



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 Hostanox[®] 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
- Fluorescent 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 | | | |

MECHANICAL PROPERTIES

| | | | | | |
|------------------------------------|----|----|-----|---------|-------------------------------|
| Tensile stress at yield, 50 mm/min | 84 | 76 | 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 | 76 | 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 | | 2.4 | % | 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 | 2.5 | % | 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 | 5135 | 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 | 5.9 | 4.2 | 5.6 | kJ/m ² | ISO 179 | Injection molded |
| | | | | kJ/m ² | ISO 179 | 3D printed XY / flat at 220°C |
| Charpy impact unnotched | 30 | 30 | 28 | kJ/m ² | ISO 179 | Injection molded |
| | | 21 | 24 | kJ/m ² | ISO 179 | 3D printed XY / flat at 220°C |
| THERMAL PROPERTIES | | | | | | |
| Melting point | | 175 | 175-178 | 174-175 | °C | ISO 11357, DSC ^b |
| Glass transition temperature | | 60 | 67 | 58-62 | °C | ISO 11357, DSC ^b |
| Heat deflection temperature at 1.8 MPa (A) | 104 | 112 | | | °C | ISO 75 Injection molded |
| | | 91 | | | °C | ISO 75 3D printed XY / flat at 220°C |
| Heat deflection temperature at 0.45 MPa (B) | 135 | 148 | | | °C | ISO 75 Injection molded |
| | | 144 | | | °C | ISO 75 3D printed XY / flat at 220°C |
| GENERAL PROPERTIES | | | | | | |
| Density | | 1319 | 1298 | | kg/m ³ | ISO 1183 |
| pH | | 5.9 | 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 | | ~13 | ~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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