

PDMS Replica Process

Purpose

This document describes the procedure for making a PDMS replica from a mold.

Equipments and Apparatus:

- 1) Vacuum Oven
- 2) Graduated Plastic Beaker
- 3) Syringe (10ml)



Materials:

- 1) A mold for replication
- 2) Sylgard 184 kit (Base and Curing agent)



Procedure:

1) Pour the desired amount of PDMS BASE into a 4 oz. graduated plastic bottle. Note the volume.

2) Use a disposable syringe to inject catalyst (curing agent) into the PDMS. We recommend using 1/10 the volume of catalyst as you did PDMS. After use, please dispose the syringe's needle in a sharps bin; the plunger may be disposed in the trash.

3) Stir the solution vigorously for 2 minutes using a disposable stir rod. Thoroughly wipe clean stir rod after use with a disposable towel.

4) De-gas the mixture by placing in the vacuum oven (no heat) and opening the vacuum valve (vacuum gauge level should go past 20 inch/Hg). Degas for 50-60 minutes (bubbles will be removed from most of the mixture).

5) Pour 10-15ml of PDMS mixture onto each master within 15 minutes of de-gassing. Surface tension will hold the PDMS on top of the master, much like water on a penny. If this surface tension breaks, PDMS will flow freely off of the master, requiring you to wipe clean the master's sides with a tex-wipe and pour on more PDMS to replenish what flowed off. Observe PDMS stamps for at least two minutes into their cure for this problem.

6) Cure the mixture. EITHER

a) leave on a leveled surface for 3 days at room temperature OR

b) heat in a leveled oven or on the hotplate at 70C for 1hour.

Other temps and times are possible; the higher the temperature the faster the cure. Generally, you can use the highest temperature that your mold can take, up to 150C maximum. Curing past the recommended temps/times above will cause the PDMS to become harder, more brittle and much more prone to cracking. Curing less than recommended will cause the PDMS to be sticky and floppy. All else the same, slower cures yield slightly tougher PDMS stamps.

7) Carefully remove the PDMS from the master. Often this requires peeling 1cm in from all sides of the master before you peel the bulk. If you have lines and spaces on your master, peel parallel to them. You can cut the PDMS with a dull razor blade either on the master or after peeling.