

### Key Features

- Aluminium filled
- Excellent Mechanical Properties
- Excellent Thermal Stability
- Medium Viscosity Resin
- Ideal for Vacform and other Tools

### Product Description

Tool Cast is an aluminium filled epoxy casting resin designed for high temperature tooling applications such as resin casting tools, vacuum forming tools etc. Tool Cast cures quickly with minimal shrinkage and can be cast in quite large volumes.

The system is highly polishable and very hard-wearing making it ideally suited to vacuum forming and other repetitive pressing/moulding applications. The low mixed viscosity of this two-part epoxy system ensures very accurate reproduction of even the finest surface detail.

### Recommended Uses

Tool Cast is ideally suited for the following uses:

- Vacuum forming male tools
- Platen press tool
- Any cast mould tool.

### Properties

The table below shows the typical uncured properties:

Property	Units	Resin	Hardener	Combined
Material	-	Metal Filled Epoxy Resin	Formulated Amine	Epoxy
Appearance	-	Grey Liquid	Amber Liquid	Grey Liquid
Viscosity @20 °C	mPa.s.	35000 – 45000	60 - 100	10000 – 15000
Density @20 °C	g/cm <sup>3</sup>	1.70 – 1.80	0.93 – 0.98	1.62 – 1.72

### How to Use

Before mixing, ensure that both the Tool Cast epoxy resin and its hardener are both at room temperature (between 15° and 25°C). Thoroughly mix the Tool Cast epoxy resin to distribute the aluminium filler throughout the resin.

Pattern or mould surfaces should be clean and dry and treated with an appropriate mould release agent. Porous surfaces such as foam or wood (including MDF) should be thoroughly sealed using either a coat of epoxy or a suitable filler/primer paint (such as two pack polyurethane) and finished to the required standard.

Any deep sections in the moulding should be 'blocked out' using a tapered wooden block to reduce the quantity of resin that will be required and reduce any shrinkage. We recommend blocking out any areas where the casting resin would be deeper than 75mm. Always ensure that any such wooden core/block is at least 35mm from the mould surface. Wooden blocks/cores should be removed after the resin has cured, before the mould is used.

### Mix Ratio

#### Mix Ratio 100:6 by Weight

Tool Cast Epoxy Casting Resin should be mixed with its Hardener at a ratio of 100 parts of resin to 6 parts of hardener, by weight.

You must maintain the correct overall ratio of resin to hardener 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. Under no circumstances add 'extra hardener' in an attempt to speed up the cure time; epoxies do not work in this way.

### 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 hardener into a straight sided container. Using a suitable mixing stick begin to mix the resin and hardener together to combine them completely.

Mix thoroughly to ensure that the hardener is well distributed throughout the resin and again ensure that any aluminium filler is evenly distributed throughout the resin before pouring.

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 containing 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.

To remove any trapped air, pour the resin into the mould in a thin stream into a single part of the mould, allowing it to flow to the rest of the mould from there.

On areas of fine surface detail we suggest painting an amount of the mixed resin directly onto the detailed areas ensuring that the resin is in intimate contact with the mould with no trapped air before pouring the bulk of the resin around it.

## Pot-Life / Working Time / Cure Time

Transfer the resin from the mixing pot onto the part as soon as possible to extend the working time and avoid the risk of uncontrollable rapid cure in the mixing pot.

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

	Pot Life @ 20 °C	Gelation @ 20 °C	Demould Time @ 20 °C
Time	150 mins	6 hrs	12-24hrs

Our Tool Cast Epoxy Casting Resin can be used in ambient temperatures between 15°C (59°F) and 30°C (86°F). For best results, an ambient temperature of at least 20°C (68°F) is recommended. Ensure that both resin and hardener containers are within this temperature range before use.

Curing times will depend on the size and shape of the casting and also the ambient working temperature and so will vary between 12 and 24hrs to reach a full cure.

## Full Cure / Post-Cure

As with most epoxy systems, where parts cure in normal ambient temperatures, full cure is not reached for several days. Although parts will be handleable after the listed demould time (at 25°C), full mechanical properties will take at least 14 days to develop in (at 25°C). Where possible, avoid exposing the cured resin to full service rigours for at least this time.

To ensure that the cast material achieves its maximum operating temperature a ramped elevated temperature post-cure is recommended. Allow the casting to cure fully at room temperature before post curing as follows:

- 40°C for 1 hour
- 60°C for 1 hour
- 80°C for 1 hour
- 100°C for 1 hour

## Mechanical Properties

### Cured Resin Properties

*These properties describe the resin only. The mechanical properties of a reinforced composite would be considerably different.*

	Units	Result
Hardness 25°C	Shore D	90 - 95
Linear Shrinkage	%	0.07%
Tensile strength	MPa	12 - 17
Elongation at break	%	2.5 - 3.5
Flexural strength	MPa	44.0 - 49.0
Flexural Modulus	MPa	6300 - 6700
Heat Distortion Temperature	°C	80

## Transport and Storage

Resin and hardener should be kept in tightly seal containers during transport and storage. Both the resin and hardener should be stored in ambient conditions of between 10°C (50°F) and 25°C (77°F).

When stored correctly, the resin and hardener will have a shelf-life of 12 months. Although it may be possible to use the resin after a longer period, a deterioration in the performance of the resin will occur, especially in relation to clarity and cure profile.

Pay particular attention to ensuring that containers are kept tightly sealed. Epoxy hardeners especially 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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