Vacuum Forming Guide

Architecture Dept
8/13/2014
## Revision Table

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<tbody>
<tr>
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Familiarize yourself with the location of all the controls.

Air supply is behind the operator, to the left of the door by the table saw (see photo in the Machine Operation section).
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**CONTROL PANEL**

- **Hand Light indicator**: It starts the cycle and controls the sliding motion of the plastic holder.
- **UP**: Controls the upward motion of the perforated wooden table and the vacuum action.
- **START**: Enables the cycle.
- **STOP**: Cancels the command and stops the process.
- **EMERGENCY STOP**: Logs the emergency stop input.
- **HAND/OFF/AUTO Switch**: Switches between manual, off, and auto modes.
- **AUTO Light indicator**: Indicates the auto mode is active.

*Images of the control panel with labeled components.*
### SAFETY AND CONDUCT

- Make sure that there are no materials
  - behind the fan,
  - on top of the heaters,
  - inside of the Vacuum Former,
  - on the safety metal tray, or
  - on the wooden vacuum table.

  The equipment has movable parts, make sure nothing is obstructing its path.

- Dusting off the equipment may be necessary before use. **WOOD DUST WILL STICK TO YOUR HEATED PLASTIC.**
- **DO NOT** leave the equipment unattended during use. This will result in the suspension of your shop privileges.
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What can & can’t you vacuum form?

Things to keep in mind:

- If the plastic piece wraps around your mold THINK about how you would separate them. If your mold is a convex object, such as a sphere, the plastic will wrap around it and you will not be able to get it out.

- It is critical that the mold does not exceed the dimensions of the table (24” by 24”) as it may obstruct the path of operation of the equipment and damage your mold or the equipment.

- This equipment uses vacuum pressure. If your mold is flimsy or delicate, you run the risk of damaging it. Use a firm material for your base mold. Clay (fully dry), pink foam (however the heat of the warm plastic may melt the surface of your pink foam), Styrofoam, wood, and laminated chipboard topos make for good base molds.

- **Note:** it takes 3 minutes on 45% power for a 1/16” thick piece of plastic to heat up adequately. Based on this, make the necessary adjustments.
Machine Operation

GETTING STARTED

- Make sure the air valve is open (Look behind you, to the left of the door opening by the table saw)

- To turn on the Vacuum Former,
  - Flip the main power switch to ON
  - Turn the black power knob to ON
  - Turn the Heaters knob to ON
  - Turn the Pump knob to ON
  Yellow indicator lights will come on for each

Main Power Switch
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- Place a 24” by 24” piece of plastic in the plastic holder. Make sure to clamp it down firmly by pressing the handles on the left and right side of the plastic holder all the way down. Verify that the holder is firmly holding the plastic all the way around the edge.

- Place the mold on top of the perforated wood table (please review the section “What can & can’t you vacuum form?” section for construction and size requirements).
VACUUM FORMER SETTINGS

On the touch screen you will see the following display. Press “SELECT RECIPE”. This is where you adjust the parameters of the vacuum forming cycle.

Press “PLANNING” in order to access the list of parameters to adjust.

HEAT ON TIME refers to time in seconds that the plastic will be under the heat.

You may make changes to the SETTING PARAMETERS by directly pressing on the values. Remember the time is in seconds. Press “ENT” when you are done.
**BOTTOM PLATEN DELAY:** amount of time in seconds that the perforated wooden tray takes to rise up after the holding tray comes out of the heat. *(0.00 SEC. RECOMMENDED)*

**BOTTOM TIMER:** amount of time in seconds that the perforated wooden table would stay in the up position. *(30 SEC. RECOMMENDED)*

**VACUUM DELAY:** Vacuum Delay refers to amount of time in seconds before high pressure vacuum starts once the perforated wooden table is in the up position and the properly heated plastic is ready to be formed on top of your mold. *(2 SEC. RECOMMENDED)*

**VACUUM TIME:** Is the duration (in seconds) the vacuum will stay on. (This step determines how tight the plastics wraps around your base mold) *(60 SEC. RECOMMENDED)*
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**AIR EJECT:** Is the time in seconds between Vacuum Time and the depressurization. In other words, the time that the form would stay pressurized. (This step determines prevents the plastic from retracting from your mold) *(2 SEC. RECOMMENDED)*

**LENGTH OF TRAVEL:** The time allowed for the perforated wooden table to come back down. (Do not change this setting unless you want the perforated wooden table to lower all the way down after the vacuum forming is completed. *(2 SEC. RECOMMENDED)*

**MOLD-COOL TIME:** time in seconds for the cooling fan to stay on after the vacuum forming process is complete.

**PART-COOL TIME:** time in seconds that the newly formed piece would stay in place (even after the fan shuts off)
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**HEATERS:** You can adjust the power level of the 4 top heaters separately. (This is not recommended - keeping them the same is recommended)

- After pressing “NEXT” on the “HEATERS” menu, the system will take you back to the “SELECT A RECIPE” menu screen.

**Saving your Settings**

- Press “SAVE RECIPE” follow by “USE RECIPE” to save your settings.

  *(This is a crucial step to save any changes made to the preset parameters)*

- Press “EXIT” after saving your settings. It will take you back to the following screen where you would be able to see the timing of each parameter as they get executed
AUTOMATIC MODE

The AUTO mode will allow you to complete one vacuum forming cycle with the press of a button. However you must first establish the parameters.

- We strongly recommend a “dry run”. Meaning running a test cycle without molding plastic.

- Locate the Settings control panel and turn the knob toward the right to “AUTO”

- Press the “START “and watch it go. The machine will perform an entire cycle following the set parameters.
MANUAL OPERATION – (HAND MODE)

HAND mode offers you greater control over your vacuum forming process. Note: This mode also requires closer attention. All the parameters described in the previous section “VACUUM FORMER SETTINGS” can be performed directly by the operator. Read over that section to become familiar with the parameters before continuing with HAND MODE. Refer to the “Safety and Conduct” & “Getting Started” sections before turning the machine ON.

BEFORE STARTING

- “HAND MODE” still requires the time parameters to be set. Ex: Say the “HEAT ON TIME” parameter is set for 30 seconds; this would be the total time that the holding tray would stay under the heater each time. Set this and any other parameter to your desired times before hand.
- Become familiar with the Control Panel

- We strongly recommend a “dry run”. Meaning running a test cycle without mold or plastic. (Get familiar with the machine)
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- Locate the “Settings” control panel and turn the knob toward the LEFT to “HAND”.

Start Button: Press once and the plastic holder will slide under the heaters (remember that it will stay there for the time set under “Heat on Time”). You may stop it at any time. By pressing the “Stop” button.

When the plastic piece is warm enough (When it is sagging evenly and looks like a big bowl or bubble, approximately 2” from its original state), press the “STOP” button to bring the plastic holder back above the perforated table. At this point the plastic is losing its elasticity, so act quickly. Press the “UP” button to elevate the perforated wooden plate.

Press the “UP” button a second time and the air will be vacuumed out. (Allow time for the vacuum to suck the air out and the plastic to fully form around your object. This could take as much as 20 seconds.)

Press the “UP” button a third time and the cooling fan will go off. Allow time for the plastic to cool down. (60 seconds is recommended)

In order to release the pressure and bring the perforated wooden table back down, press and HOLD the “Down” button until it returns to its original position.

Unclamp the piece of plastic and enjoy!

- Make sure to turn off the equipment and close the air valve when you are finished.
Recommended Materials and Vacuum Former Settings
This section will be developed from data gathered as different types of materials are used for different projects.

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