



WELCOMES YOU TO SUGARING WITH A *SUGAR CUBE ZB™*

The Vermont Evaporator Company's *Sugar Cube ZB* is designed for the backyard sugaring enthusiast with 5 to 200+ taps.

Although the *Sugar Cube ZB* is small, it will save you hours of boiling sap and allow you to boil when it's convenient for you. The *Sugar Cube ZB* is a reverse osmosis machine that also includes a UV filter. In operation, the *Sugar Cube ZB* will separate water from your raw sap, thereby increasing the sugar concentration of the sap that you'll boil into syrup. The inclusion of the UV filter allows you to substantially deactivate the yeast and bacteria in the sap (otherwise, yeast and bacteria would eventually eat the sugar in the sap and leave you with nothing to process). With the *Sugar Cube ZB*, you can store your concentrated sap longer and more conveniently while waiting for the right time to boil.

We hope you get many years of enjoyment from your *Sugar Cube ZB*. Here's how to start!

Understanding your *Sugar Cube ZB*

What is your *Sugar Cube ZB* made of and how can you expect it to perform? Here are the basics*:

Ideal Tap Number	The <i>Sugar Cube ZB</i> can work for a hobby of any size . We recommend it for operations of 5-200+ taps .
Capacity	The <i>Sugar Cube ZB</i> processes up to 16 gallons of sap per hour .
Concentrate Production	The <i>Sugar Cube ZB</i> produces up to 8 gallons of sap concentrate per hour .
Number of Membranes	The <i>Sugar Cube ZB</i> has 1 membrane with the capacity to process 400 gallons of sap per day .
Pump Rating	The <i>Sugar Cube ZB's</i> pump is rated to process 300+ gallons of sap per day .
Power Consumption	The <i>Sugar Cube ZB</i> runs at 110 VAC .
UV Filter	The <i>Sugar Cube ZB's</i> UV filter deactivates yeast and bacteria for longer pre-boil storage.

**Specifications are based on a 2% sugar solution and achievement of a 50% reduction in water content in sap. Actual concentrate production will be impacted by a number of factors, including, but not limited to: temperature of sap, age of reverse osmosis membranes, and location of the Sugar Cube ZB relative to raw sap storage container and sap concentrate storage container.*

Preparing your *Sugar Cube* for Use

Your *Sugar Cube* needs little set-up. Open the carrying case. You will see:

- one reverse osmosis filter (to go in white housing),
- one sediment filter (to go in blue housing),
- one filter housing wrench,
- one length of white hose,
- one length of blue hose,
- one length of red hose,
- one needle valve.

Take all of these things out of the carrying case. Then take a picture of what remains in the carrying case for your reference. Take the filters out of their packaging.

Remove the two filter housings from the *Sugar Cube*. In order to do this, you may have to release the filter housings from the tubing using the push-to-connect fittings. To disconnect the filter housings from the tubing, push down on the plastic ring (“collet”) surrounding the tubing at each fitting and hold while pulling tubing out. To reconnect, simply push the tubing back into the fitting. To see a YouTube demonstration of how to use a push to connect fitting, visit <https://www.youtube.com/watch?v=-Avzf-jsHyM..>

Unscrew the caps of the filter housings using the filter housing wrench. Take the reverse osmosis filter out of its plastic packaging. Place the reverse osmosis filter into the white filter housing so that the end of the filter with the rubber seal goes in last. Take the sediment filter out of its plastic packaging. Place the sediment filter into the blue filter housing. Screw the caps back on the filter housings and reconnect to the tubing using the photograph you took as reference.

Set aside the filter housing wrench, and locate the lengths of white, blue and red hose. Turn the *Sugar Cube* so that you are looking at the outside of its right side. Insert the white hose into the fitting labeled “sap in.” Insert the blue hose into the fitting labeled “sap concentrate out.” Insert the red hose into the fitting labeled “water out.” Your *Sugar Cube* is all set up and ready to go!

IMPORTANT: do not let your *Sugar Cube* freeze after you’ve used it – frozen water will destroy the filters and may crack fittings and/or the tubing.

Operating your *Sugar Cube*

First Operation:

- Place your *Sugar Cube* on a slightly elevated surface such that it is not directly on the ground (on a table, , milk crate, etc.).
- Fill a 5-gallon bucket with clean water.
- Place the loose end of the white hose into the bucket of clean water.
- Put the loose end of the blue hose into a second bucket (or wherever you prefer to dispose of water after it runs through the system).
- Put the loose end of the red hose into the bucket of clean water.
- Unwind both power cords and plug into a power source. Let the *Sugar Cube* run until all the clean water has gone through the system and the blue hose is blowing air.
- Your unit was tested for leaks by the manufacturer. However, while the unit is running, you will want to check for any leaks that developed during the shipping process. If a large leak is found, turn off the unit and tighten the fitting slightly (be careful as the plastic fittings can break). Turn the unit back on. If the leak returns, turn off the unit, remove the fitting, place some Teflon tape on the threads and reinstall.
 - Note: A small amount of leaking (~1 cup per hour) is acceptable. The *Sugar Cube* has drain holes that will allow small quantities of liquid to exit the *Sugar Cube*. It's big, obvious leaks that you are looking for.

Concentrating Sap:

- Place the *Sugar Cube* on a slightly elevated surface off of the ground.
- Open the *Sugar Cube* and unwind both power cords.
- Put the loose end of the white hose into your sap storage container.
 - For best results, arrange your sap storage container such that it is higher than your *Sugar Cube*.
- Install the needle valve. The needle valve goes in-line with the blue hose. Thus, cut the blue hose (a sharp utility knife or tubing cutter work best) where it is convenient for your operation (either closer to the *Sugar Cube* ZB or closer to where your sap receptacle is).
- Insert the loose end coming from the *Sugar Cube* ZB into one side of the needle valve and insert an end of the other unconnected piece of blue hose into the other side of the need valve.
- Put the loose end of the blue hose into your sap storage container.
- Put the loose end of the red hose into your sap storage container.
- Plug the power cords into a power source.
- Let the *Sugar Cube* run until liquid comes out of the blue hose.
- Slowly close the needle valve located at the end of the blue hose (it may take many turns). After about 15 to 30 seconds, you should see liquid coming out of the red hose. You will also hear the pump change pitch, which indicates an increase in pressure in the system.
- Continue adjusting the needle valve until the amount of liquid coming out of the blue and red hoses is about equal.
 - Note: It is best NOT to constrict the flow such that the amount of concentrate is *significantly less*

than the amount of clean water coming out. This can damage the filters, shorten the life of the pump, and have other undesirable consequences to your *Sugar Cube*'s operation.

- A single pass through the *Sugar Cube* should about double your sap concentration (e.g., 2% to 4%). If desired, you can run this concentrated sap through the *Sugar Cube* again – thereby removing 75% of the water. For example, if you have 2% sap, the first pass would give you about 4% concentrate, and a second pass would give you about 8% concentrate.
- Put the loose end of the red hose in a clean, 5-gallon bucket. Clean water is now coming out of the red hose. (Fill up at least one 5-gallon bucket with water for use later; the remaining water can be discarded.)
- Put the loose end of the blue hose in the container in which you would like to store your concentrated sap.
 - Note: Because of the UV filter, this sap can be stored for an extended amount of time before boiling. In a test conducted by the Vermont Evaporator Company, concentrated sap was stored in a sanitized container at 40° Fahrenheit for 2 weeks with no measurable degradation in sap quality.
- Run the *Sugar Cube* until all of your raw sap has been processed and the blue hose is blowing air.

Note: Although the pump supplied with the *Sugar Cube* can be run “dry,” prolonged operation of the pump without liquid will potentially damage the pump.

Maintaining your *Sugar Cube*

Leaving residual sap in your *Sugar Cube* can result in fouling of the system, producing off-flavors, inefficient processing and potentially mold and bacteria growth. After each use, you'll want to flush the system with water, and at the end of the season, a thorough cleaning is advised.

After each use:

- Put the loose end of the white hose in your bucket of clean water. Open the needle valve on the blue hose completely (so that no water comes out of the red hose). Put the loose end of the blue hose into the clean bucket of water. Run the *Sugar Cube* for 15 minutes.
- After 15 minutes, remove the white hose from the bucket of clean water. Allow the *Sugar Cube* ZB to “run dry” (the blue hose will be blowing air).

Keep your *Sugar Cube* in a cool, dry place when not in use. DO NOT allow it to freeze.

After the Season is Over

Note: you will need 7 gallons of clean water for this operation.

- Mix a two-gallon 0.2% hydrogen peroxide solution (2 cups of 3% hydrogen peroxide in 2 gallons of non-chlorinated clean water – preferably water processed by the *Sugar Cube*).
 - Note: You can also purchase, from most maple supply stores, reverse osmosis cleaning solution. If you do so, please follow the instructions provided by the manufacturer of the cleaning

solution.

- Put the loose end of the white hose into the solution.
- Put the loose end of the blue hose into the solution. Ensure that the needle valve is fully open. No solution should be coming through the red hose.
- Run the *Sugar Cube* for 30 minutes. You are circulating the solution throughout the *Sugar Cube*.
- Then, run 5 gallons of clean water through the *Sugar Cube*, discarding the liquid that flows out through the blue hose.
- Then, pull the white hose out of the solution and run the *Sugar Cube* until air is coming out of blue hose.
- Remove the reverse osmosis filter from its housing and discard.
- Remove and discard the sediment filter.
- Disconnect the white, red and blue hoses from the *Sugar Cube*. Air dry the hoses or use compressed air to dry out the hoses.
- Wipe out any liquid inside and outside the *Sugar Cube*.
- Store your *Sugar Cube* in a cool, dry place. DO NOT allow it to freeze.

Next Season:

- Clean and inspect all parts.
- Install new filters..
- Follow the steps above for “First Operation”