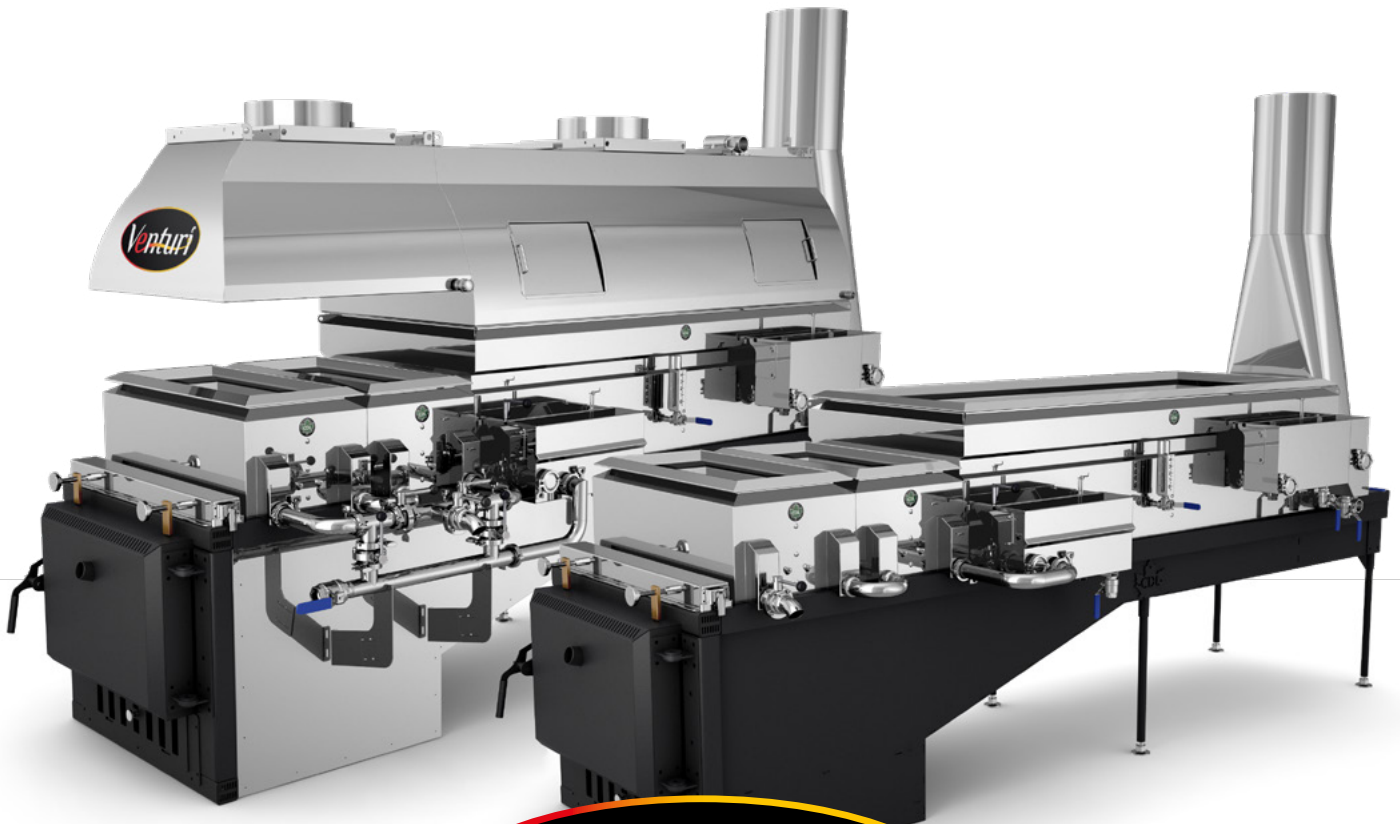




OWNER'S MANUAL

Version 1.1 | 15/09/2021
FRAVE-MAN

VENTURI EVAPORATORS



Thank you for choosing a CDL wood evaporator. Our experience working with sugarmakers ensures you that you acquired a high performance, quality piece of equipment.

Before using this product, make sure you understand all the following instructions. If there is any problem upon receipt of this product, please immediately contact CDL or your sales representative.

FINDING INFORMATION

Make a record for future use

Brand: _____

Purchase Date: _____

Model Number: _____

Serial Number: _____

Serial number location

The serial number is located on the back of the evaporator arch.

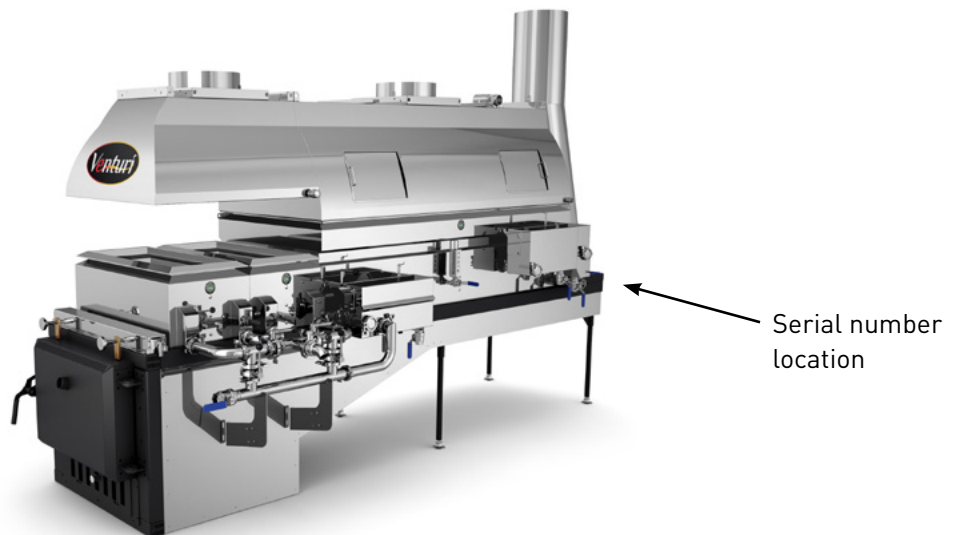


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SAFETY

A wood evaporator can be a dangerous piece of equipment. Always wear heat resistant gloves and clothing when you fire an evaporator. Often, visitors can be in the sugarhouse. Make sure they stay at a safe distance from the evaporator, especially childrens.

A wood evaporator works with solid material (wood) and produces intense heat in front of the arch and around the smoke stack. The evaporator should be set up on a concrete or ceramic floor strong enough to support the weight of the evaporator and its contents, all walls and rafters should be at least 24" from all points of the smoke stack. If you need to put it closer to the wall, a heat barrier (ceramic blanket for example) should be installed. Also, make sure that your steam and smoke stacks have a clear path to the roof of the building (avoid rafters). Your ceiling should be high enough for you to raise the hoods safely with a cable and pulley system.

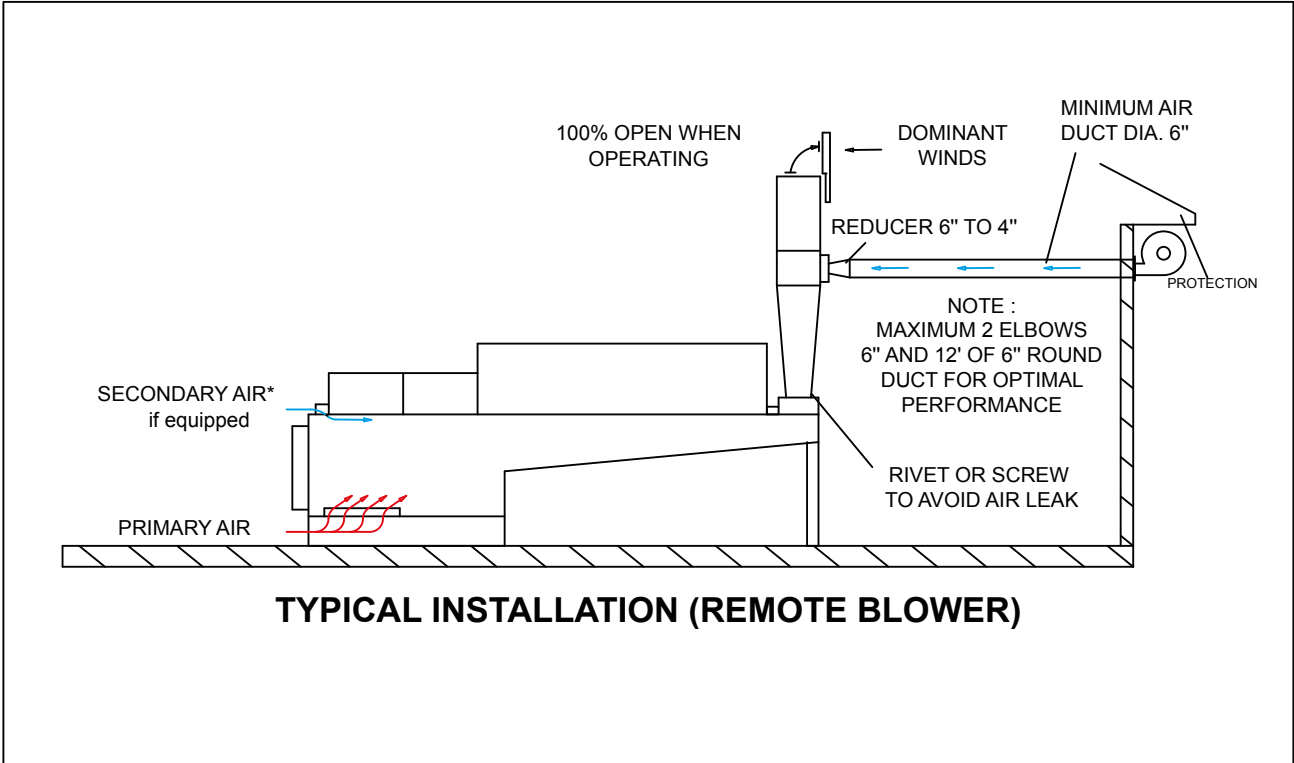
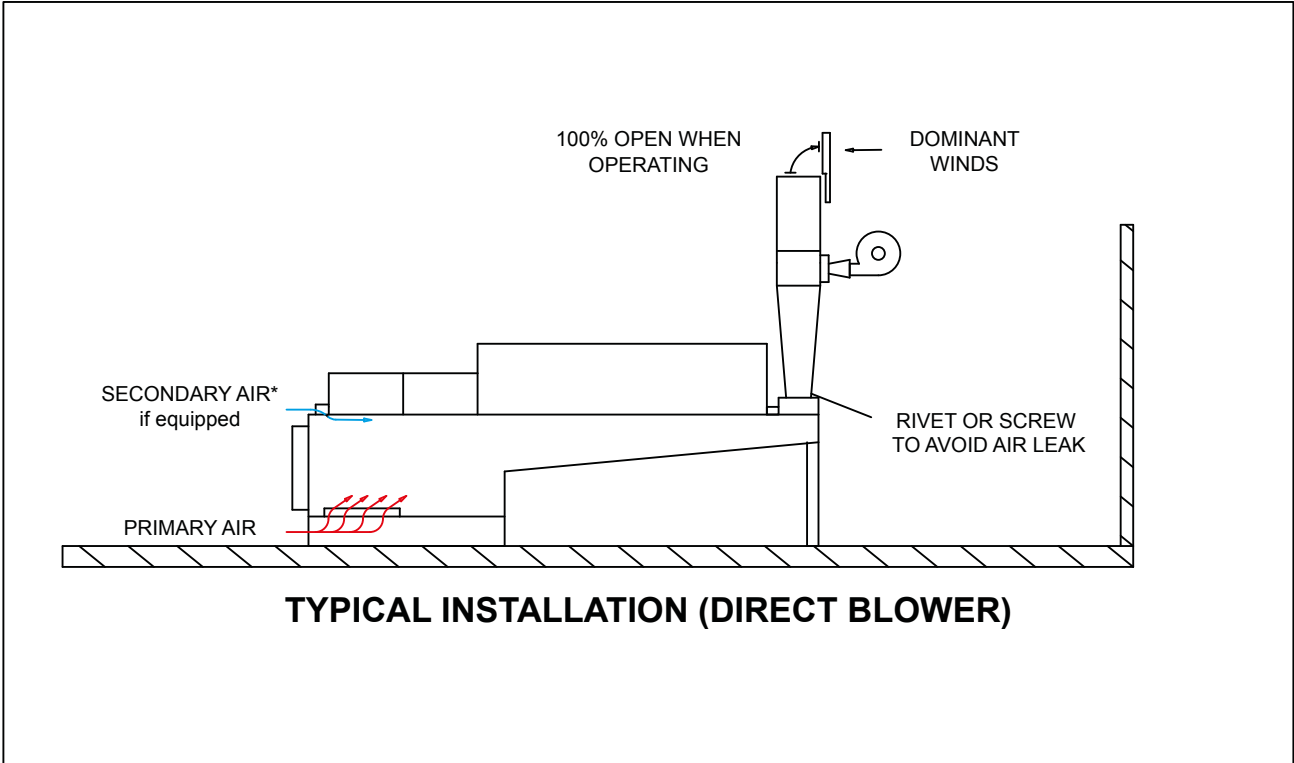
IMPORTANT: Make sure to contact your insurance company in order to verify their safety standards, and requirement for coverage.

If your building is not insulated, you will have better combustion and better steam evacuation. If it is insulated, you will need to have an air intake inside your building (air trap, open window etc.)

INSTALLATION OF THE ARCH

If your building is not insulated, you will have good combustion and a better evacuation of the steam. However, if it's well insulated, make sure you have enough fresh air intake to have a good combustion and enough draft.

1. Remove the wheels under the evaporator.
2. Remove the pans. Level the arch using the adjustable legs.
3. When the evaporator is leveled, tighten the nuts on the legs.
4. The 2' wide Venturi evaporator has a fixed Venturi system on the smoke stack. It only requires a 110 volt plug in.
5. If the blower is installed in a remote location, it is important to follow the instructions on the installation diagram. CDL recommends a minimum 6" air intake pipe from the blower to the smokestack and a maximum length of 12 feet. It is also recommended to use a maximum of two 90 degree elbows in order to limit the restriction which will have an impact on the proper functioning of the evaporator.
6. The Venturi system must be hooked up in the first section of smoke stake on top of the base stack.



BRICKING

The Venturi evaporator is delivered with the ceramic wool already installed. All you have to do is to brick the combustion chamber.

Follow these steps.

Call your CDL sales representative if you need further assistance.

1. Start with the bottom between the grates and the front, sides and back of the arch. Leave 3/16" between the grates and the bricks for expansion.
2. Build the side walls, one row at the time. Make sure to lean the brick against the wool on each side of the arch.

Here's what the final product should look like:



Front view



Close-up of the wall

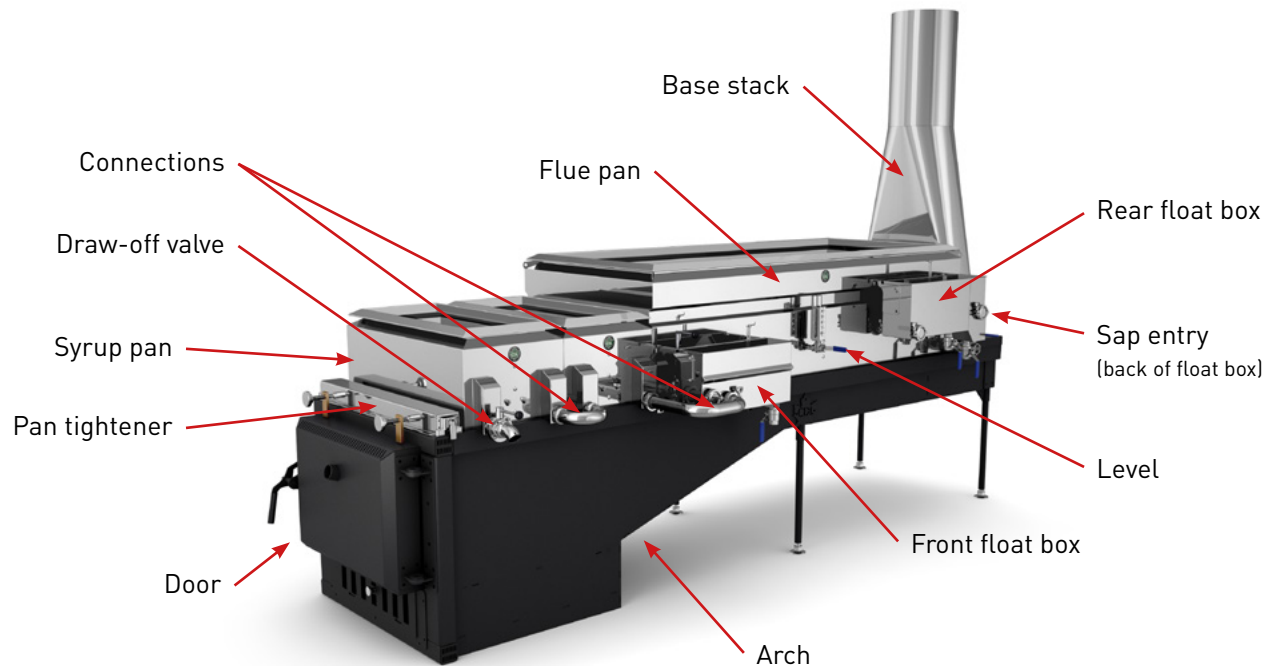


Side view

3. Let the cement dry for 24 hours.
4. It's now time to cure the cement and the bricks. Fill the pans with water as if you were going to boil sap. Start a fire and bring the temperature inside the burning chamber between 400°F and 500°F for an hour. Do not start the Venturi system during this operation. Also, do not exceed 500°F and make sure the pans don't run out of water. Keep at least 2" of water in each syrup pan and at least 2" of water above the flues at all time.
5. Let the evaporator cool down for 24 hours.

ASSEMBLY

The insulation and bricking are completed. Here's how to put together the pans and stack.



1. Set the pans on the evaporator starting with the flue pan. Make sure the back of the pan touches the back plate (or the preheater pan if you have one). Then, install the syrup pans in the front. Make sure the evaporator and the pan are leveled. **Finally, tighten the pans together using the pan tightener.**
2. Install the float boxes, all the connections and the level(s). Hook the sap / concentrate line from the tank to the back of the rear float box. The bottom of the tank needs to be at least 12" higher than the maximum level in the evaporator. Don't forget to put Teflon tape on the threaded parts to avoid leaks and stainless to stainless seizures.
3. Install the base stack on the back of the evaporator.
4. Install the first section of smoke stack (**the one with the Venturi system**), on top of the base stack.
5. Install the roof jacks on the roof. Make sure you seal the installation properly to avoid leaks inside the sugarhouse.
6. Install the remaining smoke stack and the steam stacks (if you have hoods). Then install the collars around the stacks, above the roof jacks.

7. Install the Chinese hats or/and the rope operated stack covers. In the case of the stack covers, make sure the dominant winds will close them.
8. The last step is to install the steel wires holding the stack in place. Make sure not to tighten too much. The chimney will expand significantly with the heat.

INSTRUCTIONS

Only use dry wood, without paint or other chemicals (no treated wood). Never use any products made of plastic, tires, coal or any other combustible material. The use of any unauthorized combustible will void the warranty.

To optimize combustion, the best length for the wood used in the Venturi evaporator is 20". The grates inside the burning chamber are 20" long. So with 20" logs, we get the maximum benefit of the air drawn in the burning chamber.

The quality of the wood that will be burned is an important factor in the performance of the evaporator. Poor quality wood will reduce the boiling rate, you will fill the burning chamber more frequently and the maple syrup produced will be darker. See **table 1** to find the heat potential for each type of wood.

Table 1

Heat produced by different wood species (Million BTU per cord)

Oak	29	Elm	25	White pine	17
Sugar maple	29	Red maple	24	Lime tree	17
Beech	28	Larch	24	Spurce	16
Yellow birch	26	White birch	23	Fir	16
Ash	25	Poplar	18		

OPERATION OF THE EVAPORATOR

Before firing the evaporator

1. Open the drawer under the front door of the evaporator and empty the ash if necessary. A full drawer will have a negative effect on combustion efficiency.
2. Make sure the outlet of the tank feeding the evaporator is at least 12" higher than the sap level in the flue pan and that the tank is hooked up properly to the back of the rear float box.
3. Install a syrup thermometer on each syrup pan. Make sure they are calibrated by dipping them in boiling water and adjusting the temperature at 0 degree.
4. Open the rope operated stack covers.
5. Open the sap valve from the sap tank to the evaporator. Fill the flue pan 2" above the flues.
6. Open the front float box valve and fill the syrup pans 2" deep by adjusting the float in the front float box.
7. After the start of the evaporator, using the float boxes, stabilize the level in each pan. We recommend 1" in the flue pan and between 1 ½" and 2" in the syrup pans.

Light the evaporator

1. Lighting the evaporator is done with the Venturi shutoff.
2. Completely open the primary air grill located under the door.
3. Using small dry wood and paper, light the evaporator.
4. Wait until you get a good burn.
5. Fill the combustion chamber (3-4 inches from the pans).
6. Start the Venturi system.
7. Leave the Venturi system running at all time, even when you fill the chamber with wood.
8. Manage the boiling intensity by opening (high intensity) or closing (lower intensity) the primary air damper.

Note: If your evaporator is fitted with the adjustable pan tightener exclusive to Venturi evaporators, it is possible to adjust the boiling pattern by opening the grid to reduce the boiling intensity under the syrup pans.

Operation during the boiling process

1. Using defoamer is necessary to the good operation of the evaporator. When the syrup generates too much foam, the float boxes will have difficulty maintaining a proper level in the pans and you might run the pans dry. **RUNNING THE EVAPORATOR WITH NOT ENOUGH LIQUID IN THE PANS COULD RESULT IN PERMANENT DAMAGE TO THE EQUIPMENT.** Also, the defoamer helps avoiding the foam from overflowing above the pan walls, preventing a huge mess.
2. **ALWAYS** pay attention to the liquid level in all the pans. Adjust the floats accordingly.
3. Maple syrup is ready when the temperature hits 7 degrees above the boiling point of water. Open the draw-off valve when the syrup reaches this level and close it when the temperature comes back below this value. An automatic draw-off valve is a very useful option to improve consistency of the maple syrup. Don't add wood if the syrup is almost ready. The temperature under the syrup pans will become too high and you might burn your syrup. Wait after you draw-off.
4. Repeat drawing-off syrup every time the temperature gets to 7 degrees above the boiling point. It's possible that the draw-off temperature may vary over time. This is caused by variations in the atmospheric pressure. Verify regularly your syrup using hydrometer, a densimeter or a refractometer to make sure you have the right sugar content.
5. The recommended safe water level in the pans is 1" above the pleats in the water pan and 1-1/2" to 2" in the syrup pans. It is possible to reduce or increase the water level in order to adapt to the quality of the maple sap. We recommend that you master your evaporator before reducing the water level.
6. After each day of boiling, it is recommended to drain the sap in both float boxes.
7. When you are almost done for the day, make sure you have enough sap left in your tank to fill all the pans 2" higher than the normal sap level. It will compensate for the evaporation that will keep on happening because of the heat accumulated in the evaporator until it cools down.

If you have any questions, don't hesitate to contact your CDL sales representative.

IMPORTANT SAFETY NOTE:

THE HEAT IN FRONT OF THE EVAPORATOR WHEN THE DOOR IS OPEN IS INTENSE. ALWAYS WEAR GLOVES, SAFETY GLASSES AND HEAT RESISTANT CLOTHING WHEN FIRING THE EVAPORATOR.

TROUBLESHOOTING GUIDE

Can't keep a constant liquid level in the pans:

- Use more defoamer. (careful, too much defoamer could alter syrup flavor).
- The silicone part in the float box arm is worn down or misplaced.
- The float box arm needs to be realigned.
- There is a leak in the float, it's filling with sap. Repair or replace the float.
- The sap tank is too high, there is too much pressure on the float box. Move the tank or install a pressure control float box.

Sap turns to syrup in the 1st syrup pan:

- It can happen when you start the evaporator. Draw-off enough syrup to get it to the front and distribute what was drawn-off in the flue pan. This will get the movement forward going.

Excessive chimney temperature:

- Gradually close the primary air grille located under the door.
- Check that the cleaning drawer is properly closed.
- Check that the primary air grate is properly seated and does not allow primary air to enter around the perimeter.

Too intense boiling under the syrup pan:

- Gradually close the primary air grille located under the door.
- Adjust the secondary air damper integrated into the pan tightener by opening it gradually.

If you have any other problem, contact your CDL sales representative

MAINTENANCE

Pan cleaning

1. Fill the pans (even with the separation) with permeate or clean water.
2. Add a CDL recommended pan cleaning product (read the product label for the right dosage). Heat the liquid to 90°C (195°F), extinguish the fire and let it sit overnight.
3. Drain and rinse thoroughly all the pans with water. Make sure there is no trace of acid left in the pans.
4. Fill the pans again and add sodium bicarbonate to neutralize any acid residue. Leave for 15 minutes. Drain and rinse with water one last time.
5. Never use abrasive products, metal brushes, steel wool or any products with chlorine or muriatic acid.
6. If there is burned syrup on the outside walls of the pan, you can use a commercial oven cleaning product (cold oven). It will dissolve the syrup without damaging the pans. To bring back the shiny finish, use an industrial glass foaming cleaning product.

IMPORTANT: Between seasons, if there is ANY trace of acid left in a pan, it will be filled with pin holes at the beginning of the next season.

QUANTITY OF WATER IN THE FLUE PAN

Dimension	Height of the flues (in inches)	US Gallons	Liters	US Gallons	Liters
		(equal with the flues)	(equal with the flues)	(for every inch above the flues)	(for every inch above the flues)
2 x 4	5	10.8	41	4.8	18
2 x 5	5	13.4	51	6	23
2 ½ x 5	5	15.5	59	7.5	28
2 ½ x 6	7	21.8	82	9	34
2 ½ x 7	7	34.8	132	10.8	40.5
3 x 7	7	38.4	145	13.2	50
3 x 8	7	43.2	164	15	57
4 x 8	7	60	227	19.8	75
4 x 10	7	74.4	280	25	94
5 x 10	7	91.2	345	31	117
5 x 12	7	99.6	376	37.2	141
6 x 10	7	123.6	467	37.2	141
6 x 12	7	134.4	508	44.6	168

WHEN TO CLEAN YOU PANS

Pan cleaning depends on evaporator size and the amount of scale deposit produced by your evaporator. Front pans have to be checked every hour to prevent overheating. If too much scale deposit in your pan, you could burn it. So make sure that you check your flue pan at the end of every day, especially in the corners at the end of each flue. Too much niter deposits can cause a pan to overheat. Under the pan and between the flues, use a flue brush to remove as much soot as possible.

IN BETWEEN SEASON STORAGE

1. Put all your pans on wood blocks to let air circulate in the arch and under the pans. Too much humidity can cause damage.
2. Remove any deposits inside the pan with a good acid wash. If necessary, brush all the flues inside and outside with the appropriate brush and a pressure washer. Always make sure the flues of the pan are clean.
3. Never leave any kind of cleaning product in the pans, it will damage them and it's not covered by the warranty.
4. O-rings must be greased with food grade grease (to prevent shrinking and drying).

EVAPORATOR WARRANTY

Your evaporator is covered by a two year limited warranty. For two years from your original date of purchase, Les Équipements d'Érablière CDL (CDL), will replace or replace any parts of this evaporator that prove to be defective in materials or workmanship when such evaporator is installed, used and maintained in accordance with the provided instructions.

Exclusions

This warranty does not cover the following:

1. Products with original serial number that have been removed, altered or cannot be readily determined.
2. Product that has been transferred from its original owner to another party or removed outside the USA or Canada.
3. Production loss due to any kind of failure of the evaporator.
4. Revenue losses due to syrup quality.
5. Service calls which do not involve malfunction or defect in materials or workmanship, or used other than in accordance with the provided instructions.
6. Service calls to correct the installation of your evaporator or to instruct you how to use your evaporator.
7. Expenses for making the evaporator accessible for servicing, such as the removal of wall, shelves etc.
8. Service calls to repair insulation or the bricking job.
9. Any service beyond the first two years.
10. Damages caused by: services performed by unauthorized service companies; use of parts other than genuine CDL parts or parts obtained from persons other than authorized service companies; or external causes such as abuse, misuse, inadequate power supply, accidents, fires, or acts of God.
11. It doesn't cover the consumable products or accessories.
12. If the product was damaged by abusive use, negligence, accident caused by the customer, modification made by the customer, variation in the electric power.

13. Damage cause by the use of products that are not meant for use with our equipment or a bad use of a product as acids, cleaning products.
14. Use of painted wood or any wood containing chemicals, glue or any other added agent.
15. Use of any other burning agent than wood.
16. The warranty for electric motors is covered only upon approval by the CDL service department. Any electrical or electronic device or component whose source of electricity comes from a generator is not covered by the CDL warranty.

Disclaimer of implied warranties; limitation of remedies

Customer's sole and exclusive remedy under this limited warranty shall be repair or replacement as provided herein. Claims based on implied warranties, including warranties of merchantability or fitness for a particular purpose, are limited to two years or the shortest period allowed by law, but not less than two years. CDL shall not be liable for consequential or incidental damages such as property damages and incidental expenses or loss or revenues caused by any event covered by this warranty. Some states and provinces do not allow the exclusion or limitation of incidental or consequential damages, or limitations on the duration of implied warranties, so these limitations or exclusions may not apply to you. This written warranty gives you specific legal rights. You may also have other rights that vary from states to states.

If you need service

Keep your receipt, delivery slip or some other appropriate payment record to establish the warranty period should service be required. If service is performed, it is in your best interest to obtain and keep all receipts. Service under this warranty must be obtained by contacting CDL at the addresses or phone numbers below.

Obligations for service and parts under this warranty will be performed by CDL in Canada. Products features or specifications as described or illustrated are subject to change without notice.

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