OPERATING PRINCIPLE

These last few years, many new technologies have shown up on the market to fill a primary need of maple producers: to lower production cost and improve time management. The High Brix technology addresses the needs of the maple producers.

By using a High Brix Osmosis from H2O Innovation, it is now possible to concentrate sap to a higher Brix level, considerably reducing the volume of concentrate to process. The use of a refrigerated bulk tank allows the producer to concentrate for days, without losing or altering concentrate quality. High Brix technology paired with this type of tank brings a storage solution to average size producers, allowing them to start boiling only when it’s necessary. Imagine fixing your leaks in the wood when sap is flowing and boiling only when it’s frozen outside. This is the best way to optimize your time.

By choosing the High Brix option, there is no need to modify your working methods acquired throughout the years. The High Brix osmosis controls itself the way a conventional osmosis does and is just as easy to clean.
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The High Brix Econox is the most efficient osmosis on the market for a producer that wants to be part of the cutting-edge technology. Allowing a concentration of 35°Brix or more, this unit will enable you to maximize your floor space and your time. This translates to an increased profitability for your operation. The Econox High Brix allows you to concentrate your sap in only one pass up to more than 35°Brix.

You can also concentrate in 2 steps either from 2 to 15°Brix with a conventional osmosis and then from 15 to 35°Brix with this system. This option allows you to keep your current reverse osmosis machine.
WHAT TO KNOW

Start up

To start the Econox, place the selector switch to the “START” position. This will start the booster pump. Hold the selector in this position until the pressure pump starts. Once the pump is running, release the switch. It will go back by itself to the “ON” position. The “ON” position is the normal operating mode of the system. A delay of a few seconds will then occur before the recirculating pump starts.

Shutdown

To turn off the Econox, set the selector switch to the “OFF” position this will simultaneously stop the three pumps. The Econox has protective devices that instantly stop the system in case of a problem. There is an alarm and warning lights for all the following elements:

- High water temperature
- Low pressure at the inlet of the pressure pump
- Motor fault

General characteristics

Power supply 120/240 volts, 60 Hz, single-phase
- Height: 72" (183 cm)
- Width: 27" (69 cm)
- Depth: 30 " (76 cm)

Plumbing connections

- Sap inlet: 1 ½ " PVC
- Permeate outlet: 1" PVC type A quick connect
- Concentrate outlet: 1" PVC type D quick connect
- Drain: 1 ½" PVC

Pumps

- Feed pump: Stainless steel pump, 1 HP or 2 HP motor, 60 Hz, 3500 rpm, 230 volts, single-phase
- Pressure pump: 5 HP or 7.5 HP, 60 Hz, 3500 rpm, 230 volts, single-phase
- Recirculating pump: 1 HP, 60 Hz, 3500 rpm, 230V, single-phase
- Booster pump: 3 HP pump on the High Brix vessel
REQUIRED TANKS

PERMEATE TANK: To collect pure water (permeate) that your system will remove from sap. This water will be used to rinse the Econox;

SAP TANK: To accumulate enough sap to feed the Econox High Brix;

CONCENTRATE TANK: To accumulate enough concentrated sap to feed the evaporator.

YOUR ECONOX

Adding a High Brix vessel on an existing Econox will change some of the operating parameters. Thus, the following items will no longer be used on your control panel. See image and explanations below:

- The concentrate control valve will be useless as there will be no flow that will pass thru it.
- The concentrate and permeate flowmeters (too important measuring range);
- The CONCENTRATION / CLEANING & RINSING VALVE must ALWAYS be in the cleaning & rinsing position. You can either remove it or block it. If this valve is not kept in cleaning and rinsing position, the system will rise under pressure and this will damage the Econox.

ECONOX CONTROL PANEL
CONCENTRATION / CLEANING & RINSING VALVE

IMPORTANT: This valve must always remain in wash mode at the risk of irreparably breaking your Econox.
YOUR HIGH BRIX VESSEL

The concentration control is done directly on the High Brix vessel. Next to this valve are the permeate and concentrate flowmeters (from 0.5 to 5 GPM).

It is recommended to start the unit by adjusting the permeate around 1-1.5 GPM.

It takes generally between 20 to 25 minutes before the Brix degree increases. When your sugar level is reached, readjust at about 0.9 GPM.

You can return the permeate directly to the permeate or sap tank.
The blue hose is the return of washing water. Always check the two valves "rinsing & concentration" to ensure they are in the correct position. Look at the arrows on the valves to confirm direction.
**WASHING**

You need to wash every day, first an opticlean wash then a bio membrane wash. Do not forget the 2 “concentration & rinsing” valves. The pH during an opticlean wash is between 2 and 3, the pH during bio membrane wash is between 11 and 12.

**RINSING PROCEDURE**

**To do every 6 hours:**

1. **Rinsing cycle**
   - Rinse with permeate for 15 minutes (less than 100 psi)
   - Read the permeate flow rate at 150 psi and take the temperature
   - Calculate the PWP
   - If there is less than 20% of flow loss, restart production (concentration cycle)
   - If performance drops by 20% or more do a washing cycle

2. **Washing cycle**
   - In the washing tank, use cleaning solution in closed-loop and wash for 20 minutes

3. **Rinsing cycle**
   - Rinse with water for 10 minutes, evacuate water to the drain
   - Read permeate flow rate at 150 psi, take the temperature
   - Calculate PWP

Continue with a concentration cycle.
Calculation of Pure Water Permeability (PWP)

Procedure:
- Rinse the membrane using permeate
- Adjust the pressure to 150 psi
- Record the permeate flow
- Record the water temperature
- Take the permeate value and divide it by the temperature correction factor at 13°C (55°F)

See the correction factor table on next page.

Example
Initial PWP = 7gpm
The initial PWP is to be taken when the membranes are new, after 12 to 24 hours of use.

Today your readings are: 150 psi, 68°F and a permeate flow of 6gpm

PWP calculation
PWP = permeate flow / temperature correction factor
PWP = 6gpm / 1,2 = 5gpm (flow at 55°F)

Yield loss calculation
(PWP/PWP_{initial}) \times 100 = \% efficiency
(5 / 7) \times 100 = 71,4 \% efficiency

100 \% - 71,4 \% = 28,6 \% yield loss
A wash is required because the loss is more than 20%.
## CORRECTION FACTOR TABLE

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