ABS-CF10

Carbon Fiber Filled 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

Stratasys ABS-CF10 combines standard ABS (acrylonitrile butadiene styrene) material with 10% chopped carbon fiber by weight. The result is a low moisture-sensitive FDM® thermoplastic 50% stiffer and 15% stronger than standard ABS 3D printing material.

Typical applications include manufacturing tools, jigs, fixtures and end effectors that benefit from the combination of increased stiffness and reduced weight.

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Product Information

Table 1. Printer Compatibility

Printer	Model Tip (Slice)	Support Material	Support Tip
F170™	F123 Head (7, 10, 13 slice)	QSR™	F123 Head (7, 10, 13 slice)
F190™CR	F123 Head (7, 10, 13 slice)	QSR	F123 Head (7, 10, 13 slice)
F270™	F123 Head (7, 10, 13 slice)	QSR	F123 Head (7, 10, 13 slice)
F370™	F123 Head (7, 10, 13 slice)	QSR	F123 Head (7, 10, 13 slice)
F370®CR	F123 Head (7, 10, 13 slice)	QSR	F123 Head (7, 10, 13 slice)

Support Material

- QSR soluble support

Build Tray

- F170 build tray
- F270/F190CR build tray
- F370/F370CR build tray

Table 2. ABS-CF10 Ordering Information

Part Number	Description
Filament Canisters	
333-90310	ABS-CF10, 90 cu. in.
333-63500	QSR Soluble Support, 60 cu. in. - F123
Printer Consumables	
123-00603-S	ABS-CF10 Hardened Head - Recommended (Light Gray Cover)
123-00601-S	ABS-CF10 Head (Green Cover)
123-00402-S	Standard Extrusion Head (Black Cover)
123-00302-S	F170 Build Tray, Standard
123-00303-S	F270/F190CR Build Tray, Standard
123-00304	F370/F370CR Build Tray, Standard

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. ABS-CF10 Physical Properties

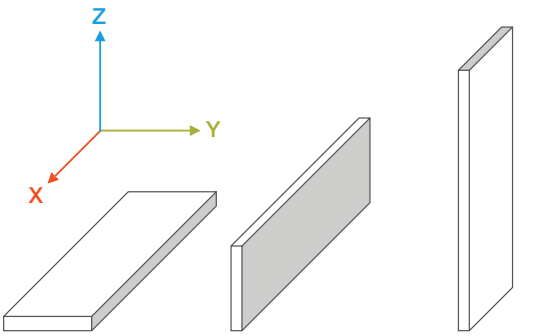
Property	Test Method	Typical Values	
		XY	XZ/ZX
HDT @ 66 psi	ASTM D648 Method B	100 °C (212 °F)	
HDT @ 264 psi	ASTM D648 Method B	99 °C (210 °F)	
Tg	ASTM D7426 Inflection Point	104 °C (219 °F)	
Mean CTE	ASTM E831 (-50 °C to 100 °C)	19 µm/[m*°C] (11 µin/[in*°F])	76 µm/[m*°C] (42 µin/[in*°F])
Volume Resistance	ASTM D257	4.6×10^{12} Ω*cm	
Specific Gravity	ASTM D257 @23 °C	1.0972	
Dielectric Constant	ASTM D150 1 kHz test condition	2.26	11.1
Dielectric Constant	ASTM D150 2 MHz test condition	2.16	-0.001
Dissipation Factor	ASTM D150 1 kHz test condition	0.000	-0.011
Dissipation Factor	ASTM D150 2 MHz test condition	10.18	-0.014

Mechanical Properties

ABS-CF10 samples were printed with a 0.010 in. (0.254 mm) layer height on the F370. For the full test procedure please see the Stratasys Materials Test Procedure (immediate download upon clicking the link).

Print Orientation

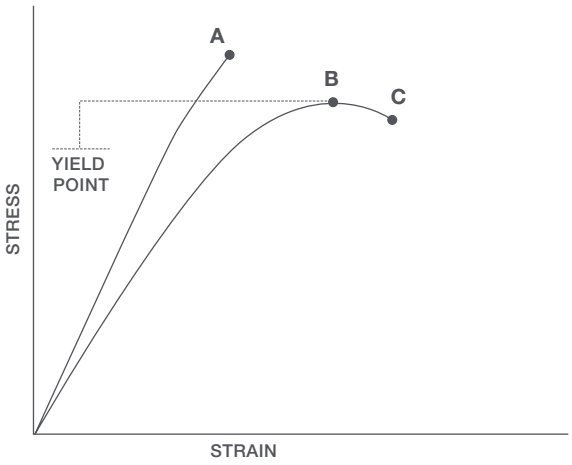
Parts created using FDM are anisotropic as a result of the printing process. Below is a reference of the different orientations used to characterize the material.



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. ABS-CF10 Mechanical Properties

0.010 in layer height		XZ Orientation	ZX Orientation
Tensile Properties: ASTM D638			
Yield Strength	MPa	No yield	21.2 (0.48)
	psi	No yield	3080 (69)
Elongation @ Yield	%	No yield	1.49 (0.08)
Strength @ Break	MPa	37.7 (1.38)	21.3 (0.48)
	psi	5465 (200)	3100 (70)
Elongation @ Break	%	2.70 (0.20)	1.49 (0.09)
Modulus (Elastic)	GPa	3.342 (0.12)	1.958 (0.028)
	ksi	484.6 (18)	283.9 (4.1)
Flexural Properties: ASTM D790, Procedure A			
Strength @ Break	MPa	69.0 (2.4)	29.2 (0.86)
	psi	10000 (350)	4240 (120)
Strain @ Break	%	2.45 (0.11)	1.89 (0.08)
Modulus	GPa	3.76 (0.099)	1.75 (0.051)
	ksi	545 (14)	254 (7.5)
Compression Properties: ASTM D695			
Yield Strength	MPa	No yield	No yield
	psi	No yield	No yield
Peak Strength	MPa	73.2 (4.5)	94.8 (2.56)
	psi	10620 (650)	13740 (370)
Modulus	GPa	2.129 (0.093)	1.917 (0.063)
	ksi	309 (13.6)	278 (9.2)
Impact Properties: ASTM D256, ASTM D4812			
Notched	J/m	51.4 (1.9)	20.3 (2.8)
	ft*lb/in	0.962 (0.04)	0.381 (0.05)
Unnotched	J/m	212 (25)	47.0 (6.4)
	ft*lb/in	3.97 (0.47)	0.881 (0.12)

(1) Values in parentheses are standard deviations.

Appendix

Figure 1. DSC data for the ABS-CF10 sample.

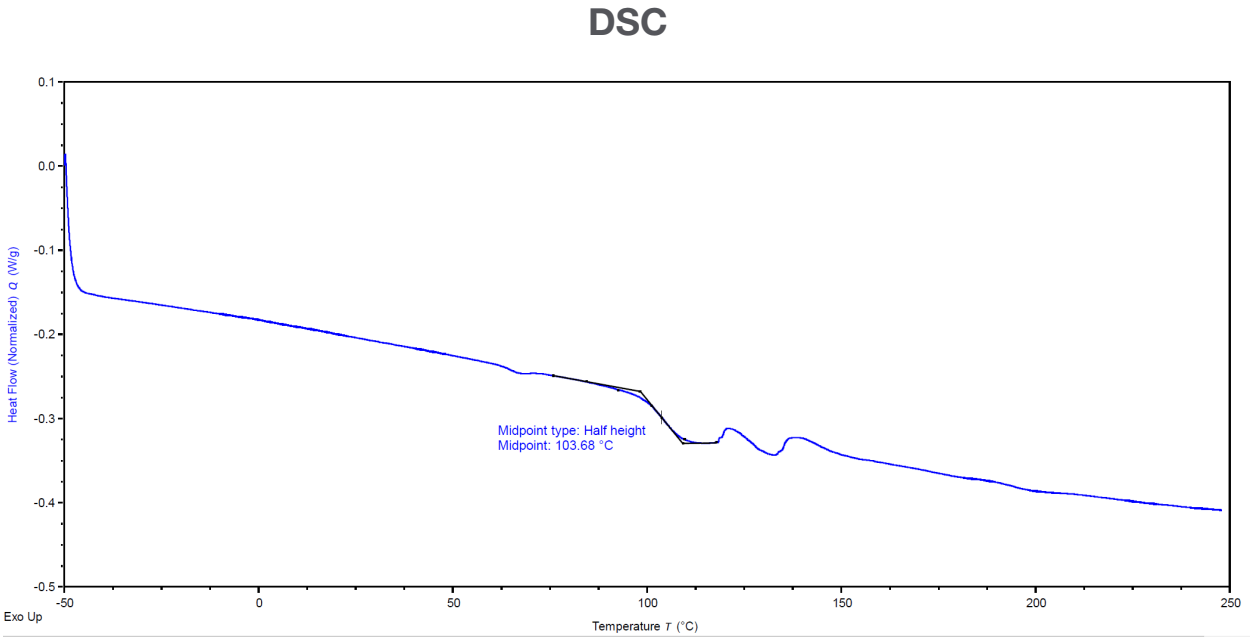


Figure 2. Dimension change data as a function of temperature for ABS-CF10 Flat (XY) sample.

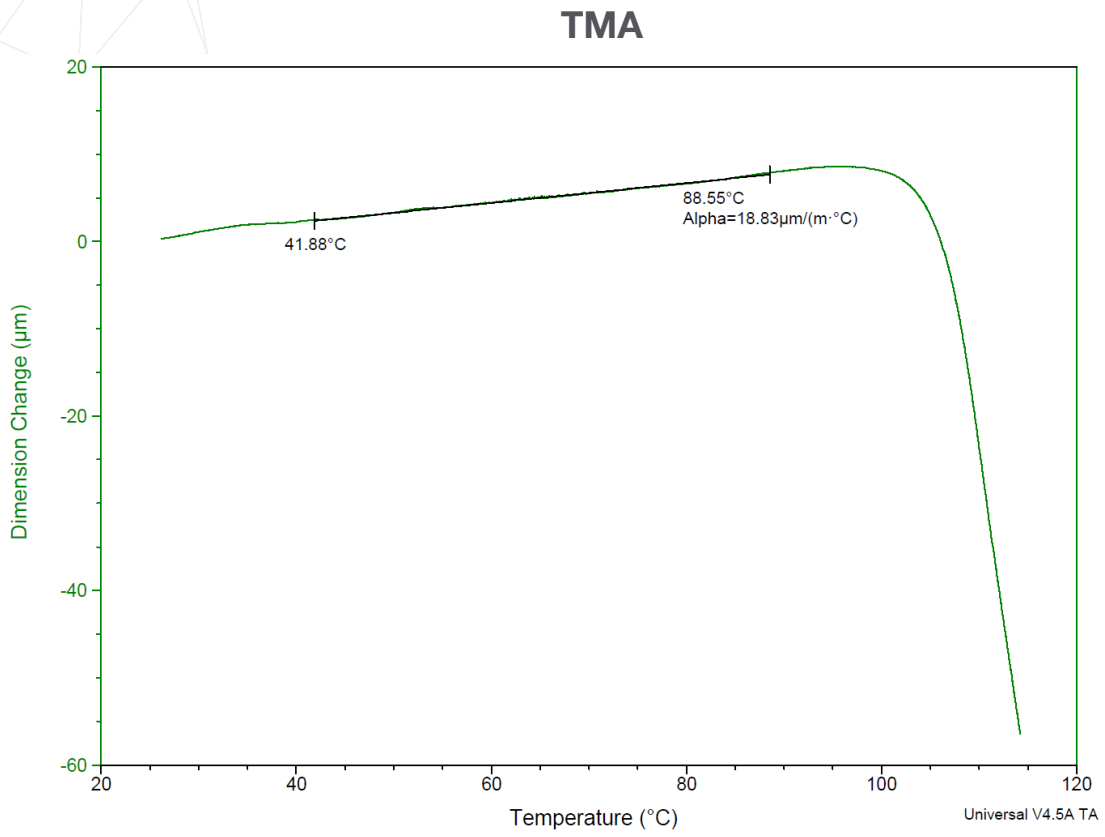
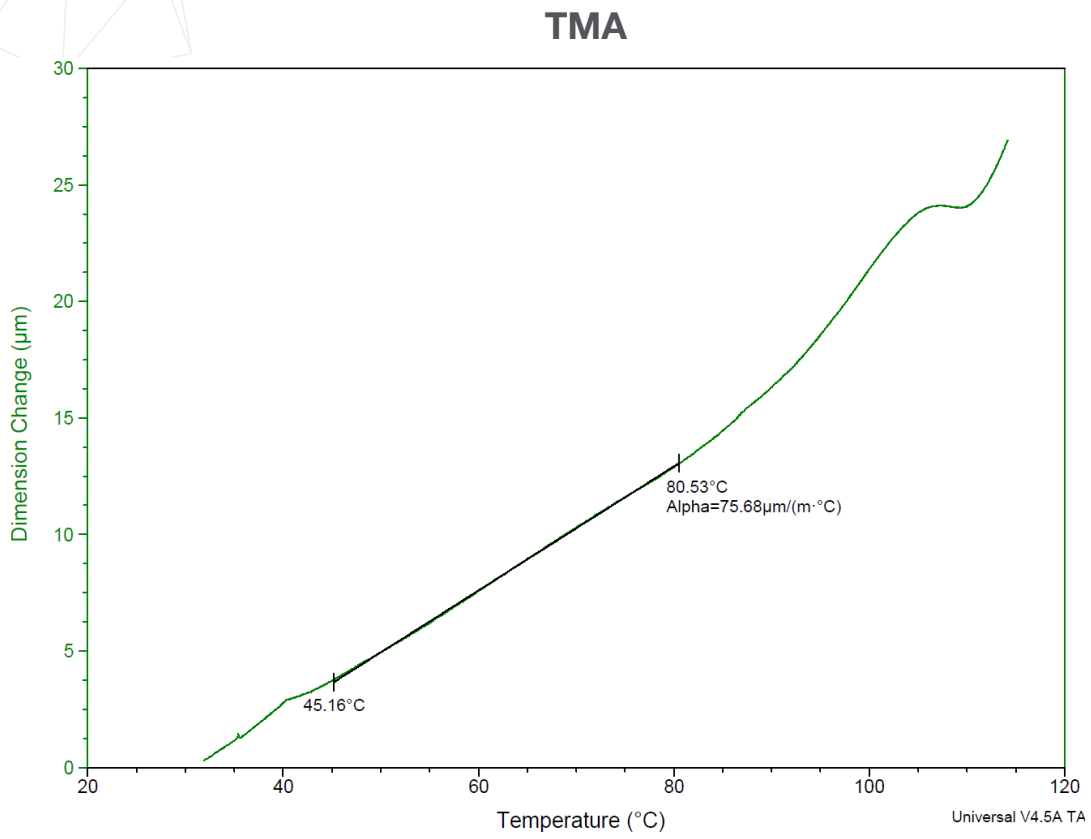


Figure 3. Dimension change data as a function of temperature for ABS-CF10 On Edge (XZ) sample.



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