1) Materials needed: Original plug, liquid and/or paste wax mold release, tooling gel coat, fiberglass mat, woven roving, stitchmat, knytex or equivalent, marine laminating resin, resin roller, brush, acetone for cleanup, containers for mixing resin and gel coat, catalyst, plastic or metal container for acetone.

2) The plug is the master around which the mold is made. For best results it should be polished and cleaned. All compound and polish residues must be removed. Any defects in the plug will be reflected in the mold. Soap and water should be used for the final plug cleaning after wiping with a solvent-type cleaner. Any sanded or otherwise rough surface should be sealed. If the paste wax mold release is to be used exclusively you should apply at least 7 coats, hand buffing between each coat. If you are just using the liquid PVA mold release, spray on at least 6 thin mist coats, allowing it to dry between layers. The mold wax will give a smooth final surface, but the PVA is more foolproof. Paste wax will leave a shiny surface on a smooth mold; PVA will leave a dull surface. After the mold release surface dries, black or red tooling gel coat is applied to the surface to form a layer at least 20 mils (.020”) thick. Spraying is the best way to apply gel coat, especially on a waxed surface. If you brush the gel coat, brush the first coat in one direction, let it dry for a few minutes (flash off), and then brush the 2nd coat across the 1st one to fill in the brush marks and thin spots in the 1st layer. Let the gel coat dry until it does not transfer to your fingertips. The gel coat needs time to harden and cure enough to keep the resin subsequently applied from eating its way through the gel coat surface. Thin spots in the gel will result in the resin soaking through and causing a wrinkled (alligator) surface on the mold. The gel surface against the plug will form the final mold surface so the plug should be as shiny as possible. The gel coat should not be allowed to sit for long periods of time (i.e.: overnight) without having glass applied to the surface. The gel coat film can shrink and pull away from the plug if it is left too long. At least 2 layers of 1½ oz mat should be applied to the gel surface before any woven material is used; this prevents the weave from “printing through” to the mold surface. One possible lay-up schedule is to apply and thoroughly roll out 1 layer of mat, letting it form a skin as it dries. Subsequent layers should start with mat and woven roving. Three layers make 1/8” thickness; the mold should be thick enough to withstand handling, generally 2-3 times as thick as the parts you are going to make. Bracing may be applied after the lay-up has cured for 1-2 days to prevent the bracing lines from printing through to the mold surface. Braces may be formed from foam strips, PVC or cardboard tubing, wood, metal pipe, or similar products that should be attached to the outside of the mold surface with mat before the mold is released from the plug.

3) The mold should remain on the plug for a few days, or sufficient time to cure the lay-up. After releasing the mold from the plug, care must be taken to keep from warping the mold by placing it in proper position for use and storage. The new mold surface should be prepped by polishing as necessary, thoroughly cleaned of all compound and polish, and washed with soap and preferably hot water. Five coats of mold release wax should be applied, buffing between coats. Three mist coats of PVA liquid mold release should be sprayed on the waxed surface followed by gel coat and the lay-up for the first part (product). After curing the part, remove it from the mold, usually leaving some of the green PVA film on the mold and some on the part. Wash the PVA off the mold with water, wax five more times, spray PVA, lay-up the second part, cure, remove the part, wash the mold, repeat. By the third lay-up in the mold
all the green film (PVA) should come off with the part. This means the wax layer is releasing everything above it (i.e.: the PVA). Subsequent waxing after this should be every few parts as necessary. Rewaxing is normally indicated when a part starts to stick to the mold. Some people prefer to use PVA for every lay-up, this works but does not give as shiny a surface as wax. When the mold is not in use it should be carefully stored in a position that will prevent warpage and covered to keep it clean.

4) Possible problems:

a) Gel coat wrinkle (alligator) on mold or part surface, caused by gel coat too thin or under cured before laminating resin is applied.

b) Woven glass print-through showing the weave texture on the surface of the mold or part, caused by hot layup (too many layers too quickly, or over catalyzation), or insufficient layers of mat on initial layup.

c) Mold warpage, caused by too hot layup, improper plug position during layup, or improper mold storage.