

Filter Press Owner's Manual

Custom Model STF – 1 2022

Introduction and Overview

The Springboro Tree Farms STF-1 2022 is a hobby-level filter press designed and built by Daryl Sheets. The hand-actuated Guzzler® brand pump that came with the press was replaced (January 2022) with a built-in pneumatic diaphragm pump (also provided by Daryl Sheets). See appendix for more about the pump.

Contacts:

For aluminum press parts, filter paper, diatomaceous earth (DE) and the diaphragm pump:

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1-814-337-3149 (cell phone...last resort)

Note:

This documentation has been developed by Springboro Tree Farms and reflects their specific operating environment used in their maple syrup production facilities and processes.

Operating Modes

There are three operating modes that will be referred to in this document:

1. Normal Operating Mode
2. Recirculation Mode
3. Pressure Relief Mode

Warning: When pre-heating, charging and filtering, the pump and related hoses will be hot.

Normal Operating Mode

This mode is used for charging the press, filtering syrup and cleaning.

Normal Operating Mode Set Up instructions for filtering:

1. Set the blue handle on the 3-way valve so that the handle is perpendicular (at a 90° angle) to the pipe that connects the outlet from the pump to the 3-way valve. In this position the blue handle points to the back wall.
2. Connect the quick connect line from the finishing pan outlet at the bottom back left side of the finishing pan to the lower inlet port on the back of the pump.
3. Connect the quick-connect recirculation line from the recirculation outlet (downstream from the pump and before the press) to the recirculation inlet located on the upper left side of the finishing pan.
4. Attach the quick connect filtered syrup outlet line to the outlet port on the press. Hang/hold the line so that it empties into the finishing pan or canner, as will be called for in the following instructions.



Note: Always be sure the press, the lines and the polypropylene seat inside quick connects are clean.

Recirculation Mode (used as required for larger batches)

When processing large volumes of syrup, this mode may be useful in the mixing of diatomaceous earth (DE) to help ensure the DE is completely mixed into the hot syrup.

Recirculation Mode Set Up instructions:

In this mode, set the blue handle on the 3-way valve so that the handle is parallel, and in alignment with the pipe that connects the outlet from the pump to the 3-way valve.

The syrup line set-up is the same as for 100% Operating Mode instructions.

Place the end of the filter press out line so that it hangs into the finishing pan. Be careful to route that line over the top of the recirculation line so that it is NOT located close to the gas burner under the finishing pan.



Pressure Relief Mode

This mode is used to control system pressure in the press. System pressure can fluctuate from mid 20s to a mid-50s psi.

This is an “in operation” adjustment used to manage system pressure. Use the gauge located after the pump and before the filter press to monitor system pressure.

Warning: Excessive system pressure may cause plumbing and/or filter press failure, sudden high-pressure leaks of extremely hot syrup resulting in serious burns and other injury.

Pressure Relief Mode Set Up instructions

Set the blue handle in the 100% operating so that the blue 3-way valve handle is perpendicular (At a 90° angle) to the pipe that connects the pump outlet to the 3-way valve (i.e., pointing toward back wall).



Then as the system pressure begins to increase, slowly and gently begin to crack the valve to the left (turn counter-clockwise) as needed to bring system pressure to its initial operating level (or slightly higher). This will cause a flow of syrup through the recirculation line back into the finishing pan.

You may continue to operate in the Pressure Relief Mode so as long as there is flow to the canner and system pressure stays only a little higher than the initial system pressure at startup.

[Photo of press with paper loaded to be added...]

Press Set-up Instructions

Pre-operation checks:

- ✓ Ensure the plates and other parts of the press are clean and dry. Since we heat and charge the press with water there is no need to dampen the papers for assembly.
- ✓ Assemble the plates onto the press. Make sure that the hump near the topside of each plate is on the right-hand side as you face the press. The order of plate assembly beginning at the front is: one thick plate, then a thin plate and alternating thick and thin plates. At the end of the nine-plate assembly process there are two thick plates at the front of the press assembly and two thick plates at the back of the assembly.
- ✓ Loosen the handles of the press to ensure enough room to insert the filter paper.
- ✓ Insert the filter paper between the plates with holes in the paper down. Make sure that the paper sheets are placed all the way down until they firmly touch the bottom and are only slightly visible at the top of the plate assembly.
- ✓ Torque left and right handles evenly...small increments at a time...and NEVER use a mechanical advantage...hand tighten only.

You are now ready to begin the press warming and charging (with DE/water mix) processes.

Warming and Charging Instructions

Initial preparation:

- ✓ Charge (turn on) the air compressor/system in the garage. Set the regulator on the compressor to 90 psi.
- ✓ Heat the syrup in the finishing pan to 190° - 200° F. Monitor the syrup temperature thru the entire process to ensure it doesn't further evaporate.
- ✓ Heat a full tank of water in the tall stainless tank on the Sugar Shack stove to 200 degrees. Note: this can take up to 2 hours.

Pre-operation checks:

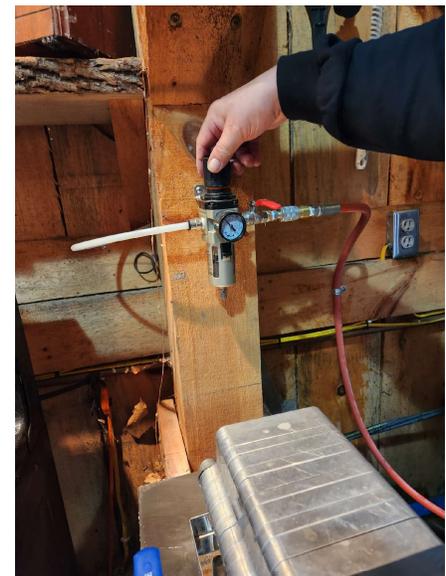
- ✓ Set the machine to the Normal Operating Mode (see instructions above).
- ✓ Make sure drip pan is under filter press and under the pipe that runs along the left side of the press.
- ✓ Make sure filter press plates are tight...hand tight...but tight.
- ✓ Take the filtered syrup outlet line connected at the outlet port on the press and hang/hold the line so that it empties into the tall stainless pan holding hot water.
- ✓ Be sure the valve at the finishing pan outlet is in the off position
- ✓ **IMPORTANT:** Make sure all lines are disconnected from the finishing pan.

Pressurize the pneumatic system and test the pump (dry run with no hoses attached):

- ✓ Charge the air compressor/system tank with the regulator set to 90 psi.
- ✓ Set the regulator at the pump (i.e., on the post) to 50 psi. (Note: during the filtering process adjust the regulator at the pump to maintain the right “sound” and “pace” of the pumping action.)
- ✓ If the regulator is bleeding air, you will hear an air leak. If so, cover the hole at the bottom of the valve with your finger. This will reset the internal valve and when it does the air will stop leaking.



- ✓ Open the regulator valve to operate the pump.
- ✓ If the pump fails to operate at system pressure, it may be necessary to further adjust the pressure at the regulator. (See Appendix A for more information.) This is done by pulling up and twisting the regulator adjustment fixture on the top of the regulator.
- ✓ When the pump begins to operate press the regulator adjustment mechanism back down.



Pre-heat the press:

- ✓ Ensure the extension hose connects from the existing short hose so that you can reach the outlet valve on the tall stainless tank of hot water.
- ✓ Make sure the outlet hose and fitting from the filter press hangs in the top of the tall stainless water heating tank.
- ✓ Run the system in the normal operating until the press plates are hot. This should take 3 or 4 minutes.
- ✓ Put 3 cups of DE in the dairy bucket and then shut the system off.



Prepare the charging solution:

- ✓ Move output hose from the tall stainless tank to the dairy bucket...and run 2 gallons of hot water into the bucket.
- ✓ Whisk the DE into the water until mixed/suspended.



Charge the press:

- ✓ Be sure the valve at the finishing pan outlet is in the off position and ensure that all lines from the finishing pan are disconnected.
- ✓ Continue to monitor the heat of the syrup in the finishing pan. Maintain a temp of 190° - 200° F.
- ✓ Continue stir/whisk the 3 cups of DE in the 2 gallons of water throughout the pre-charging process.
- ✓ Turn valve off on water heater tank and remove the extension hose.
- ✓ Put the extension line into the bucket.
- ✓ Put the outlet line on to the floor. We're watching this line for clear water as the 2 gallons of DE/water mix are processed thru pump.
- ✓ Run the system till the bucket is empty and the 2 gallons of DE and water mix has been processed thru the system.

The press is now pre-heated and pre-charged and ready for filtering syrup.

Filtering Instructions

Pre-operation check:

- ✓ Prepare the canner. (See canner instructions)
- ✓ Monitor syrup temperature in the finishing pan. Do not start filtering process until syrup is 200°F. Maintain a syrup temperature of at least 200°F but no higher than 210°F throughout the filtering process.
- ✓ Whisk 1/4 cup DE for every gallon of hot syrup being processed. Note: capacity of finishing tank is 1 gallon per inch of depth.
- ✓ Continue to whisk DE in the syrup thru out the process.

Transition from warming and charging the press to filtering syrup through three steps.

1. Purge water from the pump:

- ✓ Set the system to Recirculation Mode so blue handle is pointing left toward the stove.
- ✓ Put the recirculation outlet hose in the bucket and run the system in Recirculation Mode.
- ✓ Watch for water to turn syrup color
- ✓ Stop when you see color



2. Purge water from the press:

- ✓ Set the system to the Normal Operating Mode (blue handle pointing to back wall).
- ✓ Put the output line (with the fixture) from press in the bucket
- ✓ Run the system and as soon as you see color stop...this will only take few seconds
- ✓ Move the output line to finishing pan



3. Filter syrup:

- ✓ Run the system
- ✓ Watch output line (with fixture) now running into the finishing pan for clear syrup



- ✓ When it's clear, shut the system down and move output line (with fixture) to the canner
- ✓ Turn system back on and continue filtering until finished



Operating tasks:

1. Manage System Pressure

- ✓ During system start up, as syrup first flows through the press when the machine is in the **Normal Operating Mode**, **TAKE NOTE OF THE INITIAL SYSTEM PRESSURE**.
- ✓ Then monitor pressure. If pressure raises more than 5 PSI, set the machine into the **Pressure Relief Mode** by slowly turning the blue valve handle counter-clockwise.
- ✓ Watch the gauge and bring the pressure back to the starting level or a little higher. Operate the valve handle as needed throughout the filtering process in order to maintain initial system pressure +5 PSI. This will cause a flow of syrup back through the recirculation line into the finishing pan.
- ✓ You may continue to operate in the Pressure Relief Mode so as long as there is flow to the canner and system pressure stays only a little higher than the initial system pressure at startup.

2. Manage Incoming Syrup Temperatures

- ✓ Monitor the temperature of the syrup in the finishing pan and hold heat between 200 and 210 degrees.

3. Manage Canner Syrup Temperatures

- ✓ Watch the temperature in the canner and hold the temperature at between 180 and 190°F (No more than 195°F).

Cleaning Instructions

Pre-operation check:

- ✓ Set the valve to the **Normal Operating Mode**
- ✓ Connect the outlet line from the press into a clean stainless steel dairy bucket.
- ✓ Put permeate (or clean water) into the finishing pan and heat the water to 200°F

Run the machine for a few minutes to clear good syrup from the press. Place this syrup and water mix into the evaporator for future reprocessing.

Next, set the machine in the **Pressure Relief Mode** and recirculate clean hot permeate water. Add/change the hot permeate as needed until clean water comes out.

Disconnect all lines and let the filter press cool a bit before disassembly and further cleaning.

Disassemble and clean the filter plates, base, etc.

Reassemble clean and dry plates in position to receive filter paper. (See previous instructions)

Drain the pump and make sure there is NO water in the pump. The pump will freeze if this is not done. (It's a good practice to store the pump in the house where it can't freeze or put it with the RO machine.)

Cover and store machine and lines.

Supporting Equipment Recommendations

Plumbing Recommendations:

Use only stainless steel plumbing. If flexible tubing is required be sure the tubing is FDA approved for temperatures of 400° F or greater.

Appendix A

Troubleshooting the pump

If the pump fails to function with adequate air pressure, and you hear air bypassing the pump mechanisms, increase system pressure at the regulator to cause the pump to begin to work. If increasing system pressure fails to make the pump work, disconnect the pump completely from the air system and from the syrup plumbing system.

Using a 4 mm Allen wrench carefully remove the four Allen screws at the aluminum plate that holds the air inlet. Gently and carefully remove that plate making sure to keep the play gasket in place. Inside you will see two pneumatic switches that could be stuck causing the problem. Gently manually activate the switches back-and-forth to ensure they are not stuck. Apply a drop or two of air tool oil to the switches. Reassemble the plate and the four Allen screws making sure the oh ring seal on the plate is correctly installed. Retest the pump. This should resolve the issue.

Note: occasional injection of two or three drops of air tool oil in the air inlet may help eliminate this issue.