



Print this page 3D Printing

New Businesses

PA6/66 FR Using Exolit®

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3D printer filament

Product Description

Clariant's Exolit® non-halogenated flame retardants provide environmental friendly and sustainable solutions for products used in a variety of industries. Flame Retardant Polyamide 6/66 Using Exolit® (PA6/66 FR) 3D printer filament is created by compounding polyamide 6/66 (a blend of polyamide 6 and polyamide 66) with the phosphorus based flame retardant Exolit®. The 3D printer filament prints exceptionally and can be used to produce a variety of parts that require flame retardancy and good mechanical properties.

Benefits

- Flame retardant material
- Semi-crystalline thermoplastic
- Good impact strength and stiffness
- Outstanding wear resistance
- Good temperature resistance
- Reduced thermo-oxidative degradation
- Improved long term heat and stability to ultraviolet and visible light

Applications*

- Functional end use parts
- Functional prototypes

*Subject to detailed product specifications.

Color Range Standard

- White
- Black
- Grey
- Red

ColorWorks® ColorForward® consumer color directions 2019

- MADE IN HUMAN - Protect the core (red)
- DO NOT DISTURB - ἀταρξία von has fidanken (green blue)

ColorWorks® ColorForward® consumer color directions 2020

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

Custom colors available upon request.

Printing Parameters

- Print Temperature = 230-250°C
- Print Speed = 20-50 mm/s
- Bed Adhesion = A polyvinylpyrrolidone (PVP) based glue coated on a glass or carbon fiber surface
- Bed Temperature = ideally 80°C
- Fan Settings = off to low

Note: Parameters are dependent on printer used; Clariant tests were performed on Ultimaker S5 and 3ntr A4 V3 printers.

Typical Property Values

Property	Typical Values				Units	Test Method	Test Specimen
	white	black	Catch me if you can ^a	natural			

MECHANICAL PROPERTIES

Property	Typical Values				Units	Test Method	Test Specimen
Tensile stress at yield, 50 mm/min					MPa	ISO 527	Injection molded
	46	39	40	52	MPa	ISO 527	3D printed XY / flat at 250°C

	44	39	37	56	MPa	ISO 527	3D printed XZ / on edge at 250°C
	--	21	--	--	MPa	ISO 527	3D printed ZX / upright at 250°C
Tensile stress at break, 50 mm/min	48	56		37	MPa	ISO 527	Injection molded
	41	37	37	49	MPa	ISO 527	3D printed XY / flat at 250°C
	43	35	30	52	MPa	ISO 527	3D printed XZ / on edge at 250°C
	20	23	18	25	MPa	ISO 527	3D printed ZX / upright at 250°C
Tensile elongation at yield, 50 mm/min					%	ISO 527	Injection molded
	3.5	3.1	3.5	3.7	%	ISO 527	3D printed XY / flat at 250°C
	3.3	2.9	3.1	3.1	%	ISO 527	3D printed XZ / on edge at 250°C
	--	0.6	--	--	%	ISO 527	3D printed ZX / upright at 250°C
Tensile elongation at break, 50 mm/min	12	13		35	%	ISO 527	Injection molded
	12	12	17	6.9	%	ISO 527	3D printed XY / flat at 250°C
	4.5	9.3	8.1	4.5	%	ISO 527	3D printed XZ / on edge at 250°C
	1.1	0.8	1.4	1.3	%	ISO 527	3D printed ZX / upright at 240°C
Tensile modulus (modulus of elasticity), 1 mm/min					MPa	ISO 527	Injection molded
	2138	2345	2372	2803	MPa	ISO 527	3D printed XY / flat at 240-250°C
	2459	2041	2078	3010	MPa	ISO 527	3D printed XZ / on edge at 240- 250°C
	2101	2602	1666	2389	MPa	ISO 527	3D printed ZX / upright at 240- 250°C
Flexural modulus	2130	2370		1320	MPa	ISO 178	Injection molded
Flexural strength	67	83		46	MPa	ISO 178	Injection molded

Izod impact notched	6	5	7	MPa	ISO 180	Injection molded	
Charpy impact notched	5	5	7	MPa	ISO 179	Injection molded	
Charpy impact unnotched		28	27	27	kJ/m ²	ISO 179	3D printed XY / flat at 250°C

FLAMMABILITY PROPERTIES

UL 94 flammability rating		V-0 at 0.8 mm			UL 94	Injection molded
		V-0 at 0.8 mm			UL 94	3D printed XY / flat at 240°C
	V-0 at 1.6 mm	V-0 at 1.6 mm			UL 94	Injection molded
		V-0 at 1.6 mm			UL 94	3D printed XY / flat at 240°C
	V-0 at 3.2 mm	V-0 at 3.2 mm	V-0 at 3.2 mm		UL 94	Injection molded
		V-0 at 2.0 mm			UL 94	Injection molded

THERMAL PROPERTIES

Melting point	197	197	194	191		ISO 11357, DSC ^b	
Glass transition temperature	--	--	--	--	°C	ISO 11357, DSC ^b	
Heat deflection temperature at 1.8 MPa (A)	57	56		58	°C	ISO 75	Injection molded
	73	61	64	67	°C	ISO 75	3D printed XY / flat at 250°C
Heat deflection temperature at 0.45 MPa (B)	143	140		142	°C	ISO 75	Injection molded
	151	141	133	148	°C	ISO 75	3D printed XY / flat at 250°C

GENERAL PROPERTIES

Density	1169	1169	1117	1159	kg/m ³	ISO 1183	
Volume	4.16	4.16	4.33	4.29	cm ³	ISO 1183	
pH	4.7	4.7	4.6	4.7		1% in H ₂ O	
Water absorption	8.2	5.2		5.4	%	ISO 62	24 hours at 23°C
Water content - coulometric Karl Fischer				220	µg/g	ISO 12937	

Water content	0.08	0.07	0.08	%	ISO 15512	after drying at 120°C for 2 hours
non-volatile-matter content	~9	~11	~10	~7	%	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 80°C for 3-4 hours with a vacuum or desiccant drying system if possible. Minimum shelf life is 1 year from the date of shipping when properly stored.

Contact Us;

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

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