

Wrapping procedure

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Materials

- aluminized mylar (0.026mm - 0.001in thickness)
- scissors
- tweezers
- ≥ 3 razor blades
- Cricut machine
 - Cricut sticky/tacky mat
 - Cricut blade tool
 - Cricut scoring tool
- orange plastic tube (as in Fig 1)
- acrylic block (as in Fig 1)
- scotch tape
- creaser (as in Fig 1)
- isopropyl alcohol
- kimtech
- gloves

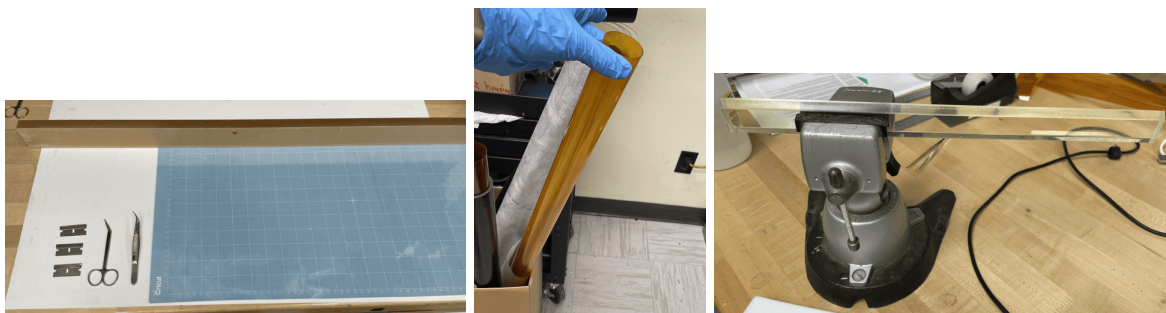


Figure 1: In the leftmost image: razor blades, scissors, tweezers, Cricut mat; acrylic block at the top. Middle image: orange tube. Rightmost image: creaser

1 Procedure

Complete this work in the upstairs of the detector support facility.

Ensure you are wearing nitrile/rubber gloves for the procedure and keep in mind this doesn't mean everything you touch is therefore clean – your gloves can become dirty. The scintillator is extremely sensitive, handling it without gloves can cause the surface to crack due to the oils in your fingers; the evaporation of alcohol can also cause cracks due to the temperature change. That being said, clean every surface and tool you use with isopropyl alcohol.

STEP ONE: Cut a piece of mylar from the roll that is larger than the cricut mat, about 65x35cm. The inner side of the roll is the shinier side (referred to as 'the shiny side' from now on), this is the side you don't want to mar at all. Place the shiny side face down on the cleaned white cardboard mat. Then, using scotch tape, tape it down then pulling up one corner at a time, pull the mylar sheet to provide tension to make the mylar taut and smooth as seen in Fig 2 then retape the edge.

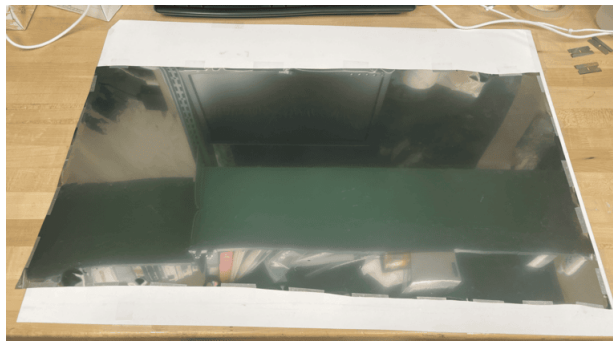


Figure 2: Mylar taped taut to the table

STEP TWO: Roll the Cricut mat down onto the mylar as in Fig 3. Do not place it straight on it as you could introduce bubbles. Press down firmly everywhere on the mat to ensure the mylar is stuck to it. Then cut around the mylar, leaving about 1 cm of mylar overhang from the blue mat, to free the mylar and the mat from the table. Throw out the excess mylar. At this point, you should have a sheet of mylar stuck to the mat with the shiny side up that overhangs past the sticky part of the mat.

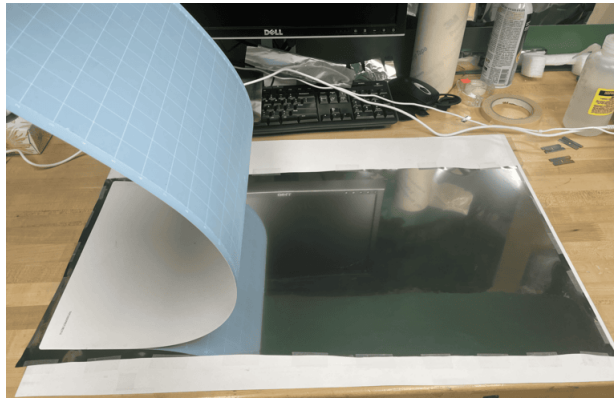


Figure 3: Rolling tacky mat onto taut mylar

STEP THREE: Clean the edges of the long acrylic block. Use the long acrylic block to slide between the mylar and the mat up to where the mat begins to get sticky as in Fig 4. Once in place, use a razor blade to cut along the edge of the block to get a straight cut. Repeat on all sides to end up with what is seen in figure 5

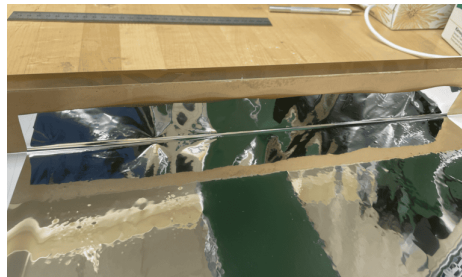


Figure 4: Use acrylic block to cut mylar to just where mat begins to be tacky

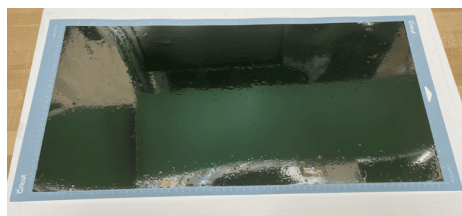


Figure 5: After using the acrylic block and cutting the edge you should be left with this.

STEP FOUR: You will use the `wrapv7-1socre.dxf` file in this latex file for this part. Download the Cricut software from <https://cricut.com/en-ca/apps>. Once there, connect to the machine via Bluetooth or USB. Make a new project and on the left side scroll down to 'upload'. There you can upload the .dxf file and then add it to the canvas. The sizing will be incorrect so you will have to

resize the objects (in 'more' on the canvas). The larger of the two should have a length of 20.8cm and a height of 9.382cm. The smaller should be 2.519cm by 0.917cm.

You will have to ungroup the three shapes then select the large object and the single line that goes across part of it and choose to 'attach' them at the bottom right of the page. Then you will have to select the line and towards the top left of the page you where it says 'operation' you will change it from 'Basic Cut' to 'score'.

To wrap one scintillator, you will need one of the large objects and four of the small ones. Use the "duplicate" feature to make all four small pieces. You can copy and past up to 6 sets of wrapping materials and still have them all print on the area you prepared. It is a good idea to make extra sets of the four small pieces in case there is mistake when cutting them out.

Press "make" and set the mat size to 30.5 cm x 61 cm.

STEP FIVE: Make sure the Cricut machine is turned on, press 'make' on the page. Position each object where you want it and then press continue. For materials, select 'mylar', for pressure select 'less', and set the mat size to 30.5 cm x 61 cm. Ensure you have the correct initial tool in the machine and place an acrylic block behind the input side of the Cricut to support the mat. Follow the instructions in the software to start the cut.

STEP SIX: Cut away excess mylar from what is cut as seen in Fig 6. Then, carefully slide three razor blades underneath the edge of one of the cutouts as in Fig 7.

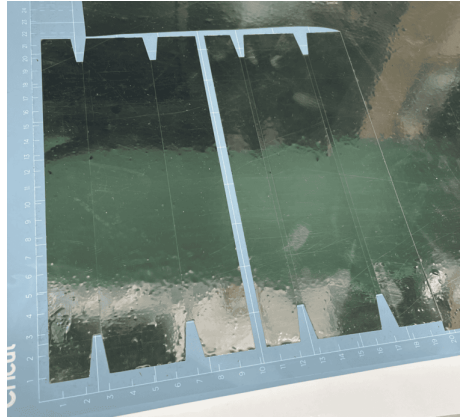


Figure 6: Excess mylar peeled away from the cut out wrapping.

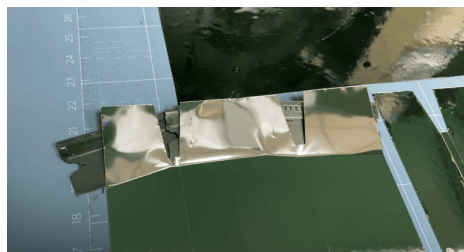


Figure 7: The razor blades carefully slid under the edge of the cutout.

STEP SEVEN: Get the orange tube as seen in Fig 1, clean it with alcohol. Then roll the mylar off of the mat onto the tube as seen in Fig 8 – this prevents stretching the mylar if you were to just try to pull it off with your hands. Be extremely careful with this step as it is very easy to fold the mylar accidentally and crease it. If this happens, throw it out and retry. For the smaller cutouts, you can slide a razor blade under it to remove it, no need to roll it off. Still don't pull it off by hand.

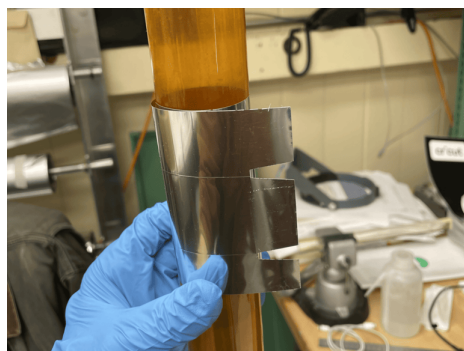


Figure 8: The mylar rolled onto the orange tube

STEP EIGHT: Use the creaser as in Fig 1 to crease along the score line. Then align the crease on the scintillator and make the next crease against the next edge of the scintillator while keeping the mylar as flat to the scintillator as possible. Then deepen the crease against the creaser tool. Repeat this for all edges.

STEP NINE: Use the scotch tape to tape along the seam. This is a very time-consuming step as you have to be very methodical in ensuring the mylar is as tight and smooth to the scintillator as possible. Further, you want it so that when you press the small edges of the scintillator, the mylar does not bubble up on the top. This is because in the set up the scintillators will be squished together, squeezing the sides replicates the final setup situation

Once the big piece of mylar is wrapped you may have to trim part of it so that the edge of the outermost light guides goes slightly past the mylar.

As in Fig 9 fold the small corner parts of the mylar and then cut them as pictured. Then tape them to the corners of the wrapped scintillator as seen in Fig 10

In the end, it should look as in Fig 11



Figure 9: Stages of folding and cutting the small portions of the mylar.

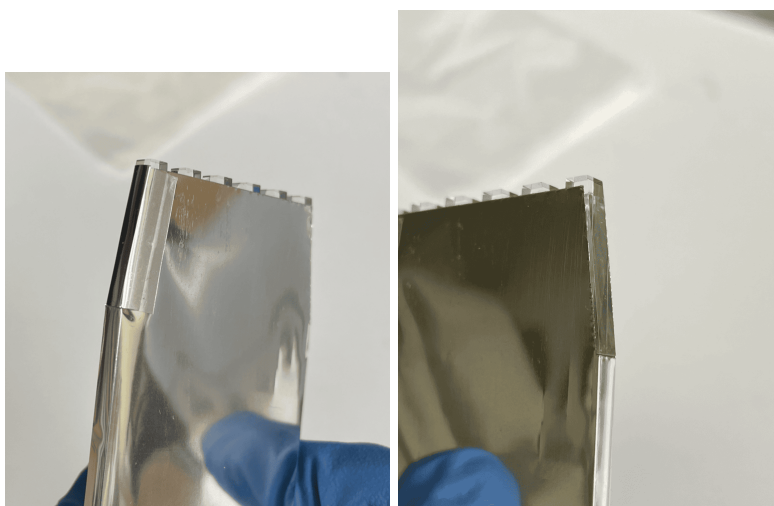


Figure 10: Left is the covered corner, right is the uncovered version.



Figure 11: Wrapped scintillator