

REPORT

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NEWS ABOUT

EPOXY
CHEMISTRY

COMPOSITE
PROCESSES

FABRICATORS

Drum Management

Glenn House, Health, Safety & Environmental Manager

If you purchase PRO-SET® Epoxy in the 15 gallon plastic drum or the 55 gallon steel drum, you may want to consider a Drum Management System. Storing and dispensing your epoxy using such a system can save valuable floor space by allowing vertical stacking (forkliftable) of the drum cradles, as well as centralizing your dispensing activities in fewer locations. In addition, these drum management systems also satisfy secondary containment requirements identified by the US EPA in 40 CFR 264.175. With your dispensing taking place in a controlled location, any spills are automatically contained within the system, which allows for a cleaner, more environmentally compliant workplace. Several brands of this Drum Management System are commonly available in most industrial safety catalogs.



The Poly-Racker™ Photo courtesy of ENPACK Corporation. www.enpac.com ■

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New Fairing System

Bruce Niederer, Technical Services

Gougeon Brothers has recently introduced a 2 part, 1:1 Epoxy Fairing System to the PRO-SET product line. After over a year in development, PRO-SET 185 Resin and 285 Hardener are now available. Designed with the production or custom builder in mind, this system uses the proprietary sheer thinning chemistry that has made our adhesives so popular throughout the industry. This chemistry allows us to formulate a highly filled product that is extremely easy to handle while providing one of the most easily sanded and versatile fairing products available.

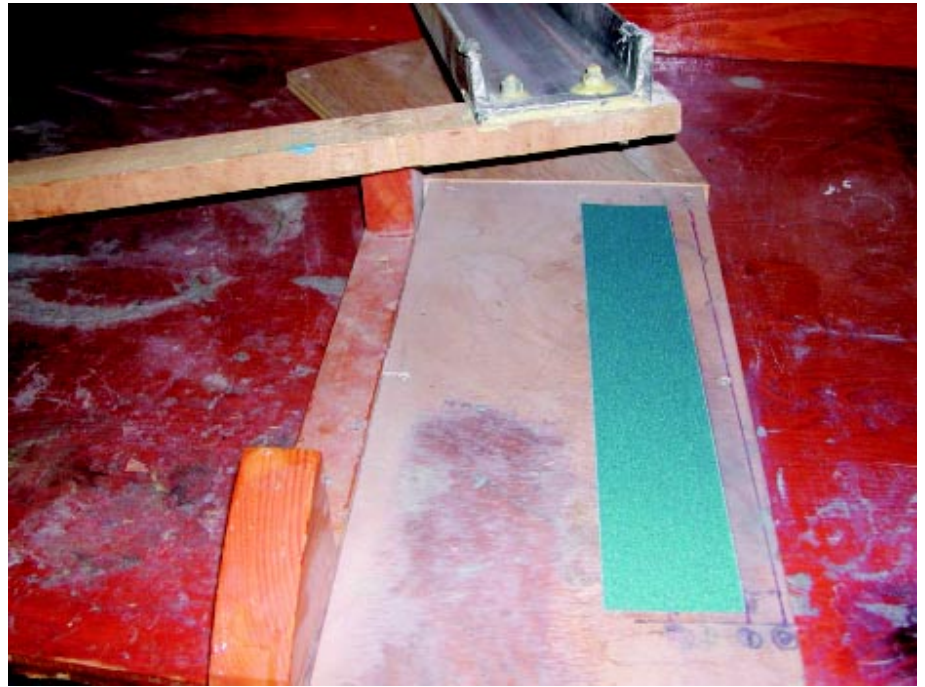
In developing this product, we focused on the handling characteristics that builders told us were important for their operations—a 1:1 system that mixes quickly and easily, a high degree of sandability, a reasonably long working time coupled with a quick and thorough through cure, good non-sag characteristics, good substrate wet out, and the ability to feather out smoothly without “lifting” at the outer edges. Builders who have tried the product report we have met or exceeded all these requirements.

Continued

A 1:1 (by volume) system is the industry standard because this allows for fast, easy, and accurate measuring on the shop floor. The dark 185 Resin and white 285 Hardener mix easily on a cardboard or plastic palette with a trowel. The different colors provide a visual cue that the components are thoroughly mixed when an even, non-streaked compound is formed.

Easy sandability is perhaps the key component for any fairing system. We spent many hours testing our formulations and making comparisons to other products on the market. Using a simple fixture designed at GBI, we developed a procedure to quantify and compare the relative sandability of different materials. We fill identical plastic syringes with the material to be tested, taking care to spin the cylinders in a centrifuge as they are filled to reduce or eliminate air pockets, and allow them to cure over night. The cured cylinders are removed from the syringes and sanded to exactly 1.5" long, using a jig attached to a power sander so the ends are squared. Each cylinder's length is accurately measured with calipers and recorded. Using 80 grit automotive sanding strips, each cylinder is loaded into the apparatus. A steel channel provides constant weight on the cylinder as each one is pushed an equal number of passes over the sandpaper. The cylinder is removed and the sandpaper is repositioned so that the next cylinder has a fresh sandpaper surface for testing. Once all the cylinders are sanded, they are remeasured and the change in length calculated. By dividing the change in length by the original length, we get a percent of length lost, which we characterize as sandability.

By inspecting the sandpaper after testing, we can get an idea of how a material will load paper in a practical sense similar to what one might experience in the shop. Our research



Sanding fixture used to test sandability of the new fairing system.

and customer feedback have led us to conclude that sandability of 12% is the minimum that we would characterize as good. Sandability of 14% to 18% meets or exceeds expectations. PRO-SET® 185/285 has a sandability of 15% or better. Comparison to other systems available in the industry has shown that many have a sandability of 10% or less. Only two systems of the many we tested equaled or surpassed the PRO-SET product in sandability, but neither could compare in terms of handling characteristics, which is where 185/285 excels due to its unique chemistry.

Other systems tested are basically a variation of the same theme — highly filled resin and hardener with no sheer thinning characteristic. This scheme makes for a stiff compound that is hard to mix and hard to spread effectively with smoothly feathered edges. The new 185/285 System spreads and feathers so smoothly and effectively that much of the sanding due to curling or drag, and the resulting build-up at the edges, is significantly reduced or eliminated. An additional benefit is minimal

pinhole content in cured material. The system also has a reasonably long working time and is ready for sanding after an overnight cure at 72° F, so the project can continue at pace.

This system is also very effective at wetting out the substrate without the need for a two step process. This eliminates the need to pre-coat before applying the fairing compound, whether the substrate is laminate or wood. Additionally, it is completely non-sag on a vertical surface at 3/8" thick.

To find out if the PRO-SET 185/285 Fairing System is right for you or to get product data sheets, contact our Technical Support staff at 989-684-7286 or via email at proset@gougeon.com ■

Resin Infusion

Jeff Wright, Technical Services

Resin infusion is a very popular method for manufacturing composites. While there are many (perhaps too many) acronyms to describe resin infusion, they all use vacuum to compact and wet out the core and fiber. Resin infusion may increase production efficiency and will reduce the laminator's exposure to wet laminates. The process begins by placing the dry fabric and core into a mold. This allows all of the material to be located exactly as specified. After all of the reinforcements are in place, a vacuum bag is placed over the mold. Applying a vacuum to the sealed mold creates a pressure differential that draws the resin into the flow media located under the vacuum bag. The flow media systems can be disposable or can be part of the laminate. For example, certain core material can be used as flow media.

A successful transition to any closed mold method, such as resin infusion, requires a strong development program. Many builders use an outside consultant, while others create a team in house. A good understanding of vacuum bagging techniques is important, as well as understanding how head pressure and flow restrictions can affect the infusion process. The resin can only flow a certain vertical height, and dry spots, caused by

“racetracking”, or over-compaction of the laminate stack, can create unwanted rework time. Practice panels or parts will help identify problems during production and provide experience with the common pitfalls.

Successful infusion processes depend on the proper resin selection. Viscosity is the most discussed property in selecting a resin for infusion. However, it is important to understand that viscosity is just one property that makes up a resin's rheology or flow characteristics. Other properties are just as important. For example, water has a lower viscosity than motor oil, but motor oil can wet out a waxed surface, whereas water will bead up. In this example, the surface tension of the liquid is just as important as viscosity when measuring its ability to wet out a surface. So just comparing viscosities is not enough to understand a resin's flow characteristics. PRO-SET® 117LV Resin has a viscosity between 290cps and 360cps depending on which one of the four available hardeners is used. Gougeon Brothers Inc. has performed extensive testing of our 117LV Resin to ensure that it has excellent wet out capability.

Using PRO-SET Epoxy for infusion simplifies the resin handling process. Working time can be varied by selecting the appropriate hardener, rather than changing the catalyst ratio. Our four different hardeners provide a 100g potlife ranging between 44 minutes and 465 minutes. This will accommodate almost any size part and laminate. Selecting the appropriate hardener eliminates having to adjust catalyst concentration by adjusting metering equipment or using complicated measuring techniques.

Storage is also very easy with PRO-SET Epoxy. PRO-SET Resins have a

minimum shelf life of 3 years and hardeners a minimum of 2 years. They also do not separate while stored so agitation of the resin is not needed. Material handling with some polyesters and vinylesters requires the storing and mixing of promoter packages as well as catalyst. These products often have a shelf life measured in months.

Although the closed molding process used in resin infusion traps many of the Hazardous Air Pollutants (HAP) that polyester and vinylester produce, secondary lamination processes can still require open mold laminating techniques. When PRO-SET 117LV is used for the infusion process, our other PRO-SET Resins can be used with the same hardeners for secondary bonding operations. Since none of the PRO-SET products have a significant VOC or HAP content, all lamination operations will be almost free of emissions.

PRO-SET 117LV provides excellent physical properties and toughness. It bonds very well to all reinforcing fibers and any core, and will not attack structural foam cores. These characteristics are very important since infusion often results in laminates with high fiber contents. With PRO-SET 117LV, the final infused laminate will have excellent properties that are appropriate for many high-performance applications.

Resin infusion is growing in popularity. It has allowed builders to improve the quality of their product, and reduce the amount of protective clothing they buy.

If using an infusion process interests you, please call us for additional information about PRO-SET 117LV. Our Technical Support staff can help you make the transition to high performance resin infused laminates. ■



A 30' sailboat being infused with PRO-SET 117LV/237.

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PRO-SET[®]

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