

AUSPREG UV CASE STUDY

UV CURABLE PREPREG FOR USE IN TRAIN PARTS

A manufacturer of interior passenger train parts was seeking a faster, cleaner, easier methodology for producing large quantities of each of up to a dozen different shaped parts without needing autoclaves and expensive moulds. Products needed to be light weight, strong, flame resistant to train product standards, able to meet transport rated flexural standards and offer a cost effective alternative to hand lay composite manufacturing methods without the mess or excessive styrene odour. After assessing multiple options, the company decided to select an “out of oven”, UV curable pre-preg from Australian composites as the primary source material .



Figure 1 – Wide shot of mould to be used for one of the train interior parts.

The company built several moulds using thick acrylic and plexiglass. Larger parts were made out of steel or MDF

A UV Curable polyester resin impregnated fibreglass from Australian Composites, article #925 3275 gsm chop strand mat with modar resin was used for this project. The product was chosen as the most suitable product in the range for this application where high strength and flame resistant properties were required.

The material was supplied in rolls weighing around 30 kilos and 127cm wide. As the product did not need refrigeration, the company was able to store it in their warehouse for up to a year and use it as needed.



Figure 2 – A light meter was used to determine whether the products would be cured outside using natural light or inside using metal halide lights.

As the product cures with light, the company had the option of placing products outside to cure in sunlight or inside using banks of lights.

Sunlight provides for the fastest curing methodology however as the company runs shift work, it was decided to set up banks of lights as well.

In tests undertaken outside parts cured in less than 10 minute. With this level of light and speed of curing, the client would be able to produce more than 10 parts per person per mould each hour, vastly more than through other methodologies. With lower levels of light through artificial indoor lighting, curing was expected to take up to 30 minutes.



Figure 3. – Standard metal halide lights or mercury vapour lamps are used were set up for curing the train parts indoors.

A bank of lights was set up to provide light along the whole length and width of the product so that every part could be cured. This insured that even curved areas received light exposure.



Figure 4 – The Auspreg UV being taken out of its protective layers prior to applying it into the moulds.



Figure 5 – Auspreg UV is supplied in rolls 20-30 kilos. In this particular project, the roll lengths were 15m x 1.27m which enabled long train parts to be manufactured with ease.



Figure 6. – A technician clamps down a cover to create an airtight seal during vacuum bagging

High intensity (1000w) commercially available lighting was then set up to cure the prepreg while vacuum bagging took place. Lighting was kept on for approximately 10 minutes while the prepreg cured and hardened.



Figure 7. Lighting in the 360-420 Nm visible light range is applied via a 1000w commercially available metal halide lighting

After several minutes of exposure to light and after determining the prepreg has cured, the plastic wrap can be removed by hand. Confirmation of the product having cured can be measured by touch; the prepreg is completely dry or by Barcole testing whereby a reading of 60 or greater indicates complete cure.



Figure 8. After curing finished parts are removed and ready to use

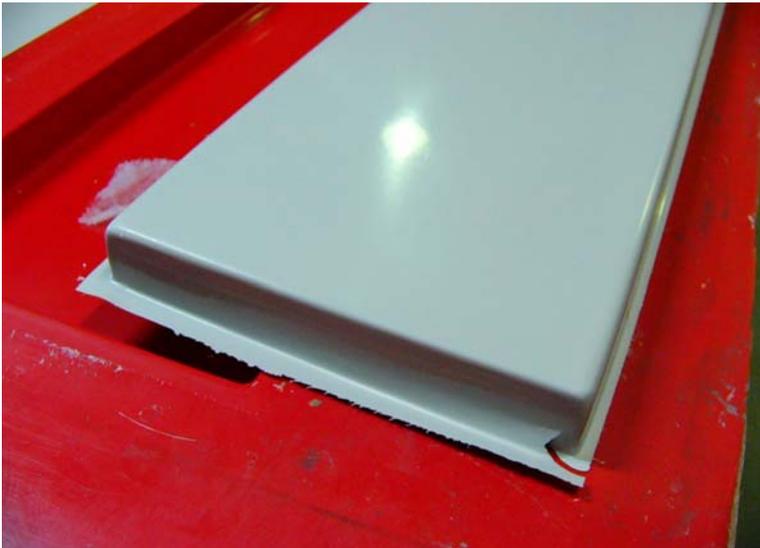


Figure 9. – Close up of the finished train interior parts made from Auspreg UV



Figure 10. Finished product ready to be installed on trains.

It is expected that the company will receive the following benefits from using Auspreg UV materials:

- Substantial reduction in energy costs due to the “out of oven” process
- Substantial energy savings in that the product can be stored on a shelf without requiring refrigeration.
- Greater productivity - more finished items can be made per hour
- Reduced materials cost - resin content is controlled
- Reduced waste
- Reduced tooling costs
- Reduced styrene emissions

For more Information about UV Curable prepregs for use as train and transport interiors, contact:

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