Proto-pasta

Carbon Fiber Composite HTPLA

Proto-pasta Carbon Fiber Composite HTPLA is a combination of milled carbon fibers and high-performance PLA. Resulting 3D printed prototypes and end-use parts are characterized by exceptional stability of form and potential use up to 155 deg C (310 deg F) when heat treated.

Material Properties

Properties	Value/Description
Base material	Heat treatable PLA w/ high temp resistance
Characteristics	low odor, non-toxic, renewably sourced
Molecular structure	Amorphous or partially crystalline *(Amorphous as printed, part crystalline when heat-treated) (Melting resets crystalline structure to amorphous state)*
Additives	10% by weight high-purity, milled carbon fiber
Max particle size	0.15 mm (may limit resolution)
Density	approx. 1.3 g/cc
Length	approx. 360 m/kg (1.75 mm) & 136 m/kg (2.85 mm)
Min bend diameter	40 mm (1.75 mm) & 100 mm (2.85 mm)
Glass transition (Tg) onset	approx. 60 deg C (140 deg F)
Melt point (Tm) onset	approx. 155 deg C (310 deg F)
Max use	Tg for amorphous, Tm for crystalline

Use limit is geometry, load & condition dependent

Print Settings

(Based on Ultimaker s5 .15mm Profile)

Setting	Value
Nozzle Temperature [°C]	205
Heated Bed Temperature [°C]	60
Print Speed [mm/s]	20-40
Flow Rate/Extrusion Multiplier [%]	100
Extrusion Width [mm]	.65 (.05mm larger than nozzle size)
Volume Flow Rate [mm³/s]	2-4

Heat Treating (for heat-treating only)

HTPLA is a semi-crystalline grade of PLA optimized for heat-treating for higher temperature use. Prior to printing, HTPLA parts should be scaled in the slicer to compensate for shrinkage when heat treating.

(Please note that all values for heat-treating are process dependent and may vary between users)

Part Axis	Percentage
Scale Values (x/y-axis)	100.6%
Scale Values (z-axis)	99%

(a large range of temperatures & times can yield acceptable results)

Typical Heat Treat Temperature	Typical Heat Treat Time
95-110 °C	10+ minutes

For a more in-depth look at heat treating please view *proto-pasta.com/ht-carbon*

Results may vary based on print settings as well as print quality