

# *The Trailing Edge*

April 2025

## **Building an Acrylic Display Box**

I have three models on display over my desk. Unfortunately, that puts them about 20 feet from the kitchen stove. Frying food, such as yummy bacon, throws tiny droplets of oil into the air. You may have felt the sting of a splattered oil droplet hitting you hand—after all, this what they sell splatter screens for. The droplets are tiny enough that their Reynolds number is really small, which means they see the air as a viscous mess, and tend to remain airborne. Our Molekule air purifier gets really angry when we cook bacon, cranking itself up to full speed trying to remove all of the oil particulates from the air.

While some of those oil droplets will be sucked into the air purifier to be terminated, some manage to target the models and come to rest there. These oil droplets get lonely, so they reach out to passing dust particles and invite them to settle down, and the oil glues the dust to the model. Because of the oil, the dust cannot just be blown off with air or flipped off with a feather duster. Removing the dust requires using soapy water to encourage the oil to let go and a soft cloth to make it happen. Unfortunately, such action is very stressful around fragile model components that would desperately love to be broken off to start a life on their own.



**Example of oily dust stuck to the Bearhawk model**

A solution to this problem of cleaning the models is to cover the model with an acrylic (Plexiglas, Perspex if you're British) box. The oil and dust will still fall and attach themselves to the box, but it is much easier to clean the oily dust off of the box, and there is almost nothing to worry about breaking.

The Mustang model is covered with a commercially available display box, because apparently enough people buy models of this size that there is enough demand to make it commercially viable to sell such display boxes. However, the Bearhawk and F-16XL models are big enough that they won't fit in such boxes. I spent some time scouring the Interwebs looking for a suitably sized display box, but none were to be found, at least not at a reasonable price.

My solution was to learn how to work with acrylic and build my own display boxes.



### **Mustang and Bearhawk models on display in their protective boxes**

Because the models are displayed above eye level, I chose to make the base of the box of acrylic for visibility. The sides and top of the box are bonded together and just rest on the base.

#### **Box Design**

The box design is super simple, since the point is to make the dust easier to clean, not to show off my acrylic fabrication skills.

For material, I chose the 0.093 inch (3/32) thick acrylic sheet from Home Depot. At \$59.98 for a 36x48 inch sheet (required for the Bearhawk box), it ain't cheap, but at least it doesn't cost as much as at some other sources.

The size of the top is selected to be big enough to fit around the model. The height of the sides is selected to be tall enough to provide enough clearance above the model. The length of two opposing sides matches the corresponding dimension of the top. The length of the other two sides is equal to the corresponding dimension of the top minus two times the thickness of the material to allow for overlap on the sides. The bottom is 1/2 inch larger than the top in both dimensions so that the box does not have to sit right at the edge of the bottom sheet.

## Cutting the Acrylic

The dimensions for both the Bearhawk box and the F-16XL box were too large to be cut on by bench top table saw. Therefore, I used my track saw (Milescraft 1409 Track Saw Guide, Amazon.com, \$99.99) with my 7-1/4 inch circular saw. I used a carbide tipped saw blade designed for cutting thin metal.

Each cut was planned to be able to cut completely across the sheet at whatever width it was at the time. All cuts were made with the protective sheets in place on both sides of the acrylic.

The last two cuts on the sides were short enough to be done on the table saw, which was done with a similar saw blade for cutting thin metal.



Track Saw set up for cutting acrylic



Saw kerf after cutting

### **Dressing the Edges**

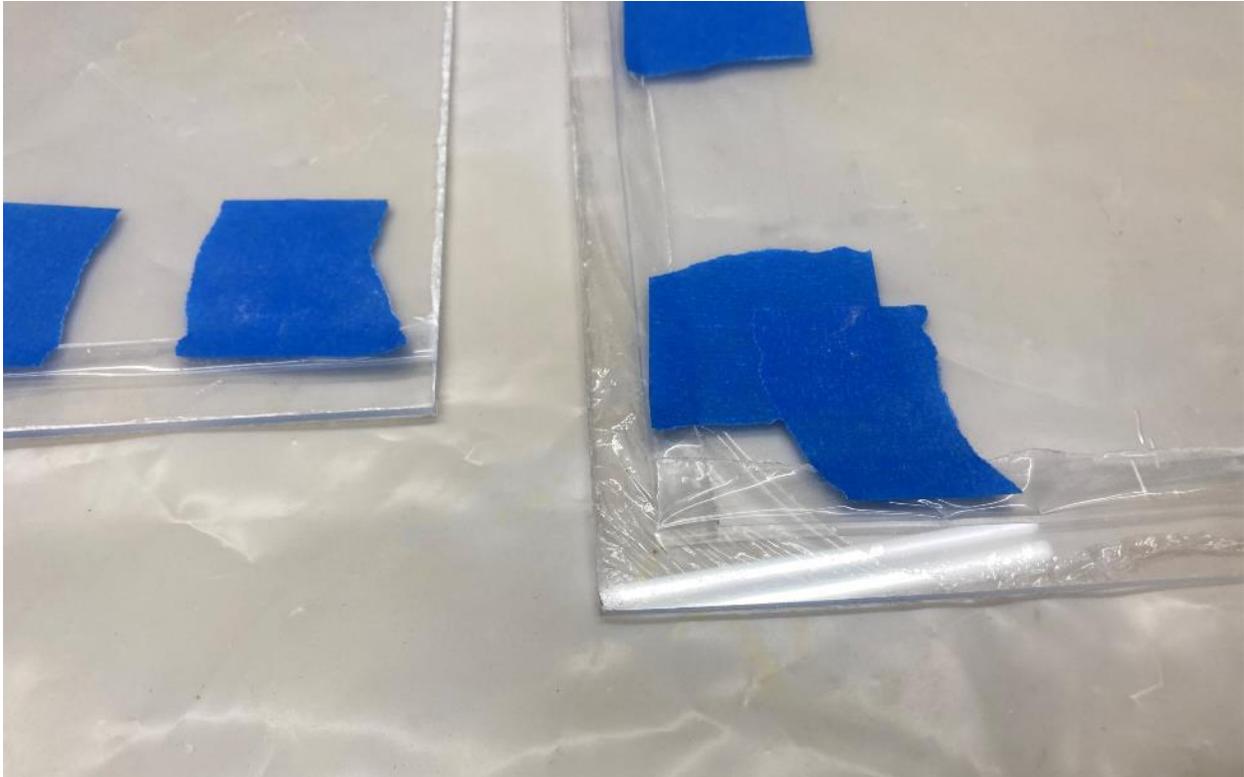
Because the circular saw blade leaves a relatively smooth edge, but not a smooth edge, the edge must be smoothed. Not only does this guard against cracks, it is also necessary to get a good glue bond. The edges can be smoothed simply using 320 grit sandpaper on a sanding block. This is the only grit required for a sufficiently smooth edge for cementing.



**Sanding the edges of the acrylic**

### **Preparing for Cementing**

The protective covering was peeled back about 1/2 inch on the inside surface along all edges that will be cemented on the sides and top. Blue painter's tape was used to hold the protective covering out of the way.



**Protective covering taped out of the way**

A piece of plastic drop cloth was placed on the table to protect the table top. Though not shown in this picture, on the second box I found it useful to shim the top (which is on the bottom—this is cemented upside down) up off of the table to prevent excess cement from wicking between the plastic and the tabletop, thus damaging the outer surface. For shims I used cheap, disposable chop sticks, since we have a large supply of those in the house.

The sides are taped in place on the top piece with blue painter's tape. Chop sticks are used to hold the tape away from the outside of the joints so that the cement wicking through the joint will not wick up between the tape and plastic, thus damaging the outside surface.



**Box taped together, ready for cementing**

## Cementing the Box

I bought the Weld-On 4 cement in a package that came with an applicator bottle. The nozzle on the applicator bottle is a very tiny diameter, roughly the diameter of an old-school hypodermic needle. The can of cement has a very wide opening at the top, and the applicator bottle has a very small opening, so there doesn't seem to be a way to pour the cement into the applicator bottle. The applicator bottle works by squeezing the bottle, so the trick is to squeeze the bottle, stick the nozzle in the can of cement, then release the bottle to suck the cement up into the applicator bottle, much like filling a syringe.



### Cement can and applicator bottle

Because the cement has such low viscosity, the cement is going to be coming out anytime the nozzle is pointing below horizontal. Do not point the nozzle below horizontal until you are ready for the cement to come out. When it is coming out, keep the nozzle against the joint and move it quickly and deliberately along the joint.

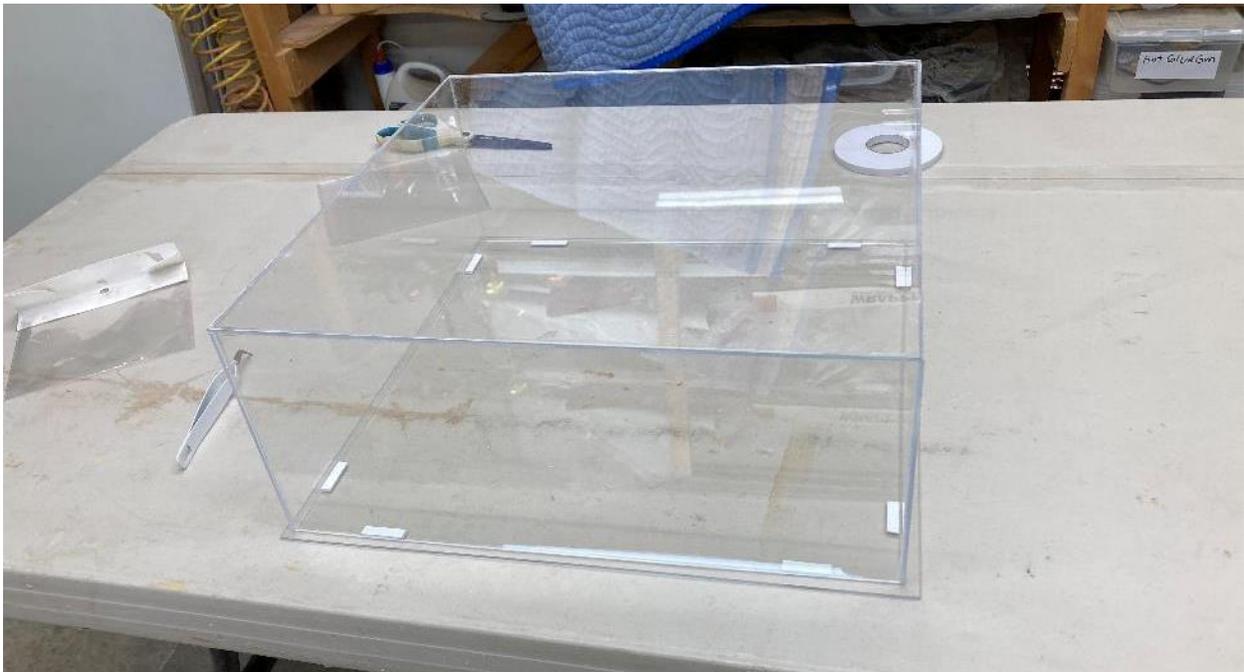
Initial cementing is much like tack welding. Don't try to do the entire joint on the first try. Ensure the plastic is in the proper position, then touch a short distance of the joint with the cement. Hold the plastic until the joint sets. Do this to each of the joints. Once all of the joints are tacked in place, apply cement to the remaining uncemented portions of the joints.

After the cement has had several minutes to set, remove the protective plastic from the acrylic.



**Freshly cemented box in place on bottom piece**

The sides sit on the bottom with a 1/4 inch extra all around, but it wouldn't take much slippage for the top to fall off. Therefore, I marked the position of the outer sides in the vicinity of the corners. I removed the top part of the box. Using a scrap piece of acrylic as a spacer, I placed a piece of 1/4 inch wide, 2 mm thick double sided mounting tape inside of each corner. The lining was not removed from the top of the tape, as it was being used as a stop block for the box side and not to attach two items.



**Mounting tape in place to keep top box from sliding off of the bottom**

- Russ Erb