

MAKING A FIBERGLASS MOLD

THE PLUG

To have a form to develop your mold, you will need to build the article from scratch using wood, plaster, polyester putty, Formica, sheet metal, etc. or you have a completed article which you wish to duplicate. The latter is the fastest method. The plug is a male model exactly like the item you wish to fabricate in every detail. If the plug does not have taper then you will have difficulty removing parts. If the plug has reverse bends then you will need to make a split mold, which can be spread or taken apart.

If the plug contains soft materials on its surface such as plaster, wood, or putty, then it will have to be sealed with lacquer or resin to fill the pores. If plaster is used, it must be oven dried and then sealed.

To prevent your mold from sticking to the plug, the plug must be coated with plastic film known as "PVA." This is a plastic dissolved in alcohol and has a green color. It can be brushed or sprayed on, but the best system is to spray on three thin coats, the first being a "mist coat." The appearance will then be green. Each coat must dry half an hour or so and there must be no pools or drips to blemish your mold surface. For the easiest possible parting, before applying the PVA, apply a soft wax (Partall #2) formulated for use with PVA. After the third coat of PVA has dried, a coating of this wax can be gently applied over it for easy parting.

THE MOLD

The first step is to apply a gel-coat, which will be the mold surface. The gel-coat must be "exterior gel-coat" (wax free). If many parts are to be taken off the mold, it is desirable to use a "tooling" gel-coat, which is designed to give longer life in mold use. The gel-coat should be contrasting in color to the surface of the part you will make. Since most parts are light colored, black gel-coat is commonly used. This facilitates spraying up a uniform thickness of light colored gel-coat since the black will show through thin spots.

If the gel-coat is to be brushed on, two coats must be applied, and the first coat must cure several hours before the second coat is applied. The best means of gel-coat application is a gel-coat gun designed for the purpose and easy to clean. Air pressure of 80 to 90 pounds is desirable. Gel-coat must be applied at least 15 mils thick, or a quart to every 25 square feet of surface. If the plug is rough, sanding of the gel-coat will be necessary, so, double the application. Before applying the gel-coat, it must be catalyzed with MEK peroxide hardener.

When the gel-coat has cured, so that it cannot be scratched off with the fingernail at the edge of the mold, (taking from 2 to 4 hours to overnight) in cool or humid weather, you are ready for the "skin coat." This is a layer of $\frac{3}{4}$ or 1oz. fiberglass mat, thin enough so you can see and remove all air bubbles entrapped by the resin when you "wet-out" the mat. The resin should be applied with a mohair roller or brush until no white fibers remain. Any air bubbles are then eliminated with a grooved plastic or metal laminating roller. The polyester resin used should be "lay-up" resin, which is wax-free. Be careful

not to over-catalyze when laying up the glass. Above 75°F one 10-15 cc of hardener to the quart will generally suffice. Below 70°F, 20 cc per quart. Do not work below 65°F.

In laying up a fiberglass mold, warping can be avoided by allowing each layer to “kick” or gel before proceeding with the next layer. For a large mold, it is good to apply just one layer per day. After the “skin coat,” you can use 1½ oz. mat for a faster build-up. Generally, woven roving is not used in molds because the pattern transfers through the mold to the gel-coat. If it is necessary to use woven roving for strength in a large mold, it is applied after a thickness of 3 or 4 layers of mat has cured hard. The thickness required in a mold depends upon size and shape and the number of parts to be taken off. For a dinghy mold to be used only a few times, four layers of mat might be adequate.

REMOVING MOLD FROM THE PLUG

Allow mold to cure several days if possible so it will hold its shape. The first step is to trim the excess laminate back to the molded edge. This is easily done with a saber saw and a metal-cutting blade. The edges are sanded carefully until the line between the mold and plug is exposed. Then a sharpened “tongue stick” is forced between mold and plug to separate the edges. The stick is then pulled clear around the plug until all edges are free and no bridges remain. Avoid using metal tools for this purpose, as they will scratch the mold surface. Then the mold should pull free of the plug. If not, the parts can be flexed or pounded gently with a rubber mallet. If necessary, air or water can be forced under pressure between plug and mold. A hole can be drilled through the interface for this purpose. PVA is water soluble, which facilitates parting with water pressure.

POLISHING THE MOLD

Depending upon the condition of the mold surface, it may have to be sanded with 220-grit working up to 600-grit, wet or dry. The surface is then compounded with regular and fine finish compound formulated for fiberglass work. Best results can be achieved by using special compounds such as our “Heavy Duty Cleaner” followed by our “Sealer Glaze” to bring out a mirror finish. Before using a mold, it should be allowed to cure a week or more if possible. Be sure to use PVA parting film and soft wax for the first 3 or 4 parts, after which a carnauba wax can be used.

GELCOAT PROBLEMS

Wrinkling, can result from:

1. Gel-coat too thin in some spots.
2. In-sufficient hardener or hardener not mixed well enough.
3. Gel-coat not cured long enough before mat lay-up.
4. Acetone cleaner drips out of roller or brush during mat lay-up.