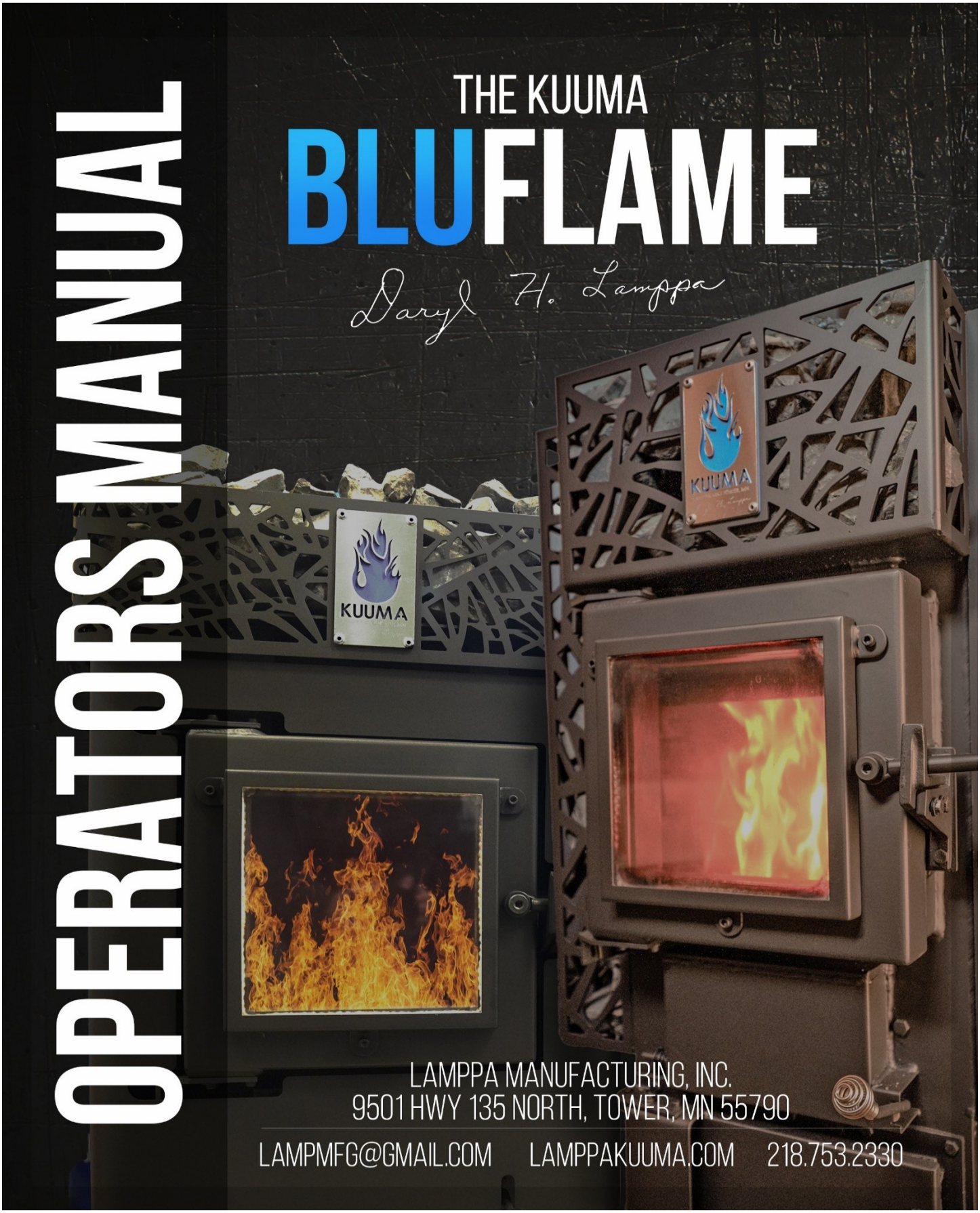
OPERATORS MANUAL

THE KUUMA

BLUFLAME

Daryl H. Lamppa



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1 Contents

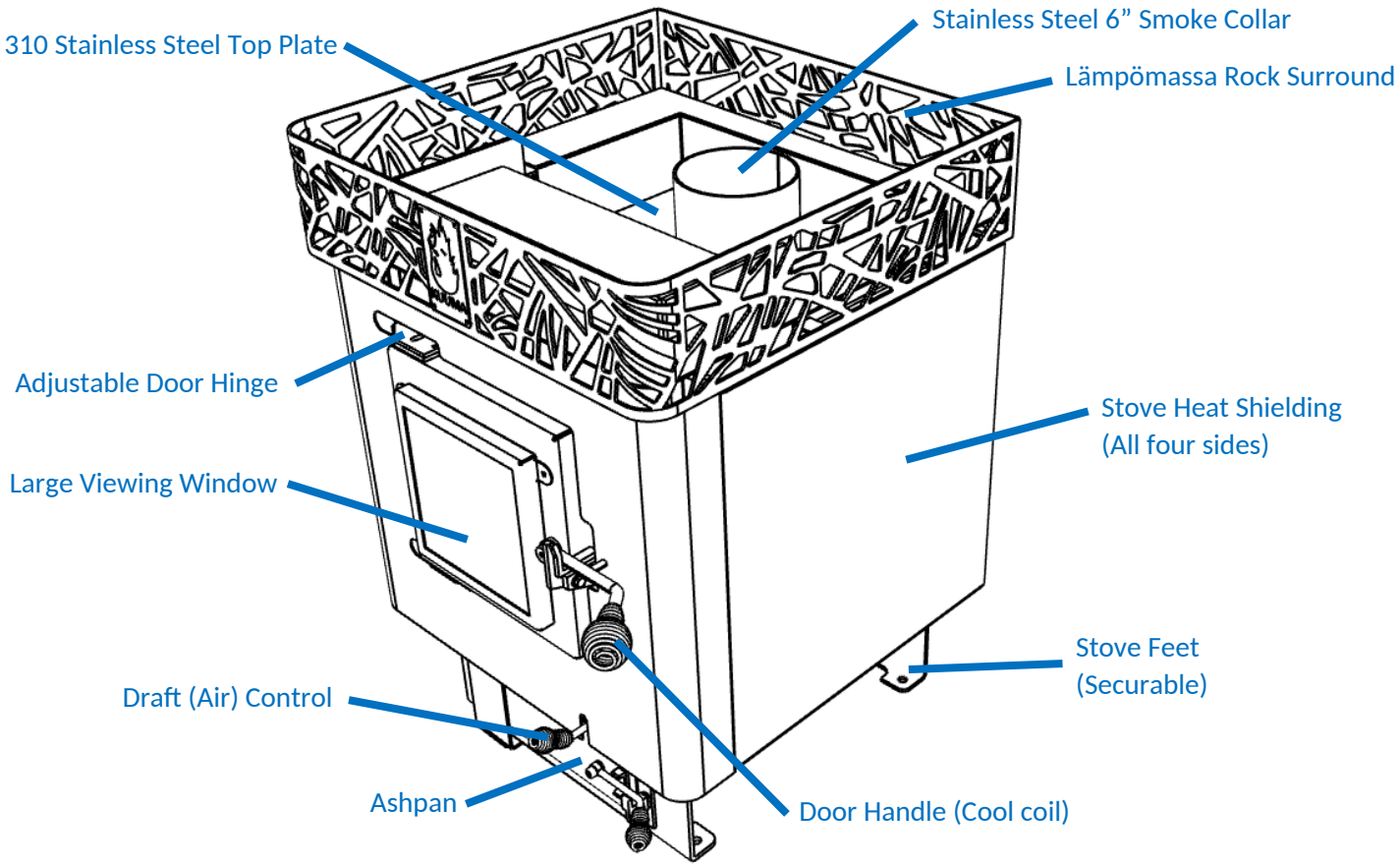
2 Notes, Cautions, and Warnings

Statements enclosed in text boxes within this document are used to bring attention to important information. Below are descriptions of the 3 different text boxes you will see throughout this manual.

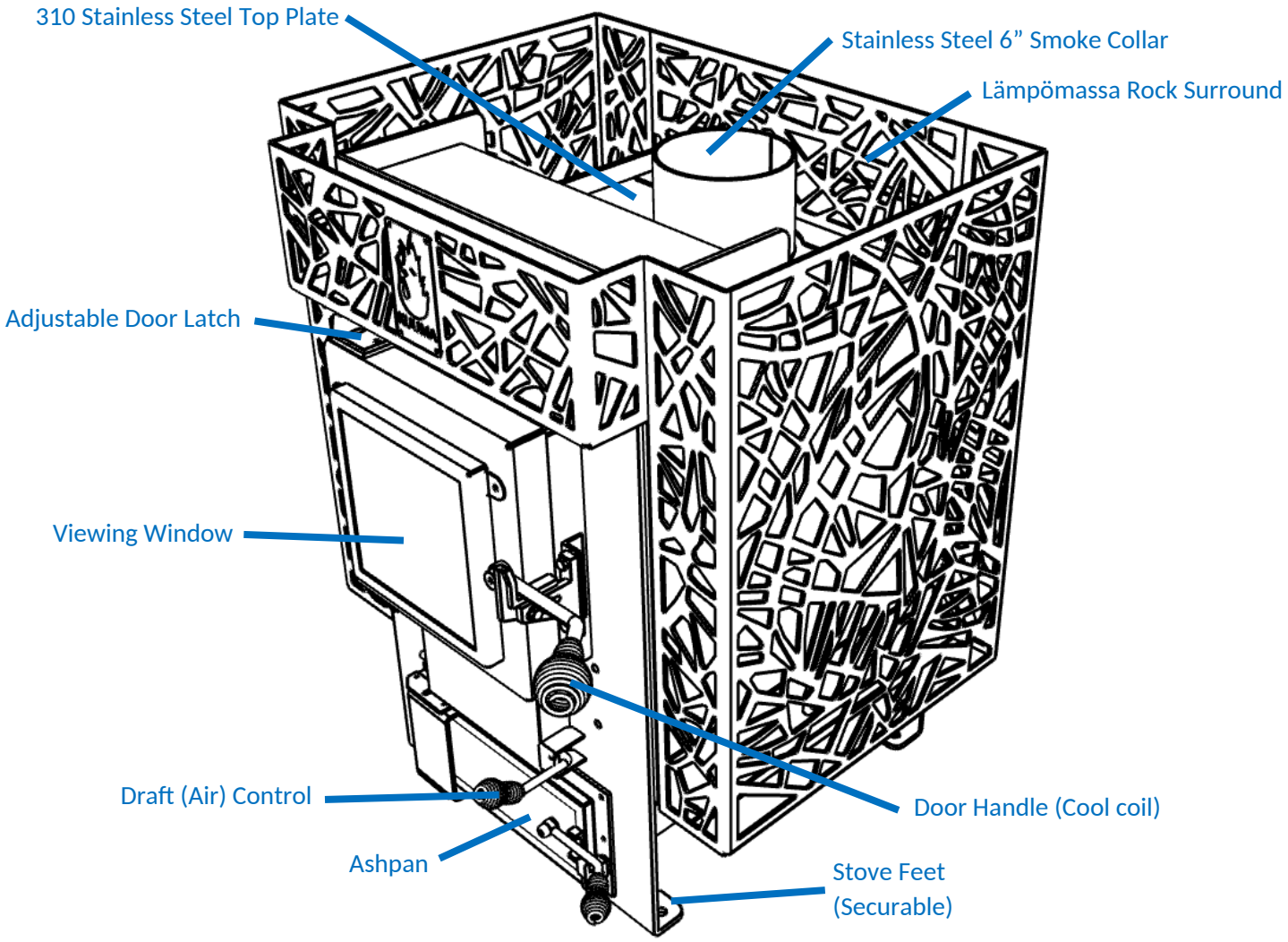
NOTE:	Statements that provide further clarification.
CAUTION:	Statements identifying conditions or practices that could result in equipment or other property damage.
WARNING:	Statements identifying conditions or practices that could result in personal injury or loss of life.

3 Components

3.1 BluFlame



3.2 BluFlame Banya Edition



4 Installation Instructions

WARNING:	Install and use only in accordance with these installation and operating instructions.
NOTE:	Contact local building or fire officials about restrictions and installation inspection in your area.

4.1 Stove Assembly

- Stove internal shield installation (applies when picked up only, installed when shipped)
  - Inside the firebox is a stainless-steel metal plate and washers. This internal shield should be placed against the back wall with the washers also facing the back wall.
- Stove external surround heatshield installation (pick-up only, installed when shipped)

- Use two people and a 7/16 open-end wrench and socket to install the side and front shields with the provided bolts and nuts.
- Side Shields
  - Hang the first heat shield by putting bolts from the back welded-on heat shield into the holes of the heat shield.
  - Use the nut to secure the top bolt and then put a nut on the bottom bolt.
  - Line up the top of one side heat shield and the rear shield evenly and tighten.
  - Repeat the same process on the opposite side.
- Front Shield
  - Open the firebox door and carefully install the front shield (we like to use a small towel on the top door, so it doesn't scratch).
  - Secure the front shield to the side shields. Start with the top two bolts, keeping the front shield level with the side shields.
  - Snug the bolts to hold the front shield in place. Check that it is level, and the door does not hit.
  - Install the bottom two bolts and tighten all bolts.

- Firebrick Installation
  - Install floor bricks first.
  - Proceed with side bricks by sliding the top under the angled support iron and pushing the bottom against the firebox wall.
  - By design, there should not be any firebrick on the back wall.
- Confirm the firebox door closes tightly; adjust or replace the gasket if necessary.

4.2 Stove Curing

- Before using the stove for the first sauna, it is necessary to do a stove-curing burn. To avoid a non-toxic odor in your hot room, you can perform the curing burn outdoors before installation inside your sauna. The stove functions quite differently outside the hot room, in the open air, so don't worry if it's not working perfectly if you complete this outside.
- Before lighting a fire for a cure burn, first install the provided fire bricks as described above.
- Add on a 3-4 foot section of stove pipe.
- Place some newspaper or an appropriate fire starter inside the firebox near the front door.
- Next, place some small wood kindling on the newspaper.
- Finally, place 3 or 4 pieces of well-cured firewood on top of the kindling. We suggest pieces that are 14 to 15 inches in length. Push these chunks back until the ends touch the back wall of the firebox.
- Move the draft-control handle (located directly below the main firebox door) to the full-open position (move the handle up as far as it will go).
- Open the ash pan door to get additional combustion air during the lighting process, light the newspaper, and close the main firebox door.
- Once the fire is burning well, lower the draft control lever on the stove until it is open, only about ½ throttle or less if you have drier wood.
- Let the stove burn until the fire goes out.
- If you are doing your stove-cure burn inside your hot room, we suggest propping the sauna door open and potentially installing a room fan to help blow smoke out of the hot room.
- The stove will smoke a fair amount (non-toxic) as the paint is hard-cured, and any remaining oils and/or preservatives on the steel are burned off.
- The stove might pop, crackle, and smoke, which are all good things. Also, expect some smoke (film) on the window during these burns.

- It is recommended that you perform three curing burns (small, medium, and large).
- You are now ready to enjoy your first sauna!

WARNING:

Only use cordwood as fuel and never use gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, or similar liquids to start of "freshen up" a fire in this stove. Keep all such liquids well away from the stove while it is in use.

WARNING:

The stove is hot while in operation. Do not touch and keep children, clothing and combustibles (wood) away. Direct contact will cause severe burns to the skin.

4.3 Installation

- Confirm that the stove has an appropriately sized non-combustible surface to be set on. (See section 7.1)
- Confirm that the stove and stove pipe location will comply with all clearances. (See section 7)
- Place the stove into its final resting position.

NOTE:

Because the top of the stove is made to drain water out the back, we suggest having the stove tilted slightly backwards.

- Ensure the stove is fully assembled, including the fire bricks and heatshields. (see section 4.1)
- The stove must be connected to:
    a. A chimney complying with the requirements for Type HT chimneys in the Standard for Chimneys, Factory-Built, Residential Type and Building Heating Appliance, UL 103, or
    b. A code-approved masonry chimney with a flue liner.
- Use a 6” stove pipe to connect the stove to an approved chimney.
    a. Install a chimney damper in the first stove pipe section from the stove (this will help negate extremely windy conditions, prevent too much heat from being drawn up the chimney, and help arrest a chimney fire).
    b. Secure each pipe section to the next using a minimum of 3 sheet metal screws.

WARNING:

Never locate stove in an area (room) that is too air-tight. The stove needs air to burn and occupants need air to breathe.

5 Operation

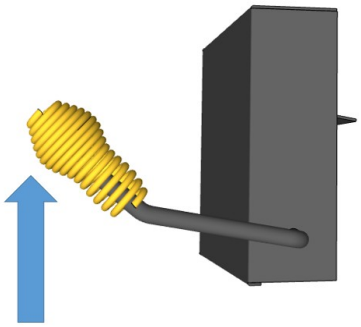
WARNING:

Only use cordwood as fuel and never burn garbage, gasoline, or other flammable liquids.

WARNING:

The stove is hot while in operation. Do not touch and keep children, clothing and combustibles (wood) away. Direct contact will cause severe burns to the skin.

1. Place a generous amount of paper and dry kindling into fire chamber and stack a reasonable amount of dry wood on top of kindling, keeping the front of the logs at least 1” away from the front of the stove (it’s important not to block the airflow from the bottom-front on the inside of the stove). Wood lengths of 14-15” are recommended for this stove.
2. Adjust the draft control arm to the wide-open (up) position.

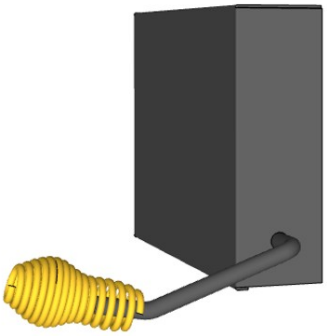


3. Light the fire and close the door.

CAUTION:

Never burn a stove wide open very long. Preheating the firebox and wood are the only time it's needed. This will enable the stove to last a long time and result in safe burns.

4. After 5-10 minutes of pre-heating, lower the draft control arm to the normal burn position – about 50% open.



5. If, for some reason, you want to put the fire out, lower the draft control arm all the way down to the stop position. This will slow the burn rate but not immediately extinguish the fire.
6. To reload, pull the coals forward with the ash rake and place three small pieces of wood in a triangle shape directly on top of the coal bed, slightly tilted toward the back to maintain the front-to-back burn. Open the draft

control fully for about a minute to allow the wood to burn well, then reduce it to the normal burn position (around 50% open). Usually, in the next 10-15 minutes, you can often close the draft nearly all the way—an "eco mode" that idles the stove and provides the longest burns (suitable for holding current temp when not actively saunaing). For optimal active sauna use and plenty of steam, maintain a draft of around 50%. If you notice visible smoke right after cutting the draft, the stove isn't hot enough; open the draft slightly until the smoke clears.

7. The reload is when you can add a lot of heat to your hot room if desired. It's also the time when you can really extend burn times when correctly operating the draft control.

WARNING: The pipes and stove should never become red or glow - this would indicate over firing and possibility of a pipe and/or chimney fire, which is very dangerous.

6 Stove Maintenance

6.1 Each Use

- Before starting, make sure the backside of the draft control inside the firebox is free of obstruction (coals, etc.). A gloved hand or the ash rake hook works well for this.
- We suggest the "Bake and Breath" method following each sauna session.
    - **Bake:** When you are done with a sauna session, make sure you still have some good coals in the firebox. Pull the coals forward with the ash rake and open up the draft control all the way. Then exit your hot room and leave the door closed for the night (this will dry out the inside of the hot room and kill any germs).
    - **Breathe:** The next morning, return to the sauna and prop open the hot room door until the next sauna session (this will air out your sauna between sessions).

6.2 Every 4 or 5 Sauna Sessions

- Empty ashpan
    - Place ashes into a metal container with a tight-fitting lid.
    - Place the metal container on a non-combustible floor or on the ground, well away from all combustible materials.
    - Retain the ashes in the closed container until all cinders have thoroughly cooled before disposal.

CAUTION: If ashes are permitted to build up above the grate, the grates could warp and eventually burn out.

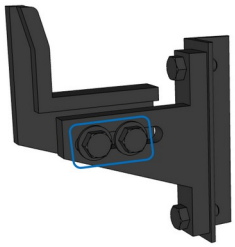
6.3 Every 2 Months

- Inspect and clean the stove pipe and chimney for creosote and soot accumulations. (See section 10.1)
    - If creosote is found during inspection, it should be removed to reduce the risk of a chimney fire.
    - Clean chimney with a chimney brush.

6.4 Annually

- Vacuum inside the smoke collar on top of the baffle.
- Pull the sauna rocks, check, and replace any rocks that are disintegrating.
- Vacuum rock box, firebox, and ash pan surround.
- Check the fire brick in the stove. Cracks are okay, but if they are disintegrating, they should be replaced.

- Use a Scotch-Brite pad to scuff areas where paint has chipped, scratched, and worn away (especially in the rock box area). Then, touch up the areas with a black high-temp flat/matte paint (Stove Bright, Thurmalox, VHT, Rustoleum, all available at box stores, auto part stores, or on Amazon). The paint will help keep a protective barrier between the water and the metal of the stove.
- Confirm the fire box and ash pan doors close tightly and evenly across the door.
    - To adjust the door on the handle side, loosen the two screws, lower the handle behind the latch, push the door in tightly, and tighten the screws.



    - Once the door handle/latch is adjusted, adjust the doors on the hinge side. Loosen the two screws on the top and bottom brackets of the door, and push the door in until you feel a slight resistance as you close it. Ensure it is not too tight, then tighten the screws.

    - Confirm that the door is compressing the gasket evenly around the door.
- Confirm the fire box and ash pan door gaskets are not worn.
    - If the gaskets become worn, replace with ½" fiberglass rope available from local sources.

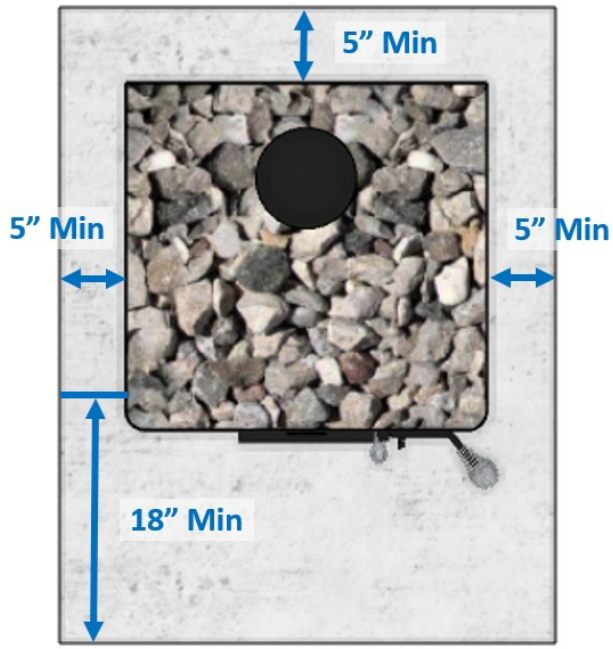
6.5 As Needed

- Glass cleaning
    - If needed, it's easy to clean by dipping a wet rag or crumpled piece of newspaper into ash located in the firebox and wiping, followed by drying with a paper towel. Household ammonia also works well.

7 Safety Dimensions and Clearances

7.1 Floor

The stove must be set on a non-combustible surface. This surface must extend at least 5” on the back and sides of the stove and at least 18” from the front of the stove base (not from the front of the door).

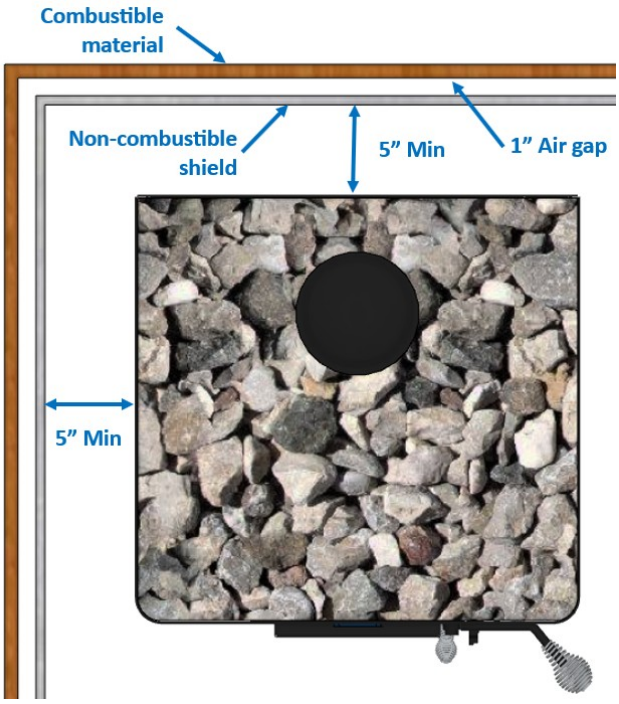


7.2 Front of Stove

All combustible materials need to remain 28” from the front of the fuel loading door.

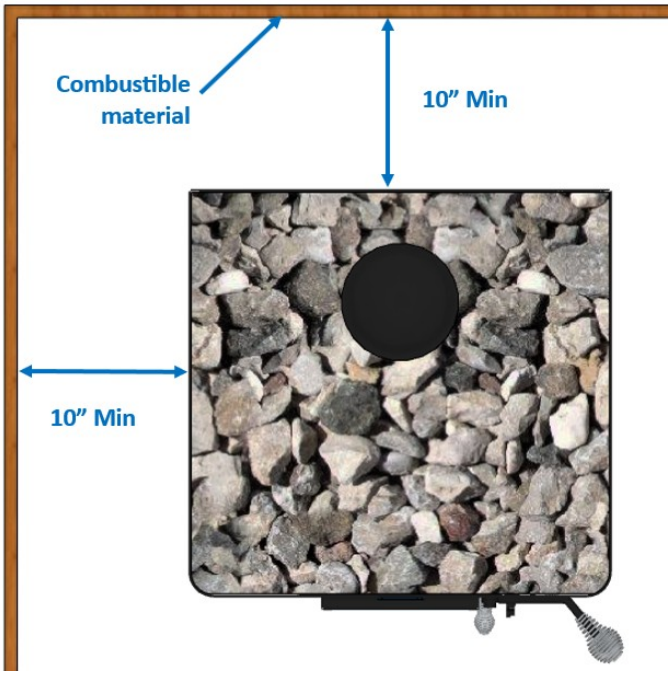
7.3 Side and Rear of Stove

- 5 inches to a non-combustible wall shield with a 1-inch air gap



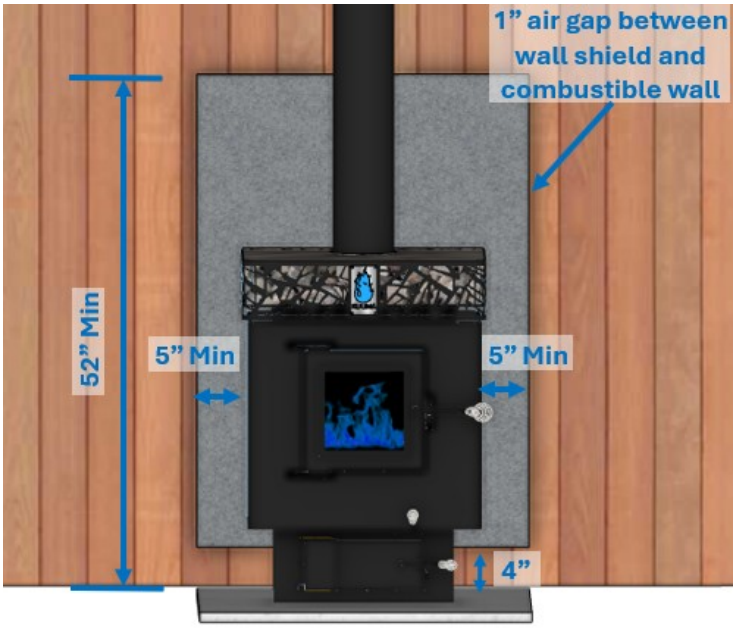
or

- 10 inches to a combustible wall



7.4 Wall Heat Shields

For extra safety, we always recommend a Non-combustible wall heat shield. It should be 4” off the floor and have a minimum overall height of 52” from the floor. The width needs to extend past the sauna stove 5” on each side.



7.5 Ceiling

The minimum ceiling height for this stove is 82” from the surface that the stove sits on to the ceiling. The height of the ceiling will determine if a noncombustible ceiling surface is suggested.

Option A (MOST POPULAR): If your ceiling height is greater than 88”, no ceiling heat shielding needs to be applied.

Option B: If your ceiling height is ≥82” and ≤88”, a 3’x5’ heat shield is to be placed on the ceiling with a 2” air gap between the heat shield and the combustible ceiling material. The heat shield should also be within 1” of an adjacent side or back wall.

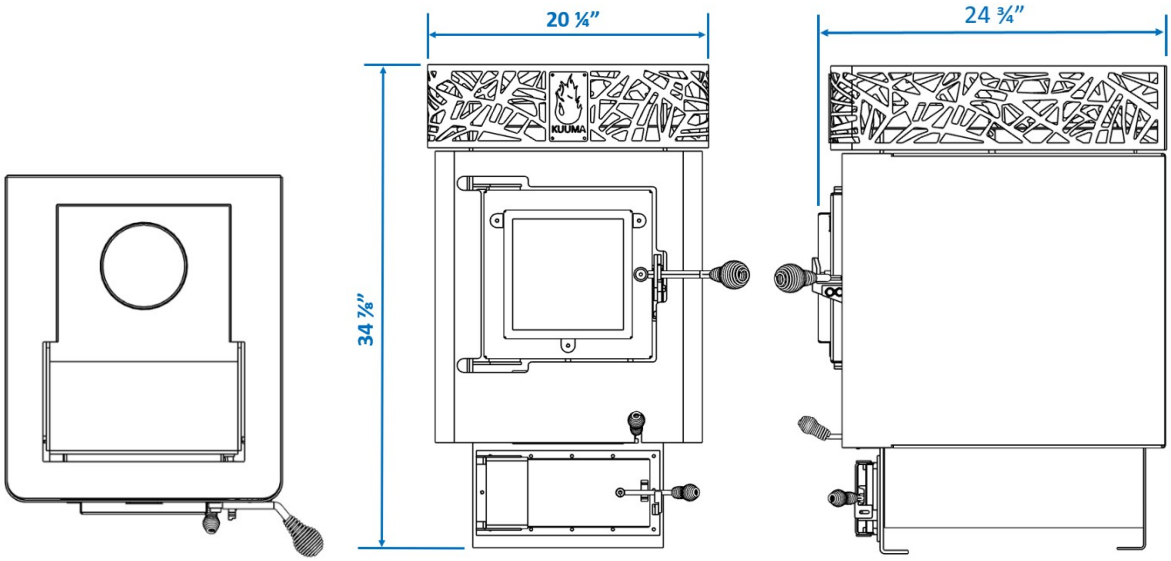
7.6 Stove Pipe

The stove pipe needs 18” clearance in all directions from anything combustible, unless double or triple-walled pipe is used. If using double or triple-walled pipe, check the manufacturer’s specifications for clearances.

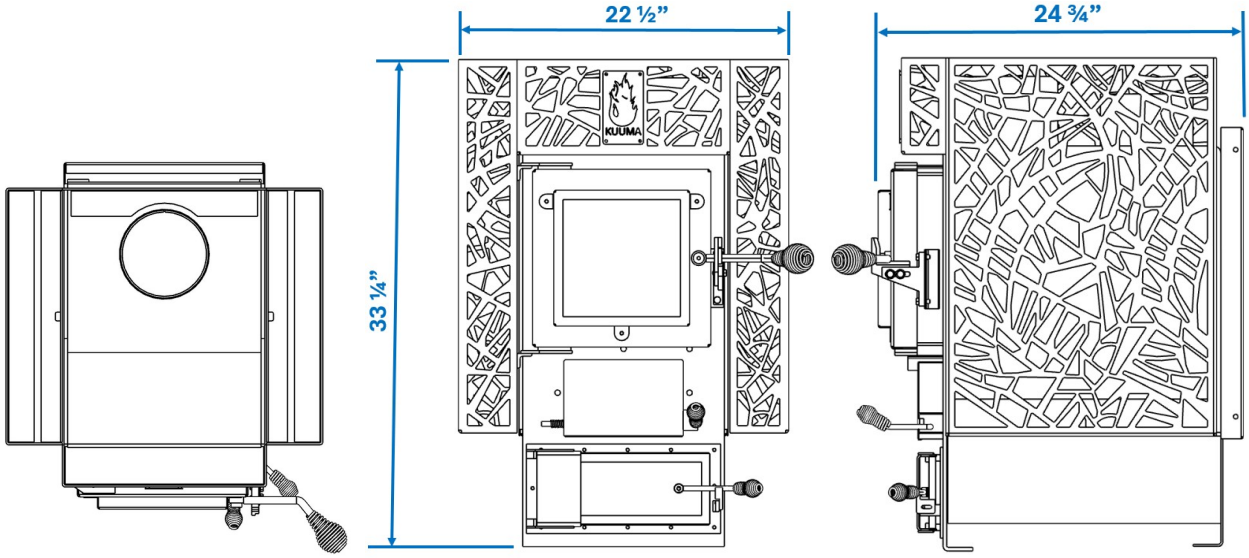
8 Small and Medium BluFlame Information

8.1 Dimensions

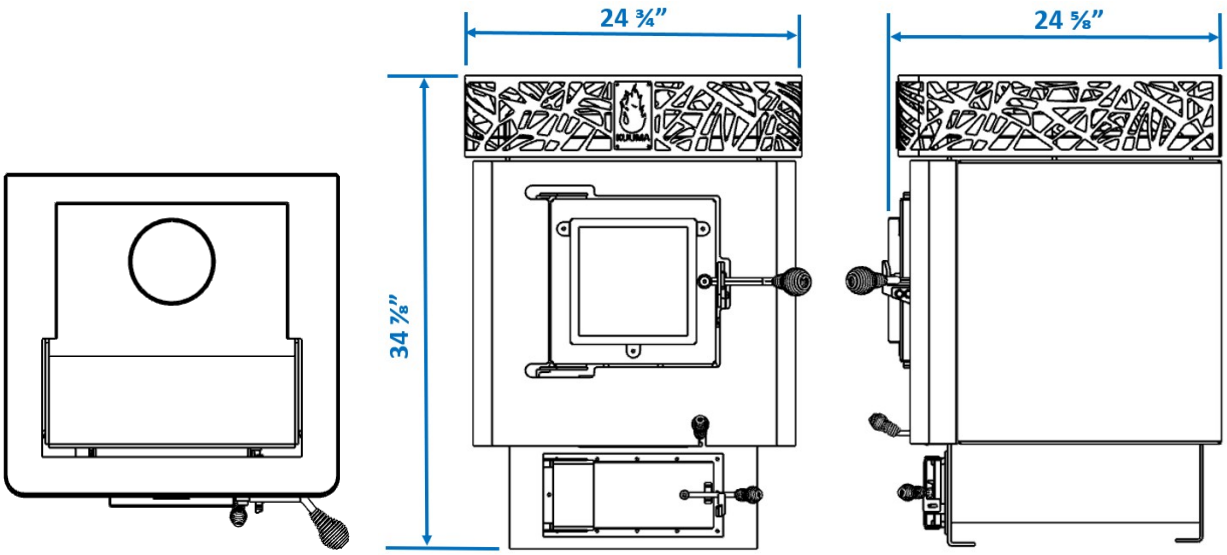
8.1.1 Small BluFlame



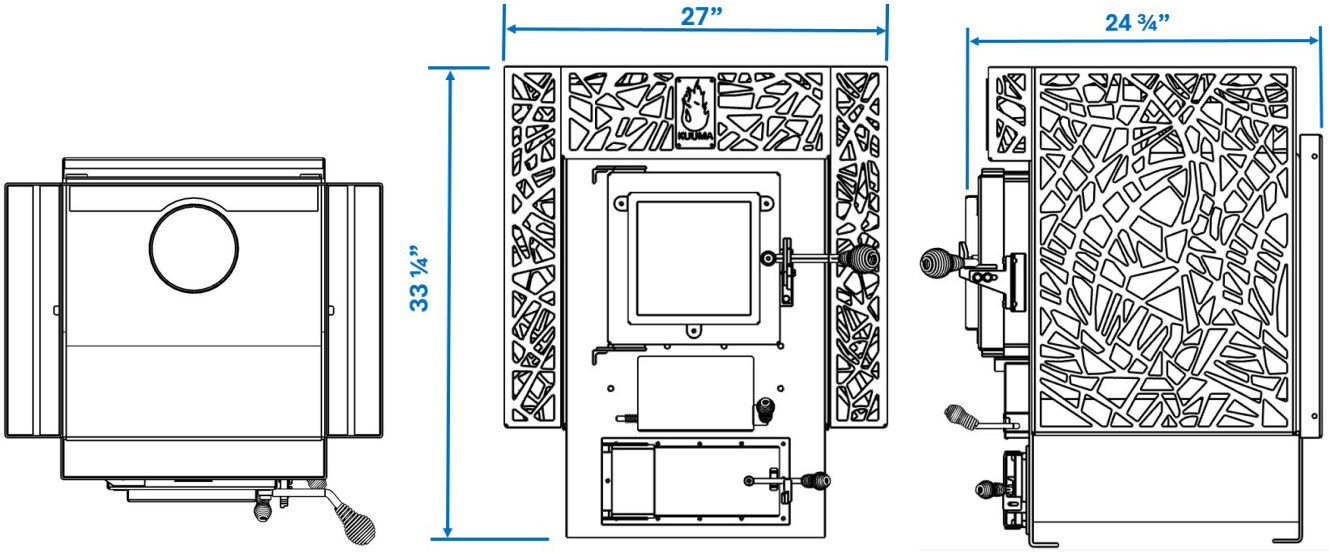
8.1.2 Small BluFlame Banya Edition



8.1.3 Medium BluFlame



8.1.4 Medium BluFlame Banya Edition



8.2 Hot Room Size Recommendation:

- Small – (336 – 576 ft^3)
- Medium – (512 – 900 ft^3)

8.3 Stove Weight (without rocks)

- Small – 375lbs.
- Medium – 405lbs.

8.4 Rock Capacity

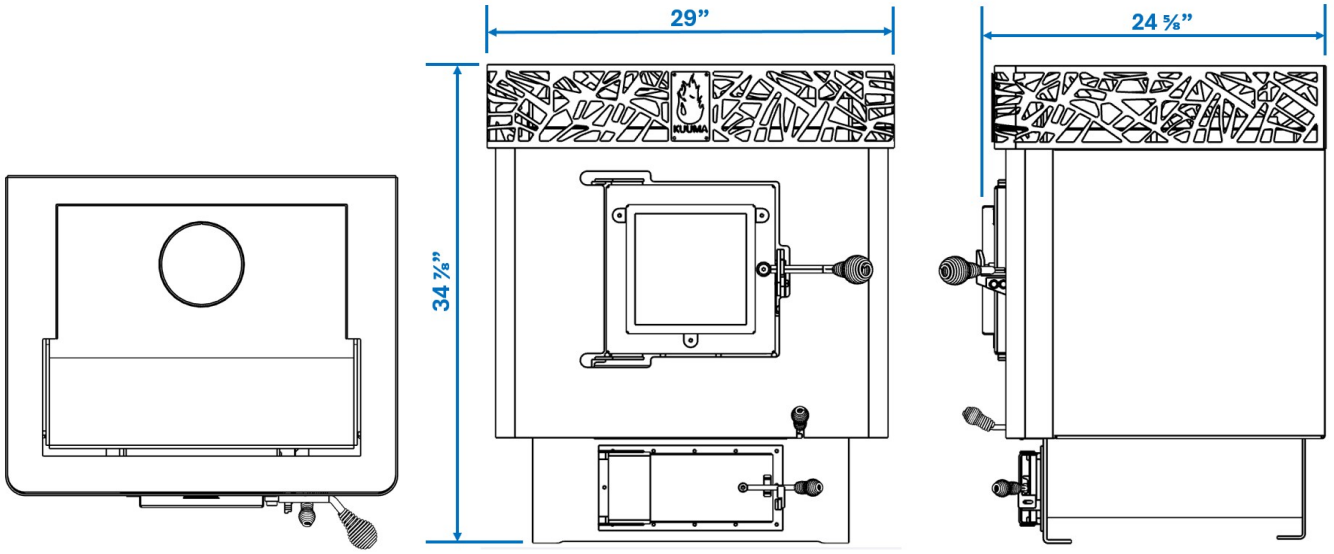
- Small
  - 100-150lbs.
  - Banya Edition – 300-350lbs.

- Medium
  - 150-200lbs.
  - Banya Edition – 350-400lbs.

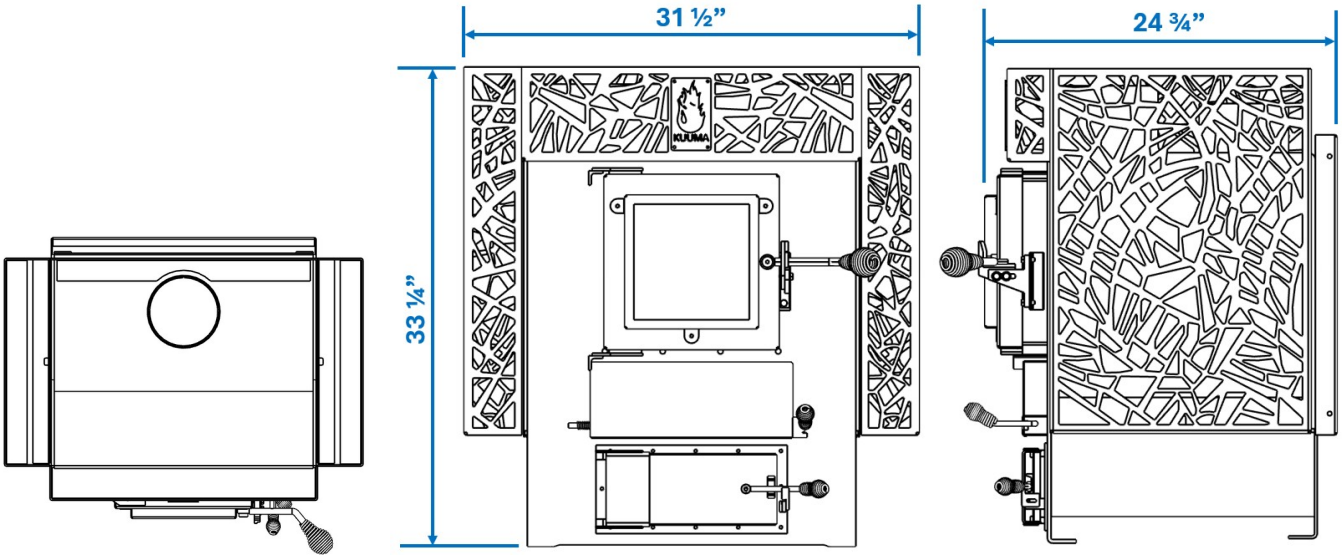
9 Commercial Kuuma BigBlu Information

9.1 Dimensions

9.1.1 BigBlu w/Heat shielding & 6” Rock Surround



9.1.2 BigBlu Banya Edition



9.2 Hot Room Size Recommendation:

- BigBlu– (800-1450 ft^3)

9.3 Stove Weight (without rocks)

- BigBlu– 440lbs.

9.4 Rock Capacity

- Heat Shielding & 6” Rock Surround
  - 200-250lbs.
- Banya Edition
  - 350-500lbs.

9.5 Commercial Warranty Kuuma BigBlu

- Lamppa Manufacturing, Inc. warrants its Kuuma BigBlu Gasification wood-burning sauna stoves against defects in materials and workmanship for **two (2) years** from the date of delivery to the original purchaser **when installed and used in a commercial or public setting** (including spas, gyms, hotels, wellness centers, or rental properties). Please refer to the formal limited commercial warranty for BigBlu on our website.

10 Reference Information

10.1 Creosote

WARNING: Serious fire may result if a sufficient creosote "build-up" is permitted over an extended period of time.

Highly combustible in its solid and semi-liquid state, creosote is present in the unburnt gases given off by burning wood. Creosote may build up to a considerable thickness on the interior surface of the chimney and flue pipes, reducing the cross-sectional area through which air flows.

The amount of creosote deposited in the pipe and chimney depends on the amount of moisture in the flue gases, the temperature of the stack, and the extent to which the combustible elements in the flue gases have been burned during the combustion process.

Moisture in the flue gases can be controlled by using seasoned wood, mixing small pieces with a full load, and avoiding the use of only large wood when combustion is relatively slow.

When wood is burned slowly, it produces tar and other organic vapors, which combine with expelled moisture to form creosote. The creosote vapors condense in the relatively cool chimney flue of a slow-burning fire. As a result, creosote residue accumulates on the flue lining. When ignited, this creosote makes an extremely hot fire. The chimney connector and chimney should be inspected at least once every two months during the heating season to determine if a creosote buildup has occurred. If creosote has accumulated, it should be removed to reduce the risk of a chimney fire.

NOTE:

In the event of a chimney fire:
- Ensure the fire box door and ash tray door are fully closed
- Close the draft lever
- Close the manual damper on the stove pipe
- Call the fire department

10.2 Chimney Design

The chimney is one of the most important yet often neglected and misunderstood components of any solid fuel-burning installation.

CAUTION:

The chimney must be a class "A" chimney in good operating condition. Do not connect this unit to a chimney flue servicing another appliance.

There are two types of Class “A” chimneys

This stove must be connected to:

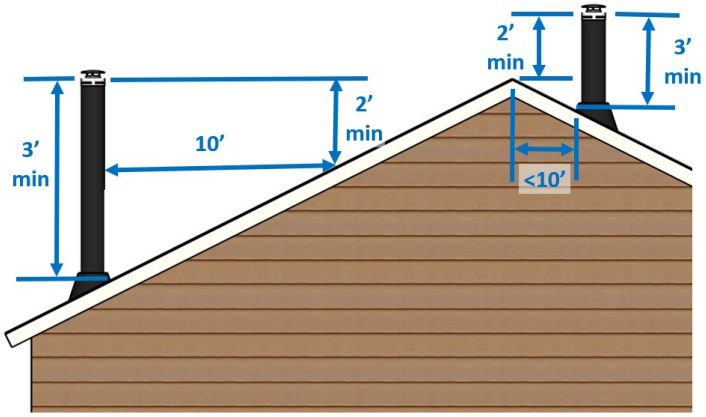
1. A chimney complying with the requirements for Type HT chimneys in the Standard for Chimneys, Factory-Built, Residential Type and Building Heating Appliance, UL 103, or
2. A code-approved masonry chimney with a flue liner.

CAUTION:

Never connect to an outside chimney unless it is sufficiently insulated to reduce the amount of condensation to a level that will not interfere with the exhaust of the flue gasses.

Always follow the 3-2-10 rule when determining how high the chimney needs to protrude out of the roof:

- The chimney’s shortest side must be at least 3 feet above the roof
- The chimney’s top must be at least 2 feet higher than any part of the building within 10 feet

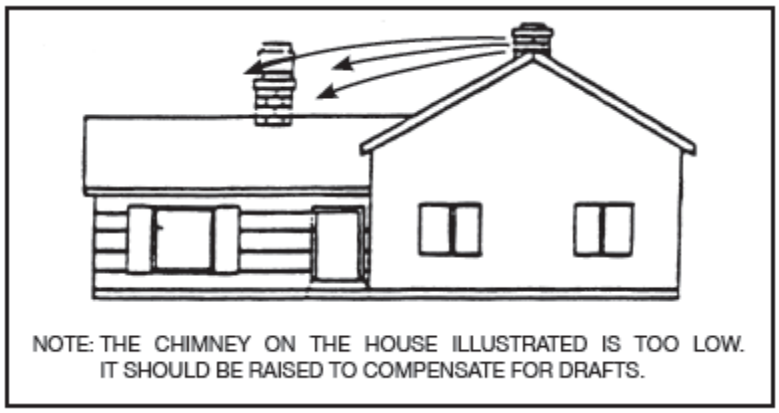


REASONS FOR INSUFFICIENT DRAFT READINGS:

1. Leaky Chimney – Air leaking in around a loose-fitting clean-out door, flue pipes not tight at the joints, improper plug openings, or defective masonry.

CAUTION: You must check your chimney flue pipe connector frequently when first starting to burn wood to determine the amount of chimney maintenance (cleaning) that will be required. This, of course, is also dependent on wood type, moisture, and, in general, how the stove/furnace is used.

2. Chimney Improper Height – Chimney does not extend through the roof to a sufficient height to promote sufficient draft, or causes a down-drafting condition to take place. See 3-2-10 rule above.
3. Obstructions – Obstructions in the chimney. Check the area before use by holding a mirror in the chimney cleanout door. This will give an inside view of the chimney.
4. Trees or other topographical barriers – Impeding the chimneys' operation or causing a down-draft condition to exist. This can also be caused by an adjacent building or the roof of the same structure where the chimney is not high enough (see figure below).



NOTE: THE CHIMNEY ON THE HOUSE ILLUSTRATED IS TOO LOW. IT SHOULD BE RAISED TO COMPENSATE FOR DRAFTS.

5. Chimney size – Chimney is not properly sized to fit the appliance adequately. It is either too small or too large—minimum Diameter – 6 inches.
6. Chimney Offsets – chimneys with offsets should not be used. They obstruct the draft and provide a place for debris to collect.
7. Elbow Restrictions – The flue pipe is connected to the chimney with too many elbows, reducing the draft that the chimney can provide.
8. Multiple Venting – When more than one (1) device vents into the same chimney flue.

When smoke rises into the chimney, it will do so in a spiraling path.

The most important thing to remember about chimneys is their need for maintenance and cleaning. If chimneys are not cleaned regularly, it affects the draft and increases the risk of a chimney fire.

If the chimney cannot maintain a constant draft, the unit will not operate as intended!

10.3 Best Wood for Burning

Generally, wood should be cut at least a year in advance and split adequately at that time.

This wood should also be stored out of the weather, if possible. If the wood is to remain outside, be sure to cover it with plastic, etc. This wood should be brought inside and stored there for at least two (2) weeks before it is fired to obtain top performance.

Soft woods burn at a faster rate per cord than do hard woods.

Know what types of wood to burn. Wood is a safe, clean, and economical fuel. Freshly felled wood is not suitable fuel due to the moisture content of the wood; well-seasoned wood is best for the proper production of heat. The following table provides the relative heating values of some commonly available woods.

Type	Weight Cord (#)	BTUs Per Cord Air-Dried Wood	Equivalent Value #2 Fuel Oil Gals.
White Pine	1800	17,000,000	120
Aspen	1900	17,500,000	125
Spruce	2100	18,000,000	130
Ash	2900	22,500,000	160
Tamarack	2500	24,000,000	170
Soft Maple	2500	24,000,000	170
Elm	2750	24,500,000	175
Yellow Birch	3000	26,000,000	185
Red Oak	3250	27,000,000	195
White Oak	3750	27,700,000	200
Hard Maple	3000	29,000,000	200
Hickory	3500	30,500,000	215

10.4 Useful Facts

No. 2 Fuel Oil	140,000	BTU/gallon
Natural Gas	100,000	BTU/therm
Propane Gas	93,300	BTU/gallon
Butane Gas	100,671	BTU/gallon
Electricity	3,413	BTU/kilowatt-hour

11 Troubleshooting

11.1 The stove is not burning properly (quick checks)

- Chimney draft is incorrect and is being restricted.
    - Remove the mesh from the chimney cap. It is not designed for modern wood-burning appliances, because it reduces your draft.
    - Chimney is too low. Increase chimney height. (see section 10.2)
    - Check for obstruction in the chimney and clean it to eliminate the obstruction.
- The hot room is airtight, and you don't have a dedicated air inlet for the stove. If this is the case, the stove will usually start burning more efficiently when you open the sauna door while it is operating. This is super easy to test. Have someone open and close the hot room door as usual. If you see movement of flame in your firebox, you need to create more airflow in your hot room. Add a dedicated air inlet for the stove to ensure it draws enough air.
- Using non-seasoned wood or pieces that are too large to burn well initially. Slightly larger pieces work much better after the stove has been preheated.
- Keep the front of the logs at least 1" away from the front of the stove (it's important not to block the airflow from the bottom-front on the inside of the stove). A gloved hand or the ash rake hook works well. Wood lengths of 14-15" are recommended for this stove.
- Follow stove maintenance instructions. (see section 6)

11.2 Overheating

- You operate with more wood than needed. Overheating won't typically be experienced until the reload. This is a gasification sauna stove. Once the stove is preheated (usually with one load of wood), any additional wood added will be gasified, a process quite different from that of other sauna stoves. Operate the draft control as intended and avoid burning the wood too quickly. It's essential to determine the exact BTU demand for your specific hot room and sauna style preference (trial and error). I can get really close to guessing the end temp based on how much wood I load initially and also on the reload.

11.3 Underheating

- Using non-seasoned wood or pieces that are too large to burn well initially. Slightly larger pieces work much better after the stove has been preheated.
- Incorrect-sized stove for the hot room. In this case, the stove may still be suitable for your hot room due to its efficiency. It will just take longer to get there.

11.4 Visible Smoke after 15 minutes

- Chimney is too low. Increase chimney height. (see section 4.1)
- Using non-seasoned wood or pieces that are too large to burn well initially. Slightly larger pieces work much better after the stove has been preheated.
- The draft inlet is blocked from the bottom front on the inside of the stove. Push the wood back with the ash rake and/or clean the inlet.
- Wood is smoldering – (bad start, it happens to everyone at some point). Ensure the draft control is wide open and/or try using the ashpan for a short time to improve airflow and help the wood burn well.