

Key Features

- Up to 90°C service temperature
- Hard wearing
- Highly polishable
- Very low shrinkage
- Compatible with epoxy, polyester and vinylester processes

Product Description

UG1 Uni-Mould Tooling Gelcoat is a hard-wearing yet highly polishable vinylester gelcoat for composite moulds and tools. Its high service temperature and compatibility with epoxy resin make it the perfect mould surface for the production of epoxy components, including resin infusion and even some low cure-temperature preregs.

UG1 Uni-Mould Tooling Gelcoat is part of the Uni-Mould™ universal mould making system and should be used in conjunction with Uni-Mould Coupling Coat and Uni-Mould Tooling Resin to produce hard-wearing, polishable moulds of any size with zero shrinkage suitable for use in just about any composites process. This high performance tooling gelcoat can also be used as a gelcoat for conventional fibreglass mould production.

UG1 Uni-Mould Tooling Gelcoat is a filled, vinylester tooling Gelcoat compatible with epoxy, polyester and vinylester resin systems meaning that parts made using any of these resin systems will reliably release from moulds made with a UG1 Uni-Mould Tooling Gelcoat surface.

Moulds made using Uni-Mould are fully compatible with all widely used resin systems (including epoxy, polyester and vinylester).

Recommended Uses

UG1 is ideally suited for the following uses:

- As a tooling gelcoat as part of the Uni-Mould Complete Mould Making System.
- As a tooling gelcoat for conventional fibreglass mould production

Properties

The table below shows the typical uncured properties:

Property	Units	Resin
Material	-	Filled Vinylester GelCoat
Appearance	-	Black Liquid
Viscosity @20 °C	mPa.s	7000
Density @20 °C	g/cm³	1.10
Non Volatile Content	%	60

Pattern Compatibility

As with any composite mould making process, but particularly for styrene-based systems such as Uni-Mould, before proceeding to apply the tooling gelcoat 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 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.

Uni-Mould Tooling Gel Coat should be catalysed at 2-3% 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..

Mix Ratio

Mix Ratio 2-3% MEKP Catalyst by Weight

UG1 Uni-Mould Tooling Gelcoat should be mixed with standard grade MEKP Catalyst at a ratio of 2-3% MEKP Catalyst by weight.

You must maintain the correct overall ratio of resin to catalyst to ensure a proper cure. Failure to do so will result in a poor or only partial cure of the gelcoat, greatly reduced mechanical properties and possibly other adverse effects.

Mixing Instructions

Only weigh out and mix as much Gelcoat as you can use within the pot life.

Weigh or measure the exact correct ratio of gelcoat and MEKP Catalyst into a straight sided container. Using a suitable mixing stick begin to mix the resin and catalyst together to combine them completely.

Mix thoroughly to ensure that the catalyst is well distributed throughout the gelcoat. Care should be taken to avoid aerating the gelcoat whilst mixing. Use a steady mixing action, moving material from the bottom and edges of the container into the middle.

Once you have finished mixing in one container, it is good practice to transfer the mixed gelcoat into a second container and undertake further mixing of the resin using a new mixing stick. Doing so will eliminate the risk of accidentally using unmixed gelcoat from the bottom or sides of the container.

Pot-Life / Working Time / Cure Time

As with all resin systems, the pot-life/working time will vary significantly depending on the ambient temperature, the starting temperature of the gelcoat and catalyst and the amount mixed.

The following table shows typical pot life and cure times:

	Pot Life @ 20 °C	Initial Cure Time @ 20 °C	Full Cure @ 20 °C
Time	15 minutes	4 hours	7 Days

Our UG1 Uni-Mould Tooling Gelcoat can be used in ambient temperatures between 15°C and 30°C. For best results, an ambient temperature of 20°C to 25°C is recommended. Ensure that both gelcoat and catalyst containers are within this temperature range before use.

Full Cure / Post-Cure

As with most resin systems, where Moulds cure in normal ambient temperatures, full cure is not reached for several days. Although parts will be handleable after the listed demould time (at 20°C), full mechanical properties will take at least 7 days to develop in (at 20°C). Where possible, avoid exposing the cured mould to full service rigours for at least this time.

To ensure that the Uni-Mould based mould achieves its maximum operating temperature, a ramped elevated temperature post-cure is recommended. Allow the mould to cure fully at room temperature for a minimum of 24 hours before post curing. The post cure cycle is as follows:

- 60°C for 10 hours
- 70°C for 2 hours
- 80°C for 2 hours
- 90°C for 2 hours

Ideally the mould should be supported during the post cure process to minimise the chances of distortion or sagging. Once the post-cure is complete, allow the mould to return to room temperature naturally before use - preferably by letting it cool down in the oven. If the temperature drops suddenly, distortion or warping can occur. Once the mould is fully cooled, it can then be put into service at temperatures up to 90°C.

Mechanical Properties

Cured Gelcoat Properties

These properties describe the gelcoat after a 24 hour cure at room temperature followed by the recommended post-cure.

	Units	Result
Max Service Temperature	°C	90
Hardness	Shore D	70
Elongation at break	%	2.10
Tensile strength	MPa	38.58
Flexural strength	MPa	155.2
Flexural Modulus	GPa	3.44

Transport and Storage

Gelcoat should be kept in tightly seal containers during transport and storage. The Gelcoat should be stored in ambient conditions of between 15°C (50°F) and 25°C (77°F).

When stored correctly, the gelcoat will have a shelf-life of 3 months. Although it may be possible to use the gelcoat after a longer period, a deterioration in the performance will occur.

Pay particular attention to ensuring that containers are kept tightly sealed. Gelcoats will deteriorate quickly when exposed to air.

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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