



RO Bucket

Practical, Portable Reverse Osmosis

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actual users!*

User Manual

RB5, RB10, RB15, RB20, RB25 | Maple Sap Buckets

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Responsible Use and Liability Disclaimer

The products offered by The RO Bucket LLC. are intended for use by individuals who are knowledgeable about using reverse osmosis for maple syrup production. Follow all directions and observe reasonable care when utilizing this product.

Possible hazards associated with use of the RO Bucket include:

- **Shock/Electrocution:** Always use a ground fault outlet and surge protector. Always wear shoes and keep electrical cord away from wet/moist surfaces. Always run discharge hoses into containers. Never allow them to spill onto nearby surfaces.
- **Fire:** Do not use the product in potentially explosive, flammable, or corrosive environments. In the event the thermal protection function is enabled, unplug the unit and wait one hour before using again. Do not disassemble or alter the motor or driver. Use only the provided transformer.
- **Physical Hazards:** The product works under high pressure. Always wear safety goggles and point hoses away from your body and face.
- **Leaks:** Closely monitor the operation of the product. Regularly inspect and repair any components that are leaking.

In no event shall The RO Bucket LLC be liable for any direct, indirect, punitive, incidental, special, or consequential damages to property or life whatsoever arising out of or connected with the use or misuse of our products.

Introduction

The RO Bucket is the original small scale, portable reverse osmosis machine that is inexpensive and arrives fully assembled and ready to use. Specifically designed to efficiently reverse osmosis sap for smaller scale maple syrup producers, the RO Bucket can process thousands of gallons of sap for years to come. We take pride in what we do, and offer unparalleled RO systems that are manufactured with the highest quality and hand-selected components. As you begin planning your first batch of syrup with your RO Bucket, please consider the following:

Concentrating Sap

Running your sap through the RO bucket one time will double the sugar content. You can increase this up to 8% by running sap through multiple times.

Pre-Concentrating Sap Before You Boil

If your boiling rate is greater than the RO Bucket's processing rate, we recommend pre-concentrating some sap before you boil so that you do not run out of concentrated sap during the boiling process. How much you pre-concentrate will depend on the system you use and your boiling rate.

Ensuring Flavor and Color

Maple syrup acquires its distinctive flavor and color through extended boiling. Reverse osmosis shortens boiling times, and can lead to changes in both flavor and color. If any unfavorable smells or flavors occur, we recommend doubling your batch size. This ensures adequate boiling time and helps maintain an ideal syrup quality by allowing compounds to break down.

Preserving Membranes

To ensure membrane longevity, the RO Bucket needs to be flushed with non-chlorinated water after every use. Permeate water – the water produced from the reverse osmosis process – is preferred for flushing, and we recommend saving 20 gallons during each use.. If no permeate water is available, non-chlorinated water (distilled water, spring water, or well water) can be used. If chlorinated municipal water is all that's available, you must replace the pre-filter with a 10" carbon block filter before flushing the system.

RO Bucket Parts List

 <p>(1) Bucket</p>	 <p>(2) Separator Plate</p>	 <p>(3) Booster Pump</p>
 <p>(4) 110v Transformer</p>	 <p>(5) Water Filter Housing</p>	 <p>(6) Membrane Housing(s)</p>
 <p>(7) Concentrate Outlet with Needle Restriction Valve</p>	 <p>(8) Intake Hose</p>	 <p>(9) Permeate Outlet</p>
 <p>(10) 5-Micron 10" Prefilter</p>	<p>Need Replacement Parts? Visit robucket.com/shop or scan here!</p> 	

Setting Up Your RO Bucket

Flushing A New Ro Bucket:

1. Insert the $\frac{3}{8}$ " plastic intake hose into the $\frac{3}{8}$ " intake bulkhead fitting on the outside of the bucket. *Note: If properly installed, the intake hose should go in $\frac{1}{2}$ " - $\frac{3}{4}$ ".*
2. Insert the other end of the intake hose into a filled 5-gallon bucket of clean, non-chlorinated water. *Note: if no non-chlorinated water is available, replace the pre-filter with a 10" carbon block filter.*
3. Remove the needle valve from the concentrate hose for the initial rinse and place the concentrate and permeate hoses in the 5-gallon bucket of water.
4. Plug in the RO Bucket. After a minute or two, a steady flow of water should come out of the concentrate hose. Let the system run for 10 minutes. *Note: It is normal to have some flow out of the permeate hose as well. If you do not get any flow out of the concentrate hose and the pump doesn't seem to be "sucking", check that your intake suction hose is properly inserted into the bulkhead fitting.*
5. After 10 minutes, unplug the pump, reconnect the needle valve, and leave the system full of water until you are ready to process sap. *Note: To prevent membranes from drying out and becoming damaged, always leave liquid in the system when storing.*

Processing and Concentrating Sap

1. Place the intake hose into the sap, making sure the hose stays submerged. *Note: If the hose does not remain submerged, the procedure will have to be done again.*
2. Plug the transformer into a grounded GFI outlet. Once the sap is flowing out of the concentrate hose for 2-3 minutes, you can begin concentrating sap.
3. Turn the needle valve slowly clockwise until the stream of sap is about 50% less than the original flow. Within 2 minutes, permeated water will begin to flow out of the blue permeate hose.
4. Adjust the needle valve so the flow rate from both hoses is the same. This will ensure that 50% of water from the sap is being removed. *Note: Concentrate flow should never be more than permeate flow. If this happens, the membranes will rapidly deteriorate.*
5. Once both hoses are flowing equally, move your concentrate and permeate hoses to their proper containers.

Flushing Your RO Bucket

Following a regular flushing schedule will ensure your RO bucket continues to perform well.

Performing A 24-Hour Flush

Follow these steps if your unit will be used within 24 hours after processing your sap:

1. Fully open or remove the needle valve.
2. Remove the $\frac{3}{8}$ " intake hose from the sap and allow it to run until the hose begins gurgling and pushing air.
3. Insert all three hoses into 5 gallons of permeate water and recirculate for 10 minutes.
4. Unplug the unit and keep the membrane(s) full of water.
5. Remove the 5 micron pre-filter, empty the contents of the filter housing, and leave the pre-filter housing open and dry. *Note: The old pre-filter can be saved in the refrigerator for future use.*

Performing A Short-Term Flush (24-48 hours)

Follow these steps if your unit will be used between 24 and 48 hours after processing your sap:

1. Fully open or remove the needle valve.
2. Remove the intake hose from the sap and allow it to run dry. *Note: The hose will begin gurgling and pushing air.*
3. Remove the 5 micron pre-filter and empty the contents of the filter housing.
4. Install a new pre-filter and reinstall the filter housing..
5. Place the intake hose into 5 gallons of permeate water and run the entire 5 gallons through the system. *Note: Run the discharge hoses into a container and dispose of them in a safe location away from electricity.*

6. Place the intake hose and the two discharge hoses into another 5 gallons of permeate water. Run the unit for 10 minutes. *Note: The water should keep recirculating in the same 5 gallon bucket.*
7. After 10 minutes, unplug the unit, and leave RO membranes full of water. Do not let it run dry.
8. Remove the pre-filter, empty the water from the filter housing, and leave it open until next use. *Note: This filter can be saved for future flushes or for sap processing.*

Performing A Temporary Storage Flush

If the unit will not be used for an extended period of time but is not being stored for the end of the season, flush the unit by following the steps in “**Performing A Short-Term Flush.**” Every week the RO Bucket isn’t used, flush it with 5 gallons of permeate water. You may also store it temporarily by running a preservative mixture through the system.

Flushing with a Membrane Preservative Mixture

1. Mix the RO Membrane Preservative according to the instructions on the bottle.
2. Circulate the solution through the system for 10 minutes.
3. After 10 minutes, unplug the unit. Leave the membranes full of preservative.
4. Before continuing to process sap, rinse the system until the discharged concentrate approaches a pH of 7. *Note: This process may use 20-30 gallons of water.*

Storing Unit at the End-of-Season

1. Perform a “**Temporary Storage Flush**” (see page 9) and install a new filter.
2. Dissolve RO Membrane Preservative in 1 gallon of warm permeate water.
3. Re-circulate the gallon of solution through the system for 15 minutes. After 15 minutes, turn the unit off.
4. After letting the unit sit for a couple of hours to a day, place the intake hose into 2 gallons of permeate water and run the system for one minute—approximately 1 gallon of water will flow through the system. The goal is to slightly dilute the preservative mixture and flush out the pump head.
5. Turn off your system and leave membranes filled with diluted preservative.
6. Remove the pre-filter, empty the water from the filter housing, and leave it open until next use.

Note: This filter can be saved for future flushes or for sap processing.

When storing your bucket, leave the lid off the bucket to make sure the exterior contents are completely dry (leaving the membranes full of liquid). Do not let the bucket sit in a humid environment during storage, and do not store the bucket in freezing temperatures.

Preparing the RO Bucket for Next Season

1. Turn on the system and allow it to completely drain out.
2. Install a new 5 micron pre-filter and run 10 gallons of permeate water through the system to flush out the membrane mix.
3. After flushing with 10 gallons of permeate water, recirculate 5 gallons of permeate water through the system for 30 minutes. *Note: All three hoses should be in the same container.*
4. Continue flushing until the pH of the discharge matches the pH of the initial water source.

Maintaining Your RO Bucket

Due to sugar concentration, sap quality, temperature, and wear over time, the RO Bucket’s pre-filter and RO membranes have varying life expectancies. The following general guidelines can aide you in deciding when to replace these parts.

Maintaining pre-filters

The RO Bucket uses a 5 micron 10" pre-filter. These pre-filters are designed to be single use due to bacteria growth. However, with adequate flushing and refrigeration between uses, they can last up to a week. If you are processing large amounts of sap uninterrupted, you should change the pre-filter every 300 gallons.

Installing or Changing pre-filter

1. Remove the two hoses from their quick connect fittings.
2. Pull the entire filter housing out of the RO Bucket.
3. Twist the top lid of the filter housing counter-clockwise to remove it.
4. Remove the filter and insert the new one in its place.
5. Replace the lid and insert the filter housing back into the RO Bucket.
6. Re-install the two hoses into their quick connect fittings.

Maintaining RO Membranes

To preserve the quality of your RO membranes:

- Replace the RO membranes every three years OR when processing speed is greatly reduced
- Never allow the permeate hose to flow at a faster rate than the concentrate hose.
- Flush the RO membranes liberally between uses by following the steps outlined in "Instructions For Cleaning Unit" (page 7).

Removing RO Membranes From Their Housing

1. Remove the two lower hoses and the top hose from their quick connect fittings.
2. Remove the RO membrane housing from the RO Bucket.
3. Using the membrane housing wrench, twist the lid of the membrane housing counter-clockwise to remove it. *Note: If you do not have membrane housing wrenches, you can use strap-style wrenches.*
4. Insert a round bar (or Phillips head screwdriver) into the hole on the top of the membrane and pry the membrane out.

Maintaining Quick Connect Fittings

Quick connect fittings feature a movable collar that allows the inserted hose to be easily removed.

Remove a Hose From a Quick Connect Fitting:

1. Push the collar against the fitting with one hand.
2. Use the other hand to pull the hose out of the fitting.

The fitting should pull out easily and excessive force could ruin it. If you have a leaky fitting, you can repair it by replacing the O-ring or using teflon sealing tape. Our housing manufacturers recommend twenty turns of teflon tape to seal plastic fittings when O-rings are not available.

Flushing an Improperly Maintained RO Bucket

Follow these steps if you are noticing odors or poor performance:

1. Remove the old pre-filter and install a new one.
2. Open the needle valve all the way (*or remove it completely*).
3. Run 10 gallons of permeate water through the system.
4. After 10 gallons has passed through, remove the intake hose from the water source and keep the system running until it begins pushing air out of the concentrate hose.
5. Mix 5 gallons of membrane preservative according to the instructions on the vial.
6. Place all three hoses into the 5 gallon bucket of membrane flush mix. Allow it to recirculate for 30 minutes.
7. After 30 minutes, turn the system off, leaving it full of membrane flush mix. Let it sit for 2 to 24 hours..
8. Turn on the system and allow it to completely drain out.

9. Install a new 5 micron pre-filter and run an additional 10 gallons of permeate water through the system to flush out the membrane mix.
10. After flushing with 10 gallons of permeate water, place all three hoses in 5 gallons of permeate water and circulate for 30 minutes.
11. Continue flushing until the pH of the discharge matches the pH of the initial water source.

Performing a Hydrogen Peroxide Flush

If you still notice odors and the RO soap isn't effective, follow these steps:

1. Completely empty the RO system by running it until air discharges from the concentrate hose.
2. Install a new pre-filter or one that has been used for a previous flush. *Note: Do not use a pre-filter that has been in contact with anything other than permeate water or membrane flush.*
3. Mix 2 cups of 3% hydrogen peroxide with 2 gallons of permeate water.
4. Recirculate the hydrogen peroxide solution for 5 minutes with all three hoses in the same container. Then, turn the system off, leaving it full of the solution.
5. Let the system sit for 2 hours, then drain it by turning it on until air discharges from the concentrate hose.
6. Recirculate 5 gallons of permeate water through the system for 30 minutes.
7. Replace the pre-filter before running sap through the system. At this point, there should be little odor and performance of your membranes should be restored.

FAQ

What happens if I don't get any flow out of the concentrate hose?

If there is no flow from the concentrate hose and the pump is not 'sucking,' check the intake hose to ensure it is fully inserted into the bulkhead fitting. In addition, the intake hose should not exceed 5' of vertical lift if drawing from a container, and should not exceed 15' in length if plumbed to the bottom of a tank.

Why is permeate water not coming out of my hose?

Not flushing the system with water prior to first use can cause this. Also, restricting the needle valve too soon before the system all the air is out can cause this. Let the concentrate run full flow with no restriction for 2-3 minutes before restricting the valve at all. It can take up to 5 minutes for permeate to start flowing.

Why is my RO Bucket slowing down?

At no time should the flow of concentrate be less than the flow of permeate. This could result in rapid deterioration of the reverse osmosis membranes (RB5-RB15 systems). To increase the concentration of syrup, run multiple passes. Concentrations up to 8% can be achieved by running multiple passes.

What to do if it floats or draws any air throughout the concentrating process?

You will need to start this procedure over if this happens. Next time make sure the hose stays submerged at all times. It might help to put a short section of ½" food safe rigid hose over the inlet hose to help keep it straight and towards the bottom of the container.

Why am I having flow related issues?

Try removing or cleaning the strainer. If this is not the issue, please contact us.

How can I ensure the flow is 50/50?

If you cannot reduce the concentrate flow to achieve 50/50 flow, make sure the backing nut on the needle valve is not hindering operation.

What do I do with my pre-filter after use?

Your filter can be saved in the refrigerator for future flushes or for sap processing.

Warranty Coverage Information

The majority of components in the RO Bucket are intended to be easily replaceable and relatively inexpensive. It is expected that the user becomes familiar with how the product functions and has the ability to repair broken fittings, hoses, and leaks if necessary. Furthermore, the user must perform routine maintenance—including filter and membrane changes, routine membrane flushing, etc.

Membrane fouling, bacterial growth, and unpleasant odors can all develop due to improper maintenance and handling. While membrane degradation is not covered by a warranty, our customer service team will gladly help you determine the cause of such issues and ensure improved product performance moving forward.

The booster pump and transformer have a **one-year limited warranty** from the date of purchase that covers **manufacturer defects**. **It does not cover damage caused by freezing, submersion in water, or rough handling**. It is the purchaser's responsibility to ship the defective pump and/or transformer back to The RO Bucket LLC. along with proof of purchase to be eligible for replacement.