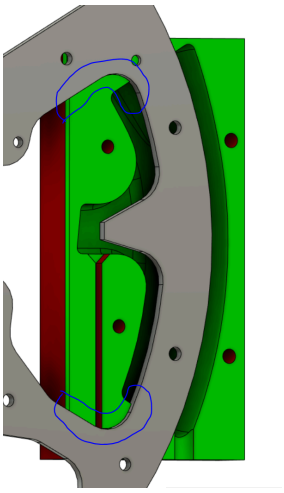
Rubber molded Grips with 3d Printed mold

This will be a guide that shows one of many ways of molding rubber grips using 3d printed molds. There are plenty of different ways of doing it, and this method is not perfect but works well if done correctly.

3D Modeling

When modeling the mold for your grips it is important that you think about the following things:

1. **Attachment point** - Make sure that molds somehow stays in place when you are to clamp the molds to the part that you molding the grips to, i my case i made a cutout from the metal plate that is 0,3mm bigger than the plate, and made sure that there were some good positioning features that ensure that the grips ended up in the place i wanted. I made sure that they were featured on both sides of the mold.

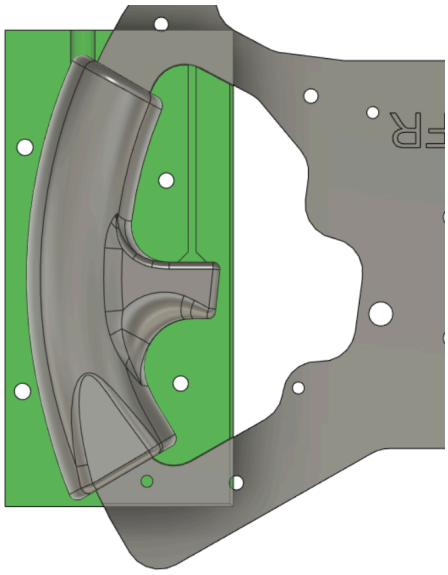


2. **Clamping -** my first attempt was to use vice grips, but that deflected the mold and made the process really hard. Second version I made 4mm holes true to the mold and used threaded rod, bolts and washers to clamp it, much easier.

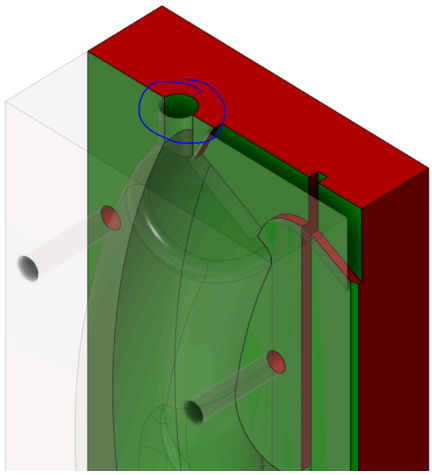
   Based on more experience, the recommendation is to use external clamps, as the bolts can easily be glued in place when modeling.

3. **Hide the Ugly** - Make sure you have the inlets, air vents or any other features where you can flush cut them or hide them. Bottom backside of the handle for example.

4. **Bubbles Travel up -** I made so that my mold was “upside down” that way the bubbles that went up, were hidden from view.

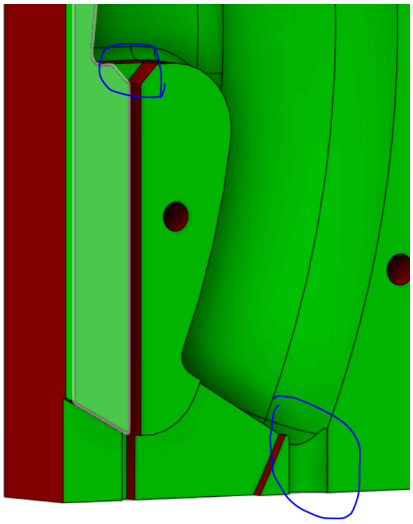


5. **Inlet placement and design -** In my design i used a inlet that fitted the syringe I was going to use, but i made mine way to short, something happens when the inlet is this short where the bubbels seem to stay there, i think it is the surface tension that prohibit the air bubbles to go up into the inlet. so a longer inlet is recommended. 1-2 cm.

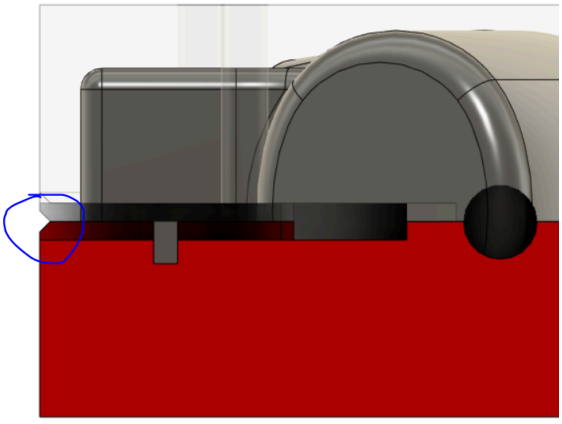


6. **Air Vents** - In this Model i added an air vent on the underside of the grip and used the inlet to vent air. What i learned was that it's good to have a air vent next to the inlett, and make the air vent have as big of an area as you can, this is where the bubbles are going to go, and the bigger that areas the more bubbels you are going to get out of the part you like to have bubble free.

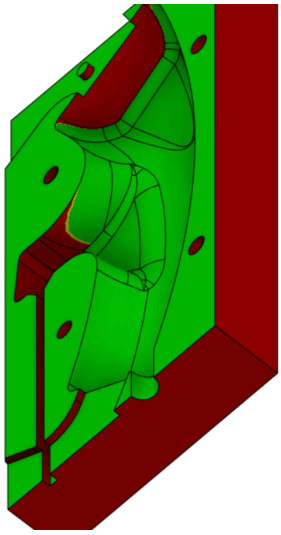
The Airvent shaft I made was 1mm and it worked well.



7. **Glue gun bevel -** In order to ensure that the rubber stayed in the mold, I added a small 1mm chamfer around the molds side and bottom, that i later used a hot glue gun to seal the mold.



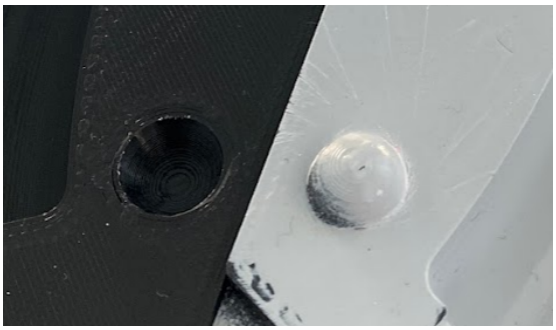
8. **Release Angle** - When you design your mold, or even the grips themself, it's important to look if you create any hooks. Often our grips are round, but there is a good tool in Fusion 360 that can help you see if you have any.
   Even Flat surfaces can be problematic (90degrees).
   Inspect -> draft analysis



9. **Test before mold** - If you can it's a good idea to just 3d print the grips before to test the shape and look. Before committing to the process of rubber molding.

10. **Mold alignment** - some molds have bumps and dips in order to aligned the molds to each other. I opted for having equal attachment points, so the plate was 3mm and I have attachment points of about 1,5 on each mold half.

    But this is a feature that you might need to use based on your design.



Mold Printing and Finishing

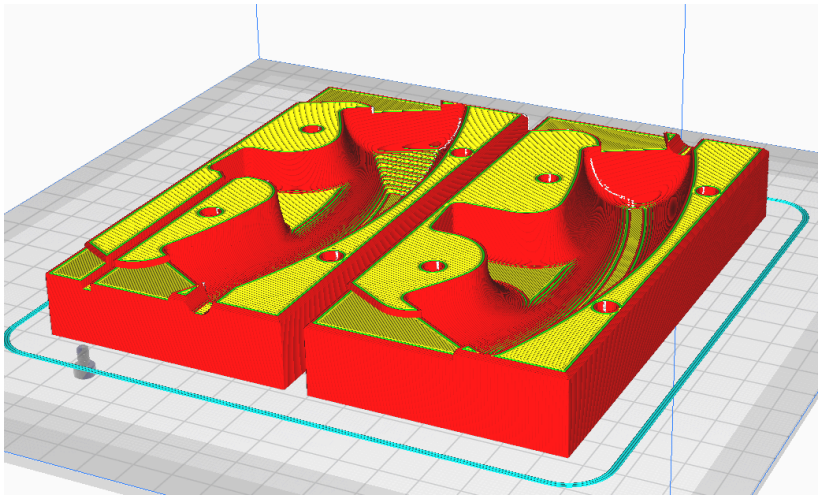
Things You need

1. Spray Filler
2. Clear Coat
3. Sandpaper, 240 and 400 grid (Wet)
4. 3D printer

Printing

I printed the molds in a 0,2mm layer height with a 0,6mm nozzle, 20% infill - I did not see any major improvements going to a lower layer height. As the filler seems to stick well and level out just right with 0,2mm.

But the printing is pretty straight forward.



Printing Mold true Printing Service

JLCPCB offers 9000R Resin that is suitable for Master molds, and can be used to print molds. A light sanding with 400 wet-sandpaper gives the grip a matt finish.

Finishing

It's important to say that any imperfection will transfer to the final grip, even a speck of dust that might be hard to see and impossible to feel will be seen in the end result.

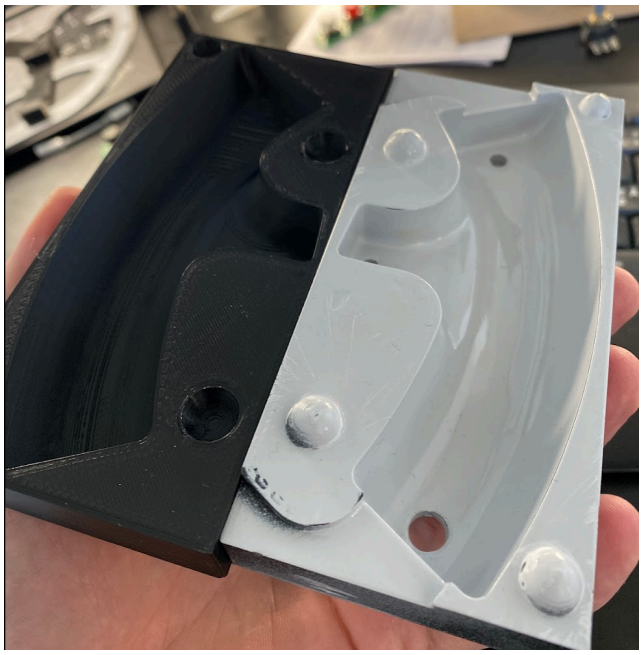
1. I put on 5 layers of spray filler and let it dry for a really long time. **1 week.**
   I noticed that you can let the filler dry for 24h and sand to a smooth finish, but after 5 days, the layer lines come back ever so slightly. I think it has to do with the filler fully curing, and then shrinking. And it will be visible on the grips.

2. Make sure that the mold closes well, I noticed that the filler makes for a slightly uneven surface, so the contact areas of the molds might have to be flatten to seal well.

3. I sanded to mold with 240 and then 400 wet-Sand pepper.

4. 2 layers of 1K High Gloss clear coat to seal the mold.

5. 2 Layers of acrylic clear coat.



Fyi - This Mold did not work due to incorrect venting and design, but the finish was great.

Mold Preparation

Release Agnat
Things You need **:** FormX Webshop

In order to get a mold to release from the part you need to add Mold Release.
I used the Super Sealant kit from MANN that had both sealant and release agent in one kit. and a convenient sprayer that helps to get an even coverage on the mold.

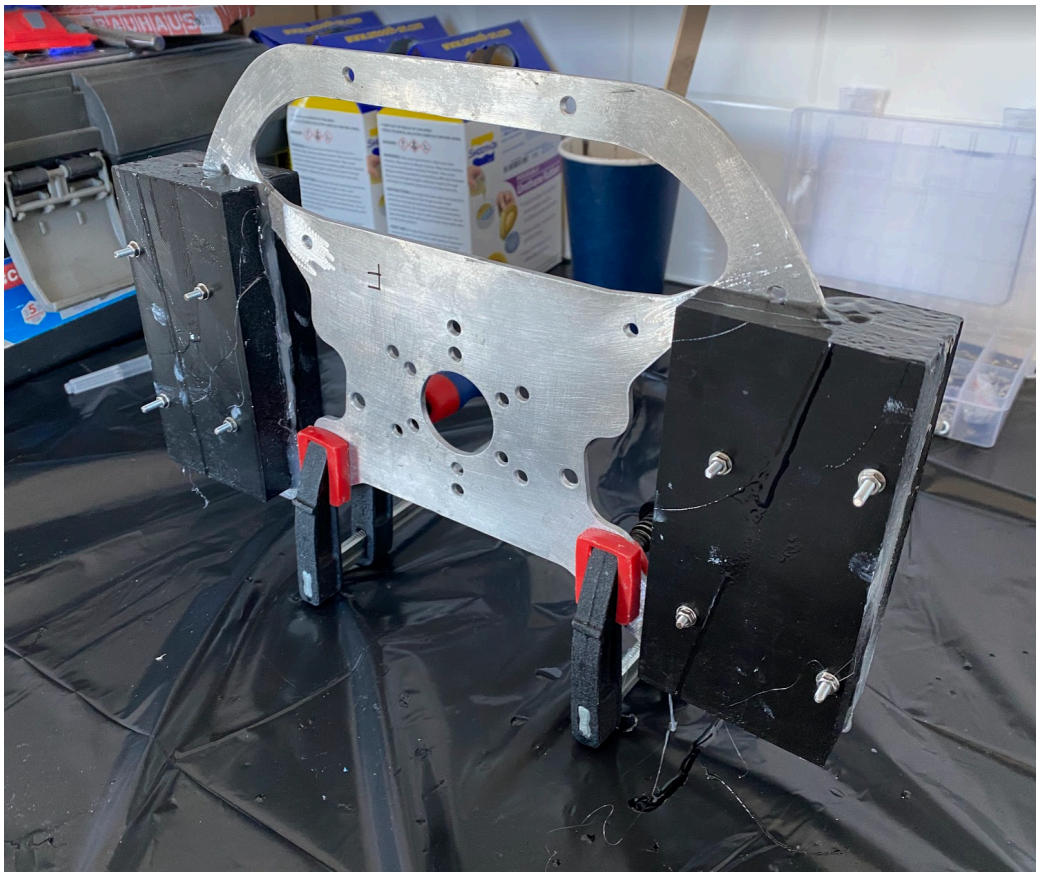
In essence you just apply the Release agent and klamp the mold together and proceed to the molding process.

If you put on the Release Agent and bubbles form, they will transfer to the molded part. So if you get bubbles or any thing sticks to the treated molds, wipe off and reapply

Mixing-Mixing-Mixing

A. Shake the Release Agent. 1-2 min
B. Shake the Mold sealant if you use one. 1-2 min

Mold Clamping and Holding



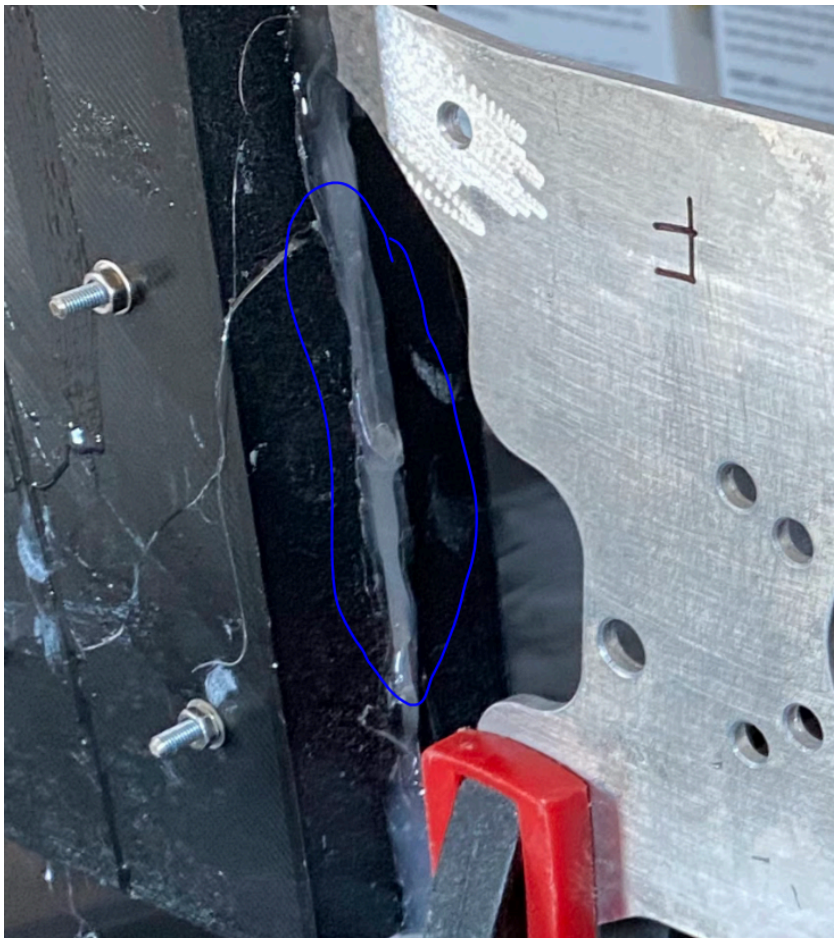
I used an M3 threaded rod and some M3 nuts and washers to clamp the molds to the part.

To ensure that the mold was oriented correctly i used two clamps to make a temporary stand.

Sealing the mold

In order to seal the mold you can use Mold Sealant. Insted I went for a hot glue gun and sealed the molds “from the outside” on all sides except the top, paying extra attention to the place where the mold and the metal plate were touching.

I left the hot glue gun turned on during the molding process so I could patch a leak that appeared.



Preparation and Components

What you need:

- Scale (g)
- Mixing Sticks - FormX Webshop
- Paper cups

- Suitable syringe. - FormX Webshop
- Timer
- Hammer (rubber)
- Pigment - FormX Webshop
- Rubber - Simpact60apint Simpact TM 60A /0,88 kg FormX Webshop
- Mold Sealant and Mold Release - FormX Webshop

Mixing-Mixing-Mixing

It is SUPER important that everything is Pre-Mixed and Mix well to ensure a correct curing of the rubber.

1. Pre mix and pre shake all the different components well, and ensure that all the activators and pigments are well dispersed when mixed is a key to a good result. This shall be done just prior to starting the molding process.

   A. Pre mix the A and B rubber. Inside the B part there is a clear and a gray part, this two components (within B) needs to be well mixed prior to molding. Remember that the gray part settles quickly to the bottom.

   B. Shake the Pigment. 1-2 min

Pigmentation
The pigment I used was FormX own, and I noticed that “4 dropsTO A100g+B94g rubber” works okay.

According to the Description the pigment shall be added to the Part B first, well mixed into a smooth color, before part A and B is combined.

Rubber consumption
It is really hard to know how much rubber you need, but it's always best to mix up more than less.

I used water and the syringe to get me an estimate on how much I needed, but remember that there will be rubber lost during the process..

As Urethane is really sensitive to water, you need to ensure that molds are dry before molding, so if you used water to estimate the volume you need, I would recommend you to dry the molds well.

Mixing ratio
This is pretty well documented on the bottles , but I went “by weight” as it was much easier than the volume, due to the two mixtures having very different viscosities.

Game Plan
As you only have 5 minutes to mix the rubber and get it into two molds, it is important to have all the different steps planned and ensure that all you need is present.

I made it so that I worked my way from Right to left, and had all the different parts laid out in sequence.

In order to divide the 5 minutes, I ran some dry tests, just to get an idea on how long I could be mixing. Before I needed to start pouring in the rubber.

And the earlier you can get rubber in the mold, the longer you can spend on spinning and hammering the mold to get rid of bubbles and any imperfections.

Molding Process Step By Step:

1. Pre mix Part A and B.
2. Por the required amount of Part A into a paper cup using a scale.
3. Por the required amount of Part B into a paper cup using a scale.
4. Shake the Pigment and drop it into part B.
5. Mix the pigments into Part B until the color is even, try not to mix in air.
6. Por the Part B in to the Part A
   Start the timer 5 min.
7. Mix the two parts well, ensuring the walls and bottom are scraped every 10 times of mixing.
8. Por over the Mixture to a clear cup and continue mixing.
9. Put the Mixture close to the Grip mold and remove the mixing stick.
10. Take the syringe and start filling the molds.
11. Move and hammer the molds left and right to get rid of trapped air and add rubber when needed.
    Until you can see the rubber getting “rubbery”.
12. Let be for 2h
13. Remove the mold.
14. Let cure for 48h in room temp or 6h in the oven for 60c.

Post processing.

I found that snippers you get from Creality work really well, to get rid the the mold-Flashing. and this is best done before the rubber fully cures (48h)

Remember that if you go for the 60c fast curing, your oven will smell like rubber.

I made sure to keep dust away from the rubber when it cured, as I suspect that dust particles can stick to the grips, during this process.