



Print this page 3D Printing

New Businesses

PLA-HI-GF10

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3D printer filament

Product Description

Clariant developed this 3D printer filament while testing a number of candidate materials for an industrial customer. The customer desired a very strong and tough (not brittle) material that printed with many common 3D printers and would not regularly require drying. Clariant's high impact modified 10% glass fiber reinforced polylactic acid (PLA-HI-GF10) 3D printer filament proved to be the best material for this industrial customer and is now offered as an exceptional material for the production of manufacturing aids and functional parts that require high strength and toughness. Clariant Hostonox[®] P-EPQ[®] and Hostavin[®] ARO 8 are added to PLA-HI-GF10 to improve the heat stability and resistance to thermo-oxidative degradation and yellowing of the material during printing and usage.

Benefits

- Semi-crystalline thermoplastic polyester
- Easy to print
- No odour during printing
- Very high tensile strength (70 MPa 3D printed in XZ direction)
- High impact strength
- Reduced thermo-oxidative degradation
- Minimized undesired yellowing due to ultraviolet light

Applications*

- Manufacturing aids (jigs and fixtures) for industries such as automotive, aerospace, consumer goods, electrical & electronics, packaging and more
- Functional parts requiring strength and toughness
- Prototypes

*Subject to detailed product specifications.

Color Range Standard

- White
- Black
- Red
- Orange
- Yellow
- Green
- Blue

ColorWorks[®] ColorForward[®] consumer color directions 2020

- EYE AM WATCHED - Catch me if you can (orange)

Printing Parameters

- Print Temperature = 200-220°C
- Print Speed = 30-50 mm/s
- Bed Adhesion = directly on glass or carbon; a thin coating of ethylene vinyl acetate (EVA) or polyvinylpyrrolidone (PVP) glue may be applied to the bed to further enhance adhesion
- Bed Temperature = ideally heated up to 60°C
- Fan Settings = medium to high
- Heat stability = the heat deflection temperature of the 3D printed part(s) may be increased by annealing the part(s) at 80-130°C (please contact for details)

Notes: parameters are dependent on printer used; Clariant tests were performed on an Ultimaker S5 printer.

Typical Property Values

Property	Typical Values				Units	Test Method	Test Specimen
	white	black	blue ^a	natural			
Tensile stress at yield, 50 mm/min	84				MPa	ISO 527	Injection molded

		--	--	MPa	ISO 527	3D printed XY / flat at 220°C
		--	--	MPa	ISO 527	3D printed XZ / on edge at 220°C
		--	--	MPa	ISO 527	3D printed ZX / upright at 220°C
Tensile stress at break, 50 mm/min	84	98		MPa	ISO 527	Injection molded
		67	65	MPa	ISO 527	3D printed XY / flat at 220°C
		81	70	MPa	ISO 527	3D printed XZ / on edge at 220°C
		32	30	MPa	ISO 527	3D printed ZX / upright at 220°C
Tensile elongation at yield, 50 mm/min	2.6			%	ISO 527	Injection molded
		--	--	%	ISO 527	3D printed XY / flat at 220°C
		--	--	%	ISO 527	3D printed XZ / on edge at 220°C
		--	--	%	ISO 527	3D printed ZX / upright at 220°C
Tensile elongation at break, 50 mm/min	2.7	2.1		%	ISO 527	Injection molded
		1.5	2.0	%	ISO 527	3D printed XY / flat at 220°C
		1.6	1.9	%	ISO 527	3D printed XZ / on edge at 220°C
		1.6	1.0	%	ISO 527	3D printed ZX / upright at 220°C
Tensile modulus (modulus of elasticity), 1 mm/min	6349	6880		MPa	ISO 527	Injection molded
		5565	5094	MPa	ISO 527	3D printed XY / flat at 220°C

	5975	5193	MPa	ISO 527	3D printed XZ / on edge at 220°C
	3361	2864	MPa	ISO 527	3D printed ZX / upright at 220°C
Flexural modulus			MPa	ISO 178	Injection molded
Flexural strength			MPa	ISO 178	Injection molded
Izod impact notched			kJ/m ²	ISO 180	Injection molded
Charpy impact notched			kJ/m ²	ISO 179	Injection molded
Charpy impact unnotched	21	24	kJ/m ²	ISO 179	3D printed XY / flat at 220°C
THERMAL PROPERTIES					
Melting point	175	175-178	°C	ISO 11357, DSC ^b	
Glass transition temperature	60	67	°C	ISO 11357, DSC ^b	
Heat deflection temperature at 1.8 MPa (A)			°C	ISO 75	Injection molded
	91		°C	ISO 75	3D printed XY / flat at 220°C
Heat deflection temperature at 0.45 MPa (B)			°C	ISO 75	Injection molded
	144		°C	ISO 75	3D printed XY / flat at 220°C
GENERAL PROPERTIES					
Density		1298	kg/m ³	ISO 1183	
Volume		2.44	cm ³	ISO 1183	
pH		6.2			1% in H ₂ O
Water content - coulometric Karl Fischer		2300	µg/g	ISO 12937	
Water content - coulometric Karl Fischer		70	µg/g	ISO 15512	60°C for 8 hours in a vacuum oven
non-volatile-matter content		~10	%	ISO 3251	

^a. Organic based color. ^b. DSC = Differential Scanning Calorimetry at 10°C/minute.

Note: results are generated according to the valid testing standards indicated above and the standard operating procedures used by the testing facilities.

Packaging and Handling

Delivery Form

1.75 mm and 2.85 mm diameter 3D printer filament.

Packaging

1 kg and 5 kg spools of 3D printer filament. Custom sizes are available upon request.

Storage

Ideally store the 3D printer filament in a cool, dry place at temperatures between 5 to 25°C in a sealed container with the provided Clariant Desi Pak[®] desiccant bag. If the 3D printer filament has been exposed to moisture, please dry at 60°C for at least 8 hours with a vacuum or desiccant drying system if possible. Minimum shelf life is 1 year from the date of shipping when properly stored.

Safety

Contact Us;

Please contact us for safety and regulatory details or the Material Safety Data Sheet (MSDS).

www.clariant.com

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