



Lantor Soric[®] Adhesive: Improving every step of the infusion process

FEATURE

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With Soric, a group of flexible and compression resistant core materials, Lantor offers a unique and patented product range that can be used in closed mold processes. Soric is made up of a unique combination of polymer fibers and microspheres that is pressure resistant. During the infusion process, the Soric flexible core works as a flow medium and enables steady and inter-laminar impregnation. Once the process is finished, the impregnated Soric is an excellent bonded honeycomb structured core that offers weight reduction and cost efficient stiffness.

Soric TF is the ideal product for the most demanding cosmetic and surface requirements. As it is designed for use as a print blocking material, this grade does not have a honeycomb structure. Soric[®] TF is suitable for infused laminates and prepreg processes.

Soric TF Adhesive (Fig. 1) is the newest development in the range of Soric products. The print blocking Soric TF grade is available with a helpful adhesive layer. Due to the adhesive the new Soric core can be re-positioned with a high accuracy without adding extra spray adhesive. It contributes to a high product quality and saves labor time.

The adhesive is a buta-styrene rubber which itself has several beneficial aspects for use in composite infusion processes. The adhesive will dissolve in polyester and vinylester resins. The controlled application of the adhesive will keep the amount of adhesive mixing with the resin to a preset minimum. This makes sure that there will be no adhesive layer remaining in the final product and that the interlaminar bond between layers is at full strength.

The adhesive is not reactive; therefore it will remain tacky for at least a year in normal storage.

With the introduction of new materials such as the Lantor Soric group of materials, Eastman Machine Company has responded by offering a range of equipment that meets the automatic cutting and roll handling demands for experimentation, concept testing or full-production runs.

The series of automated, computerized cutting systems manufactured at Eastman's Buffalo, New York facility cut with accuracy and repeatability at speeds of up to 152 cm per second. Automatic



FIGURE 1
Soric TF Adhesive.

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cutting systems are engineered for single, low or high-ply cutting requirements of flexible core materials; uni-, bi-, and multi-directional glass, carbon and aramids; and materials pre-impregnated with epoxy resin. The range of equipment from Eastman for cutting technical textiles, composites, and otherwise non-woven technologies is as unique as each customer. Nearly 60% of Eastman's global sales involve the composites industry.

Eastman engineers are continuously innovating and expanding the product offering to meet the demands of processing evolving material compositions.

Cutting & kitting

As new applications for composites have emerged, Eastman has worked in tandem with industry engineers to develop and enhance the cutting products, capabilities and technical support offered. With over 128 years of experience innovating products used for all types of flexible soft goods, Eastman's product portfolio includes computer-controlled (CNC) systems and manual tools (operated by hand); material handling equipment for pre-and post-cutting piece management; and a sophisticated software suite of programs. Success in an automated cutting environment can be measured with reductions in manual labor and scrap of expensive composite materials, improved throughput and quality of cut parts and faster time to market.

Automatic cutting systems are available in a variety of widths and lengths to address the industry supply of core materials, foams, reinforced plastics and other flexible materials. Each project is uniquely considered and the equipment is configured based on the anticipated materials to be cut, pattern dimensions and end product.

Common machine configurations

Eastman's static table system is capable of cutting, marking, drilling and punching virtually any flexible material at speeds of up to 60 in. per second (152.4 cm/s). The static table system is available in a range of system lengths and widths to meet the demands for prototypes, one-offs and full-production runs. The system's high-precision configuration features multi-axis motion for more defined and accurate cuts. Material is spread across the static table by an operator or with the use of a pneumatic gripper bar. The open plenum vacuum system design ensures evenly dispersed airflow for optimal material hold-down. This computer-controlled system features zoning capabilities to enable cutting in one area while the operator is simultaneously picking parts in another, maximizing daily production capacity. The standard cutting surface is a porous plastic sheet. Alternative cutting surfaces are available to optimize cutting results for any given material or aid in controlling material contamination concerns.

The Eagle™ C125 conveyor system (Fig. 2) has the ability to continuously convey rolled material goods with consistent speed and control. Eastman's gantry and tool-head design are engineered to cut the most diverse technical and industrial fabrics available, while exceeding industry standards for accuracy. The robust conveyor design delivers unrivaled levels of material utilization and is often capable of cutting multiple layers without plastic overlay* (*material dependent). This computer-controlled cutting system requires minimal operator guidance to automatically feed and



FIGURE 2

Eastman's conveyor cutting system.

spread material to the identified start position. Smooth and accurate cutting of long markers is accomplished with the support of a powerful, yet quiet and self-contained vacuum system.

Both systems feature an ergonomic free-standing enclosure that houses the operating computer and controls. It can be sealed to offer dust and water resistant protection in harsh or high particulate environments. Additionally, cabling connectors, servo motors and display components meet recognized international protection ratings requirements.

Accessory solutions – automated cutting

A variety of optional accessory equipment offers maximum adaptability for the automated cutting system, providing additional tools to streamline associated processes in your operations.

Material handling

Feeding systems are an efficient way of introducing rolled fabrics to the cutting table in a relaxed or tensionless state with precise edge control. Eastman manufactures over 50 variations of single to multiple roll feeding systems to meet the specifications of many roll widths, diameters and weights. Also available are numerous styles of manual or motorized multi-roll carousels or roll racks that can be used for storage or as a means for supply to a cutting table or system.

Specialty solutions have been engineered for:

- removing the peel-ply (film protection layer) from prepreg materials as it enters the cutting system, from the top or bottom layer, or both
- re-rolling long cut pieces as they exit the conveyor system on quick change core shafts mounted across the off-load zone on the conveyor or on a separate take-off conveyor table (Fig. 3)

Marking & labeling

Marking and labeling pattern pieces during the cutting process makes parts identification fast, accurate and streamlined. Several optional gantry-mounted accessories are available help reduce labor time in collecting parts – from the traditional ballpoint pen model, standard with the Eastman tool head and a great solution for marking prepregs – to the advanced JetPRO™ inkjet drop-on-demand printer.

JetPRO is the answer to fast throughput printing compared to more traditional pen or airbrush marking options. The system allows full speed character printing with ink colors and formulas that comply with the stringent demands of leading aerospace

**FIGURE 3**

Feeding systems.

giants. Because there is no direct contact between the printer and the material, it is especially useful for fabrics such as fiberglass and other materials where traditional printing will not work. It joins the line-up alongside Eastman's exclusive EasiMark airbrush system, and EasiLabel, a system to apply adhesive labels directly onto the material.

Manual cutting machines

The industry standard since 1888, Eastman cutting machines are engineered to cut the most diverse range of traditional, modern, and industrial fabrics in the market today. Fabricated using modern manufacturing technology, superior components, and skilled craftsmen, there is a machine solution for cutting intricate or simple patterns. Eastman manual cutting machines feature many of the same benefits as automatic cutting, at a much lower investment.

- Straight knives – high-speed reciprocating cutting technology designed for cutting patterns, as well as straight lines in multiple thicknesses of material
- Round knives – commonly used to cut straight lines or large radius curves
- Rotary shears – quickly cut intricate markers, one-of-a-kind patterns, and samples. Solution to low-quantity cutting jobs
- End cutters – fast, efficient, accurate straight end cuts to minimize excessive selvage

Easy process

In order to optimize the effects of Soric on processing and the final product, the placement must be considered. Placement without folds or wrinkles will maximize the flow of resin and assure the best surface quality. This begins in production where the Soric is rolled and cut to size on the production machine without human intervention. This assures the material is shipped wrinkle free. The Eastman automated cutting system design features a high-flow vacuum system to ensure material hold-down for cutting. Static table cutting systems feature a porous surface to ensure the vacuum flow is evenly dispersed, no matter where you are cutting on the table—this means clean, smooth edges of the Soric[®], any adhesive layers and protection foil cut simultaneously. The conveyor system features a smooth and durable, high-durometer cast urethane belt suitable for even sticky or downy materials. It has millions of holes that are perforated in a random pattern to provide the same evenly dispersed vacuum flow as the static table.

**FIGURE 4**

Application of Soric TF Adhesive.

Soric cut with Eastman tools enables high production quality and accuracy without extra cost in production time. Thanks to the stable adhesive layer the Soric core can be re-positioned without the need to add more adhesive. Also the adhesive remains tacky, which requires no special storage conditions. The adhesive will keep your layup in the mold over the weekend or a short holiday, allowing more freedom in production planning. Soric TF will, as a print blocker, be one of the first layers in the dry stack. It is important that this layer stays in place during the rest of the lay-up without shifting position, even when lightly tugged or scraped. However the layer must be repositionable when required. The Soric Adhesive allows this and the amount of adhesive is tuned for this purpose. When infusing with polyester or vinylester resins the Lantor adhesive layer dissolves completely. This assures that there will be no weak spots in the final product and that it does not interfere with the excellent interlaminar flow properties of Soric. There is no health issue associated with the normal use of Soric Adhesive. The adhesive does not produce fumes in normal application and does not splatter when removing the protection foil. This means that mouth and eye protection are not required when using Soric Adhesive (Fig. 4).

Reduced cycle times

When working with expensive materials, piece orientation and lay-up can be a critical part of the operation. EastmanPRO is a sophisticated and intelligent software suite that enables a customer to go from design and nesting through to cutting within the same interface. Optional software modules are available in an intuitive, easy-to-use suite that has successfully been integrated with ERP systems, robots and PLC systems. Add-on features for batch programming to streamline organizing and separating complex order runs is also available. The user can sort items to be cut by material type, color, thickness or other pre-established variables so that all similar materials from multiple daily production orders are "batched" together for a single run on the cutting system.

Applying Soric Adhesive to your laminate will save time in every step of the infusion process. This starts with the amount of layers in a stack. Soric is available in several thicknesses from 1.5 mm up to 6 mm. This way one layer of Soric will replace multiple fiber bulking layers like Chopped Strand Mat (CSM) or Continuous Fiber Mat (CFM). The amount of Adhesive on Soric is constant and there is no risk of dry spots in a laminate due to local adhesive excess. Operators can proceed directly with applying the layer,



FIGURE 5

Left: Soric TF applied to a skin coat with spray adhesive. Right: Soric TF Adhesive applied to a skin coat.

skipping the adhesive application necessary with a spray adhesive. Time typically lost respraying corners and edges that come loose is also saved as the Soric Adhesive has the same adhesive strength on the whole surface (Fig. 5). This Adhesive strength is not affected by transport, storage, handling or cutting. By applying Soric XF, XXF, LRC or SF, the added benefits of not requiring a disposable flow mesh saves time in the lay-up and in the post processing of an infused part.

Improved quality

The quality of a final composites product hinges on many factors, some of which can be covered by using Soric and Eastman cutting machines. For example: by cutting material, adhesive and backing in one go without frills or particles the seams in the product are smooth and thickness is constant. By cutting the exact same shape every time no corrections by hand are required. By avoiding the use of spray adhesives a cleaner process is achieved with less change of contaminations and no spray fumes. Applying Soric greatly improves the infusion process by allowing resin to flow inside the stack and allowing air to evacuate. Applying Soric TF will greatly improve the visual quality of the finished part by blocking the print through of reinforcing layers.

Markets

Soric Adhesive is developed with large vertical mold sections and sharp mold features in mind. These molds are widely found in the marine industry, transportation industry and wind industry. The easy application and reduced processing time offered by Soric Adhesive make it an ideal solution for any product and production

environment. Soric Adhesive in combination with existing offerings of reinforcements with an adhesive layer can completely remove the spray adhesive and associated fumes and processing issues from your workshop.

The Soric range of products is successfully being applied for more than a decade in:

- Marine: hulls, decks, and structures of boats and yachts
- Mass transit: interior and exterior of trains, light rail and buses
- Leisure: kayaks, surfboards, pools and tubs
- Industrial: cladding panels, fans, containers and tanks
- Wind Energy: nacelle covers and spinners
- Transportation: parts and panels of cars, trailers, trucks and RV's

Soric TF is widely recognized as the best way of assuring a gel-coated glass fiber hull does not print through. Soric XF, XXF and SF and LRC are used to enable one-shot infusion of hull and deck structures, whether monolithic or in combination with solid core materials. Soric also allows easy co-infusion of features like stiffening ribs, windmill blade spars and other pre-cured and metal inserts.

Soric TF Grey is used in combination with carbon fiber in order to create thin class A body panels which look like full carbon.

With the cutting systems being universal for most materials, the customizations in size, accessories, blade types and cutting pressures allows Eastman to supply equipment across a variety of industries. We're proud that Eastman machines are used in thousands of factories around the world in markets as varied as aerospace, apparel, energy, safety and protection, upholstery, and recreational sporting goods. Eastman appreciates the diversity of facilities using new and high-tech materials, as well as traditional textiles. The company maintains a continuously expanding library of relevant material and applications information to offer advice, support and guidance for engineers, technicians and operators using or considering Eastman automated systems.

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