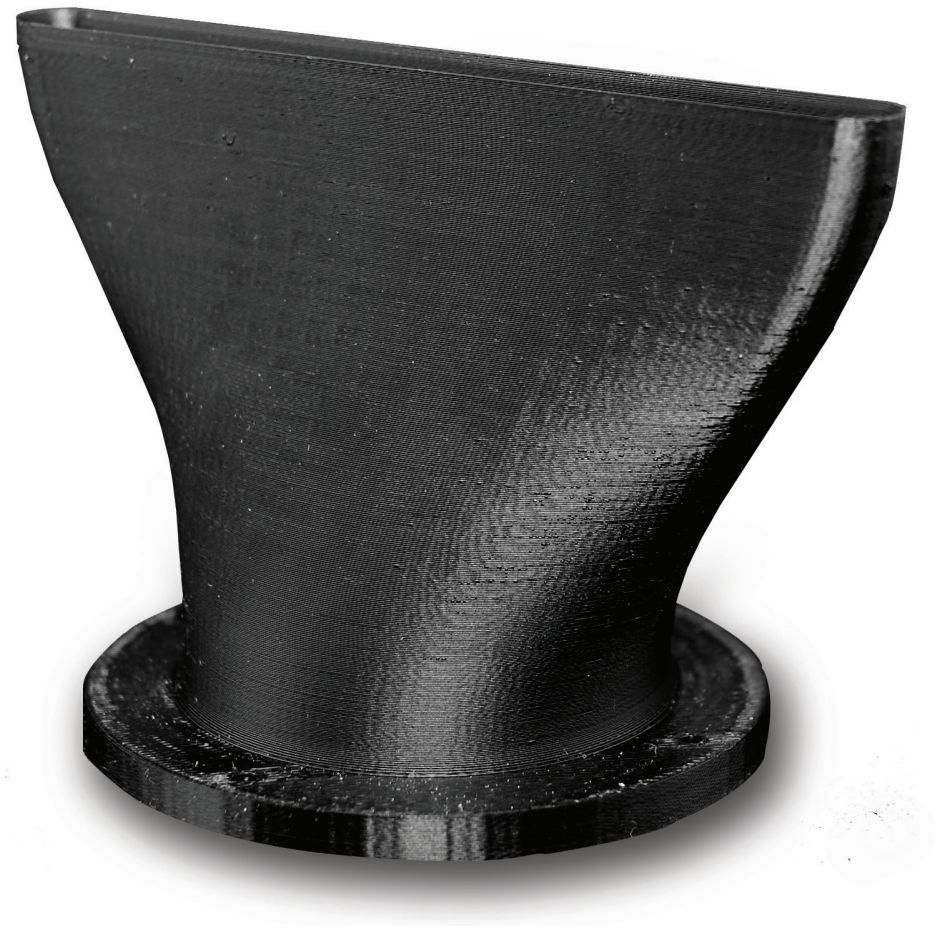
PC-ABS

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

PC-ABS is a blend of polycarbonate (PC) and acrylonitrile butadiene styrene (ABS) thermoplastics. The result is an FDM filament that exhibits optimal characteristics of each – excellent strength, high toughness and heat resistance, and good flexural strength. Choose PC-ABS when you need the strength of PC but the impact resistance of ABS.

PC-ABS is suitable for a variety of applications that include prototyping, tooling and low-volume production. Available colors are black and white.

Contents:

Ordering Information

Table 1. Printer and Support Material Compatibility

Printer	Model Tip (Slice)	Support Material	Support Tip
F170™	F123 Head (5, 7, 10, 13 slice)	QSR Support™ (soluble)	F123 Head (all slices)
F270™	F123 Head (5, 7, 10, 13 slice)	QSR Support (soluble)	F123 Head (all slices)
F370™	F123 Head (5, 7, 10, 13 slice)	QSR Support (soluble)	F123 Head (all slices)
Fortus 360mc™	T10 (5 slice) T12 (7 slice) T16 (10 slice) T20 (13 slice)	SR-20™ (soluble)	T12SR20 (all slices)
Fortus 400mc™	T10 (5 slice) T12 (7 slice) T16 (10 slice) T20 (13 slice)	SR-20 (soluble)	T12SR20 (all slices)
Fortus 380mc™/450mc™	T10 (5 slice) T12 (7 slice) T12 (10 slice) T20 (13 slice)	SR-110™ (soluble)	T12SR100 (all slices)
Fortus 900mc™/F900™	T12 (7, 10 slice) T120 (13 slice)	SR-110 (soluble)	T12SR100 (all slices)

Build Sheet

Low Temperature

- 0.02 x 26 x 38 in.
- 0.02 x 16 x 18.5 in.
- 0.02 x 14 x 16.5 in.
- 0.03 x 16 x 18.25 in.

F123 Standard Build Trays

Table 2. PC-ABS Filament Ordering Information

Part Number	Description
Filament Canisters [1] [2]	
355-02260	PC-ABS (black), 92.3 cu in. - Plus
310-20500	PC-ABS (black), 92.3 cu in. - Classic
333-90701	PC-ABS (black), 90 cu in. - F123
333-60701	PC-ABS (black), 60 cu in. - F123
333-60700	PC-ABS (white), 60 cu in. - F123
355-03130	SR-110 soluble support, 92.3 cu in. - Plus
355-03140	SR-20 soluble support, 92.3 cu in. - Plus
310-30500	SR-20 soluble support, 92.3 cu in. - Classic
333-63500	QSR soluble support, 60 cu in. - F123
Printer Consumables	
511-10501	T10 tip, 0.005 (0.127 mm) layer height
511-10301	T12 tip, 0.007 in. (0.178 mm) layer height
511-10401	T16 tip, 0.010 in. (0.254 mm) layer height
511-10701	T20 tip, 0.013 in. (0.330 mm) layer height
511-10100	T12SR100 tip, all layer heights
123-00401-S	F123 Standard Head (all layer heights)
325-00300[3]	Low Temperature build sheet, 0.2 x 26 x 38 in. (0.76 x 660 x 965 mm)
325-00100[4]	Low Temperature build sheet, 0.2 x 16 x 18.5 in. (0.76 x 406 x 470 mm)
355-00100[5]	Low Temperature build sheet, 0.2 x 16 x 16.5 in. (0.76 x 406 x 420 mm)
310-00100[6]	Low Temperature build sheet, 03 x 16 x 18.25 in. (0.76 x 406 x 464 mm)
123-00304	F370 Build Tray, Standard
123-00303	F270 Build Tray, Standard
123-00302-S	F170 Build Tray, Standard

[1] Classic canisters are compatible with all Fortus 400mc and Fortus 900mc printers prior to s/n L502.

[2] Plus canisters are compatible with all Fortus 450mc, all Stratasys F900, and Fortus 900mc printers s/n L502 and up.

[3] Compatible with Fortus 900mc and F900.

[4] Compatible with Fortus 450mc, Fortus 900mc and F900

[5] Compatible with Fortus 380mc

[6] Compatible with Fortus 360mc

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. PC-ABS Physical Properties

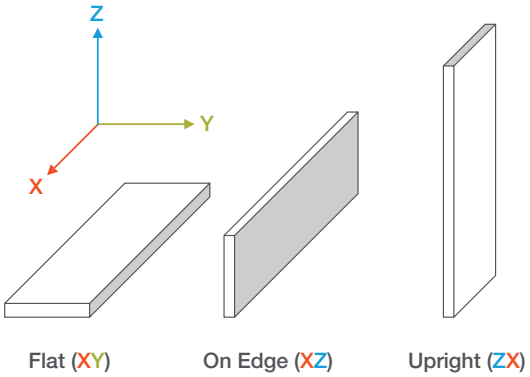
Property	Test Method	Typical Values	
		XY	XZ/ZX
HDT @ 66 psi	ASTM D648 Method B	125 °C (257 °F)	
HDT @ 264 psi	ASTM D648 Method B	100 °C (212 °F)	
Tg	ASTM D7426 Inflection Point	105 °C (221 °F)	
Mean CTE	ASTM E831 (-50 °C to 95 °C)	-	70 µm/[m*°C] (39 µin/[in*°F])
	ASTM E831 (-50 °C to 35 °C)	35 µm/[m*°C] (19 µin/[in*°F])	-
	ASTM E831 (35 °C to 50 °C)	0.5 µm/[m*°C] (0.3 µin/[in*°F])	-
	ASTM E831 (50 °C to 90 °C)	-60 µm/[m*°C] (-33 µin/[in*°F])	-
Volume Resistivity	ASTM D257	> 6.8*10^14 Ω*cm	
Dielectric Constant	ASTM D150 1 kHz test condition	2.62	2.74
	ASTM D150 2 MHz test condition	2.74	2.88
Dissipation Factor	ASTM D150 1 kHz test condition	0.001	0.002
	ASTM D150 2 MHz test condition	0.002	0.001
Specific Gravity	ASTM D257 @23 °C	1.10	

Mechanical Properties

PC-ABS samples were printed with 0.010 in. (0.254 mm) layer heights on the F900. For the full test procedure please see the Stratasys Materials Test Procedure (immediate download upon clicking the link).

Print Orientation

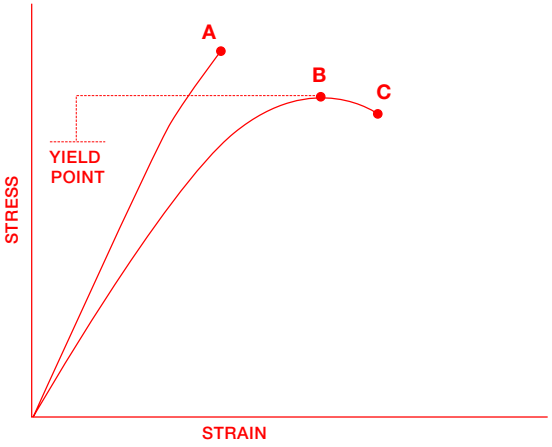
Parts created using FDM are anisotropic as a result of the printing process. Below is a reference of the different orientations used to characterize the material.



Flat (XY) On Edge (XZ) Upright (ZX)

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. PC-ABS Mechanical Properties (Fortus 900mc - T16 Tip)

		XZ Orientation[1]	ZX Orientation[1]
Tensile Properties: ASTM D638			
Yield Strength	MPa	36 (1)	No yield
	psi	5,300 (105)	No yield
Elongation @ Yield	%	3.01 (0.09)	No yield
Strength @ Break	MPa	34 (2)	25 (2)
	psi	5,070 (200)	3,755 (230)
Elongation @ Break	%	4.7 (0.7)	1.8 (0.2)
Modulus (Elastic)	GPa	1.98 (0.04)	1.8 (0.2)
	ksi	290 (5)	270 (30)
Flexural Properties: ASTM D790, Procedure A			
Strength @ Break	MPa	No break	45 (2)
	psi	No break	6,700 (290)
Strength @ 5% Strain	MPa	60 (1)	-
	psi	8,970 (170)	-
Strain @ Break	%	No break	3.5 (0.3)
Modulus	GPa	1.9 (0.1)	1.68 (0.07)
	ksi	270 (20)	240 (10)
Compression Properties: ASTM D695			
Yield Strength	MPa	95 (4)	170 (15)
	psi	13,985 (525)	24,990 (1920)
Modulus	GPa	1.95 (0.05)	2.11 (0.09)
	ksi	280 (7)	305 (8)
Impact Properties: ASTM D256, ASTM D4812			
Notched	J/m	240 (40)	35 (5)
	ft*lb/in.	4.5 (0.7)	0.6 (0.1)
Unnotched	J/m	655 (130)	100 (20)
	ft*lb/in.	10 (2)	1.9 (0.4)

[1] Values in parentheses are standard deviations.

Appendix

Figure 1. 2nd heating scan DSC data for the PC-ABS Flat (XY) sample.

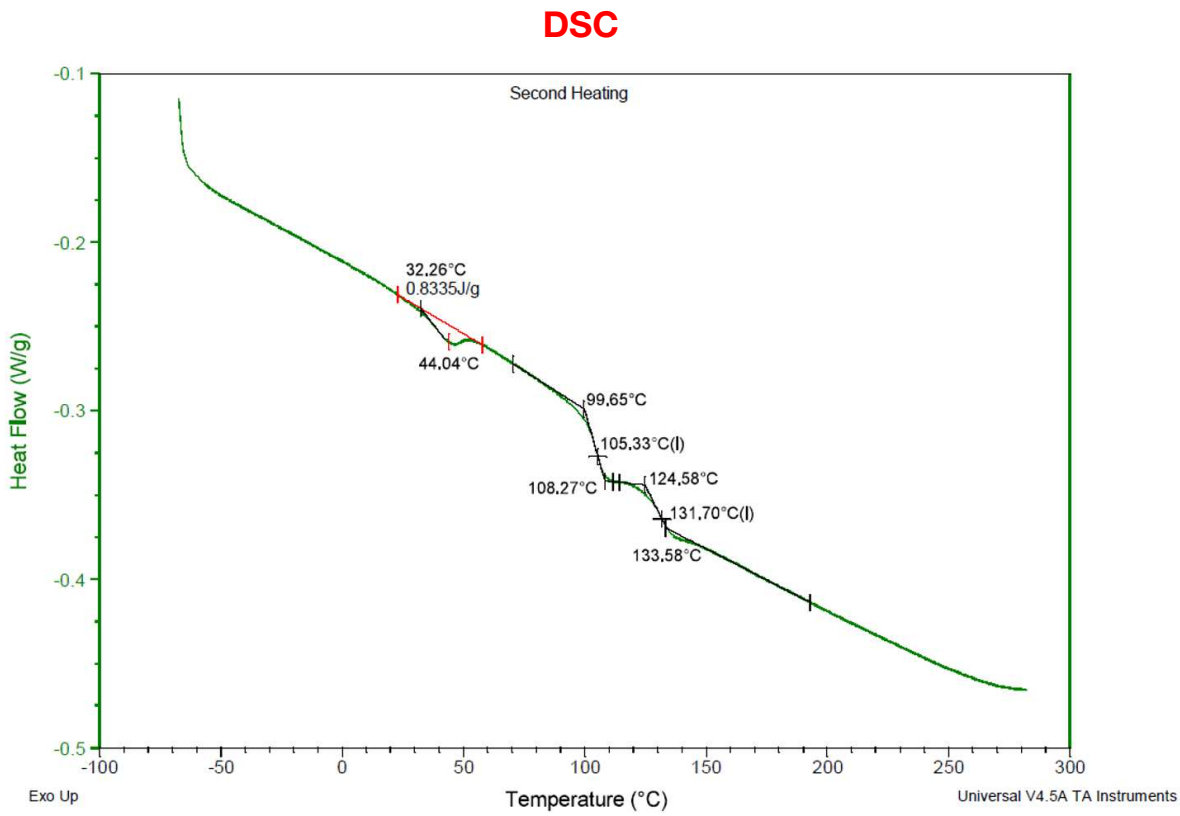


Figure 2. Dimension change data as a function of temperature for the PC-ABS Flat (XY) sample.

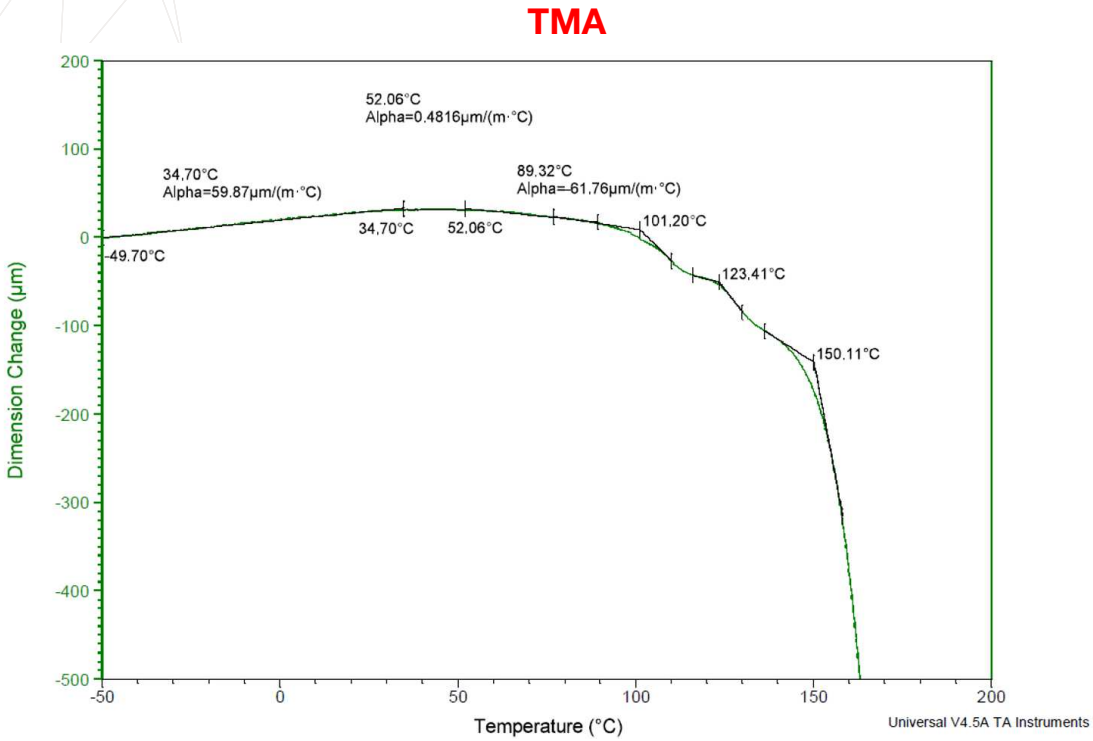


Figure 3. Dimension change data as a function of temperature for the PC-ABS On Edge (XZ) sample.

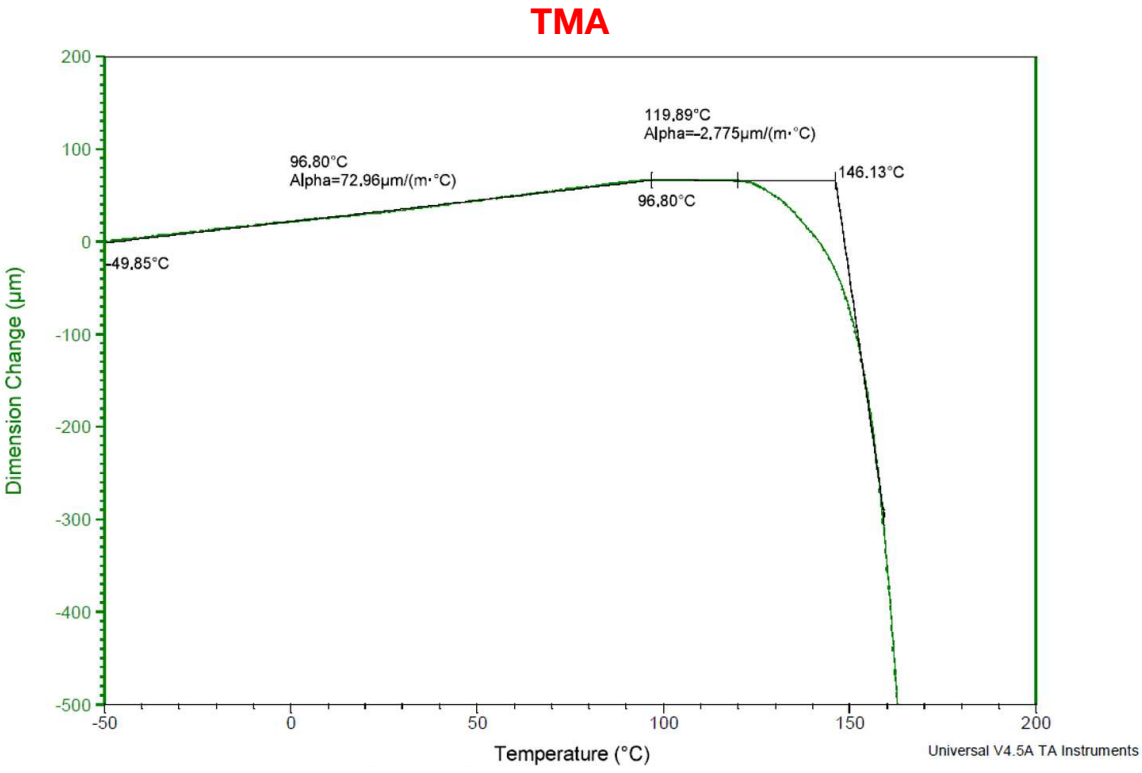
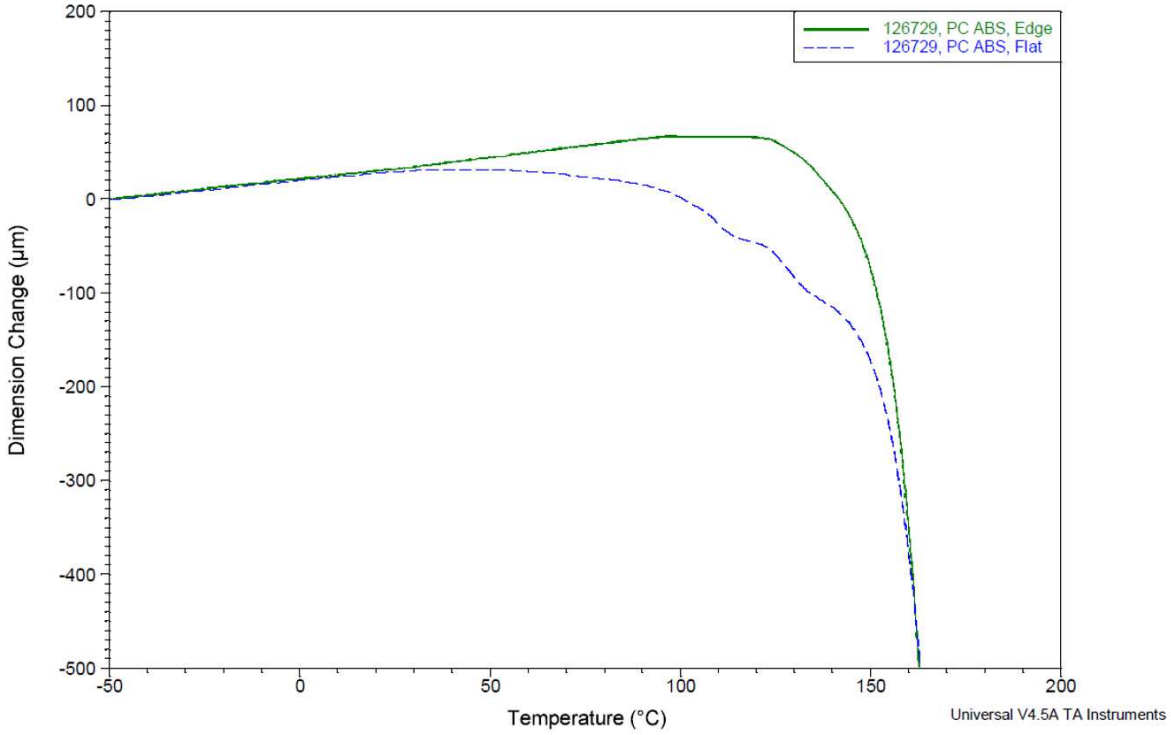


Figure 4. Overlay of the dimension change data for the Flat (XY) and On Edge (XZ) PC-ABS samples.

TMA



Stratasys Headquarters

7665 Commerce Way,
Eden Prairie, MN 55344
+1 800 801 6491 (US Toll Free)
+1 952 937-3000 (Intl)
+1 952 937-0070 (Fax)

1 Holtzman St., Science Park,
PO Box 2496
Rehovot 76124, Israel
+972 74 745 4000
+972 74 745 5000 (Fax)

stratasys.com
ISO 9001:2015 Certified