Waste Fluid Transfer Conduits
Completing the Circle of Sustainable RVB Processing

Rich Rydin, Ph.D., SR Composites

A recent article "RVB: Coming of Age" pointed out why reusable vacuum bags are displacing disposable films for many infused composite parts. The focus of that article was to introduce synthetic rubbers, primarily silicones, and natural rubber based Sprayomer™ elastomers. The review compared key material characteristics such as tear strength, chemical/thermal resistance and flexibility, and contrasted typical methods of membrane creation including brushed, splatter and spray formed. Perhaps most importantly, it began the dialogue on how RVB durability displaced consumables and avoided touch labor figure into calculation of ROI. While clear distinctions were conveyed for typical thickness, RVB weight and raw input costs, there were confusing claims made regarding specific proprietary elements and underlying IP which dramatically impact ROI. The objective of this recap is to clarify certain of those claims.

While some SCRIMP™ IP describing disposable resin distribution media has come off patent, there remains a substantial body of in force IP including US Patent No. 5,702,663 describing fixed resin distribution networks built into synthetic RVB for flowing resin into a preform. Regarding useful means of forming RVB from elastomers; US Patent No. 8,916,073 describes a spray formed Natural Rubber vacuum bag while currently abandoned US Patent No 7,014,809 described a swirl spray formed silicone vacuum bag. This is meaningful because hand brushing, knifing or roll forming larger net-shape RVB is counterproductive. One of the more crowded IP fields includes patents/applications that address variants on reusable seals and methods of attaching various membranes to such seals. While a handful of perfectly functional reusable seals are available, there is a significant push to further reduce touch labor and capital costs.

This article focuses on US Patent No. 8,672,665 which applies to any elastomer RVB and offers one of the fastest paths to breakeven for infusion, debulk, consolidation and bonding fixture vacuum bag processes. Figure 1 illustrates an elastomeric vacuum bag with integral Waste Fluid Transfer Channels (WFTC) used both to seal the vacuum bag surface to an underlying mold and provide a reusable vacuum manifold in spaces between the RVB and mold. By creating spaces between the RVB and mold surface which remain open and interconnected while communicating with a vacuum source, it is possible to remove waste fluids (liquids and gases) from the preform cavity. It is further possible to create fluid impervious bulkheads between the preform cavity and the WFTC where the vacuum bag surface is smooth and bears down on the mold surface. By creating permeability gradients with texture variations and properly positioned disposable breathers, resin can be constrained to the preform cavity and prevented from draining into waste lines even as gases are removed to assure low porosity and complete wetout.

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By incorporating WFTC directly into an RVB, fabricators can eliminate nearly all disposable elements of the vacuum system and the related cyclic touch labor to place bleeders, breathers and peel plies and remove after each use. When properly set up, there is no waste resin in any of the vacuum ports or peripheral lines which translates to additional saved time and materials. Feedback from current licensees suggests that the savings attributed to WFTC can approach $1/sq ft/cycle. This is significant. In fact, *we believe that this patented IP firmly tips the economic scale in favor of using RVB for most production closed molding operations*.

The past several years have seen a frenetic pace of counter and co-promotion by suppliers and distributors rushing to position themselves as fabricators finally began to realize the underlying value of RVB. When the Wild West dust of this exuberance settles, we believe it is those organizations that offer a viable, complete and protected IP platform that will be positioned to provide serious composites fabricators with a reliable long term solution to their closed molding needs. Fabricators with production schedules to meet generally understand cap ex purchases that generate a secure return and have little difficulty appreciating the value of WFTC. Testing the RVB waters by evaluating various borrowed elements and niche elastomers is quite different from investing in a proven production methodology that is backed by issued US patents. SR Composites has worked hard to make Sprayomer™ Technology a unique platform that turns frustrated and disillusioned players into long term closed mold winners.

Although no grant of rights to incorporate WFTC into an RVB has been made to any of the parties included in the “RVB: Coming of Age” article, SR Composites recognizes the positive impact that WFTC is having on current users and has decided to offer a license that will make the IP available to fabricators using synthetic elastomer RVB as well. For more information, please contact the author or SR Composites.

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Figure 1: WFTC used as a Perimeter Seal and Reusable Vacuum Manifold in an RVB