



Leader Wood Fired Arch



Leader Evaporator Co., Inc.

49 Jonergin Drive

Swanton, Vermont 05488

SET UP INSTRUCTIONS FOR A LEADER WOOD FIRED ARCH

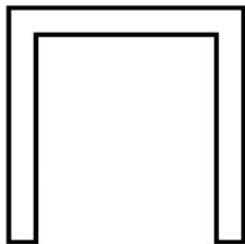
Step 1: Preparing The Sugar House

There are some major decisions that go into planning and preparing a sugar house for a quick and smooth set up. Two of these decisions are: How much space do I need? What kind of a foundation do I need?

Space in the sugar house is an issue that people always think back and wish they had done different, however there are some minimal guidelines we recommend. Leave six feet in front of the arch for ample room to fire the evaporator and clean out the ashes. Three feet at the back of the arch will allow for room to clean out the back and put up or take down the stack. Having four feet on each side will be sure to leave room for drawing off syrup and movement to do other chores within the sugar house. Just remember these are minimum recommended distances. Be sure to have plenty of space, it is better to have a little extra space, rather than not having enough. Think about possible expansions to, thinking of what space will be needed ten years from now will save aggravation in the future.

- Installing support pillars under each pipe leg 4-12 inches square.

- It is very important that all parts of the foundation reach below the frost line so that the arch will remain level, and secure during operation.



The Horseshoe shaped foundation around the fire box should be 5-12 inches high and 4-12 inches wide for a secure platform.

Leave the front of the arch foundation open to increase air flow into the fire box, and removal of ashes.

Foundations will also vary from one sugar house to the next. There are three basic guidelines to follow for the evaporator foundation.

1. Have enough support that reaches deeper than the frost line.
2. Make arch footers 4-12 inches wide planning the arch to sit near the middle leaving flexibility to slide the arch slightly in any direction.
3. Build in a 5-12 inch ash pit with easy access for cleaning.

When finished the arch foundation should look similar to the diagram on the left.

***If the arch is being placed on a wooden floor a layer of fire bricks topped by a steel plate

should be placed on the floor under the entire fire box, and extending a minimum of 2 feet forward in front of the arch. The bricks and plate should be at least as wide as the evaporator.

When pouring a foundation use standard concrete for a sturdy and durable foundation. When done right the foundation is done once.

Step 2: Setting Up the Arch

The first thing to do now that the arch is on site is to check your parts list and order to make sure everything is accounted for. Once you have identified everything you are ready to set the arch on the foundation.

1. Start by taking the pipe legs and moving the nuts to approximately half way of the threads, or mid range.
2. Set the arch on the foundation, placing the legs into the appropriate sockets threads first. The sockets of the arch should rest on the nut.
3. Using a four foot level, level the arch using the nuts previously set at mid range. This is easiest to do using two pipe wrenches. If necessary use small steel shims to level the front two corners of the arch.

Making sure the arch is completely level side to side and front to back will make the later parts of setting up your evaporator go much smoother.

Step 3: Insulating the Arch

Before installing any bricks it is recommended to use high temperature caulking to seal all of the sheet metal joints where they meet the structure of the arch, arch front and over all rivets and bolts. This will ensure that sparks and smoke cannot exit anywhere but the stack.

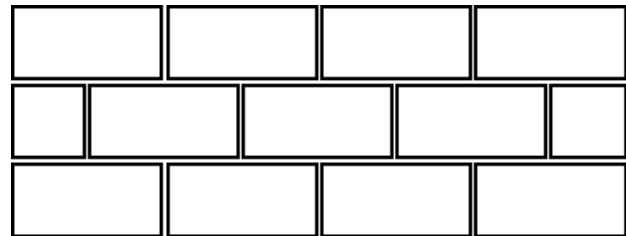
Now that the arch is set on the foundation you are ready to brick the arch. Before beginning be sure to have the right number of bricks and the correct amount of Refractory Cement, according to the chart and guidelines below.

Evaporator Size	No. Of Bricks Full/Half		30lbs Pails of Pre-mix Cement	Evaporator Size	No. Of Bricks		30 lbs Pails of Pre-mix Cement
	Drop	Raise			Drop	Raise	
2x4	64/30	n/a	1	4x10	140/60	100/35	3
2x6	72/45	80/40	2	4x12	165/70	105/35	4
2x8	80/60	64/40	2	4x14	190/85	105/35	5
30x8	60/48	40/28	2	5x12	200/70	130/40	5
30x10	70/60	45/30	2	5x14	230/85	130/40	5
3x8	100/48	85/30	2	5x16	255/95	150/40	6
3x10	115/60	90/30	3	6x14	325/85	190/40	7

3x12	140/70	95/30	3	6x16	365/95	235/40	7
40x10	125/60	95/32	3	6x18	410/95	280/40	8
40x12	150/70	100/32	4	3000 degree full fire brick: 2-1/2" Thick x 4-1/2" Wide x 9" long			
40x14	175/85	100/32	4				

Now begin laying the bricks in the arch dry, with no cement to establish the proper pattern and determine how and where to cut the necessary bricks. Start by standing bricks on end with the 4-1/2 inch wide part of the brick against the sheet metal in the area under the grate rails around the bottom of the arch. From there begin with the sides of the arch in the fire box area (from the front to the top of the incline behind the grates) laying bricks on their sides with the 4-1/2 wide part of the brick against the sheet metal side of the arch. Make sure that as each layer is added to break the joints as shown in the diagram.

Breaking the vertical joints in your wall will add stability, and strength for long term use.



It is easiest to cut bricks using a wet saw, or masonry blade in a circular saw. For the best results rent the proper equipment.

On all drop flue arches you will need to continue bricking the sides of the arch from the top of the incline all the way to the back of the arch under the collar. It is easiest to do this by using a combination of half or split bricks (1-1/4" thick x 4-1/2" wide x 9" long) along with the full bricks. Place one row of split bricks flat on the bottom sheet metal, tight to the side wall, then stand a half brick on end with the 4-1/2" wide side flat against the side sheet metal to bring you very close to the top rail. Make sure to leave the drain pipe hole un-bricked, and finish insulating this with rail gasket material or another form of ceramic blanket.

On all Raised Flue Arches with one baffle continue bricking the sides of the arch behind the baffle all the way to the back under the stack collar. If the arch has multiple baffles - leave the space between the two baffles un-bricked and begin bricking the sides behind the second baffle continuing all the way to the back under the stack collar.

Finally set the grates into the arch temporarily to make sure there is space for them between the brick walls on each side.

Now that the sides have been completely laid out remove the bricks from one side, and begin placing them back in, this time with refractory cement. Be sure to fill all air spaces created by rivet and bolt heads with refractory cement, and use a generous coating of refractory cement on the sheet metal behind the bricks. This will help the bricks adhere to the arch and make a more stable wall. Make sure all joints are well cemented so as not to leave any cracks for heat to escape. Be sure to fill all small gaps where the bricks meet the top rail of the arch with refractory cement as well.

Once both sides of the arch have been finished put the grates into your arch with the points of the grate facing down as if to make a letter "W", which should leave the side of the grates with narrow troughs facing up. Once the grates are in place take a piece of cardboard the same width as all of the grates in the arch and fold it over twice. Place the now three thicknesses of cardboard against the back end of the grates (towards the stack). Begin laying out the bricks tight to the cardboard. This piece of cardboard will leave the necessary expansion space for the grates, and make it possible to remove the grates as needed. Continue laying the bricks in without refractory cement until the entire incline is covered, and on drop flue arches continue along the flat bottom of the arch from the top of the incline all the way under the stack collar at the back of the arch cutting bricks wherever necessary.

For raised flue arches with one baffle lay the bricks out in the bottom of the arch behind the baffle all the way to the back under the stack collar. For arches with multiple baffles do not brick between the baffles, but begin bricking the bottom of the arch behind the second baffle all the way to the back under the stack collar. The first row behind the baffle should be half bricks on the bottom, and then stand a full brick on its end with the 4-1/2" side facing the baffle on top of the half brick so that the top of the standing brick meets the top edge of the baffle.

Once the entire pattern has been established and bricks have been cut to fit, remove bricks section by section, and put them back in using refractory cement. Be generous with the cement, especially on the initial incline of the arch to ensure no heat will escape through unwanted cracks between bricks. Be sure to put a light layer of refractory cement on the sheet metal before putting the brick in place to help adhere the brick to the arch for long term stability.

For Raised Flue Arches with multiple baffles only, once the bricking is completed it is time to insulate between the baffles. It is recommended to fill between the baffles with a light weight pour-able insulating material to within 2" of the rail of the arch. For the last 2 inches mix dry cement and the lightweight insulation together and finish filling level with the rails. Once the area is completely full dampen the top of the area between the baffles. Once this dries the concrete will harden to keep the lightweight material from moving during operation and flue brushing.

*****Special added instructions for arches with the COMBO RAISED AND DROPPED MAX FLUE PANS on them.**

For the combo raised and dropped flue Max pans a few extra bricks must be added to create baffles for the heat. By using a full fire brick on top of the full bricks already in the bottom of a drop flue arch we can create a baffle the proper height. Looking at the chart below locate the length flue pan you will be installing and install the bricked baffles in the correct locations. All measurements will be taken from the front of the stack collar where it is resting on the rail of the arch to the front of the brick baffle.

3' Long Flue Pan	1 Baffle	20 inches
4' Long Flue Pan	2 Baffles	20 inches and 30 inches
5' Long Flue Pan	2 Baffles	20 inches and 42 inches
6' Long Flue Pan	2 Baffles	20 inches and 54 inches
7' Long Flue Pan	2 Baffles	20 inches and 66 inches
8' Long Flue Pan	3 Baffles	20 inches, 50 inches and 78 inches**
9' Long Flue Pan	3 Baffles	20 inches, 56 inches and 90 inches**
10' Long Flue Pan	3 Baffles	20 inches, 62 inches and 102 inches**

Optionally you can fill between the baffles if you choose, however it is not required.

**If you fill between the baffles the center baffle is not required.

It is highly recommended to insulate any portions of the cast iron front possible, especially the sides of the door opening. Cut bricks as needed, and form them to fit as good as possible. On 2x4, 2x6 and 2x8 arches after all bricking has been completed dry fit full bricks against the cast iron front along the bottom of the door opening. These bricks will rest on the grates and therefore will need to be removed in order to take the grates out. DO NOT CEMENT them in place.

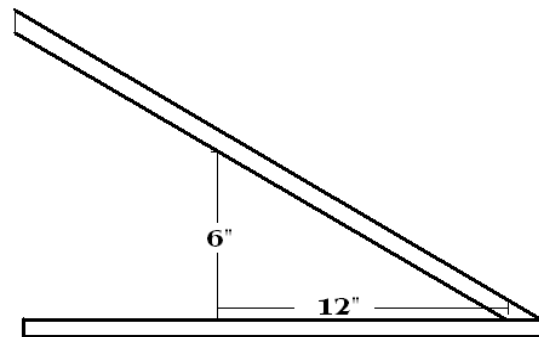
Now that the arch is fully insulated re-check to ensure the arch is still level and make any necessary adjustments. Check the doors and hinges to make sure they are all operating adequately and install the draft door latch using the nut and bolt provided (if packaged separately).

Step 4: Putting up the Stack

The first thing to do is make sure you have the right amount of stack and that it is the right size according to the following table

Arch Size	Taper Height	Stack Diameter	Round Stack Height	Arch Size	Taper Height	Stack Diameter	Round Stack Height
2x4	3'	10"	6'	4x12	6'	18"	18'
2x6	3'	10"	9'	4x14	6'	18"	21'
2x8	3'	10"	12'	5x12	6'	22"	18'
30x8	3'	10"	12'	5x14	6'	22"	21'
30x10	3'	10"	18'	5x16	6'	22"	27'
3x8	6'	12"	9'	6x14	6'	24"	21'
3x10	6'	12"	15'	6x16	6'	24"	27'
3x12	6'	14"	18'	6x18	6'	24"	30'
40x10	6'	14"	15'	It is very important to put up all stack that comes with the evaporator to create the necessary draft and get an efficient burning fire. It may be necessary to add stack in certain situations.			
40x12	6'	14"	18'				
40x14	6'	14"	21'				

It is highly recommended that you have a leader style roof jack fitted for the pitch of your roof. Pitch is the rise in the roof over the run, shown in a ratio. Better explained, measure into the sugar house 12 inches along the plate from where the rafter meets the plate. Now measure vertically to the bottom of the rafter, and pitch will be your measurement over 12 (see the diagram for better illustration).



In the example shown the pitch would be 6/12.

With a roof jack you will also want to specify whether it is going to be installed on the side of the roof or the peak of the roof.

Once you have the roof jack prepare to install it by taking a plumb bob and a drill up into the rafters of the sugar house to approximately where the roof jack will have to be. Use the plumb bob to find the correct place for the roof jack by centering the plumb bob over the stack collar opening on the arch. Use the drill to set a center hold for the roof

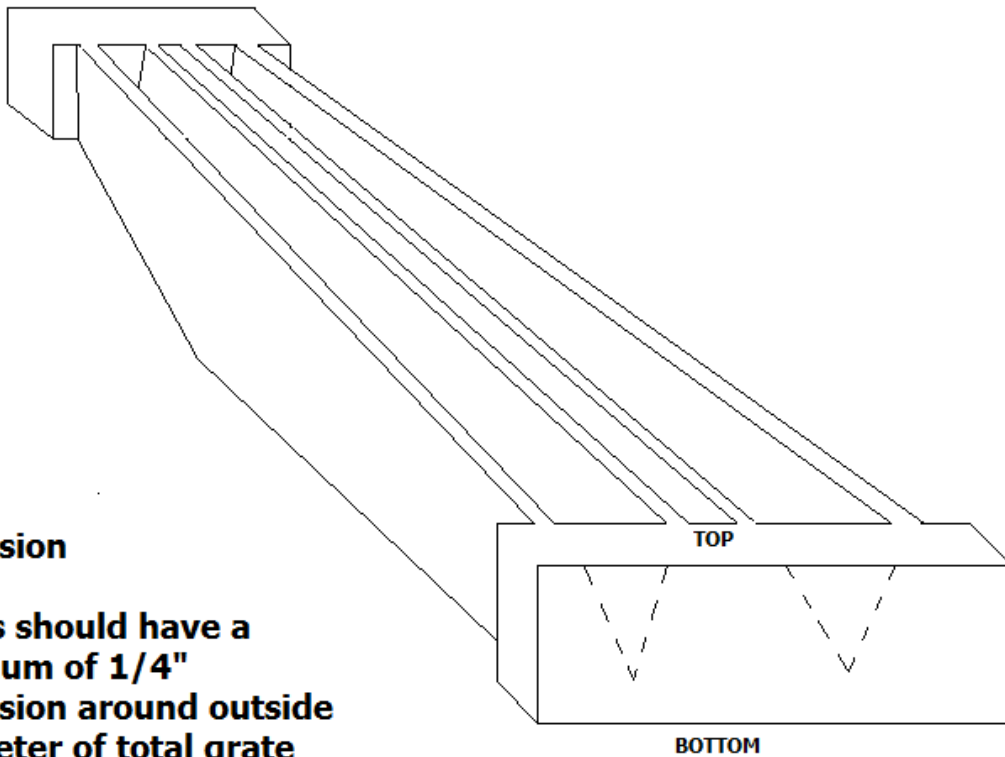
jack. Measure the bottom of the roof jack and add 2 inches in all directions. Take those measurements to the outside of the roof and cut a whole with those minimum dimensions. Center the roof jack over the hole and secure it down in the most water tight manner possible.

Now that the roof jack is secure start building up to it. Start by setting the taper on the stack collar of the arch. Now take one length of stack and push it up into the roof jack until it just starts to snug. Now measure from the top of the taper to the top of the bottom bead going around the stack. It may be necessary to cut one length of stack shorter to make the proper fit inside the sugar house, or have a custom piece made the correct length. The remainder of the stack needs to be installed onto the roof jack outside the sugar house. Outside the stack should be fastened together using self tapping stainless steel sheet metal screws, and guide wired in at least three directions for minimal effect from the wind.

Stack covers are highly recommended and should be installed to the top length of stack before the stack is secured in place.

On behalf of Leader Evaporator and your local dealer we would like to thank you for purchasing your new Leader Wood Fired Arch and if you have any questions please do not hesitate to contact your local dealer or us here at Leader Evaporator. Good luck and have a great season.

Grate Arrangement



Expansion

Grates should have a minimum of 1/4" expansion around outside perimeter of total grate pattern.

Flat side of "V" grate is always up