PC15 Water Clear Polyurethane Casting Resin

Key Features

- Optically Clear
- UV Stable
- Polishable to a High Gloss
- Low Viscosity Resin
- Easily Pigmented
- Fast Curing
- Mercury Free

Safety Information

- **THIS PRODUCT IS UNSUITABLE FOR USE BY CHILDREN**
- Polyurethane resin is toxic and should not be ingested and skin contact should be avoided.
- Always wear protective gloves and eye protection when handling the liquid resin and catalyst.
- Read this document in conjunction with the SDS

Product Description

This advanced resin formula is UV stable, resistant to shrinkage and easy to use. Premium quality clear polyurethane casting resin suitable for clear casting, object embedding, jewellery making and set design. Its low viscosity makes it suitable for reproducing incredible fine surface detail when casting sculptures and also ensures excellent wet-out when encapsulating/embedding objects in clear resin to make objects such as paperweights.

Recommended Uses

The resin is ideal for embedding, rapid prototyping or any type of casting where an ultra clear or coloured translucent part is required. The resin can be used with or without vacuum degassing.

Properties

The table below shows the typical uncured properties:

Property	Units	Part A	Part B	Combined
Material	-	Formulated Polyol	Isocyanate	Polyurethane
Appearance	-	Clear Liquid	Clear Liquid	Clear Liquid
Viscosity @25 °C	mPa.s.	300-500	100-150	100-350
Density @25 °C	g/cm^3	1.25 – 1.30	1.08 – 1.13	1.16 – 1.21
Minimum Casting Thickness	mm	-	-	2
Maximum Casting Thickness	mm	-	-	15

How to Use

Mixing Ratio

100p.b.w Resin Part A

120p.b.w Resin Part B

Mixing ratios above are listed as parts by weight, you must accurately measure out by weight to ensure the resin cures properly.

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

Open both A and B containers and examine for any signs of crystallization. If any crystals are observed place in an oven at 45–60°C for several minutes.

Ensure that both components are between 20 – 25°C before mixing. If using pigments, add the pigment to the part A. We suggest using 1 – 3% pigment. Do not use water based pigments.

Easy Composites' Water Clear Polyurethane Casting Resin can be used without the assistance of vacuum degassing but under such conditions it is very difficult to get a perfectly clear, bubble-free casting. Degas in a purpose-built de-gassing chamber for best results.

Mix the two components in the correct ratio, mixing carefully to avoid air inclusion and making sure that the material at the sides and at the bottom of the mix vessel is well stirred in to the middle. The material will be cloudy in appearance for a few minutes, continue mixing until the liquid becomes clear.

Degas for approximately 2 minutes before pouring. Pour the material into the mould, onto the sides and in one place to reduce air bubbles. Degas again if necessary, avoid boiling the material at very high vacuum.

Mould Preparation

Before use ensure that the master model from which the mould is made has the exact finish that is required in the cast or finished units, i.e. for optimum clarity polish the master model to a very high gloss shine. Ensure that the mould is clean and dry. If the mould is made from metal or resin, use a compatible release agent.

For flexible moulds we recommend Easy Composites' Addition Cure Silicone Rubber. Condensation cured silicone rubber should not be used with this casting resin.

When embedding an object ensure the object is thoroughly dry. Very thin Perspex rods are useful for holding the units in place this will eliminate the need for casting in layers and so avoid join lines.

When casting rectangular shapes, preheat the mould to 45 – 50°C in order to prevent hrinkage at the corners of the block. If the casting has thin sections, it is advisable to preheat the mould to 45 – 50°C.

Using Pigments

If using pigments, add the pigment to the resin before mixing the two parts. We suggest using 1 – 3% pigment. Only use pigments designed for pigmenting polyurethane resins.

You can create interesting and artistic results by pouring your casting in multiple layers, allowing the previous layer to cure and then adding different colours or pigment ratios to subsequent layers.

Other interesting resins can be created by pigmenting two or more batches of resin and then carefully pouring them at the same time to create marbled colour effects.

Our PC15 Waterclear Polyurethane Casting Resin can easily be tinted with our range of Translucent Tinting Pigments to create stunning colour effects from subtle tints to vivid, vibrant colours. Simply add a drop or less of these special pigments to your waterclear castings for amazing colour effects. Colour tinting in this way can bring vivid life to lighting prototypes, jewellery and artwork.

Pot-Life / Working Time / Cure Time

The Table below shows typical pot-life and cure times:

Pot-Life @ 25°C	Demould Time @ 25°C	Full Cure (Machinable)
6-8 Minutes	60 Minutes	48 Hours

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 Resins, the pot-life/working time will vary significantly depending on the ambient temperature, the starting temperature of the resin, the amount of resin mixed and the catalyst ratio used.

Full Cure / Post Cure

The cure rate of the resin is affected by temperature, the product must be cast at temperatures greater than 20°C. To optimise the cure, especially if the casting has thin sections, it is advisable either to use preheated moulds or to post cure the castings after gelation. To achieve optimum properties, a post cure is recommended. A typical post cure schedule would be to heat the material for 3 hours at 80°C.

To achieve maximum thermal performance an extended post cure of 16 hours at 100°C is advised. To prevent any distortion during the post cure cycle, the unit should be placed on a conformer. When postcuring is complete, let the unit cool down slowly to room temperature, preferably in the oven. Sudden change in temperature can cause distortion or warping.

Polishing Tips

Allow the casting to cure for at least 48 hours before machining or polishing.

To avoid distortion ensure that the material does not reach temperatures above 60°C. For general polishing of a moulded part use a fine liquid polishing compound such as Pai Crystal NW1 White. If a deep scratch needs to be removed then wet and dry paper should be used in the following descending grit sizes 400, 800, 1000 and 1200. A single stage polishing compound such as our Pai Crystal NW1 White can then be used to polish the part back to a high gloss.

Mechanical Properties

Cured Resin Properties

	Standard	Units	Result
Hardness	BS EN ISO 868	Shore D	75 – 80
Linear Shrinkage	500 x 50 x 5 mm	%	<0.2 %
Tensile strength	BS EN ISO 527	MPa	60 - 64
Tensile Modulus	BS EN ISO 527	MPA	1500 - 1800
Elongation at break	BS EN ISO 527	%	4.5 - 5.5
Flexural strength	BS EN ISO 178	MPa	95 - 100
Flexural Modulus	BS EN ISO 178	MPa	2150 - 2450
HDT 7 Day room	DMA	°C	46 - 50
HDT 3 hrs @ 80°C	DMA	°C	58 - 62
HDT 16 hrs @ 100°C	DMA	°C	86 - 90

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).

KEEP THE PACKING TIGHTLY SEALED WHEN NOT IN USE.

If stored under the above conditions the resin and hardener will have a shelf life of 3 months, from the date of production.

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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