Inferno Wood Fired Arch

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Directions for an Inferno Wood Fired Arch

Preparing the Sugarhouse

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

Space in the sugarhouse 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 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 sugarhouse. Just remember these are minimum recommended distances. Be sure to have plenty of space, it is better to have a little extra space than not have enough. Planning for possible expansions in the future, will save time and aggravation later.

Foundations will also vary from sugarhouse to sugarhouse. There are two basic guidelines to follow for a foundation:

1. Have enough support that reaches deeper than the frost line.
2. Make all footers at least 12 inches wide planning the arch to sit in the center so it can be slid a few inches in any direction.

Be sure to use standard concrete for a sturdy and durable foundation. When done right the foundation is only done once.

Setting up the Arch

The first thing to do now that everything has been delivered or brought home is to check your parts list and be sure everything is accounted for. M Now that everything is there you are ready to set the arch on the foundation:

1. Set the arch on the foundation, placing the leveling bolts in the center of the footers.
2. Level the arch by adjusting the bolts previously mentioned. Be sure that the arch is absolutely level, which will save time latter in the set up process.

Bricking the Arch

Now that the arch is set on the foundation you are ready to brick the arch. Before any cement is applied be sure to have the right number of bricks and the correct amount of refractory cement, according to the guidelines below:

- 1 – 30 lbs pail of 3000 degree refractory cement for every 65 bricks,
- Use only 3000 degree fire brick

Table A-1

Evaporator Size	No. of Bricks	Pails of Cement	Evaporator Size	No. of Bricks	Pails of Cement
30 X 8	135	2	4 X 12	285	5
3 X 8	180	3	4 X 14	310	5
3 X 10	205	4	5 X 12	330	5
3 X 12	250	4	5 X 14	350	6
40 X 10	220	4	5 X 16	410	7
40 X 12	265	5	6 X 14	465	8
40 X 14	290	5	6 X 16	535	9
4 X 10	235	4			

Now lay the bricks in the arch without any cement in order to see what bricks need to be cut and assure the correct alignment. It is recommended that you rent a masonry saw from your local equipment rental facility in order to cut any bricks necessary. Another recommended item which will make bricking the arch much easier is the use of mono-block. Using the 1 ½ inch mono-block under the bricks on the outside of the wall from the top of the incline back will make the bricking process much easier. With the mono-block under a 9 inch brick there should be a snug fit on the side wall under the rail.

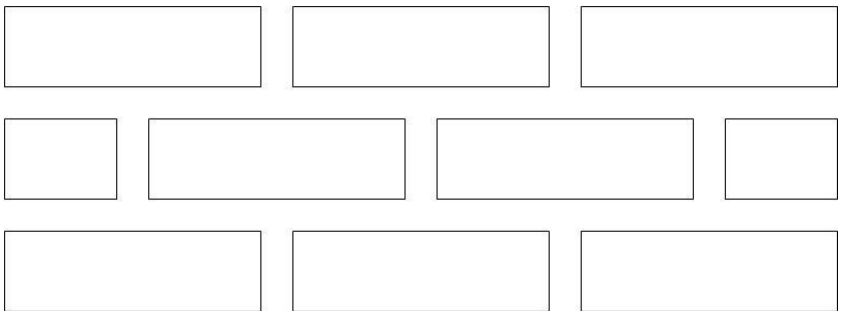
Two things to remember while laying the bricks are to break the joints of the bricks as shown in figure A-1. Secondly, leave a minimum of ¼ inch gap on each end of the grates for expansion and removal. It may help to place the grates in the arch while you are establishing a brick pattern. Remember different size arches take different number and size grates as shown in table A-2.

Table A-2

Width of Arch Inches	**Size of Grates Inches**	**Number of Grates**
30	24	3
36	24	3
40	30	4
48	30	5
60	30	7
72	30	8

***Exception – 3 x 12 arches takes 30 inch grates.

Figure A-1



For Raised Flue Arches

The baffles prompt some interesting methods of insulating; however we require that you brick the front of the first baffle. In between the two baffles is where there may be some options. It is recommended that you fill the space with a light weight, pourable, insulating material to within 2 inches of the top. For the top two inches simply mix dry cement with the insulating material you have chosen and finish filling. When you have finished filling in between the baffles lightly dampen the top of the fill so that the cement will harden. This will ensure that the insulation cannot blow out the stack.

For Combo Raised and Dropped MAX Flue Pans

For the combo raised and dropped MAX flue pans a few extra bricks must be added to create baffles for the heat. By suing 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 table below locate the length flue pan you will be installing an install the bricked baffles in the correct locations. All measurements will be taken from the front of the 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.

Flue Pan Length Feet	Number of Baffles	Placement of Baffles Inches
3’	1	20”
4’	2	20” & 30”
5’	2	20” & 42”
6’	2	20” & 54”
7’	2	20” & 66”
8’	3	20”, 50” & 78”
9’	3	20”, 56” & 90”
10’	3	20”, 62” & 102”

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 2 X 4, 2 X 6, and 2 X 8 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 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.

Remember that you have to leave a slot and hole for the drain pipe on the flue pan. Now that you have a pattern established keep it in mind, pull the bricks out and begin placing them back in order using the refractory cement to bond the bricks together. *Be sure to put the refractory cement on the sheet metal walls of the arch*, this assures that the wall is anchored and can't collapse.

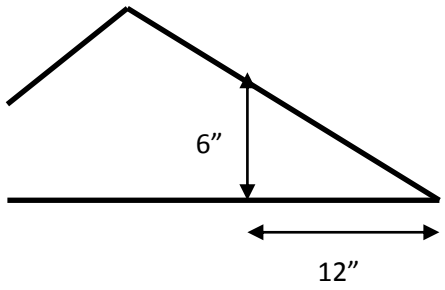
The arch is now fully bricked and should still be level; however check it again to make absolutely certain it remained level. Once you have checked the level of the arch go ahead and place the grates in the arch. Double check all the doors and their hinges to be sure they are secure and ready to go.

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 table A-3.

Table A-3

Arch Size	Taper Height Feet	Stack Diameter Inches	Total Round Stack Feet
30 X 8	3	10	12
3 X 8	6	12	9
3 X 10	6	12	15
3 X 12	6	14	18
40 X 10	6	14	15
40 X 12	6	14	18
4 X 12	6	18	18
4 X 14	6	18	21
5 X 12	6	22	18
5 X 14	6	22	21
5 X 16	6	24	21
6 X 16	6	24	21
6 X 16	6	24	27



It is also 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 showed in a ratio, better explained if you measure in one foot along the plate from where it meets the rafter, and it’s six inches from that point to the rafter you have a 6/12 pitch. The other distinguishing feature of a roof jack is whether it is a side pitch or a peak pitch. This is simple to decide, if the stack goes through the peak of the roof it is a peak pitch, if the stack goes through the side on the roof it is a side pitch.

Once you have a roof jack you have to prepare to install it. Take a string with some kind of weight tied on one end of it, and a drill up into the rafters of the sugarhouse to approximate where the roof jack will have to be. Use the sting to find the correct place for the roof jack by lowering the weighted end of the string down to the level of the arch collar at the back

of the arch. Have someone else eyeballing the weight, when it reaches dead center of the collar as the person up near the roof moves the string along the roof use the drill to put a guide hole through the roof.

Now from the outside find the hole and measure from the guide hole to find exactly where to make the cuts for the roof jack. Measure the opening in the bottom of the roof jack and add 2 inches all the way around for the hole in the roof. Once you have marked and made the cuts, place the roof jack over the center of the hole and secure it down in the most watertight manner possible.

Now that the roof jack is secure start building up to it. Start by setting the taper on its collar at the back end of the arch. In some installations it may be necessary to use a spark arrester between the collar and the taper (¼ x ¼ inch stainless steel mesh is sufficient). Now take a quick measurement of how much stack is needed to get into the bottom of the roof jack. It may be necessary to cut one length of stack down to get a proper fit. The stack should have a snug fit from the collar to the roof jack. Once the inside is taken care of, the remaining stack must be put outside from the roof jack up.

It is highly recommended that you install stack covers for all stacks (smoke and steam). The process is simple; the stack cover is secured to the top length of stack by three stainless steel bolts, one on each side and one on the back. Nylon rope or cable needs to be hooked to the swing arm for opening and closing the stack cover. Now put the length of stack with the cover already installed in place. Send your rope or cable down to the most convenient point for opening and closing and try it to be sure it works correctly.

Setting up the Forced Draft System

Thanks to some innovation to the Inferno wood fired arches the only thing to do with the forced draft system is to wire it up. A couple things to keep in mind: install both a speed control and an on/off switch for each fan, **use only copper or copper clad wire,** and turn off the power to the circuit that you are working on. If you have any questions contact your local electrician for help.

Start by removing ¾ inch of the exterior insulation from the end of each wire conductor; make sure the copper conductor is straight. Attach one wire lead on the fan speed control to the end of either conductor end, and the remaining wire lead to the remaining conductor as follows: twist wire strands tightly together and screw on a wire connector – so that all bare

copper is completely covered. Make sure every connection is secured with electrical tape.

Mount the control in the wall box with the 2 long metal screws provided. Restore power to the circuit breaker or fuse, and adjust the low-end fan speed as follows:

1. Turn the switch on clockwise. Do not rotate the knob any further than the first click;
2. Insert a small screwdriver into the trim slot (see the wiring diagram below) and set low speed as desired;
3. After the initial adjustment, interrupt power by turning the switch off at the extreme counter-clockwise position. After the fan has stopped rotating, restore power by rotating the switch clockwise to on. Do not rotate the knob any further that the first click. The fan should rotate at its slowest speed with the switch in this position. If the fan is not rotating, readjust by slightly increasing the low-end fan speed as described in step 2 above.
4. After a suitable low-end speed has been set, turn the rotary knob counter clockwise until it clicks off.

Snap the plastic cover into place over the control and the installation of the speed control is now complete. For a visual representation of the diagram, see below:

Firing the Arch

With a wood fired evaporator keep in mind the amount of room you have in the firebox when you cut your wood. A good rule is to cut your wood roughly the same length as your grates. When you fire the arch there are a couple of things to keep in mind: fire the arch often and in small batches to keep a steady heat source, cross the wood to allow for good air flow. Keep the fire box approximately ¾ full, and mix between hardwood and soft wood for a consistent heat. Be sure to keep the wood back all the way onto the grates. If the doors are turning red push your wood in a bit further. Be very careful when firing to make sure that the ceramic blanket that protects the box tubing stays intact. If something should happen to the ceramic blanket be sure to replace it before the start of another boiling day.

When firing a one blower arch use the speed control to turn the fan down so that no sparks or ashes come out the doors while you are firing. However, do not turn the blower completely off. On a two blower arch simply use the on/off switch to turn one of the blowers off. This should cut the air enough so that you can fire effectively, however if sparks and ashes

are coming out the doors simply turn down the second blower using the speed control. When you have finished firing turn all of the blowers back to their appropriate levels. What is the appropriate level? Well it varies from arch to arch. The easiest way to set your speed controls is to use the stack temperature. The appropriate range to be within is 750-900 degrees F., but the ideal range is 825-900 degrees F. (Check the stack temperature 2 minutes after firing).

Maintenance

Make sure you clean the ashes in the back of the arch regularly. A build up of ashes at the back of the arch will cause a lack of draft and a drop in efficiency. It may be necessary to clean the grates off several times throughout the season as well. If there is a build up on the grates it will not allow air to get through and fuel the fire.