CELSTRAN® CFR-TP PA66 CF60-02

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Celstran® CFR-TP PA66 CF60-02 is a 60% carbon fiber 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. Alternate tape widths and thicknesses may be available.

Product information

Fiber volume content	48.7	%	ISO 11667
Tape thickness	0.00512	in	ISO 16012
Tape width	10.6	in	ISO 16012
Tape areal weight	197	g/m^2	
Fiber areal weight	118	g/m^2	

Typical mechanical properties

Tensile modulus, Tape 0°	1.36E7	psi	ASTM D 3039 M
Tensile strength, Tape 0°	280000	psi	ASTM D 3039 M
Tensile strain at failure, Tape 0°	1.8	%	ASTM D 3039 M
Flexural modulus, Tape 0°	1.38E7	psi	ASTM D 790
Flexural strength, Tape 0°	154000	psi	ASTM D 790
Flexural strain at failure, Tape 0°	1.27	%	ASTM D 790

Thermal properties

Melting temperature, 10°C/min	500	°F	ISO 11357-1/-3
Glass transition temperature, 10°C/min	122	°F	ISO 11357-1/-3

Physical/Other properties

Density	0.052	lb/in^3	ISO 1183

Characteristics

Processing	Thermoforming, Compression molding, Selective reinforcement

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).

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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: 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

NOTICE TO USERS: Values shown are based on testing of laboratory test specimens and represent data that fall within the standard range of properties for natural material. These values alone do not represent a sufficient basis for any part design and are not intended for use in establishing maximum, minimum, or ranges of values for specification purposes. Colorants or other additives may cause significant variations in data values. Properties of molded parts can be influenced by a wide variety of factors including, but not limited to, material selection, additives, part design, processing conditions and environmental exposure. Other than those products expressly identified as medical grade (including by MT® product designation or otherwise), Celanese's products are not intended for use in medical or dental implants. Regardless of any such product designation, any determination of the suitability of a particular material and part design for any use contemplated by the users and the manner of such use is the sole responsibility of the users, who must assure themselves that the material as subsequently processed meets the needs of their particular product or use. To the best of our knowledge, the information contained in this publication is accurate; however, we do not assume any liability whatsoever for the accuracy and completeness of such information. The information contained in this publication should not be construed as a promise or guarantee of specific properties of our products. It is the sole responsibility of the users to investigate whether any existing patents are infringed by the use of the materials mentioned in this publication. Moreover, there is a need to reduce human exposure to many materials to the lowest practical limits in view of possible adverse effects. To the extent that any hazards may have been mentioned in this publication, we neither suggest nor guarantee that such hazards are the only ones that exist. We recommend that persons intending to rely on any recommendation or to use any equipment, processing technique or material mentioned in this publication should satisfy themselves that they can meet all applicable safety and health standards. We strongly recommend that users seek and adhere to the manufacturer's current instructions for handling each material they use, and entrust the handling of such material to adequately trained personnel only. Please call the telephone numbers listed for additional technical information. Call Customer Services for the appropriate Materials Safety Data Sheets (MSDS) before attempting to process our products.
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