

HowTo Guide

WET LAYUP PREPREG

The term **Prepreg** is an abbreviation for the phrase pre-impregnated.

What is a Prepreg?

Prepreg composite materials are becoming increasingly common in the composite industry due to their ease of use, consistent properties, and high quality surface finish.

Pre-preg is a term used for a composite material that has been "pre-impregnated" with a resin. Most often, the resin used to impregnate a fabric is an epoxy resin, but other types of resin can be used including a variety of thermoset and thermoplastic resins. Though they both are considered a prepreg, the two types are dramatically different.

Thermoset Prepregs

Most commonly used prepregs are called thermoset prepregs. With a thermoset prepreg, the thermosetting resin starts as a liquid and fully impregnates the fiber reinforcement. Excess resin is precisely removed and then undergoes a partial curing. This changes the state of the resin from a liquid to a solid. This is known as the "B-stage."

In the B-stage, since the resin is partially cured, and usually tacky, it requires cold storage to prevent it from fully curing. When heated, a prepreg often returns briefly to a liquid state prior to hardening completely. Hence, composite structures built of pre-pregs will mostly require an oven or autoclave to finish the complete polymerization. In addition, once a thermoset prepreg is formed, it cannot be remolded or reshaped.

Thermoplastic Prepregs

Thermoplastic resins are extremely common and are often **unreinforced**. Fabrics that are impregnated with a thermoplastic resin are stable at room temperature and, generally, do not have a shelf life. When at room temperature they are at a solid state. When heat and pressure are applied, a thermoplastic prepreg will often have the ability to be reformed and reshaped.

Using Prepregs

Using a prepreg offers various advantages and disadvantages. Perhaps the greatest advantage of using prepregs is their ease of use. Using a prepreg eliminates the need for hand mixing resin and hardener. Most epoxy hardeners are considered hazardous and dealing with resins in a

Unreinforced means the resin is formed into shapes and has no reinforcement providing strength..

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Layers of composite material that have resin applied through a wet layup process, is called a **Wet Layup Prepreg**.

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liquid state can be messy. A prepreg comes with the desired amount for both resin and hardener already impregnated in the fabric. This helps produce consistent parts and takes the worry out of inaccurate measuring, excess resin weight and resin voids in the finished product.

Using prepregs can be cost prohibitive. The additional step of impregnating a fabric adds increased cost and, in some instances, close to doubles the material cost. And because the most commonly used prepregs are impregnated and partially cured, they require refrigeration or freezing prior to use, adding additional transportation and storage cost. Some prepregs allow for room temperature storage. Prepregs also tend to have a lower overall shelf life compared to dry fabric.

Wet Layup Prepreg?

Creating a Wet Layup Prepreg is the best way to generate a product that simulates the prepreg system. By impregnating a material with a resin system by hand, a pre-impregnated fabric can be created without the additional cost or storage restrictions related to commercial prepregs.

A Wet Layup Prepreg is commonly used when vacuum bagging sandwich panel structures. When using core materials such as honeycomb or aero-mat, the use of a Wet Layup Prepreg lessens the amount of resin that fills the cells. Additionally, shapes and templates can easily be cut from a Wet Layup Prepreg and applied directly to mold surface. Though a more time consuming process, creating a Wet Layup Prepreg results in a lighter weight sandwich structure in the finished product.

Creating a Wet Layup Prepreg.

- When working with resin, it is important to wear protective gear to prevent inhalation, ingestion, or direct exposure. Make sure to have a face mask, protective eye wear, and gloves accessible and work in a well-ventilated area.
- Begin by laying down a heavy sheet of plastic film, such as Visqueen or our Nylon Vacuum Bagging Film. The thicker the film the better.
- Layup the fabric reinforcement on top of the plastic film and pour resin over material.

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- Be sure to use a resin that has a longer working time. By using a lower viscosity resin like our EZ-Lam or Pro-Set 125 Resin line, the resin will flow through the fabric easily.
- Squeeze out excess resin.
- Place another layer of the plastic film on top of the fabric.
- Using a drum roller or a rolling pin, apply pressure forcing resin into the fibers while pushing any remaining excess resin.
- Keep the plastic film on to cut out templates.
- Remove top layer of plastic film and apply the fabric to mold surface.
- Once in place, remove the other plastic film layer.
- Handle as you would a commercial prepreg from this point onward with respect to vacuum bagging.