OWNER'S MANUAL

Chinook

HIGH EFFICIENCY WOOD EVAPORATORS

Les Équipements d'Érablière CDL inc.

Thank you for choosing a CDL high efficiency wood evaporator. Our 40 years of experience working with sugarmakers ensures you that you acquired a performant and quality piece of equipment. Before using this product, make sure you understand all the following instructions. If there is any problem upon reception of this product, please immediately contact CDL or your local representative.

FINDING INFORMATION

Make a record for future use

Brand:_____

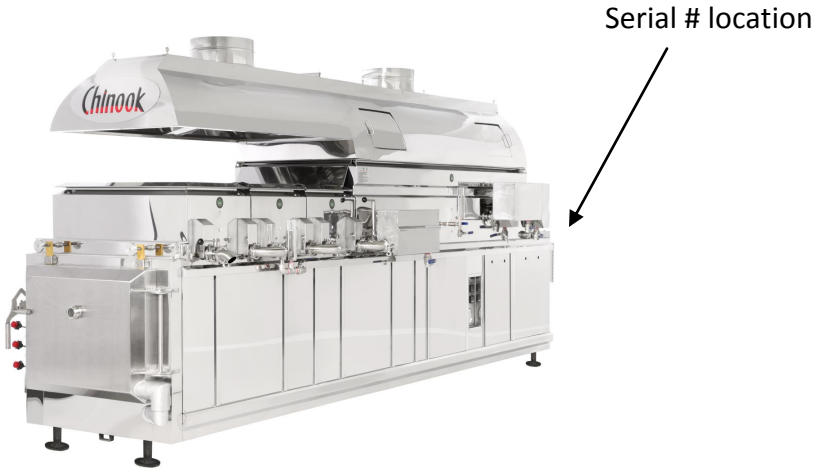
Purchased Date: _____

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 children.

A wood evaporator works with solid material (wood) and produces intense heat in front of the arch and around the smoke stack. For the location of your evaporator, make sure you have a concrete or ceramic floor strong enough to support the weight of the evaporator and its content as well as at least 24" between any wall and 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 free way to the roof of the building (avoid rafters). Also, 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.

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

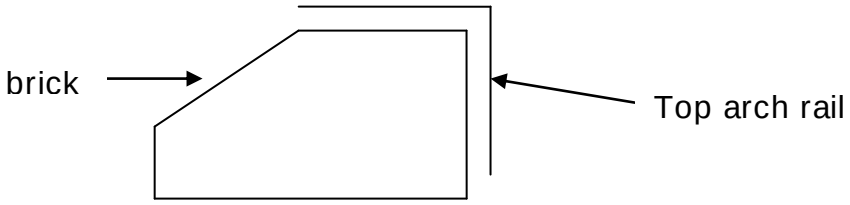
INSTALLATION

1) Remove the wheels from the evaporator (if you have some).

2) Level your arch with the adjustable legs. Use a carpenter's level onto the smooth rail (pans are off the arch at this point) and adjust the leg adjustable bolts located at the very bottom of the legs as needed.

3) Once the evaporator is leveled (length and width), make sure the locking nuts are secured and tight.

4) Brick your arch (see drawing #C)
   - 4.1 Place insulation board against inside arch panels using refractor cement to help hold board in place if necessary. The insulation board can be cut with a utility knife or saw. Always use a dust mask when insulating your arch.
   - 4.2 Start placing firebricks in the firebox. Start around the grates and work up and towards the rear of the arch. Refractory cement is applied in THIN layers only to stick the firebricks to the insulation board and to each other.
   - 4.3 The last layer of bricks at the top of the arch should be cut at an angle to allow heat to touch as much pan surface as possible.
     (drawing A). Do not force bricks into location. A too tightly bricked arch could create problems.

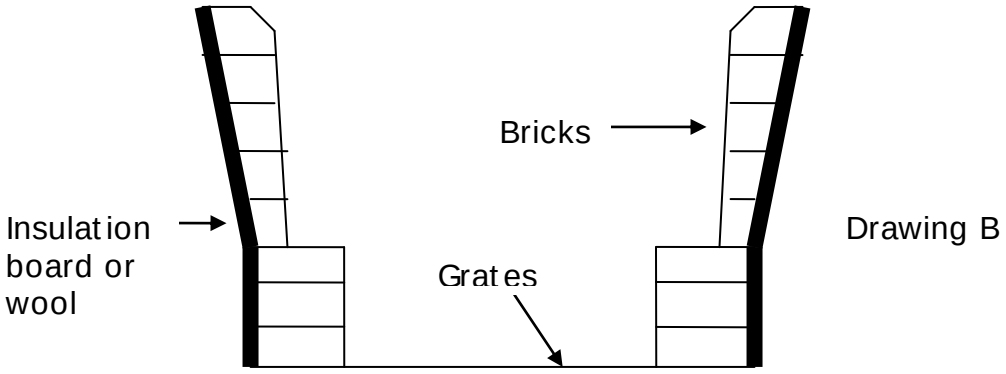


Drawing A

   - 4.4 Build a wooden form to allow you to pour castable concrete around the front end of the arch. No bare metal should be exposed to the intense heat.
   - 4.5 Fill the form slowly to make sure you have no air pockets in the concrete.
   - 4.6 Allow 24 hours for concrete and mortar to set and dry with a room temperature between 60 and 70 ^{0}F.
   - 4.7 After a minimum of 24 hours, check to see if any area may need refractory cement to fill any cracks or crevices.
   - 4.8 Remove the form.
   - 4.9 **IMPORTANT**: Make sure there is no air space between the top of the bricks and the top steel rail. If there is, push in some wool insulation. If heat directly hits the railing, it will warp.

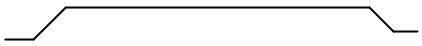
4.10 It's highly recommended to cure the concrete. Follow the following procedure for optimal results:

a) Air cure at ambient temperature (no less than 40^0F and no more than 100^0F) for 24 hours, keeping surface damp with light water spray, curing compound or covering with plastic
b) Elevate temperature to 250^0F and hold for 1 hour per inch of thickness
c) Elevate temperature 50^0F per hour to 500^0F and hold 1 hour per inch of thickness
d) Elevate 100^0F per hour to 1000^0F and hold for 12 hours
e) Elevate 100^0F per hour until 1500^0F, and let the temperature gradually come back to the ambiant temperature.
   Note: if at any time during the heat up excessive steaming is noted, STOP the procedure at that point until steaming slows. If steaming is during a holding period and continues for more than 15 minutes, reduce temperature by 100^0F



Drawing B

5) Place the pans on the arch. Start with the flue pan (the bigger one). Adjust it to the back collar. Then install the syrup pan(s) on the front of the arch. Install the base stack behind the flue pan and be sure that flue pan is levelled.
   Don't forget to install the insulation bars between each pan, they have to be installed like this:



   You don't want the insulation to be touched directly by the flames.

6) Install the roof jack, base stack, stack pipe, collar and stack cover (please make sure that the stack cover is installed, the cover has to be against dominant wind). Ideally, have a rope coming down from the stack cover to a place where it is easy to operate.

7) If you have a drop flue pan, you need to raise the front of the pan (3/16") to help drainage.

8) Install the float boxes and transfer fittings. All valves and fittings will need Teflon tape applied prior to installation.

9) Install the sap level gage on the side of the flue pan. Remove glass tube before installing. Don't overtighten the glass tube holding nut.

10) Install the draw off valve on your syrup pan.

11) Connect power to the fan of the evaporator (by a licensed electrician), IMPORTANT, the blower motor runs on **220Volts**. If you hook it on 120V, you will burn the motor and it won't be warrantied.

12) Use only dry wood free of paint, glue or other chemicals. Never use tubing, rope, plastic bags, old tires (rubber), coal or any other combustible.

Note: the quality of the wood you will use is an important factor in the performance of your evaporator. Poor quality wood will cause a more frequent opening of the doors and can reduce the quality of the final product (darker syrup). For example: oak provides 29 million BTU per cord vs 16 million BTU for spruce. (see table 1)

TABLE 1
Heat produced by each type of wood (Million BTU per cord)

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

PRE-FABRICATED CHIMNEYS

If you decided to buy a pre-fabricated chimney to install with your evaporator, please refer to the manufacturer's instructions. A chimney can get up to 800 F degrees and even more on an intens-o-fire. Before installing this type of equipment, make sure it's made for this kind of conditions and validate with your insurance company that it's in compliance with their safety standards.

IMPORTANT

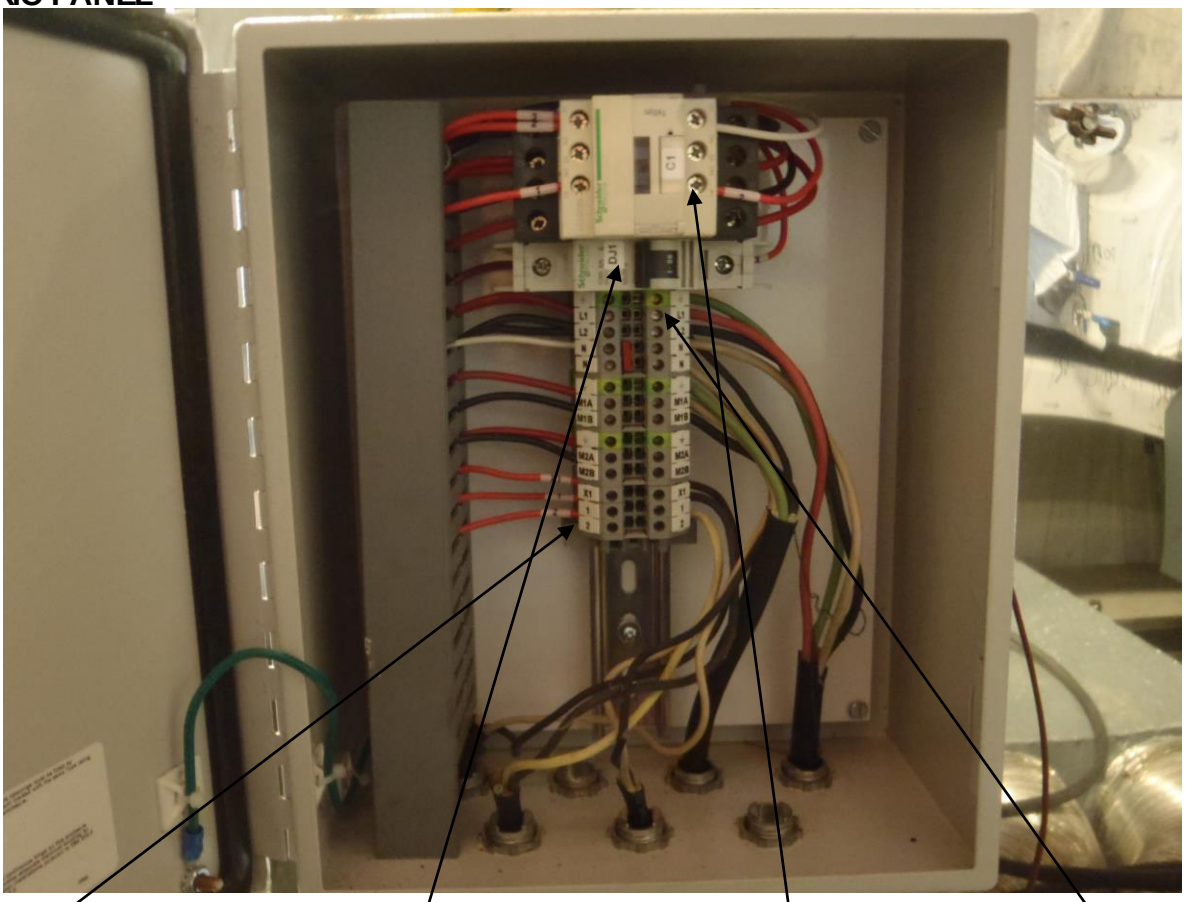
We highly recommend to use a spark arrestor with the smoke stack cover. Any forced air evaporator may blow sparks out of the chimney. A spark arrestor will help reduce the risk of a fire. That's why proper air adjustment is very important in order to reduce the amount of sparks leaving the arch. We also recommend to inspect and clean everyday the spark arrestor because ashes may plug it over time. There is always a risk of fire when burning wood, so don't leave anything flammable outside the sugarhouse.

INSIDE OF A BRICKED INTENS-O-FIRE

NOTE: ***Once the arch is bricked, no bear steel is supposed to be exposed to the flames. The heat is so intense inside the arch that it will eat through the metal very rapidly. Notice the castable cement all around the arch door frame.***

Picture of a bricked arch. For larger arches, you can see that the bottom rows are laid flat and the top part is laid on the side. The top part is cut at an angle to allow the heat to touch as much as possible the pans. High temperature cement is used, lay bricks one against the other and to seal properly avoiding the

ELECTRIC PANEL



Modulator terminal

Breaker CB1

Blower breaker C1

L1, L2, N, 1 terminal

OPERATING THE EVAPORATOR

Before starting the evaporator

- Open the stack covers
- Verify all sap and syrup valves
- Make sure all the pan outlets are unplugged

1. Close all valves on evaporator.

2. Make sure supply tank to feed evaporator is at least 12" higher than the top of pans on evaporator. Hook up the tank to the rear float. Make sure you have a valve at the outlet of the tank.

3. Calibrate a thermometer with boiling water. Install it at the outlet of the last syrup pan.

4. Open valve from supply tank to rear float on flue pan, fill flue pan to 2" over the top of flues. After you start, bring the level to 1" above the flues.

5. Open valve on front float box to fill syrup pans between 1 ½" to 2" above the bottom of pans. (**ADJUST FLOAT TO MAINTAIN LEVEL**).

6. Make sure the valve feeding the flue pan is open. If it's closed, you will burn your flue pan.

7. Now you are ready to make a fire in the fire box using wood split 2" to 3" in diameter, 20" long on a smaller unit, larger on a bigger evaporator. Load the combustion chamber with paper, cartboard and wood. Place the wood 6" from the door.

8. Shut the air shutters by pushing all the way in the 3 air adjustment knobs. (see photo 1)

photo 1

9. Ajust the temperature of the draw off valve at 500^{0}F
To operate manually the valve during the start up

10. Light the fire and close the door.

11. Start the blower

12. Pull the grate adjustment knob at 1/3 (photo 2)

photo 2

13. Let the wood burn for about 10 minutes or until it is well lit

14. Close the air under the grates (photo 3)
Open the door, level the embers on the bottom of the arch. Fill with wood, 4" to 6" from the syrup pans and fully open the 2 other air controls.

Photo 3

15. During the loading of the evaporator with wood, it isn't necessary to shut the blower off. Only the air under the grates must be closed manually by pushing the red knob and then pushing all the way down the middle handle to prevent the flames to be blown towards you. Once the burning is full of wood, just open the grate air adjustment fully. When the temperature inside the chimney gets to its set point (it can take about 30 minutes), then the automatic mode takes charge of the air controls (photo 4). The controller optimizes the combustion to maintain the temperature inside the base stack at its set point. The set point can be adjusted to a maximum of 700^0F. The higher the set point, the faster the evaporator will boil. However, the wood burning efficiency will be less. The adjustment of the back air must be fully open and the one for the door air should be adjusted between 50% and 100%, wether you want to boil harder in the front or the back of the evaporator. Make sure to maintain a positive level of draft between 0 and 0.05 on the magnehelic gauge. Notice that the needle of the gauge will go down when the controller requires more air from the grates.

PHOTO #4

Open 100% when the set point is reached (+/- 30 minutes). The controller with modulate the air at that point.

Close this handle when loading the burning chamber

When to recharge the burning chamber?
When the controller can't maintain the temperature at the set point.

16. Have some vegetable oil or defoamer close by when operating evaporator, should pans start to foam up, put a drop into the pan and the foam will go down. This will prevent boiling over.

17. Maintain these levels by the adjustment on your front and rear floats. (**THEY WILL HAVE TO BE ADJUSTED AS EVAPORATOR STARTS TO EVAPORATE WATER FROM THE MAPLE SAP).**

18. Finish syrup is always drawn off at 7 degrees above the boil point of water.
(**EXAMPLE: IF BOILING WATER IS AT 212 DEGREES, THEN YOU WOULD OPEN VALVE AT 219 DEGREES).**
Close valve when temperature starts to drop.

19. Repeat from step # 13 when next batch reaches 219 degrees.

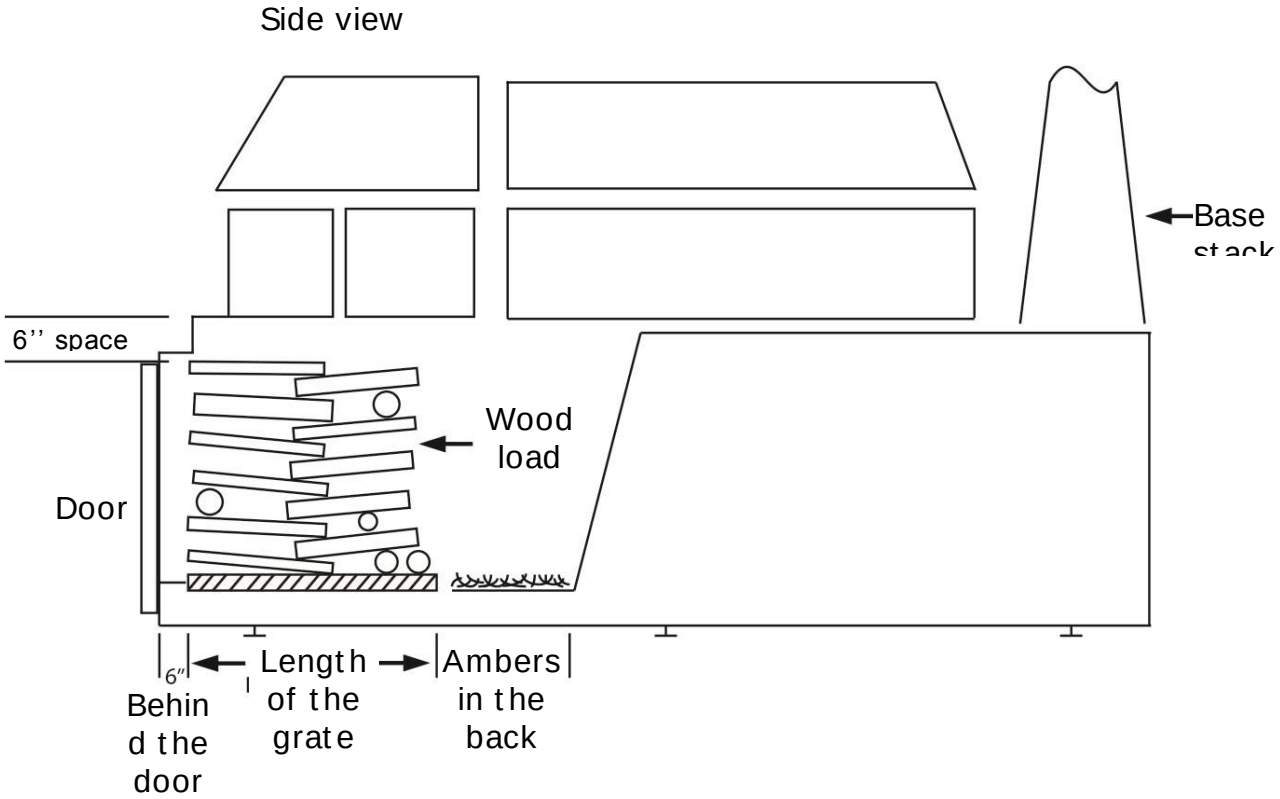
20. When you become more experienced on the evaporation of your evaporator, you can bring the level of sap down to 3/4" above the flues in the flue pan. Be carefull, the lower the level, the more dangerous it is to burn a pan.
(**ALWAYS MAINTAIN THE LEVEL BETWEEN 1 ½" TO 2" IN THE SYRUP PAN).**

Exemple

Highest possible set point temperature 700°F	
600°F	← Your set point
550°F	← Actual base stack temperature

When the evaporator reaches 600°F the controller will operate to maintain this temperature. When the temperature lowers to 585°F or lower, it's time to reload the burning chamber.

When loading with wood, push the ambers towards the back but keep 1'' to 2'' of them over the grates for a faster recovery. Fill the burning chamber with wood up to 6" from the pans and no further than the back of the grates



CONTROL PANEL

Blower ON/OFF

Temperature in the burning chamber

Base stack temperature

Draft

Transformer : 60S84A310
Contact zb2be101 :52107
Contact zb2be102 : 52109

Burning chamber temperature

Not used

Actual base stack temperature

Base stack set point temperature

Push the up and down arrows to the modify the set point

If there is a problem, you can call one of our technician at: (800) 762-5587

IMPORTANT SAFETY NOTE: THE HEAT COMING OUT OF THE FRONT OF A WOOD EVAPORATOR IS INTENCE WHEN THE DOOR IS OPEN. ALWAYS WEAR HEAT PROTECTIVE CLOTHES COVERING ALL YOUR BODY, INCLUDING GLOVES AND GOGGLES. SEVERE BURNING COULD OCCUR IF THE EVAPORATOR IS OPERATED WITHOUT ADEQUATE PROTECTION.

If there is a power outage, let the air adjustement for the door and the back the same, close the air under the grates and open the door slightly (1/2'') to bring enough air in to burn what's left inside the evaporator safely.

For the same reason, you should also leave the door open at the end of each boiling day.

DIMENSION AND PERFORMANCE

Specifications	Complete evaporator	Frame only	
width x length	Part #	Part #	Performance us gallons/hr
2,5X8	6700301C	677422AFC	100
2,5X10	6700401C	677424AFC	125
3X10	6700501C	677430AFC	150
3X12	6700601C	677432AFC	180
3,5X12	6700701C	677436AFC	227.5
3,5X13	67007011C	677435AFC	245
3,5X14	6700801C	677437AFC	245
4X12	6700901C	677442AFC	240
4X13	6701001C	677443AFC	260
4X14	6701101C	677444AFC	280
4X15	6701201C	677445AFC	300
5X12	6701301C	677446AFC	300
5X14	6701401C	677450AFC	350
5X15	6701501C	677451AFC	375
5X16	6701601C	677452AFC	400
6X14	6701701C	677454AFC	420
6X15	6701801C	677453AFC	450
6X16	6701901C	677455AFC	480
6X18	6702001C	677456AFC	540

Number of gallons of sap in a flue pan

Size (feet)	Flue height (inches)	Us gallons (equal to the flues)	US gallons (for every inch above flues
2 ½ x 5	5	15.6	7.5
2 ½ x 6	7	21.9	9
3 x 7	7	30.9	13.2
3 x 8	7	35.1	15
4 x 8	7	45.9	19.8
4 x 10	7	56.1	24.9
5 x 10	7	70.3	30.9
5 x 12	7	83.4	37.2
6 x 10	7	84.3	37.2
6 x 12	7	99.6	44.7

TROUBLESHOOTING GUIDE

Float doesn't hold a constant level of sap

- The rubber piece of the float arm needs to be replaced or readjusted.
- Float box arm needs to be realigned.
- Make sure there isn't sap inside the float (hole in the float).
- The sap tank is too high and puts too much pressure on the float arm; you need to install a secondary pressure control float box or to relacate the sap tank.

Syrup is being made in the second pan

- It's normal when you start. Draw off some syrup and put it in the flue pan to get the movement going.
- If problem continues, reduce your draft (see draft adjustment) to reduce the heat in the front pans.

Intense heat in front (the doors become red)

- Not enough air coming from the door, adjust the door air knob.
- Not enough draft (see draft adjustment).
- The burning wood is too close to the doors (need to be at least 6" from the doors).
- Verify if the heat recuperator is obstructed.

Intense heat in the base stack (or the evaporator boils slowly)

- Too much air coming from the grates, adjust grate air knob.
- Too much draft (see draft adjustment).

The front of the evaporator warps or the metal is crumbling

- The metal frame is exposed to the heat, protect it by repairing with castable concrete on all the exposed surfaces.

If the modulating controller stops working, you can operate the evaporator on "manual" mode by going under the evaporator (open the side access door) to disengage the control motor that modulates the air shutters. Then, you'll be able to adjust the air manually.

*** For any other problem, please refer to your local representative.

MAINTENANCE

Pan cleaning

1) Fill pans with permeate or clean water. Fill it to the top.

2) Add a CDL recommended cleaner, heat up and leave sitting all night.

3) Drain and rinse thoroughly with water.

4) Fill the pan to the top again with clean soft water and bring it to a boil for 15 minutes, to insure that there is no more cleaner residues left.

5) Use only a CDL recommended cleaner.

6) Never use abrasive products or steel brush, steel wool or any product containing chlorine or muriatic acid.

7) If there is burned syrup on the side of a pan, use commercial **cold** oven cleaner. It will dissolve the syrup without using abrasive products. To bring back the shine, use a foaming industrial glass cleaning product.

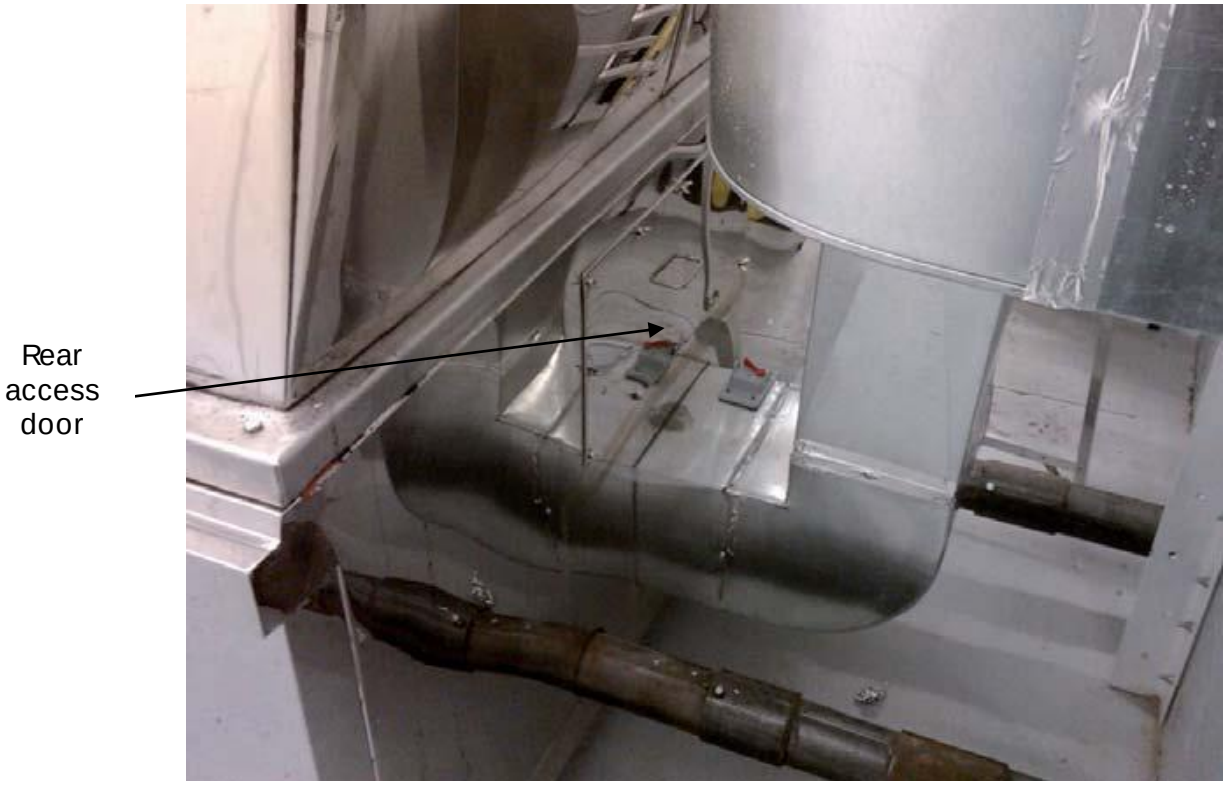
IMPORTANT: if there is any cleaning product left in the pan, it will seriously damage the pan. It could even make holes in it.

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 scale deposits can cause a pan to overheat.

Mid and end of season maintenance

Remove the rear access door (see picture below) to get access to the base stack heat exchanger. Remove any ashes or dust accumulated at the bottom of the base stack, with a vacuum cleaner.



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) It is necessary to brush all the flues inside and outside with the appropriate brush. 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 should be greased with food use grease (to prevent shrinking and drying)

Parts: CHINOOK

Long handle valve: 720603

Handle bearing: 662454

Door handle: 60017

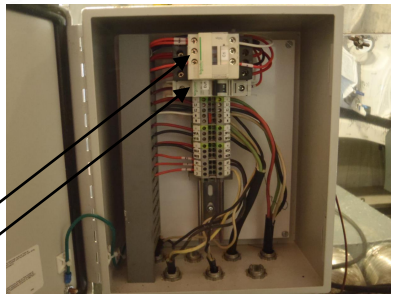
Adjustment handles: 60015

Legs: 69PATT00

Sight glass: 601402

Latch kit: 67 LATCH

O'ring door # 60144V



Transformer : 60S84A310
Contact zb2be101 :52107
Contact zb2be102 : 52109

Start-stop button:51215

Controller: 66E5CNR

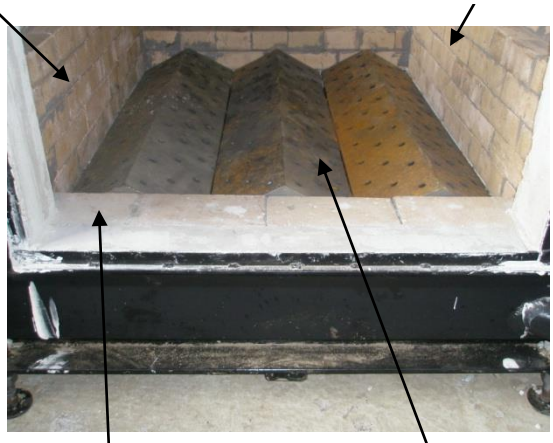
Modulating controller: 66E5CNC

Magnehelic

Belimo motor: #66776

Bricks: 66868

Pyromix: 668664



Castable cement: 66875

Grates: 601139

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. Revenu 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. Crack cast iron parts if a blower was used in the evaporator.
10. Any service beyond the first two years.
11. 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.
12. It doesn't cover the consumable products or accessories.
13. If the product was damaged by abusive use, negligence, accident caused by the customer, modification made by the customer, variation in the electric power.
14. 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.
15. Use of painted wood or any wood containing chemicals, glue or any other added agent.
16. Use of any other burning agent than wood.

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.

Les Équipements d'Érablière CDL
257 Route 279
St-Lazare, Québec, Canada
G0R 3J0
(418) 883-5158

CDL USA
3 Lemnah Drive
St. Albans, VT, 05478
(802) 527-0000