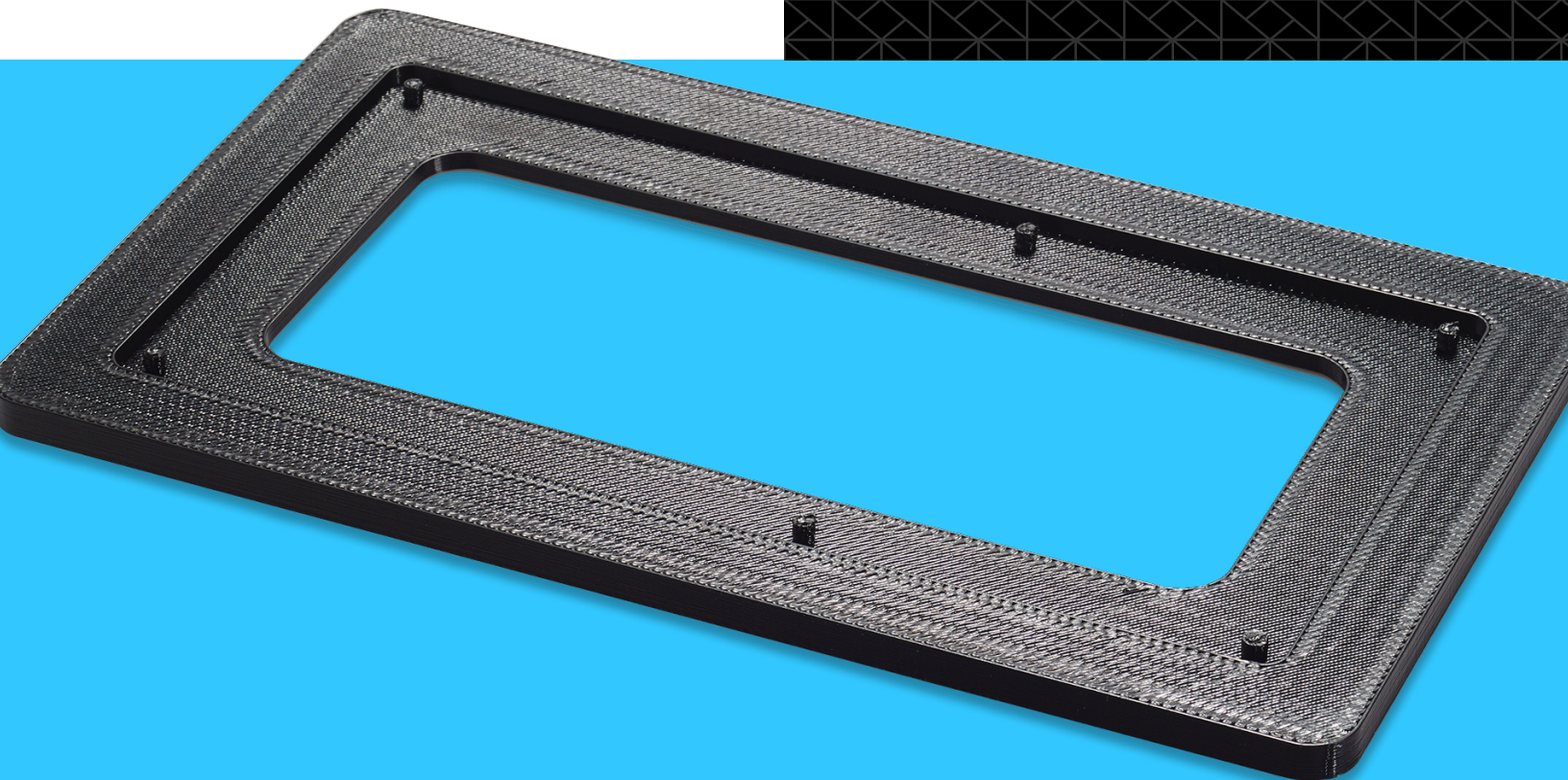


ABS-ESD7

Electrostatic-Dissipative 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

ABS-ESD7™ (acrylonitrile butadiene styrene-electrostatic dissipative) is an ABS thermoplastic with static dissipative properties suited for static discharge-sensitive applications. ABS-ESD7 prevents static electricity buildup so it will not produce a discharge or attract other materials like powders, dust and fine particles.

The material is ideal for jigs and fixtures used to fabricate and assemble electronic components and associated production line and conveyor parts. It is also useful for producing functional prototypes, enclosures and packaging.

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Ordering Information

Table 1: Printer and Support Material Compatibility

Printer	Model Tip	Layer Height	Support Material	Support Tip
F370™	F123 Standard Head	0.18 mm (0.007 in.) 0.25 mm (0.010 in.)	QSR Support™ (soluble)	F123 Standard Head
F370®CR	F123 Standard Head	0.18 mm (0.007 in.) 0.25 mm (0.010 in.)	QSR Support (soluble)	F123 Standard Head
Fortus 450mc™	T12 T16	0.18 mm (0.007 in.) 0.25 mm (0.010 in.)	SR-30™ / SR-35™ (soluble)	T12SR30
Fortus 900mc™/F900™	T12 T16	0.18 mm (0.007 in.) 0.25 mm (0.010 in.)	SR-30 / SR-35 (soluble)	T12SR30
F3300™	N500SA	0.25 mm (0.010 in.)	SR-35 (soluble)	N410SA

Build Sheets

F123 / F123 CR Standard Build Trays

- 356 x 254 mm (14 x 10 in.)

Fortus Low Temperature Build Sheets

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

F3300 Low Temperature Build Sheets

- 0.51 x 660 x 711 mm (0.02 x 26 x 28 in.)

System Requirements¹

F123 / F123 CR

- Standard F123 head - Model and Support (black cover, head life of 1,500 hours)
- No material licenses required

Fortus 450mc

- Standard Fortus 450mc head
- ABS-ESD7 material license (included if new system)

F900

- Standard F900 head
- ABS-ESD7 material license

F3300

- F3000 Series Extruder Drive
- Standard Hot Ends
- No material licenses required

¹ Contact your Stratasys representative for ordering information.



Table 2: ABS-ESD7 Ordering Information

Part Number	Description	System Compatibility
Filament Consumables		
F123 / F123CR Series Spools		
333-90230	ABS-ESD7, 90 in³	F370, F370CR
333-63500	QSR Soluble Support, 983 cm³ (60 in³) - F123	
Fortus Plus Canister (black snout)		
355-02130	ABS-ESD7, 1510 CC (92.3 CU. IN.) – PLUS	Fortus 450mc, F900, Fortus 900mc (S/N L502 and up)
355-03110	SR-30 Soluble Support, 1,510 cc (92.3 cu in.) - Plus	
355-03135	SR-35 Soluble Support, 1,510 cc (92.3 cu in.) - Plus	
Fortus Plus Xtend 500 Box		
360-53110	XTEND SR-30 Soluble Support, 500 cu. in. – Plus	Fortus 450mc, F900, Fortus 900mc (S/N L502 and up)
Fortus Classic Canister (gray snout)		
311-20800	ABS-ESD7, 92.3 cu. in. – Classic	Fortus 900mc (S/N prior to L502)
311-30200	SR-30 Soluble Support, 1,510 cc (92.3 cu in.) - Classic	
311-30235	SR-35 Soluble Support, 1,510 cc (92.3 cu in.) - Classic	
F3000 Series Spools		
363-00180	MTRL, F3000 Series, (M), ABS-ESD7, 4,100 cc (250 cu in.)	F3300
363-00700	MTRL, F3000 Series, (S), SR-35, 4,100 cc (250 cu in.)	
Printer Consumables		
F123 / F123CR Series		
123-00304	F370/F370CR Build Tray, Standard	F370, F370CR
Fortus		
511-10301	T12 tip, 0.007 in. (0.178 mm) layer height	Fortus 450mc, F900
511-10401	T16 tip, 0.010 in. (0.254 mm) layer height	
511-10900	T12SR30 support tip, all layer heights	
325-00100	Low Temperature build sheet, 0.02 x 16 x 18.5 in., 20	F900
325-00300	Low Temperature build sheet, 0.02 x 26 x 38 in., 10	
F3000 Series		
533-00521-S	FDM, N500SA Hot End (0.25 mm/0.010 in. layer height)	F3300
533-00421-S	FDM, N410SA Support Hot End (0.25 mm/0.010 in. layer height)	
363-30000-S	F3300 sheet bundle, standard 0.02 x 26 x 28 in., 10	
Print Heads		
F123/F123CR Series		
123-00402-S	F123 T14 Standard Head (black cover)	F370, F370CR
Fortus		
821725-XXXX	Standard Fortus 450mc head (silver handle)	Fortus 450mc
380-30300-S	OpenAM Standard Fortus 450mc head (silver handle, additional sticker)	
404210-XXXX	Standard F900 head (formed rod handle)	F900
380-63600-S	OpenAM Standard F900 head (formed rod handle, additional sticker)	
F3000 Series		
533-10000-S	F3000 Series Extruder Drive	F3300



Legal Disclaimer

Important Information Regarding Material Property Data

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. End-use material performance can be impacted (+/-) by, but not limited to, part design, end use conditions, test conditions, etc. Actual values will vary with build conditions. Product specifications are subject to change without notice.

This document provides technical performance information and is not a substitute for the applicable Safety Data Sheet, processing instructions, or other product safety information. Before use, each user must review the applicable safety information and independently test and validate the material and finished part under the intended processing, operating, and end-use conditions.

Physical Properties

Values are measured as molded and printed with ABS-ESD7. XY and XZ orientations were tested. For full details refer to the [Stratasys Materials Test Procedure](#). DSC and TMA curves can be found in the Appendix.

Table 3: ABS-ESD7 Physical Properties

Physical Properties - Printed			
Property	Test Method	Typical Values	
		XY	XZ
Mean CTE	ASTM E831 (-50 °C to 100 °C)	63.26 $\mu\text{m}/[\text{m}^{\circ}\text{C}]$ (35.14 $\mu\text{in}/[\text{in}^{\circ}\text{F}]$)	56.15 $\mu\text{m}/[\text{m}^{\circ}\text{C}]$ (31.19 $\mu\text{in}/[\text{in}^{\circ}\text{F}]$)
Physical Properties - Non Printed			
Property	Test Method	Molded Plaques	
HDT at 66 psi	ASTM D648 Method B	104.6 °C (220.2 °F)	
HDT at 264 psi	ASTM D648 Method B	101.4 °C (214.6 °F)	
Tg	ASTM D7426 Inflection Point	105.5 °C (221.8 °F)	
Volume Resistivity ¹	ASTM D257	10 ⁴ - 10 ⁹ $\Omega\cdot\text{cm}$	
Thermal Conductivity	ASTM E1952 at 0 °C	0.3131 W/[m*K] (0.1809 BTU/[hr*ft*°F])	
	ASTM E1952 at 30 °C	0.3141 W/[m*K] (0.1815 BTU/[hr*ft*°F])	
	ASTM E1952 at 60 °C	0.3171 W/[m*K] (0.1833 BTU/[hr*ft*°F])	
	ASTM E1952 at 90 °C	0.3176 W/[m*K] (0.1835 BTU/[hr*ft*°F])	
Thermal Diffusivity	ASTM E1952 at 0 °C	0.227 mm ² /s (3.52*10 ⁻⁴ in ² /s)	
	ASTM E1952 at 30 °C	0.205 mm ² /s (3.18*10 ⁻⁴ in ² /s)	
	ASTM E1952 at 60 °C	0.186 mm ² /s (2.93*10 ⁻⁴ in ² /s)	
	ASTM E1952 at 90 °C	0.174 mm ² /s (2.70*10 ⁻⁴ in ² /s)	
Specific Gravity	ASTM D792 at 23 °C	1.07	

¹ See ESD section for details

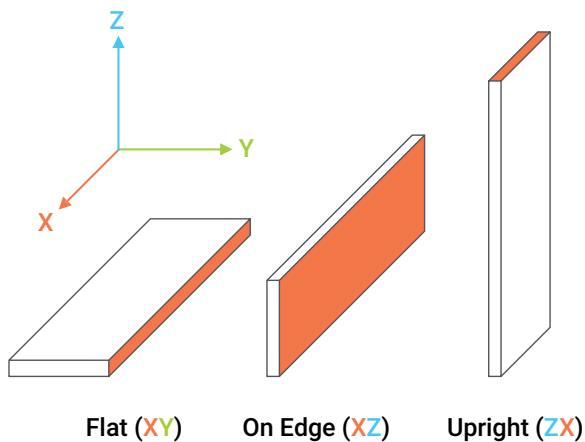


Mechanical Properties

Samples were printed with 0.25 mm (0.010 in.) layer height on a F370 and on a F900. For the full test procedure, please see the [Stratasys Materials Test Procedure on stratasys.com](https://www.stratasys.com/resources/test-procedure). For more information on compression testing and reporting please see the [Refining Compressive Yield Stress Measurement for FDM Materials](#) one pager.

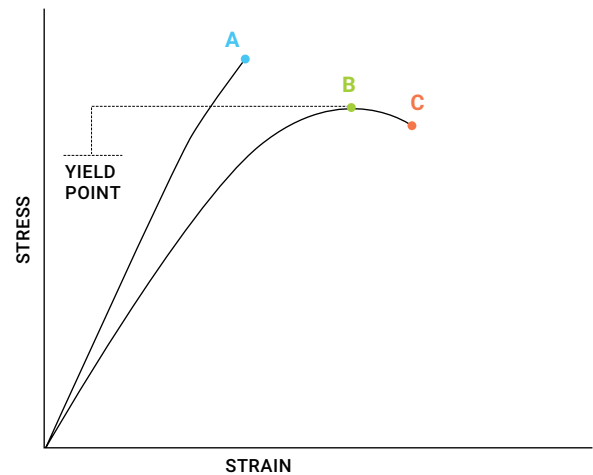
Print Orientation

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: ABS-ESD7 Mechanical Properties - F370 - T14 Standard Head

0.25 mm (0.010 in.) Layer Height		XZ Orientation ¹	ZX Orientation ¹
Tensile Properties: ASTM D638			
Yield Strength	MPa	33.3 (0.70)	No yield
	psi	4,830 (100)	No yield
Elongation at Yield	%	2.1 (0.035)	No yield
Strength at Break	MPa	31.8 (0.77)	23.2 (0.34)
	psi	4,610 (110)	3,370 (49)
Elongation at Break	%	2.4 (0.21)	1.8 (0.071)
Modulus (Elastic)	GPa	2.12 (0.029)	1.73 (0.020)
	ksi	308 (4.3)	252 (2.9)
Flexural Properties: ASTM D790, Procedure A			
Strength at Break	MPa	60.4 (2.5)	29.8 (3.4)
	psi	8,770 (360)	4,320 (490)
Strain at Break	%	3.81 (0.26)	2.00 (0.29)
Modulus	GPa	2.25 (0.026)	1.65 (0.036)
	ksi	326 (3.8)	240 (5.2)
Impact Properties: ASTM D256			
Notched	J/m	41.4 (3.0)	18 (2.7)
	ft*lb/in	0.776 (0.056)	0.337 (0.051)

¹ Values in parentheses are standard deviations.



Table 5: ABS-ESD7 Mechanical Properties - F900 - T16 Tip

0.25 mm (0.010 in.) Layer Height		XZ Orientation ¹	ZX Orientation ¹
Tensile Properties: ASTM D638			
Yield Strength	MPa	35.4 (1.3)	No yield
	psi	5,130 (190)	No yield
Elongation at Yield	%	2.1 (0.050)	No yield
Strength at Break	MPa	33.9 (1.0)	27.0 (2.3)
	psi	4,920 (150)	3,920 (330)
Elongation at Break	%	3.4 (0.52)	1.59 (0.29)
Modulus (Elastic)	GPa	2.69 (0.10)	2.28 (0.21)
	ksi	391 (15)	330 (31)
Flexural Properties: ASTM D790, Procedure A			
Strength at Break	MPa	No break	44.3 (2.6)
	psi	No break	6,440 (370)
Strength at 5% Strain	MPa	67.5 (1.2)	-
	psi	9,800 (170)	-
Strain at Break	%	No break	2.67 (0.14)
Modulus	GPa	2.41 (0.073)	2.04 (0.084)
	ksi	350 (11)	296 (12)
Impact Properties: ASTM D256			
Notched	J/m	36.2 (3.0)	20.5 (1.6)
	ft*lb/in	0.678 (0.057)	0.384 (0.029)

¹ Values in parentheses are standard deviations.



ESD Properties

ABS-ESD7 was tested per ANSI ESD S20.20, S11.11, STM11.12 to determine the effect that build parameters and part geometries have on ESD properties. Different geometries printed in different orientations fall into the ESD safe range (10^4 to 10^9 ohms), with some variability in thin-walled cylinders. For full details, see the [ABS-ESD7 ESD White Paper](#).

Figure 1: 4 x 4 x 0.1 in. plaque resistance in various build orientations

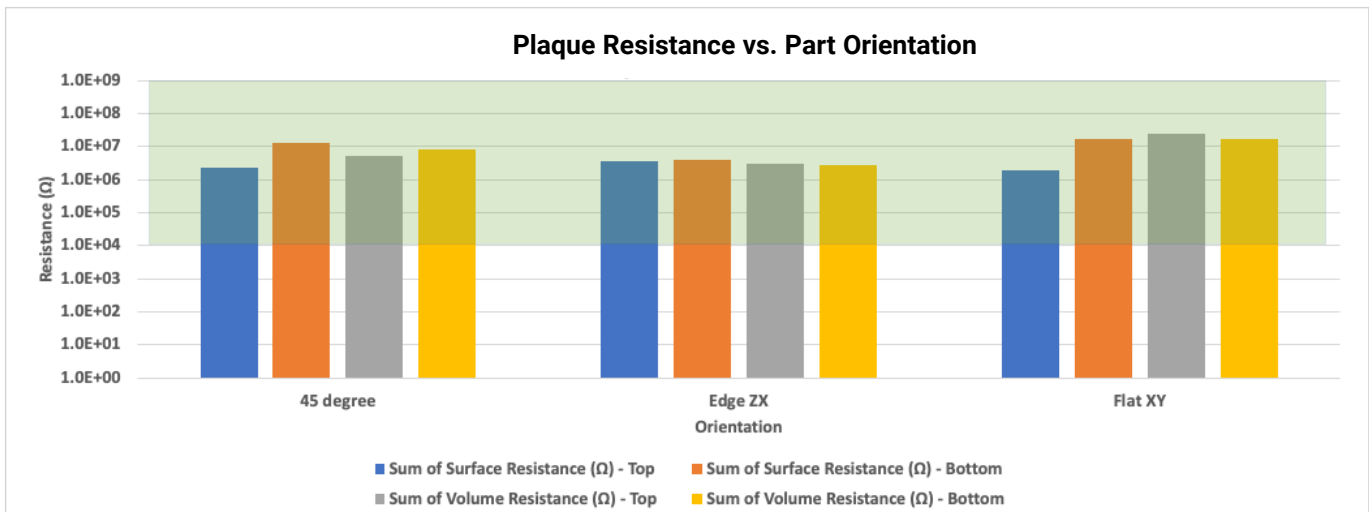
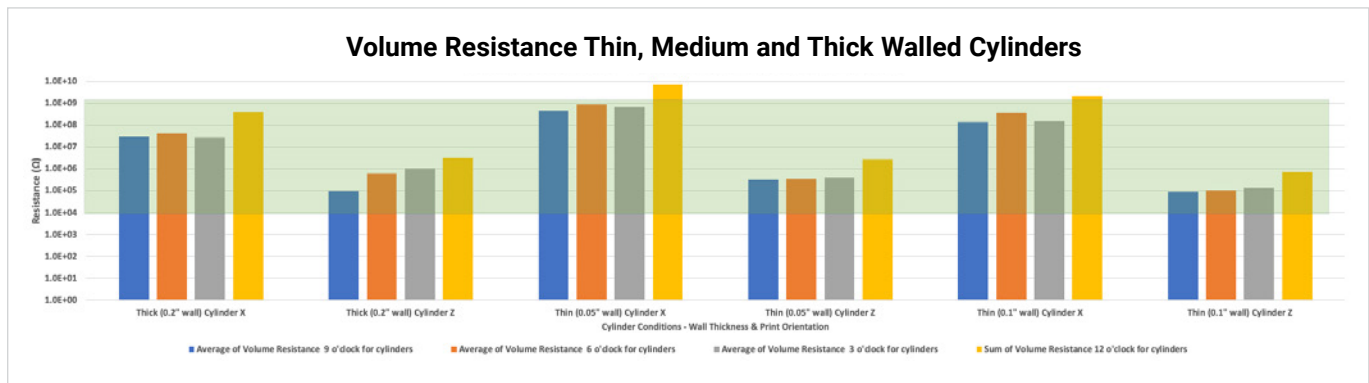


Figure 2: Volume resistance of hollow cylinders with respect to wall thickness, build orientation, and location on the cylinder.





Appendix

Figure 3: Dimension change data as a function of temperature for the ABS-ESD7 Flat (XY) sample.

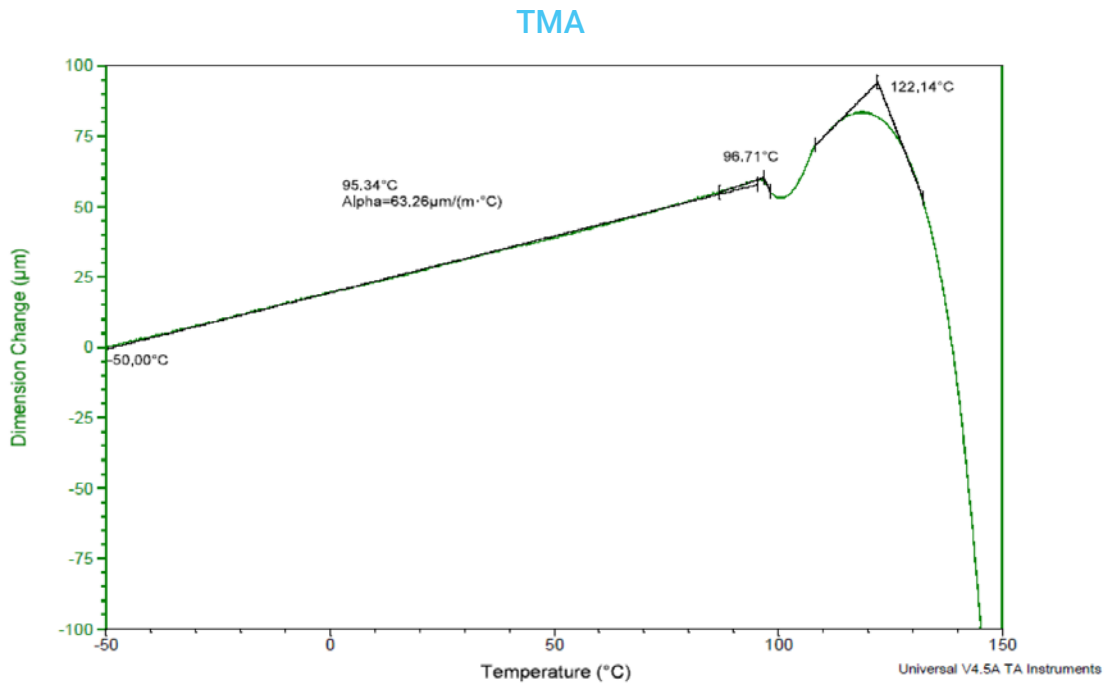


Figure 4: Dimension change data as a function of temperature for the ABS-ESD7 On Edge (XZ) sample.

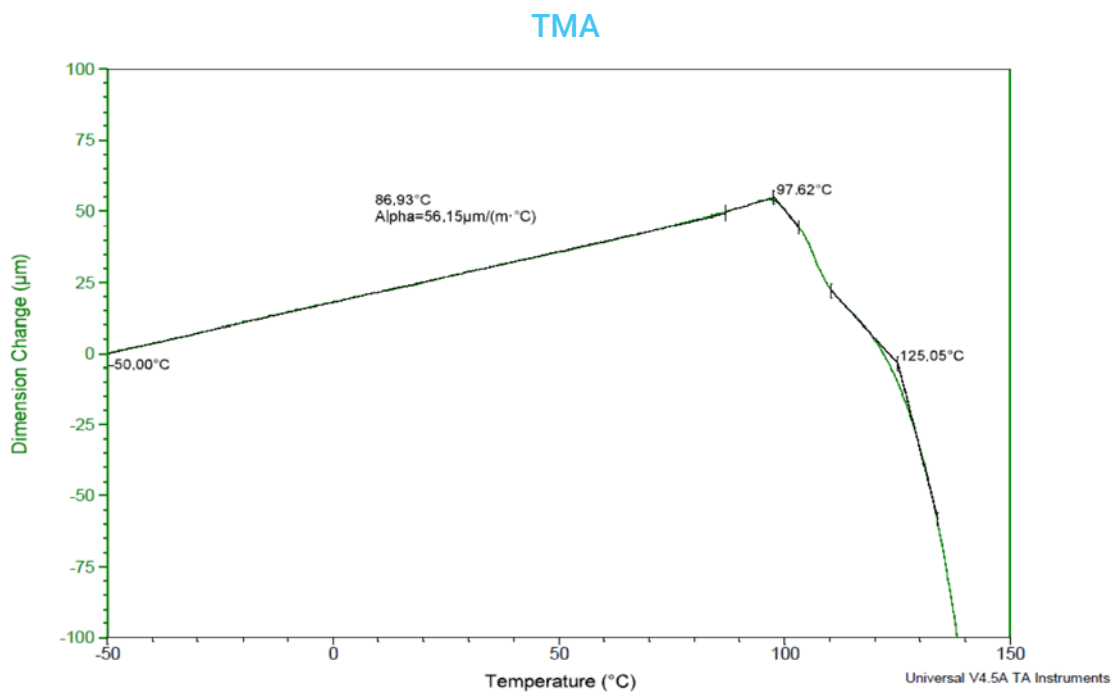




Figure 5: Overlay of the dimension change data for the Flat (XY) and On Edge (XZ) ABS-ESD7 samples.

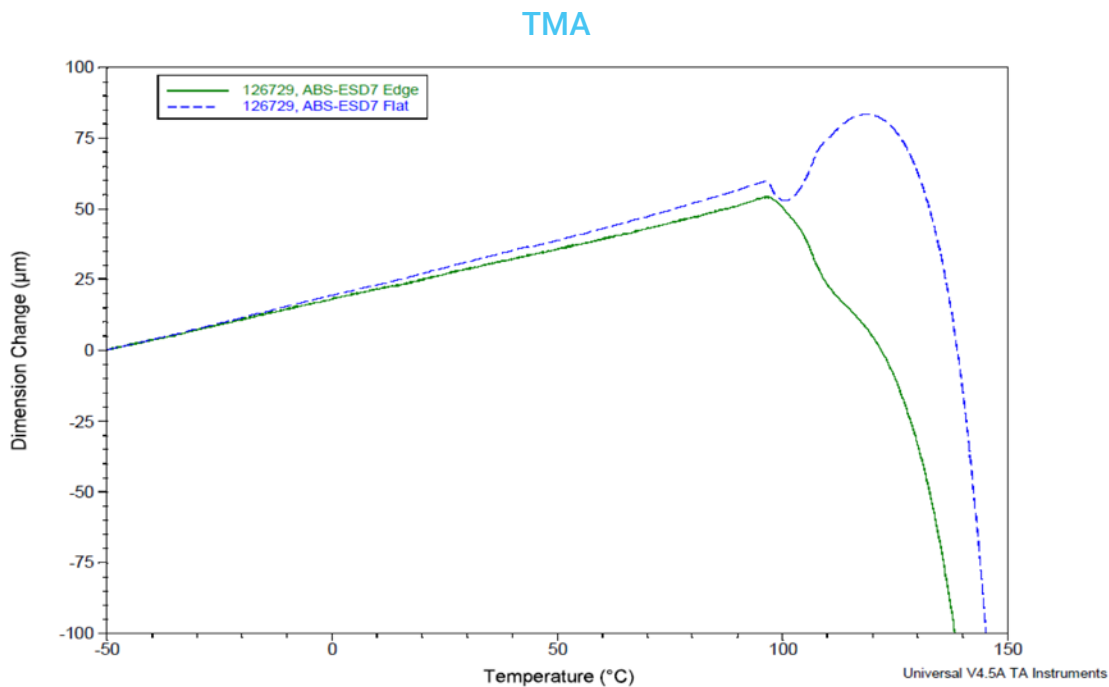
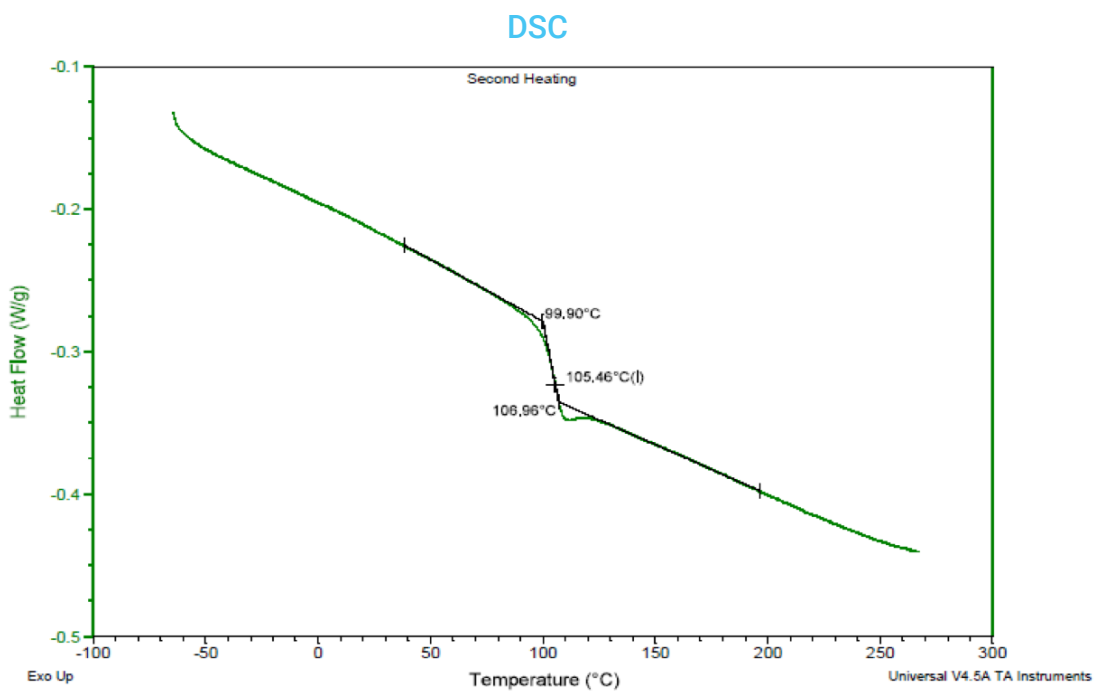


Figure 6: 2nd heating scan DSC data for the ABS-ESD7 Flat (XY) sample.





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MATERIAL DATA SHEET FDM

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