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CELSTRAN® CFR-TP PA66 GF60-02

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Celstran® CFR-TP PA66 GF60-02 is a 60% E-glass by weight polyamide 66 (nylon 66) 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 weight, strength and toughness are critical, as well as higher thermal resistance of PA66 versus other nylon materials. This material is available in natural and black colors. Alternate tape widths and thicknesses may be available.

Product information

Fiber volume content	40.2	%	ISO 11667
Tape thickness	0.3	mm	ISO 16012
Tape width	305	mm	ISO 16012
Tape areal weight	485	g/m²	
Fiber areal weight	291	g/m²	

Typical mechanical properties

Tensile modulus, Tape 0°	33400	MPa	ASTM D 3039 M
Tensile strength, Tape 0°	759	MPa	ASTM D 3039 M
Tensile strain at failure, Tape 0°	2.48	%	ASTM D 3039 M
Flexural modulus, Tape 0°	32000	MPa	ASTM D 790
Flexural strength, Tape 0°	791	MPa	ASTM D 790
Flexural strain at failure, Tape 0°	3.32	%	ASTM D 790

Thermal properties

Melting temperature, 10°C/min	260	°C	ISO 11357-1/-3
Glass transition temperature, 10°C/min	50	°C	ISO 11357-1/-3

Physical/Other properties

Density	1730	kg/m³	ISO 1183

Injection

Drying Recommended	yes	
Drying Temperature	80	°C
Drying Time, Dehumidified Dryer	2 - 4	h
Processing Moisture Content	≤0.2	%
Melt Temperature Optimum	295	°C
Min. melt temperature	285	°C
Max. melt temperature	305	°C
Screw tangential speed	≤0.2	m/s
Mold Temperature Optimum	100	°C
Min. mould temperature	70	°C
Max. mould temperature	120	°C
Hold pressure range	50 - 100	MPa

Characteristics

Processing	Injection Moulding, Thermoforming, Compression moulding, Selective reinforcement
Delivery form	Tape

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Additional information

Compression molding

Processing

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.

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Resin: PA66
Drying Time: 2 hours
Drying Temperature: 180°F, 82°C
Platen Temperature: 585°F, 307°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: 125°F, 52°C

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