



Tool Tip...

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Building A Drying Box

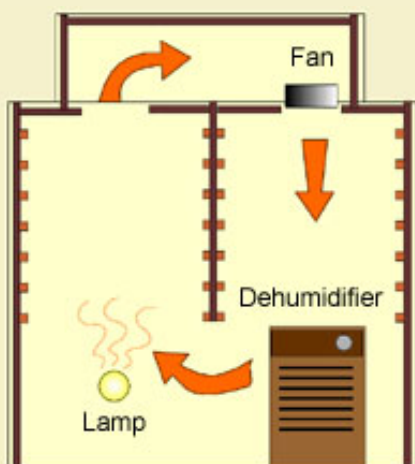


Figure 1: Two chamber design with circulated, warm dehumidified air.

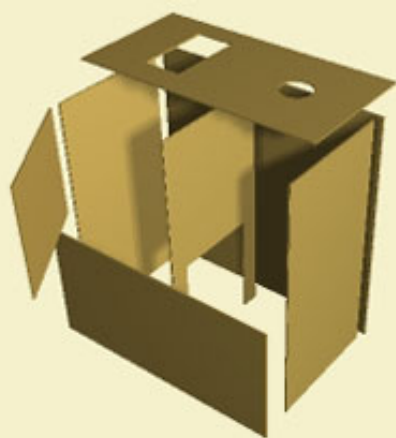


Figure 2: Plywood panel assembly.



Introduction:

Your guild is having a shoot in three days and you don't even have your stars made yet. You need to make your stars and have them dry in time to load a few shells and then dry the pasted shells before the weekend. Possible? It is if you have this dry box! I have gotten through many situations like the one mentioned above without being left empty handed on the field, all thanks to the speedy drying accelerator illustrated here.

There are a variety of methods commonly used for drying both stars and shells. The simplest is to set them out in the sun on a breezy day, but then you have to rely on the weather being optimal and even then you are limited to daylight hours. Placing pasted shells on screens or racks with a fan blowing across them can definitely speed the drying process. Some hobbyists use food dehydrators for accelerating the drying times of their stars.

There are three essential elements for maximized drying efficiency: elevated temperatures, low humidity and air circulation. Air flow is probably the biggest accelerator, with warm temperature the second biggest catalyst. Humidity becomes a problem only in enclosed places where the evaporating water has no place to go.

Do-It-Yourself Drying Box

This drying chamber is compact enough to fit in most workshops yet still allows a lot of material to be dried at one time. The basic concept is a wooden box with two compartments separated by a half wall that allows air to flow from one chamber to the next. A fan is placed in a hole at the top of one chamber, which draws air from a hole in the top of the other chamber. This circular airflow passes by a dehumidifier to keep the air dry, and a light bulb is used to heat the air to about 100 degrees (varies depending on external temperatures). The sides of both chambers are fitted with runners to hold up to 14 screens total.

A second box is placed on top of the cabinet to act as an air duct between the chambers. This can be a wooden box that you build or even just a cardboard box that is taped down so that air can not leak in around it.

Figure 2 shows how the plywood pieces go together. I prefer the use of dado joints for assembling plywood cabinets of this type, but just butting the ends up against each other with wood glue between them and screwing them together with wood screws should work fine.

Figure 3 and 4 shows how the two pieces of plywood required to make the cabinet should be cut. The dimensions were chosen to create the least amount of waste and also require the least amount of cutting. A taller box that

Figure 3: Cut sheet for first 4x8 3/4" plywood sheet.

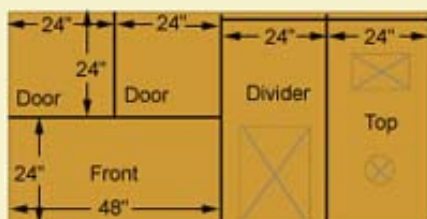


Figure 4: Cut sheet for second 4x8 3/4" plywood sheet.

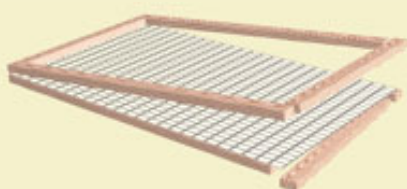


Figure 5: Drying screen construction.

holds more screens could easily be made if you can afford another sheet of plywood.

The cutouts for the center wall and the top airflow holes are arbitrary, so don't worry about exact dimensions. You will want to obtain the fan you will use first before cutting out the round fan hole. A good source for surplus fans and other types of motors is [MECI](#).

Screens

You will want to build a good number of screens to go along with your dryer. It is good to have a fine mesh screen like window screen for drying smaller stars, and strong screens made from 1/4" hardware cloth for drying heavier things like shells. The screens are made as shown in Figure 5, using two sets of 1"x3/4" wooden frame members to sandwich the screen between.

The corners of the frame sets are staggered so that the joints of the bottom and top do not align. Prefit the two frames on top of each other without the screen, square them up, and drill the pilot holes for the screws first. You will need to actually put in the screws as you go in order to keep the pieces from slipping out of square as you drill all the holes. When all the screws are in, back them out just enough to get the boards apart, then place the screen between them.

The window screen is easier to cut oversized and trim with a utility knife after the frame has been assembled. Hardware cloth should be cut to the correct size before framing.

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Drying Box

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Figure 6: Drybox with screens.



Figure 7: Left side contains high wattage bulb to provide heat.



Figure 8: Right side contains dehumidifier to keep air dry.

The drying box shown in Figure 6 is not the full 48" wide as the plans here show, due to space limitations in my shop. It is also comprised of two single units pushed together, since my first dryer was only one compartment. Like everything pyro, more is better and I had to expand capacity without throwing out my original dryer. So you will see an odd seam down the middle that shouldn't be there if built correctly.

Figure 7 shows the left chamber with the 100W bulb for heat. Note that pieces of wood are used as shields above the bulb to prevent comp from falling onto the exposed bulb and causing a fire risk. The wooden slats that hold the screen are 23" long pieces of 1" x 3/4" pine nailed to the sides. A 2" spacer is used as a guide between the slats when nailing them in order to make sure they are all the same distance apart. These supports are easiest to attach to the side pieces before the cabinet is assembled.

Figure 8 shows a Sears dehumidifier at the bottom of the box. The water collection bucket can be emptied manually or fed out the side of the box with a hose.

Figure 9 and 10 shows the fan duct box at the top. The gray weather stripping is used to make a good seal around the edges of the box. Temperature inside the box is monitored using a Radio Shack temperature and humidity meter, seen in Figure 11. The outdoor probe is routed into the box so that the meter can be mounted elsewhere. For \$20, this meter can measure two temperatures plus give you a humidity reading- which is a good safety feature to have in any pyro shop.

Fast Pyro:

This drying box can dry some types of stars within one day. Cut stars and small comets made from grainy type mixes will dry very fast. However, care must be taken when using this tool to force dry stars. Many types of stars such as round stars rolled from fine charcoal or lampblack mixes are very easily driven in, especially if they are placed on the right side directly under the fan. I generally use the less breezy chamber on the left for drying stars, while the right side is used for drying shells. Placing almost any kind of stars under the fan on the right will surely get them driven in. I usually let charcoal streamer type stars air dry outside the chamber for several days before even putting them into the dryer.

This box will dry a 4" comet in just one week (if it has a hole down the middle and was dampened with less than 10% water). It will dry a full load of vacuum hemispheres in just one day. Pulverone, corned BP and break charges of rice hulls, cotton seeds and puffed rice cereal all dry within one day. Canister shells take about 2 days to dry, while ball shells about 4 depending on the number of pasted layers and the temperature inside the box. Temperatures around 100 degrees are ideal.



Figure 9: Underneath the air hood on top.



Figure 10: Small fan circulates air through the chambers.



Figure 11: Radio Shack temperature/humidity gauge.

There are probably many variations of drying boxes you can build to achieve the same effect. As long as you can get warm, dry circulated air flowing around your screens then you will see drastically faster drying times. Once you start using something like this, you will wonder how you ever got along without it! 🔥