Steam Box Plan

Steam Box Components

A Top/Bottom
B Sides
C Rear Cap
D Door
E Gasket/Seal
F Support Dowels
G Feet
H Thermometer

Kit Contents

1 Steam Generator
2 Steam Hose
3 Brass Fitting
4 Hinges
5 Latch/Clasp

CAUTION: Burn Hazard. Steam, dripping water, and heated workpieces are hot. Keep hands and face away from steam box when opening. Use protective gloves when handling the steam box and steamed workpieces. Read and understand all safety information and instructions that come with the steam generator.

Introduction

Low pressure steam is an age-old method of softening wooden components for bending them into curved shapes. The heat and high moisture soften the fibers of the wood, allowing it to bend in the shape of a press or form. As the wood cools, it retains the shape that it was formed into with only minor spring-back. The key elements for steam bending are a shaped form, a steam source, and an enclosed steam box. This Rockler® steam kit contains the portable steam generator and hardware necessary to construct a steam box using your wood. (See “Kit Contents” above.)

Steam Box Construction

Your steam box should be as small as possible while still accommodating all of your workpieces. The smaller the box, the less steam energy it takes to bring it to temperature and keep it there. The box should also have a flow-through design so that steam enters at one end and exits at the other end, but is relatively tight so that most of the steam and heat remain within the box. Here are some tips for constructing a steam box:

General

- The box can be constructed from either solid wood or plywood (exterior grade preferred).
- The box should be sloped upward slightly on a set of legs so that condensed water runs to the back, but also so the steam flows toward the front.
- Assembling the box using simple butt-joints with screws (without glue) will allow you to disassemble the box and reuse some parts for making other sizes.

Steam and Support

- Drill a 9/16” hole in the center of the Rear Cap to install the brass steam fitting.
- For maximum cross-flow of the steam while maintaining good steam capacity, build the box as tight as possible, and drill a small vent hole in the lower face of the front door.
- A meat thermometer can be used to monitor the internal box temperature.
- Dowels are used to elevate the workpiece off the bottom of the box.
- Heat rises, so the workpiece should be elevated to be near the top of the box.
Wooden dowel stock is available from Rockler or most home centers. Don’t use metal rods.

- The dowel holes can be through-holes, but stopped holes will keep the dowels captured between the sides without fasteners, and also prevent steam from leaking out.

Rear Cap and Door

- Note that the Rear Cap (where the steam line connects) butts to the outside of the box instead of being captured between the sides.
- This allows you to remove the Rear Cap (and therefore the brass fitting) without taking the rest of the box apart.
- Make sure you install the brass fitting into the Rear Cap before securing the Rear Cap to the rest of the steam box.
- For best results, seal the door with 1/8" weather stripping.
- Using the provided hinges and quick acting latch allows you to remove one workpiece at a time without losing too much heat from the box.

Steam Box Sizing

The practical limitation on the size of the steam box is how much steam you have available to heat it, and the efficiency of the box for heating up and staying hot. Individual results will vary, but boxes larger than 6’ x 6’ x 4’ or thicker materials may require compensation to achieve sufficient steam energy, as described in the following sections.

Thicker Materials

The general rule of thumb is that each inch of material thickness requires 1 hour of steaming. For thicker materials this may exceed the length of time a single steam generator can supply steam without refilling. To increase the length of time that steam is available without cooling down while fresh water is being heated, use two steam generators with staggered start times so that one generator is producing steam while the other is heating the water.

Larger Steam Boxes

The larger the steam box, the greater the volume of steam required to maintain the temperature. A simple solution is to use two steam generators at the same time for a greater volume. However, there are a few other things that can be done to extend the efficiency of the existing steam:

- Heating up the steam box itself can take a significant volume of your steam energy. You can pre-heat the steam box and then replenish your steam generator while you load the workpieces into the box for final steaming.
- To reduce the amount of steam energy lost to heating the box, reduce the thickness of the box material and insulate the exterior of the box. However, make sure to use insulation capable of sustaining at least 212°F (100°C).

Basic Operation

Observe all safety warnings that accompany your steam generator.

1. Make sure the steam generator is unplugged from electrical power.
2. Fill the steam generator with water to the "Max" indicator on the side (approximately 5.3 quarts). Use hot water to decrease the initial heating time.
3. Connect the flexible steam hose between the steam generator and the brass fitting on your steam box.
4. Connect the steam generator to electrical power.
5. While the steam generator is heating the water, load your steam box with the material to be steamed. If you are steaming more than one piece, make sure there is enough air space between pieces for steam to reach all sides of the material.
6. Close the door on the steam box and observe the temperature of the box. When the internal temperature reaches 212°F (100°C), count the length of steaming time based on the approximation of 1-hour per inch of thickness of wood. The steaming time may vary depending on the species of wood, the degree of bending required, and the actual thickness.
7. When the steaming is complete, you need to work quickly to get the workpiece into your forms while it is still hot. Leave the remaining workpieces in your steam box until you are ready to clamp them in the forms.

Further Reading

For additional reading and techniques on Wood Bending, the following books are available from Rockler:

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<tr>
<th>Catalog #</th>
<th>Title</th>
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<tbody>
<tr>
<td>41028</td>
<td>Wood Bending Made Simple</td>
</tr>
<tr>
<td>36247</td>
<td>Woodworker's Guide to Bending Wood</td>
</tr>
<tr>
<td>65913</td>
<td>Complete Manual of Wood Bending</td>
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Attention Rockler Plan User

Before starting, please read the plan completely. Check Rockler.com for updates that may not be included on this copy. If you have further questions, please contact our Technical Support Department, 1-800-260-9663 or support@rockler.com