

CELSTRAN[®] CFR-TP PA6 CF60-03 CELSTRAN® CFR-TP

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.

Product information

Fiber volume content Tape thickness Tape width Tape areal weight Fiber areal weight	194		ISO 11667 ISO 16012 ISO 16012
Typical mechanical properties			
Tensile modulus, Tape 0° Tensile strength, Tape 0° Tensile strain at failure, Tape 0° Flexural modulus, Tape 0° Flexural strength, Tape 0° Flexural strain at failure, Tape 0°	1.76 98100	MPa % MPa MPa	ASTM D 3039 M ASTM D 3039 M ASTM D 3039 M ASTM D 790 ASTM D 790 ASTM D 790
Thermal properties			
Melting temperature, 10°C/min Glass transition temperature, 10°C/min	220 57	°C °C	ISO 11357-1/-3 ISO 11357-1/-3
Physical/Other properties			
Density	1450	kg/m³	ISO 1183

Characteristics

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

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:

 The platens should be heated above the polymer matrix melt temperature.
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).

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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: 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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Stress-strain







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Secant modulus-strain

