OPERATING PRINCIPLE

An evaporator is the centerpiece of maple syrup production. It is with evaporation that the flavor and color of maple syrup will develop. The taste of the maple develops in flat pans (Maillard reaction) but to have a good efficiency, the ratio of flat and flue pans is important.

The Classic evaporator by H2O Innovations is reliable and easy to operate. The Carlin burner which it is equipped with is easy to adjust and has a low maintenance cost. This evaporator is specially designed to have increased efficiency for minimum oil consumption.

The Classic evaporator can also be modified, by adjusting the flat pan to flue pan ratio, into a finishing rig, to be used with a High Brix concentrator.
# Table of contents

- OPERATING PRINCIPLE ................................................................................................................................... 2
- SAFETY INSTRUCTION AND DESCRIPTION ...................................................................................................... 4
- COMPONENTS ................................................................................................................................................ 5
- INSTALLATION ................................................................................................................................................ 8
- INSTALLATION ............................................................................................................................................ 8
- ELECTRICAL CONNECTIONS ........................................................................................................................ 8
- OIL BURNER CONNECTION ........................................................................................................................................ 9
- OPERATION..................................................................................................................................................... 9
- WARNING BEFORE FIRST USE ........................................................................................................................ 9
- BEFORE START-UP ...................................................................................................................................... 9
- STARTUP ................................................................................................................................................... 10
  - Draft adjustment...................................................................................................................................... 12
- TROUBLESHOOTING ..................................................................................................................................... 13
  - Inconstant level in pans ........................................................................................................................... 13
  - Making syrup before the finishing pan .................................................................................................... 13
  - Evaporator does not start ........................................................................................................................ 13
  - Bad combustion (black under pans)......................................................................................................... 13
  - Pans overheating...................................................................................................................................... 14
  - Burner is shooting oil but do not ignite .................................................................................................. 14
  - Oil is getting out by the air hatch............................................................................................................... 14
  - Air in oil .................................................................................................................................................... 14
  - Sap boils too much at the front or rear of the evaporator .................................................................... 14
  - Evaporator boils little, intense heat at the stack, red stack ................................................................... 14
- MAINTENANCE ............................................................................................................................................. 15
  - WHEN TO CLEAN PANS ............................................................................................................................ 15
  - CLEANING PANS ....................................................................................................................................... 15
  - STORAGE BETWEEN SEASONS .................................................................................................................. 15
- Water quantity in the water pan – US gallon (level equal with the flue).................................................... 17
  - Classic ....................................................................................................................................................... 17
  - Finishing Rig ................................................................................................................................................ 17
  - Performance – Evaporation in gallons of water per hour ...................................................................... 18
- WARRANTY ................................................................................................................................................... 19
SAFETY INSTRUCTION AND DESCRIPTION

An oil evaporator is a dangerous piece of equipment. You should always wear heat-resistant gloves and clothes when operating the evaporator.

While having visitors, especially children, make sure they keep a safe distance from the evaporator.

An oil evaporator uses fuel oil and gives off intense heat at the smoke stack and at the front of the arch. Make sure the floor is strong enough to support the weight of the evaporator and its components. Keep a minimum distance of 48” between the wall and the evaporator and 36” at the rear. If you can not maintain that minimum distance, a heat-resistant sheathing must be installed to protect the wall.

Make sure your smoke stack and steam hood are not obstructed. Install a roof jack for each stack. It is highly recommended to have a ceiling high enough to allow you to lift the hood using a pulley system.

We recommend you contact your insurance company to ensure you are respecting their safety standards. Each company has its own safety rules.
Float box

H2O Innovation float boxes have an adjustable inlet as for all conventional float boxes. Its major difference is its settling tank allowing sugar sands to settle instead of going on the flat pans. At the bottom of the settling tank, there is a 1” valve to allow easy and quick removal of sugar sands.
INSTALLATION

If your sugarhouse is well insulated, you will have to create air inlets to improve your evaporator combustion and steam evacuation. Make sure the floor is strong enough to support the weight of the evaporator and its components. Ensure you are meeting the safety standards of your insurance company.

INSTALLATION

• To position the evaporator, check carefully the direction of the prevailing wind.
• Remove the wheels under the evaporator.
• Remove the pans from the evaporator, adjust the adjustable legs to level the evaporator use a carpenter level.
• When the evaporator is leveled (length and width) tighten the nuts at the bottom of the legs.
• Replace the pans on the evaporator starting with the rear flue pan (the biggest), place it on the arch all the way to the back. Then install the syrup pans in the front.
• Make sure the pans are well leveled, then install the stack.
• Install the roof jack for each of your stacks. Seal the joint to prevent leakage. Install the steam pipe (if applicable). Install the smoke pipe. Check carefully the direction of the prevailing wind.
  1. Attach steel cables to the pipes to keep them in place. Do not to overtighten the cables as the stack expands as it warms up.
• Install the float boxes and connections. To avoid leaks, put Teflon tape on each of the threads. Do not thread stainless to stainless without using Teflon tape, it will seize up.
• Install the sight levels.

ELECTRICAL CONNECTIONS

The electrical connection may be performed by trained and authorized electricians only.

• 120 Volt connection.
• If you have a “DETECTEAU” connect it.
OIL BURNER CONNECTION

The burner connection must be done by a certified professional.

- Oil tank and evaporator connection.
- Filter installation.
- Burner connection.
- Nozzles installation.
- Low fire air adjustment.
- Pressure adjustment.
- Draft adjustment.
- When the burner adjustment is properly done, adjust the draft.

OPERATION

WARNING BEFORE FIRST USE

When first using your evaporator, remove any traces of packaging debris, manufacturing debris and residual oils: wash the pans and all components that might be in contact with sap. Wash all components with soapy water and rinse thoroughly with hot water. You can also add the equivalent of one cup of commercial white vinegar per gallon (4L) of soapy solution.

BEFORE START-UP

Note: At the season beginning, before starting your evaporator, consult the “water quantity in the flue pan” section on page 17 to know which sap quantity is to be used in your evaporator.

Make sure:
- The oil tank is full;
- The filter is clean;
- The oil line is airtight, not frozen or clogged;
- The burner oil feeding valve is open;
- The burner is electrically fed;
- The outlet of the sap tank feeding the evaporator is at least 12” higher than the level in the rear pan.
1. Connect the sap tank with the rear float box.
2. Install a thermometer or a temperature controller at the outlet of the rear pan. Calibrate it in boiling water, adjust its temperature to 0°F.
3. Open the smoke stack hinged cover of the smoke pipe.
4. Open the valve of the feeding tank. Fill up the flue pan until the level reaches 2” above the channels.
5. Always start the evaporator on “LOW” mode for about three minutes. Then switch on “HIGH” mode.
6. After starting the evaporator, stabilize the water level 1” above the channels. Adjust the rear float to maintain sap level.
7. Adjust the float arm in horizontal position. Open the front float box valve and fill the syrup pans up to 1” ½ with sap. Adjust the front float to maintain this level.

To adjust the water level, use the screw on the picture below:
- Unscrew to raise the level.
- Screw to lower the level.

8. During the season, frequently clean O-ring, clamp and ferrule because sugar deposits could affect the sealings of the connections. Use food grade grease for each component in contact with sap or maple syrup.
9. Pay attention to the front and rear water level. Use the screw on the floats to adjust the level.

10. Maple syrup is ready when its temperature reaches 7°F above boiling point of water – the boiling point is collated with atmospheric pressure. Open the valve when syrup is reaching this temperature and close it when the temperature starts to drop.

11. Repeat the operation each time the temperature reaches 7°F above boiling point of water. While using a thermo regulator it will automatically control the valves compensating the boiling point with the atmospheric pressure.

12. After gaining experience, you will be able to lower the level in the pans. The ideal level is 1” above the flues of the flue pan and 1”1/2-2” in the flat pan. Do not lower the level too much, the lower the level is, the faster it will boil so risks of burning the pans will increase.

NOTE: Anti-foam can be required when operating the evaporator. When syrup is generating too much foam it can affect the float box causing instability on the water level and a risk of lack of sap. Anti-foam also prevents spills of syrup.
Draft adjustment

Draft adjustment on an oil evaporator is done by using the adjustment key (see picture below). The more the key is opened, the stronger the draft will be; a too much open key represents a significant loss of energy. Have at least 3’ stack above the top of the roof and a minimum of one and a half the length of the evaporator. If the draft is insufficient add an additional pipe section.

For an optimum draft, the magnehelic gauge shall be adjusted between 0.03 and 0.04.
TROUBLESHOOTING

Inconstent level in pans

- Realign the float box arm.
- Syrup makes too much foam and impacts the reading of the float. Use anti-foam.
- Dismantle the float box and clean it. There might be dirt that prevents the box from closing tight.
- Clean the O-ring on the float box.
- There is a leak in the float and it is getting filled with sap.
- Sap tank is too high putting too much pressure on the float box. Maximum level of 12’ between float box inlet and sap level in the tank.
- Sap tank is too low and there is not enough pressure to push over the float box. Minimum level of 3’ between float box inlet and sap level in the tank.

Making syrup before the finishing pan

- When happening, open the valve to fill up your draw-off syrup tank until the temperature is adjusted. Then put back (slowly and by small quantity) the syrup at the beginning of the flue pan.
- Decrease the draft in order to decrease the heat on the first finishing pan.

Evaporator does not start

- Ensure there is oil in the tank.
- Ensure the oil feeding valve is open.
- Ensure the burner is electrically powered.
- Ensure the burner relay is working properly. Push its button 15 seconds (only once).
- Ensure the oil line is airtight and without leaks.
- Purge the oil pump.
- Block the ignition air intake.
- Ensure there is no water in the line. Ensure the line is not frozen.
- Ensure the electrodes are making sparks.

If after doing this checklist, the evaporator is still not starting, contact your H2O representative.

Bad combustion (black under pans)

- Check flame quality, if there is black under pans, there may be too much air.
Pans overheating

- Defectives burner nozzles.
- Check burner angle.

Burner is shooting oil but do not ignite

- Check the ignition transformer for gas burner.
- Check the relay.
- Ensure the solenoid is not defective.
- Check the air hatch that might stay open.
- Check burner angle.

NOTE: After few bad starts, oil might have accumulated in the evaporator and there is risks of explosion during a next ignition attempt. Remove pans and use a stick to burn oil excess.

Oil is getting out by the air hatch

- Broken oil pump seal.

Air in oil

- The oil tank is empty.
- The oil line is leaking.

Sap boils too much at the front or rear of the evaporator

- Modify draft intensity by using the adjustment key.

Evaporator boils little, intense heat at the stack, red stack

- Use the adjustment key to decrease the draft. Close the key.
- Insulation under the flue pan is too low. For a good heat transfer in the flue pan, the insulant shall be at the same level as the sides of the evaporator.
MAINTENANCE

Daily drain and clean float box, floats and pipes going to the pan.

WHEN TO CLEAN PANS

Pan cleaning frequency depends on the time of the season, on the amount of sugar sand forming at the bottom of the pan and on the size of the evaporator. Check the syrup pan every hour. Immediately, when there is too much deposit at the bottom, replace the pan with a clean one or clean it. Excessive deposits on the pan could burn it. Flue pan cleaning frequency depends on the size of the evaporator and the quantity of sugar sand in sap. Usually, a mid-season cleaning is enough. Again, excessive deposits on the pan could burn it or cause cracks at the bottom of the flue. Your flue pan must be checked every day, pay special attention to the corners.

CLEANING PANS

1. Fill the pans with filtrate or clean water. Fill up to the height of the dividers to make sure you remove any dirt that may have accumulated in your pans. You will remove all the dirt on your pans. If using a H2O pan washer skip next steps.

2. Add pan detergent recommended by H2O Innovation (read label for proper dosage).

3. Heat the water up to 90°C (194°F). Stop the fire. Let it soak all night.

4. Drain and rinse a lot to ensure there is no acid left.

5. Fill the pan again to the top with filtrate or clean water. Use soda polycarbonate to neutralize all acid residues. Let it soak 15 minutes then drain and rinse one last time.

6. Never use abrasive products, steel wool or products containing chlorine or muriatic acid.

7. If there is burnt syrup on the outside of the pans, you can use commercial cold oven cleaner. It will dissolve the syrup without damaging the pans. To bring back the shine of the pans, use industrial foaming cleaner for glass. You can also use a mix of water and white vinegar (half and half).

**Note for under pan cleaning:** Never use abrasive products. Take an appropriate brush to rub back and forth under the pan and between flue. If using a pressure washer, make sure the pan is dried quickly after washing: water and soot will turn into acid, causing damage to the pan.
STORAGE BETWEEN SEASONS

**IMPORTANT:** If there is any acid left in the pan between the seasons, the pans will be damaged and punctured at the next season.

1. To allow air circulation around the pans, put them on wood blocks. Excessive humidity could damage the pan.

2. Make sure pans are clean. Remove all the sugar sand by doing a good acid wash. For the flue pan, it is necessary to brush the inside and outside of the flue. Use the appropriate brush.

3. Never use abrasive products, steel wool or products containing chlorine or muriatic acid. Pans will be damaged; those damages are not covered by the warranty.

4. Silicone O-ring shall be greased with food grade grease in order to prevent them from drying.
**Water quantity in the water pan - US gallon**

*(level equal with the flue)*

### Classic

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Flue Height</th>
<th>US Gallons</th>
<th>US Gallons (for each inch above the flue)</th>
<th>Flue Pan</th>
<th>Flat Pan</th>
</tr>
</thead>
<tbody>
<tr>
<td>2'1/2 X 8’</td>
<td>7”</td>
<td>25.1</td>
<td>8.3</td>
<td>30” X 60’’</td>
<td>2 – 30” X 18’’</td>
</tr>
<tr>
<td>3’ X 10’</td>
<td>7”</td>
<td>38.8</td>
<td>18.7</td>
<td>36” X 84’’</td>
<td>2 – 36” X 18’’</td>
</tr>
<tr>
<td>3’1/2 X 12’</td>
<td>7”</td>
<td>51.2</td>
<td>26.2</td>
<td>42” X 96’’</td>
<td>2 – 42” X 24’’</td>
</tr>
<tr>
<td>3’1/2 X 14’</td>
<td>7”</td>
<td>62.9</td>
<td>30.5</td>
<td>42” X 120’’</td>
<td>2 – 42” X 24’’</td>
</tr>
<tr>
<td>4’ X 12’</td>
<td>7”</td>
<td>56.6</td>
<td>29.9</td>
<td>48” X 96’’</td>
<td>2 – 48” X 24’’</td>
</tr>
<tr>
<td>4’ X 14’</td>
<td>7”</td>
<td>69.5</td>
<td>34.9</td>
<td>48” X 120</td>
<td>2 – 48” X 24’’</td>
</tr>
<tr>
<td>5’ X 12’</td>
<td>7”</td>
<td>68.6</td>
<td>37.4</td>
<td>60” X 96’’</td>
<td>2 – 60” X 24’’</td>
</tr>
<tr>
<td>5’ x 14’</td>
<td>7”</td>
<td>84.2</td>
<td>43.6</td>
<td>60” X 120’’</td>
<td>2 – 60” X 24’’</td>
</tr>
<tr>
<td>5’ X 16’</td>
<td>7”</td>
<td>84.2</td>
<td>49.9</td>
<td>60” X 120’’</td>
<td>3 – 60” X 24’’</td>
</tr>
<tr>
<td>6’ X 14’</td>
<td>7”</td>
<td>99.0</td>
<td>52.4</td>
<td>72” X 120’’</td>
<td>2 – 72” X 24’’</td>
</tr>
<tr>
<td>6’ X 16’</td>
<td>7”</td>
<td>99.0</td>
<td>59.8</td>
<td>72” X 120’’</td>
<td>3 – 72” X 24’’</td>
</tr>
</tbody>
</table>

These quantities, although approximate, give a good idea of the volumes to be used.

### Finishing Rig

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Flue Height</th>
<th>US Gallons</th>
<th>US Gallons (for each inch above the flue)</th>
<th>Flue Pan</th>
<th>Flat Pan</th>
</tr>
</thead>
<tbody>
<tr>
<td>30° à 45° Brix</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2’1/2 X 10’</td>
<td>10”</td>
<td>17.3</td>
<td>15.6</td>
<td>30” X 24’’</td>
<td>2 – 30” X 48’’</td>
</tr>
<tr>
<td>3’1/2 X 14’</td>
<td>10”</td>
<td>22.8</td>
<td>30.5</td>
<td>42” X 24’’</td>
<td>3 – 42” X 48’’</td>
</tr>
<tr>
<td>5’ X 14’</td>
<td>10”</td>
<td>31.3</td>
<td>43.6</td>
<td>60” X 24’’</td>
<td>3 – 60” X 48’’</td>
</tr>
<tr>
<td>6’ X 14’</td>
<td>10”</td>
<td>37.1</td>
<td>52.4</td>
<td>72” X 24’’</td>
<td>3 – 72” X 48’’</td>
</tr>
<tr>
<td>30° à 35° Brix</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2’1/2 X 12’</td>
<td>10”</td>
<td>30.8</td>
<td>18.7</td>
<td>30” X 48’’</td>
<td>2 – 30” X 48’’</td>
</tr>
<tr>
<td>3’1/2 X 16’</td>
<td>10”</td>
<td>40.1</td>
<td>34.9</td>
<td>42” X 48’’</td>
<td>3 – 42” X 48’’</td>
</tr>
<tr>
<td>5’ X 16’</td>
<td>10”</td>
<td>54.3</td>
<td>49.8</td>
<td>60” X 48’’</td>
<td>3 – 60” X 48’’</td>
</tr>
<tr>
<td>6’ X 16’</td>
<td>10”</td>
<td>64.1</td>
<td>59.8</td>
<td>72” X 48’’</td>
<td>3 – 72” X 48’’</td>
</tr>
<tr>
<td>7’ X 20’</td>
<td>10”</td>
<td>73.5</td>
<td>84.3</td>
<td>84” X 48’’</td>
<td>4 – 84” X 48’’</td>
</tr>
</tbody>
</table>

These quantities, although approximate, give a good idea of the volumes to be used.
### Performance - Evaporation in gallons of water per hour

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Imperial gallon</th>
<th>US gallon</th>
</tr>
</thead>
<tbody>
<tr>
<td>3’ X 10’</td>
<td>90</td>
<td>108</td>
</tr>
<tr>
<td>3’ ½ X 12’</td>
<td>125</td>
<td>150</td>
</tr>
<tr>
<td>4’ X 12’</td>
<td>150</td>
<td>180</td>
</tr>
<tr>
<td>4’ X 14’</td>
<td>145</td>
<td>174</td>
</tr>
<tr>
<td>5’ X 12’</td>
<td>180</td>
<td>216</td>
</tr>
<tr>
<td>5’ X 14’</td>
<td>210</td>
<td>252</td>
</tr>
<tr>
<td>5’ X 16’</td>
<td>240</td>
<td>288</td>
</tr>
<tr>
<td>6’ X 14’</td>
<td>252</td>
<td>302</td>
</tr>
<tr>
<td>6’ X 16’</td>
<td>288</td>
<td>345</td>
</tr>
</tbody>
</table>

**IMPORTANT**

This table is indicative only. The performance depends on several factors; values are +/-20%.
WARRANTY

H2O INNOVATION offers a limited warranty of two years, from the date of original purchase, on all its new evaporators. H2O Innovation undertakes to repair or replace parts with manufacturing or workmanship defects only if the evaporator is used under normal conditions of installation, use and maintenance. H2O Innovation will repair or replace the parts by equivalent new parts, free of charge by the consumer (parts and labor). Defective parts that are replaced become property of H2O Innovation.

The guarantee applying for the cosmetic aspect of the parts or equipment is 7 days only from the date of delivery.

THIS WARRANTY DOES NOT APPLY IF:

- The serial number of the evaporator has been removed or altered.
- There has been use as fuel of: painted wood, treated wood or wood containing chemicals, glue or any other agent.
- There has been use of any other fuel than wood.
- The product has been damaged by negligence or misuse. Repairs or modifications made by the customer. Use of parts other than H2O Innovation parts or use of parts not from an authorized technician.
- The product has been damaged by a cause like: an accident, a water damage, a fire, a natural or human catastrophe
- Damage is caused by misuse of products or use of non-recommended products.
- Operating instructions, installation recommendations, maintenance and storage instructions were not respected.
- Damage is due to electrical connection, overloading, current fluctuations, poor power quality.

THIS WARRANTY DOES NOT COVER:

- Service calls that: do not concern manufacturing defects; for use or installation instructions; to repair insulation or bricking; service calls after two years.
- Breakage of cast iron elements due to overheating or if a blower has been modified.
- Service calls for start-up or end-of-season shutdown.
- Loss of production caused by the quality of syrup or by a problem covered by this warranty.
IMPORTANT: This warranty is only provided to the original purchaser of the equipment. It is not transferable. This warranty may be ended at any time if there is evidence of improper equipment use.

H2O Innovation cannot be held responsible for any loss of time, production, property damage or any costs arising from the warranty claim.

How to benefit from this warranty

To report any defect and to know the service you are entitled to under this warranty, contact H2O Innovation at the phone number or address below. Keep all valid proof of payment (receipts, invoice, delivery order) to validate the warranty period. Without valid proof of payment, the guarantee will not be considered valid. After any repair, the end date of the warranty will be the same as the original warranty end date which is the original delivery date of your equipment.
WARNING

Before first use

To remove any traces of packaging debris, manufacturing debris and residual oils:

IT IS IMPORTANT, when first using the evaporator, to wash all pans, stainless steel pipes, fittings, all components that might be in contact with sap, with soapy water and then to rinse abundantly with hot water. You can also add the equivalent of one cup of commercial white vinegar per gallon (4L) of soapy solution.