



Reusable vacuum membranes do save money

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Radical change within an industry always begins with a struggle for acceptance. A total 180 degrees flip of conventional methods often raises concerns about the validity of the technology. ‘Why change to a reusable when our consumable process works perfectly fine?’ The common sense of ‘if it isn’t broke, why fix it?’

However, more than ever, there is an increasing demand for sourcing new ways of saving money in production. The composites industry is immense and ever growing. And with this in mind, it is just unfeasible not to explore new technologies and simply remain with current, yet sometimes totally outdated, traditional methods (Fig. 1).

Industrial manufacturing does not demand the mass use of consumable tooling, and it just does not make sense. In this regard, we speak of composite moulding vacuum infusion and prepreg where tens of thousands of square meters and kilometers of consumable bagging materials and resin wastage are discarded and thrown into the skip each day (Fig. 2).

Living in the twenty-first century, it is bewildering how we have become accustomed to this traditional, wasteful, and time-consuming practice of consumable focused composite manufacturing. There will always be technology advances, but it appears that the developments in current vacuum bagging processes are aiming in the wrong direction.

Despite this, there is hope on the horizon. After five years of supplying reusable membranes, we are regularly seeing a consistent success of clients experiencing considerable savings, not only in waste elimination but in massive reduction of labour time and thus production costs. So what this ultimately translates into is more money in the moulders pocket.

But surely if what is said here is true, why hasn’t the whole industry converted?

The composites industry has reached a central state of normality, where procedures and knowledge are too fixed to divert from

the original routine processes. The “bagging” fraternity have only been led to believe that pre-preg and infusion moulding must only use the myriad of consumables and that there is no better alternative. Even the bare thought of converting to a sustainable,



FIGURE 1

Luton body van spoiler 10 m² moulding infused under reusable vacuum membrane by VPI.

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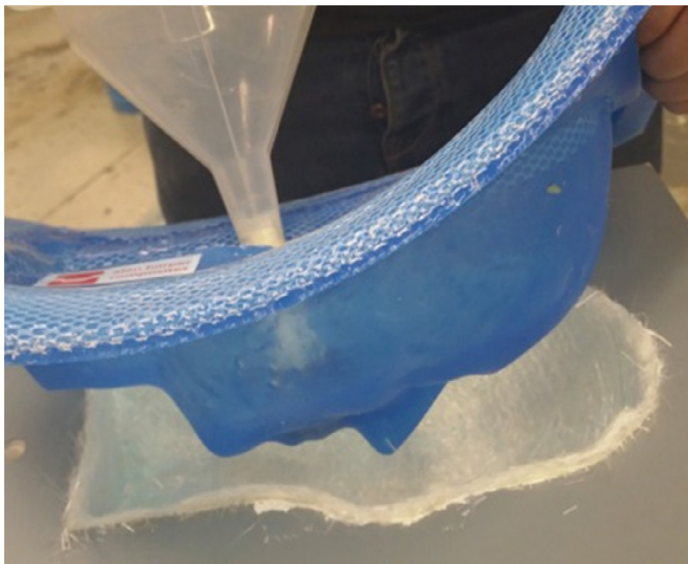
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**FIGURE 2**

Industrial skip full of typical waste produced from consumable vacuum bagging used in infusion and prepreg moulding.

cost-effective and more environmentally friendly technology seems far too intimidating to pursue, and the supposed risk of losing out on current profit is not worth the inevitable future savings. Just one simple example of the difference reusables make is that they can cover an operating temperature up to 250°C and self-seal perfectly whereas consumables have 9 different tacky tape sealants each commanding higher price for higher temperatures to serve the same universal sealing feature reusables offer.

Reusable vacuum membranes save users time, material waste and thus considerable cost. There is no over-complication with the

**FIGURE 3**

Small self-sealing reusable exactly to desired shape in cured silicone with built in intensification for better consolidation.

theory behind it. It is a simple idea and is simple in practice also. While previously tailoring and placing a complex consumable bag over a mould of say 3 m² needs well-learned techniques and skill and is likely to involve at least 2 hours labour; the same complex shape can be “bagged up” in less than 5 min using a reusable vacuum membrane. It may seem hard to imagine, but the advantages of using reusables are overwhelming.

The leading form of reusable technology comes in the form of self-sealing membranes moulded from silicone. The beauty of silicone’s anatomy allows one to spray safely (or brush on) its uncured liquid form onto a calibrated face mould, meaning once set, it takes the exact precise 3D shape of the mould, perfectly tailored to fit. Furthermore, by default, the reusable sprayed membrane can be made with inbuilt intensified internal radii corner sections. This provides much greater security against “bridging” of a consumable bag which leads to poor internal radii consolidation and potential voids on the face side (Fig. 3).

Silicone contamination?

It is well noted and understandable that a degree of paranoia exists about the dangers of the use of silicone in many industrial workplaces due to potential silicone contamination spreading to surfaces needing to be used with adhesives and paint finishing. If reusable vacuum membrane manufacture presented a workplace with airborne silicone oils or uncured silicone one would accept such fears. However, the manufacturing process of reusables, professionally handled, eliminates any form of cross contamination as there is no atomizing in the spray process and the silicone exposes all surfaces to a curing cross-linked rubber without any solvents or oils present. A note worth mentioning here is that some marketed two pack addition cure silicones have silicone oil added

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