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When we started developing Moai, we knew some of our future users would be first time SLA printer users. Thus, we wanted a resin that gives good resolution and is easy to print and clean. We also know many of our users are model makers and love to sand and paint, so we want a resin that has a smooth finished surface for postprocessing. Here are the details for Moai resin that could help you understand and get better results:

Overview:

Moai standard resin is a UV curable acrylate-based resin developed for laser SLA printer. It responds to 405nm UV light and has a follow mechanical property:

Hardness (Shore D): ASTM D2240 82
Tensile strength at break (Mpa): ASTM D638M 60
Elongation at break(%): ASTM D638M 8%
Young's modulus (MPa): ASTM D638M 830

At 25C degrees, the viscosity is 600cps. Density is 1.13

The ideal printing temperature is **20 to 30C.** The higher the temperature, the lower the viscosity and requires less UV energy to cure.

Shrinkage post cure is **6.5%** and is consistent for acrylate-based resin

Exposure:

In the user guide, we recommend laser energy at 61 with default Cura profile. This is selected to ensure high print success rate for new users. Use can dial laser down to increase PDMS lifespan. Using the default Cura profile, the user can print using laser energy between **57-61** for Moai. **57-58** are preferred by experienced users who have been using Moai for production. However, if you find large print not sticking well at a lower energy level, it is best to increase to a higher level. We also have users reported using laser energy at 55/56 but with slower print speed in Cura. Moai is designed for experiments and customizations so find the best settings for your application.

an example of lower laser energy can be found here

Lower energy leads to lower shrinkage during printing and smaller laser spot size.

Colors and difference

Moai resin comes in 6 colors, and while they are very similar chemically, there are subtle differences besides appearances. In general, the darker the color, the higher the resolution and requires more energy to cure. The difference is small but is observable. For clear and green resin, they overcure more than other colors at 61 and thus may lead to shorter PDMS lifespan than other colors. **Black and Gray** has the best resolutions and requires slightly more energy to cure.

Cleaning

The best cleaning agent accessible to most users is **Ethanol**, follow by IPA. **IPA** is more toxic and is more corrosive but may be easier to obtain in some countries. Any cleaning agent that is designed to remove oil substances should work but may take more time.

Cleaning instruction with 95% Ethanol is to submerge the print completely and move back and forth for **30 seconds to 60 seconds** depending on how complex is the print. Make sure Ethanol can reach every part of the print. In some instances, you may have to remove some support to help Ethanol reach covered part of the print. For very delicate print, you spray Ethanol on the object and let it cleans and drips down. When the dripping no longer contains resin, you can stop. You can use a hair based brush to assist in removing excessive uncured resin from the object.

Some user prefers Ultrasonic cleaner with cleaning detergents. This can be helpful but be careful not to overdo it. Ultrasonic can disrupt delicate features and damage very thin walls. Ultrasonic also heats up, and it is NOT recommended to use it in conjunction with Ethanol or IPA.

Post-Curing

405nm UV light is preferred, but 395nm UV light can be used as well. You can use sunlight if you don't have UV light available. Submerge object in water will speed up the curing process as water blocks out oxygen from interfering with the curing process. When you can no longer easily scratch the print with a finger nail, it is cured.

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