



WSE Evaporator Manual



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INTRODUCTION: THEORY OF OPERATION

A maple syrup evaporator works under the principal of a gradient. As the sap boils, it concentrates. As it concentrates, the volume is reduced and the solids (sugar concentration) increase. As the volume is reduced the liquid works to maintain the levels across the evaporator so less concentrated sap flows into areas where there is more concentrated sap. During the evaporation process the percent of sugar will change from the incoming (approximately 2%) to the draw off (approximately 66%).

FORMING THE GRADIENT

When the evaporator is first filled, the concentration of the sap is the same throughout. The gradient is formed as the water is evaporated from the sap in the syrup pan and the flue pan, and as the new sap enters the flue pan.

As the sap boils it loses moisture and becomes denser / more concentrated. As it is becoming concentrated it loses volume. As it loses volume additional sap will try to keep the levels constant and at the same concentration. This is occurring in both the flue pan and the syrup pan.

In the flue pan less concentrated sap enters through the float box into the first flue pan compartment and begins to concentrate. As it concentrates it moves toward the second compartment of the flue pan. Early in the boil the second compartment will become denser as the "fresh" sap entering the first compartment from the float box keeps pushing the denser sap around.

As the syrup pan boils, the sap becomes denser. The flue pan sap is pushed into the syrup pan making sap in the first syrup pan compartment less dense. The sap from the first syrup pan compartment is pushed to the next compartment where the sap is denser and then to the densest compartment, the "syrup" compartment. The syrup is drawn off the evaporator from this compartment and more sap flows across all the compartments of the evaporator to replace the volume of syrup drawn off.

With a good gradient in place there will be a measureable difference in the liquid levels between one side of the syrup pan and the other. You may note a difference of $\frac{1}{2}$ ".

PROPER OPERATIONS TO MAINTAIN GRADIENT:

- Firing
- Defoamer
- Minimize Reversal Effects

During operations you will be working to maintain a consistent gradient. This is done through firing level, control of foaming, and minimizing the effects of reversal.

Firing

During firing you are seeking to maintain the same boil all the time. By doing so the liquid "push" in the pans will remain consistent. If the boil reduces, the syrup pan flow will reverse and flow to the flue pan. In order to maintain the boil the following should be of concern:

1. Wood to use
 - a. Mix of hardwood (longer lasting, more BTUs) and softwood (quicker, intense heat).
 - b. Avoid slabs as they do not allow heat to evenly reach the pan
 - c. Split wood 2" to 3" in diameter and approximately 24" in length
2. Loading wood into the arch
 - a. Wood should stay on the grates and 2" to 5" inside from the door so wood fire does not heat the arch face
 - b. Criss-cross the wood as best possible so oxygen can reach all wood efficiently
 - c. Do not hit the flues when loading wood

3. When

- a. Keep stack temperature in range of 650°F to 800°F
- b. Maintain the arch ½ to ¾ full
- c. Fire consistently with small amounts of wood to maintain level of heat
- d. Use timer to stay on schedule with firings
- e. Adjust firing intervals as needed to maintain an even boil

Defoamer

The purpose of defoamer is to prevent foam build up in the pans. Foam build up will prevent proper evaporation of the water from the sap. It will give a false liquid level to the float not allowing the incoming sap to flow in a consistent manner. Inconsistent defoamer usage will create large volume adds of sap into the pans as the foam is reduced (when you do add defoamer) and the float seeks to replace the level with incoming sap. The following items should be of concern in the use of defoamer:

1. Use defoamer on a regular basis. It is suggested you add defoamer to the flue pan each time you fire the evaporator.
2. Add defoamer primarily to the flue pan. Modify this only under certain conditions.
3. The estimated usage for a 2 foot wide WSE is 3 drops. The usage may need to be changed as the sap characteristics change. NOTE: This is based on the use of ATMOS 300 Defoamer
4. NEVER add defoamer to the center compartments of the syrup pan. Use one drop at a time in the syrup (draw-off) compartment.

Minimize Reversal Effects

Reversal occurs when the boil in the flue pan is reduced (when firing is inconsistent, end of day, change pan flow direction). As the flue pan boil reduces, the level is reduced so more fresh sap is added and sap will flow back from the syrup pan. This causes the “sweet” in the syrup pan to mix back across the syrup pan and increases the volume of sap in the flue pan. To minimize this effect:

1. Maintain a consistent boil
2. After the last syrup draw of the day, draw 1 to 1 ½ gallons of “sweet” from the syrup pan into a clean container. This will be added to the boiling syrup pan at the beginning of the next boil and aid in setting up the gradient.

EQUIPMENT DESCRIPTION




A standard wood fired arch from Leader Evaporator is designed to have a deeper and wider firebox to increase firing capacity. There is a large draft door to maximize airflow. The flue pan and the syrup pan are tig welded of 20 gauge bright annealed stainless steel which is the same as the larger evaporators.

NOTE: Pictures, sketches and drawings presented in this document are not to scale.

A left draw evaporator is defined, as the draw off assembly will be on the left front of the syrup pan when standing facing the firing door. A right draw evaporator is defined, as the draw off assembly will be on the right front of the syrup pan when standing facing the firing door.

The Leader WSE Evaporator consists are the following parts:

ITEM	LEADER ORDER #	DESCRIPTION / PHOTO	ITEM	LEADER ORDER #	DESCRIPTION / PHOTO
Arch	302406LN	 2X6	3 Sided SS Splash Guard	58974	
Flue Pan	372404LW	 2X4	Syrup Pan (2X2)	372402LWL (for Left) 372402LWR (for Right)	
Float Box Regulator Arm (Included – part of float box)Regulato r Bridge (Included – part of box)	Special Order 59048 59061	 	Regulator Packing (included with regulator arm)	59065	
Float with Collar (10 ½" X 5 ½" X 2")	59024	 float	SS "U" Connection	Special Order	
1-½" SS Clamps (qty: 4)	72245		1-½" Teflon Gasket (qty: 4)	65621	
¼" SS Thumb Screws (qty: 2)	72422		Draft Door Latch	75169	
1-½" #24 SS Band Clamps (qty: 2)	60046		1-½" X 2" Hose Connection	Special Order	







ITEM	LEADER ORDER #	DESCRIPTION / PHOTO
WSE ¾" SS Draw Off Valve	390000	
Base Taper 24" X 3' X 10"	502410L (Galvanized) 542410L (Stainless Steel)	
25" Full Leader Grate (qty: 4)	75021	
Flue Brush Rod (8')	60069 (6') 60071 (8')	 Rod end is threaded to allow mounting of flue brush

ITEM	LEADER ORDER #	DESCRIPTION / PHOTO
4" X 24" Ceramic Pan Gasket	65158	
Stack 10" X 3' (qty: 3)	5210 (Galvanized) 5210S (stainless Steel)	
Pipe legs (Qty: 2) Wire tied to inside rear of arch	77021	
Flue Brush	60058	

OPTIONAL SETUP MATERIAL, ADDITIONAL SPARE PARTS AND OPERATIONAL SUPPLIES

Fire Door 24"	75241	
Front Only 24" No Doors	75240	
10" Leader Style Roof Jack		 Peak Style OR  Side of Roof Style
3000° Full Brick (2X6 qty: 14)	65003	
Refractory Cement qty: 2	65001	

Draft Door 30"	75111	
10" Stack Cover	5410	
INSULBOARD 1" – 1'X3' (3 sq. ft) qty. 14	65000	
3000° Half Brick (2X6 qty: 98)	65006	
Jaco Firestop Plus (10.5 oz tube)	65196	

ITEM	LEADER ORDER #	DESCRIPTION / PHOTO
Rail Gasket	65154 (1/2" X 2" X 25')	
Stainless Steel Smoke Stack 3' x 10"	52105	
Upgrade Butterfly 1 1/2" WSE	390002	Valve allows for isolating the flue pan from the syrup pan so the flue pan does not need to be drained when you change sides of the syrup pan. 
4 oz Defoamer (Organic defoamer available Order # 63010)	63015	
Green Gloves	63125	
Short Test Cup 2" Diameter	59007	



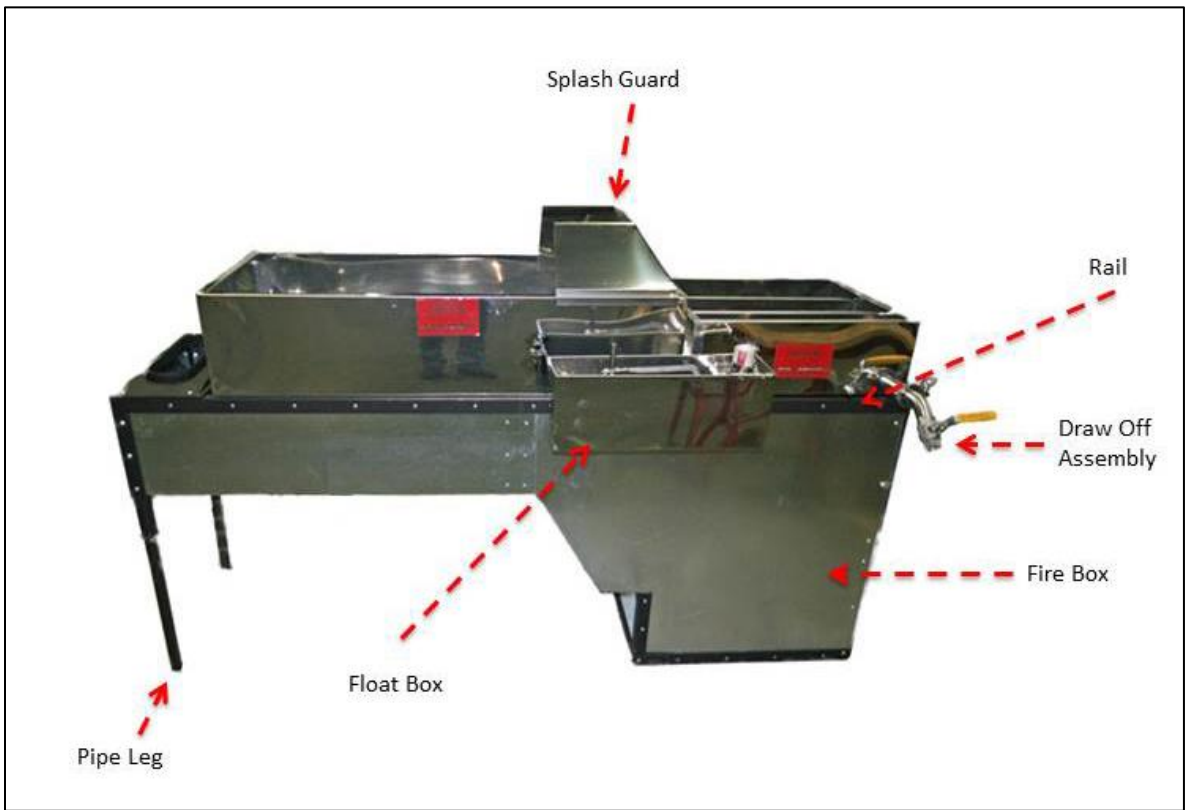
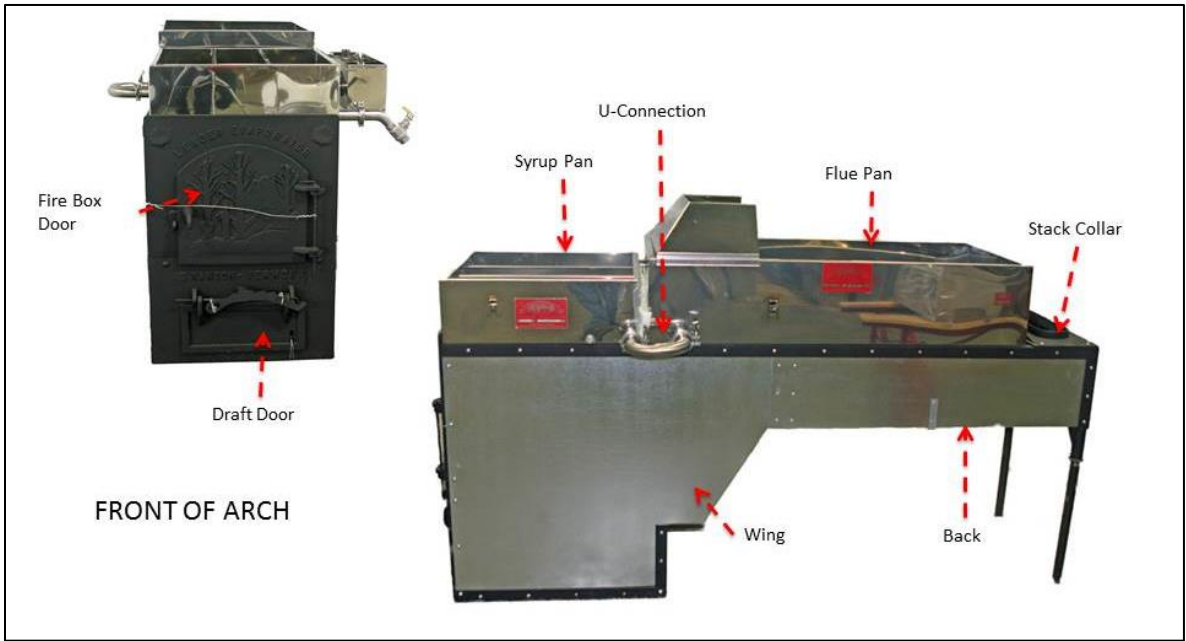
ITEM	LEADER ORDER #	DESCRIPTION / PHOTO
Thermometer 3" or 5" face, 6" stem	61022 3" Face/6" Stem 61028 5" Face/6" Stem	Two are recommended – one for each side of the syrup pan 
Stainless Steel Base Stack	542410L	
Stack Thermometer	61052	 Install at shoulder to eye level in the smoke stack
Firing Gloves	63123	
Short Syrup Hydrometer	61040	

DIAGRAM OF THE WSE EVAPORATOR



SETUP OF THE WSE EVAPORATOR

NOTE: The following information pertaining to setup of an evaporator is to be considered one suggested method. Installations should meet all applicable governmental regulations and standards.

The following documentation is pertinent to the setup of the WSE evaporator. Information about the setup and use of other equipment can be found on the Leader Evaporator website – www.leaderevaporator under the Information Resources option.

SUGGESTED TOOLS:

- 7/16" box/open-end wrench
- Phillips screwdriver
- Utility knife
- Plumb bob
- Drill
- Drill bits
- Bricking trowel
- Measuring tape
- Marker (mark roof material)
- Level 4'
- Brick saw

RECEIVING YOUR EVAPORATOR:

Upon receipt of the evaporator, it is recommended the following tasks be performed:

1. Protect all incoming materials from damage and the environment. If possible place the evaporator at the location where it will be setup (See section titled SUGAR HOUSE SETUP).
2. Unpack all materials and check the received materials against the Equipment Description list provided above.
3. Immediately notify Leader Evaporator or your local dealer if there are questions on the received equipment.

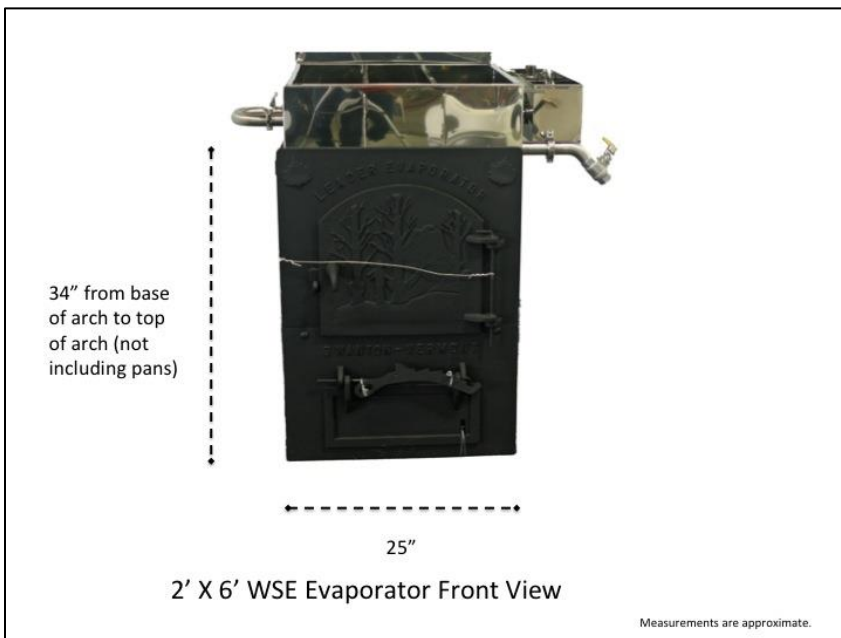
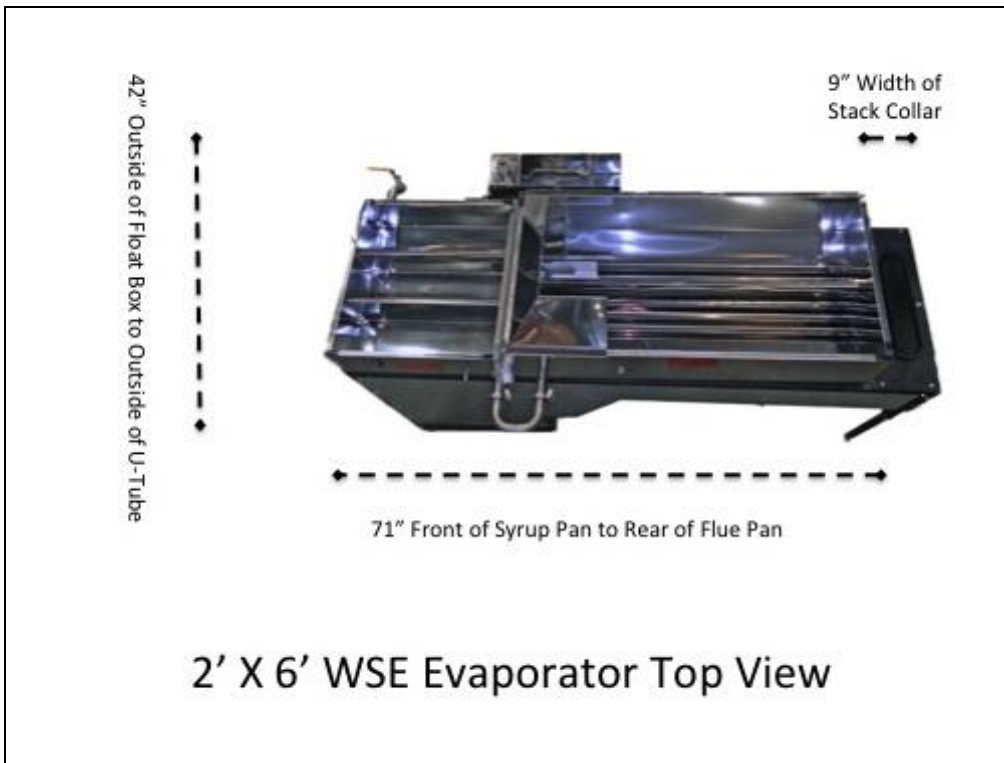
SUGAR HOUSE SETUP:

Prior to setup of the sugar house, it is suggested future needs be considered. The requirements for the setup of the WSE evaporator may not be adequate if in the future additional or larger equipment will be needed. If assistance is needed in determining possible future requirements please contact Leader Evaporator Sales or your local dealer.

The following are the dimensions of the evaporator:

2 X 6 WSE



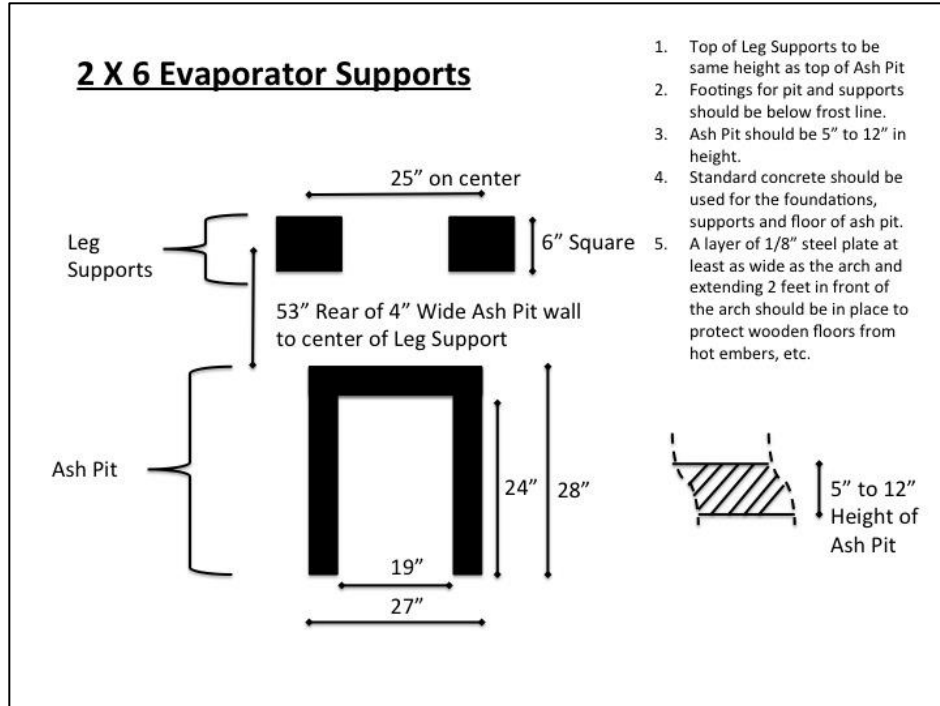


The following are *minimum* clearances recommended for around the arch. When determining the clearances, keep in mind any additional items/equipment (ex. packaging supplies, canner, table(s), chairs) and where they will be located in the sugar house:

1. Front of the arch: six (6) feet
 - a. Allows room for firing and cleaning out of ashes
2. Back of the arch: three (3) feet
 - a. Allows for cleaning and removal of the stack
3. Sides of the arch: four (4) feet
 - a. Allows for draw off and movement

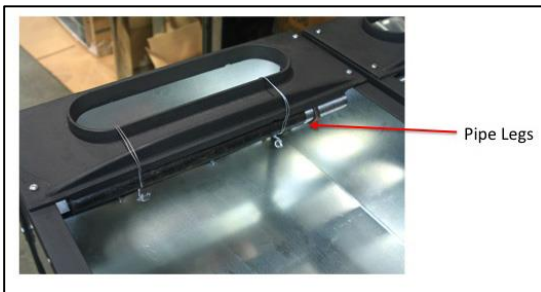
FOUNDATION FOR THE ARCH

The following is one suggested method of preparing a foundation for the WSE arch.



SETTING THE ARCH ON THE FOUNDATION:

5. Place the arch on the foundation.
 - a. The firebox of the arch should be centered on the foundation of the Ash Pit.
 - b. The front of the arch should be on the open side of the Ash Pit.
 - c. Center the firebox on the Ash Pit foundation.



2. The pipe legs are wire tied to the inside rear of the arch for transport. Remove the pipe legs from the arch
3. Move the pipe leg nuts to a position approximately half way on the threads.

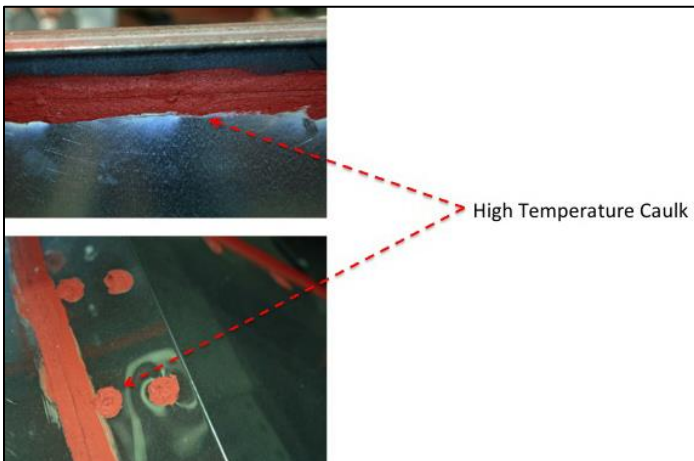


4. Place a pipe leg into each socket. The sockets are located at the rear of the arch. The threaded end of the pipe leg should be inserted into the sockets.
 - a. Seat the pipe legs in the Leg Support.



5. Level the arch on the foundation.
 - a. Place a 4-foot level on the rail of the arch front to back. (The rail is the part where the pans are rested).
 - b. Adjust the level of the arch by raising or lowering the pipe leg nuts. The use of two pipe wrenches is suggested. Metal shims may be needed on the front of the arch..
 - c. Place the level on the rail of the arch side-to-side.
 - d. Adjust the level of the arch by raising or lowering the pipe leg nuts.

INSULATING THE ARCH:



1. Prior to insulating the arch it is recommended high temperature caulking (ex. JACO Firestop Plus) be used to seal all joints, rivets and bolts. This is to prevent sparks and smoke from exiting the arch.
2. Obtain the right number of 3000° fire bricks, refractory cement containers and insulation board:
 - 14 full bricks
 - 98 half bricks
 - 2 - 30 lb. buckets of refractory cement
 - 14 sheets of 1' X 3' insulation board

3. Begin by fitting the insulation board and bricks in the arch “dry” (no cement). This will allow you to cut and fit all the insulation board and bricks into the arch so the cementing can be done in one continuous application.

NOTE: The use of a wet saw or masonry blade in a circular saw is recommended to cut the bricks where required.



NOTE: The use of a mini hacksaw is suggested for cutting the insulation board.

The following sections are the outline for the preparing and sequencing of the fitting of the insulation board and brick into the arch. Adjustments to shown sizes will be required as the installation proceeds. The rule of “*Measure twice and cut once*” will reduce waste in fitting the pieces. As you go through each of the following pages, cut, “dry fit” then cement the parts into place. The order is as follows:

1. Left Side Insulation
2. Right Side Insulation
3. Back Insulation
4. Insert the grates
5. Front Insulation
6. Top View Insulation starting with under the Grate Shelf then the Incline then the Rear Floor

7. Left Side Brick
8. Right Side Brick
9. Front Brick
10. Back Brick
11. Top View Brick starting under the Grate Shelf then the Grate Shelf then the Incline then the Rear Floor

When fitting pieces in the arch there will be bolts and rivets where the pieces are being fit. In order to properly fit for the bolts and rivets either:

- Measure the locations on the sheet and cut out the necessary area for clearance of the rivets/bolts

OR

- Place the sheet in position and press it against the rivets/bolts in order to mark the rear of the sheet then cut out the marked area to allow for clearance of the rivets/bolts.

NOTE: All drawings for the insulating board are illustrated as the board “white” face up.

NOTE: Insulating sheets at the top of the arch are cut to leave a ¼” gap between the sheet top and the bottom of the arch rail.

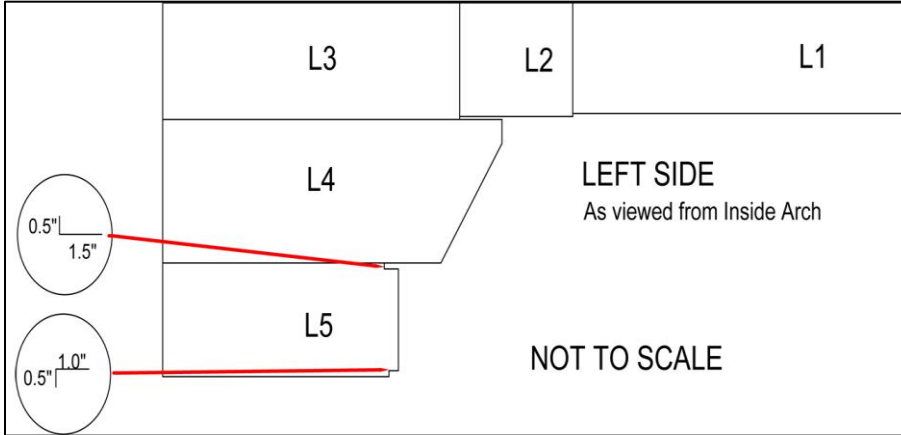
Cementing of Insulation Board and Bricks

1. Place a temporary support at the bottom of the arch to hold the brick in place as you are bricking.
2. Skim coat a layer of refractory cement to the inside arch wall covering the approximate area of the piece of arch board to be mounted. Place the board against the cement.
3. The cement does not need to dry prior to installing the bricks.
4. To install brick, skim coat the rear of the brick and apply a heavier coat to the sides of the brick. Place it into position. As more bricks are added the cement will be forced from the joints. Scrape and smooth off the excess cement. Make sure all openings between the bricks are filled with cement..
5. Allow the cement to dry for 36 hours at room temperature (65°F or higher).

DECIMAL	FRACTION
0.125	1/8
0.250	1/4
0.375	3/8
0.500	1/2
0.625	5/8
0.750	3/4
0.875	7/8

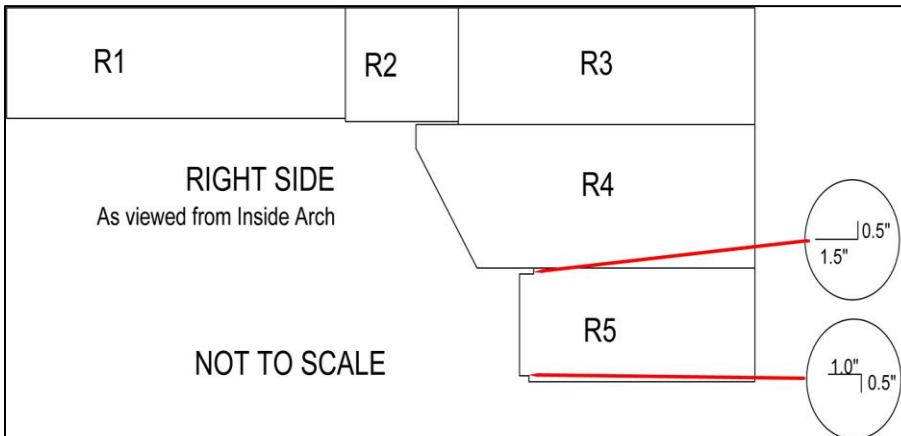
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Insulation Board



The following are dimensions for the parts labeled above. Always “dry fit” the parts prior to cementing to ensure proper fit.

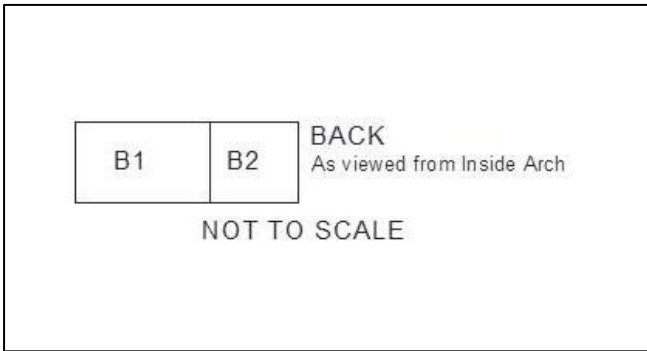
Print ID	Length	Width	Notes
L1	36"	9.25"	
L2	12"	9.5"	
L3	31.5"	9.75"	
L4	Top: 36" Bottom: 29.5"	12"	Down 2" from Top then cut on angle to 29.5"
L5	25"	9.5"	Top cutout 1.5" L, 0.5" W / Bottom cutout 1" L, 0.5" W



The following are dimensions for the parts labeled above. Always “dry fit” the parts prior to cementing to ensure proper fit.

Print ID	Length	Width	Notes
R1	36"	9.25"	
R2	12"	9.5"	
R3	31.5"	9.75"	
R4	Top: 36" Bottom: 29.5"	12"	Down 2" from Top then cut on angle to 29.5"
R5	25"	9.5"	Top cutout 1.5" L, 0.5" W / Bottom cutout 1" L, 0.5" W

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The following are dimensions for the parts labeled above. Always “dry fit” the parts prior to cementing to ensure proper fit.

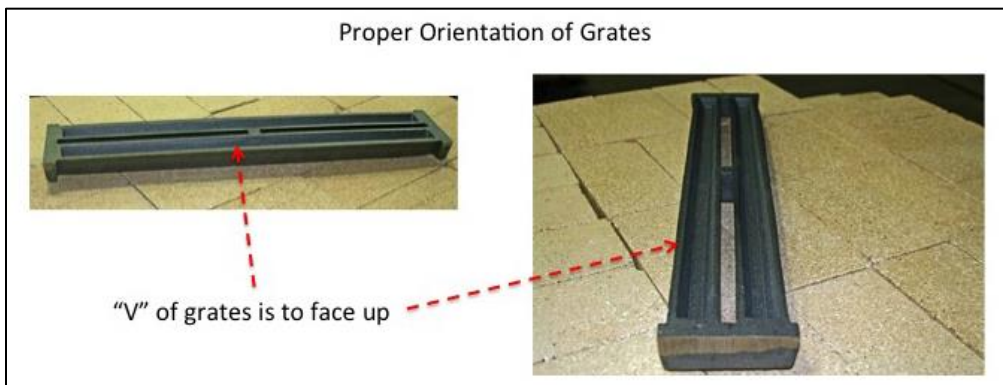
Print ID	Length	Width	Notes
B1	13.375"	8.5"	
B2	8.75"	8.5"	

Install The Grates



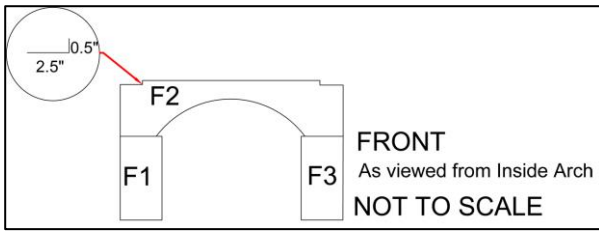
Place three of the arch grates evenly spaced into the arch with the grates touching the front of the arch. Place the grates so one is on each side of the arch and the other is approximately in the middle. Obtain a piece of “C flute” cardboard (most common type of cardboard) approximately 20” x 18”. Fold it into thirds along the length and tape with a non-plastic tape (ex. masking tape). Place it behind the grates toward the rear of the arch. The cardboard will provide the spacing needed to remove the grates after the bricks have been fit in place.

PROPER ORIENTATION OF GRATES



Grates should be installed so the “V” groove is up. In other words the opening of the “V” will be in a position to catch and fill with ashes.

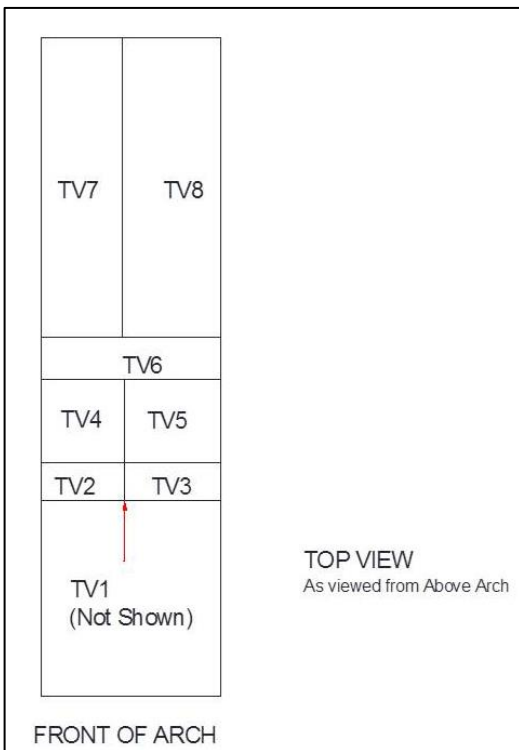
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The following are dimensions for the parts as labelled. Always “dry fit” the parts prior to cementing to ensure proper fit.

NOTE: The insulation board will fit above the grates.

Print ID	Length	Width	Notes
F1	4.5"	9.0"	
F2	24" Arc cutout 16" W	6"	Cutouts top corners 2.5" L 0.5" W
F3	4.5"	9.0"	

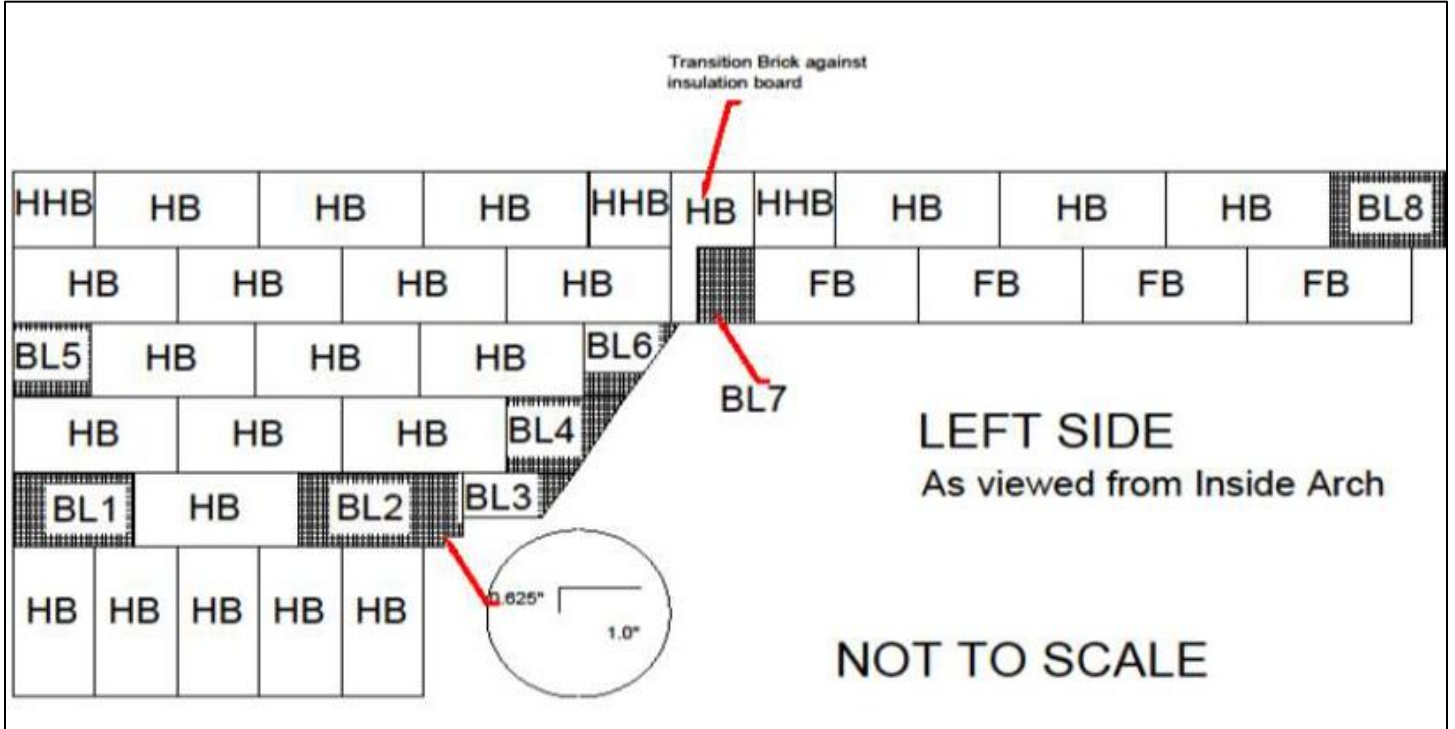


The following are dimensions for the parts labeled above. Always “dry fit” the parts prior to cementing to ensure proper fit.

Print ID	Length	Width	Notes
TV1	22.25"	9.25"	Not Shown - under the grate support shelf
TV2	10.5"	4.5"	
TV3	12"	4.5"	
TV4	10.5"	14.5"	
TV5	12"	14.5"	
TV6	22.5"	5"	
TV7	36"	10.25"	
TV8	36"	12"	

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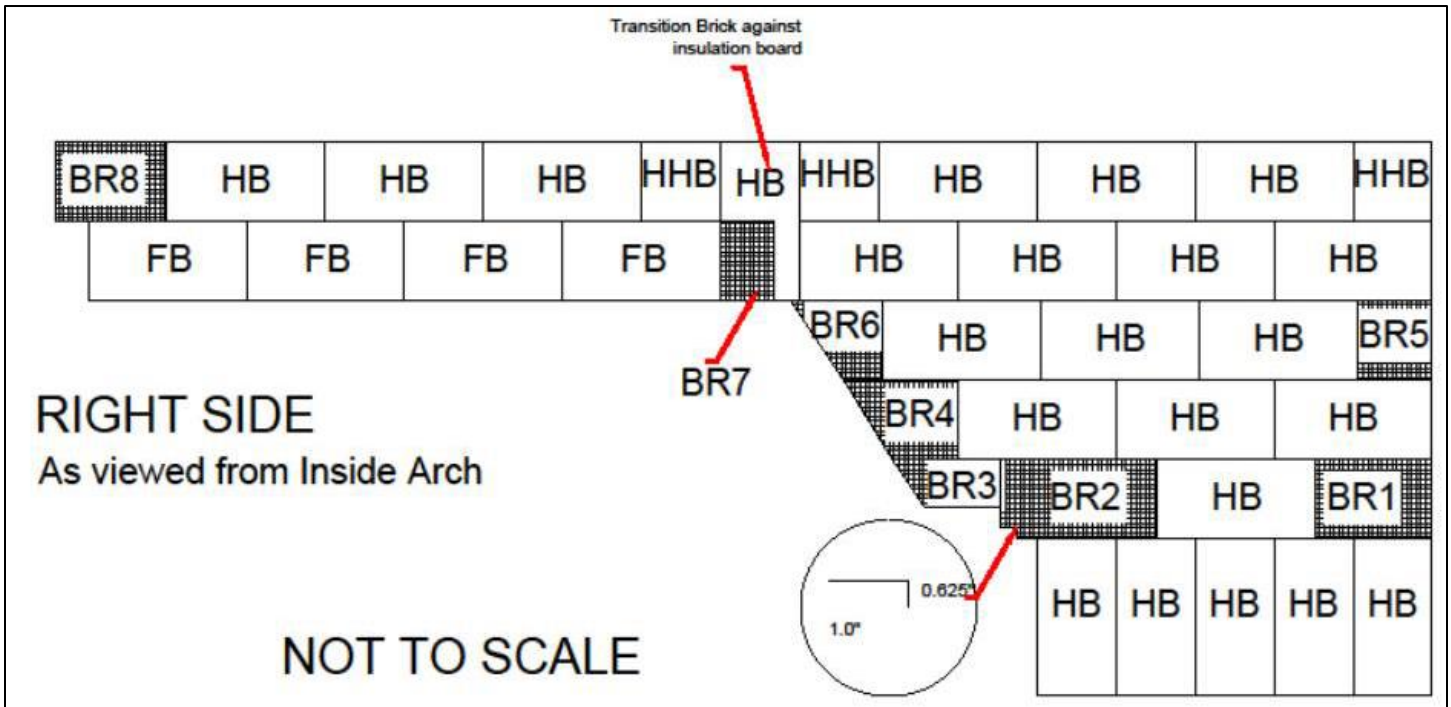
Bricks



The following are dimensions for the bricks labeled above. Always “dry fit” the parts prior to cementing to ensure proper fit

Brick ID	Brick Type	Length	Width	Thickness	Quantity Needed	NOTES
FB	Full	9.000"	4.500"	2.500"	4	
HB	Half	9.000"	4.500"	1.250"	22	
HHB	Half	4.500"	4.500"	1.250"	3	
BL1	Half	6.625"	4.500"	1.250"	1	
BL2	Half	9.000"	4.500"	1.250"	1	Cutout 1" L 0.625" W
BL3	Half	top - 6.125" bottom - 4.25"	2.750"	1.250"	1	
BL4	Half	top - 6.5" bottom - 3.75"	4.500"	1.250"	1	
BL5	Half	4.25"	4.500"	1.250"	1	
BL6	Half	top - 2.5" bottom - 5.25"	4.500"	1.250"	1	Use part of brick left from BL5
BL7	Half	3.000"	4.500"	1.250"	1	
BL8	Half	6.375"	4.500"	1.250"	1	

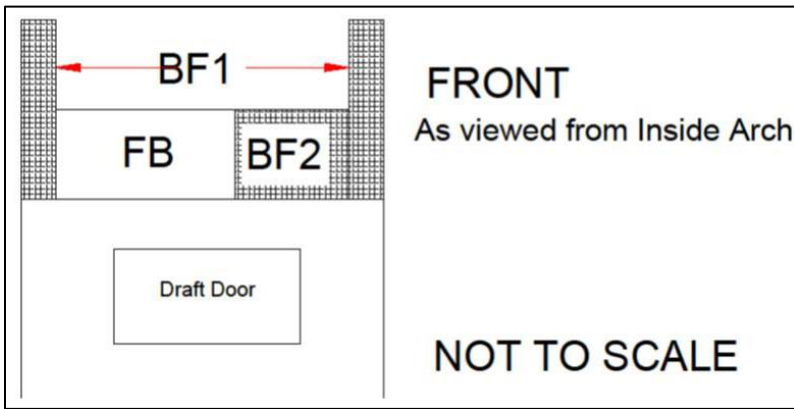
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The following are dimensions for the bricks labeled above. Always “dry fit” the parts prior to cementing to ensure proper fit

Brick ID	Brick Type	Length	Width	Thickness	Quantity Needed	NOTES
FB	Full	9.000"	4.500"	2.500"	4	
HB	Half	9.000"	4.500"	1.250"	22	
HHB	Half	4.500"	4.500"	1.250"	3	
BR1	Half	6.625"	4.500"	1.250"	1	
BR2	Half	9.000"	4.500"	1.250"	1	Cutout 1" L 0.625" W
BR3	Half	top - 6.125" bottom - 4.25"	2.750"	1.250"	1	
BR4	Half	top - 6.5" bottom - 3.75"	4.500"	1.250"	1	
BR5	Half	4.25"	4.500"	1.250"	1	
BR6	Half	top - 2.5" bottom - 5.25"	4.500"	1.250"	1	Use part of brick left from BR5
BR7	Half	3.000"	4.500"	1.250"	1	
BR8	Half	6.375"	4.500"	1.250"	1	

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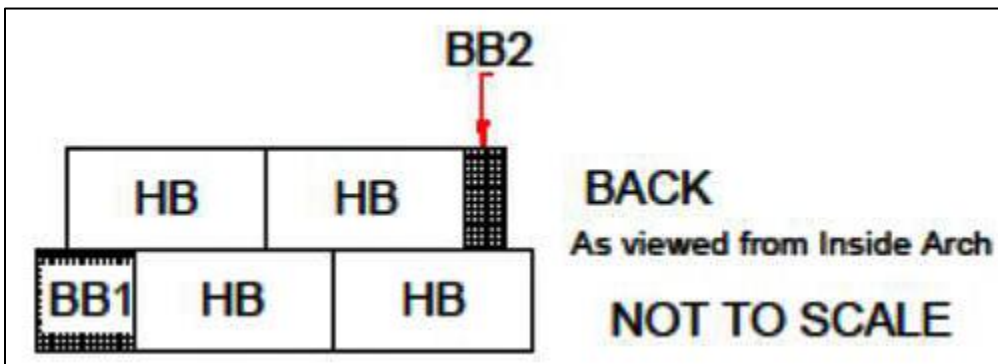
The following are dimensions for the bricks labeled above. Always “dry fit” the parts prior to cementing to ensure proper fit

NOTE: DO NOT CEMENT these bricks. They will need to be removed to take out grates.

NOTE: The bricks as shown begin above the section containing the draft door. They are placed so as to be above the grates.

NOTE: NO bricks are placed around the draft door section.

Brick ID	Brick Type	Length	Width	Thickness	Quantity Needed	NOTES
FB	Full	9.000"	4.500"	2.500"	1	
BF1	Full	1.750"	9.000"	2.500"	2	
BF2	Full	5.750"	4.500"	2.500"	1	

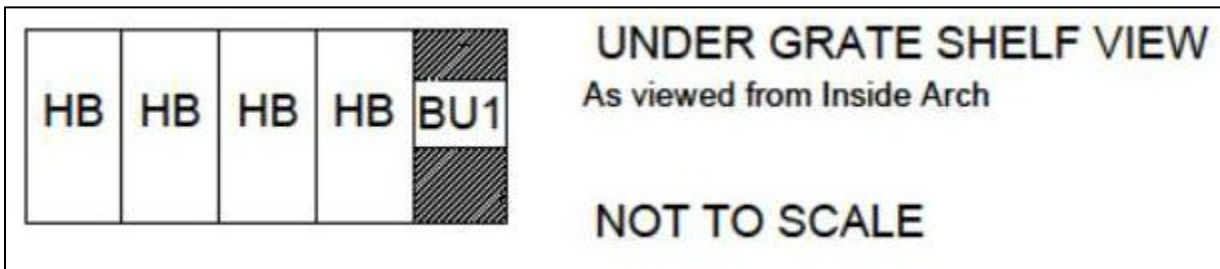
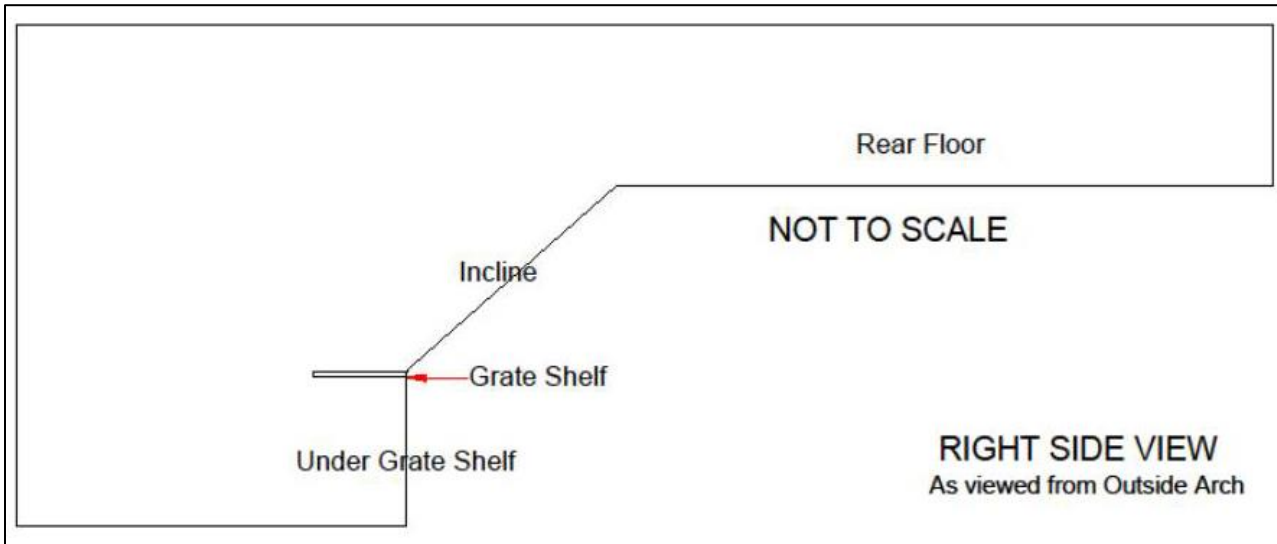


The following are dimensions for the bricks labeled above. Always “dry fit” the parts prior to cementing to ensure proper fit

Brick ID	Brick Type	Length	Width	Thickness	Quantity Needed	NOTES
HB	Half	9.000"	4.500"	1.250"	4	
BB1	Half	4.250"	4.500"	1.250"	1	
BB2	Half	1.750"	4.500"	1.250"	1	

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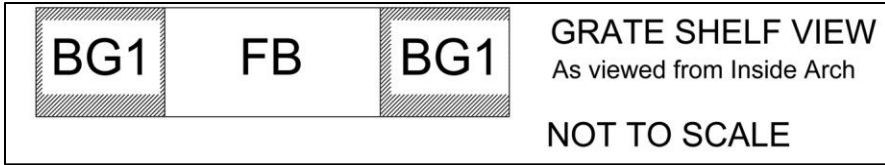
The TOP VIEW will be divided into sections for easier illustration. The arch sections are as follows



The following are dimensions for the bricks labeled above. Always “dry fit” the parts prior to cementing to ensure proper fit

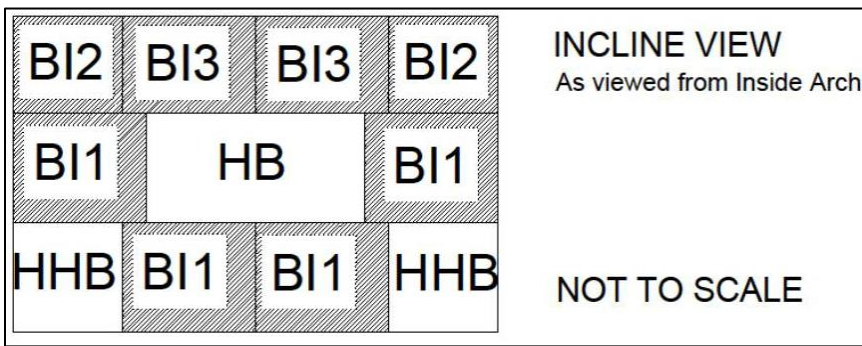
Brick ID	Brick Type	Length	Width	Thickness	Quantity Needed	NOTES
HB	Half	9.000"	4.500"	1.250"	4	
BU1	Half	4.375"	9.000"	1.250"	1	

WSE EVAPORATOR MANUAL



The following are dimensions for the bricks labeled above. Always “dry fit” the parts prior to cementing to ensure proper fit

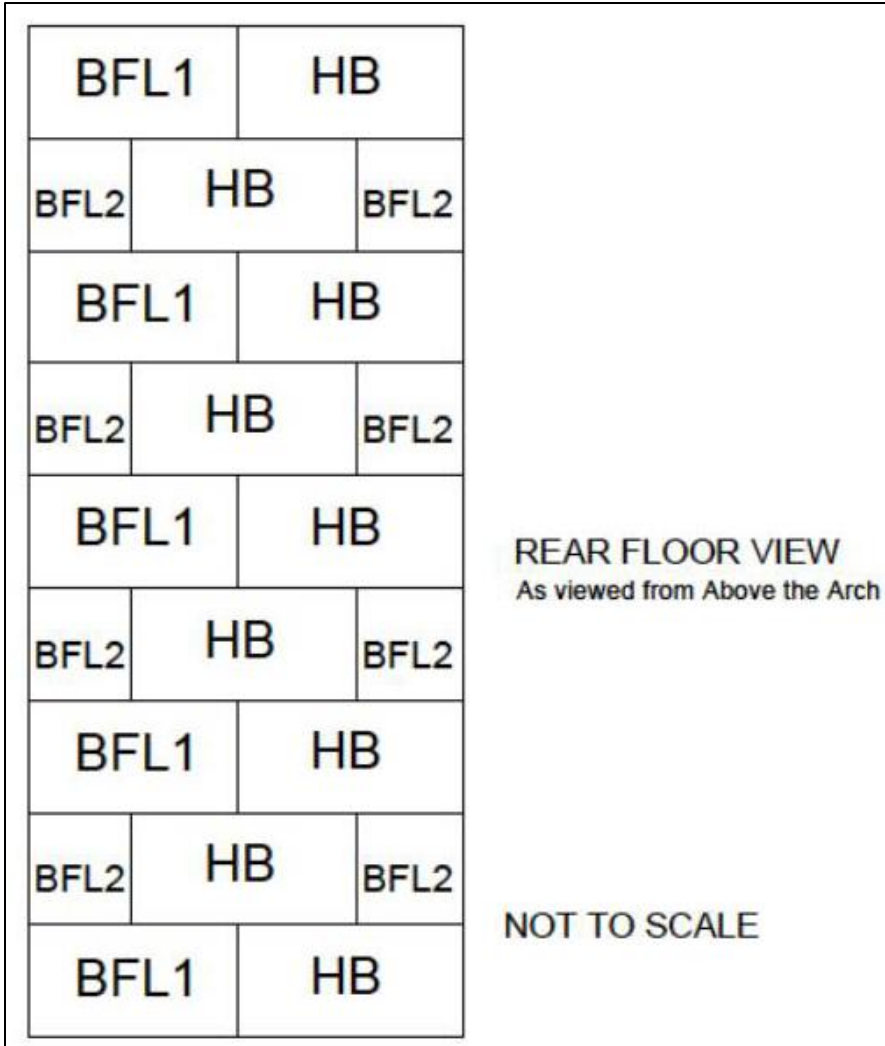
Brick ID	Brick Type	Length	Width	Thickness	Quantity Needed	NOTES
FB	Full	9.000"	4.500"	2.500"	1	
BG1	Full	5.375"	4.500"	2.500"	2	



The following are dimensions for the bricks labeled above. Always “dry fit” the parts prior to cementing to ensure proper fit

Brick ID	Brick Type	Length	Width	Thickness	Quantity Needed	NOTES
HB	Half	9.000"	4.500"	1.250"	1	
HHB	Half	4.500"	4.500"	1.250"	2	
BI1	Half	5.500"	4.500"	1.250"	4	
BI2	Half	4.500"	4.000"	1.250"	2	
BI3	Half	5.500"	4.000"	1.250"	2	

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The following are dimensions for the bricks labeled above. Always “dry fit” the parts prior to cementing to ensure proper fit.

NOTE: The first row of bricks will overlap the bricks on the Incline. Use cement to fill openings between the bricks.

Brick ID	Brick Type	Length	Width	Thickness	Quantity Needed	NOTES
HB	Half	9.000"	4.500"	1.250"	9	
BFL1	Half	9.375"	4.500"	1.250"	5	
BFL2	Half	4.125"	4.500"	1.250"	8	

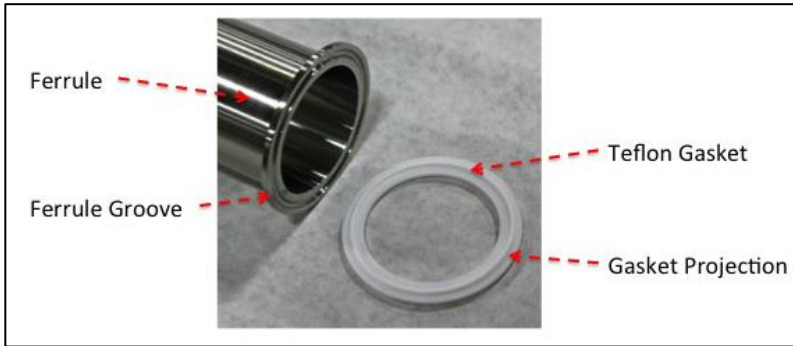
WSE EVAPORATOR MANUAL

SETTING UP THE PANS:

NOTE: All arch side directions are as if you were facing the fire door of the arch.

NOTE: The pictures used in this section are from a Right Draw Evaporator.

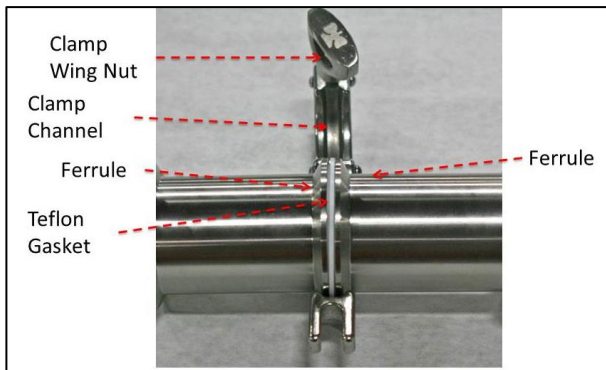
In this section you will be using ferrules, Teflon gaskets and clamps to make connections. The ferrules are welded in place to the items being connected. The Teflon gaskets and clamps are used as follows to complete the connections:



1. Match the groove in the ferrule to the projection on the Teflon gasket.
2. Place the clamp groove over the assembled ferrules and Teflon gasket. Ensure the gasket is properly seated in the ferrule prior to placing the clamp.
3. Align the clamp so the wing nut is accessible for turning and will be turned away from any work area.

NOTE: The clamp does not rotate easily once placed over the ferrules. It is recommended you position it initially so the wing nut will be easy to access.

4. Close the bolt of the clamp and tighten the wing nut

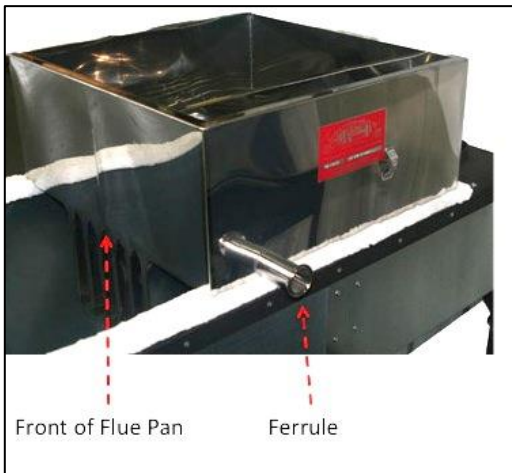


Setting the Pans

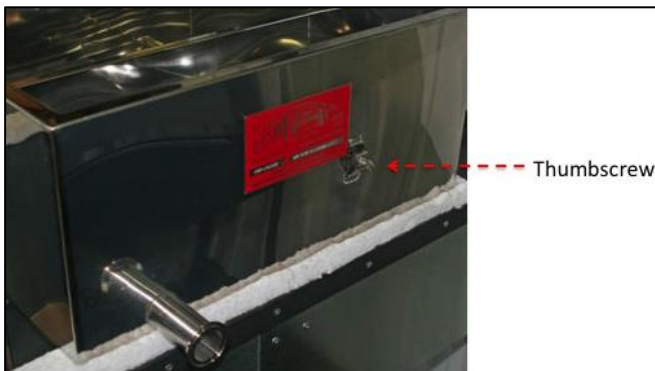


1. Prior to placing the pans on the arch, line the rails with ½" ceramic rail gasket (not included). Use a utility knife to cut the gasket to make a square fit with no gaps.

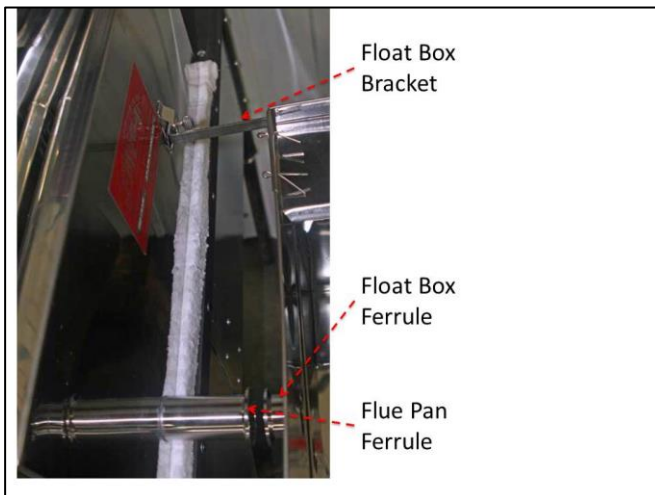
WSE EVAPORATOR MANUAL



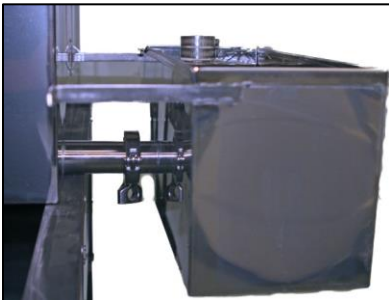
2. The rear of the flue pan is the end where the sides do not have ferrules welded. Place the flue pan on the arch so the rear of the pan is on the rail gasket and against the stack collar projection.



3. Loosely thread a thumbscrew into the mounting bracket on the side of the flue pan. Use the bracket on the same side as the draw off is to be installed (left draw - bracket on left, right draw - bracket on right).



4. Slide the float box brace into the bracket where the thumbscrew is installed. Ensure the float box ferrule is facing the flue pan ferrule.
5. Place a 1 ½" Teflon gasket between the flue box and float box ferrules. Ensure the gasket aligns with the grooves in the ferrules



6. Loosen the wing nut on a 1 ½" clamp and open up the clamp. Place the clamp over the ferrules and gasket. Align the clamp so the wing nut faces down. Close the clamp with the wing nut and tighten enough to securely hold the float box.
7. Tighten the thumbscrew in the bracket.

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8. Place the 4" X 24" pan gasket between the pans. It should be centered so the ends overlap the rails. If necessary, use a small piece of tape to hold the gasket in place.
9. Place the syrup pan on the arch so one welded ferrule is in the rear on the side opposite the float box. A left draw pan has the rear ferrule on the right. A right draw pan has the ferrule on the left.
10. Move the syrup pan toward the flue pan:
 - a. Slide the float box brace into the bracket on the side of the syrup pan.
 - b. Compress the pan gasket to hold it in place.
 - c. Place the thumbscrew into the syrup pan bracket and tighten the thumbscrew of the syrup and flue pans.
11. Install the U-tube
 - a. Place a 1 ½" Teflon gasket onto the ferrule of the flue pan to be connected to the U-tube (same side as the rear ferrule on the syrup pan).
 - b. Place the U-tube over the gasket. Align the clamp so the bolt is inside the u-tube and the wing nut faces down. Ensure the gasket aligns with the grooves in the ferrules.
 - c. Loosen the wing nut on a 1 ½" clamp and open up the clamp. Place the clamp over the ferrules and gasket. Close the clamp with the wing nut and partially tighten.
 - d. Place a 1 ½" Teflon gasket onto the rear ferrule of the syrup pan to be connected to the U-Tube. Place the U-tube over the gasket.
 - e. Loosen the wing nut on a 1 ½" clamp and open up the clamp. Place the clamp over the ferrules and gasket. Align the clamp so the bolt is inside the u-tube and the wing nut faces down. Close the clamp with the wing nut and partially tighten.
 - f. Ensure the U-tube and pans are aligned then fully tighten both clamps.

12. If tape was used to hold the pan gasket, remove it now.

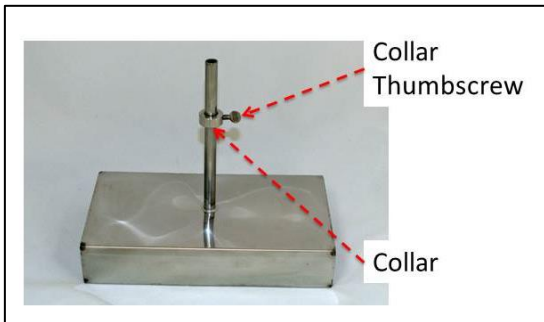
WSE EVAPORATOR MANUAL



13. Install the draw off valve assembly. The draw off assembly should be as vertical as possible with the open end pointed down.

a. Place a 1 ½" Teflon gasket between the ferrule on the front of the syrup pan and the draw off valve assembly. A right draw off evaporator will have the draw off located on the right front of the syrup pan. The left draw off evaporator will have the draw off located on the left side of the syrup pan.

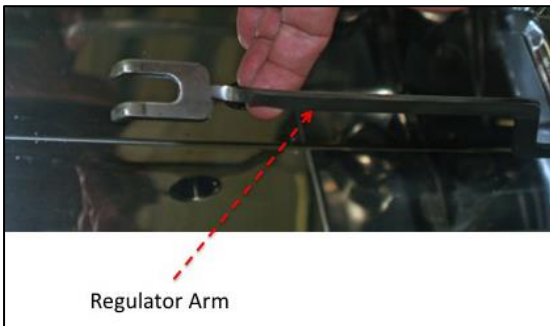
b. Loosen the wing nut on a 1 ½" clamp and open up the clamp. Place the clamp over the ferrules and gasket. Position the clamp so the bolt is on the flue side of the evaporator and the wing nut faces down. Align the draw off valve assembly so it is directed fully down. Close the clamp with the wing nut and fully tighten.



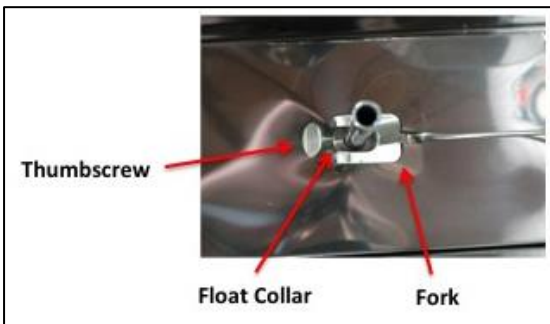
14. Install the float

a. Loosen the thumbscrew on the float collar and adjust the float collar to approximately ½" from the top of the float. Retighten the thumbscrew.

b. Align the long side of the float with the long side of the float box.

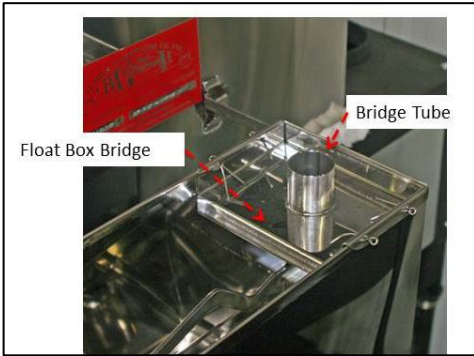


c. Raise the regulator arm.



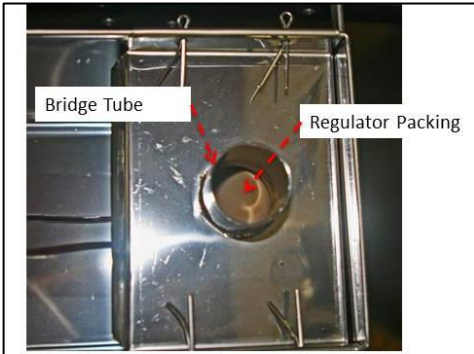
d. Tilt the float under the arm and lower into the float box until it is seated on the bottom of the float box. The float collar should be positioned under the fork of the regulator arm and the thumbscrew of the collar should be at the open end of the fork.

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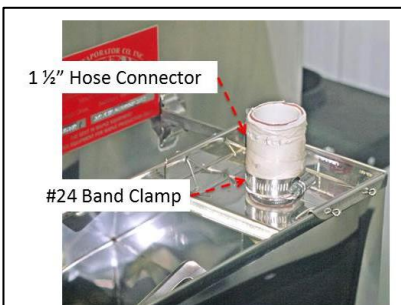


15. Install Hose Connector

- a. Locate the bridge of the float box.

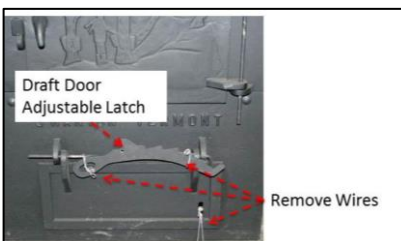


- b. Ensure there is packing on the regulator arm. You can check this by looking down the bridge tube. There will be either a tan or black colored appearance.



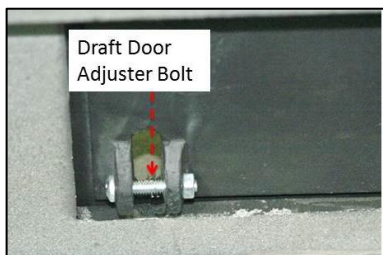
- c. Slide the hose connector onto the float box bridge and place a #24 band clamp over the lower end of the hose where it overlaps the bridge tube. Tighten the clamp.

- d. Slide a #24 band clamp onto the other end of the hose connector. Place your sap source line into the connector and tighten the band clamp to hold your line. NOTE: It is recommended a valve be installed between the sap source



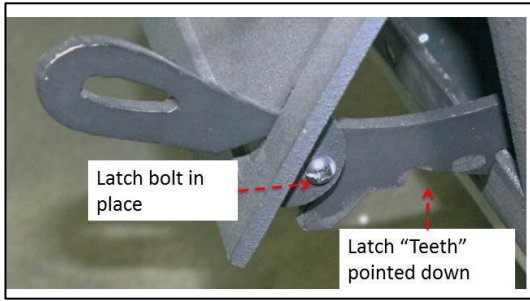
16. Install the draft door adjustable latch

- a. The latch is wire tied to the front of the draft door. Remove the wires to free the latch. Remove the wire securing the draft door.

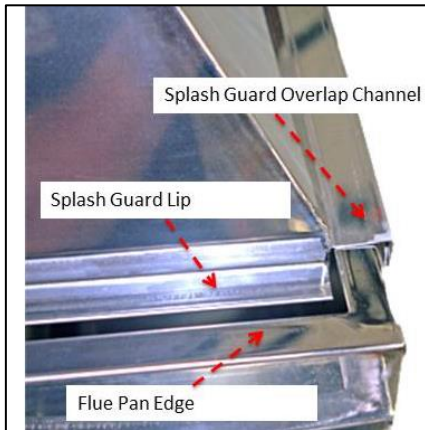


- b. Remove the draft door adjuster bolt. The draft door adjuster bolt is located on the rear of the draft door across the latch slot.

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- c. Slide the latch into the slot until the mounting hole in the latch is in line with the bolt holes in draft door. Ensure the “teeth” of the latch are pointed down. Insert the bolt through the bolt holes and the latch and tighten the nut.



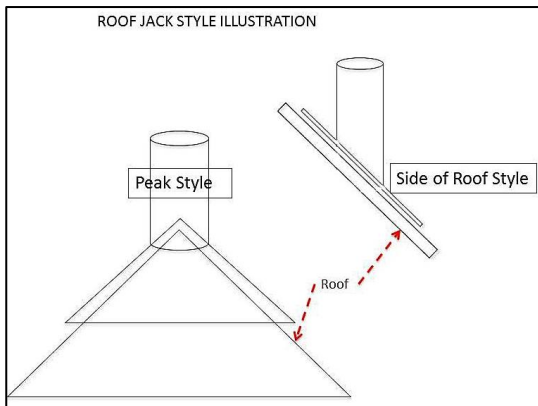
17. Install the Splash Guard

- a. The splash guard is approximately shaped as a “U”. The open end of the “U” will be placed facing the rear of the arch.
- b. Bring the splash guard to the front of the flue pan with the wide part of the guard toward the flue pan.
- c. Raise the rear of the splash guard to allow for the splash guard lip to slide under the front edge of the flue pan.
- d. Lower the splash guard onto the sides of the flue pan with the splash guard channels overlapping the sides of the flue pan. Ensure the splash guard lip is forward under the front edge of the flue pan.

INSTALL TAPER AND STACK

A roof jack should be installed prior to setting up your taper and stack. Leader Evaporator offers two styles of roof jack – a Leader style that is mounted on the peak of the roof and a Leader style that is mounted on the side of the roof.

In order to determine your requirements you will need to know where you will penetrate the roof with the stack and the pitch of your roof.



Roof Penetration and the Type of Roof Jack:

1. Obtain a plumb bob with sufficient line to reach from the roof to the stack collar of the arch.
2. Run the plumb bob from the center of the stack collar to the roof, moving the roof point until the plumb bob is properly positioned. Ensure there are no bends in the line caused by other items.
3. If the plumb bob line end is at the peak of the roof - order a Leader peak style roof jack. If the plumb bob line end is at the side of the roof – order a side of roof Leader style roof jack.
4. Prior to taking down the plumb bob, mark the inside of the roof, as this will be used when making the roof penetration for the stack or installation of the roof jack.

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Roof penetration:

1. When installing a roof jack refer to the [LEADER CUSTOMIZED ROOF JACK](#) document.
2. If not using a roof jack, make a hole at the point marked on the inside of the roof in the previous step. The hole should be large enough to allow the stack to be slid into position and as small as possible to allow for sealing to prevent rain, moisture and debris from entering the hole.

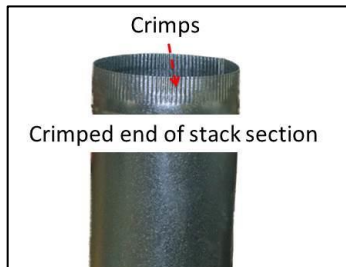
NOTE: If sealing is done directly around the stack, ensure all governmental regulations are met for this type of installation.

Install the Taper and Stack

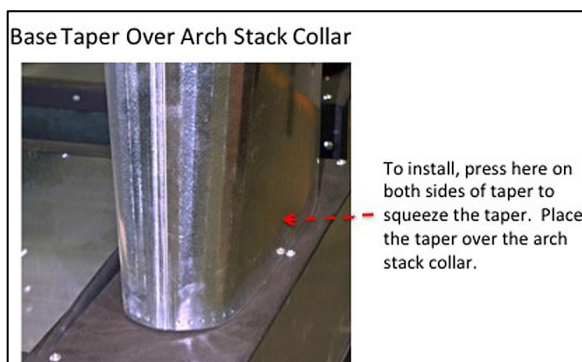
NOTE: It is recommended you install all supplied exhaust stack, as a minimum. Additional stack may be required to ensure proper draft.

Draft is correct when:

- The boil is the same in the syrup pan front-to-back and side-to-side
- The fire door is open the flame, sparks, etc. are drawn toward the rear of the arch.

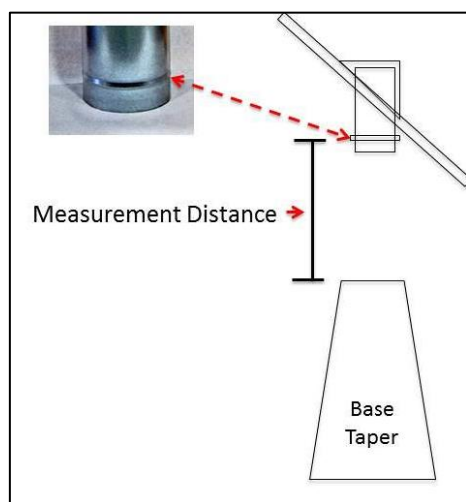
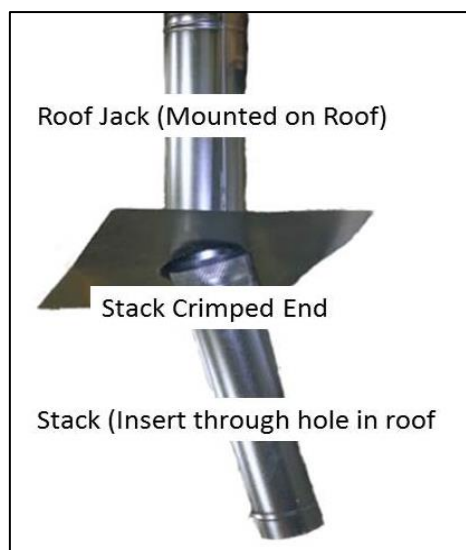


NOTE: When working with stack sections, recognize that the crimped end of the stack section is the upper / top section.



1. Place the base taper on the arch stack collar. If you have difficulty placing the base taper onto the collar, squeeze the base taper by pressing on the long sides at the base.

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2. If a roof jack is used,
 - a. Insert one piece of stack into the roof jack until it is a lightly wedged. The Leader style roof jack is tapered from larger to smaller. The end to be inserted into the roof jack is the crimped end. NOTE: You will be moving the piece of stack back down by approximately 2 ½" when you connect to the next stack section so ensure it will be able to move.
 - b. Measure from the top of the taper to the bead at the bottom of the stack section in the roof jack.
 - c. Determine the number of lengths of stack required by dividing the measurement taken in inches by 34".
 - i. For example if the measurement was 68", then $68" \div 34" = 2$ so 2 lengths of stack are required.
 - ii. For example if the measurement was 60", then $60" \div 34" = 1.76$ lengths of stack are required. This would mean one full length and a length measuring 26" would be required. To obtain the 26" length you can either
 - iii. Special order a piece of stack the length required
 - iv. Cut a standard length of stack to fit. If you cut a length of stack to fit, measure the length from the crimp on the bead end of the stack.
3. Install the stack sections starting from the base taper. Ensure you place the crimped end up when connecting the stack sections.
4. When you put the last indoor section in place, lower the stack section from the roof jack (if used) approximately 2 ½" down onto the top piece of stack, or lower a stack section through the penetration in the roof.
 - a. If a roof jack is used, place a remaining section of stack onto the roof jack by inserting into the top of the roof jack and aligning with the interior stack.
5. Continue installing stack until all pieces have been installed. Ensure you have a good overlap for each stack joint. Overlap will be 2 to 2 ½". It is recommended you screw all sections together using self tapping stainless steel screws.
6. Stack above the roof should be guide wired in at least three directions (tripod configuration) to minimize the effects of wind.
 - a. It is recommended you install a stack cover on the last / top section of stack. A closed stack cover will minimize the rain and moisture entering the stack and arch. When installing a stack cover refer to the LEADER STACK COVER document.

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THE FIRST BOIL

The first boil is done to remove any residual materials from the pans and to “season” the bricking and insulation.

1. Fill the flue pan and syrup pan with a baking soda : water mix (1 pound:200 gallons) to a level of 2 to 3 inches.
2. To season the bricking, start by building a small fire in the fire box and very gradually build to a normal fire.
3. Boil the solution for approximately 30 minutes. Watch the boil carefully and replenish the solution as needed to ensure the solution in the pans remains at the 2 to 3 inch level.
4. Check all equipment:
 - a. No leaks at fittings
 - b. Pans are boiling evenly
 - c. Valves work properly
 - d. Draft is correct

Draft is correct when:

- The boil is the same in the syrup pan front-to-back and side-to-side
- The fire door is open the flame, sparks, etc. are drawn toward the rear of the arch.

5. Drain the solution after the evaporator has cooled. CAUTION – ensure the equipment is cool enough to be safely handled for draining.
6. Check the interior of the arch to ensure insulation and bricking are in place.
7. Refill the pans to the 2 to 3 inch level with clean water.
8. Boil for 30 minutes then drain the pans – after the evaporator has cooled. CAUTION – ensure the equipment is cool enough to be safely handled for draining.

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OPERATING THE WSE EVAPORATOR

NOTE: When operating the evaporator be cautious of hazards such as hot surfaces, hot liquids, sparks, and exposed flames.

NOTE: You must be aware at all times of the level of sap in all compartments of the pans. If the level drops too low you can and will damage your pans. If there is too much foam you risk damaging your pans.

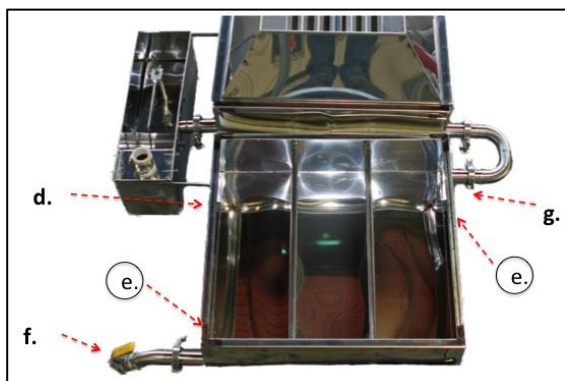
NOTE: If you have purchased a scoop or skimmer, do NOT use them to push sap through the evaporator. Doing so will change the gradient in the evaporator.

1. Check the evaporator
 - a. Make sure all sap sources are flowing freely i.e. not frozen.
 - b. Ensure defoamer is usable.
 - c. Ensure all fittings are tight.
 - d. Make sure all valves are working properly and the float is properly positioned.
 - e. Clean the flues with the flue brush every 8 to 12 hours of boiling. NOTE: The rod supplied with the arch has a threaded end. The flue brush can be screwed onto the rod to clean the flues.
 - f. Ensure the open area in the grates is clean and free of material.
 - g. Remove the ashes from below the grates.
 - h. If present, open cupola, thimbles and hood condensate drains.
2. If this startup is for a new evaporator or for the first time of the season, go to the Section titled MAKING SYRUP.

It is recommended in order to minimize the sugar sand and niter, the flow in the syrup pan be reversed daily or when it is noted the bubbles from boiling are drawn back down into the compartment as they break (appear like boiling mud). The following are the instructions for reversing the syrup pan on the WSE:

SYRUP PAN REVERSAL

DISASSEMBLE



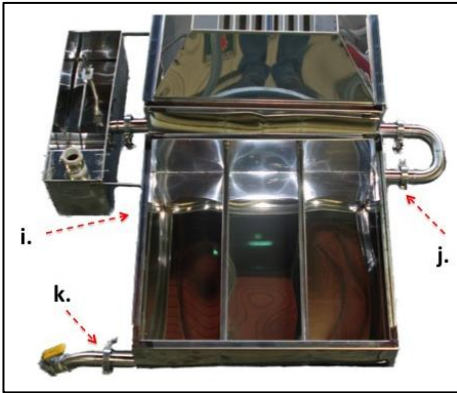
1. At the end of the day, while still hot, draw off 1 to 1 ½ gallons of “sweet” from the syrup pan and set aside.
 - a. Allow the evaporator to cool.
 - b. Open the draw off valve on the syrup pan and drain the sap from the flue pan and the syrup pan into containers; approximately 11 gallons for 2X4 WSE and approximately 16 gallons for a 2X6.
 - c. Wipe out any loose material using clean cloths.
 - d. Remove the thumbscrew securing the float box bracket from the syrup pan mount and thread into the mount on the opposite side of the syrup pan.

- e. If you have installed a single dial thermometer, remove it from its position near the draw off valve and install it in the ¼” threaded fitting on the opposite side of the pan. Plug the empty thermometer fitting with a ¼” plug.

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- f. Loosen and remove the clamp from the draw off assembly on the syrup pan then remove the Teflon gasket and draw off assembly. As you take off the clamp, the draw off assembly and Teflon gasket will need to be held so as not to drop them.
- g. Loosen and remove the clamp on the syrup pan side of the u-tube. Remove the Teflon gasket. Loosen but do not remove the clamp on the flue pan side of the u-tube.
- h. Turn the pan 180° so the draw off ferrule is now the syrup pan u-tube connection ferrule.

RE-ASSEMBLE



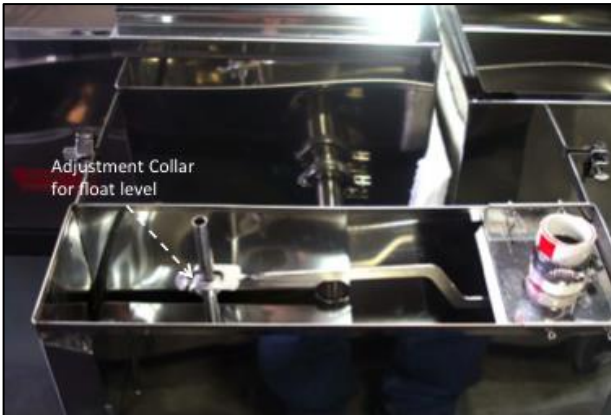
- a. Slide the float box support into the syrup box bracket
- b. Reconnect the u-tube by securing with a Teflon gasket and clamp.
- c. Reconnect the draw off assembly with a Teflon gasket and clamp.
- d. Refill the evaporator with the sap drained off at the start of the procedure.
- e. Tighten the thumbscrew (at step i).



NOTE: LEADER EVAPORATOR offers an upgrade to the WSE (LEADER EVAPORATOR part number 390002), which replaces the u-tube with a connector including a butterfly valve. If this upgrade is installed, the butterfly valve can be closed and the flue pan does not need to be drained. This lessens the effects to the gradient in the evaporator. See ATTACHMENT #2 for installation and usage instructions.

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MAKING SYRUP



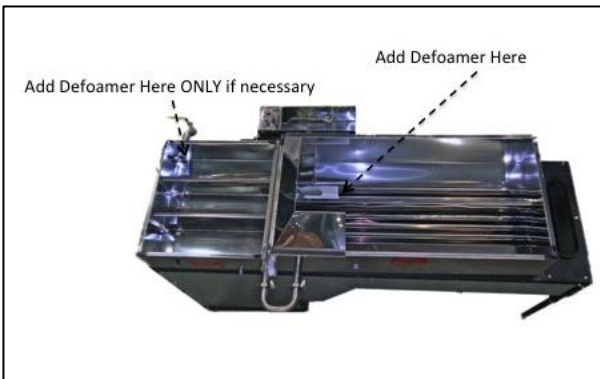
1. Set the float so the level of sap over the flues is 1" in depth. To set the depth using the float, loosen the thumbscrew on the side of the float shaft collar. Raise the collar to lower the level of the sap. Lower the collar to raise the level of the sap. Tighten the thumbscrew when the proper level is set.

2. Load the arch for firing. It is suggested you start with a small load of wood (approximately 1/3 of full) until this has begun to burn then finish loading the arch.

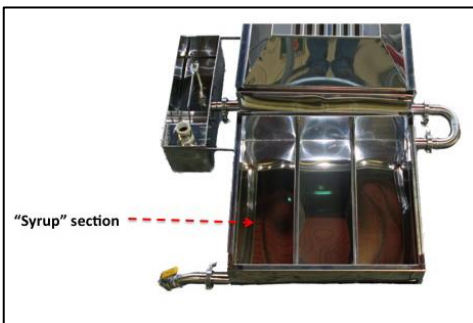
CAUTION: Use care when loading wood into the arch. Do not hit the flues with the wood.



3. Fully open the draft door and light the fire.
4. When the wood has begun to burn load the wood into the arch until 1/2 to 2/3 full. Adjust the draft door so the air entering the arch allows for a consistent burn of the wood and a consistent boil.



5. As the flue pan starts to boil, add three (3) drops of defoamer (based on ATMOS 300) to the flue pan on the float box side. Defoamer should be added close to the inlet from the float box. Open the sap feed valve on your sap source line.



6. As the syrup pan is boiling, watch for foam higher than the compartment divider of the pan. If the foam is higher than the divider, add 1 drop of defoamer to the syrup pan syrup compartment directly in front of the draw off valve. If the problem repeats increase the amount of defoamer used in the flue pan. It will take 15 to 20 minutes before any change is noted. REMEMBER you are trying to stop the foaming not the boiling.

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- The sap in the syrup compartment of the syrup pan must be boiled until it reaches 7.0°F to 7.5°F above the boiling point of water (the draw off temperature). The boiling point of water is not a consistent point. Therefore the following is the recommended method for determining the draw off temperature.



- Prior to using the evaporator, install a thermometer in the syrup pan. The preferred model is mounted in the ¼" threaded fitting near the draw off. Rotate the "7" so it is straight down for easier viewing standing next to the evaporator.
 - As the sap begins boiling in the syrup pan, monitor the thermometer. The thermometer needle will need to go around completely once and come back to the "7" mark on the thermometer.
 - When the "7" mark is reached, use a hydrometer to test the density of the syrup. See ATTACHMENT #1 on the use of a hydrometer.
 - Adjust the thermometer to "7" when the hydrometer indicates the sap in the pan has turned to syrup i.e. is at the "HOT TEST" mark. To adjust the thermometer, place the Allen wrench, provided with the thermometer, into the screw and turn until the "7" aligns with the needle.
- Draw off the syrup into a container. You should open the valve and allow a pencil size stream of syrup to flow, maintaining the temperature at the "7" mark as long as possible. When the temperature starts to drop below the "7" mark, close the draw off valve.
 - Check your incoming sap, at the float box, to ensure it is flowing properly.
 - If you have not determined the firing interval, monitor your boil. Check the stack thermometer to maintain the temperature between 650°F and 800°F Determine how long it takes between firings to keep the temperature in the right range then use that time as your firing interval. The use of a timing device with an audible alarm to notify you when to fire the evaporator, is recommended. Adjust your interval as necessary to maintain a steady boil. The firing interval should be between 5 and 10 minutes depending on the wood being used.

DAILY SHUTDOWN

- There are two factors influencing the shutdown of the evaporator; time and sap volume.
 - It will require approximately 1 hour from the last firing to bring the fire down to embers (coals on the grates).
 - It will require a volume of sap from the last firing to embers and to flood the arch so ensure there is adequate volume left prior to the last firing.
 - 2X4 WSE will require 20 gallons of sap after the last firing
 - 2X6 WSE will require 25 gallons of sap after the last firing
- After the last firing and the last syrup draw (there may be 1 to 2 draws after the last firing) draw off 1 to 1 – ½ gallons of "sweet" from the evaporator into a clean container. Set the container aside and cover it.
- Continue to monitor the arch as done for normal operations but do not add any additional wood. If you want to hasten the shutdown, rake the burning material in the firebox to aid the flow of oxygen.
- When there is no more boil in either pan and the fire is down to coals on the grates, add sap until the pans are at a depth of 2". This is done by holding the float down or by loosening the float collar and lowering it. If the

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sap remaining does not cover the pans to the 2" depth then add clean, non-chlorinated, potable water until the depth is reached.

NOTE: The extra sap depth is required as the insulation of the arch (ex. bricks) will hold heat and continue the evaporation process until the heat has been dissipated.

MAINTENANCE

DAILY – prior to performing maintenance make sure the surfaces have been cooled.

1. Remove spills and splashes from the pan by wiping with hot water.
2. Follow the steps listed in the above section titled SYRUP PAN REVERSAL
3. Clean out the ash chamber and the slots in the grates NOT the "V" grooves of the grates.
4. Check all fittings for leakage. Repair / replace as necessary.

PERIODIC

1. Using the supplied brush and rod, brush the underside of the flue pan to remove accumulated material. Cleaning will allow the heat to better reach the sap in the pan.
2. Inspect the rail gasket and pan gasket for areas where heat and smoke maybe escaping. Replace if necessary.
3. If excessive niter and sugar sand is coating the surfaces of the pans with scale, clean the pans with a pan cleaner such as LEADER Order #63006 (1 quart size). The directions are as follows:
 - a. Add water to the pans until the coating to be removed is covered with water.
 - b. Add 1 quart of concentrated pan cleaner for each 40 gallons of water in the pans.
 - c. Heat the solution to simmering and keep at that level for one hour and the scale is noted to dissolve.
 - d. Wearing protective gloves, brush the loose scale.
 - e. If scale is removed flush the pans with water. If the scale is thick you may need to continue simmering the solution in the pan.
 - f. When the scale has been removed, drain off the solution, fill the pans with clean water. Add 2 pounds of baking soda to 200 gallons of clean water. Heat to a light boil, brush the pans, and empty the water from the pans.
 - g. Ensure all solution is rinsed from the pans.

END OF SEASON

NOTES:

- Do not allow sap or acid solutions to soak in the pans for more than 24 hours.
 - Use ONLY cleaners stated to be for maple syrup equipment.
 - Never store or transport the flue pan upside down.
1. Clean the pans with a pan cleaner such as LEADER Order #63006 (1 quart size). The directions are as follows:
 - a. Add water to the pans until the coating to be removed is covered with water.
 - b. Add 1 quart of concentrated pan cleaner for each 40 gallons of water in the pans.
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 - f. When the scale has been removed, drain off the solution, fill the pans with clean water. Add 2 pounds of baking soda to 200 gallons of clean water. Heat to a light boil, brush the pans, and empty the water from the pans.
 - g. Ensure all solution is rinsed from the pans.
 2. Disassemble pan connections. Inspect all seals and gaskets.

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3. Discard the rail gasket and pan gasket.
4. Inspect the brick and cement. Replace missing or damaged bricks or loose cement.
5. Clean the grates.
6. Raise the flue pan out of the arch and finish draining.
7. Thoroughly brush the soot from the flues of the flue pan.
8. Set 2X4s across the rail of the arch where the flue pan is usually placed then set the flue pan right side up on the 2X4s.
9. Set 2X4s across the rail of the arch where the syrup pan is usually placed then set the syrup pan right side up on the 2X4s.
10. Cover the pans and arch with plastic or a tarp.

BEGINNING OF SEASON STARTUP

1. Remove the cover and take the pans and 2X4s off from the arch.
2. Install a new rail gasket.
3. Place the pans on the arch and install a new pan gasket between the pans.
4. Assemble the pan connections (ex. Draw-off, u-tube) and float box.
5. Wipe and/or rinse out the pans.
6. When filling the pans for the first time check all fittings for leakage and repair if necessary.

FEEDBACK

Please use the following e-mail address (feedback@leaderevaporator.com) to suggest improvements or enter comments on this document. Reference the document title in your note. You may also contact LEADER Customer Service.

NOTES

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ATTACHMENT #1: HYDROMETER USAGE

HYDROMETER FUNCTION

A hydrometer works based on the density of the maple syrup. There are two scales on the hydrometer; Brix and Baume. The Brix scale indicates the percentage of sugar in the maple syrup. The Baume scale is a measure of how dense the maple syrup is related to the density of water. The correct density for maple syrup is a minimum of 66% sugar (66°Brix/35.6°Baume). You will need to verify your state's rules and adjust your readings as necessary. The hydrometers supplied by LEADER EVAPORATOR have been calibrated at two temperatures; 60°F Cold Test (66.9°Brix/36°Baume) and 211°F Hot Test (59.1°Brix/32.1°Baume). The maple syrup is expected to be at the upper temperature when it is measured immediately after being drawn off the evaporator.

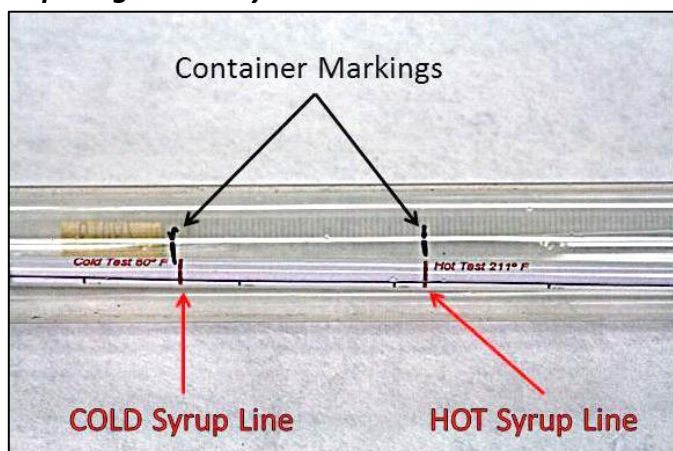
NOTE: Hydrometers from Leader Evaporator by law are calibrated by the State of Vermont. . The HOT and COLD test lines should be considered guidelines. Hydrometers should only be used by reading temperature and Brix/Baume readings.

USE OF A HYDROMETER

NOTE: Hydrometers are very fragile. Two most susceptible points of damage during use are the bottom and where the stem meets the body. Take extreme care when handling a hydrometer.

As hydrometers are susceptible to damage it is recommended the sugar house have a spare.

Preparing A New Hydrometer For Use:



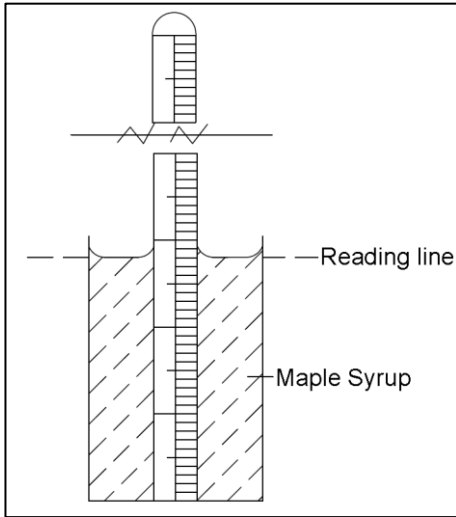
1. Unpack the hydrometer from its tube or box.
2. Carefully inspect the hydrometer for any breakage. If you suspect any cracks, fill your test cup with hot water and immerse the hydrometer. If it leaks then it is damaged and can't be used.
3. Place the hydrometer in its original container seated in the packaging and mark the container where the bottom of the hydrometer aligns.
4. Mark the container at the same lines as the HOT and COLD test lines in the hydrometer. When using the hydrometer in the future these lines are a check to ensure the scale inside the hydrometer has not moved.

Using The Hydrometer

1. Prior to using the hydrometer for the day, place it into its original container and check the hydrometer lines against the lines you marked on the container. If they do not match then replace the hydrometer.
2. Ensure the hydrometer is clean prior to every use. Accumulated material on the hydrometer will cause the hydrometer readings to be incorrect as it will have extra weight and not float as easily.
3. Hold the test cup upright. Fill the test cup up to $\frac{1}{2}$ " to $\frac{3}{4}$ " from the top with the syrup to be tested or from the syrup compartment of the syrup pan. **DO NOT HAVE THE HYDROMETER IN THE CUP.**
4. Do not allow the syrup to cool. Place the cup on a level surface. Immerse a thermometer into the test cup. Slowly immerse the hydrometer into the syrup in the test cup until it reaches the "HOT" test mark then carefully release it. **NEVER DROP THE HYDROMETER INTO THE TEST CUP.**
5. Read the temperature from the thermometer.

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6. Read the Brix or Baume number from the hydrometer.



NOTE: To correctly determine the Brix/Baume, you need to read from the line of the syrup.

LEADER EVAPORATOR Hydrometers: Hydrometers from LEADER EVAPORATOR are calibrated by the State of Vermont at two temperatures; 60°F Cold Test (66.9°Brix/36°Baume) and 211°F Hot Test (59.1°Brix/32.1°Baume). After numerous measurements it was determined 211°F is the average temperature of syrup when measured immediately after draw-off from the evaporator. When checking syrup at 211°F, the syrup is at the proper concentration when the reading line is at the Hot Test line. If the Hot Test Line is below the reading line of the liquid, continue to boil as the syrup is “light”. If the Hot Test Line is above the reading line of the liquid, the syrup is “heavy” and will need to be diluted with sap.

TEMPERATURE °F	Degrees Baume	Degrees Brix
209	32.0	59.0
202	32.25	59.6
193	32.5	60.0
185	32.75	60.4
176	33.0	60.9
167	33.25	61.4
158	33.5	61.8
149	33.75	62.3
140	34.0	62.8
130	34.25	63.3
120	34.5	63.8
110	34.75	64.3
100	35.0	64.8
90	35.25	65.4
80	35.5	65.9
70	35.75	66.4
60	36.0	66.9
50	36.25	67.4

7. Refer to the chart to determine if your syrup is “light” or “heavy”. If the reading is higher than the number on the table your syrup is “heavy” and will need to be diluted. If the number is lower than the number in the table, the syrup is “light” and will need to be boiled more.

8. After reading the hydrometer, remove it from the test cup and rinse it with either hot water or hot sap to ensure it is clean. Dump the contents of the test cup into the syrup compartment of the syrup pan or back into it’s storage container. Rinse the test cup with hot sap or hot water.
9. During the boiling period, store the hydrometer in a container of clean hot water or hot sap.

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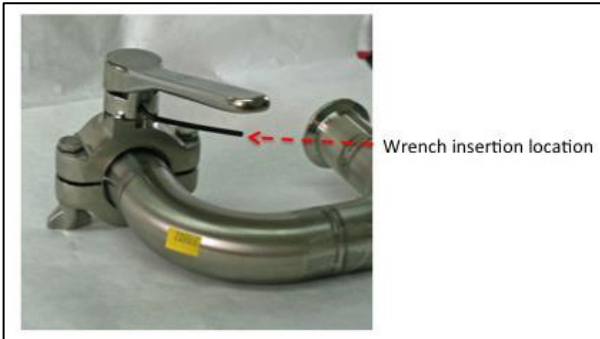
ATTACHMENT #2: INSTALLATION AND USAGE OF THE WSE UPGRADE BUTTERFLY

The WSE butterfly upgrade provides a valve to close the connection between the flue pan and the syrup pan. This eliminates the need to drain the flue pan when reversing or cleaning the syrup pan. Closing the valve additionally helps maintain the gradient as closed it minimizes the reverse flow of sap to the flue pan.

INSTALLATION

NOTE: Do NOT install this valve onto the pans without first disassembling. If not fully disassembled the rubber section cannot be aligned properly and will be damaged.

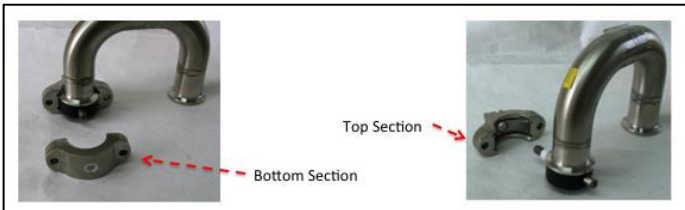
1. Remove the u-tube by loosening and removing the clamps. Hold the u-tube when removing the clamps so the tube and the Teflon gaskets are not dropped.
2. Disassemble the butterfly valve as follows:



- a. Using the supplied 3MM hex wrench loosen and remove the handle.



- b. Loosen / remove the wing nuts and remove the bolts.

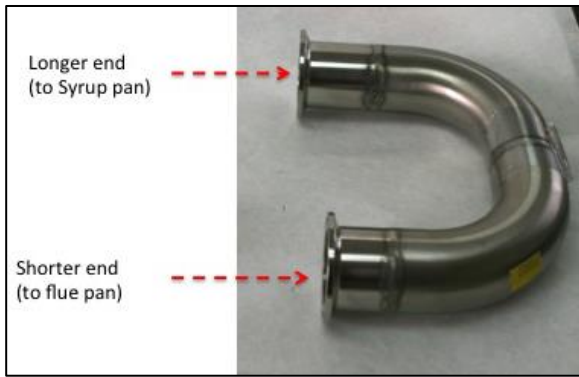


- c. Remove the top and bottom sections of the valve.

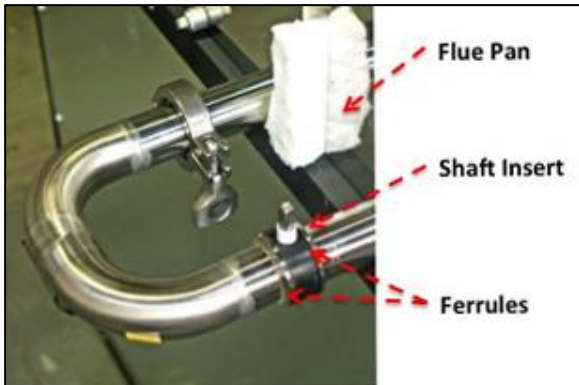


- d. Remove the rubber section containing the flapper.

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Flapper in closed position

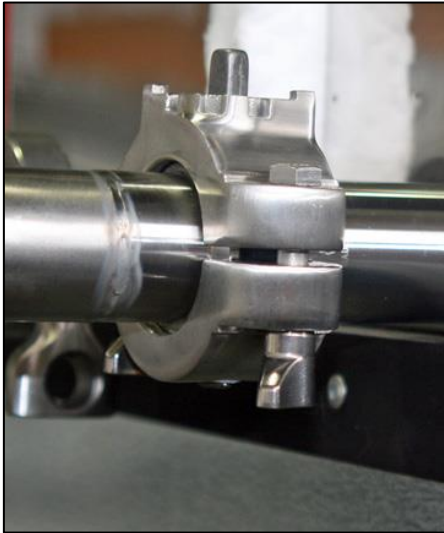


3. Attach the upgrade tube to the syrup pan using one of the clamps and Teflon washers from the u-tube that was removed. The end to be connected to the syrup pan is longer after the elbow. Do not fully tighten the clamp.
4. Align the upgrade tube with the FLUE pan ferrule. Insert the rubber section between the upgrade tube and the flue pan ferrule, ensuring the top of the shaft (top is square) is upright and the shaft insert is in place. Make note of the position of the flapper in the rubber assembly i.e. is it across or 90° to the assembly. A way of doing this is to use a marker and mark the top side of the shaft and the same side as the flapper. In order to make the completion of the assembly easier, it is suggested you set and maintain the valve flapper in the closed position (flapper and rubber are parallel).
5. Place the top section of the valve assembly over the shaft. Ensure the grooves in the section are lined up with the ferrules of the flue pan and the connector tube.
6. Place the bottom section over the shaft. Ensure the bottom section grooves are lined up with the ferrule of the flue pan and the connector tube. Pay careful attention to ensure the insert is present in the section and the shaft is inserted into it. Hold the section in place.



Bottom Clamp – note the grooves and the shaft insert

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7. Insert the two bolts with the bolt head on top. Thread the wing nuts onto the bolts then tighten



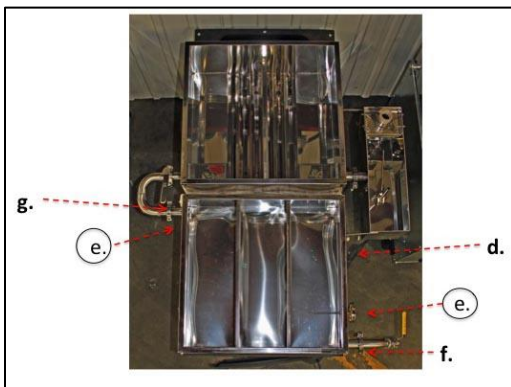
8. Place the handle onto the shaft pointing in the same direction as the flapper valve. If you have maintained the flapper parallel to the rubber assembly then the handle should be mounted at right angles to the valve. Tighten the handle with a 3mm hex wrench. Make sure the handle opens away from the pan.

USAGE

The following is a modification of the syrup pan reversal procedure detailed earlier in the document.

STEP 1: DISASSEMBLE

- a. At the end of the day, while still hot, draw off 1 to 1 ½ gallons of “sweet” from the syrup pan and set aside.
- b. Allow the evaporator to cool. Close the upgrade valve on the flue pan, open the draw off valve on the syrup pan and drain the sap from the syrup pan into containers; approximately 5 gallons.
- c. If the pan is cool you can wipe out any loose material using clean cloths.

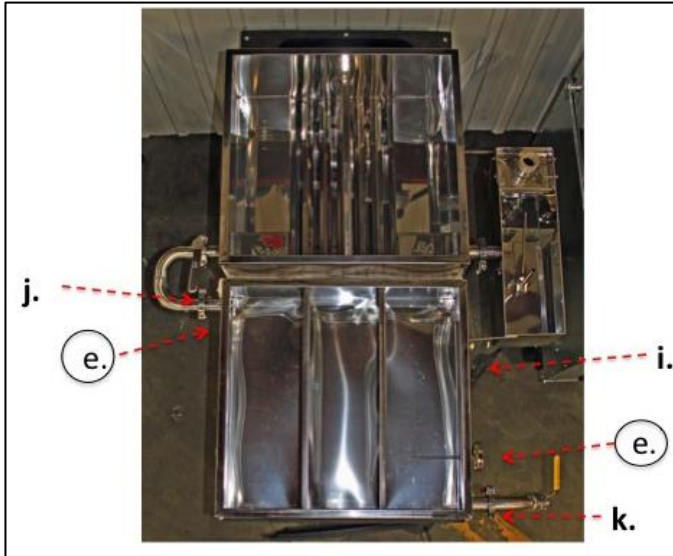


- d. Remove the thumbscrew securing the float box bracket from the syrup pan mount and thread into the mount on the opposite side of the syrup pan.
- e. If you have installed a single dial thermometer, remove it from its position near the draw off valve and install it in the ¼” threaded fitting on the opposite side of the pan. Plug the empty thermometer fitting with a ¼” plug.
- f. Loosen and remove the clamp from the draw off assembly on the syrup pan then remove the Teflon gasket and draw off assembly. As you take off the clamp, the draw off assembly and Teflon gasket will need to be held so as not to drop them.

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- g. Loosen and remove the clamp on the syrup pan side of the upgrade assembly. Remove the Teflon gasket. Do not remove the upgrade assembly on the flue pan side.
- h. Turn the pan 180° so the draw off ferrule is now the syrup pan upgrade assembly connection ferrule.

STEP 2: RE-ASSEMBLE



- a. Slide the float box support into the syrup box bracket.
- b. Reconnect the upgrade assembly by securing with a Teflon gasket and clamp.
- c. Reconnect the draw off assembly with a Teflon gasket and clamp.
- d. Close the draw off valve and refill the syrup pan with the sap drained off at the start of the procedure.
- e. Tighten the thumbscrew.
- f. Open the upgrade valve to the flue pan and add sap as necessary to bring the evaporator up to the operating level.

NOTE: If using only a single thermometer and you have not reverse the positioning, refer to step e.