CLEAR PETG, REINFORCED CFC PETG

Technical Data Sheet (Ver. 1.1, latest update: March 2023)

CLEAR PETG is polyether based material developed for use in Anisoprint Composer A4/A3. Little shrinkage of PETG makes it possible to obtain high-quality thin-walled products and the high interlayer adhesion allows achieving parts with good toughness.

PHYSICAL PROPERTIES	TEST	RESULT
Density, g/cc	ASTM D972	1.3
Operating temperature, ºC	-	-40...+70
Melt flow index (g/10 min)	240 C, 2.16 kg	18

MECHANICAL PROPERTIES*	TEST	RESULT
Tensile Strength (X-Y) (MPa)	ASTM D638	36.5
Young's Modulus (X-Y) (GPa)	ASTM D638	1.12
Elongation at Break (%	ASTM D638	2.41
Tensile Strength (Z-X) (Mpa)	ASTM D638	33.6
Young's Modulus (Z-X) (GPa	ASTM D638	1.73
Bending Strength (X-Y) (MPa)	ASTM D790	76.1
Bending Modulus (X-Y) (GPa)	ASTM D790	2.06
Compressive Strength (Z-X) (MPa)	ASTM D695	51.7
Compressive Modulus (Z-X) (GPa)	ASTM D695	1.81
Shore hardness (D scale)	-	76
Notched Charpy Impact (KJ/m2)	ISO 179-1:2010	4.17

***Printing conditions and orientation of specimens are shown in NOTE**

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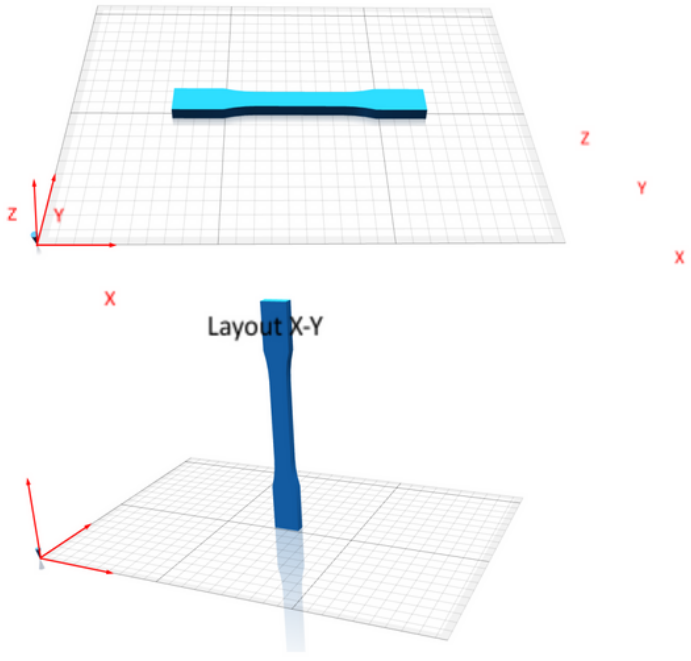
THERMAL PROPERTIES	TEST	RESULT
HDT, °C	STM E2092 0,45 MPa	71
Vicat softening temperature, °C	ISO 306 (B120)	80

RECOMMENDED PRINTING PARAMETERS	SETTING
Nozzle temperature, °C	235-340
Build plate temperature, °C	45-60
Model cooling fan	Moderate
Printing speed, mm/s	20-60
Drying	55-65 °C for 2-4 hours

NOTE The 3D print samples for the tests were printed in XY and ZX planes with 0.2mm layer thickness at 100% fill, 235˚C nozzle temperature and 70˚C build plate temperature.

Orienting models on the platform:



CLEAR PETG, REINFORCED CFC PETG

Technical Data Sheet (Ver. 1.1, latest update: March 2023)

CFC PETG is a material developed for use in CFC (continuous fiber coextrusion) process with Anisoprint Composer A4/A3. High strength characteristics of the composite is achieved by better binding of fiber layers and load distribution between them due to PETG high interlayer strength.

CFC PETG+CCF – 3D printed composite based on PETG plastic reinforced with continuous carbon fibers.

COMPOSITE MECHANICAL PROPERTIES*	TEST	PETG + CCF	PETG + CBF
Tensile Strength along printing paths, MPa	ASTM D3039	863.2 ± 49.2	604.1 ± 16.9
Tensile Modulus along printing paths, GPa	ASTM D3039	64.1 ± 2.4	22.6 ± 0.3
Tensile Strain at Break along printing paths (%)	ASTM D3039	1.3 ± 0.04	2.8 ± 0.09
Poisson ratio 21	ASTM D3039	0.36 ± 0.02	2.8 ± 0.09
Compressive Strength along printing paths (MPa)	ASTM D6641	237.4 ± 4.2	195.1 ± 23.0
Compressive Modulus along printing paths (GPa)	ASTM D6641	49.0±2.4	20.0 ± 1.9
Compressive Strain at Break along printing paths (%)	ASTM D6641	0.52 ± 0.02	20.0 ± 1.9

CFC PETG + CBF – 3D printed composite based on PETG plastic reinforced with continuous basalt fibers.

* Printing conditions and orientation of specimens are shown in NOTE

NOTE

The properties in this datasheet are based on the tests of unidirectional composite specimens with the direction of the fibers along the length (0^0 Plies). Fiber orientation in test specimen is shown in Figure 1. Specimen shape and orientation on the build plate are shown in Figure 2.

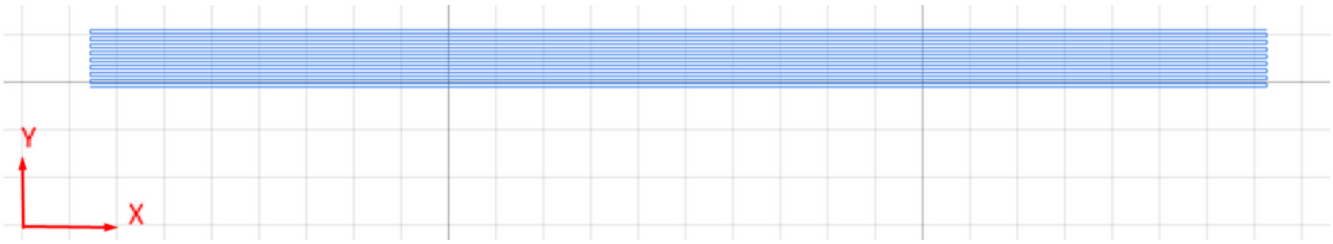


Figure 1. – Fiber orientation in test specimen

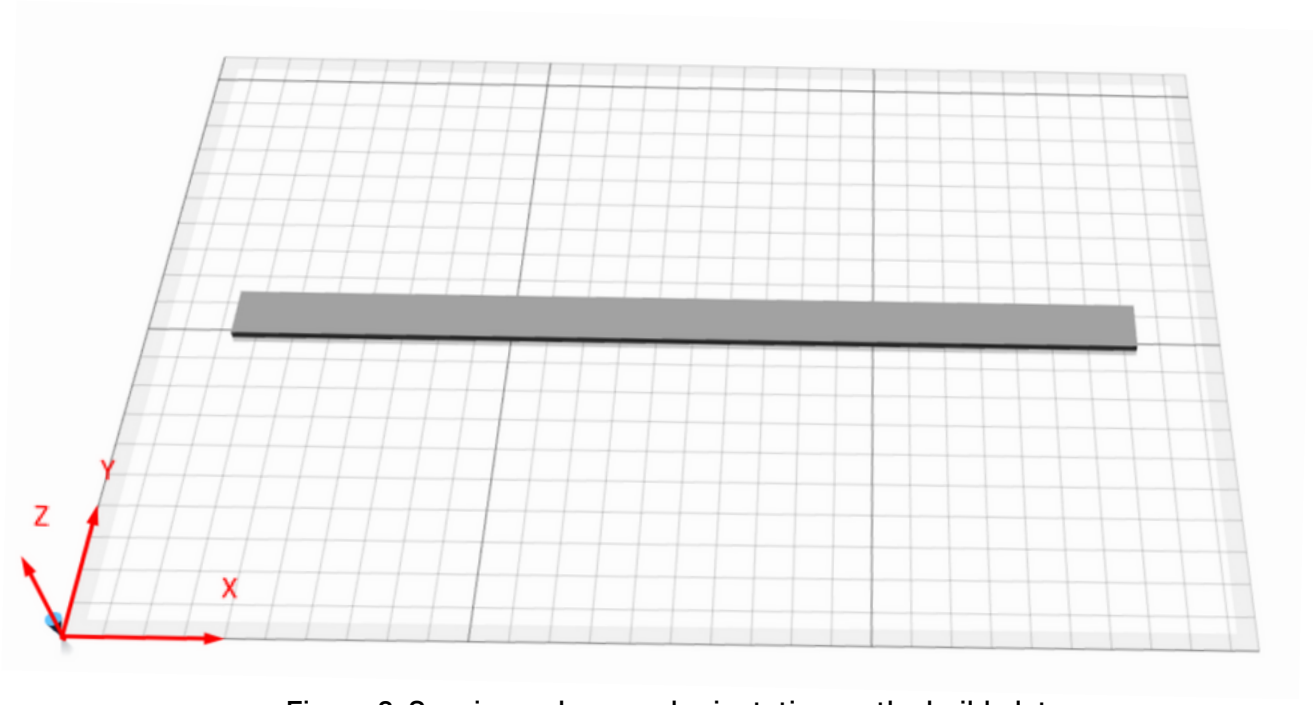


Figure 2. Specimen shape and orientation on the build plate

Printing conditions

Tensile specimen:

- Printing Temperature – 240 ºC
- Printing speed – 5 mm/s
- Dimensions – 250 (Length) x 15 (Width) x 2 (thickness) mm

Compressive specimen:

- Printing Temperature – 240 ºC (for PETG+CBF); 250 ºC (for PETG+CCF)
- Printing speed – 3 mm/s
- Dimensions – 140 (Length) x 12 (Width) x 4(thickness) mm