



# EASTBAY COMPOSITES

KITS AND COMPONENTS TO MAKE YOUR OWN CARBON FIBER PARTS

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## Mold Making Kit Instruction Manual

Thank you for your purchase of an Eastbay Composites Mold Making Kit. This kit will provide you with all the components you need to make a high quality mold for use in making your final part in carbon fiber or any other composite material.

**Please read these instructions thoroughly before you begin making your first mold. Read the warning labels printed on all components before use, always use all components in a well-ventilated area, and always wear the included gloves and a facemask.**

### The Mold Making Kit

The following components are part of your mold making kit:

- 2 pairs Nitrile Gloves
- 4 Mixing Cups
- 4 Laminating Brushes
- 1 oz. Mold Release Wax
- 2 oz. PVA Mold Release Agent
- 2 oz. Mold Polishing Compound
- 1 Putty Knife
- 16 oz. Bondo Body Filler to be used as mold backing agent
- 6 oz. Orange Tooling Gel Coat
- 0.5 oz Gel Coat Hardener
- 4 oz. Block of Non Drying Modeling Clay
- 1 ml Disposable Pipette

### What You Can Make With Your Molding Making Kit

Your Eastbay Composites Mold Making kit is designed to allow you to make a single mold of approximately 9x9 inches or so, depending on depth and complexity of the mold, or several smaller molds.

## The Model

The directions and the kit are designed around making a mold based on an existing part or model that you provide. A plastic switch plate will be used as the model for the following directions but you are free to use any appropriate part for your model.

While there is great flexibility as to the item you choose to use as a model, please use the following guidelines to choose a model that will give you the best results. This list is intended as a guide only and we always encourage our customers to develop new ways to get the most out of our kits.

- Your model should have a “good side” and hidden side. These directions do not cover the process of making two sided molds.
- Avoid models that are tubular or round
- Models that require hidden threaded fasteners on the back side of the part add complexity to the model and are not included in the directions
- Models that are fastened via adhesives or through holes in the final part are the least complicated parts to make and are recommended
- Parts that have “cut backs” or indentations require soft molds or multi-part molds and are not recommended. These parts will be more difficult or impossible to remove from your mold once it has hardened.

## Getting Started

Once you have selected the appropriate model, the first step is to acquire a backing board. We recommend “1/8” CAT Hard Board” available from Home Depot. This board is low cost and easy to cut to size. It has a shiny surface that easily accepts the mold release agents and because it is flexible, it is easy to separate from the mold once it has hardened.



## Preparing Your Model

The next step is to prepare your model by mounting it onto the board. For this process you will be using the included modeling clay that came with your kit.



You will want to use the clay to raise your model off the surface of the board by about 1/8 to 1/4 of an inch. This ensures that the entire model is part of your mold and that your finished part won't be slightly smaller than your original model. Additionally, you will want to use the clay to fill in any gaps that exist in the part. Gaps, holes, and "cut ins" can cause mechanical lock. Mechanical lock will make it impossible for you to remove your model and any future parts from your mold and must be avoided. You should also always smooth the surface of the clay you add to ensure an easy removal of your model. The sample switch plate has several gaps so we used the clay to fill in all the holes. Notice in the following pictures how the model is lifted off the surface of the board and that all clay surfaces are smoothed and rounded both inside and out. Also notice that the mounting holes are filled in with clay and slightly depressed to make it apparent in the finished part where the hole should be.



Now just clean off the excess clay from the exposed part of your model and you are ready for the next step.

## Applying the Mold Release

When creating a mold, you want the model to easily separate from the mold once the mold has hardened. To ensure that this happens, your kit has two mold release agents. The first is mold release wax. Now that your model has been prepared apply the mold release wax to your model. Use a soft cloth to apply a thin layer of the wax to the model, the clay, and the surrounding parts of the backer board. Smooth the wax on the model so there is a thin even layer. Any clumps will show up on your mold and consequently on your final part.



In the example, the switch plate is hard and smooth so one coat of wax is sufficient. If your model is more porous you will need to apply multiple coats of wax. Just remove the excess from each coat and then allow to set for 15 minutes or so. Then buff the surface of the model like you would buff the surface of a car. Then apply a new coat and repeat the process. Most surfaces should be complete after 2-3 coats but some may need more.

The next step is to apply the PVA mold release agent with a lint free cloth. This is a polymer that adds an additional barrier between your mold and the gel coat that we will be adding later. To use the PVA, apply a thin layer to all the surfaces that you just applied the wax to. Allow it to dry over the next 30 minutes and inspect. It should leave a smooth shiny surface where applied. Ensure that all surfaces of the model, the clay, and the nearby backer board are coated. One coat of PVA is sufficient so long as there are no gaps or missing spots.

## Applying the Gel Coat

Once you are sure that the PVA is good and dry, you are ready to mix and apply the gel coat. It is not recommended to proceed with this step if the room you are working in is less than 65F degrees. Temperatures lower than this will increase the

curing time of the gel coat and may make it impossible for the gel coat to cure at all.

You will want to use the included gloves, as the gel coat can be messy. In order to properly mix the gel coat you must have a working gram scale that reads to 0.1g. The gel coat requires precise amounts of the hardener it will be impossible to properly mix the two components without a gram scale. Scales are available on the **Eastbay Composites** website and other internet retailers. The proper mix of gel coat to hardener is 1.8%. That is, the amount of hardener needed is 1.8% by weight of the weight of the gel coat base.

First weigh an empty mixing cup and record the result. Then pour the required amount of gel coat base into one of the included mixing cups and weigh the cup and gel coat base combined.



As an example, let's assume that the cup weight alone is 7.8g and that the weight of the cup and the gel coat base is 111.6g. From this we know that the weight of the gel coat base is 103.8g. So to get the weight of the required amount of gel coat hardener, we multiply  $103.8g \times .018$  to get approximately 1.9g of hardener. Now we add the 1.9g to the total weight of the cup and gel coat base of 111.6g to get 113.5g. This is the total weight of the cup, the gel coat base, and the gel coat hardener once we have added it to the cup.

Weight of Gel Coat and Cup	111.6g
Weight of Cup	7.8g
Weight of Gelcoat (111.6 - 7.8)	103.8g
Weight of Hardener (1.8% or 103.8 x .018)	1.9g*
Total Weight (111.6 + 1.9)	113.5g**

\* Rounded up from 1.8684

\*\* The same result can be had by adding 103.8 + 7.8 + 1.9,



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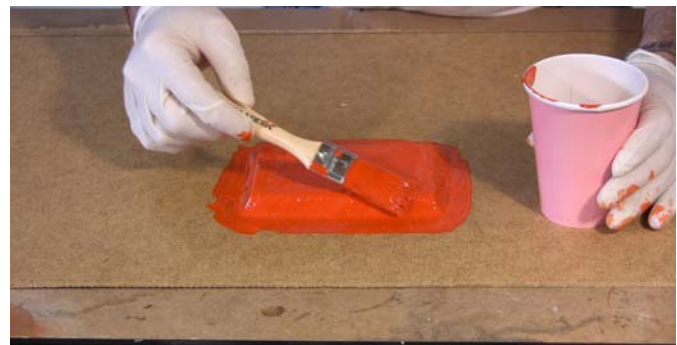
In this example, you would put the cup with the gel coat base on the scale where it would read 111.6g. Then, using the included pipette, you would carefully add (it doesn't take much) the hardener until the total weight reached 113.5g.

Now mix the combination carefully with the included mixing stick or brush. You want to mix thoroughly so that the hardener is distributed throughout the base but be careful not to mix too vigorously as you will add bubbles to the gel coat that will appear in your mold. Spend a few minutes mixing your gel coat but not much more than that as it will setup much faster in the cup than on your model.

Now you are ready to apply the gel coat. Apply it to the model using the included brush in slow even strokes. You want to apply the gel coat in a thick layer. Remember that this will be the surface of your mold so you cannot miss any part of the model.



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Be sure to cover the entire model, the clay and the backer board that is near the model. If you see that the gel coat is thin in parts, especially on the exposed part of the model, be sure to add more gel coat before it hardens. You can even dab the gel coat to ensure that a thick layer is left on the model but be careful not to add any bubbles. It is not recommended to pour the gel coat on the model as if it is too thick it can rupture as it dries. If you are concerned that the gel coat is not thick

enough, simply wait until it dries and mix up a second batch and re-apply the gel coat.

## Applying the Mold Backer

Once the gel coat is hard you are ready to apply the Bondo mold backer. Remove the cap on the top of the Bondo can and retrieve the small tube of hardener. Using the included putty knife, scoop out the required amount of Bondo onto a clean piece of cardboard or a disposable plate. In this example we are using about  $\frac{3}{4}$  of the can.



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Follow the instructions on the Bondo can to calculate the amount of hardener to use with the Bondo. In our example, we used about  $\frac{3}{4}$  of a can of Bondo and added about 3 inches of hardener. The amount of hardener you add to the Bondo is not nearly as critical as when calculating the hardener for the gel coat. Just be advised that the more hardener you add, the faster the Bondo will setup.

Now mix the hardener and Bondo together until it has a uniform pink color and then spread over your model.



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Be sure to spread the Bondo evenly over all the gel coat, taking special care to cover those areas of the gel coat that cover the actual model. Use the putty knife to smooth Bondo. When you are done, it should look something like this:



Now let it sit for an hour or two to setup nice and hard. It is not a bad idea to let it setup over night.

## De-molding

Now that the Bondo is good and hard, you are ready to remove the mold from the backer board. Simply pick up the board and flex it under the mold so that the mold separates. Repeat the process for all four sides. If you have done a good job with your mold release agents, the mold should come off very easily.



Once you have removed the mold from the board you will see all the clay is now exposed. Simply remove the clay and set it aside. The clay is non-hardening and if clean you can reuse it for your next mold.



Now it's time to remove the model from your mold. If you were thorough with your mold release agents and there were no cut-ins, your model should pop right out. Be careful with the surface of your mold, as any scratches you make will be replicated in every part you make from this mold.



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Next you will want to trim the excess material from around the sides of the mold. In the following picture we are using a power saw but any hacksaw will do just fine.



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With your mold now cleaned and trimmed it should be looking something like this:



Now there is only one last step to do. In order to have the best possible finish on the parts you make from this mold, it is critical that the surface of the mold be as smooth as possible. Using the included polishing compound, use a soft cloth to polish the inside of the mold just as if you were polishing your car. If possible, make circular motions with the cloth and allow the polish to dry. Then buff the finish to a shiny smooth surface. Multiple coats may be necessary for some molds.



And that's it! You have completed your first mold. If you take your time being sure to complete each step completely, you will find that it is easy to make high quality molds that allow you to make many copies of your final part. Start with something simple and we are confident you will be pleased with the results.