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TECHNICAL TIPS

Removing Bubbles from Epoxy

There are three general ways to remove bubbles from liquid epoxy before applying it to your parts. They are: Vacuum degassing, Centrifuging, and Heating.

Vacuum Degassing:

This process involves removing the air pressure surrounding the epoxy. This allows the air that is trapped inside the epoxy to easily escape. In order to accomplish this, you need to place the epoxy in a container that has at least five times as much volume as the epoxy because the volume will increase without the air pressure.

The vacuum should be created with a pump that can pull a vacuum of 29 inches of Hg quickly. The key is to hold the vacuum for as short a period of time as possible. Also, make sure you don't pull too much vacuum. This will cause a "rolling boil" and will add bubbles to the epoxy. If the vacuum is applied with vibration, the bubbles will be removed even faster.

Centrifuge:

This is the most commonly used process for removing bubbles in syringes. Once the product is placed in the syringe, the syringe is stood up with the bottom on the lab desk to allow bubbles to be moved up to the syringe tip. After the bubbles have moved up, the stopper is removed, and the plug is pushed up, removing any large bubbles present in the syringe. Once the stopper is replaced, the syringes are placed in the centrifuge.

With unfilled epoxies, the centrifuge can be run from 1,000 to 3,000 RPM for 3 minutes. This will remove all minute bubbles suspended in the epoxy. You may see some large bubbles present near the plug of the syringe, but this is just the miniature bubbles that were in the epoxy, and as long as the syringe is stored dispensing tip down, the bubble will not get into the epoxy.

Filled epoxies can also be degassed this way, but special care needs to be taken to ensure that the filler does not get pulled out of the epoxy. Generally, you want to keep the speed around 1,000 RPM for 3 minutes. This will remove the bubbles but not drag the filler out of the resin.

Heat:

Heat is a simple and efficient way to remove bubbles from epoxy. The key to this solution is to keep the product in a wide container. It is best to have large amounts of epoxy in the X and Y dimension, and little in the Z dimension. This gives a large surface area for the bubbles to escape.