

## Advantages

- Low cost system ideal for all size moulds
- Epoxy and polyester compatible
- High dimensional stability
- Long-life moulds
- Highly polishable hard-wearing surface
- No special equipment or processing

## Uni-Mould™ Advantages

Traditionally, moulds made using polyester resin and gel coat are unsuitable for use as moulds for epoxy-based parts due to well-known release problems when used in this combination. Most polyester moulds also suffer from distortion (pulling), particularly on larger moulds, and cannot be used at elevated temperatures, making them unsuitable for in-mould post-curing.

Uni-Mould is different. It features unique vinylester chemistry which is 100% compatible with epoxy, vinylester, polyester and prepregs making it a genuinely universal tooling system. Its specially formulated resin systems are designed to be dimensionally stable up to the Maximum Service Temperature of 90°C and will not pull as they cure resulting in more dimensionally accurate moulds.

Moulds made using Uni-Mould are highly polishable and, in combination with a chemical release agent (such as Easy-Lease), will result in high-gloss parts straight out of the mould, time after time.

Uni-Mould is designed to be used with low-cost emulsion bound glass chopped strand mat (CSM) reinforcement which breaks down excellently in the resin, just like it would with a polyester resin, meaning that it is an ideal and cost-effective way to create medium to large moulds.

### Use with Prepregs

Although it is possible to use Uni-Mould moulds with out-of-autoclave (oven cure) prepregs (such as XPREG® XC110) we no longer recommend Uni-Mould moulds for this purpose. See 'Finished Use' section for further information.

## The Uni-Mould™ System

The Uni-Mould system is made up of 3 specially formulated resins, all capable of high operating temperatures and filled for minimal shrinkage:

Uni-Mould Tooling Gel Coat (single or double application to 0.8mm)

Uni-Mould Coupling Coat (used with 1 layer of 150g CSM)

Uni-Mould Tooling Resin (used with 4 layers of 450g CSM)

## Pattern Compatibility

As with any composite mould making process, but particularly for styrene-based systems, including Uni-Mould, before proceeding with mould lamination it is essential to confirm that your pattern is made from, or coated with, a material that will not adversely affect the release agent, and will not be attacked by the styrene solvent in the gelcoat.

### Paint Finished Patterns/Original Parts

It is common to create moulds from existing panels that have been painted but in these situations, extreme caution must be paid to ensure that the gelcoat will release from, and not attack, the paint finish.

The main causes of problems with paint-finished parts are:

1. Solvents still leaching from fresh paint/fillers affecting the release agent
2. Styrene in the gelcoat softening vulnerable paints/finishes

Most factory paint finishes will be oven-cured industrial 2k paint and will not be leaching solvents or be attacked by styrene in the gelcoat but fresh paint, 'rattle-can' paints, filler primers and polyester bodyfillers can all be problematic.

Whilst paints make a tempting option to finish original patterns, or modified/refinished components, rattle-can '1k' paints, or rattle-can 2k paints which have not been oven cured, will almost always result in a release problem or complete release failure.

If your pattern or original part has a paint finish, it is essential to conduct a small test to establish whether you will get a proper release.

A far more reliable alternative to traditional paint is to use our Pattern-Coat Hi-Gloss which is a two-part polyester resin system designed specifically for finishing patterns prior to mould making.

### New Composites Patterns

For new composite patterns, the most reliable surface would be our Pattern-Coat Primer or Pattern Coat Hi-Gloss. Both of these coatings will provide both a high quality surface finish and a trouble free release of the mould.

Uni-Mould is known to work with the following pattern/barrier materials:

Pattern-Coat™ Primer  
Pattern-Coat™ Hi-Gloss  
Oven Cured 2k Paint\*  
Polyester/Vinylester/Epoxy Gelcoats  
Sheet Wax  
Polypropylene, Polyethylene, Nylon, Acetal, PTFE and PVC Plastics\*\*  
Glass  
Metals  
Melamine Board

\*Conduct a test sample to ensure compatibility.

\*\*Will self-release, release agent is not necessarily required.

## Application Guide

This step-by-step application guide assumes that your pattern or master is made from a suitable material (see Pattern Compatibility), is fully cured, sealed and prepared with a suitable release agent.

The guide assumes a mould of 1-2sqm. For larger moulds (up to the size of full boat hulls) the Uni-Mould system is still suitable but special measures need to be undertaken when applying the mould reinforcement. Please contact us for more details.

### Uni-Mould Tooling Gel Coat Application



Uni-Mould Tooling Gel Coat should be catalysed at 3% using standard MEKP catalyst. Before application allow the catalysed gel coat to stand for a few minutes to settle and de-gas.

Gel coat should be applied in two applications. For the first application aim for a consistent thickness of 0.3–0.4mm.

Allow the first application to cure for around 2-3hrs (at 20°C room temperature) before applying the second coat of gel coat, again aiming for a thickness of 0.3 - 0.4mm.

Allow the gel coat to cure for a minimum of 4hrs (at 20°C room temperature), preferably overnight..

### Uni-Mould Coupling Coat Application



The Uni-Mould Coupling Coat is designed to eliminate print-through of the mould reinforcement, to reduce the risk of blisters underneath the gel coat by ensuring the gel is reinforced with a skin of resin and glass and to provide an ideal substrate for the main reinforcement.

Uni-Mould Coupling Coat should be catalysed with standard MEKP at 1.5 – 2%. Apply a layer of the coupling coat over the mould surface and then add a single layer of 150g CSM. We do not recommend the use of glass surface tissue in lieu of the 150gsm CSM.

Wet out the CSM thoroughly with the coupling coat resin and ensure that all air is removed from the reinforcement, that it is well wetted through and that the reinforcement is conforming to all the contours of the mould, particularly any tight corners.

### Uni-Mould Tooling Resin Application



The laminating technique for the Uni-Mould Tooling Resin is quite different from conventional polyester laminating resins and it is essential that you familiarise yourself with this technique and follow the guidelines carefully in order for the resin to cure properly and result in a successful mould.

Uni-Mould Tooling Resin is cured by its own exotherm and must reach a temperature of 50-60°C during its cure in order to achieve its full properties. In order for this to happen your workshop environment needs to be between 18°C and 25°C and you must lay down a minimum of 4 layers of 450gsm or resin-rich (4:1) CSM onto the back of the mould in a single session.

### Preparation

In order to ensure that all the reinforcement can be laid down in a single session it is important to prepare the resin and reinforcement in advance before starting to laminate.

Cut your 450gsm CSM to the right shapes for your mould, allowing for a minimum of 4 layers of mat. Once you have cut the mat, weigh it to see how much CSM you will be using.

Next, weigh out 4 times the weight of the glass in resin (Uni-Mould Tooling Resin should be used at a typical 4:1 ratio or resin to glass) which means if you are using 5kgs of CSM to reinforce your mould you should prepare 20kgs of resin.

### Begin Laminating

When you are ready, catalyse the resin using MEKP catalyst at 0.75 – 1.25% (depending on the ambient temperature) and mix thoroughly.

Working quickly, apply resin all over the mould and then add layers of glass one at a time, wetting with plenty of resin (4:1 by weight) until you have added all the layers of glass to the back of the mould. You should use the last of the prepared resin as you add the last layer of CSM.

As the laminate starts to cure the temperature will rise to 50-60°C and the colour of the laminate will change from a mid brown to a light brown colour.

Allow the resin to cure fully for 24hrs.

### Post Curing

For ambient temperature use, a post cure of the mould is recommended, but not required. If you intend to use the mould for higher temperature curing or in-mould post curing of your parts then an elevated temperature post cure is required.

Recommended post-cure for elevated temperature mould use:

10hrs at 60°C > 2hrs at 70°C > 2hrs at 80°C > 2hrs at 90°C

## Polishing



Moulds made using Uni-Mould are highly polishable to a full gloss and can easily be restored if they are subject to light scratches using a composites polishing compound (such as Pai Cristal NW1 or TOPFINISH 2).

After polishing, ensure a thorough re-application of release agent before use.

## Finished Use

Composite moulds made from the Uni-Mould system can be used for wet-lay, vacuum bagging and resin infusion. Moulds made from Uni-Mould are 100% compatible with epoxy resin, polyester resin and vinylester resin.

## Use with Prepregs

Although it is possible to use Uni-Mould moulds with out-of-autoclave (oven cure) prepregs (such as XPREG® XC110) we no longer recommend Uni-Mould moulds for this purpose.

Instead – for prepreg use – better results will be achieved using high temperature epoxy moulds made using our EG160 / EMP160 tooling system or XPREG® XT135 Tooling Prepreg. These high temperature epoxy tooling systems allow the prepreg to be cured at the optimum 120°C which reduces the cure time and improves the mechanical properties of the component. Additionally, epoxy tools have been found to result in a better surface finish with prepregs such as XPREG® XC110.

## Release Agent

Because Uni-Mould's tooling gel coat is fully compatible with epoxy, polyester and vinylester, a wide range of release agents (waxes and chemical release agents) should all result in a good release.

Uni-Mould is tested and recommended for use with Easy-Lease Chemical Release Agent which is universally suitable for all resin systems and processes.

## Disclaimer

This data is not to be used for specifications. Values listed are for typical properties and should not be considered minimum or maximum.

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