FLASHFORGE®

TECHNICAL DATA SHEET

NexPA-CF25

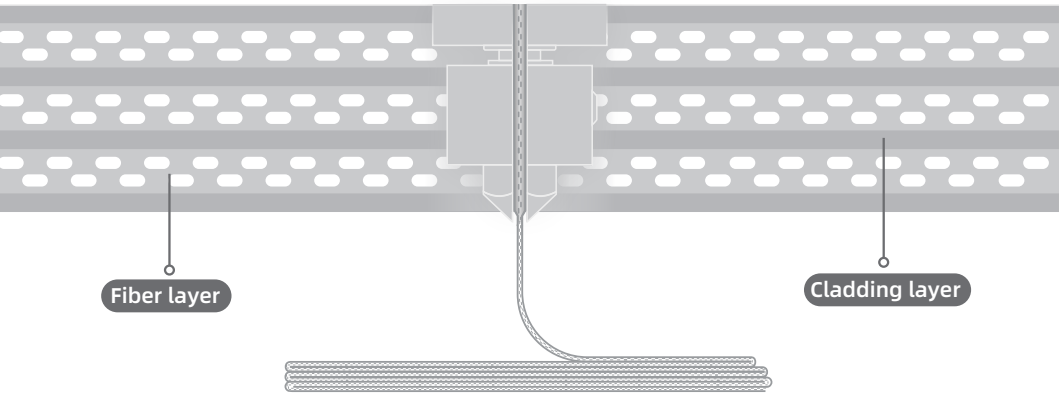
NexPA-CF25 is one type 3D printing nylon filament with Co-extrusion skin-core structure and 25% chopped carbon fiber to improve its thermal and mechanical properties.

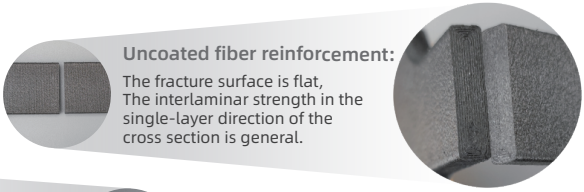
Product Description

NexPA-CF25 is an outstanding candidate for printing parts that need to have thin walls and high mechanical property requirements. It is one type of 3D printing filament with 25% carbon fiber content and a skin-core structure. The outer 'skin' of the filament is a modified resin with high layer adhesion strength, and the inner core is reinforced resin containing high chopped fiber content. Printing filaments take advantage of the general laminar flow of polymeric fluids during extrusion and maintain the stable skin-core structure even after the filament passes through the nozzle of the printer. This technology contributes to the excellent Z-axis interlayer adhesion of FDM fiber-reinforced filaments because the major layer adhesion comes from the outer shell rein without fibers. Meanwhile, 25% chopped cabron fiber content can improve the mechanical properties and heat resistance of the printed parts.

Covered Fiber Reinforcement

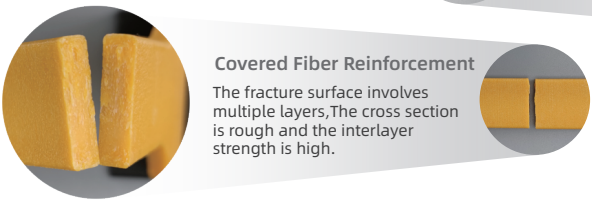
New Arrivals





Uncoated fiber reinforcement:

The fracture surface is flat, The interlaminar strength in the single-layer direction of the cross section is general.



Covered Fiber Reinforcement

The fracture surface involves multiple layers,The cross section is rough and the interlayer strength is high.

Product Advantages

• Co-extrusion ‘skin-core’ structure
The new generation of industrial 3D printing filament features a skin-core structure. The outer 'skin' is a modified resin with high layer adhesion, and the inner core is reinforced resin containing high chopped fiber content.The co-extrusion skin-core technology has greatly increased fiber content while maintaining the toughness of the filament and thus improved the mechanical properties and heat resistance of the printed parts.

• Excellent layer adhesion
The 3D printing filaments have taken advantage of the general laminar flow of polymeric fluids during the extrusion and maintain the stable skin-core structure even after the filament passes through the nozzle of the printer. Among many other fiber-reinforced filaments, Z-axis layer adhesion loss is always a common issue during printing. However, for 3D printing filaments, the Z-axis interlayer adhesion comes from the adhesion between the resin of the outer shell and this can completely avoid the layer adhesion loss. In addition, after being extruded through the nozzle, the inner core and outer layers of the extruded filament are heated, melted and bonded together again. In this way, the adhesion between the inner and outer layers can reach the optimal level and the fibers of the inner core can effectively withstand the force from the z-axis outer layer resin. With these two advantages, the Z-axis interlayer adhesion of final parts printed with these filaments is further improved compared to parts printed with pure resin filaments.

• Reducing nozzle abrasive wear
During the extrusion process, the filaments can greatly reduce the wear of the nozzle. The material that contacts the inner wall of the nozzle is made of pure resin which greatly limits the contact between the reinforcing fibers and the nozzle. At the same time, the skin-core structured filament can also avoid the contact between the reinforcing fibers of the filament and extruders or throats, which prolongs the service life of the entire extrusion parts of the 3D printer.

Availabe

Colors	■Black
Diameter	1.75mm/2.85mm
Net weight	500g/1kg/2.5kg

Material Properties

Property	Testing method	Typical value
Density	ISO 1183	1.23 g/cm³
Water absorption	ISO 62: Method 1	0.5 %
Melting Temperature	ISO 11357	237 °C
Melt index	300°C, 2.16kg	4.2
Determination of temperature	ISO 75: Method A	122.5 °C (1.80MPa)
	ISO 75: Method B	187.5 °C (0.45MPa)
Tensile strength(X-Y)	ISO 527	103.25 ± 2.96 Mpa
Young's modulus(X-Y)		8789.10 ± 458.32 Mpa
Elongation at break (X-Y)		1.49 ± 0.09 %
Bending strength (X-Y)	ISO 178	170.09 ± 4.88 Mpa
Bending modulus (X-Y)		8568.60 ± 172.79 Mpa
Charpy impact strength （X-Y）	ISO 179	6.57 ± 0.38 KJ/m²
Tensile strength (Z)	ISO 527	51.51 ± 2.01 MPa
Young's modulus (Z)		4213.96 ± 87.46 MPa
Elongation at break (Z)		1.55 ± 0.12 %

Specimens printed under the following conditions: Nozzle temp 340℃, Bed temp 80℃, Print speed 45mm/s, Infill 100%, Infill angle ±45°
Post-processing: 100℃ Annealing 8 hours

Recommended printing conditions

Nozzle Temperature	300-340 °C
Recommended Nozzle Diameter	0.4-1.0 mm
Recommended build surface treatment	PEI or Coating with PVP glue
Build plate temperature	70-80 °C
Raft separation distance	0.08-0.12 mm
Cooling fan speed	OFF
Print speed	30-90 mm/s
Retraction distance	1-3 mm
Retraction speed	1800-3600 mm/min
Recommended support material	S-PAHT Quick-Remove Support

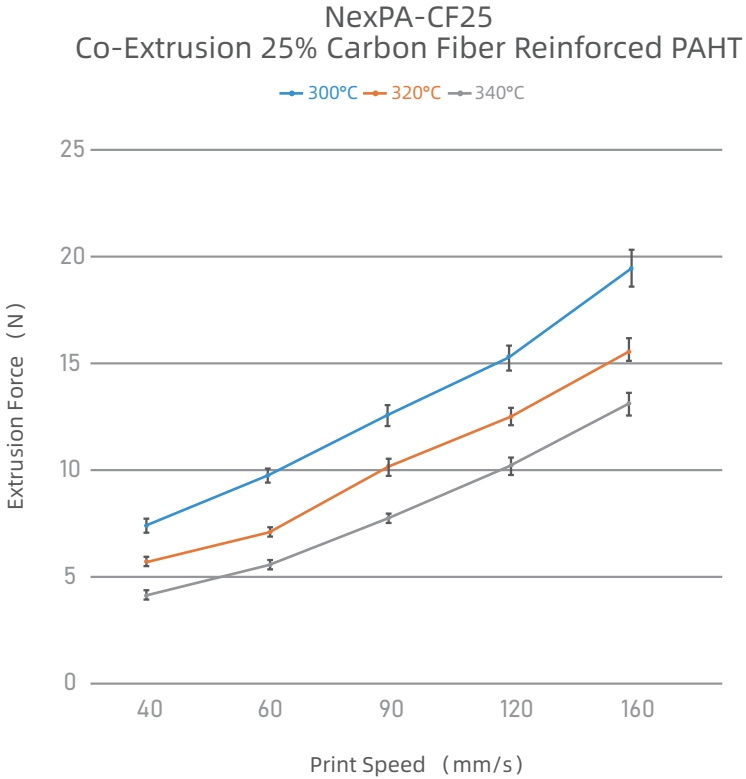
Additional Suggestions:
1. Nylon material is very easy to absorb moisture within the environment, and printing after absorbing moisture will result ozzing, extruding with bubbles and rough surface appearance, thus reducing print quality. It is recommended that put the filament into a dry box (humidity below 15%) immediately after opening the NexPA-CF25 vacuum foil bag for printing. Please put the unused filament back into the original aluminum foil bag for sealed storage.

2. After the material is damp, there will be more printing ozzing, bubbles extruded and rough printing surface. Please dry the filament in an oven at 80-100℃ for 4-6h to restore the printing quality of NexPA-CF25.

3. It is recommended to use hardened steel and above grade nozzles made by Phaetus, which can effectively improve the print quality. Besides, it is recommended that the thickness of the heating block is longer 12mm.

4. After the printing is completed, the NexPA-CF25 printed part can be annealed to further improve the strength of print part. Annealing conditions: leave printing part in an oven at 80-100℃ for 4 to 8 hours and cool to room temperature naturally.

Extrusion Force vs Print Speed Test



Test parameters: 12mm length brass heat block, BMG extruder, Phaetus Hardened Steel Nozzle, Nozzle size 0.4mm, Layer Height 0.2mm.

www.flashforge.com