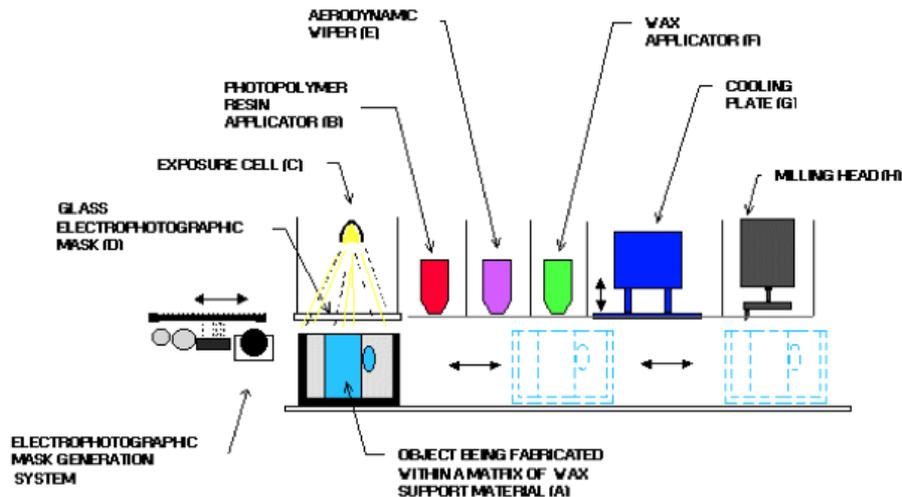


# Solid Ground Curing (SGC)

From <http://home.att.net/~castleisland/sgc.htm>

Instead of using a laser to expose and harden photopolymer element by element within a layer as is done in stereolithography, SGC uses a mask to expose the entire object layer at once with a burst of intense UV light. The method of generating the masks is based on electrophotography (xerography).



This is a two cycle process having a mask generation cycle and a layer fabrication cycle. It takes about 2 minutes to complete all operations to make a layer:

1. the object under construction (A) is given a coating of photopolymer resin as it passes the resin applicator station (B) on its way to the exposure cell (C).
2. A mask is generated by electrostatically transferring toner in the required object cross sectional image pattern to a glass plate (D). An electron gun writes a charge pattern on the plate which is developed with toner. The glass plate then moves to the exposure cell where it is positioned above the object under construction.
3. A shutter is opened allowing the exposure light to pass through the mask and quickly cure the photopolymer layer in the required pattern. Because the light is so intense the layer is fully cured and no secondary curing operation is necessary as is the case with stereolithography.
4. The glass mask is cleaned of toner and discharged. A new mask is electrophotographically generated on the plate to repeat the cycle.
5. The object moves to the aerodynamic wiper (E) where any resin that wasn't hardened is vacuumed off and discarded.
6. It then passes under a wax applicator (F) where the voids created by the removal of the unhardened resin are filled with wax. The wax is hardened by moving the object to the cooling station (G) where a cold plate is pressed against it.
7. The final step involves running the object under the milling head (H). Both the wax and photopolymer are milled to a uniform thickness and the cycle is repeated until the object is completely formed within a wax matrix.

Secondary operations are required to remove the wax. It can either be melted away or dissolved using a dish-washing-like machine. The object is then sanded or otherwise finished as is done in stereolithography. The wax matrix makes it unnecessary to generate extra support structures for overhangs or undercuts. This, and the large volume capacity of the system, also makes it easy to nest many different objects within the build volume for high throughput.