CELSTRAN® CFR-TP PA6 CF60-03 - PA6

Description

Polyamide 6 (nylon 6) continuous fiber (uni-directional) reinforced thermoplastic composite tape, 60% carbon fiber by weight.
Celstran® CFR-TP PA6 CF60-03 is a 60% carbon fiber by weight polyamide 6 (nylon 6) continuous fiber (uni-directional) reinforced thermoplastic composite tape. This material exhibits a high strength-to-weight ratio, excellent toughness and impact resistance. It is well suited for industrial, automotive, and sporting goods applications where strength and toughness are critical as well as ease of processing. Alternate tape widths and thicknesses may be available.

Physical properties	Value	Unit	Test Standard
Density	**90.3**	lb/ft^3	ISO 1183
Fiber Content	**60**	% by wt.	-
Fiber Volume	**48.5**	% by vol.	-
Tape Thickness	**0.00512**	in	-
Tape Width	**10.8**	in	-
Tape Areal Weight	**5.72**	oz/yd^2	-
Fiber Areal Weight	**3.45**	oz/yd^2	-

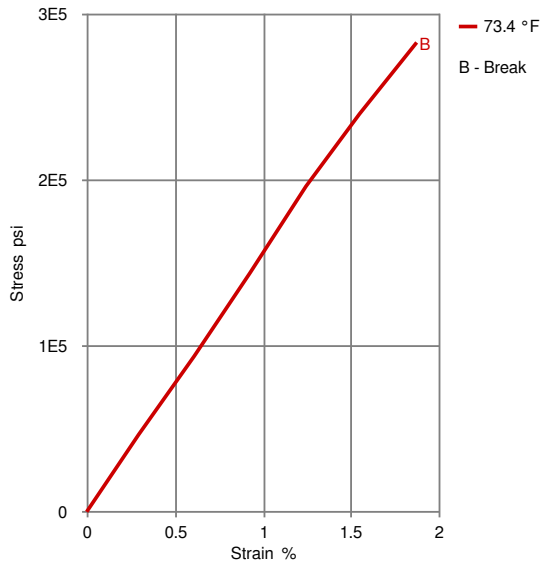
Mechanical properties (Tape)	Value	Unit	Test Standard
Tensile Strength, 0°	**277**	ksi	ASTM D3039M
Tensile Modulus - Tape, 0°	**14.5**	Mpsi	ASTM D3039M
Tensile Strain at Failure, 0°	**1.76**	%	ASTM D3039M
Flexural Strength - Tape, 0°	**151**	ksi	ASTM D790/Tape
Flexural Modulus - Tape, 0°	**14.2**	Mpsi	ASTM D790/Tape
Flexural Strain at Failure, 0°	**1.08**	%	ASTM D790/Tape

Thermal properties	Value	Unit	Test Standard
Melting temperature, 10°C/min	**428**	°F	ISO 11357-1/-3
Glass transition temperature, 10°C/min	**135**	°F	ISO 11357-1,-2,-3

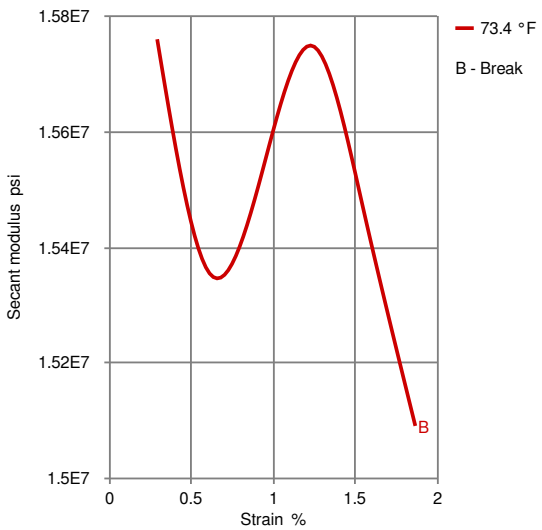
Diagrams

CELSTRAN® CFR-TP PA6 CF60-03 - PA6

Stress-strain



Secant modulus-strain



Other text information

Compression molding

Celstran® CFR-TP Tape Laminate Processing Guidelines

Celstran® CFR-TP can be molded using a heated platen compression molding press. A hardened steel, aluminum or flexible tooling can be used depending on the application. The tool should be treated with a mold release prior to molding.

The molding cycle consists of the following steps:
1. The platens should be heated above the polymer matrix melt temperature.
2. The individual lamina should be constructed and placed in the tool to achieve the desired laminate reinforcement orientation.
3. The tool is placed between the platens and the platens are closed to achieve a contact pressure on the tool less than 30 psi (2 bar).
4. The tool is allowed to rise in temperature until stabilizing at the initial temperature the platens were set to.
5. The pressure is increased to the desired amount and held for a recommended time.
6. Air and/or water cooling is initiated until the material reaches a temperature sufficiently below the melt and peak crystallization temperatures wherein the pressure is reduced to a contact pressure less than 15 psi (1 bar).
7. The tool is continually cooled until reaching a temperature, typically at or below the glass transition point, at which the pressure is completely removed and the part de-molded from the tool. It should be noted that the choice of tooling, geometry and heating/cooling mechanisms will greatly dictate processing conditions, and thus, optimization specific to the individual molders' capabilities is necessary. Additionally, the resin is what dictates the molding temperatures, whereas the sample thickness is what determines the time. As the thickness increases, the time at melt should also increase to account for the time for heat to conduct to the center of the laminate.

It should be noted that the choice of tooling, geometry and heating/cooling mechanisms will greatly dictate processing conditions, and thus, optimization specific to the individual molders' capabilities is necessary.
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Resin: PA6
Drying Time: 2 hours
Drying Temperature: 180°F, 82°C
Platen Temperature: 520°F, 271°C
Press Pressure: 84 psi, 5.8 bar
Time at Melt: 5 min
Cooling Rate: 15-30°F/min, 8-17°C/min
Material Removal Temperature: 175°F, 79°C

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Characteristics

Special Characteristics	Chemical resistant, Fuel resistant
Product Categories	Tribological
Processing	Compression molding, Extrusion, Film extrusion, Injection compression molding, Injection molding, Porous sintering
Delivery Form	Tape

General Disclaimer

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