

# Silicone Mould Making Course

Remember that many moulds are simpler. Always examine the object carefully – there are often ways in which to make a less complex mould at a lesser cost.

## Planning the mould

Remember the difference between the UNDERCUT (negative curve) and the DRAFT (positive curve).

It is the undercut, which presents problems for the mould maker and necessitates a split in the mould and/or the use of a flexible moulding material, many objects, even when a flexible mould making material is used still requires a split in the mould. Objects which stand on flat surfaces of their own can sometimes be moulded in a single piece flexible mould even if it means that the inflexible support has to be split.

### Ask yourself :

#### 1. Does the object have undercuts?

**YES:** A flexible mould (Silicone) or an inflexible mould (F/glass with splits) has to be made.

**NO:** An inflexible mould can be made – remember that in order to avoid having to make splits the object must have sufficient draft to enable release – usually a taper of at least four degrees.

#### 2. Does the object have fine detail?

If YES, then the use of silicone would usually be required.

#### 3. If the answers to 1. and 2. are YES.

Then decide whether the silicone mould, if made in one piece, will release from the object without undue strain on the mould or the object.

#### 4. If the answer to 3. is YES.

Then decide whether the mould support should be split. Remember that often one can save on Silicone consumption if the mould is made thin and the support is split rather than to fill up the undercuts completely with silicone.

#### 5. If the answer to 1. is NO

Decide whether it will be necessary to split the inflexible mould- in 99% of objects it will have to be split even when the object is perfectly round because the object will probably adhere to the mould purely as a result of atmospheric pressure. An object like a sphere or a tube will usually require three pieces unless you are able to determine the exact halfway line and make the mould with a great degree of exactitude. But a flexible material solves all these problems.

## Making a one-piece mould with a split support.

1. Stand or lie the object on a flat surface. The flat surface which enables the object to stand will usually form the opening through which you will pour the casting material (SPRUE).
2. If the silicone may leach under the object then fill in the area with a bit of clay.
3. Apply white Cobra polish or ram wax to your working surface in the area where the flange will be.
4. If the object is porous or painted and you are worried that demoulding will be difficult or will destroy the paintwork on the object, polish the object making sure that all excess polish has been removed.
5. Apply a thin first layer of catalized silicone.
6. Use your stiff-bristle brush to ensure that the silicone has interest everywhere and that all air between the object surface and silicone has been removed.

7. When the first layer of silicone has almost cured but remains slightly tacky apply a second layer.
8. If you are satisfied that the fine detail has been sufficiently covered and that the silicone is thick enough to withstand brushwork with a thicker mix proceed to mix another batch of silicone with THIXOTROPIC.
9. Apply more layers until you are satisfied that the mould is thick enough to withstand the rigours of demoulding – remember that silicone is tough and need'nt be too thick. Remember that it is often handy to let the silicone form a flange around the object.
10. Smooth out the final layer with a bit of dishwashing liquid mixed with a small amount of water – this is only for the last layer because soap is a separator.
11. If the silicone shape requires a two-piece support, plan the split keeping in mind that both support halves must be able to release. Use a cola pen draw the split line.
12. Using clay build a dividing wall with one side of the clay on the line that you have drawn.
13. Smooth out the clay keeping it as close to 90 degrees to the silicone surface as possible. The clay wall has to be high enough to accommodate location grooves and holes for bolts.
14. Cut fairly large location holes into the clay ensuring that there are no undercuts in these.
15. Coat the clay with a few layers of sanding sealer – water and resin are not compatible.
16. Once the sanding sealer has cured apply the first layer of gelcoat first and then proceed with surface tissue or fiberglass.
17. Build up the fiberglass until it is strong enough – two layers for small objects are usually sufficient.
18. Make sure that the fiberglass extends all the way up the clay flange. Before the fiberglass has become rock-hard trim of any excess or else you will have grind or file it off afterwards.
19. Once the first side of the support is fully cured remove all the clay making sure that no water is present on the newly exposed surface.
20. Polish the flange of the first side of the mould support leaving no excess wax. Repeat the polishing and buffing 3 times and then apply separating agent (a pink water-based fluid) to the polished area.
21. Once the separating agent is thoroughly dry (a hair dryer can speed it up) repeat the process for the other half of the mould support.
22. Before removing the mould support halves drill a few 7mm holes through both halves at the flange to accommodate a 6mm gutterbolt.
23. Remove all the mould components from the object and you are ready to cast!
24. It is always advisable to leave the mould for a day or two before demoulding, giving the silicone time to cure properly thus extending the lifespan of the mould.

## Making a Two Piece Mould with a Two-Piece Support

Please make sure that you know and remember what is contained above because the same basics apply for more intricate moulds.

### 1. Plan your mould properly:

- a. Where can you place the split for the two silicon halves?
- b. Can the split be placed for minimum interference with detail?
- c. Can the split be placed to save on silicone consumption?
- d. If there is no obvious opening for a sprue, where must it be placed?
- e. How will the position of the split affect the making of the support?
- f. Must the dividing clay wall be built horizontally or vertically?

2. Make a sprue out of clay or Plasticine and attach it to the model.

3. Build a clay wall on the model as above.
4. Make location grooves in the wall keeping in mind all the requisites for a wall as mentioned above. Remember the better the wall and the neater the clay at the point where the clay and the model meet, the finer and less obtrusive the seam line will be on the casting saving a lot of hassle afterwards.
5. Proceed to apply silicone as above until the required thickness has been achieved.
6. Make the first side of the support as above.
7. Remove the clay wall and polish the silicone flange properly.
8. Apply silicone for the second half of the mould.
9. Make the second half of the support.
10. Drill holes for bolts.
11. De-mould, re-assemble and you're ready for casting!

## Making a Block Mould

The moulds which have been described above are referred to as skin moulds or glove moulds. Block moulds are simpler to make but consumes lot of silicone and have other drawbacks as well. For very small objects which require only a very small amount of silicone it is often a viable proposition, especially if the object has only one side to be moulded i.e. a small plaque, medallion etc.

1. Polish the working surface.
2. Build a clay wall around the object leaving about a centimeter of space between the wall and the object.
3. The wall must be at least a cm. higher than the highest point of the object.
4. Catalyze silicone and apply a layer to the object by brush ensuring that all air has been driven off.
5. Simply pour silicone over the object until it has been covered with at least a cm. of silicone.
6. Once the silicone has cured remove the clay wall, pull the mould off the working surface and remove the object.
7. A two-piece block mould can be made by dividing the object in two with a clay wall. Another containing clay wall is then built at 90 degrees on the dividing wall. The silicone is cast for the first side, polished and the other side is then poured.
8. If the silicone block is sufficiently thick no mould support is required.
9. Undercuts may trap air – make sure the air is driven out by poking a brush into the undercut area.

## Handling Silicone

1. Silicone adheres to very few materials. If in doubt apply wax to your object or work surface.
2. Before decanting always stir the contents of the container first.
3. After measuring out the amount required it works well to stand the silicone for a few minutes before adding catalyst – it gets rid of some of the air.
4. Always add catalyst and mix it thoroughly before you add thixotropic additive – you will not be able to distribute catalyst evenly through the mix and the other way round.
5. Brushes and ladies etc, must be wiped clean immediately after use and further cleaned with either lacquer thinner or acetone.
6. Brushes, which have been cleaned, must be free of solvents before use.
7. It is advisable to apply polish to a silicone mould before making the fiberglass support.

8. Silicone comes in different shore hardnesses – select what is suitable for the job.
9. Keep lids on catalyst and silicone.
10. Before using silicone and catalyst which is over 3 months olds, always do a small test to ensure that it still cures well.
11. Much-used silicone moulds can be baked in an oven at 120 C degrees for a few hours to rid it of styrene which is an ingredient of polyester resins – boiling in water also works.
12. For starters use the standard catalysts – remember the longer the silicone remains in a fluid state on the model the less chance for air bubbles on the mould surface.
13. When you buy silicone ask for a datasheet explaining the catalyst percentages, pot life and curing times.
14. Always store moulds upside down and fully assembled.

## Handling Resin and Fibreglass

1. Use a barrier cream or gloves on your hands.
2. MEKP catalyst is poisonous and very hazardous to your eyes.
3. Never store catalyst and accelerator together.
4. Always keep lids on containers.
5. Always store catalyst and accelerator separately in cool places away from sunlight.
6. Do not use the same syringes for both silicone and fibreglass work.
7. Clean brushes and mixing utensils with acetone or water and ordinary green Sunlight soap.
8. When using accelerator always mix in the accelerator first before adding catalyst or fillers.
9. Resins can be coloured with pigments available from fibreglass merchants.
10. Like accelerator and catalyst Acetone is also flammable.
11. Keep fibreglass well out of the home or else you may end up with a very itchy family.
12. When casting with resin always add fillers i.e silica, wollastonite, kulubrite, cenolite, etc. These materials absorb some of the exotherm and prevent cracking.
13. Only relatively small objects can be cast solid with resins.
14. Larger objects need to be cast hollow using slush (resin with filler) which is poured into the mould and the mould is then rotated until the entire surface is covered and the resin has started to gel. As the casting progresses the slush can be thickened by adding more filler for every subsequent layer.
15. When doing slush casting it is imperative that the mix is accelerated or you may stand rotating a mould for a day – especially in winter. Mix a small amount and test until you find the correct mix and then proceed to mix enough to cover the mould to a thickness of a mm. or so.
16. Temperature affects the curing time of resin. Experience will teach just how much accelerator and catalyst to use. It may be a good idea to start a chart with temperatures and percentages for your future reference.

**Nivitex as suppliers of materials are helpful – ask us for a suggestion or a recommendation in what ever you wish to do.**

[» Back to Top](#)

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