

Silicone Mould Resin Casting Starter Kit

This Easy Composites Silicone Mould Resin Casting Starter Kit has been put together by experienced composites professionals to allow anyone to quickly and easily benefit from the many useful applications of RTV silicone mould making and polyurethane casting.

The following pages should give you the essential, practical advice you need to take an original part, made from almost any material, create a flexible, reusable silicone mould from it and then use this mould to create identical copies of the original part using a fast curing, pourable, two part polyurethane casting resin.

Kit Contents

- 952g CS2 Condensation Cure RTV Silicone Rubber
- 48g CS2 Condensation Cure Silicone Catalyst
- 1kg Fast-Cast Polyurethane Casting Resin Part A
- 1kg Fast-Cast Polyurethane Casting Resin Part B
- 4 Plastic 'Set-up' Boxes
- 4 Pairs Nitrile Gloves, 4 Mixing Cups and Mixing Sticks
- 2 1" Laminating Brushes
- This Beginners' Guide

Uses for This Kit

This simple kit can be used for many applications including to produce design concepts, replicate small engineering parts, copy figurines or reproduce original sculptures. In fact, anything that you would like to be able to make or copy in plastic is a potential use for this kit.

Description of Kit Materials

CS2 Condensation Cure Silicone Rubber

Easy Composites' Condensation Cure Silicone Rubber is a low viscosity, two-part condensation cure silicone rubber. It is used for mould making where it is mixed (with its catalyst) and then poured around a pattern to create a flexible silicone mould.

CS2 Condensation Cure Silicone Rubber has been specially selected for its ease of use, excellent performance and great value.

Once cured the silicone rubber is very soft and flexible making it perfect for casting complicated or intricate shapes where the cast part can be easily removed from the silicone mould. The long pot-life of our silicone allows plenty of time for careful pouring and self de-gassing although forced degassing in a vacuum chamber can also be performed if required.

The cured mould can then be used to produce precise replicas of the original part, including fine surface detail, out of a range of materials including polyester, epoxy and polyurethane resin, urethane foam, wax, casting plaster, Jesmonite, and reconstituted stone.

Fast-Cast Polyurethane Casting Resin

Fast Cast Polyurethane Casting Resin is a high quality, low viscosity odourless general purpose casting resin for use in model/sculpture casting, pattern making and prototyping/product development.

As the name suggests the resin is very fast curing making it ideal for production runs whilst its low price ensures that even larger castings can be produced cost effectively.

Fast Cast is also one of the lowest viscosity casting resins on the market enabling it to flow freely into the most complex moulds where it will faithfully recreate even the finest surface detail. The ultra-low viscosity also opens up the possibility of casting without the need for degassing the mixed resin before pouring.

Step By Step Practical Guide

1. Choose a suitable original 'master' part.

CS2 Condensation Cure Silicone Rubber is compatible with just about any material and will reliably not stick to metals, woods, plastics and ceramics. The only consideration when choosing a suitable part to copy (a 'master') is to ensure that its surface is relatively non-porous. Particularly porous surfaces may allow the liquid silicone to 'soak' into the original part which will make the silicone difficult to separate from the original part and leave the mould with an overly rough texture.

Suitable 'masters' for your first project would be any existing small mechanical parts, figurines, sculptures, original parts you have carved or constructed; in fact, just about anything with a reasonably smooth surface.

2. Position the part in a 'set-up' box

Included in the kit are a number of small plastic 'set-up' boxes. These boxes are intended to hold the silicone rubber around your part whilst the silicone cures. You should aim to use a setup box that is only slightly larger than the part you wish to take a mould from, so as not to waste additional silicone. If the part you want to mould from is significantly smaller (or larger) than the included setup boxes then it is suggested that you use an alternative container (such as a correctly sized Tupperware container) or even that you construct a correctly sized 'box' using five rectangles of material such as plastic sheet, MDF or plywood. You should aim to have a setup box that allows approximately a 1cm gap between the part and the walls of the container in all directions (each side and beneath). For small figures or parts the mixing cups included in the kit also make suitable set-up boxes.

Once you have a suitable set-up box, the part you want to copy can be suspended upside down from the top of the box or can be glued upright to the bottom of the box.

To suspend a part from the top of the container (which is probably the most common way to do it) the easiest method is usually to glue or double-sided tape the piece to a stick (like the mixing sticks included in the kit) and then bridge the stick across the top of the box, thus hanging the master down into the set-up box.

Silicone rubber will not stick to any conventional material that has a reasonably hard, smooth surface therefore no release agent or further preparation is required.

2. Mix a quantity of silicone rubber

CS2 Condensation Cure Silicone Rubber needs to be mixed thoroughly with its catalyst to cure. The catalyst can be added at a ratio of between 100:2 to 100:5. Adding 100:2 (2%) catalyst will result in a slower cure time (around 14hrs) but will ensure a longer 'pot-life' (the amount of time the silicone remains liquid and useable after the catalyst has been added) or around 35 minutes. Adding catalyst at a ratio of 5% (100:5) will result in a cure time of around 6hrs but will mean a much shorter pot-life of around 15 minutes. Exact pot life and cure times will vary considerably depending on the working temperature.

The mix ratios provided are 'parts by weight' and not parts by volume. For accurate mixing it is essential to use accurate digital scales and aim to be accurate to within around 1g.

Mix the silicone with its catalyst in one of the paper cups provided. Take lots of care when mixing to ensure that the catalyst is completely mixed with the silicone and so ensure that no unmixed silicone is clinging to the sides of the mixing cup. Remember that the two liquids are of very different densities which means that the catalyst has a habit of floating on top of the silicone during mixing and not dispersing properly throughout the silicone. Spend several minutes mixing the two together whilst at the same time trying not to aerate the silicone.

3. Pour the silicone rubber into the set-up box

To ensure a good surface finish on the parts that are made using the mould it is important to ensure that the silicone rubber does not contain any air bubbles.

In a professional environment this would be achieved through the use of a vacuum de-gassing chamber and so without this equipment we need to firstly be careful not to mix air into the silicone in the first place and then secondly using a process called 'stretch pouring' to remove any trapped air.

Position the set-up box either on the floor or on a low table and then very gently and carefully pour the mixed silicone into the lowest point of the set-up box. As the silicone pours it will stretch out to a very thin 'stretched-out' trickle of silicone and in doing so any trapped air will be forced to the surface and out of the silicone. Done carefully this process can be highly effective at the removal of air from silicone and yield excellent results.

Keep pouring until the silicone reaches the top of the master part. If you have bonded the master part to the bottom of the set-up box then keep pouring the silicone until you have covered the original part completely, allowing around 10mm additional silicone above the top of the part.

4. Allow the silicone to cure

The CS2 Condensation Cure RTV silicone included in the kit will take about between around 6hrs and 24hrs to cure (depending on room temperature and the amount of catalyst used) at room temperature and average humidity.

5. Remove the original part from the silicone mould

Once the silicone has *fully* cured the resulting flexible rubber block (containing the original part) can now be removed from the set-up box. The silicone should feel dry and reasonably firm (although of course, it is a flexible rubber). Do not attempt to 'demould' until you are confident that the rubber has fully cured.

Depending on the shape and complexity of the part it may be possible to simply stretch the mould slightly and pull the original part from the mould. Other shapes will require that the mould is cut open to remove the part.

If necessary, using a sharp scalpel blade the rubber mould can be carefully cut through into two halves (which will fit back together perfectly) and the original part removed. The mould should be flexible enough to allow extraction of the part.

When cutting a mould into two halves (a split mould) it is recommended to try to 'zig zag' the cut line to create a natural 'registration' for the two halves of the mould when they are put back together, ensuring that they align correctly.

If the mould has been cut into 2 halves you should always use the mould in conjunction with the original set-up box to ensure that the two halves are held together correctly and cannot distort.

6. Mix the casting resin

Fast-Cast is a very fast curing casting resin and so you should ensure that you have everything ready before you mix the resin.

Mix enough Fast-Cast Polyurethane Casting Resin to fill the new mould. The Fast-Cast resin included in the kit uses a convenient 1 to 1 mix ratio.

When mixing, it is again important to avoid unnecessary air inclusion, ensure that mixing is done thoroughly and to weigh the ratio of the two parts accurately.

Use a mixing cup (provided) and mixing stick and quickly but thoroughly mix part A and B together.

7. Pour the mixed resin into the silicone mould

Carefully pour the mixed resin into the lowest part of the silicone mould. Continue pouring into the same place and allow the resin to fill up the mould. If the mould has undercuts or awkward shapes then you can jostle the mould slightly to ensure that this resin reaches these corners.

Fill the mould all the way up to the very top (and even 1mm over in some instances) and then set the mould on one side to cure).

8. Allow to cure and then de-mould

The Fast Cast resin will cure and be ready to de-mould within an hour. Once the resin feels fully hardened the new casting can be removed from the mould (separating two halves of the mould if necessary).

The mould can now be used to create many castings in a single day!

The Silicone Mould Resin Casting Kit and these instructions were created by Easy Composites Ltd

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About Easy Composites Ltd

Easy Composites Ltd specialises in the supply of advanced composites materials to individuals, educational establishments and companies. Our manufacturing division, Carbon Mods produces carbon fibre products for motorsport, marine, aerospace and recreational use. Easy Composites Ltd operates from large modern premises in Staffordshire, England.