

Silicone mixing instructions

Gabby Gelinas and Ben Scully

February 2024

Materials

- Vacuum pump
- Digital scale – there is one that is out in detector support with one decimal place of precision. You can ask Clayton for the scale with 3 decimal points for a better mixing ratio.
- Found in detector support lab cabinet:
 - Solution A (Elastosil RT 604 A) (make sure the batch is not expired)
 - Solution B (Elastosil RT 604 B) (make sure the batch is not expired)
 - * if no solution in Det support, refill containers in rooms as seen in Figures 1 and 2
 - Stir stick
 - Small glass beaker
 - Syringe (at bottom shelf)
 - Needle (minimum of 20 gauge, lower number = easier to push but less control)
- Found in detector facility:
 - Disposable glove
 - Large KimTech wipe

Images of the materials required can be found at the end of the document.

Procedure

1. In the back room of the detector support lab, make sure the large black fan on the window is on.
2. Collect all materials (except the scale and the vacuum pump) on a kim wipe to reduce contamination.
3. Into the glass beaker, measure your quantity of A solution. The ratio of A solution to B solution is what is most important rather than an exact quantity of a singular solution. If you over pour solution A, you can use the stir stick to remove some from the beaker and put it into a napkin which can be thrown out into the regular trash. If you over pour B, clean everything and restart.

- A ratio of 9:1 of A:B solution by mass is required.
 - It is not required to wear gloves during this step but they are available if you would prefer to.
4. Into the same beaker, measure out the required quantity of solution B. You may use a syringe to do this if necessary, just be sure to use a second syringe for up taking the final product so you maintain the correct ratio.
 5. **Slowly** mix the mixture **for at least 3 minutes** in the plastic cup with the stir stick so you do not introduce extra air to the solution. Take care to ensure it's completely mixed, otherwise the B solution will start to boil when under vacuum which will cause bubbles.
 6. Insert the beaker into the vacuum pump, making sure to not cover the hole on the surface since that is where air travels. Make sure the vent is closed (handle is facing down), twist the knob all the way to the left to bell jar, then flip the switch up to turn it on (see Fig 4). Push down on the glass bell jar and twist slightly.
 - If the gauge reading does not decrease below 0 once the pump is on, push down and twist bell jar more.
 7. Many small bubbles will appear in the solution on the bottom of the cup. Provided your solution is well mixed, they will all disappear.
 - To correct incomplete mixing, turn off the vacuum pump, slowly lift the vent knob up. You must lift it slowly so air can get in gradually so the cup doesn't fall over. Mix the solution more then repeat the vacuum pump turn on procedure.
 8. Once there are no more bubbles, turn off the vacuum pump, slowly lift the vent knob up. You must lift it slowly so the air flowing back in doesn't cause the cup to fall over.
 9. Place a disposable glove over the opening of the beaker to prevent contamination during transport.
 10. Twist the knob on the vacuum pump all the way to the right to "closed vacuum". Mixing is now complete.
 11. When filling the syringe be sure to pour the silicone down the side of the inside of the syringe and not straight down the middle so you don't introduce extra air. There is no need to rush, the solution won't begin to cure for ~ 2 hours.

Images

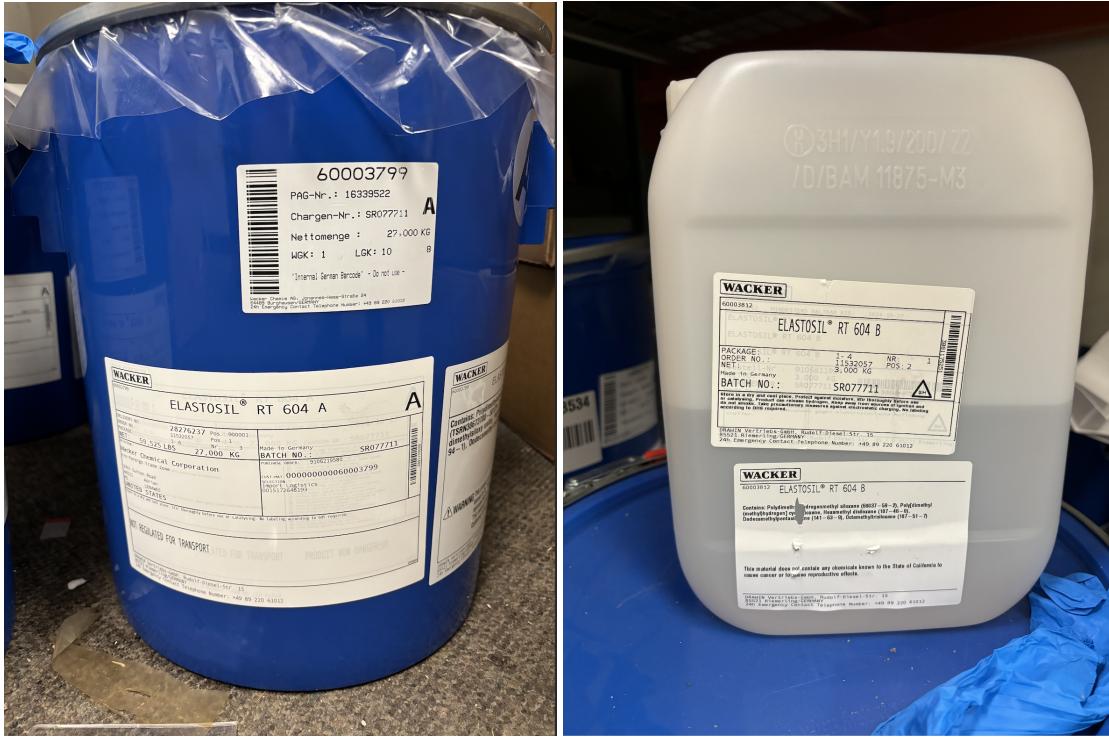


Figure 1: Stock solutions of solution A (blue) and B (white) which can be found in the room shown in Figure 2

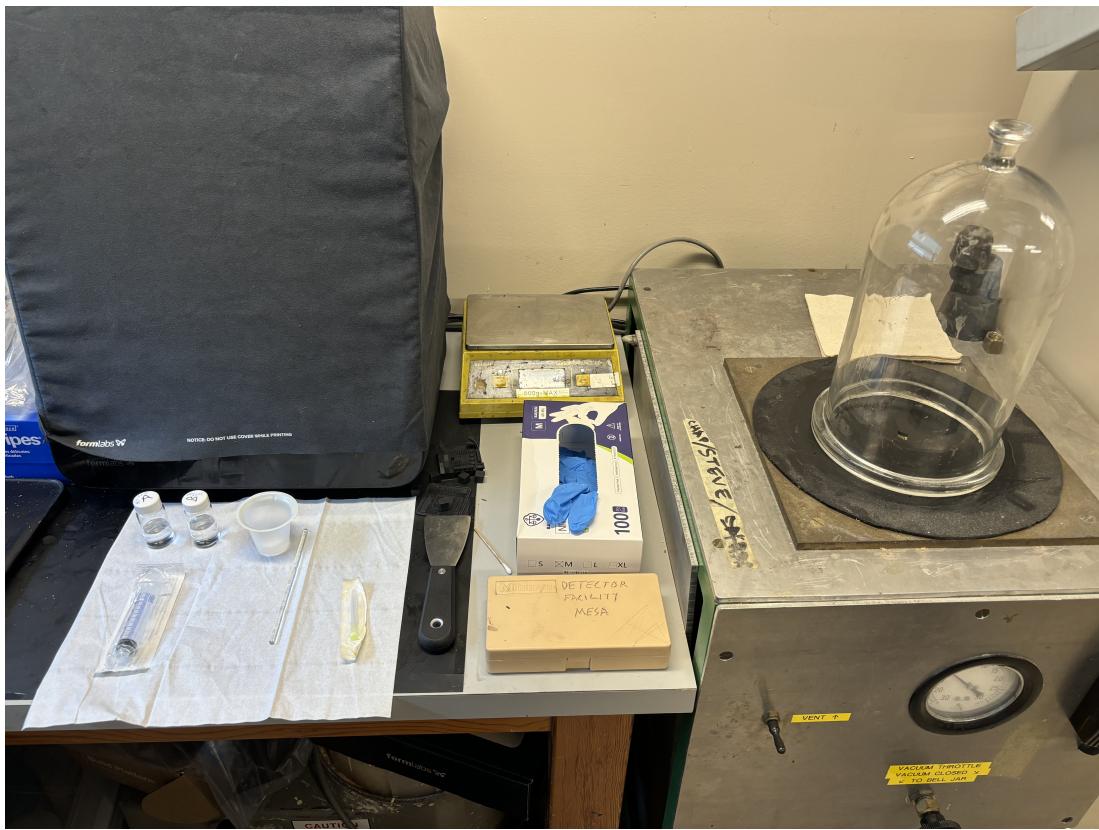


Figure 3: All materials required for preparing silicone. From left to right: vials of solutions A and B, syringe, plastic cup, stir stick, needle, (all prior to this are found on a kim wipe) digital scale, disposable gloves, vacuum pump.



Figure 2: PMT Test Facility: Location of solutions in Figure 1, beside room 12 on floor B1 in Meson hall

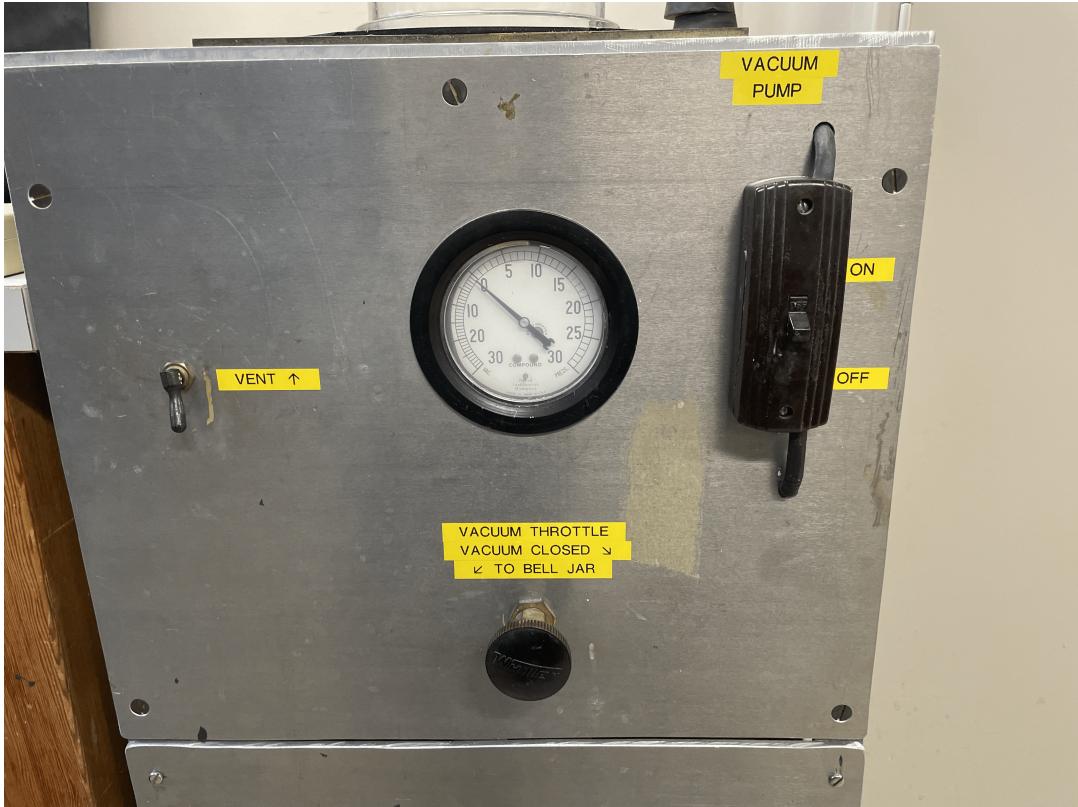


Figure 4: Vacuum pump controls: from left to right: Vent control (down = closed, up = open), throttle (ccw sends vacuum to bell jar, cc shuts it off – leave shut when finished), switch (turn pump on/off)