

## Cleaner Production Case Study

**Cleaner production** involves reducing the consumption of raw materials (including water and energy) and reducing the volume and toxicity of waste and other emissions.

### Industry:

Composites

### Licotec Pty Ltd

Licotec is dedicated to the research, development and commercialisation of liquid composite technology.

### Company characteristics

Licotec is owned and operated by Dr Serge Agafonoff and inventor, Peter Hodgson.

### Environmental successes

This is one of a series of case studies featuring companies that participated in the Department of Environment and Conservation (NSW) \$5 million 'Profiting from Cleaner Production' – Industry Partnership Program.

NSW companies are discovering that cleaner production not only protects the environment but also reduces operating costs, streamlines processes, boosts profits and improves staff engagement and morale.

# Search for a 'better way' boosts efficiency for a whole industry

**Introducing a ground-breaking improvement to a traditional manufacturing process, Licotec has developed a world-first microfibre liquid composite. Small fibres are dissolved into resin to form a sprayable composite that dramatically improves production efficiency and slashes emissions, resource consumption and waste disposal costs.**

In traditional composites manufacturing, long glass fibres are applied to an open mould using compressed air guns, then resin is deposited onto the mould and left to set, emitting high concentrations of volatile organic compounds (VOCs) while styrene from the resin evaporates.

### What did they do?

With the support of \$39,000 from the Industry Partnership Program, this world-first composite was trialled at two of the largest pool and spa manufacturers in NSW. The trials demonstrated that the new liquid composite is capable of bringing about dramatic efficiency improvements for the whole composites industry, as well as savings on production costs and improvements to the workplace environment.

Licotec's liquid composite fibres are literally 'dissolved' into resin, so, in a similar manner to spray paint, they can be sprayed directly onto moulds using a standard fibreglass pump, eliminating the need to wet fibres with resin after they have been applied to a mould.

The technology trial at two large pool manufacturers was independently verified by The University of Newcastle Research Associates (TUNRA) and demonstrated that liquid composites:

### Slash VOC emissions

Composites manufacturing is associated with emissions of VOCs which are released while resin cures on the mould, and have significant environmental and OH&S impacts. Using conventional processes it can take several hours to manufacture one spa, with 25–45 minutes of resin setting time. The trials demonstrated that by using liquid composite fibres resin setting time was only five minutes and VOC emissions were reduced by around 30%.

### Reduce energy and raw material consumption

Conventional fibreglass manufacturing consumes large quantities of energy to power compressed air equipment used for spraying glass fibre and resin onto moulds. By spraying liquid composites already dissolved into resin, the need for compressed air is effectively halved, creating energy savings of between 40 and 60%.

Liquid composites also give the manufacturer greater control over the thickness of fibreglass applied to a mould. With raw materials comprising approximately 60% of the total cost of production, the ability to control glass thickness to fractions of a millimetre can deliver major savings in production costs.

### Reduce waste disposal costs

Liquid composite technology dramatically reduces the amount of waste generated during the manufacturing process. Overspray can be recovered and milled to create a fibreglass filler, suitable for various applications. This recycling opportunity is not viable with conventional fibres.

Left: Serge Agafonoff and Peter Hodgson discuss the product trial. Right: Manufacturing a spa using Licotec's liquid composite spray.



### Improve efficiency

By eliminating the step of placing resin separately onto a mould as reinforcement, liquid composites simplify and speed up the fabrication process. Trials have demonstrated that spas can be produced four times faster using this new technology.

These efficiency improvements and cost savings in both material and labour inputs illustrate the potential for greatly improved business outcomes. "If we can produce two pools on a single mould in a day, we have effectively doubled our plant output without spending a penny on infrastructure," said Ian Mewett of trial company Compass Pools.

### Why did they do it?

After years of working in pool manufacturing, inventor Peter Hodgson believed "there simply had to be a better way" than the conventional labour intensive, time-consuming and messy process of fibreglass application.

Following extensive research and development, this 'better way' emerged in the form of a short fibre composite which can be passed through standard pumping and spraying equipment, and applied completely by machine processes in a single phase.

Licotec recognised the potential advantages of the liquid composite material, and through this Industry Partnership Project, took the R&D process to the next level by verifying the economic and environmental benefits of the technology.

### What are the environmental gains?

The industry-based trials demonstrated that significant environmental improvements can be gained by using liquid composite material in fibreglass manufacturing:

- VOC emissions are reduced by at least 30%—approximately 20 kg per pool
- glass fibres floating in the atmosphere are eliminated
- consumption of raw materials is reduced by up to 50%
- energy consumption is reduced by 50%
- quantity of waste generated during manufacturing is reduced
- recyclability is improved—liquid composite material is more user-friendly for recycling into products such as fillers for body putties etc.

For a manufacturer such as Compass Pools, who produce over 2,000 pools per year, these annual savings would equate to:

- 13.3 tonnes raw materials
- 5,760 kW.h—equivalent to 5.8 tonnes CO<sub>2</sub>
- 18 tonnes styrene emissions
- 12.55 tonnes waste in the form of fibre overspray and rags, previously used in large quantities to manually apply resin to a mould.

### What were the costs and savings?

A typical manufacturer could save 2% of input costs (excluding labour) by introducing liquid composites. Compass Pools has identified \$42,000 in annual savings at their current output, but the major advantage of using liquid composites is it can speed up production with no additional capital input, potentially increasing productivity by 25%.

### Where to now?

Licotec continues to develop the microfibre liquid composite, advancing the surface coat to increase the material's strength and resilience, and pursuing its commercial application to both open and closed moulding processes.

### More information

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