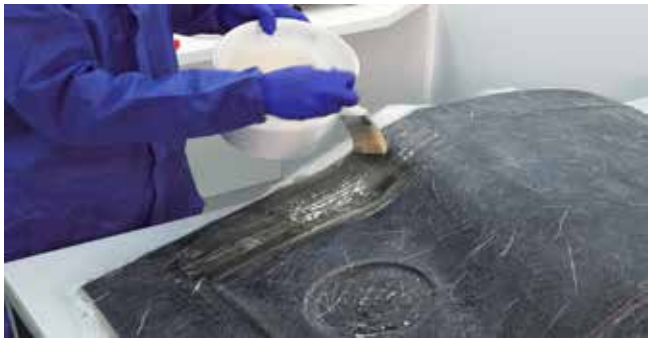
Technical Datasheet

UT1
Uni-Mould Tooling Resin



Key Features

- Up to 90°C service temperature
- Filled Polyester Resin
- Used as a rapid tooling system
- Very Low shrinkage

Description

UT1 Uni-Mould Tooling Resin is a low shrinkage filled polyester laminating for composite moulds and tools. Its special filled composition is designed for use a rapid tooling system where all the mould reinforcement is laminated at the same time, making mould production significantly quicker compared to a conventional laminating resin.

UT1 Uni-Mould Tooling Resin is part of the Uni-Mould™ universal mould making system and should be used in conjunction with UG1 Uni-Mould Tooling Gel Coat and UC1 Uni-Mould Coupling Coat to produce hard-wearing, polishable moulds of any size with zero shrinkage suitable for use in just about any composites process.

Recommended Use

UT1 is ideally suited for the following use:

- As a tooling resin as part of the Uni-Mould Complete Mould Making System.

Specification

The table below shows the typical uncured properties:

Property	Unit	Value
Material	-	Filled Polyester Resin
Appearance	-	Beige Liquid
Viscosity @ 20 °C	mPa.s.	1600
Density @ 20 °C	g/cm³	1.44
Non Volatile Content	%	75

Mix Ratio

Mix Ratio 0.75-1.25% MEKP Catalyst by Weight

UT1 Uni-Mould Tooling Resin should be mixed with standard grade MEKP Catalyst at a ratio of 0.75 - 1.25% MEKP Catalyst by weight (depending on the ambient temperature).

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 resin, greatly reduced mechanical properties and possibly other adverse effects.

Mixing Instructions

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

Weigh or measure the exact correct ratio of resin 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 resin. Care should be taken to avoid aerating the resin 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 resin 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 resin from the bottom or sides of the container.

How to Use

The laminating technique for the UT1 Uni-Mould Tooling Resin is quite different from conventional polyester tooling resin or 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.

UT1 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.

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 (UT1 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.

When you are ready, catalyse the resin using MEKP catalyst (not included) 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.

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 @ 20°C	Full Cure @ 20°C
Time	35 minutes	24 hours	7 days

Our UT1 Uni-Mould Tooling Resin 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.

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 (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.

Mechanical Properties

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

Property	Unit	Value
Max Service Temperature	°C	90
Hardness	Shore D	70
Elongation at Break	%	7.08
Tensile Strength	MPa	100.0
Flexural Strength	MPa	141.3

Transport and Storage

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

When stored correctly, the resin will have a shelf-life of 4 months. Although it may be possible to use the resin after a longer period, a deterioration in the performance will occur.

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

Disclaimer

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