

# PCF™

## Prepreg Carbon Fiber



Building  
&  
Transportation



Oil, Gas  
&  
Industrial



Offshore  
&  
Onshore



Water  
&  
Wastewater



### PRODUCT DESCRIPTION

CTech-LLC® PCF™ Prepreg Carbon Fiber preform manufacture used to be considered a labor intensive, manual and time-consuming process. This has now changed.

CTech-LLC® has developed and installed a fully automated preform manufacturing process, giving full design flexibility regarding ply weights, orientation and contours. The line concept also allows additional materials such as adhesive to be integrated into the process. The preform design can be precisely tailored to the intended customer application. a production rate of 1 minute per preform is achievable, supporting high volume production.

CTech-LLC® produces uni-directional (UD) prepreg tapes based on CTech-LLC® UCW™ Uni-directional Carbon Wrap. CTech-LLC® PCF™ Prepreg Carbon Fiber is ideal for large volume composite applications where high production throughput, excellent composite properties, and low material cost are important. a wide selection of epoxy resin formulations meets most processing and composite property requirements for tack, toughness, surface finish, cure time, cure temperature, and delivered composite strength and modulus. Custom formulations are also available. CTech-LLC® PCF™ Prepreg Carbon Fiber properties, such as fiber areal weight, resin content, and width, are readily adjusted to exactly meet customer requirements. Packaging options include core size, customer specified kitting requirements, and custom labeling. CTech-LLC® PCF™ Prepreg Carbon Fiber production is geared to large volumes and low cost.

### ADVANTAGES

- Near-perfect epoxy resin content, maximizing strength properties for the reinforcement.
- Excellent surface finish, engineered to be less porous at the surface.
- Room temperature storage, making them easier to keep and handle, without the need to thaw required of frozen prepreg options.

### TYPICAL USES

Traditionally, working with prepreg carbon fiber has required always required an autoclave, a very expensive piece of machinery used to cure the prepreg under high pressure and temperature.

### INSTALLATION PROCEDURE

At room temperature, prepreg resin systems have such a high viscosity that, even though they are made of uncured resin, they can easily be handled. Such is the firmness of prepreg resin systems when they are handled that prepreg carbon fiber is sometimes referred to as 'dry carbon'; although as descriptions go, this one is particularly confusing. Tack Level The viscosity at room temperature and other properties of a specific resin system determine the level of 'tack' of the prepreg. Tackier prepregs require more delicate handling but will easily stick to mould surfaces, less tacky prepregs are easier to handle but may not stick as easily to a mould's surface.

Only at elevated temperatures, known as the cure temperature, does the resin really start to react and cure properly which is why prepregs must always be cured in an oven of some description. Typical cure temperatures for prepregs range from 60°C up to around 180°C with the most common cure temperature for out-of-autoclave prepregs being around 100°C. Temperatures such as these can easily be reached by domestic and commercial cooking ovens as well as other types of oven including paint drying and powder coating ovens. Although it is possible to successfully cure a prepreg part without having an active vacuum line inside the oven, it is certainly preferable.

#### TOOLING PREPREG

Resin system	Cure temperature	Tg	Shelf life at 20°C	Reinforced	Application
Epoxy	50 – 170°C	190°C	Tack life: 4 days Out life: 5 days	Woven fabrics	Tooling structures
Epoxy	60 – 170°C	190°C	Tack life: 5 days Out life: 7 days	Woven fabrics	Tooling structures
Epoxy	60 – 170°C	190°C	Tack life: 10 days Out life: 12 days	Woven fabrics	Tooling structures
Epoxy	60 – 170°C	190°C	Tack life: 7 days Out life: 9 days	Woven fabrics	Tooling structures

#### COMPONENT PREPREG

Resin system	Cure temperature	Tg	Shelf life at 20°C	Reinforcement	Application
Epoxy	65 – 120°C	125°C	30 days	Woven fabrics	General & Industrial
Epoxy	90 – 160°C	121°C	30 days	Unidirectional carbon	General & Industrial parts. Fire retardant version also available.
Epoxy	110 – 135°C	115°C	30 days	Woven fabrics	General & Industrial
Epoxy	80 – 120°C	125°C	40 days	Woven fabrics	General & Industrial
Epoxy	90 – 120°C	120°C	40 days	Woven fabrics	High levels of tack – suitable for work conditions c.15°C
Epoxy	90 – 120°C	121°C	20 days	Woven fabrics	General & Industrial
Epoxy	80 – 180°C	195°C	30 days	Woven fabrics	General & Industrial, motorsport
Epoxy	140°C	140°C	40 days	Woven fabrics	Press Moulding

#### APPLICATION

Prepreg carbon fiber components are widely regarded as the pinnacle of advanced composites; their incredible performance and stunning appearance making them the most sought-after performance parts on the market. Prepreg carbon fiber is used to make the chassis and body panels of Formula 1 cars and the wings of the latest passenger jets.

#### STORAGE & SHELF LIFE

Special formulation of the epoxy ensures that at ambient temperature the curing process is incredibly slow (often several weeks) and that at freezing temperatures (typically - 20°C) the process is halted almost completely. The amount of time the resin system can spend at room temperature before noticeable partial curing of the resin takes place is known as the material's 'out life' whilst the time that the prepreg can be stored in the freezer and remain useable when thawed-out is known as its 'freezer life' or 'shelf-life'.

#### CAUTION

Carbon fiber is conducive. Implement dust-proof measures to prevent electrical equipment from shorting, malfunctioning, etc., due to fibers scattering and flying around in the work area.

- No cases of health problems due to carbon fiber have been reported, but short fibers may attach to the skin or viscous membrane to cause itchiness or inflammation. Incinerating waste material of carbon fiber or carbon fiber composite material may cause fibers to scatter and fly around and cause electrical failures. is appropriate to bury such material as industrial waste.

#### CTech-LLC®

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#### IMPORTANT NOTE:

Before using any CTech-LLC® product, the user must review the most recent version of the product's technical data sheet, material safety data sheet and other applicable documents, available at [www.ctech-llc.com](http://www.ctech-llc.com).

#### WARANTY:

CTech-LLC® warrants its products to be free from manufacturing defects. Buyer determines suitability of product for use and assumes all risks. Buyer's sole remedy shall be limited to replacement of product. Any claim for breach of this warranty must be brought within one month of the 'date of purchase. CTech-LLC® shall not be liable for any consequential or special damages of any kind, resulting from any claim or breach of warranty, breach of contract, negligence or any legal theory. The Buyer, by accepting the products described herein, agrees to be responsible for thoroughly testing any application to determine its suitability before utilizing.