Fume Free Casting Box

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FUME FREE CASTING BOX by Mark James

OK, MAYBE NOT FUME FREE – BUT THE FUMES ARE NOT IN YOUR LUNGS, EYES AND ON YOUR SKIN!

Due to allergies and sensitivities to fumes related to casting Alumilite, this project came into being. I suspect the result may also be useful for those who may develop sensitivities to resins *after* they have been casting for some time and may want to try to continue. Additionally, it may be useful for those who cast Polyester Resin (which I do not) as I've read that the fumes can be strong. I also have not used clear epoxies that others have had great success with.

When I became interested in casting, I had already developed sensitivities to Rosewoods, Snakewood and Padauk. Once noted, I can easily avoid these woods. I did not have any respiratory issues, just skin rashes. In spite of using a full turning smock, a full head mask, a cyclone dust filter and a ceiling mounted air filter, I still developed rashes on occasion – so I was disappointed, but not surprised by my experience with Alumilite after 2 months. Note: I never considered Polyester Resin, as this seemed a poor choice for me.

My objectives:

1. Construct a glove box to prevent exposure from fumes onto my skin.
2. Have a continuous air draw out from the box venting through a wall.
3. Be able to vent the pressure pot also directly out through a wall.
4. Have enough inside workspace to mix, cast and store all supplies.

I already had a pressure pot that I had used for several months and made 40-50 blanks. It could hold 40 PSI for 18 hrs, and my blanks were consistently acceptable (about 95% were bubble free). So I had a reasonable level of beginner's experience in casting. I cast for 1hr at 40 PSI.

Materials for the casting Box:

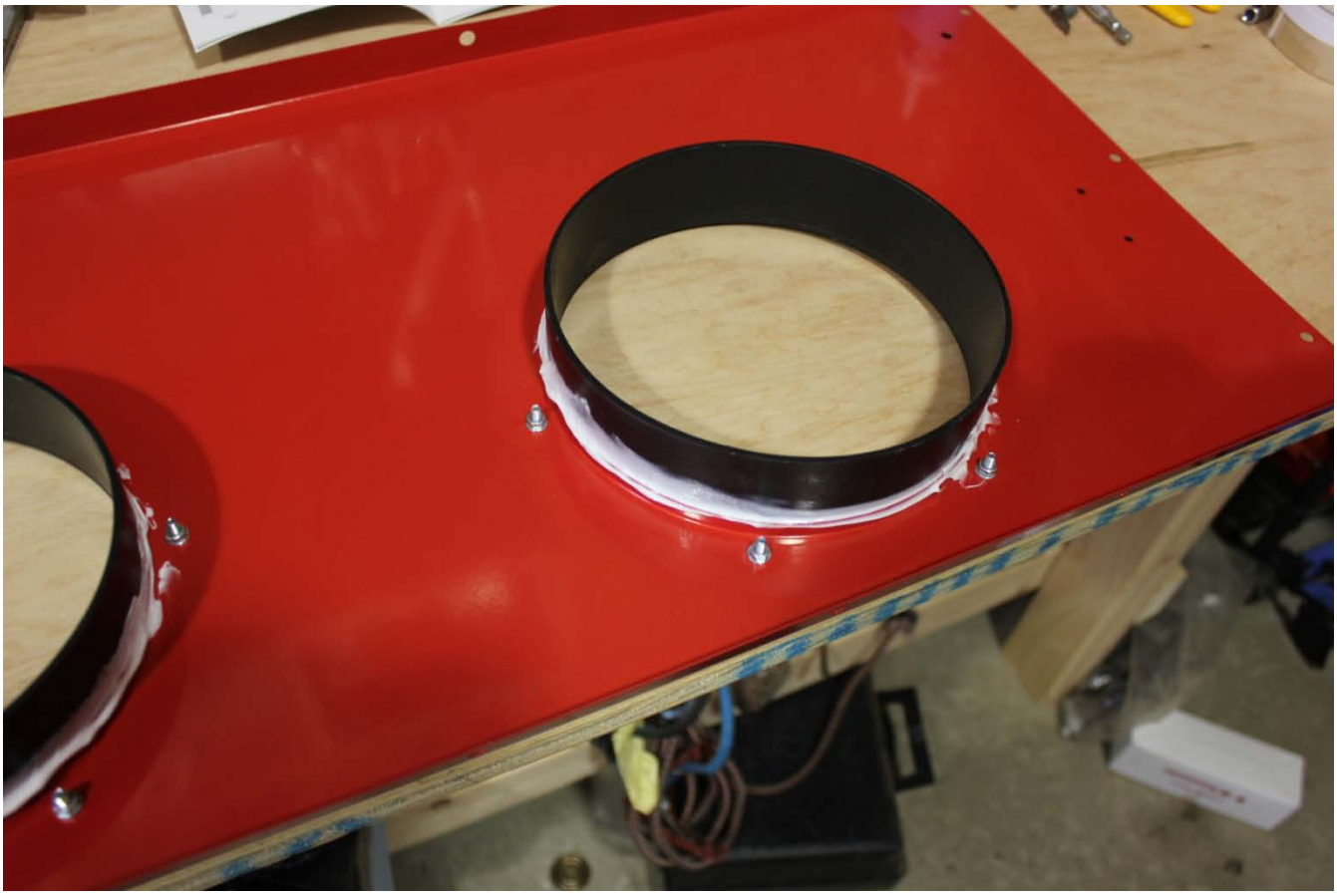
- A 40 LB Sand Blasting Cabinet (I bought mine from Harbor Freight; There are many available - I have NO relationship with HF). For reference, mine cost $168.00 after all sales/discounts – May 2014.
- Silicone Caulking – 2 tubes
- Copper fittings for the pressure pot exhaust pipe extending through my garage wall.
- Blue flex tube for the box fumes venting via a small vacuum cleaner.
- ¾" gasket tape
- 6 LED Puck lights for inside the box
- A vent/duct for the outside garage wall
- Various fitting to complete my system (yours will probably be different)

All materials were about $210.00. After investing in the Pressure pot and Air Compressor earlier, I was now doubling the cost to do casting. Whether this is worth it will be an individual decision. For me, buying a few watch parts and steampunk blanks from wonderful and talented IAP member and friends from time to time would cost me as much in 2-3 years, so I say it was worth it. (I also wanted to make 32 custom stamp blank pens with special meanings for relatives; i.e., hobbies, marine life, countries travelled to, etc).

Here is what I did.

Build the basic box and use silicone to seal the inside joints. In the first picture below, the box is sitting on its back wall.

Seal the glove fittings. All the joints facing the operator need to be sealed, as this is where any fumes may leak outside. Even with the vacuum pulling air outside, a good seal was my backup (I occasionally pop the garage circuit breaker, and wanted no chance of contact with fumes if the vacuum failed; I can still waddle out of the garage pretty quickly when motivated – think woodchuck!).

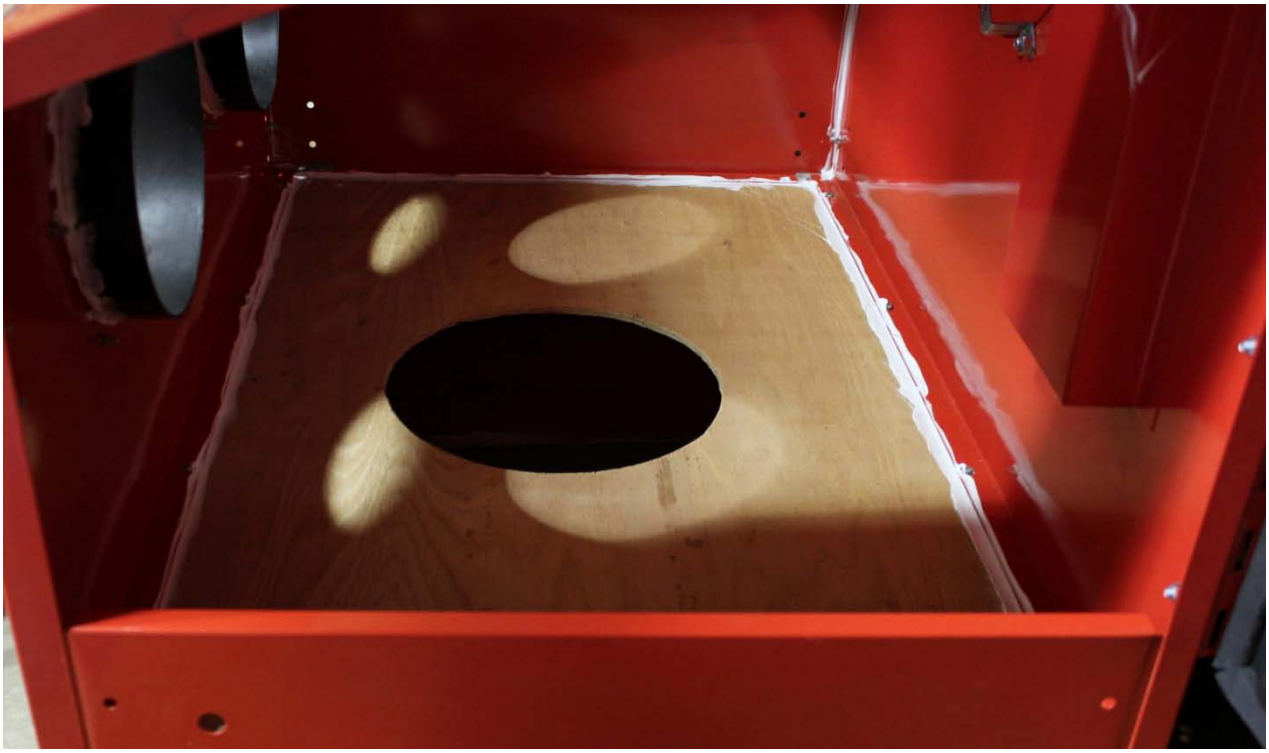


I cut a recess hole in an old door, allowing the box to sit on a “bench top”. Sealed the joints, then I measured how far below the bench top I wanted the pot to sit. The lower it is, the closer to center it has to be, but it will give you more “workable room.” This will be a custom decision. I believe mine is 6” below the tabletop. Size a small platform to fit in the V bottom, seal it in.

I then cut the hole for the pot.

BEFORE mounting the box, install whatever gloves you will be using! Mine are invisible… a challenge for later. Then seal the inside joints.

The small rectangular wall box on the right side has a nice size access hole (2”-3”) to thread the compressor hose inside the box, and allow outside air in. As several IAP members suggested quite correctly, as long as there is a continuous air draw out, the objective is not to be airtight. Rather, air does need to be able to circulate in.



This is the pipe I used to go through my garage wall to vent the fumes from the pressure pot. After casting, I disconnected the hose from the air compressor, attached it to this pipe, and vented the fumes from the pot directly outside my garage. I did a soap test to insure my joints were sealed.

I initially used a small air mattress pump to vent the box fumes, but a smoke test clearly showed it was not powerful enough. This vacuum cleaner was sitting in a closet unused for years, and found a new home. The second smoke test drew my neighbor's attention as smoke was shooting out of my garage wall!!! (Way cool). I suspect a more elegant system is possible.

Final Exterior picture.

Final Interior picture. Nice and roomy. I decided to mount a few brackets to store the pot lid on the back wall. The hose is not intended to be disconnected, so that stays on. In practice, this worked fine.

Final considerations: The gloves that came with the sandblasting box seemed very good, but I was unsure if it was good for particulates (sandblasting) but maybe not good for fumes (MY concern). So I ordered several others. The black ones are excellent Nitrile Gloves, but far too thick to be able to measure, stir, pour, etc… So they were returned.

The yellow gloves were sent free as a requested sample, but would not fit over the black mounting rings on the box.

Ultimately I decided to try the stock gloves and they proved to be excellent. Just enough play in the material to be able to use your fingers, and apparently acceptable for fumes (although I do wear very thin nitrile paint gloves inside of these also).

I also was concerned that on occasion I would not get the pot lid clamped down enough to adequately hold the pressure, so I made a simple tool from JB weld, a long socket, some nuts and bolts and a steel mending bar. It allows me to use a ratchet to tighten the pot clamps a bit more and has worked fine.

Now, this system is not elegant, nor is it perfect. It is more cumbersome than casting in the open on your workbench. However, if you have invested several hundred dollars in an economical but workable casting set-up, or upwards to a thousand dollars for a good pressure pot, and found after a year or so you have sensitivity issues – maybe all is not lost! For me, this worked.

Please modify, adapt, improve and if you have fun - *MISSION ACCOMPLISHED*!!!