consisting of two shells, which were 3D printed with a Raise3D Pro2 printer and applying the following printing conditions:

Nozzle temperature: 250 °C;
 Bed temperature: 70 °C;
 Chamber temperature: 70 °C;
 Printing speed: 30 mm/s.

90°



punched dog bone: S 3A with an orientation of 90° to the nozzle movement direction

0°



punched dog bone: S 3A with an orientation of 0° to the nozzle movement direction

E-Modul (MPa)	870 ± 125	5500 ± 550
Yield strength (MPa)	7.9 ± 0.7	30.9 ± 1.9
Tensile strength (MPa)	7.9 ± 0.7	31.2 ± 1.8
Strain at break (%)	8.7 ± 2.3	1.0 – 2.0

Filament specification

Diameter 1.75	1.75 ± 0.10 mm	PPprint
Diameter 2.85	2.85 ± 0.10 mm	PPprint
Ovality	0.05	PPprint
Netto weight on spool	600 g ± 5%	PPprint

Annotation

The data and properties presented here are averages of a standard batch. The 3D printed square tubes from which the specimens were punched out were produced in Slic3r version 1.3.0.

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