UNIT-3- LIQUID BASED AND SOLID BASED ADDITIVE MANUFACTURING

Ground Curing (SGC)

Solid ground curing utilizes the general process of hardening of photopolymers by a complete lighting and hardening of the entire surface, using specially prepared masks. In SGC process, **each layer of the prototype is cured by exposing to an ultra violet (UV) lamp instead of by laser scanning**.

1. The cross section of each slice layer is calculated based on the geometric model of the part and the desired layer thickness.
2. The optical mask is generated conforming to each cross section.
3. After leveling, the platform is covered with a thin layer of liquid photopolymer.
4. The mask corresponding to the current layer is positioned over the surface of the liquid resin, and the resin is exposed to a high-power UV lamp.
5. The residual liquid is removed from the work piece by an aerodynamic wiper.
6. A layer of melted wax is spread over the work piece to fill voids. The wax is then solidified by applying a cold plate to it.
7. The layer surface is trimmed to the desired thickness by a milling disk.
8. The current work piece is covered with a thin layer of liquid polymer and steps 4 to 7 are repeated for each succeeding upper layer until the topmost layer has been processed.
9. The wax is melted away upon completion of the part.

What is SGC in additive manufacturing?

Solid ground curing (SGC) is a photo-polymer-based additive manufacturing (or 3D printing) technology used for producing models, prototypes, patterns, and production parts, in which the production of the layer geometry is carried out by means of a high-powered UV lamp through a mask.

Is solid ground curing SGC not a part of rapid prototyping?

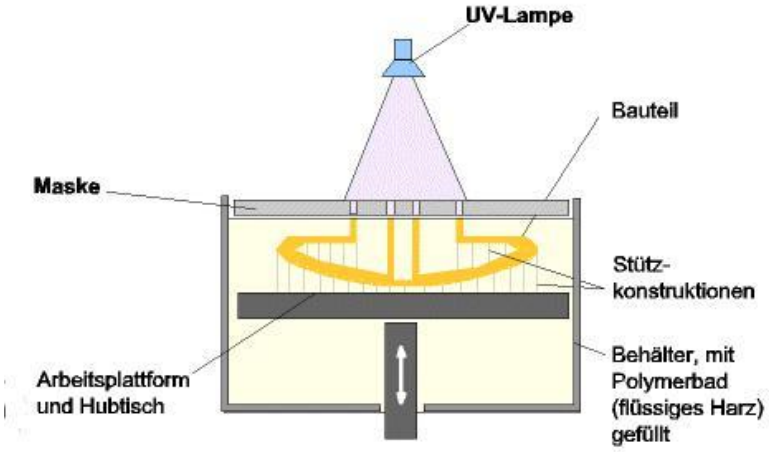
Solid ground curing (SGC) technology, one of the rapid prototyping technologies, is **suitable of building multiple parts with different geometry and dimensions in batch production of rapid prototypes to minimize the cost of prototypes**. However, the layout of CAD models in a graphic environment is time-consuming.

What is SGC in 3D printing?

A vat photo polymerization additive manufacturing process that cures the photopolymer layer with UV light that has been shaped with a digital mask rather than with a laser or a projector.

What is the best type of curing?

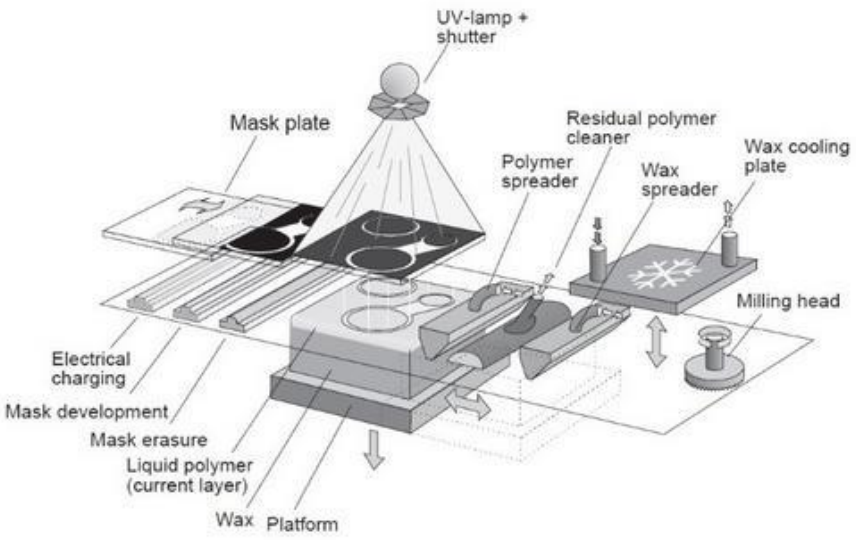
Water curing, if properly carried out, can be the most efficient - and the most appropriate for some types of work, e.g. floors, and include bonding, sprinkling, and wet coverings. On flat surfaces such as pavements, footpaths, and floors, concrete can be cured by bonding.

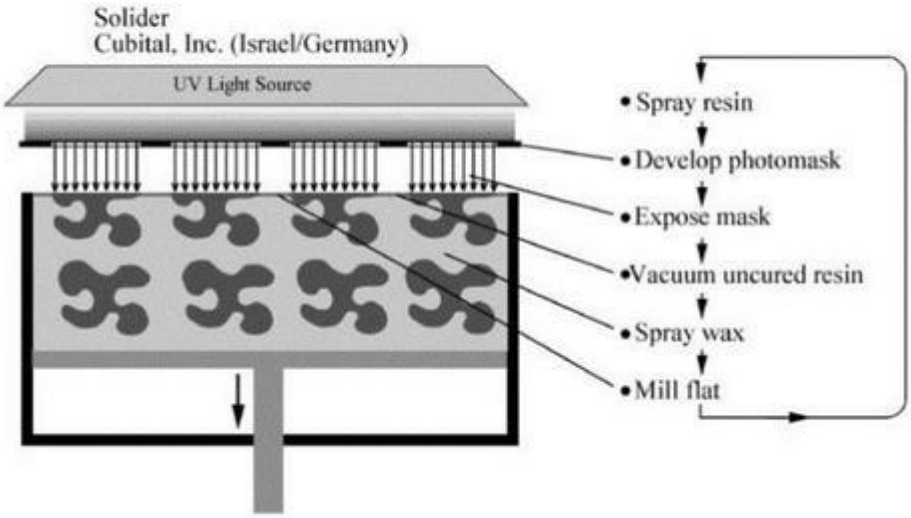


Solid Ground Curing Process

1. **Ascertaining cross segments**. You need ascertaining a cross segment of each cut layer in light of the geometric model of the part and the coveted layer thickness.
2. **Optical cover.** The optical cover is produced fitting in with each cross segment.

3. **Covering the platform**. In the wake of leveling, the stage is secured with a thin layer of fluid photopolymer.
4. **Mask positioning.** The cover relating to the present layer is situated over the surface of the fluid pitch, and the gum is presented to a powerful UV light.
5. **Residual fluid.** The lingering fluid is expelled from the work piece by a streamlined wiper.
6. **Filling voids**. A layer of softened wax is spread over the work piece to fill voids. The wax is then hardened by applying a cool plate to it.
7. The layer surface is trimmed to the coveted thickness by a processing plate.
8. **Covering work piece**. The present work piece is secured with a thin layer of the fluid polymer, and stage 4 to seven are rehashed for each succeeding upper layer until the point that the highest layer has been prepared.
9. **Melting**. The wax is liquefied endless supply of the part.





Advantages of Solid Ground Curing

1. **Solid Ground curing frame works do not need a help structure.** No extra support is needed since wax is utilized to fill the voids.
2. **Accuracy of procedure.** The model created by Solid Ground Curing process is nearly precise in the Z-bearing in light of the fact that the layer is processed after each light-presentation process.

Disadvantages of Solid Ground Curing

1. **Too much waste.** In spite of the fact that it offers great exactness combined with high throughput, it delivers excessively waste.
2. **High operational costs.** Its working expenses are relatively high because of the frameworks many-sided quality.

Strong Ground Curing (SGC) forms are reasonable for building various parts with various geometries and measurements in clump creation of fast models; in any case issues in demonstrate precision, quality, and material properties of models restrict their applications.