WELCOMES YOU TO SUGARING WITH THE *SUGAR CUBE™*

The Vermont Evaporator Company's *Sugar Cube* is designed for the backyard sugaring enthusiast with 5 to 100+ taps.

Although the *Sugar Cube* is small, it will save you hours of boiling sap and allow you to boil when it's convenient for you. The *Sugar Cube* is a reverse osmosis machine that also includes a UV filter. In operation, the *Sugar Cube* 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 eliminate yeast and bacteria in the sap (yeast and bacteria will eat the sugar in the sap and leave you with nothing to process). With the *Sugar Cube*, 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*. Here's how to start!

Understanding your *Sugar Cube*

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

Ideal Tap Number	The *Sugar Cube* can work for a **hobby of any size**. We recommend it for operations of **5-100+ taps**.
Capacity	The *Sugar Cube* processes up to **12-16 gallons** of sap **per hour**.
Concentrate Production	The *Sugar Cube* produces up to **6-8 gallons** of sap concentrate **per hour**.
Number of Membranes	The *Sugar Cube* has **2 membranes** with the capacity to process **300 gallons of sap per day** (total).
Pump Rating	The *Sugar Cube's* pump is rated to process **360+ gallons** of sap **per day**.
Power Consumption	The *Sugar Cube* runs at **110 VAC** and includes a heavy-duty, **3-amp** transformer.
UV Filter	The *Sugar Cube's* UV filter kills 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, location of the Sugar Cube relative to input sap container and concentrate container, and capacity of the membrane (the Sugar Cube comes with 2, 150 gallon per day reverse osmosis filters; these two filters can be upgraded to 200 gallon per day filters.)

Preparing your *Sugar Cube* for Use

Your *Sugar Cube* needs little set-up. Take your *Sugar Cube* out of its cardboard shipping container. Take off the top of the ammo can. You will see two reverse osmosis (RO) filters that are in plastic packaging. Take the filters out of their packaging.

Remove the two filter housings from the *Sugar Cube* (the two white canisters attached to the side of the ammo can). Unscrew the caps of the filter housings. Place a filter into each of the filter housings so that the end of the filter with the rubber seal goes in last.

Now remove the loose white, blue, and red hoses and the power cord from the *Sugar Cube*.

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*

<u>First Operation:</u>

- Place your *Sugar Cube* on a slightly elevated surface such that it is not directly on the ground (place on a board, milk crate, etc.).
- Fill a 5-gallon bucket with clean water.
- Push one end of the white hose into the coupling located near the power switch. Place the other end of the white hose into the bucket of clean water.
    - Note: All hoses used with the *Sugar Cube* are ¼" outside diameter. If you need more hose, it is generally available at most hardware stores or online.
    - Note: All couplings are "push-fit" couplings and are very easy to use. To remove the hose, push the collet (small ring encircling tube) towards the fitting and hold it there. The hose may now be removed easily. For a video on this topic, go here: https://www.youtube.com/watch?v=-Avzf-jsHyM.
- Push one end of the blue hose into the exit coupling that corresponds with the blue hose inside the *Sugar Cube*. Put the other end of the blue hose into a second bucket (or wherever you prefer to dispose of the water after it runs through the system).
- Push one end of the red hose into the exit coupling that corresponds with the red hose inside the *Sugar Cube*. Put the other end of the red hose into the bucket of clean water.
- Attach the power cord to the *Sugar Cube* and then plug into a power source.
- Turn on the *Sugar Cube* and let run until all the clean water has gone through the system and the blue hose is blowing air.
- While the unit is running, check for any leaks. 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 and place pipe dope or 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 this liquid to exit the *Sugar Cube*.

Concentrating Sap:

- Place the *Sugar Cube* on a slightly elevated surface off of the ground.
- Remove the lid of the *Sugar Cube* to allow for air circulation.
- Push one end of the white hose into the coupling near the power switch. Put the other 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*.
- Push one end of the blue hose into the exit coupling that corresponds with the blue hose inside the *Sugar Cube*. Put the other end of the blue hose into your sap storage container.
- Push one end of the red hose into the exit coupling that corresponds with the red hose inside the *Sugar Cube*. Put the other end of the red hose into your sap storage container.
- Attach the power cord to the *Sugar Cube* and then plug into a power source.
- Turn on the *Sugar Cube* and let it run until liquid comes out of the blue hose.
- Slowly close the needle valve located at the end of the blue hose. 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 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 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 a reasonable 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 noticeable 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 and 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 white hose in your bucket of clean water. Open the needle valve completely (no water should be coming out of the red hose). Put the end of the blue hose into the clean bucket of water. Run the *Sugar Cube* for 15 minutes.

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 white hose into the solution.
- Put 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 through the blue hose.
- Then, run the *Sugar Cube* until air is coming out of blue hose.
- Remove the filters from the housings, place in ziplock bags, and place in the refrigerator (unless you'd rather start with new filters next year).
- Remove and discard the sediment filter (small, cylindrical filter at the bottom of the *Sugar Cube*). Replacements will be available at www.vermontevaporator.com.
- Air dry hoses or use compressed air to clear out hoses.
- Wipe out any liquid inside and outside the *Sugar Cube*. A small amount of oil (vegetable or mineral oil) can be applied to the surface of the *Sugar Cube* so as to minimize rusting.
- Store your *Sugar Cube* in a cool, dry place.

Next Season:

- Clean and inspect all parts.
- Install new sediment filter.
- Install reverse osmosis filters in filter housings.
- Follow the steps above for "First Operation"