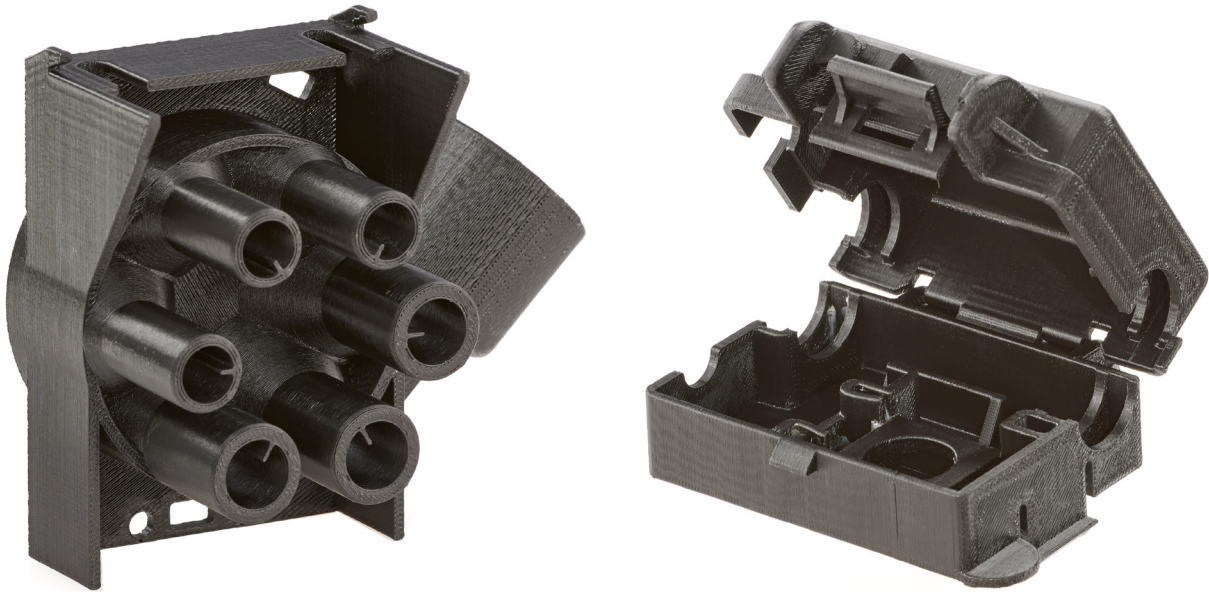


# FDM Nylon 12



## FDM Thermoplastic Filament

The information presented are typical values intended for reference and comparison purposes only. They should not be used for design specifications or quality control purposes.



## Overview

FDM® Nylon 12 filament is the 3D printing equivalent of standard industrial PA12 (polyamide 12) material. A strong engineering thermoplastic, it exhibits toughness and high impact strength, without being brittle. Its excellent fatigue properties make it a good option for repetitive-flex applications such as snap-fit clips and closures and press-fit inserts.

Other applications include jigs, fixtures and low-volume production parts, as well as accurate prototyping of nylon 12 high-volume injection molded parts. FDM Nylon 12 is available in black.

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## Ordering Information

**Table 1. Printer and Support Material Compatibility**

Printer	Model Tip (Slice)	Support Material	Support Tip
Fortus 450mc™	T12 (7 slice)	SR-110 (soluble)	T12SR100
	T16 (10 slice)		
	T20 (13 slice)		
Fortus 900mc™/F900™	T12 (7 slice)	SR-110 (soluble)	T12SR100
	T16 (10 slice)		
	T20 (13 slice)		

### Build Sheet

Nylon

- 0.02 x 26 x 38 in. (0.51 x 660 x 965 mm)
- 0.02 x 16 x 18.5 in. (0.51 x 406 x 470 mm)

**Table 2. FDM Nylon 12 Ordering Information**

Part Number	Description
<b>Filament Canisters <sup>1 2</sup></b>	
355-02230	Nylon 12, 92.3 cu in. - Plus
310-21800	Nylon 12, 92.3 cu in. - Classic
355-03130	SR-110 soluble support, 92.3 cu in. - Plus
310-32200	SR-110 soluble support, 92.3 cu in. - Classic
<b>Printer Consumables</b>	
511-10301	T12 tip
511-10401	T16 tip
511-10701	T20 tip
511-10100	T12SR-100 tip
355-00750-S	Nylon build sheet, 0.02x16x18.5 in. (0.51x406x470 mm)
310-00450-S	Nylon build sheet, 0.03x16x18.5 in. (0.76x406x470 mm)
325-00650-S	Nylon build sheet, 0.02x26x38 in. (0.51x660x965 mm)
325-00750-S	Nylon build sheet, 0.02x14x16.5 in. (0.51x356x420mm)

<sup>1</sup> Classic canisters are compatible with all Fortus 900mc™ printers prior to s/n L502.

<sup>2</sup> Plus canisters are compatible with all Fortus 450mc™, all Stratasys F900™, and Fortus 900mc™ printers s/n L502 and up.

## Physical Properties

Values are measured as printed. XY, XZ, and ZX orientations were tested. For full details refer to the [Stratasys Materials Test Report](#) (immediate download upon clicking the link). DSC and TMA curves can be found in the Appendix.

**Table 3. FDM Nylon 12 Physical Properties**

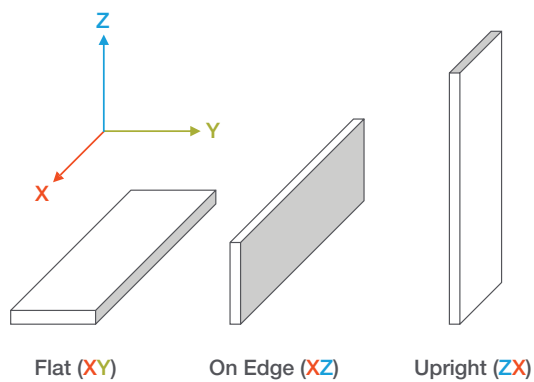
Property	Test Method	Typical Values	
		XY	XZ/ZX
HDT @ 66 psi	ASTM D648 Method B	94.7 C (202.5 F)	91.9 C (197.5 F)
HDT @ 264 psi	ASTM D648 Method B	84.3 C (183.8 F)	75.3 C (167.5 F)
Tg	ASTM D7426 Inflection Point	34.03 C (92.25 F)	
Mean CTE	ASTM E831 (-50 °C to 10 °C)	84.35 µm/[m*°C]	85.56 µm/[m*°C]
		46.86 µin/[in*°F]	47.53 µin/[in*°F]
Mean CTE	ASTM E831 (10 °C to 45 °C)	89.12 µm/[m*°C]	-
		49.51 µin/[in*°F]	-
Mean CTE	ASTM E831 (45 °C to 70 °C)	98.23 µm/[m*°C]	-
		55.83 µin/[in*°F]	-
Mean CTE	ASTM E831 (70 °C to 95 °C)	60.08 µm/[m*°C]	-
		(33.38 µin/[in*°F])	-
Mean CTE	ASTM E831 (10C to 50C)	-	97.08 µm/[m*°C]
		-	53.93 µin/[in*°F]
Mean CTE	ASTM E831 (50C to 70C)	-	102.8 µm/[m*°C]
		-	57.11 µin/[in*°F]
Volume Resistivity	ASTM D257	> 6.87*10 <sup>13</sup> Ω*cm	
Dielectric Constant	ASTM D150 1 kHz test condition	3.11	2.78
Dielectric Constant	ASTM D150 2 MHz test condition	2.48	2.52
Dissipation Factor	ASTM D150 1 kHz test condition	0.066	0.009
Dissipation Factor	ASTM D150 2 MHz test condition	0.014	0.008
Specific Gravity	ASTM D257 @23 °C	1.01	

# Mechanical Properties

Nylon 12 samples were printed with a 0.010 in. (0.254 mm) layer height on the F900. For the full test procedure please see the [Stratasys Materials Test Procedure](#) (immediate download upon clicking the link).

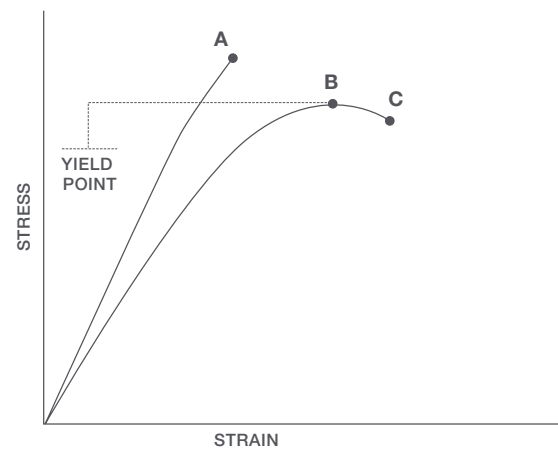
## Print Orientation

Parts created using FDM are anisotropic as a result of the printing process. Below is a reference of the different orientations used to characterize the material.



## Tensile Curves

Due to the anisotropic nature of FDM, tensile curves look different depending on orientation. Below is a guide of the two types of curves seen when printing tensile samples and what reported values mean.



- A = Tensile at break, elongation at break (no yield point)
- B = Tensile at yield, elongation at yield
- C = Tensile at break, elongation at break

**Table 4. FDM Nylon 12 Mechanical Properties (F900 - T16 Tip)**

		XZ Orientation <sup>1</sup>	ZX Orientation <sup>1</sup>
<b>Tensile Properties: ASTM D638</b>			
Yield Strength	MPa	49.3 (0.48)	41.8 (0.67)
	psi	7140 (70)	6060 (97)
Elongation @ Yield	%	6.1 (0.068)	5.8 (0.16)
Strength @ Break	MPa	33.4 (1.7)	41.2 (0.72)
	psi	4840 (240)	5890 (100)
Elongation @ Break	%	30 (23)	6.5 (0.39)
Modulus (Elastic)	GPa	1.51 (0.087)	1.25 (0.12)
	ksi	218 (13)	181 (18)
<b>Flexural Properties: ASTM D790, Procedure A</b>			
Strength @ Break	MPa	No break	No break
	psi	No break	No break
Strength @ 5% Strain	MPa	56.5 (5.0)	54.5 (4.7)
	psi	8190 (720)	7900 (690)
Strain @ Break	%	No break	No break
Modulus	GPa	1.26 (0.13)	1.20 (0.12)
	ksi	182 (18)	174 (17)
<b>Compression Properties: ASTM D695</b>			
Yield Strength	MPa	327 (33)	557 (48)
	psi	47400 (4700)	80700 (7000)
Modulus	GPa	1.48 (0.069)	1.65 (0.091)
	ksi	215 (9.9)	240 (13)
<b>Impact Properties: ASTM D256, ASTM D4812</b>			
Notched	J/m	138 (22)	71.0 (14)
	ft*lb/in.	2.58 (0.41)	1.33 (0.27)
Unnotched	J/m	1800 (240)	322 (130)
	ft*lb/in.	33.8 (4.6)	6.03 (2.4)

<sup>1</sup> Values in parenthesis are standard deviations.

## Appendix

Figure 1. 2nd heating scan DSC data for the Nylon 12 Flat (XY) sample.

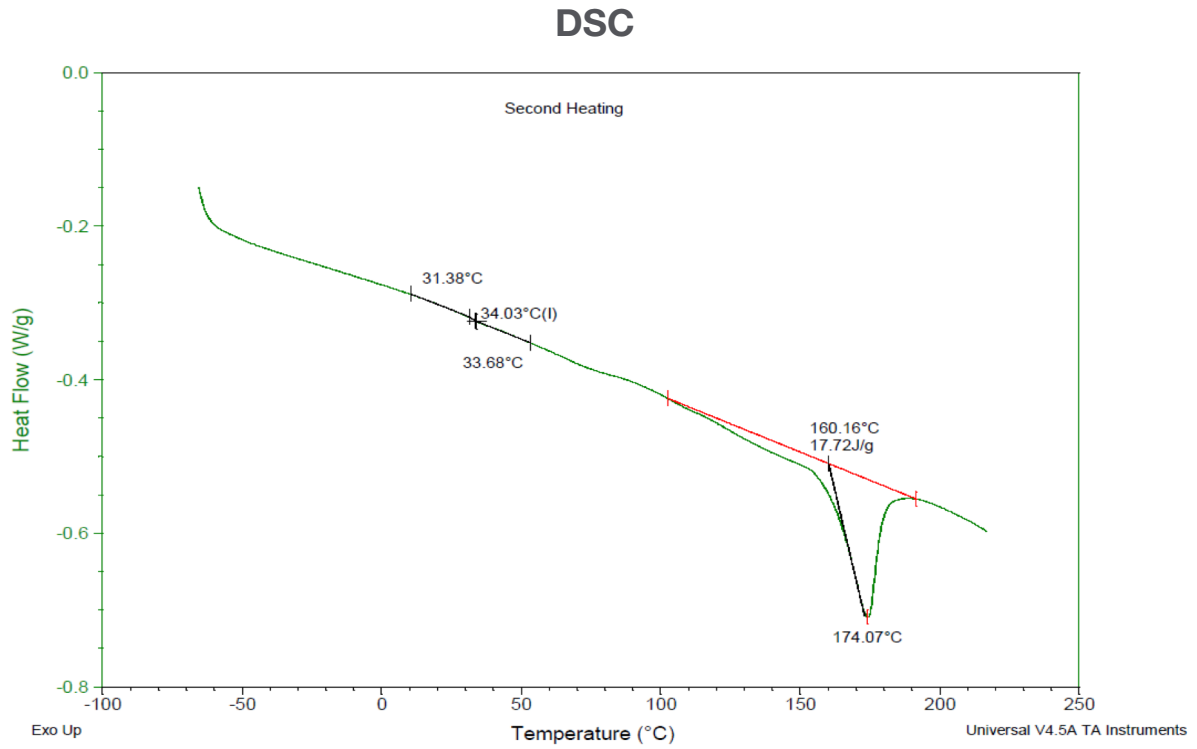


Figure 2. Dimension change data as a function of temperature for the Nylon 12 Flat (XY) sample.

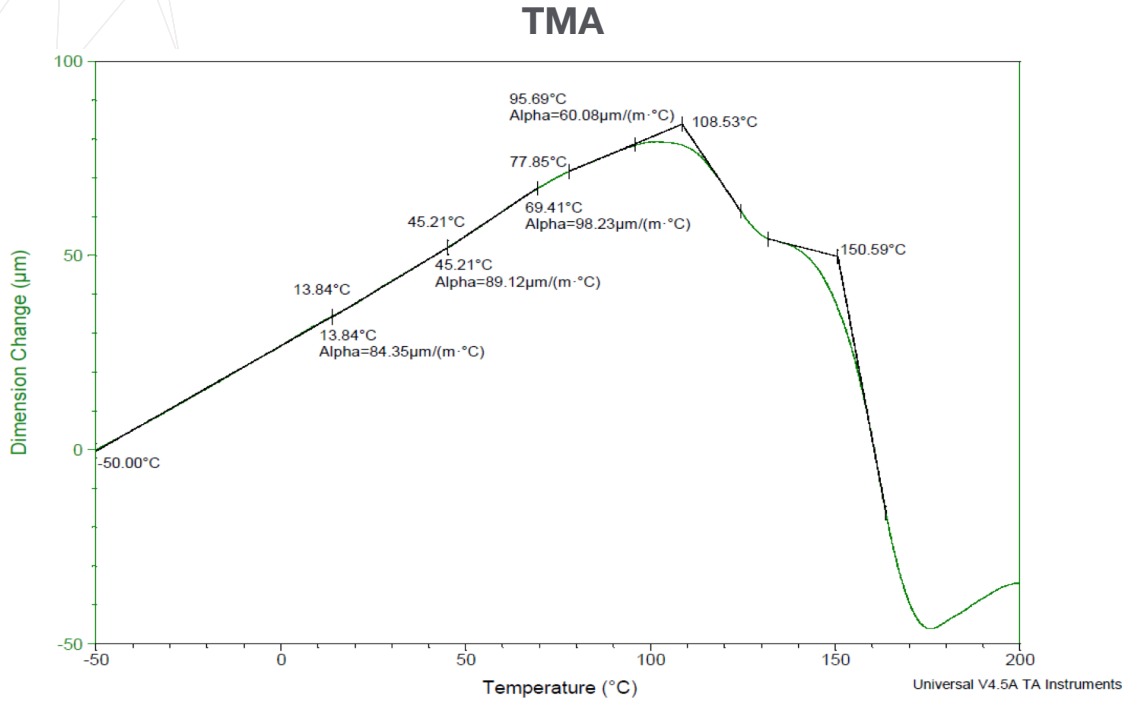


Figure 3. Dimension change data as a function of temperature for the Nylon 12 On Edge (XZ) sample.

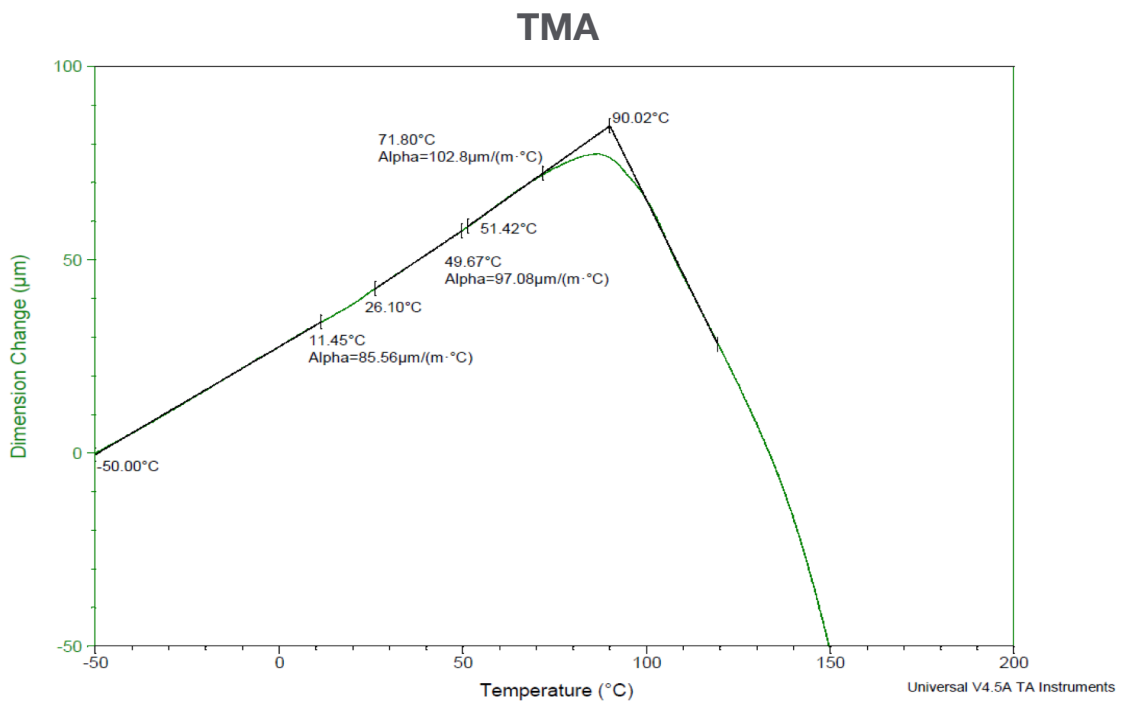
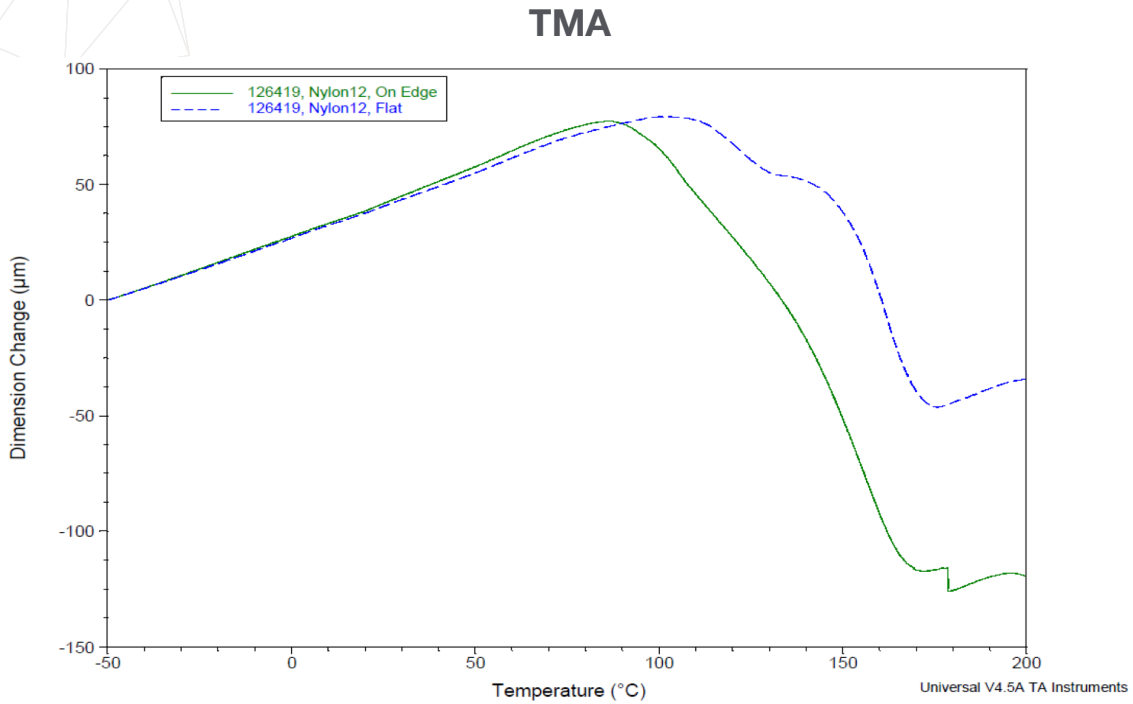




Figure 4. Overlay of the dimension change data for the Flat (XY) and On Edge (XZ) Nylon 12 samples.



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