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Build a drying box

Construction method and materials lists for a heated drying box built around a baker's rack, with framed drying screens, plus early notes on a smaller half-size version.



When manufacturing components such as stars, often they need to dry thoroughly before being used in shells or other products. Having a drying box, with controlled airflow, improves the drying process.

This article describes the construction of a large drying box, and the construction of framed screens used for holding the items to be dried. Following that are thoughts about a half-size drying box design variation.

This project requires intermediate-level carpentry skills and tools. Make your plans before starting construction, as some of your components might be different size than what I used. Additional materials such as fasteners will be needed. All measurements indicated are in inches unless otherwise noted.

Full-size drying box

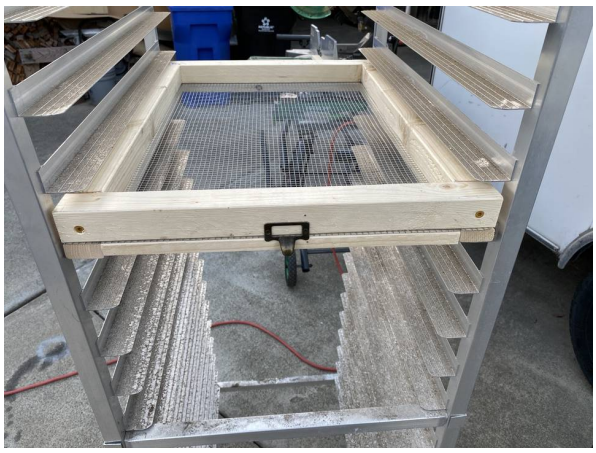
In general, this drying box is built around a commercial baker's rack which holds the screens. The box is constructed of a wood frame around the baker's rack, with plywood attached to the frame. The rack I used holds up to 18 framed screens, which are 17.75"x25".

Screen construction

For 20 screens, you'd need 20 sets of the following materials. The screens have 1/4″ hardware cloth sandwiched between the top and bottom pieces of the frame. A finger pull is added to the front of each screen after assembly. It is always nice to have extra screens so you can cycle them in and out of the box with newly manufactured items that need drying time.

- 2×2 Cut size 21″ sides x2 4 per 8′ piece
- 2×2 Cut size 17.75 ends x2 5 per 8′ piece
- 1×2 Cut size 24 sides x2 3 per 8′ piece
- 1×2 Cut size 14.75 ×2 6 per 8′ piece
- 1/4" hardware cloth, enough for the desired number of screens
- Finger-pull hardware, one per screen





Drying box air control and ducting

Ducting directs heated air into the side of the box, and the explosion-proof exhaust fan resides at the top of the box is set to pull and provides an exit for warm moist air.

- 7″ duct reducer to 6″
- 6″ semi rigid duct
- 6″ stove collar: AC Infinity 6" Ducting Take-Off Collar, Galvanized Steel Inlet Flange Starter Collar for 6″ Ducting with Dryers and Range Hoods https://a.co/d/atVbkTa
- Explosion Proof Exhaust fan: DNYSYSJ 7 Inch High Airflow Exhaust Fan, 110V 50W 2800 RPM Noise-free, Explosion-Proof Ventilation Extractor Fan Axial Fan for Kitchen Warehouse and Workshop, Black Stainless Steel https://a.co/d/12tWbvG
- Ceramic 1500W (or higher) portable heater, ideally with a round grille to connect to the ducting, but you can adapt most 1500w heaters with some ingenuity, and a trip to the home heating and cooling section of your local hardware store.











Rigid ducting provides an interface between the heater and the flexible ducting attached to the box. You may need to modify the rigid ducting assembly based on your choice of heater.

Box enclosure and finishing

The drying box is constructed by assembling the frame around the baker's rack. Make sure the screens fit nicely! Then the plywood bottom, sides, and top are added, with wheels on the bottom as desired. The back and hinged front are then added, and the airflow ducting and fan are installed.

Lumber (for box frame and door reinforcement)

- 10 pieces of 2×2×8
- 12 pieces of 1×2×8
- 5 pieces of 2×3×8
- 2 pieces of 2×2×18, for door reinforcement

Plywood

- 2 pieces of 26.5 × 63.5, for side walls
- 2 pieces of 24.25 × 63.5, for front door and back
- 26-3/8 × 17-5/8, installed at the bottom of the baking rack
- 24.25 × 30, for top

Hardware (purchased on Amazon or locally at a hardware store)

- Hinges (2)
- Heavy Duty Adjustable Toggle Latch Clamp With Lock Hole 300Kg 660Lbs Holding Capacity (7.5inch(2pak)) https://a.co/d/fAlQuDx

- 5″ screw/bolts, 2 each
- Sheet metal screws 3/4″ for intake and heater
- 3" deck screws
- Door handle
- Full size bakers rack
- Caster wheels, 4 each(included with bakers rack purchased from amazon)





The box frame is constructed around the baking rack. Test-fit the screens before proceeding!





Plywood is added to the frame, and 2×2 pieces add rigidity to the hinged door. Caster wheels make the box easier to move - it can be heavy when loaded with materials to dry.







The finished box has the ducting and fan installed. Painting the exterior makes easier to clean and protects the wood. When finished, the box can be transported to the manufacturing site. Since our sites can be windy, I added eye bolts at the top to be able to stake the box down to avoid the wind knocking it over.

Half-size drying box - a plan for a later article

I have been accumulating notes, as I plan on building a couple smaller than half size (4-5 screen) in the future (will post a better bill of materials later). It would be a completely made from scratch without a baker's rack involved, meant to sit on a table or other hard surface, and will be easier to move in a smaller vehicle. The cheap $20 Walmart rectangular heater would mount on the back of the box with a piece of aluminum mesh spark arrestor material between the heater and box. A 2000W generator will run the box, albeit it does work fairly hard to achieve the power necessary.

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Read it online

With the videos and comments: https://www.westernpyro.org/blog/drying-box