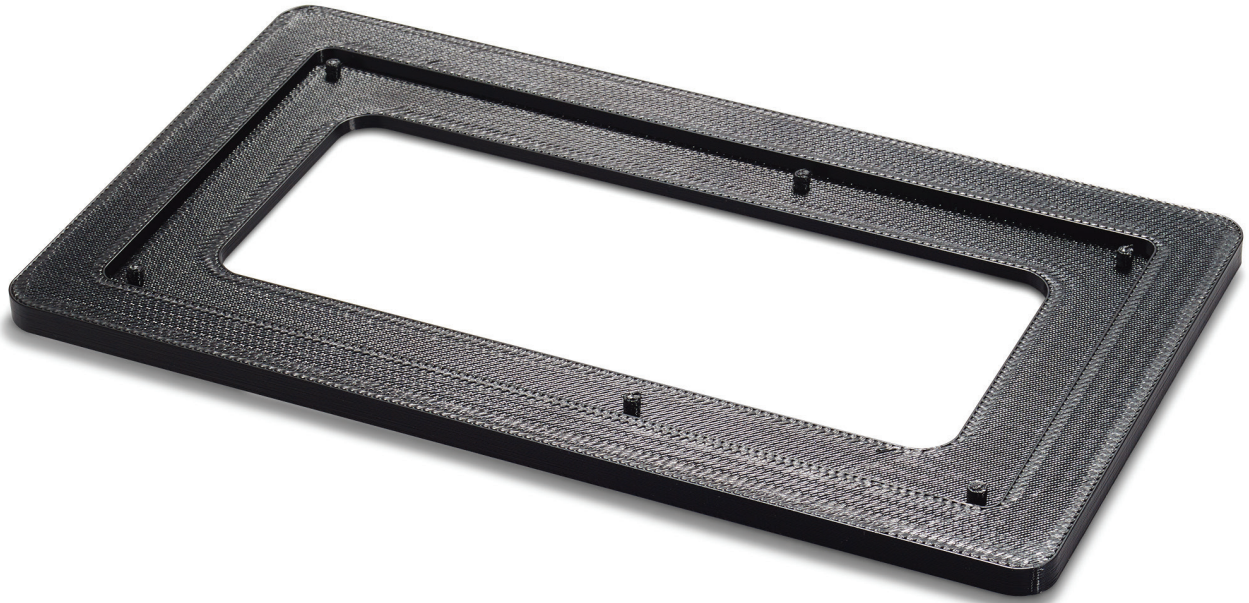


ABS-ESD7



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.

Contents:

| | |
|--|---|
| Overview | 2 |
| Ordering Information | 3 |
| Physical Properties | 4 |
| Mechanical Properties | 5 |
| Electrostatic Dissipative (ESD) Properties | 8 |
| Appendix | 9 |

Ordering Information

Table 1. Printer and Support Material Compatibility

| Printer | Model Tip (Slice) | Support Material | Support Tip |
|---------------------|---|------------------------|------------------------|
| F370™ | F123 Head (7 slice) F123 Head (10 slice) | QSR Support™ (soluble) | F123 Head (all slices) |
| F370®CR | F123 Head (7 slice) F123 Head (10 slice) | QSR Support (soluble) | F123 Head (all slices) |
| Fortus 450mc™ | T12 (7 slice) T16 (10 slice) | SR30/35 (soluble) | T12SR30 (all slices) |
| Fortus 900mc™/F900™ | T12 (7 slice) T16 (10 slice) | SR30/35 (soluble) | T12SR30 (all slices) |

Build Sheets

Low temperature

- 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)
- 0.03 x 16 x 18.5 in. (0.76 x 406 x 470 mm)
- 0.02 x 14 x 16.5 in. (0.51 x 355 x 417 mm)

F370 and F370CR build trays

Table 2. ABS-ESD7 Ordering Information

| Part Number | Description |
|---|---|
| Filament Canisters ⁽¹⁾⁽²⁾ | |
| 355-02130 | ABS-ESD7, 92.3 cu. in. – Plus |
| 311-20800 | ABS-ESD7, 92.3 cu. in. – Classic |
| 333-90230 | ABS-ESD7, 90 cu. in. – F123 |
| 355-03110 | SR-30™ Soluble Support, 92.3 cu. in. – Plus |
| 360-53110 | XTEND™ SR-30 Soluble Support, 500 cu. in. – Plus |
| 311-30200 | SR-30 Soluble Support, 92.3 cu. in. – Classic |
| 355-03135 | SR-35™ Soluble Support, 92.3 cu. in. – Plus |
| 311-30235 | SR-35 Soluble Support, 92.3 cu. in. – Classic |
| 333-63500 | QSR Support™, 60 cu. in. – F123™ |
| Printer Consumables | |
| 511-10301 ⁽³⁾ | T12 tip, 0.007 in. (0.178 mm) layer height |
| 511-10401 ⁽³⁾ | T16 tip, 0.010 in. (0.254 mm) layer height |
| 511-10900 ⁽³⁾ | T12SR30 support tip, all layer heights |
| 325-00300 ⁽⁴⁾ | Low Temperature build sheet, 0.02x26x38 in. (0.51x660x965 mm) |
| 325-00100 ⁽⁵⁾ | Low Temperature build sheet, 0.02x16x18.5 in. (0.51x406x470 mm) |
| 123-00402-S | F123 Standard Head (All Layer Heights) |
| 123-00304 | F370/F370CR Build Tray, Standard |

(1) Classic canisters are compatible with all 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 450mc, Stratasys F900 and Fortus 900mc

(4) Compatible with Stratasys F900 and Fortus 900mc

(5) Compatible with Fortus 450mc, Stratasys F900 and Fortus 900mc

Physical Properties

Values are measured as printed. XY and XZ/ZX orientations were tested.

For full details, refer to the [Stratasys Materials Test Procedure on stratasys.com](https://www.stratasys.com).

DSC and TMA curves can be found in the Appendix.

Table 3. ABS-ESD7 Physical Properties

| Property | Test Method | Typical Values | |
|----------------------|---------------------------------|---|---|
| | | XY | XZ/ZX |
| HDT @ 66 psi | ASTM D648 Method B | 104.6 C (220.2 F) | |
| HDT @ 264 psi | ASTM D648 Method B | 101.4 C (214.6 F) | |
| Tg | ASTM D7426 Inflection Point | 105.46 C (221.83 F) | |
| 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 $\mu\text{in}/[\text{in}^{\circ}\text{F}]$) |
| Volume Resistance | ASTM D257 | $10^4\text{-}10^9 \Omega \cdot \text{cm}$ | |
| Thermal Conductivity | ASTM E1952 @0°C | 0.3131 W/m*K 0.1809 BTU/(hr*ft°F) | |
| Thermal Conductivity | ASTM E1952 @30°C | 0.3141 W/m*K 0.1815 BTU/(hr*ft°F) | |
| Thermal Conductivity | ASTM E1952 @60°C | 0.3171 W/m*K 0.1833 BTU/(hr*ft°F) | |
| Thermal Conductivity | ASTM E1952 @90°C | 0.3176 W/m*K 0.1835 BTU/(hr*ft°F) | |
| Thermal Diffusivity | ASTM E1952 @0°C | 0.227 mm ² /s $3.52 \cdot 10^{-4}$ in ² /s | |
| Thermal Diffusivity | ASTM E1952 @30°C | 0.205 mm ² /s $3.18 \cdot 10^{-4}$ in ² /s | |
| Thermal Diffusivity | ASTM E1952 @60°C | 0.189 mm ² /s $2.93 \cdot 10^{-4}$ in ² /s | |
| Thermal Diffusivity | ASTM E1952 @90°C | 0.174 mm ² /s $2.70 \cdot 10^{-4}$ in ² /s | |
| Specific Gravity | ASTM D257 @23 °C | 1.07 | |

* See ESD section for details

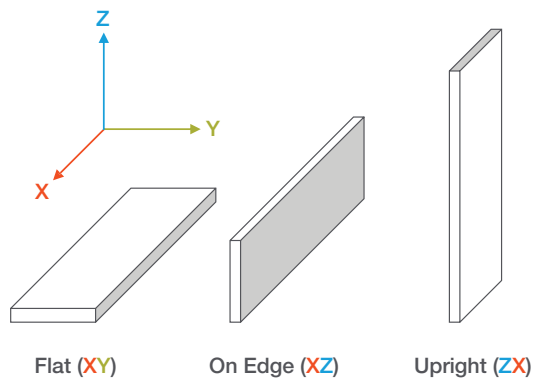
Mechanical Properties

Samples were printed with 0.010 in. (0.254 mm) 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/materials-test-procedure).

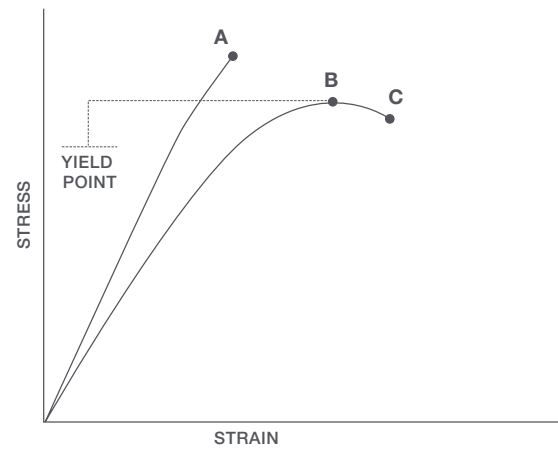
Print Orientation

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 (F900 – T16 Tip)

| | | XZ Orientation ¹ | ZX Orientation ¹ |
|--|----------|-----------------------------|-----------------------------|
| Tensile Properties: ASTM D638 | | | |
| Yield Strength | MPa | 35.4 (1.3) | No yield |
| | psi | 5130 (190) | No yield |
| Elongation @ Yield | % | 2.1 (0.050) | No yield |
| Strength @ Break | MPa | 33.9 (1.0) | 27.0 (2.3) |
| | psi | 4920 (150) | 3920 (330) |
| Elongation @ 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 @ Break | MPa | No break | 44.3 (2.6) |
| | psi | No break | 6440 (370) |
| Strength @ 5% Strain | MPa | 67.5 (1.2) | - |
| | psi | 9800 (170) | - |
| Strain @ Break | % | No break | 2.67 (0.14) |
| Modulus | GPa | 2.41 (0.073) | 2.04 (0.084) |
| | ksi | 350 (11) | 296 (12) |
| Compression Properties: ASTM D695 | | | |
| Yield Strength | MPa | 95.3 (2.5) | 202 (11) |
| | psi | 13800 (370) | 29300 (1500) |
| Modulus | GPa | 2.39 (0.090) | 2.40 (0.33) |
| | ksi | 346 (13) | 348 (48) |
| Impact Properties: ASTM D256, ASTM D4812 | | | |
| Notched | J/m | 36.2 (3.0) | 20.5 (1.6) |
| | ft*lb/in | 0.678 (0.057) | 0.384 (0.029) |
| Unnotched | J/m | 198 (36) | 85.4 (18) |
| | ft*lb/in | 3.72 (0.67) | 1.60 (0.35) |

(1) Values in parentheses are standard deviations.

Table 5. ABS-ESD7 Mechanical Properties (F370)

| | | XZ Orientation ¹ | ZX Orientation ¹ |
|--|----------|-----------------------------|-----------------------------|
| Tensile Properties: ASTM D638 | | | |
| Yield Strength | MPa | 33.3 (0.70) | No yield |
| | psi | 4830 (100) | No yield |
| Elongation @ Yield | % | 2.1 (0.035) | No yield |
| Strength @ Break | MPa | 31.8 (0.77) | 23.2 (0.34) |
| | psi | 4610 (110) | 3370 (49) |
| Elongation @ 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 @ Break | MPa | 60.4 (2.5) | 29.8 (3.4) |
| | psi | 8770 (360) | 4320 (490) |
| Strain @ 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) |
| Compression Properties: ASTM D695 | | | |
| Yield Strength | MPa | 52.8 (2.2) | 59.6 (1.4) |
| | psi | 7660 (320) | 865 (200) |
| Peak Strength | MPa | - | 150 (17) |
| | psi | - | 21800 (2500) |
| Modulus | GPa | 1.74 (0.062) | 1.73 (0.025) |
| | ksi | 252 (9.0) | 251 (3.7) |
| Impact Properties: ASTM D256, ASTM D4812 | | | |
| Notched | J/m | 41.4 (3.0) | 18 (2.7) |
| | ft*lb/in | 0.776 (0.056) | 0.337 (0.051) |
| Unnotched | J/m | 343 (41) | 69.1 (6.6) |
| | ft*lb/in | 6.42 (0.77) | 1.30 (0.12) |

(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.

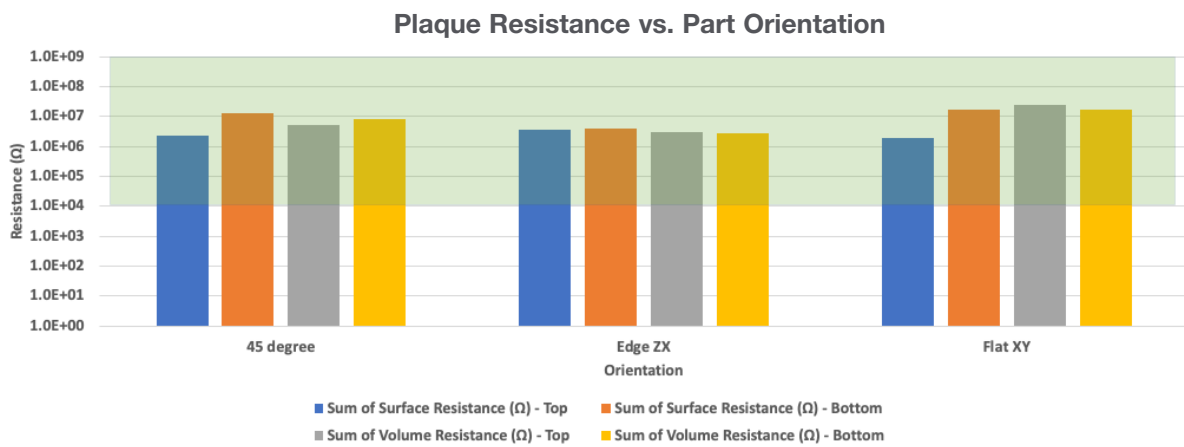
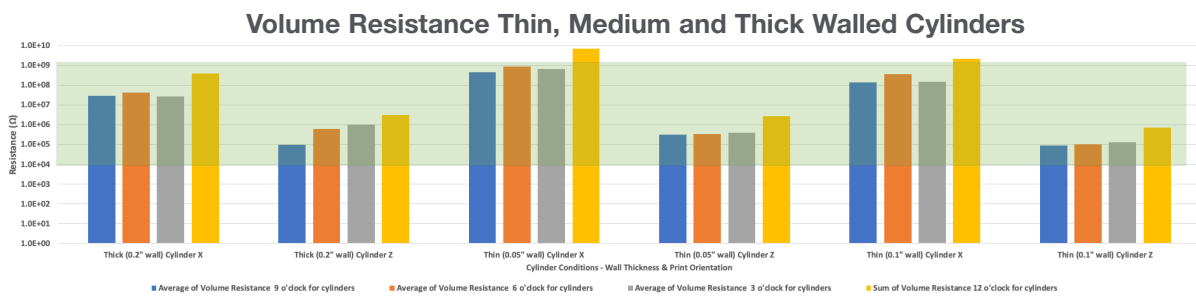


Figure 2. Volume resistance of hollow cylinders with respect to wall thickness, build orientation, and location on the cylinder.



Appendix

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

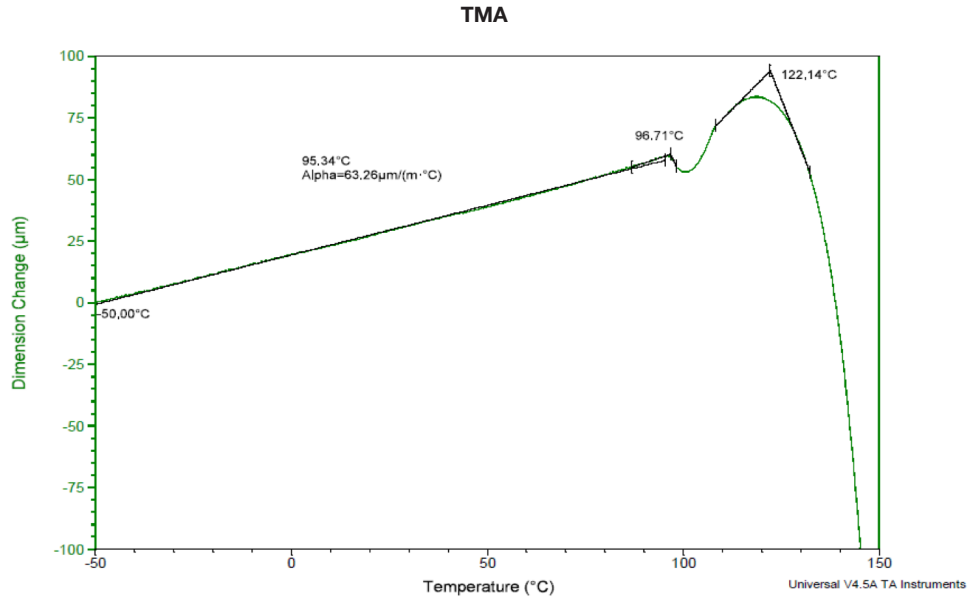


Figure 4. Dimension change data as a function of temperature for the ABS-ESD7 On Edge (XZ) sample.

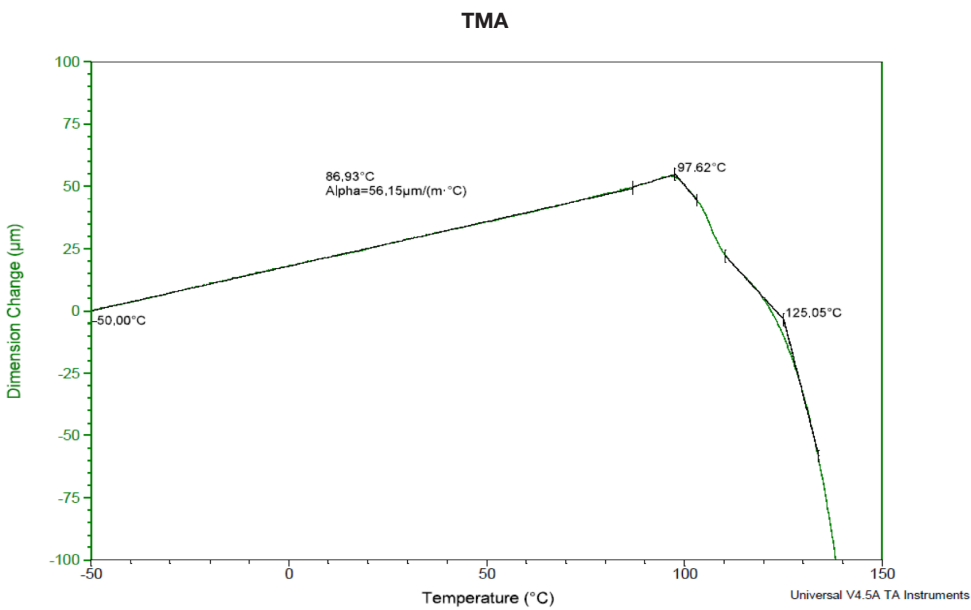


Figure 5. Overlay of the dimension change data for the Flat (XY) and On Edge (XZ) ABS-ESD7 samples.

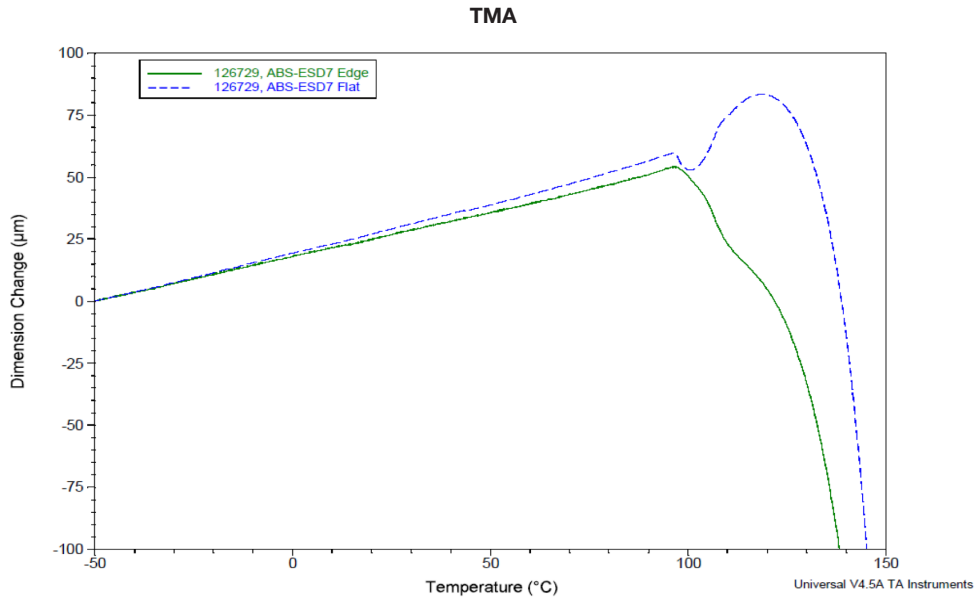
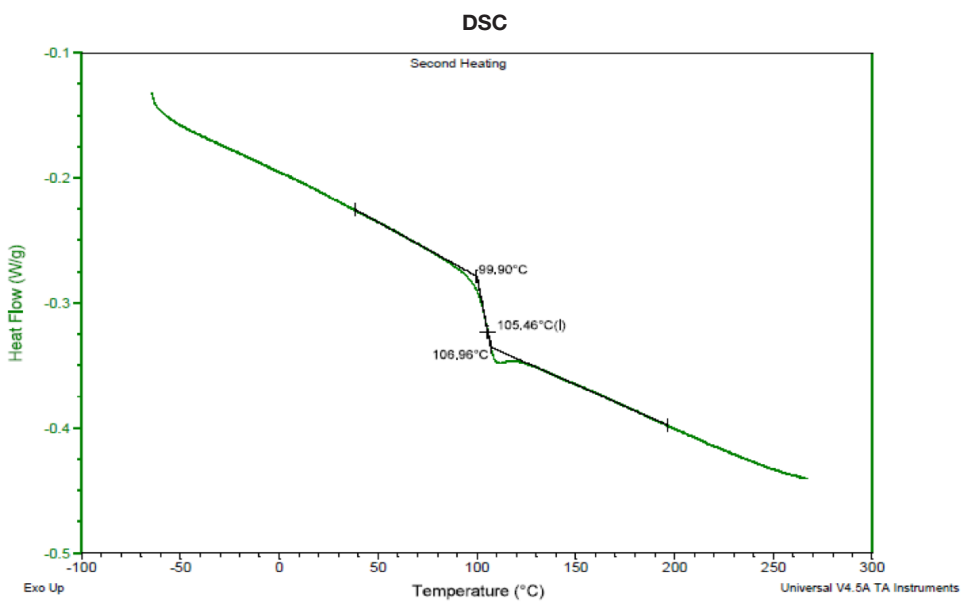


Figure 6. 2nd heating scan DSC data for the ABS-ESD7 Flat (XY) sample.



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