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TECHNICAL DATA SHEET

cABS-CF20

cABS-CF20 is one type 3D printing ABS filament with co-extrusion skin-core structure and 20% Carbon fiber to improve its mechanical properties.

BRIEF INTRODUCTION

cABS-CF20 is a carbon fiber reinforced ABS material with a skin-core structure. The inner core is ABS reinforced with 20% chopped carbon fiber, and the outer shell is unfilled ABS resin with high bond strength.

The polymer fluid is always in a laminar flow state in the throat and nozzle so the skin-core structure of filaments can be maintained even after being extruded through the nozzle. This skin□ core structure not only contributes to the low shrinkage, warpage resistance and excellent mechanical properties which ordinary fiber-reinforced materials have, but stronger interlayer bonding performance for printed parts as well. It has fixed the defect that the ordinary fiber□ reinforced material will lose the bonding strength between layers. Meanwhile, there is no floating fiber on the surface of the printed part, and the surface presents a bright matte texture.

CHARACTERISTIC

Co-extrusion 'skin-core' structure

The outer 'skin' of the filament 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 as well as heat resistance of printed parts.

Excellent layer adhesion

Take advantage of the laminar flow of polymeric fluids during the extrusion process 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. The interlayer adhesion in Z-axis comes from the adhesion between the resin of the outer shell and this can completely avoid the layer adhesion loss caused by the fibers added. In addition, after being extruded through the nozzle, the inner core and outer layer of the filament are heated, melted and bonded together again. In this way, the adhesion between the core and skin can reach the optimal level and the fibers of the inner core can effectively withstand the force from outer layer resin in Z-axis.

Reducing nozzle abrasive wear

During the extrusion process, it can greatly reduce the wear of the nozzle. The material that slides against 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 help to avoid 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.

Odorless

The main raw material of cABS-CF20 is an ABS resin synthesized by continuous bulk polymerization technique. Thanks to this advanced production process, the residual amount of solvents and monomers used in the production process in the final ABS product is so low that the filament has a low odor during printing

IDENTFICATION OF THE MATERIAL	
Trade name	cABS-CF20
Application	3D PRINTING

GUIDELINE FOR PRINT SETTINGS	
Nozzle temperature	250-270° C
Bed Temperature	100-110℃
Bed material	Glass/PEI Film/PC Film
Active cooling fan	0-20%
Recommend nozzle size	0.4-1.0 mm
Raft distance	0.18-0.2mm
Print speed	30-120mm/s

Settings are based on a 0.4mm nozzle.Nozzle temp.250℃,Bed temp.:100℃， Printing speed:50mm/s,filling rate:100%,filling angle:+/-45°

MATERIAL PROPERTIES	Typical value	Test Method
Melt index	5.5g/10min	250℃ 2.16kg
Determination of temperature	ISO 75: Method A	ISO 75: Method A
	83 °C (1.80MPa)	83 °C (1.80MPa)
Density	1.09g/cm^3	ISO 1183
Tensile strength(X-Y)	47.86±2.32 Mpa	ISO527
Young modulus(X-Y)	4606.28±192.38 Mpa	ISO527
Elongation at break 100%（X-Y）	1.48±0.11 %	ISO527
Bending strength （X-Y）	80.21±0.55 MPa	ISO178
Bending Modulus （X-Y）	4365.286±153.79 MPa	ISO178
Charpy impact strength（X-Y）	8.12±0.78 KJ/㎡	ISO179

Other Suggestions:

1. cABS-CF20 has a higher fiber content compared with ordinary ABS-GF/CF. This technology further improves the warping resistance and rigidity of ABS materials, so the chamber temperature can be properly reduced to achieve energy saving.
2. If the filament has been opened for a long time and problems such as air bubbles and stringing appear during the printing process, please dry the filament at 60-70°C for 4-6 hours.
3. It is recommended to place the printer in a well-ventilated environment when printing with ABS material.
4. cABS-CF25 can maintain a core-skin structure when extruded from the nozzle. It is based on the mechanism that the melt polymer is in a laminar state when it flows stably, However, when the printing speed is too high, the melt flow state will become unstable, and the filaments extruded from the nozzle will no longer have the skin-core structure anymore, which can cause the rough surface of the printed part. When this phenomenon occurs, it is recommended to increase the printing temperature or reduce the extrusion speed.
5. It is recommended to use hardened steel nozzles or nozzles with greater abrasion resistance, which can effectively improve the printing quality. The thickness of the heating block is recommended to be no less than 12mm.

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