

# ROXEL3D

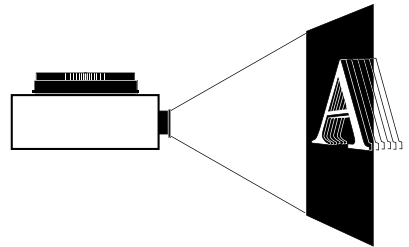
## BEST USE GUIDE FOR ROXEL3D PRINTING RESINS

Thank you for using ROXEL3D resins! We have put a lot of care and effort into providing the very best materials for your projects. And to make sure you are getting the most out of our materials, let's check off a few items. Most are likely old hat for you experienced printers. But whether you are a newbie or an oldbie, please take a moment to read & consider the following before going to print:

### It's All Black and White

Resin based 3D printing, known as Stereolithography (SLA), is a photographic process. What is true of black and white film photography is also true of SLA printing. Because that's what it is – high contrast black and white photos all stacked together. And resin is liquid photographic film!

Whether it is drawn with a laser or a projected image or a mask, all SLA is high contrast black and white photography. Where enough light reaches the resin, it cures. Where it does not, it does not cure.

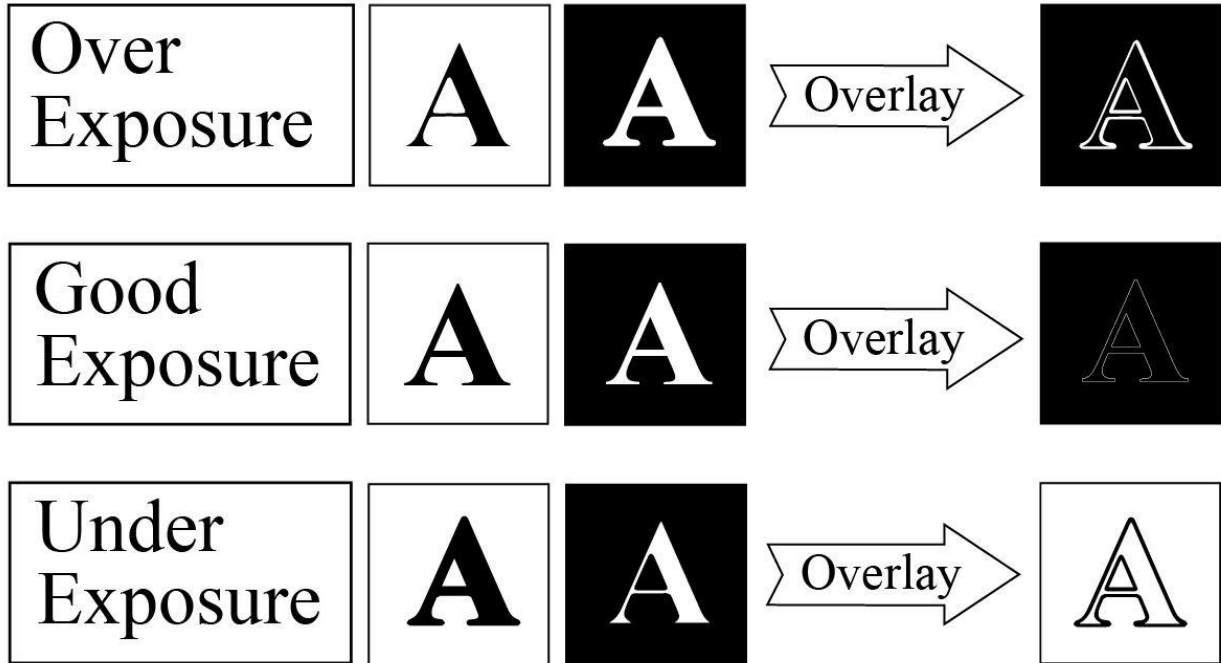


### A Print vs. A Good Print – the main variables

To get an excellent print it is important to get the right exposure balance – again, just like photography.

If the light is too weak or too short the exposure is too low, and the print will fail or have cracks and other defects.

If the light is too strong or too long the print will be over exposed resulting in an overgrown part with a loss of negative detail and over dimension.



If the resin is warm, it is easier to cure, and less exposure is needed. If the resin is cold, more exposure is needed to get the same cure. (And if it is very hot it can cure by itself, and if very cold, may not cure at all regardless of exposure)

And of course, how thick the slices are (Z height) greatly effects the amount of exposure needed. A 100-micron thick slice take much more time to cure than a 25-micron slice. For this reason, it is important to know how much exposure is needed for the slice thickness you choose.

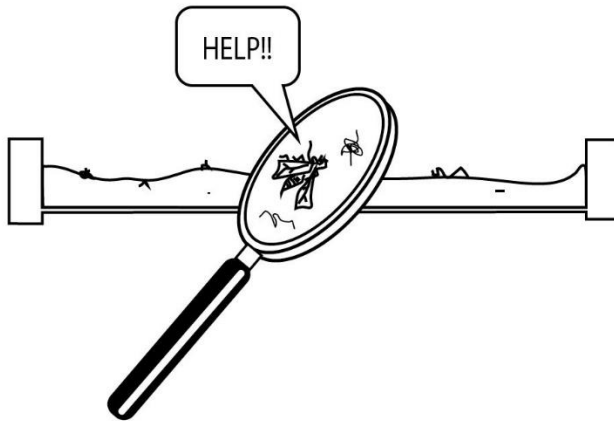
Detail is also a consideration. In the camera example, a small bird in the sky at noon vs a star in the night sky may need very different settings to get a good picture. So too, depending on what is being printed, slightly longer or shorter exposure times may be necessary. It is important to consider both positive and negative minimum features desired on the print. As a general rule, the best exposure will at least be enough to form the support tips selected for the design.



## Garbage in Garbage Out

Keep your resin clean!

Uncured resin is super sticky and picks up dust and fiber and anything else that gets into it, which can be difficult to remove.

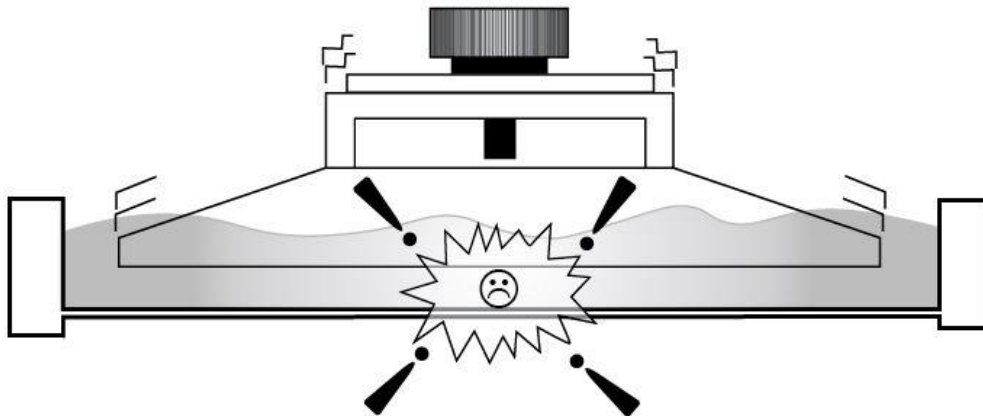


To minimize the chance for trash in your resin:

Keep your printer closed when not loading or unloading prints and resin. Don't store resin in the printer or in the printer's vat if removeable.

Filter resin after each print to ensure there are no large solid bits and pieces in the resin. **This is very important!**

Pieces of anything thicker than your design's slices that get pinched between the build head and separation layer **WILL DAMAGE YOUR PRINTER!** The print head does not know to stop and will push until the motor stalls or the separation layer gives.



## Storage

When not in use, keep previously used resin in a light-tight container. Only add new resin to old resin. Never add old resin to new resin. This will ensure nothing contaminates the new resin.

**Safe is as safe does –so do it safe.**

Our resin is made of the safest, least smelly, easiest to work with materials we can find. We use it ourselves have been in close contact with these materials for years and intend to keep doing so by making products we and you can work with without worry. Having said that, please keep these in mind.

Gloves every time! Cheap chemical resistant glove (eg.3mil nitrile gloves) are great short-term protection for your skin. Use them.

If you do happen to get resin on your skin, wash it off immediately and follow the advice in the SDS.

Aprons or even lab coats (as we use) will save you from getting resin in your clothes, which must otherwise be immediately removed and cleaned.

Eye protection is your friend. There is no better safety precaution than appropriately fitting and approved safety glasses when working with liquid or polymerized resin. If you do get resin in your eyes, flush with water immediately and follow the advice in the SDS.

If you plan to do machining or grinding on your prints, please use OSHA approved filter masks, which are cheap, effective and stylish. Good vacuum and or ventilation are encouraged as well.



## **A Clean Machine is a Dream Machine**

There are two things to always remember: Resin gets everywhere if you don't wipe it up, and dirty machines don't work well.

Wipe up resin drips and spill as soon as they occur. If this is not done, even a small drip of resin will likely spread to every surface in area. And the first place it will go is on any mirror, lens, separating film etc. blocking the light and causing print fails.

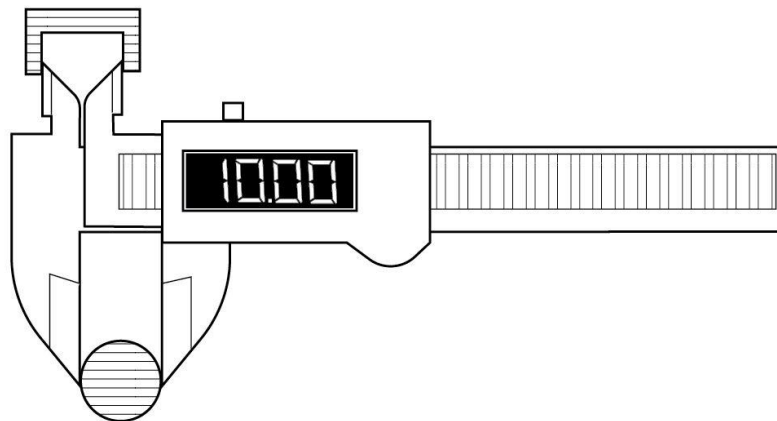
Getting proper exposure means a good steady light source and an unobstructed optical path. This means that the LED's or bulbs or lasers and the power source that runs them must be consistent within reason. And all mirrors, lenses, separating films, and even the air in between the light source and the resin must be as free from anything that will block the light as possible. Most failures we see are directly due to poor machine hygiene or a dirty environment.

## **Calibrate to Celebrate**

All 3D printers from high-end to low-end and all in between must be maintained. Some have this built into their operating system to some degree and need only perhaps weekly attention. Others should be calibrated and babysat every time you print with them. The reasons for this are many, and too many to go in to. But light intensity changes as light sources age, separating films get worn, scratched or hazy, dust coating lenses and mirrors, stepper motors losing step counts resulting in incorrect starting position, and on and on. So, it is our strong advice that you pick a calibration schedule that includes:

**Weekly calibration** – If you use your printer somewhat infrequently

**Daily calibration** – If you are using your prints for medical or dental fabrication



Calibration does not need to be anything more than a quick print representative of the models you tend to make and who's quality can be easily assessed. Calibration geometry however is only well measured after the parts have been cleaned thoroughly. We recommend washing parts in either 90% or better isopropyl or denatured alcohol and doing a final rinse with clean alcohol and drying before evaluation. Additionally, our calibration models are available for download with our compliments if you should need a good one. Just ask for a copy: [support@roxel3d.com](mailto:support@roxel3d.com)

## Easy Does It

We created our resin to be easy to use, with a minimum of odor and settle-out. That being said a good practice is to mix Roxel3D resin before each use. It is easy to do with our flexible packaging: a thorough mix can be had by squeezing the bag in a couple of spots, alternating rapidly back and forth letting the resin flow around. Don't forget to have the cap completely closed before mixing to prevent spills. And don't forget to enjoy squishing the bag.

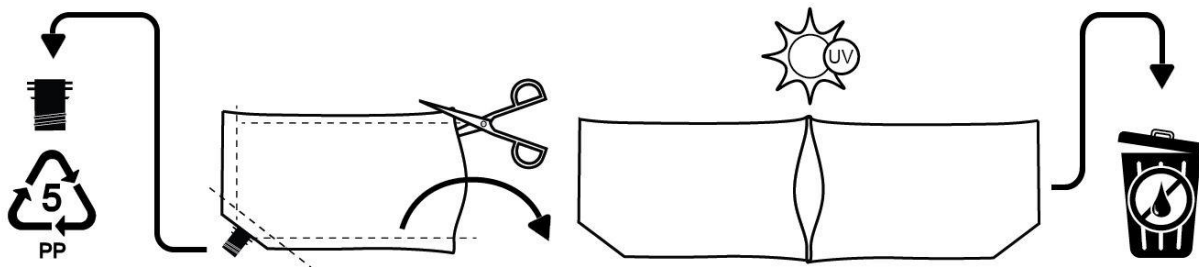
When dispensing the resin into another container, i.e. tank or vat or holding jar, be sure to not squeeze the bag, as this will forcefully jet resin out of the spout and all over everything.

When the bag is almost empty, it is our advice that the last few drops be drained out by clipping the bag over a storage container and waiting for gravity to do the work. Additionally, speed the process by pushing the remaining material out with a couple of straight edges like removing tooth paste from a tube. Experimentation will provide the best solution for you, but please always remove and use as much as possible from each bag of resin.



## Karma Considerations – good practices in waste disposal

While SLA 3D printing is a highly efficient manufacturing method there will always be waste to properly dispose. After the maximum amount of resin is removed and the bag is to be disposed of, we strongly encourage that the bag be opened with scissors or similar, the final residue be squeegeed into a holding container and any remaining resin in the bag cured in light before properly disposing. It is our sincere hope that no liquid resin **of any type or make** be thrown away or put into the waste water system. Cured resin is relatively inert, but liquid resin is a known aquatic environment hazard. The rules are the same as used motor oil in most respects while liquid. Please be a good steward of the material and protect our planet.



### **Our Good Experience to Power Your Good Experience**

While nothing can guarantee that every print will come out perfectly, using Roxel3D resin and the few points herein will put you on a path to great 3D printing.

Should you have need please reach out and we will do our very best to lend a helping hand. We make our years of experience available to make your experience the very best.

Happy printing.

Roxel3D Team.