



# Heritage

(Model 8090)

**Pellet Stove**

## **OWNER'S MANUAL** Installation & Operating Instructions

Please read this entire owner's manual before installation and use of this pellet fuel burning room heater. To reduce the risk of fire, follow the installation instructions. Failure to follow these instructions could result in property damage, bodily injury, or even death.

**CONTACT LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION  
INSPECTION REQUIREMENTS IN YOUR AREA.**

**SAVE THESE INSTRUCTIONS FOR FUTURE REFERENCE!**



We recommend that our products be installed and serviced by professionals who are certified in the U.S. by NFI (National Fireplace Institute).

**[www.nficertified.org](http://www.nficertified.org)**

Tested &  
Listed By



Portland  
Oregon USA

OMNI-Test Laboratories, Inc.

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CozyCabin.com 518-623-4349

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# Introduction

Congratulations on your purchase of Hearthstone's Heritage pellet fired stove. The Heritage Pellet stove incorporates the latest in pellet burning technology, which will provide you with clean, efficient heat for years to come. Your decision to purchase a Hearthstone Heritage Pellet stove reflects a choice to purchase a premium product and a technology which is carbon neutral, meaning that operation of this stove will not introduce any "new" CO<sub>2</sub> into our atmosphere and minimizes your carbon footprint.

Burning pellets produces essentially the same amount of CO<sub>2</sub> that the same amount of wood decomposing in the forest would produce. Purchase of this product illustrates forward thinking and the thoughtfulness to purchase an environmentally responsible product.

Pellet fuel has proven to provide the cleanest burn of any solid fuel, exhausting an average well below the United States EPA wood burning limit. Your Hearthstone Heritage Pellet stove is certified at 1.3g/hr of particulate emissions, well below the EPA standard of 7.5 g/hr, making your stove not only beautiful, but extremely clean burning and efficient as well. This is because the combustion air is closely monitored and modulated by our on-board computer, which optimizes the burn efficiency.


If you have any questions, comments or concerns please contact your local Hearthstone authorized dealer. They are certified industry professionals and should always be consulted on the installation and operation of your Hearthstone appliance for premium performance and trouble free operation and installation.

Hearthstone Quality Home Heating Products offers the best warranty in the industry. Satisfied customers are our top priority.

## Important Notes

### Please Read this Owner's Manual

Please read this manual in its entirety before installing your stove, thoroughly reading and understanding this manual will help you operate and maintain this pellet heater to ensure years of efficient, economical use. Please operate your stove in accordance with the instructions in this manual. For your safety and trouble free operation, observe a few simple safety precautions and perform some minimal maintenance. The unit will remain appealing while providing years of quality performance.

 **WARNING: ENSURE ONLY A HEARTHSTONE DEALER OR AN NFI CERTIFIED PELLET SERVICE TECHNICIAN INSTALLS, AND REPAIRS THIS APPLIANCE. A QUALIFIED SERVICE TECHNICIAN MUST INSPECT THE APPLIANCE BEFORE USE, AND AT LEAST ANNUALLY.**

 **WARNING: REGULAR CLEANING IS REQUIRED OR ASH BUILDUP IN THE FIRE BOX COULD IMPEDE OPERATION. IT IS IMPERATIVE THAT THE CONTROL COMPARTMENTS AND CIRCULATING AIR PASSAGES OF THE APPLIANCE ARE KEPT CLEAN AND FREE OF OBSTRUCTIONS. THIS IS NOT A SET AND FORGET APPLIANCE! (S'ASSURER QUE LE BRÛLEUR ET LE COMPARTIMENT DES COMMANDES SONT PROPRES. VOIR LES INSTRUCTIONS D'INSTALLATION ET D'UTILISATION QUI ACCOMPAGNENT L'APPAREIL.)**

 **NEVER BURN PAPER, WOOD OR OTHER MATERIALS**

The Heritage Pellet is a pellet fuel burning heater and is designed to burn premium natural wood pellets only. Never burn any fuel not intended for use with this unit.

### Hot Surfaces

Certain exposed surfaces of the Heritage will reach high temperatures during normal operation. Clearances to combustibles must be maintained, as specified in the "Clearances to Combustibles" section of this manual.



 **DUE TO HIGH TEMPERATURES LOCATE THE APPLIANCE OUT OF TRAFFIC AND AWAY FROM FURNITURE, DRAPERIES, CLOTHING AND FLAMMABLE MATERIALS. AS A GENERAL RULE, KEEP ALL COMBUSTIBLES 36 INCHES AWAY.**

Alert children and adults to the hazards of high surface temperatures and the need to stay away to avoid burns to skin or clothing ignition.

## Introduction

Ensure young children are carefully supervised when in the same room as the appliance. Do not place clothing or other flammable material on or near the appliance. (surveille les enfants. Garder les vêtements, les meubles, l'essence ou autres liquides a vapeur inflammables lin de l'appareil.)

### Fire Hazard

-  In the unlikely event of a soot, or creosote fire – leave the front door closed and shut the unit off. Have the unit and venting inspected before further use.
-  Do not store or use gasoline or other flammable vapors or liquids in the vicinity of this appliance. Locate stove out of traffic and away from furniture, draperies, clothing, and flammable material.

Specifications

LISTED AS: Pellet-Fired Direct-Vent Fireplace Heater

Model: Heritage Pellet (8090)

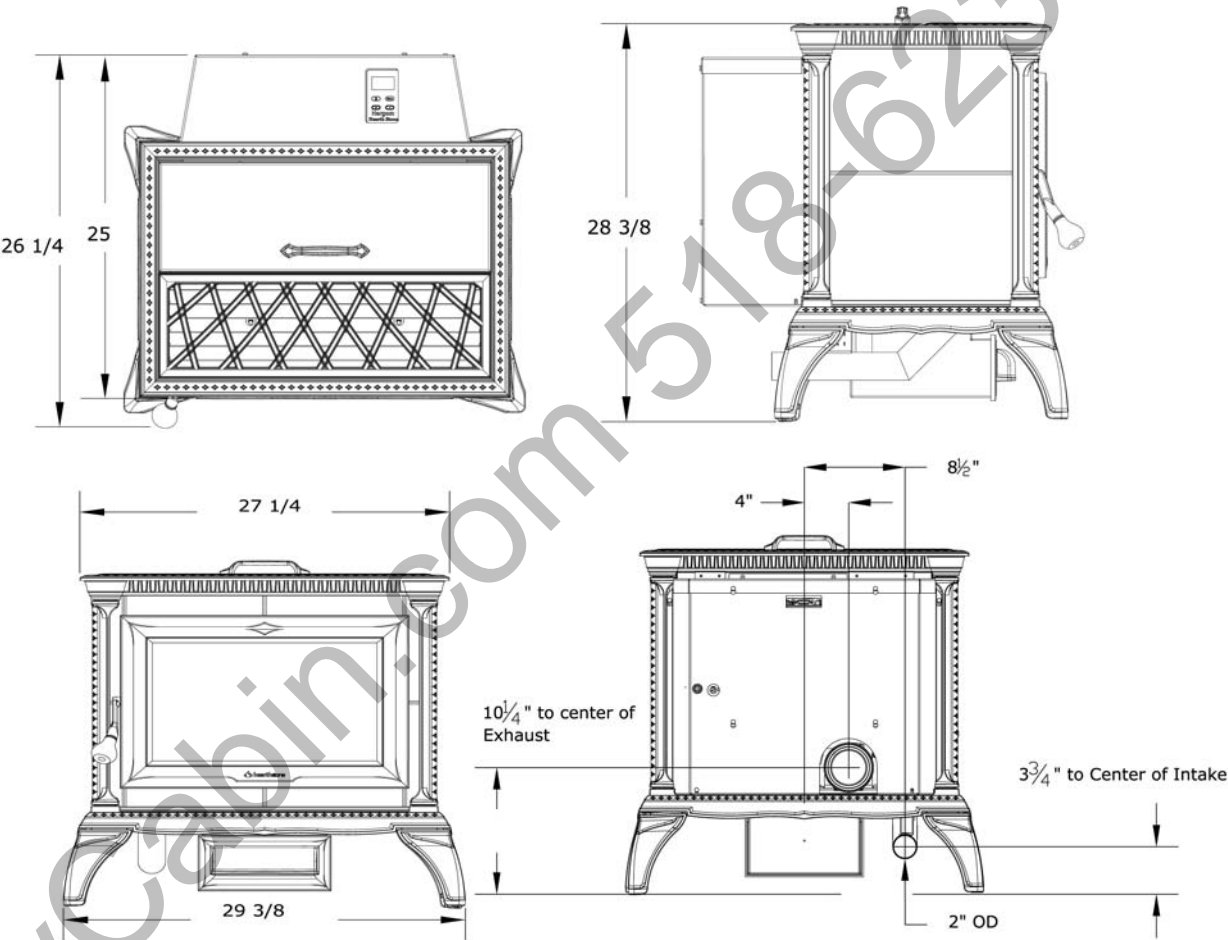
Testing Agency: OMNI-Test Laboratories, Inc.

Tested to:

- ASTM E 1509 Standard Specification for Room Heaters, Pellet Fuel-Burning Type
- ULC/ORD-C1482 Requirements for Space Heaters for Use with Particulate Solid Fuels
- ULC-S627 Space Heaters for Use with Solid Fuels

Report No.: 261-S-04-2 Certified for US and Canada

Approved for Mobile Home Installation



Output Specifications

% max burn	lbs/hr	BTU's*	Hours of burn, 40lb
30	1.8	15,300	22.2
45	2.7	22,950	14.8
70	4.2	35,700	9.5
100	6.0	51,000	6.7

\*BTU measurements assume 8,500 btu/lb. Lower quality fuel will reduce heat output and overall performance.

# Specifications

## General Specifications

Stove Weight.....	325 lbs
Pellet Hopper Capacity.....	50 lbs*
Approximate Heating Ability (sq ft).....	up to 2000 sq ft^
Burn Rate (lbs/hr).....	1.8 – 6.0 lbs/hr
Fuel.....	PFI certified premium or better Wood Pellets
<i>(Refer to Appendix A)</i>	
EPA Certified Particulate Emissions.....	1.3g/hr
<i>(EPA Standard – 7.5 g/hr)</i>	

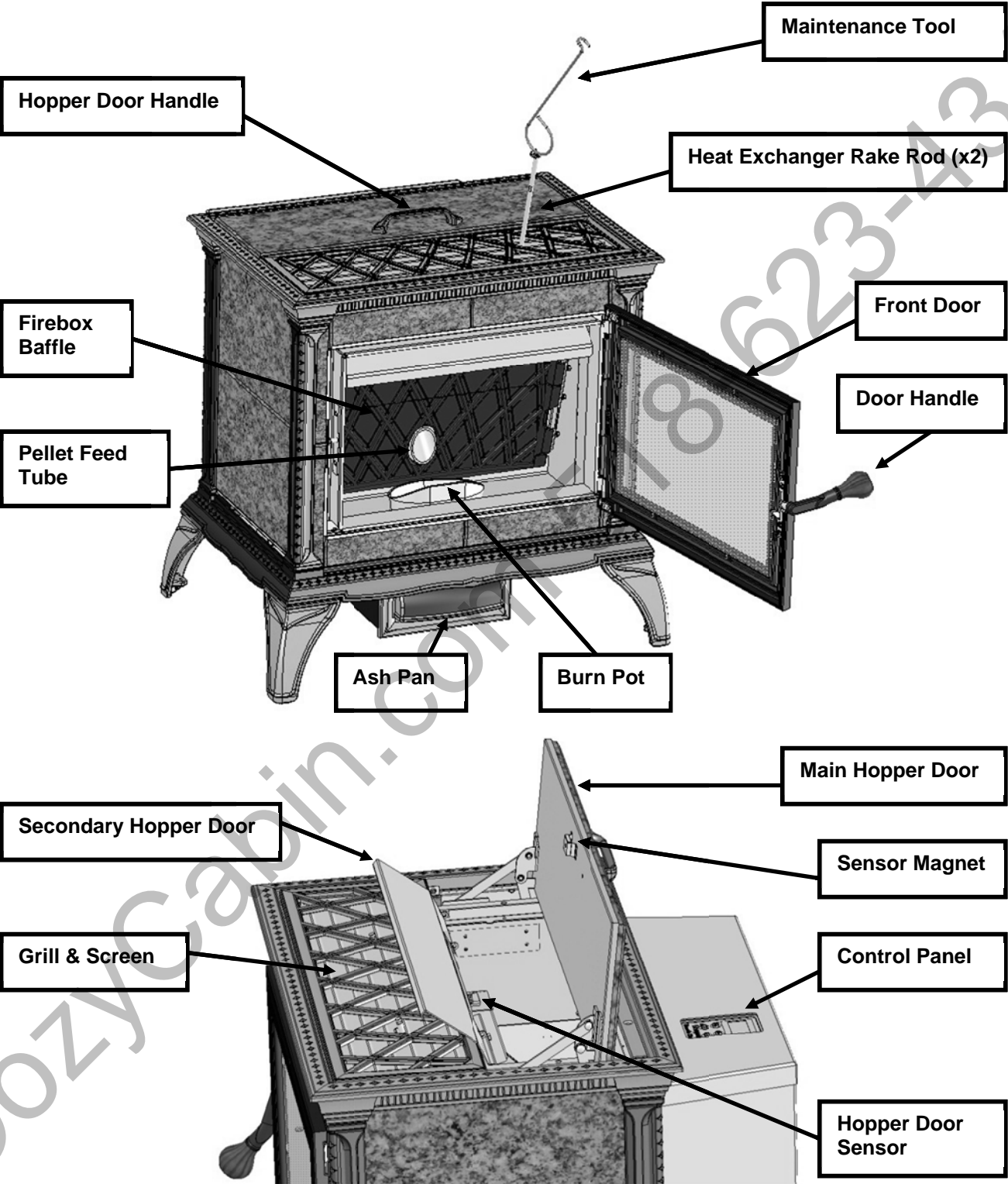
## Electrical Specifications

Electrical Rating.....	120 V.A.C. 60Hz, 4 Amps
<i>(A grounded surge protector is recommended to protect the circuit board. If the voltage entering your home is below 116 volts your stove may not work properly. Ensure that the polarity of the outlet that the stove is plugged into is correct.)</i>	
Watts used (startup) (approx).....	400 Watts
Watts used (max/high burn) (approx).....	110 Watts
Watts used (min/low burn) (approx).....	70 Watts

\*All void spaces in hopper filled.  
^Dependent on energy efficiency of structure, fuel quality, user operation, and your installation.

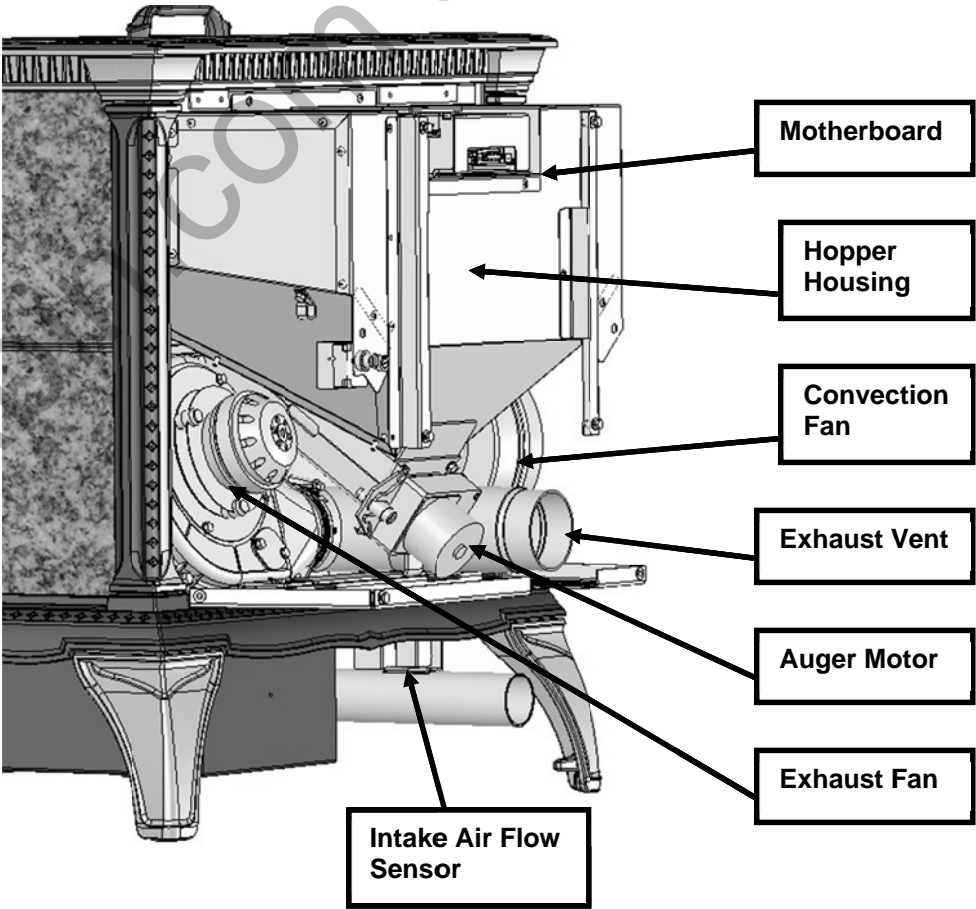
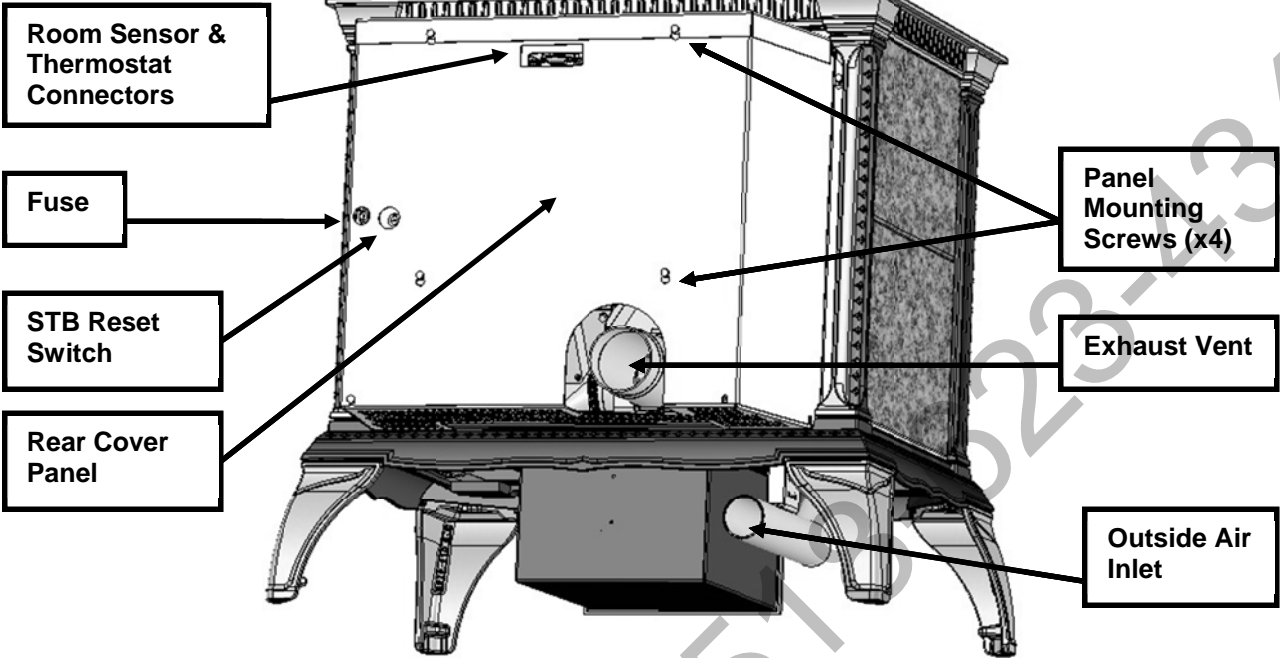
# Components

Components and features:





# Components



# Installation

## Packing list

- 1- Heritage Model 8090 Pellet Stove
- 1- Wired Room Sensor
- 1- Maintenance Tool
- 1- 5/64" Hex Wrench
- 1- Owner's Manual
- 1- Warranty Card

## Unpacking your Stove

Hearthstone packages your Heritage Pellet stove with the greatest care so that it ships safely. However, damage can still occur during transit and handling. When you receive your stove, immediately unpack and inspect it carefully, checking all parts for damage. Also, ensure all parts listed are included in the box. If any parts are damaged or missing, please contact your dealer immediately. We recommend that installation and repair of this Hearthstone pellet stove only by a qualified Hearthstone dealer. We recommend inspection of the stove and venting before use and at least annually by a qualified service person. Periodic cleaning is required throughout the heating season and at the end of each winter for the stove to work safely and efficiently.

- 🔥 Remove retaining clips from pallet; retain them if this is a mobile home installation (see page 12).

## Installation Preparation

- 🔥 Have a certified dealer install this heater. If you install the heater yourself, have your dealer review your installation plans. Adhere to all codes. Local codes take precedence if more stringent than federal codes.
- 🔥 Plan and sketch your installation, ensure all necessary requirements are met
- 🔥 Ensure you consider all structural framing members (studs, joists, rafters etc.) in your installation. Slight adjustments in placement consideration may significantly ease installation.
- 🔥 In order to avoid any odors associated with the initial burn, we suggest you burn the stove on high in an outdoor location for 30 minutes. This will allow paint to cure and any debris to burn off, greatly reducing or eliminating smells associated with stove break-in inside your home.
- 🔥 Ensure you consider access to the unit for cleaning when selecting an installation configuration.

## Hearth Requirements & Floor Protection

Ensure you protect combustible flooring (such as wood, carpet, vinyl) with a covering of any approved noncombustible material (metal, tile, stone, glass, etc.). The Heritage Pellet Stove does not require an R rated insulated hearth pad. The floor protection must extend beyond the body of the stove at the minimum as follows:

- 🔥 2 inches beyond either side of the top of the stove
- 🔥 6 inches beyond the front of the stove

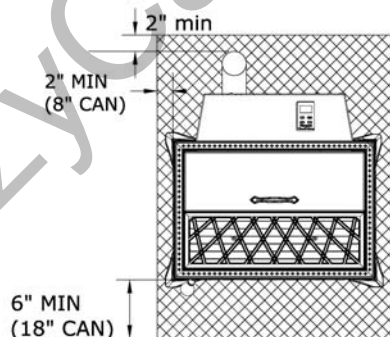


Figure 1 – Hearth with Vertical Venting

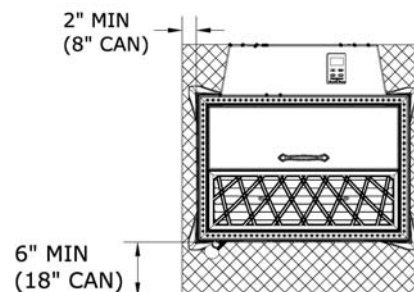


Figure 2 – Hearth with Horizontal Venting

# Installation

## Clearance to Combustibles

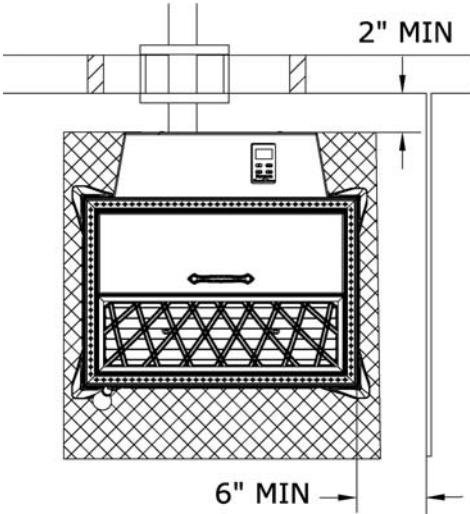


Figure 3 – Side and Rear Clearances

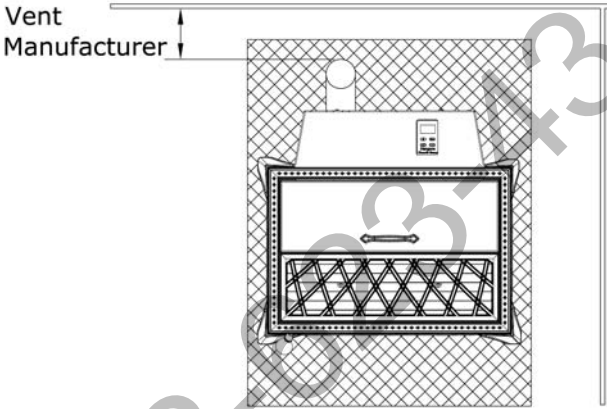


Figure 4 – Vertical Vent Clearance

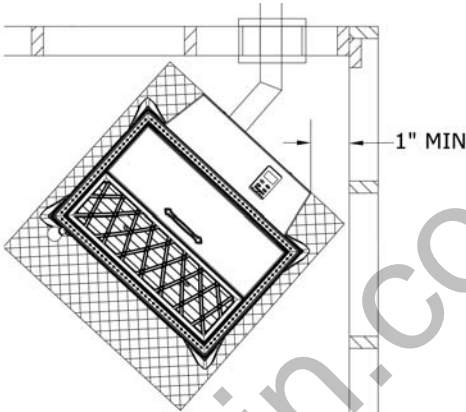


Figure 5 – Corner Clearances Horizontal Vent

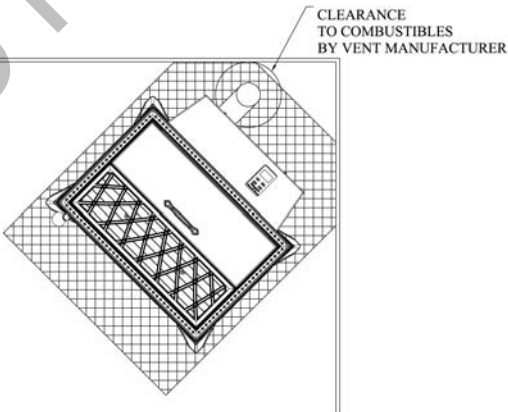


Figure 6 – Corner Clearance with Vertical Vent

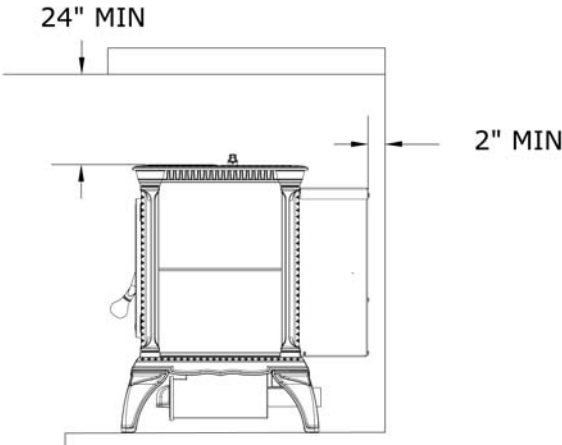
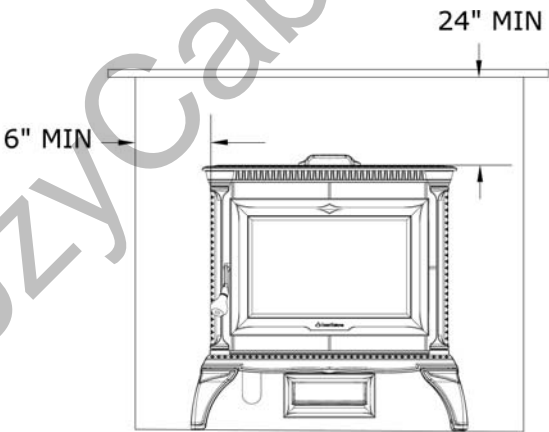


Figure 7 – Alcove Clearances

# Installation


## *Manufactured & Mobile Home Installations*

 **WARNING: DO NOT INSTALL IN SLEEPING ROOM.**

 **CAUTION: ENSURE YOU MAINTAIN THE STRUCTURAL INTEGRITY OF THE HOME FLOOR, WALL, AND CEILING/ROOF.**

**When installing this unit in a manufactured or mobile home, there are several mandatory requirements to follow:**

1. You must bolt the stove to the floor. Accomplish this using the clips (PN 5532-012), and lag screws (5/16x1-3/4") used to attach the stove to the pallet for shipping.
2. You must connect the stove to outside air. (See page 16).
3. You must ensure that the outside air inlet remains clear of any objects, leaves, icing, snow or other debris. Keep the inlet away from any exhaust fans. The inlet requires an adequate amount of ventilation. If the inlet becomes restricted during operation, the unit may starve for air, which may cause smoke spillage and an inability to maintain a proper fire. This smoke may set off smoke detectors in your home.
4. You must remove venting when transporting the mobile home.
5. Use silicone to create an effective vapor barrier at the location where the chimney or other component penetrates to the exterior of the structure.

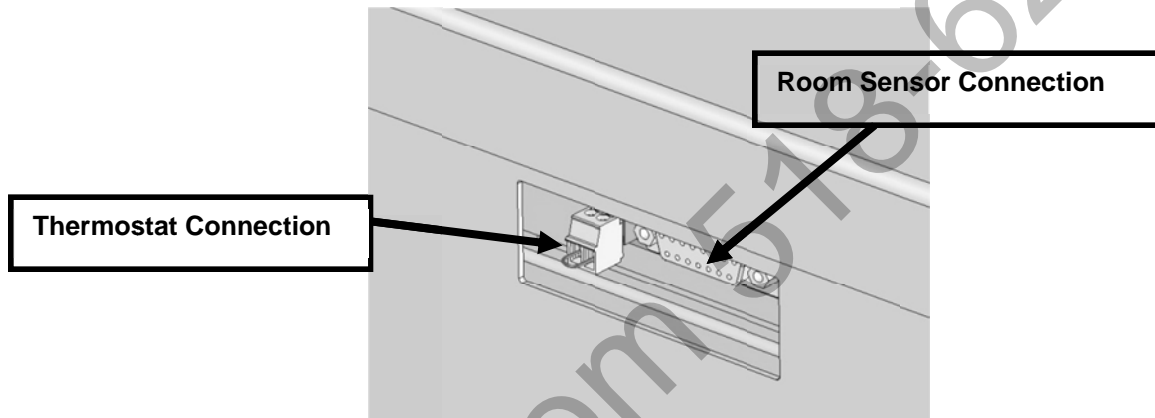
 **Important:** Use all specified components and methods for the installation. Do not use components that are not specified in this manual. Failure to use specified components and methods could void your warranty, and can cause malfunction or damage to the unit or structure.

# Installation

## Room Sensor Installation

We recommend you install your Heritage Pellet stove with the provided room sensor for optimum efficiency and comfort. The room sensor is a wired remote temperature probe for the stove's electronic control system. With the room sensor, the control system can efficiently regulate the stove's rate of burn to keep a more consistent room temperature and level of comfort. The room sensor gives you the option to use the Automatic and Programmable modes of operation (See Page 28).

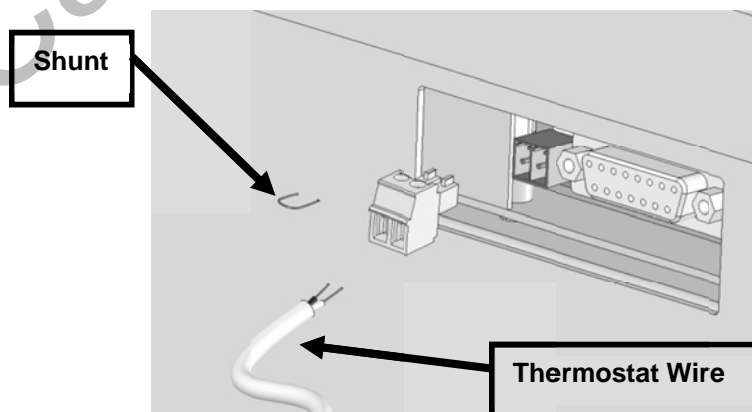
1. Locate the room sensor as you would a regular thermostat. Do not install near the stove. Avoid other sources of heat such as sunny walls, and appliances such as televisions or refrigerators. Avoid placing near, or in unusually cool areas such as windows, entry areas, or on exterior walls.
2. Install the sensor's wiring carefully – if concealing the wiring, ensure it is properly secured and protected from future damage.
3. Once the room sensor and wiring are properly installed, connect the sensor's wiring to the 15 pin connector on the back of the unit.



## Optional Thermostat Installation

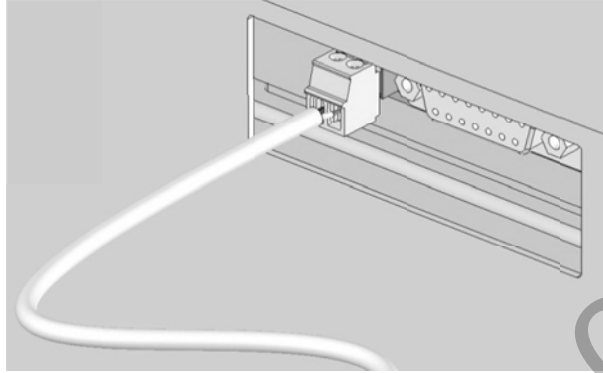
You can purchase your own thermostat for use with the Heritage Pellet stove. Ensure the thermostat is properly located and the wiring properly installed to maximize the efficiency of the unit. Any UL approved milli-volt thermostat will operate this stove. In Thermostat Mode, the thermostat will turn the stove on and off, but will not automatically vary the rate of burn. You must regulate the rate of burn manually.

1. Locate the thermostat connection (see image above), and remove the connector from the stove.
  2. Use a small flat tip screwdriver – loosen the screws and remove the shunt.
- 🔥 Note: do not connect the Room Sensor if using a thermostat.



## Installation

3. Remove a small length of the cover from the thermostat wire. Strip approximately ¼ inch insulation off the wires. Insert one wire on each side of the connector – tighten the screws.
4. Insert the connector into the connection port.



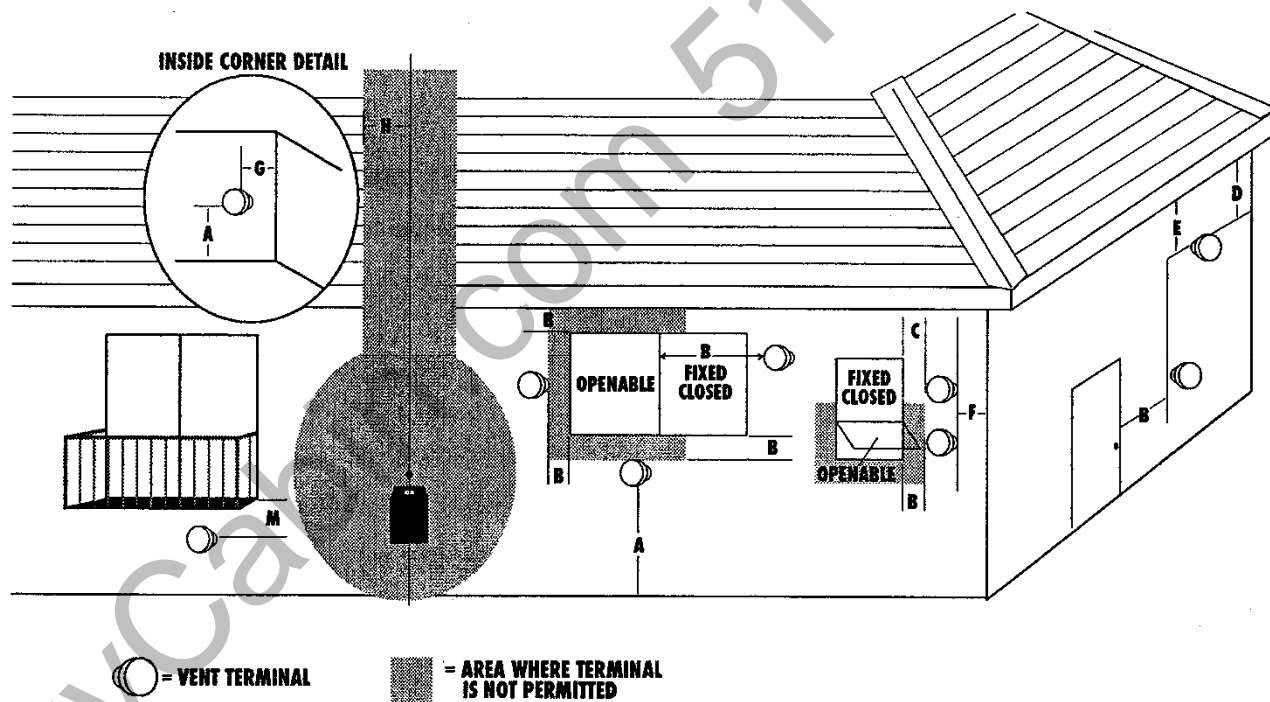
5. Connect the stove to a grounded 120 volt receptacle, and set the stove to Thermostat Mode (See Page 28).

## Venting

**Note:** Only 3" or 4" L or PL venting is approved for use on this stove. We recommend you use 4" venting for optimal performance.

- 🔥 **DO NOT INSTALL A FLUE DAMPER IN THE EXHAUST VENTING SYSTEM OF THIS UNIT.**
- 🔥 **DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE.**
- 🔥 **INSTALL VENTING AT CLEARANCES SPECIFIED BY THE VENT MANUFACTURER.**
- 🔥 **A CHIMNEY CONNECTOR SHALL NOT PASS THROUGH AN ATTIC OR ROOF SPACE, CLOSET OR SIMILAR CONCEALED SPACE, A FLOOR, OR A CEILING.**
- 🔥 **CAUTION: DO NOT CONNECT TO ANY AIR DISTRIBUTION DUCT OR SYSTEM.**
- 🔥 **WHERE PASSAGE THROUGH A WALL OR PARTITION OF COMBUSTIBLE CONSTRUCTION IS REQUIRED, THE INSTALLATION SHALL CONFORM TO CAN/CSA-B365.**
- 🔥 **ENSURE YOUR INSTALLATION PROVIDES SUFFICIENT COMBUSTION AIR FOR THIS UNIT. DO NOT RELY ON ROOM AIR FOR COMBUSTION – USE OF AN OUTSIDE AIR KIT RECOMMENDED.**

### Exterior venting requirements



**A-** The clearance above grade must be a minimum of 18". When venting terminates above a paved sidewalk or driveway on public land, termination must be at least 7 feet above grade.

**B-** The clearance to a window or door that can be opened must be a minimum of 48" to the side and 48" below the window/door, and 18" above the window/door.

**C-** A 12" clearance to a permanently closed window is recommended to prevent condensation on the window.

**D-** The vertical clearance to a ventilated soffit must be a minimum of 12"

**E-** The clearance to an unventilated soffit must be a minimum of 12"

**F-** The clearance to an outside corner is 11"

**G-** The clearance to an inside corner is 12"

## Venting

**H-** A vent must not be installed within 2 feet above a meter/regulator assembly when measured from the horizontal centerline of the regulator

**M-** The clearance under a veranda, porch, deck or balcony must be a minimum of 12".

The minimum horizontal clearance to vegetation and other exterior combustibles such as mulch is 36" as measured from the center of the outlet or termination cap. This 36" radius continues to grade up to a minimum of 7 feet below the outlet.

The longer the vent pipe and more elbows used in the system, the greater the flow resistance. Therefore, we recommend using as few elbows as possible, and 15 feet or less, of vertical vent pipe. The maximum horizontal run should not exceed 10 feet. If more than 15 feet of pipe, or two 90° elbows are required, vent pipe size should increase to 4", as larger piping offers less flow resistance.

Please note that pellets are a wood product and soot may occur during startup while the firebox approaches sufficient temperature to sustain complete combustion of fuel.

**Soot and Flyash: Formation and Need for Removal-** The products of combustion will contain small particles of flyash. The flyash will collect in the exhaust venting system and restrict the flow of the flue gases. Incomplete combustion, such as occurs during startup, shutdown, or incorrect operation of the room heater will lead to some soot formation which will collect in the exhaust venting system. The exhaust venting system should be inspected at least once every year to determine if cleaning is necessary.

Your Hearthstone appliance can handle up to 10 feet or equivalent of horizontal venting. Please follow venting manufacturer's recommendations and required installation procedures. All joints for connector pipe shall be required to be fastened with at least three screws. If vented horizontally, joints shall be made gastight with at least three screws and high temperature silicone.

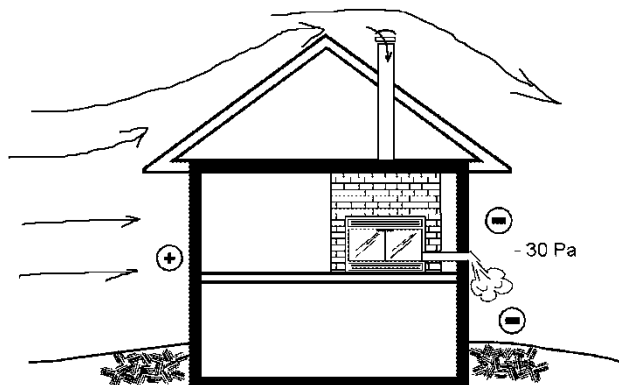
Before considering your installation to be complete, perform a leak test on your venting. Leaks are easiest to see during startup. Look for leaks at the vent pipe joints. Use of an incense stick is recommended to find leaks.

## Outside Air

 **WARNING: CONNECT THE STOVE TO OUTSIDE AIR WHEN REQUIRED!**

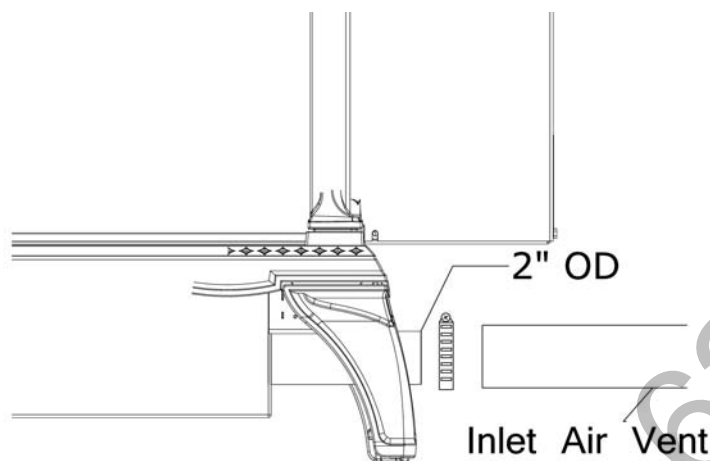
We recommend you connect your Heritage Pellet Stove to an outside air source to achieve the most efficient and productive operation. If using an existing masonry chimney for exhaust venting and using outside air feature, ensure make-up air draws from the side of the building most likely to experience direct wind pressure (upwind side). You can use a coaxial venting configuration (direct vent) if environmental negative pressure is a problem in your installation (see illustration below). This situation becomes less likely the closer the make-up and exhaust air piping are to each other.

Never draw outside air from an enclosed space (garage, unventilated crawl space, etc), as this would create a negative pressure situation and potentially starve your appliance of combustion air, creating more soot and reducing performance efficiency.





## Venting

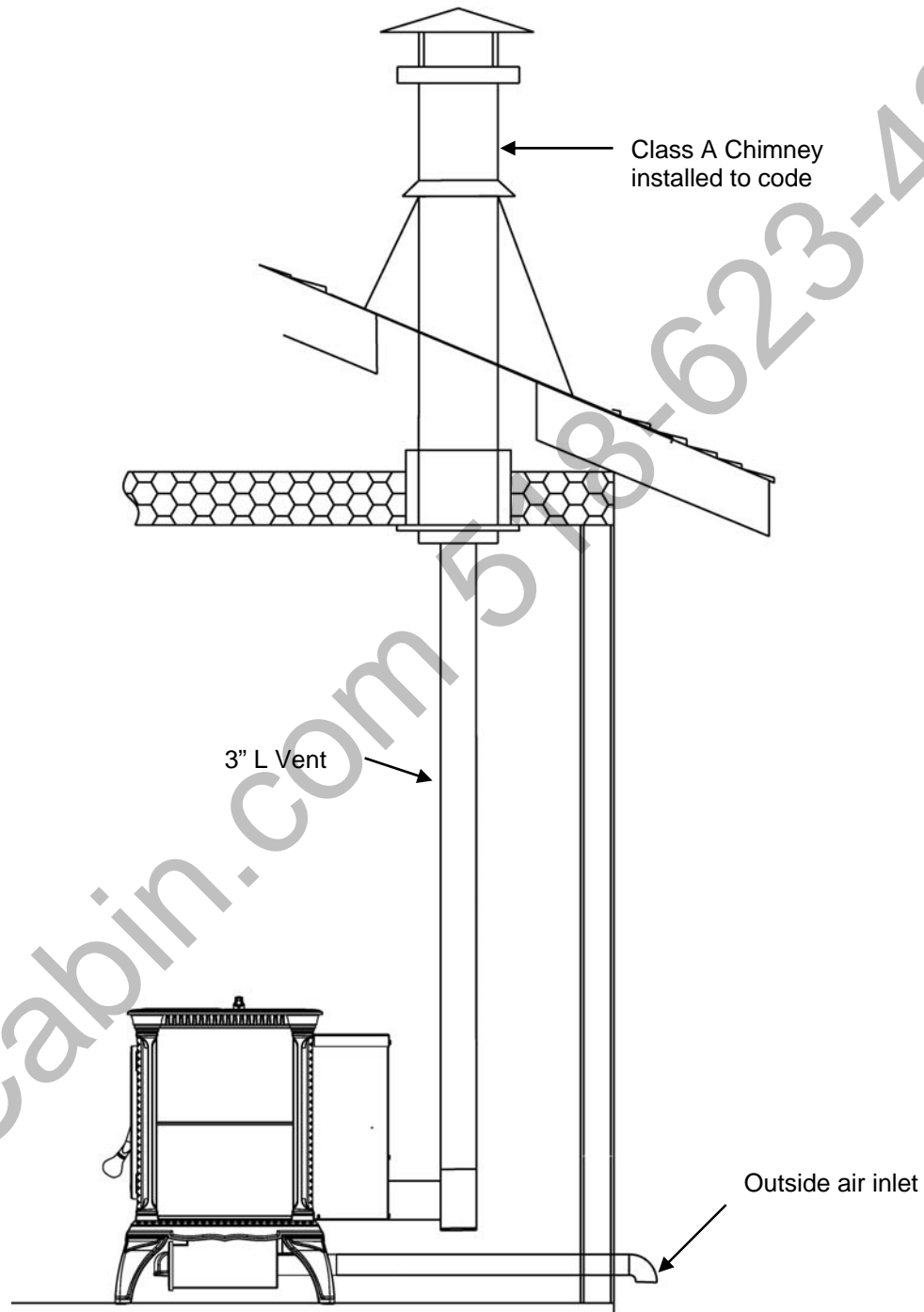


**Figure 8 – Outside Air Attachment**

- 🔥 2" diameter supply pipe for outside air must not be longer than six feet. Increase diameter of vent pipe to 3 or 4 inches if exceeding 6 feet in length.
- 🔥 Use a metal hose clamp or equivalent to secure supply air pipe to stove.

# Venting

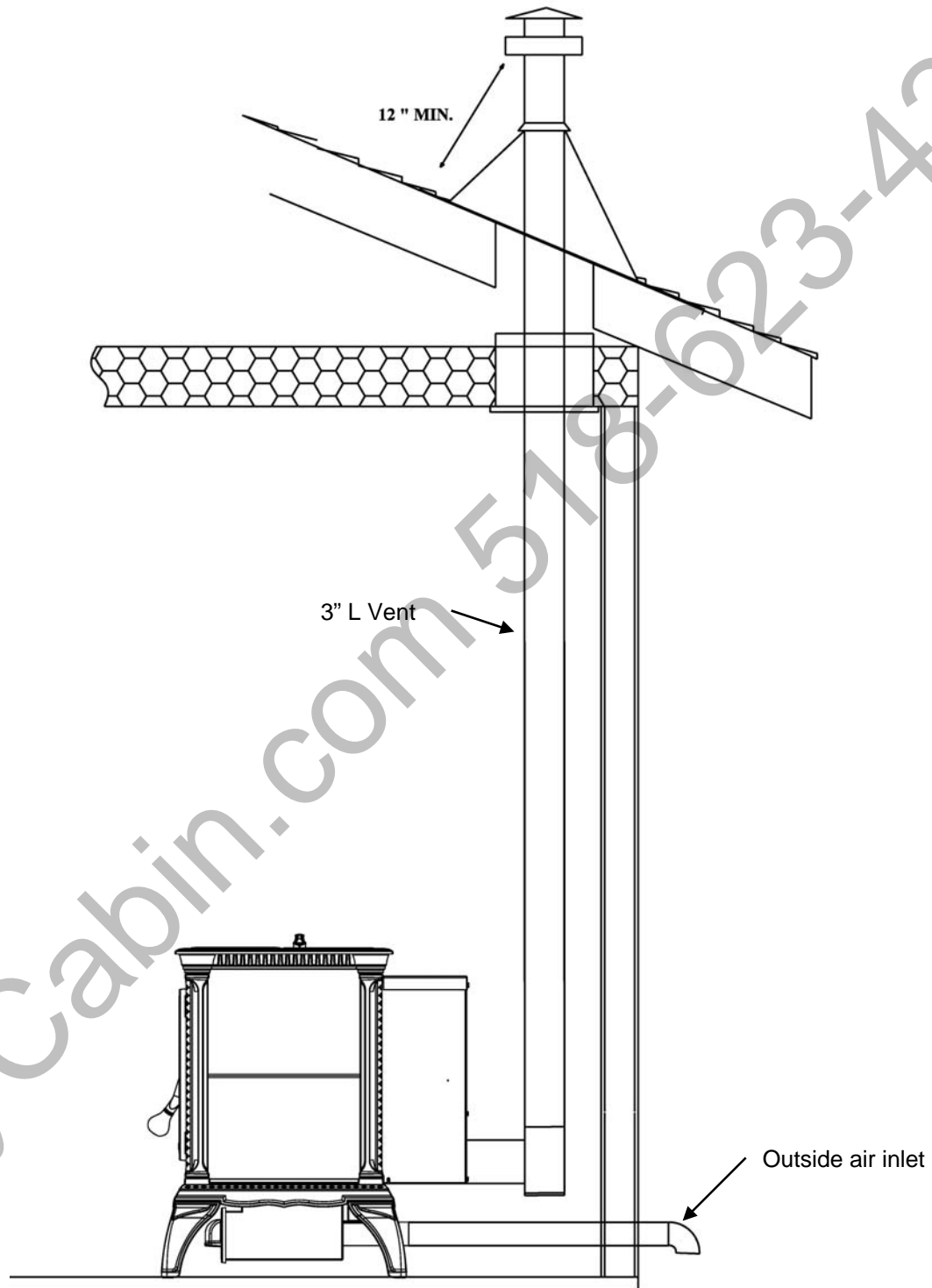
## INSTALLATION EXAMPLE: CLASS A CHIMNEY



- 🔥 Use this installation when the pellet stove replaces an existing wood stove with a Class "A" chimney.
- 🔥 Use 4" L vent if over 15' of vertical L venting is installed.

## Venting

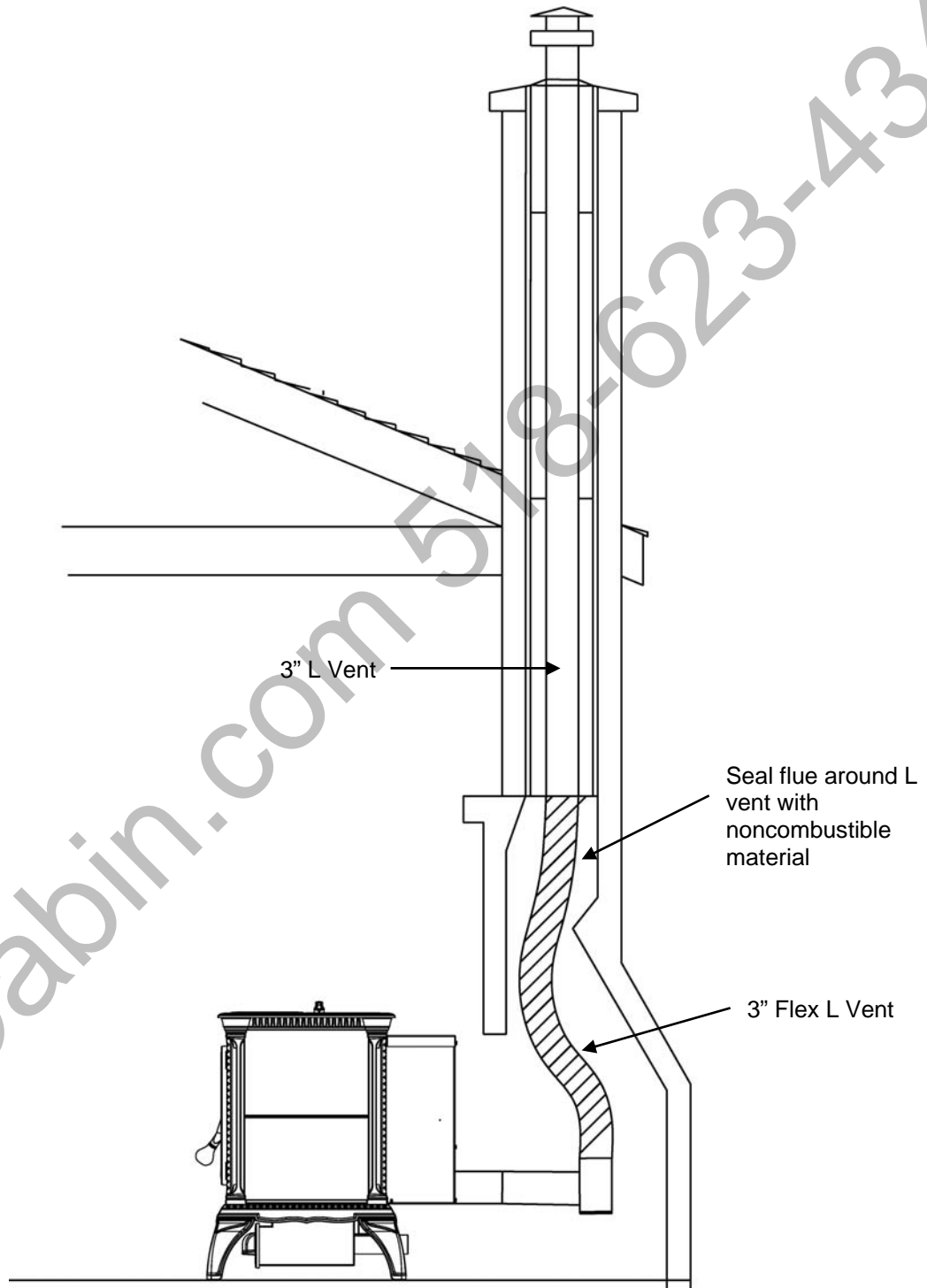
### INSTALLATION EXAMPLE: VERTICAL L VENT THROUGH THE CEILING AND ROOF



- 🔥 Use this vent configuration on new installations where there are limitations to venting out the side wall.
- 🔥 Use 4" L vent if installing over 15' of vertical L venting.

## Venting

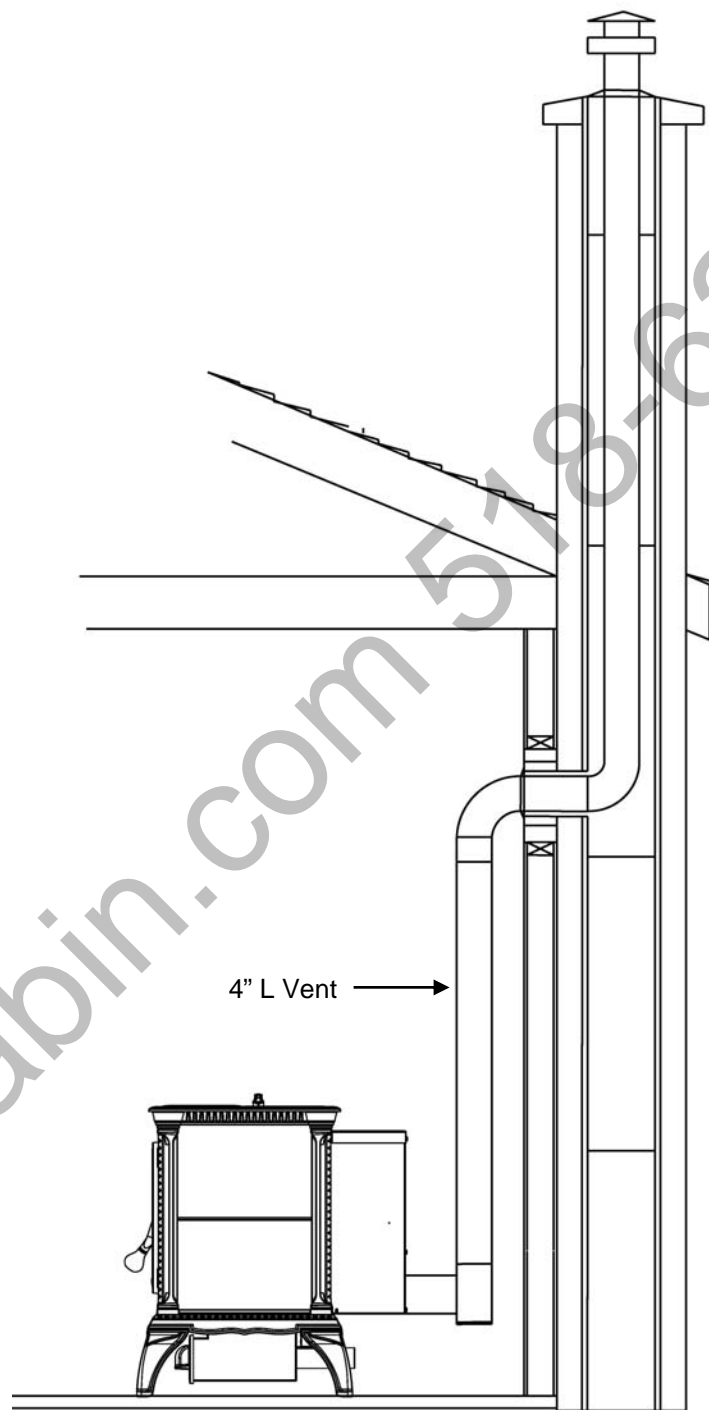
### INSTALLATION EXAMPLE: EXISTING MASONRY FIREPLACE CHIMNEY



- 🔥 Typical installation for use with an existing Masonry Fireplace Chimney.
- 🔥 Use 4\" L vent if installing over 15' of vertical L venting.

## Venting

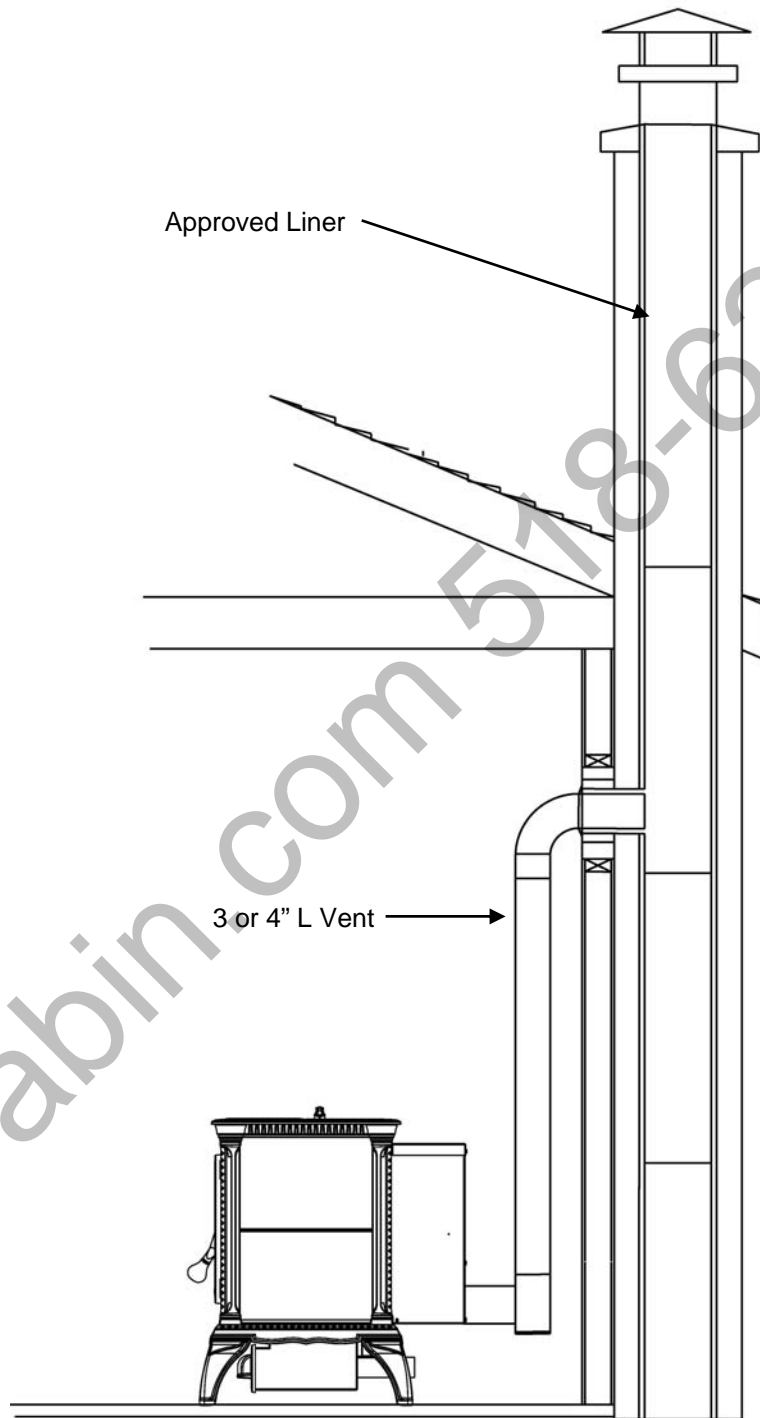
### INSTALLATION EXAMPLE: EXISTING MASONRY CHIMNEY



🔥 Installed into an existing masonry chimney with a full-length 4" L vent liner.

# Venting

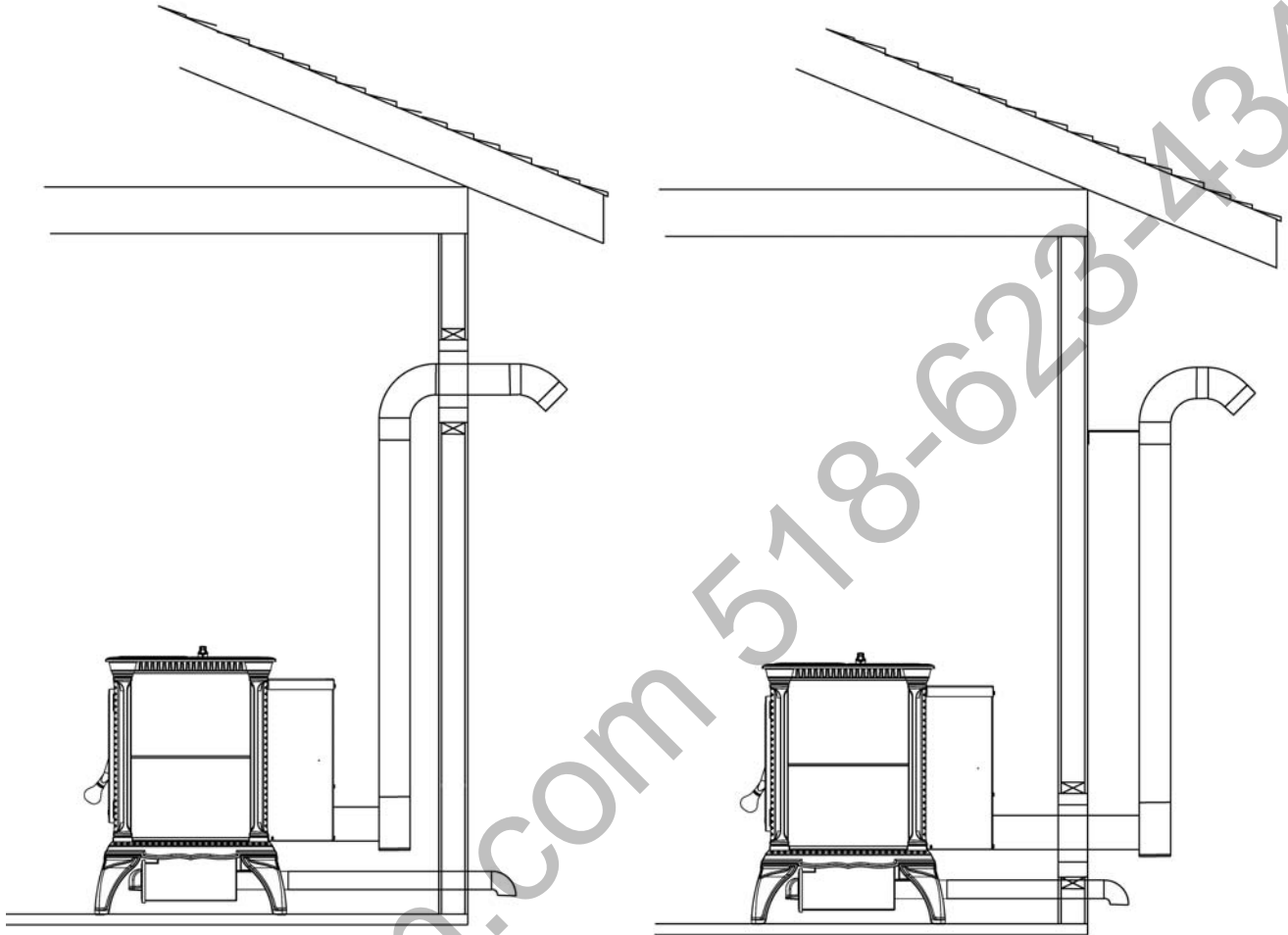
## INSTALLATION EXAMPLE: EXISTING MASONRY CHIMNEY



- 🔥 Installed into an existing masonry chimney with no L Vent liner (chimney must have other approved liner in good condition, and a working clean-out).
- 🔥 3" or 4" L vent is acceptable.

## Venting

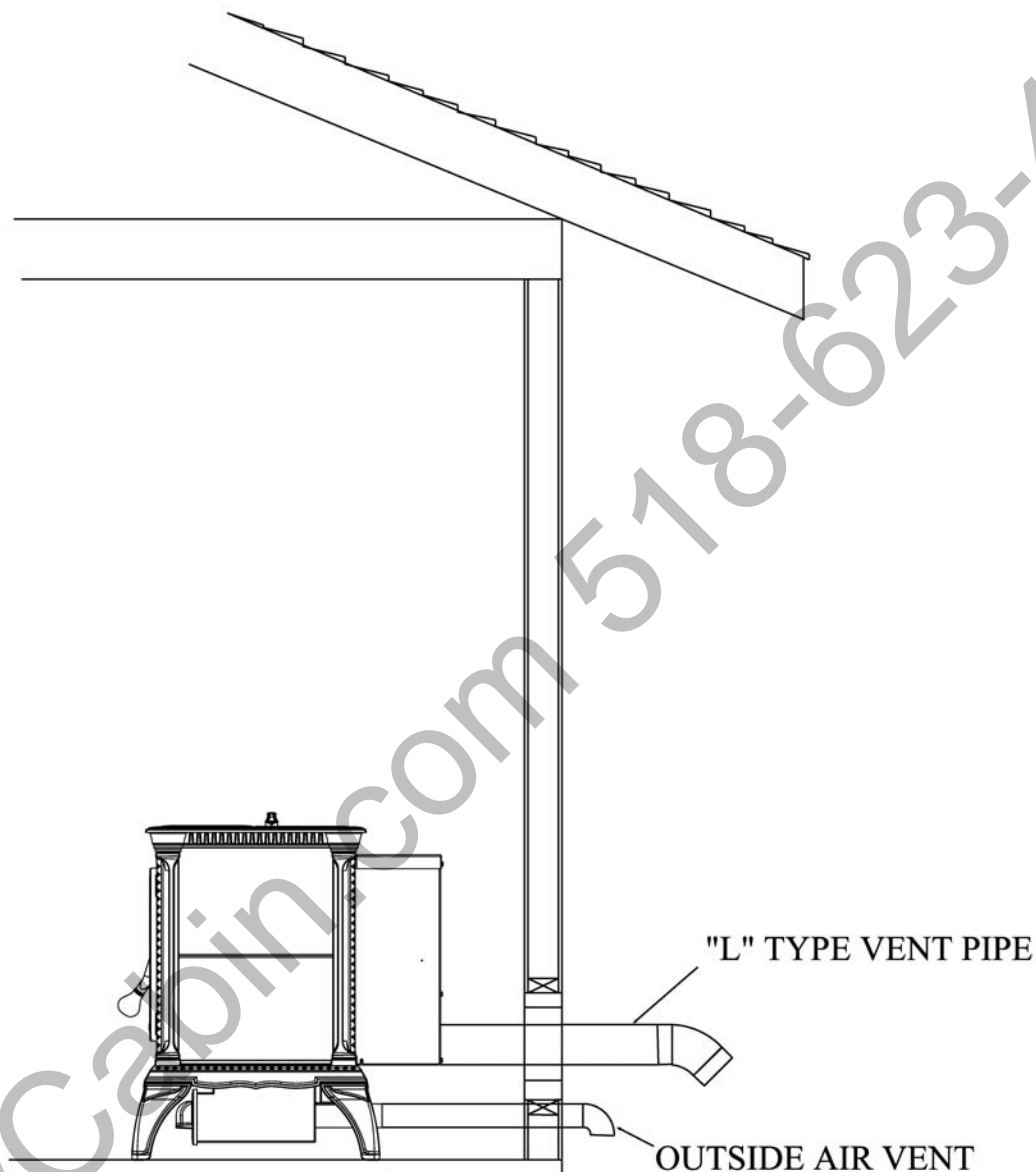
### INSTALLATION EXAMPLE: CO – LINEAR DIRECT VENTING WITH VERTICAL RISE



- 🔥 Use these configurations to minimize the chance of smoke spillage in the room during a power outage. This vent configuration will generate its own draft. There must not be any combustible material within 36" of the outlet and the termination must be at least 18" above ground level.

## Venting

### INSTALLATION EXAMPLE: CO- LINEAR DIRECT VENTING WITH NO VERTICAL

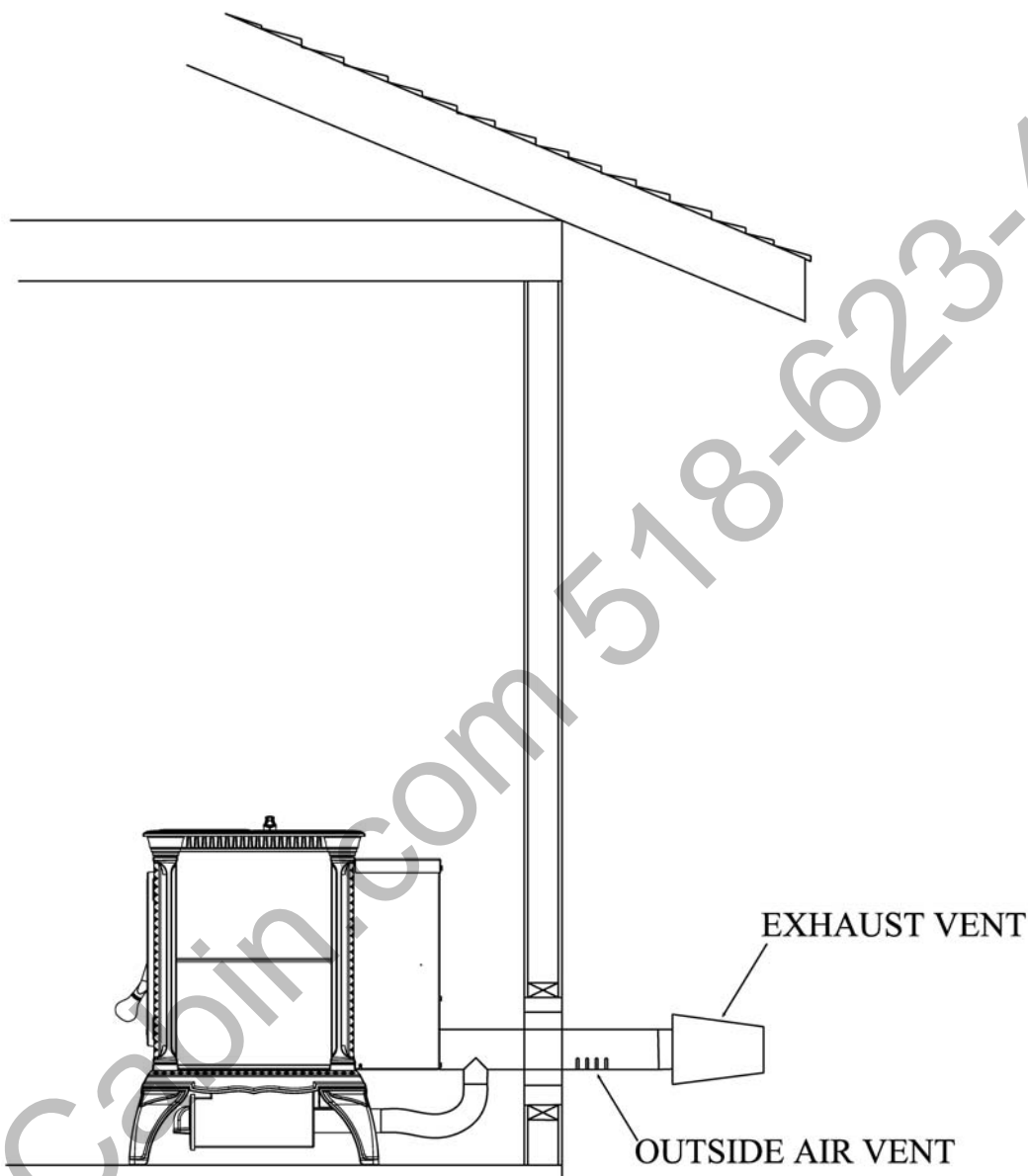


- 🔥 Use of this method is acceptable as long as there is no combustible material within 36" of the termination, and the termination is at least 18" above grade.
- 🔥 There may be smoke spillage into the room if there is a power outage. The outside air vent is recommended to reduce this chance.
- 🔥 **NOTE:** As your heritage pellet stove is power vented, you can install it (with consideration to exterior clearances) with this horizontal only exit configuration. However, we recommend a vertical rise of 5 feet minimum in case of a power outage when some smoke may back up into your heated space. Without any natural draft, the stove will smoke in this situation. However, the smoke will stop within 10 minutes.















# Venting

## INSTALLATION EXAMPLE: COAXIAL DIRECT VENTING



- 🔥 Use of this method is acceptable as long as there is no combustible material within 36" of the termination, and the termination is at least 18" above grade.
- 🔥 There may be smoke spillage into the room if there is a power outage. The outside air vent must be connected to reduce this chance.
- 🔥 **NOTE:** As your heritage pellet stove is power vented, you can install it (with consideration to exterior clearances) with this horizontal only exit configuration. However, we recommend a vertical rise of 5 feet minimum in case of a power outage when some smoke may back up into your heated space. Without any natural draft, the stove will smoke in this situation. However, the smoke will stop within 10 minutes.

# Operation



-  **CAUTION: HOT WHILE IN OPERATION! KEEP CHILDREN, CLOTHING, AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS.**
-  **CAUTION: DO NOT USE CHEMICALS OR FLUIDS TO START THE FIRE.**
-  **CAUTION: DO NOT BURN GARBAGE, FLAMMABLE LIQUIDS SUCH AS GASOLINE, NAPHTHA, OR ENGINE OIL.**
-  **CAUTION: THIS UNIT IS DESIGNED TO BURN ONLY PREMIUM NATURAL WOOD PELLETS. DO NOT BURN ANY OTHER MATERIAL NOT DESIGNATED AS WOOD PELLET FUEL. USE OF CHUNK WOOD IN THIS STOVE IS PROHIBITED BY LAW.**
-  **USE ONLY THE BURN POT DESIGNED FOR THIS STOVE – DO NOT SUBSTITUTE WITH OTHER PARTS OR USE A GRATE TO HOLD THE FUEL.**
-  **WARNING: DO NOT ABUSE THE FRONT DOOR GLASS BY STRIKING, OR BY SLAMMING THE DOOR.**
-  **CAUTION: DO NOT OPERATE THIS UNIT WITH BROKEN DOOR GLASS.**
-  **DO NOT ALLOW FIRE TO BURN TOO CLOSE TO THE GLASS.**
-  **DO NOT OPERATE WITH THE FRONT DOOR, OR ASH DRAWER OPEN – THE UNIT WILL SHUT DOWN.**
-  **DISCONTINUE OPERATION IF YOU SMELL SMOKE COMING FROM THE HEATER.**
-  **IF A MALFUNCTION IS SUSPECTED, TURN THE UNIT OFF USING THE CONTROL PANEL, DO NOT UNPLUG!**
-  **IF THE FLAMES BECOME SOOTY, OR THE BURN POT OVERFILLS WITH PELLETS, IT IS RECOMMENDED TO TURN OFF THE STOVE AND THOROUGHLY CLEAN ALL STOVE AREAS AS PER MAINTENANCE DIRECTIONS.**

## Loading Pellets

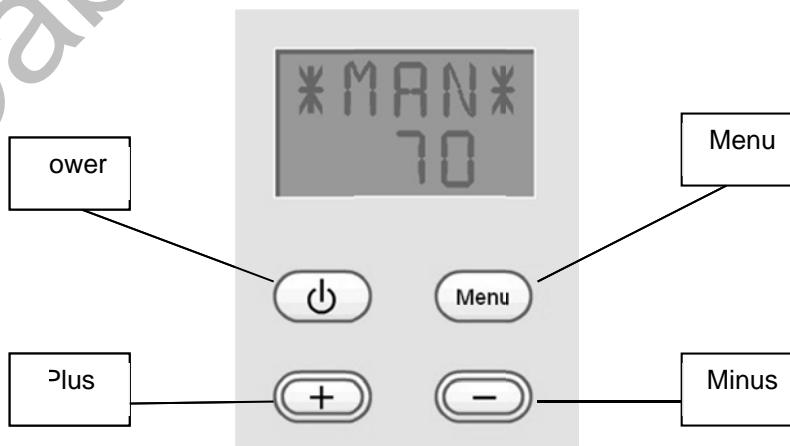
Lift the hopper door vertically until fully opened, open secondary hopper door, add pellets into hopper until full. In order to maximize hopper capacity, push pellets into void spaces. With all voids full, maximum hopper capacity is approximately 50 lbs of pellets. To reduce the introduction of fines, or spillage, we recommend the use of a secondary container to add pellets. Clean up any pellets spilled on, or down inside the stove.

Store pellets in a dry location, and outside the required clearances to combustibles of the heater.

### NOTES:

-  **WARNING! TOP GRILL AND FRONT EDGE OF STOVE CAN BECOME VERY HOT, AVOID ALL CONTACT WITH HEATED SURFACES**
-  IF THE HOPPER DOOR IS LEFT OPEN, A **CAP OPEN** MESSAGE WILL SHOW ON THE DISPLAY. AN OPEN HOPPER DOOR WILL AUTOMATICALLY STOP FUNCTION OF THE FEED AUGER, AS THE AUGER POSES A HAZARD TO FINGERS DURING OPERATION. TO ACKNOWLEDGE THIS MESSAGE, SIMPLY CLOSE THE HOPPER DOOR.

All operations of the stove are initiated from the User Interface pad. This pad is designed to provide simple, user-friendly operation of the stove. There are only four buttons on the interface pad, **Power (On/Off)**, **MENU**, **+**, **-**. During normal operation, the interface screen will illuminate red. When the unit is in OFF mode, but power is supplied, the pad will display its operational state without the red backlighting. If an error is detected, an error message is displayed, and the readout will flash.



# Operation

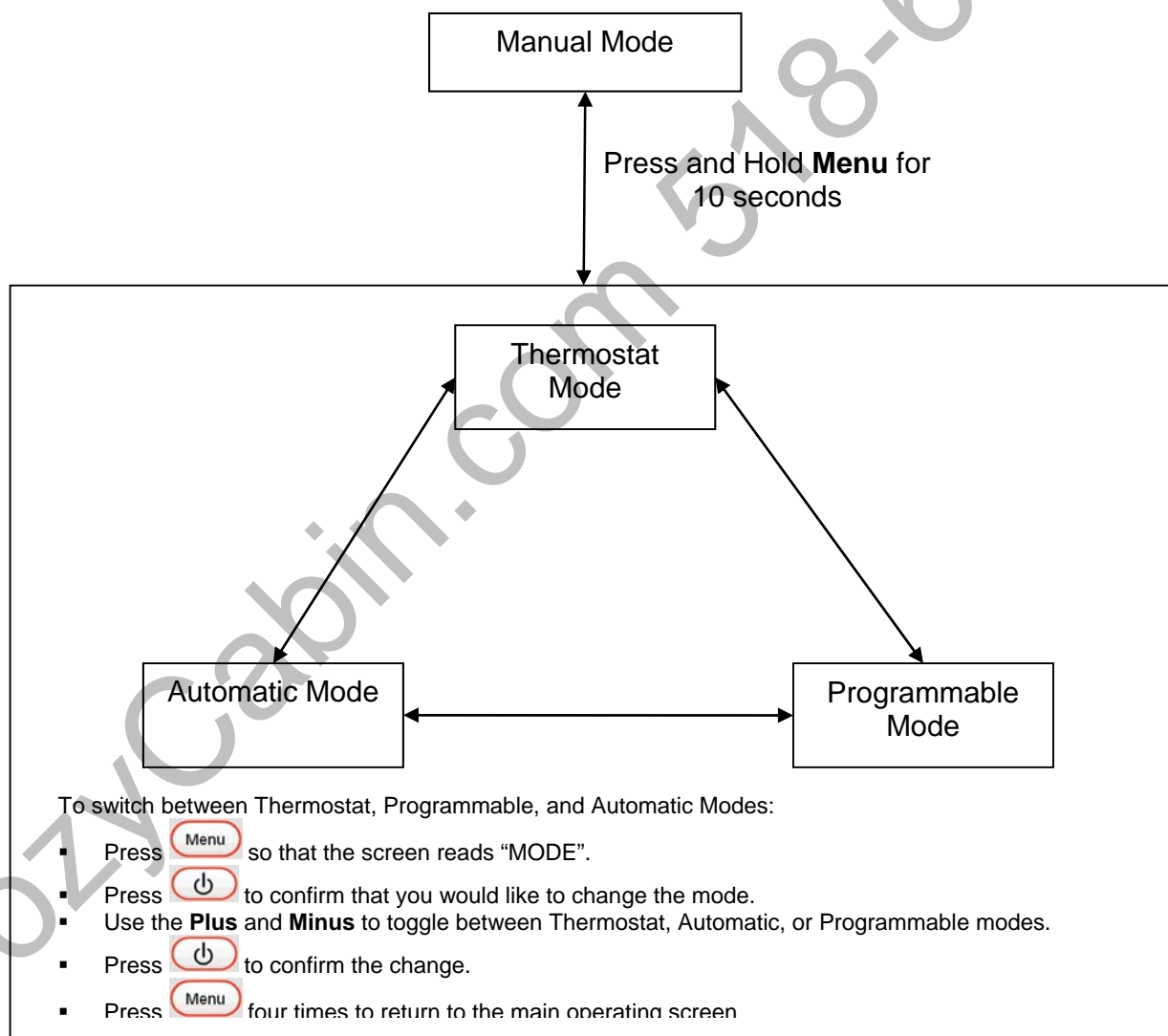
## Modes of Operation

The Heritage Pellet Stove has various modes of operation. They are:

- 🔥 **Manual** – Most basic mode (no thermostatic control).
- 🔥 **Thermostat** – Optional mode. Requires an external mili-volt thermostat sold at your local Hearthstone dealer or hardware store.
- 🔥 **Automatic** – Easiest automatic mode. Requires the use of the Hearthstone's Room Sensor (*included with the stove*).
- 🔥 **Programmable** – Best automatic mode. Requires the use of the Hearthstone's Room Sensor (*included with the stove*).

**Note:** If the stove is triggered to shut down and then triggered to turn back on immediately, it will still go through the complete shut down and startup process.

## Toggling Between Operating Modes




# Operation



## **MANUAL Mode**


The user is required to turn the stove on, off, and adjust the heat output manually in **Man Mode**.

### **Turning on the Stove:**


Press the  button. The stove will run through the startup process and then operate at the heat output level selected.

### **Adjusting the Heat Output:**

Use the  and  buttons to adjust the heat output.

 Note: The setting of 100 represents 100% of the maximum heat output and 30 equals 30% of the maximum output.


### **Turning off the Stove:**

Press, and hold the  button for three seconds.  
The stove will run through the shutdown process until the fire is extinguished.

## **THERMOSTAT Mode**


**THERMOSTAT** mode works the same as **MANUAL**; with the exception that **THERM** Mode can be controlled by a wall thermostat. To connect a wall thermostat to the stove refer to the Installation section in this manual. Do not connect the Room Sensor if using a thermostat.

### **Turning on the Stove:**


Press the  button on the display. The stove will now turn on when the wall thermostat calls for heat. The stove will run through the startup process and then operate at the heat output level selected.

### **Adjusting the Heat Output:**

Use the  and  buttons to adjust the heat output.

 Note: The setting of 100 represents 100% of the maximum heat output and 30 equals 30% of the maximum output.



### **Turning off the Stove:**


Press, and hold the  button for three seconds. Or, adjust the wall thermostat so that it is not calling for heat.  
The stove will run through the shutdown process until the fire is extinguished.

## **AUTOMATIC Mode**



Connect the included room sensor to operate your stove in **AUTO** Mode. Refer to the Installation section of this manual for instruction on how to connect the room sensor to the stove.

### **To Turn On or Off:**

In Programmable mode, press the  button to turn the stove on, and hold the  button for three seconds to turn it off.

 Note: The stove will not ignite if the set temperature is already achieved.

### **Adjust the Room Temperature:**

Use the  and  buttons to adjust the room temperature settings. The stove will automatically adjust the BTU output to meet the heating requirements of the room. The stove will turn on when heat is required, and off when the desired temperature is reached.

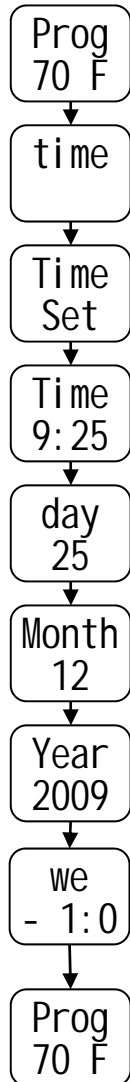
## **PROGRAMMABLE Mode**

**PROGRAMMABLE** mode functions identically to **AUTOMATIC** mode with the addition that the stove can be set to operate at two different temperature settings – home and away. Both of these temperature settings can be cycled twice daily.


You must connect the included room sensor to operate your stove in **PROG** Mode.

# Operation

## Set the Current Time/Date (Programmable Mode)






### Action

Step 1: From the main display press  twice.

Step 2: Press the  button to enter the **Time** menu.

Step 3: Press the  button to enter the **Time Set** area.

Step 4: Use the  button to set the hour and the  button to set the minutes. Once the time is set press  to continue.

*Note: 24 hour clock is used on this stove.*

Step 5: Use the  and  buttons to change and set the current day of the month.


Press  to continue.

Step 6: Use the  and  buttons to change and set the current month of the year.

Press  to continue.

Step 7: Use the  and  buttons to change and set the current year.

Press  to continue.

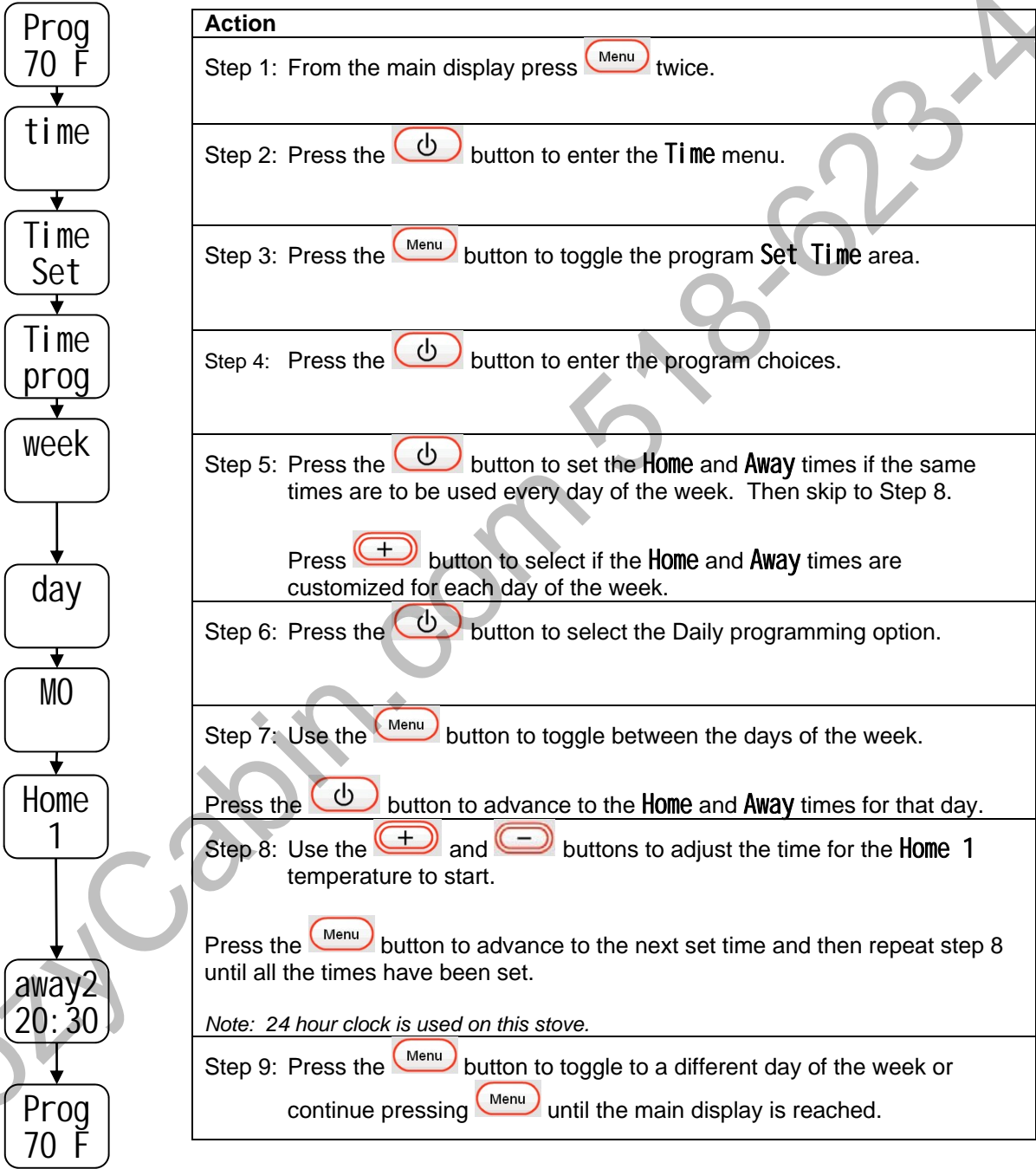
Step 8: The current day of the week displays. Press  to confirm the date settings.

# Operation

## Programming the Heating Schedule (Programmable Mode)

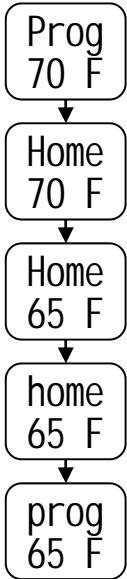
The stove can be programmed with two different set temperatures, one home and one away. Each of these set temperatures have two different times they can be switched on. The stove can use the same Home and Away time every day of the week or they can be set differently for every day.







### Setting the Home and Away schedule




# Operation

## To Adjust Home and Away Temperature (Programmable Mode)



Action
Step 1: From the main display press  to view the <b>Home</b> set temperature or  to view the <b>Away</b> set temperature.
Step 2: Press the  to modify the set temperature.
Step 3: Use the  and  buttons to change the temperatures.
Step 4: Press the  button to confirm the change in the set temperature.

## To Turn On or Off

Press the  button to turn the stove on and off in Programmable mode.

 Note: The stove will not ignite if the set temperature is already achieved.

## Startup Cycle

All of the operation modes use the same startup cycle. Once the startup sequence is initiated, the stove does not require any user intervention. The entire sequence will take between 10 and 20 minutes depending on the starting temperature of the stove and type of pellets.

### Ignition

The igniter, auger, and exhaust fan turn on immediately when the ignition phase is started. The burn pot will partially fill. The amount of filling depends on how full the auger is before the stove is started and the amount of ash and clinkers in the pot. Once the initial amounts of pellets are in the pot, the auger will stop until the pellets ignite. The unit will smoke for a few minutes as the pellets heat, shortly followed by visible flames.

The convection fan will start as soon as the firebox reaches a specific temperature. When ignition is complete, the pellets will begin to feed to maintain the fire.

Once the flame temperature in the firebox has reached a specific temperature, the unit will progress to the start phase.

### Start

The start phase operates until the flame temperature sensor in the firebox reaches the normal operating temperature.

# Operation

## **Shutdown Cycle**

The display will either read **Stop** or **Off** depending on if the unit is shut down manually or from the wall thermostat / room sensor. When the shutdown process starts, both the exhaust and convection fans are switched to high.

Once the fire is fully extinguished the control will either display **OFF** or **STANDBY**.

**OFF** will display if the shutdown was manually initiated, or **STANDBY**, if it was turned off by either a wall thermostat or a room sensor.

## **Quick Cleaning Cycle**

Every hour the unit enters a quick cleaning cycle. The cleaning cycle is the same for every operating mode. The cleaning cycle will last several minutes, and then the stove will return to the current operating setting. During the cleaning cycle, the feed rate of the pellets decreases and the exhaust fan speed increases.

## **Shutdown Cleaning Cycle**

After the unit runs for five hours, it enters a more extensive shutdown cleaning cycle. The stove cleans the burn pot by stopping the pellet feed and increasing the exhaust fan speed allowing the fire to extinguish completely. Once the fire is out completely, the stove will enter a normal startup cycle.

## **Power Outages**


The stove does not have backup power to operate during power outages. If the unit is installed with no vertical exhaust venting, it may cause smoke to backup into the room. To minimize the potential for smoke entering the room Hearthstone suggests installing the unit with a minimum of three feet of vertical venting and the use of outside air intake venting.

Once the power is restored, the stove will return to the operational setting active prior to the outage. If ignition is required, the stove will enter a special ignition procedure.

If you live in an area that experiences frequent power outages, you can use an aftermarket backup power supply for this stove, or you can use a generator. Contact your dealer for purchase options and assistance.

## **Frost Setting**

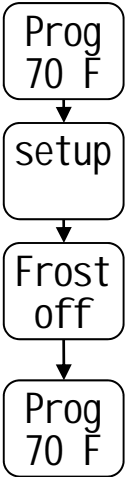
This stove is equipped with a frost setting. To utilize the setting, the room sensor must be connected and the stove must be turned off in the Automatic or Programmable Modes. If the room temperature drops below 42°F, the stove will automatically turn on at its maximum heat output setting, and then turn off when the room reaches 55°F.






 **Note:** This unit is a supplemental heat source. It will not operate without fuel or electricity therefore unattended operation time is limited. Use extreme caution with this feature.



# Operation

## Turning On and Off the Frost Setting









Action
Step 1: From the main display press  three times.
Step 2: Press the  button to enter the <b>setup</b> menu.
Step 3: Press the  button turn the <b>frost</b> setting on and  to turn the <b>frost</b> setting off.
Step 4: Continue pressing  until the main display is reached.

## Adjusting the Exhaust Fan Speed

You should only adjust the exhaust fan speed if the flames have an orange, dirty look and the burn pot has to be cleaned more than once a day. If the fan speed is too high, the fire will extinguish when on the lowest burn rate, and the **No Pellets** error will appear on the display.

### Changing the Exhaust Fan Speed







Action	
Step 1: From the main display press  three times.	
Step 2: Press the  button to enter the <b>setup</b> menu.	
Step 3: Press  twice.	
Step 4: Press the  and  buttons to adjust the fan speed faster and slower. The slower. The maximum setting is +30 and the minimum is -10.	
Step 5: Continue pressing  until the main display is reached.	

## Ash Disposal

Place ashes in an ash hod or suitable metal container with a tight fitting lid. Place the closed container of ashes only on a noncombustible floor or on the ground, well away from all combustible material, pending final disposal. If the intent is to dispose of the ashes by local dispersion, or burial in soil; retain them in the closed container until all cinders are thoroughly cool.

# Maintenance

-  **ALWAYS WORK ON A COOL STOVE!**
-  **ALWAYS DISCONNECT THE POWER BEFORE PERFORMING ANY MAINTENANCE.**
-  **WARNING: DO NOT USE ABRASIVE CLEANERS ON THE DOOR GLASS. SCRATCHING THE CERAMIC GLASS WILL COMPROMISE ITS STRENGTH.**
-  **WARNING: DO NOT CLEAN THE GLASS WHILE THE STOVE IS BURNING, OR WHEN THE GLASS IS HOT.**

Proper maintenance is essential to clean and reliable performance of your Hearthstone Stove.

Your Heritage Pellet stove requires routine maintenance and care. Ensure your stove is cool to the touch and unplugged during cleaning or service. Have qualified service personnel inspect the unit and venting once a year to ensure that they are clean, free of obstruction, safe, and in good working order. If service is required, only qualified service personnel should perform it.

-  **WARNING: DO NOT SUBSTITUTE MATERIALS. FOR REPLACEMENT PARTS, OR FOR INFORMATION ABOUT PARTS OR SERVICE, CONTACT YOUR LOCAL HEARTHSTONE DEALER.**
-  **NOTE: TURN THE UNIT OFF. ALLOW THE UNIT TO COOL.**

## ***Daily***

### ***Clean burn pot***

1. Open front door.
2. Check for buildup, and remove clinkers if present.
3. Remove burn pot and sweep ashes into ash pan if necessary.
4. Clean and check burn pot for wear.

### ***Clean heat exchanger***

1. Exercise both rakes using provided maintenance tool.

# Maintenance

## *Weekly or as Needed*

### *Remove ash from firebox*

1. Lift burn pot, sweep ashes into ash pan or use an ash vacuum.

 **WARNING! USE OF A REGULAR VACUUM MAY CAUSE A FIRE.**

### *Remove ash from ash pan*

1. Remove drawer, deposit ashes in proper metal receptacle with closable lid.

### *Clean glass*

 **DO NOT USE ABRASIVE CLEANERS ON THE GLASS.**

1. Use glass cleaner and soft cloth, or use pellet ash and a water moistened cloth (rub lightly).

## *Monthly*

### *Clean Hopper & Auger*

1. Remove auger access plate inside hopper (8mm wrench or socket).

 **AVOID DROPPING BOLTS INTO AUGER.**

2. Vacuum any fines in hopper and auger trough.
3. Replace access plate.

# Maintenance

## *Yearly or Every Ton of Pellets*

### ***Clean Hopper, Auger & Exterior of Pellet Engine***

1. Remove top grille and screen assembly – vacuum all surfaces.
2. Remove hopper door – vacuum hopper and auger inlet.
3. Remove both side panels (lift using tool provided), remove rear panel – vacuum all surfaces

### ***Clean Baffles & Heat Exchanger***

1. Remove and clean firebox baffles. Inspect for burn through or cracking – replace as required.
2. Exercise rakes, vacuum all accessible surfaces and spaces
3. Clean convection fan impeller cage with a soft brush – vacuum as necessary.
4. You can use high temperature stove paint inside the firebox after cleaning to prevent rust during the non-heating season.

# Maintenance

## ***Clean Exhaust Fan and Manifold***

1. Remove both left and right heat exchanger access panels – vacuum inside manifold.
2. Remove any build up from exhaust fan blades (located on right side) with soft bristle brush.

## ***Inspect Gaskets***

1. Use the Dollar bill test and check the door and ash pan gaskets for wear, replace as necessary.
  - a. Open the door, or ash pan, place a dollar bill over the gasket at various locations, close the door and pull the bill out.
  - b. If there is little or no resistance, adjust the latch catch or replace the gasket.

## ***Inspect Venting***

**Soot and Flyash: Formation and Need for Removal** - The products of combustion will contain small particles of flyash. The flyash will collect in the exhaust venting system and over time will restrict the flow of the flue gases. Incomplete combustion, such as occurs during startup, or incorrect operation of the room heater will lead to some soot formation that will also collect in the exhaust venting system. Inspect the exhaust venting system at least once every year to determine if cleaning is necessary. If a significant layer of ash or soot has accumulated (3mm or more) it should be removed to reduce restriction and the risk of a chimney fire.

1. Disassemble venting and check for ash and soot accumulation – clean as necessary.
2. Assemble flue connections - seal all connections after cleaning. Follow vent manufacturer's guidelines.

# Maintenance

## As Needed

### External Cleaning

 **WARNING: DO NOT CLEAN THE UNIT WHEN HOT OR WHEN ANY SIGN OF COMBUSTION IS PRESENT.**

External Cleaning - The unit should receive regular cleaning on, under, and around the stove to prevent the buildup of dust and lint. Clean the exterior surfaces of the unit using soap, water, and a soft cloth. **Do not** use abrasive or chemical cleaners. Take care not to scratch the glass or enamel finish (if so equipped) when cleaning the unit. We do not recommend the use of chemical wax based cleaners or polishes due to the potential for discoloration of the stones, castings or enamel when the residues of the cleaners or polishes are subject to heat. Excessive buildup of dust, spider webs, or room air contamination may cause odors when the stove is hot.

### Stone Cleaning

Occasional cleaning is all that is necessary to maintain the natural beauty of your stove's soapstone/sandstone. Clean the soapstone only with water or any non-abrasive cleaner and a soft cloth. To remove stains and smudges from sandstone, buff with 200 or 220 grit sandpaper. Wipe dust from the stone with a clean cloth. Do not use chemical agents to wash the stone; do not use waxes or any polishing agents on the stone. Soapstone and sandstone are porous and will absorb most liquids, which can leave a stain, change the appearance, or result in odd odors when warm. If you accidentally break a stone, contact your dealer for a replacement.

### Grill Height Adjustment

The convection air grill height is adjustable if necessary. The grill rests on three screws – tightening, or loosening the screws changes the grill's height and fit.

# Maintenance

## Glass Replacement Procedures

- 🔥 **WARNING: DO NOT OPERATE THIS APPLIANCE WITH THE GLASS PANEL REMOVED, CRACKED, OR BROKEN. DO NOT SUBJECT THE DOOR TO ABUSE, SUCH AS STRIKING OR SLAMMING SHUT. ONLY A QUALIFIED SERVICE PERSON SHOULD REPLACE THE GLASS PANEL.**

**Figure 9: Front Door assembly**

1. Follow the instructions included with the replacement glass kit.
2. Remove the door.
3. Remove the screws from the glass retainer (use penetrating oil if necessary) – lift the retainer off the glass. Set aside for reinstallation.
4. Carefully lift the damaged glass out of the door and discard.
5. Remove any remaining glass and old gasket material.
6. Clean the screw holes and place a small amount of anti-seize compound in each one.
7. Place the gasketed new glass onto the door. **Ensure sticker is on the exterior face of the glass.**
8. **Important! Center the glass** and ensure that the edges of the glass are parallel with the edges of the opening.
9. Check glass position again (centered, and parallel), then screw the glass retainer clips back on the door using a crisscross pattern. Tighten the screws no more than 1/8<sup>th</sup> of a turn after they seat. The glass will break at this point if not positioned correctly.
10. Apply a light film of anti-seize lubricant on the door's hinge pins if needed.
11. Install the door.
12. After 5 or 6 fires, check the glass retainer screws, and retighten if necessary.

**Required Glass Kit:** Part Number: 90-58900 (Glass with gasket applied). Use only 5mm Ceramic IR, or Neoceram IR glass. Contact your Hearthstone dealer.

## Troubleshooting

Most errors and issues are due to a lack of required maintenance, or cleaning. Using the instructions on the following pages should resolve most issues. If an operation error is detected, the user interface flashes, and displays a message. If the message prompts the unit to shut down, a **>I/O<** notice will follow the text of the message. To acknowledge a message, press and hold the power button for approximately 5 seconds, if the process associated with the message is complete, the stove will return to OFF Mode. At this point, normal operation may begin again if all conditions are satisfied.

### Display Messages:

Display	Problem	Possible Causes	Solution
No Pellets - (code F04)	Temperature in firebox unexpectedly dropped, or set point never reached	Pellet fuel level too low	Refill hopper
		Inferior, or wet pellets	Clean out hopper, and auger – refill with premium, dry pellets
		Auger jammed	Clean the auger. Follow the procedure in Maintenance section of this manual.
		Hopper door open	Close hopper door
No Ignition - (code F01)	Required pellet ignition temperature not achieved during startup – firebox temperature too low	Dirty Stove	Perform a Yearly Cleaning (see page 36)
		Inferior/wet pellets	Consult your Hearthstone dealer for a recommended pellet type and storage
		Auger clogged with fines	Clean auger
		Burn pot full of ash or clinkers	Clean burn pot
		Ash pan full and ashes contacting bottom of burn pot	Empty ash pan.
		Auger was completely empty and did not refill fast enough	Reset and start again. When the auger is empty, it may be necessary to add 1 cup of pellets to the burn pot prior to starting the unit.
		Front door, or ash pan open	Check both and verify they are closed completely, and sealing properly
		Hopper door is open	Close hopper door
		Blocked exhaust venting	Clean venting
		Restricted air intake, or outside air intake required.	Inspect ducting. Remove blockage. Install outside air intake
		Burn pot installed backwards	Install burn pot so ignitor hole is towards the rear of the stove
STb Initiated - (code F03)	Firebox/heat exchanger temperature too high	C-Fan (convection fan) setting above +5	Reset program. Do not adjust C-Fan setting.
		Convection fan not working	Service the unit.
		Convection fan clogged	Clean the convection fan. Follow the procedure in the Maintenance section of this manual.
		Top grill blocked	Remove any blockage from top of stove. Check for lint or hair on screen.



Display	Problem	Possible Causes	Solution
Flame Sensor – (code F06)	Temp sensor in firebox is malfunctioning	Flame sensor not working	Reset the unit using the power switch and contact your dealer if the problem persists.
Room Sensor – (code F07)	Communication between room sensor and stove interrupted	Room sensor unplugged	Check the rear room sensor connection at the rear of the stove or the connection on the inside of the room sensor.
		Sensor malfunction	Replace room sensor.
Too Little Air – (code F09)	Not enough air flow through firebox (monitored by sensors in inlet pipe)	The front door or ash pan open	Check both and verify that they are closed completely
		Inlet or exhaust venting blocked.	Inspect all venting. Verify there is no blockage. Clean Venting
		Excessive interior negative pressure	Install outside air inlet.
		Door gasket worn or missing	Check gasket using the dollar bill test outlined in this manual (see page 37). Replace gasket if necessary
		Exhaust blower clogged	Clean the blower. Follow the procedure in the Maintenance section of this manual.
		Dirty stove	Perform a Yearly Cleaning (see page 36)
		Poor air flow, or exhaust fan speed too slow	Replace 3" exhaust venting with 4" If everything checks, out and problem persists – increase exhaust fan speed
Cap Open	Hopper sensor not engaged.  Note: The cap open error causes the auger to stop and will starve the stove for fuel if not addressed quickly.	Hopper open	Close hopper door
		Pellets on gasket seal	Clean off seal
		Hopper overfilled	Remove some pellets
		Hopper door not sitting correctly on hinges.	Check that the slots on the hopper door are fully engaged and the set screws are tight
		Sensor magnet dislodged.	Remount magnet on bottom of hopper door.
		Sensor malfunction	Replace sensor
Flue Gas Fan Faulty – (code F05)	The signal has stopped from the exhaust blower	Exhaust blower not working	Service the unit.
		Exhaust blower sensor wire disconnected	Service the unit.
		Exhaust blower clogged	Clean the exhaust blower. Follow procedure Maintenance section of this manual. Blades must move freely.

**General Issues:**

Problem	Possible Causes	Solution
Burn pot is overflowing.	Burn pot needs cleaning	Remove excess ashes, clinkers, and live coals from burn pot
	Ignition did not occur	Clean burn pot
		Ensure burn pot installed with ignitor hole towards rear
		Ignitor failure. Service the unit.
	Dirty stove	Perform a Yearly Cleaning (see page 36)
	Stove feeding pellets without ignition	Turn off stove. Dump pellets into ash pan. Restart stove.
Burn pot clogs too quickly or pellets are partially burned (less than 24 hours of operation)	Poor quality or wet pellets	Consult your Hearthstone dealer for a recommended pellet type and storage
	Too much restriction in the venting	Clean intake and exhaust venting
		Increase the exhaust fan speed
		Replace 3" exhaust venting with 4"
	Excessive negative pressure in the house	Install an outside air intake.
	Burn pot is not seated correctly	Burn pot must be in direct contact with the steel surface of firebox around the perimeter of the pot. Clean floor of firebox.
	Ash pan too full and ashes contacting bottom of burn pot	Empty ash pan.
Fire has gone out	Exhaust blower clogged	Clean exhaust blower. Follow procedure in the Maintenance section of this manual.
	Room temperature satisfied (display reads STOP)	Normal operation
	Stove in a cleaning cycle (display reads CLEAN)	Normal operation
	No, or low fuel in hopper	Fill hopper with fuel
	Too much restriction in venting	Clean intake and exhaust venting
		Increase exhaust fan speed
		Replace 3" exhaust venting with 4"
	Hopper opened too long	Decrease fill time. When the hopper is open the auger does not turn which starves the fire of fuel
	Auger motor or exhaust fan failure	Service the unit.
Visible, or the smell of smoke	No power to the stove	Check circuit - supply power to the unit
	Excessive negative pressure in the house is causing exhaust vent leak, or door gasket not sealing properly	Seal venting with 500°F RTV silicone.
		Install outside air intake
		Replace gasket
	Power outage	Normal operation. Will dissipate when remaining pellets in hopper are consumed Contact your Hearthstone Dealer for battery back-up options

Problem	Possible Causes	Solution
Low heat output	Excessive soot on heat exchanger	Follow procedure in the Maintenance section of this manual.
	Poor quality, or wet pellets	Consult your Hearthstone dealer for a recommended pellet type and storage
	Dirty stove	Perform a Yearly Cleaning (see page 36)
Display not working	Stove unplugged, or electrical circuit is off	Ensure stove is plugged in to an active circuit
	Power outage	Contact your Hearthstone Dealer for battery back-up options
	Connection between mother board and display not working	Check fuse on back of stove
		Check wire connections between mother board and display
	Display malfunction	Replace display

# Replacement Parts & Optional Accessories List

PART NUMBER:	DESCRIPTION:	PART NUMBER:	DESCRIPTION:
<b>CASTINGS:*</b>		<b>GASKETS:</b>	
20XX-910	FOOT	3110-056	GASKET: ROPE, 1/4", BLK, AD
20XX-915	DOOR	3110-057	GASKET: ROPE, 3/8", AD, NON-CORE
20XX-925	BOTTOM	3120-021	GASKET: GLASS CLIP
20XX-930	SIDE LEG	3160-080	GASKET: TAPE, 3/4"x1/16", AD
20XX-955	FRONT DOOR HANDLE	3160-070	GASKET: TAPE 5/8" X 1/4"
20XX-970	FRONT DOOR	3160-390	GASKET: FEEDER TUBE
20XX-990	TOP	3160-391	GASKET: CONTROL BOARD
20XX-995	GRILL	3160-392	GASKET: CLEANOUT DOOR, 8MM
20XX-997	HOPPER DOOR HANDLE	3160-393	GASKET: INLET TUBE
2910-000	BURN POT	3160-394	GASKET: EXHAUST TO MTR HOUSING
2910-005	UPPER BAFFLE	3160-395	GASKET: MOTOR TO MTR HOUSING
2910-010	LOWER BAFFLE	3160-396	GASKET: MTR HOUSING KNOCKOUT
<b>STEEL PARTS:</b>		<b>MISC:</b>	
5000-095	BEARING: SINTERED, 16MM ID	3120-220	UPPER BAFFLE CERAMIC HEATSHIELD
5000-096	BEARING: SINTERED, 10MM ID	3120-221	LOWER BAFFLE CERAMIC HEATSHIELD
5021-060	GLASS CLIP	3200-101	SATIN BLACK HIGH TEMP PAINT
5090-010	ASH PAN	3900-184	WOODEN KNOB
5090-015	OUTER ASH BOX FRAME	4700-0795	MAGNET
5090-017	FRONT OUTER STONE RETAINER	6400-40465	OWNER'S MANUAL
5090-018	FRONT INNER STONE RETAINER	7000-034	WIRE HARNESS
5090-019	FRONT STONE FRAME	7211-948	CONVECTION FAN ASSY
5090-021	INNER SIDE STONE FRAME	7211-967	EXHAUST FAN MOTOR
5090-022	OUTER SIDE STONE FRAME	7211-970	AUGER MOTOR
5090-060	FRONT DOOR FRAME	7300-000	MOTHER BOARD
5090-061	FRONT DOOR LATCH HOLDER	7300-005	AIR FLOW SENSOR
5090-062	FRONT DOOR CATCH	7300-010	CONTROL BOARD
5090-063	FRONT DOOR LATCH	7300-015	IGNITER ELEMENT
5090-064	FRONT DOOR HINGE	7300-020	HOPPER SAFETY SENSOR
5090-069	OUTLET GRILL SCREEN	7300-025	TEMP SAFETY LIMIT SWITCH
5090-070	CIRCULATION AIR LOUVER	7300-030	FLAME SENSOR THERMOCOUPLE
5090-072	LEFT HOPPER DOOR HINGE	<b>KITS:</b>	
5090-073	RIGHT HOPPER DOOR HINGE	90-56925	WIRED ROOM SENSOR
5090-074	HOPPER EXTENSION	90-58900	GLASS KIT
5090-075	HOPPER DOOR	90-70900	HOPPER DOOR SUPPORT KIT
5090-076	FRONT TOP SUPPORT	90-73900	FRONT DOOR HANDLE KIT
5090-077	REAR TOP SUPPORT	90-76900	LOWER BAFFLE KIT
5090-080	SERVICE TOOL	90-76901	UPPER BAFFLE KIT
5210-3080	HEAT EXCHANGER CLEANING ROD		
5240-145	ASH PAN CATCH SPRING		
5240-146	ASH PAN CATCH KNOB		
5240-149	SPRING, 1.6MMX12.5MMIDX24MML		
5532-012	PALLET MOUNTING CLIP		
5909-000	LEFT BAFFLE MOUNT BRACKET		
5909-005	RIGHT BAFFLE MOUNT BRACKET		
5909-010	UPPER BAFFLE INSULATION GUARD		
5909-011	LOWER BAFFLE INSULATION GUARD		
5909-050	FLAME SENSOR THERMOWELL		
5909-060	AIR INLET PIPE		
5909-310	AUGER SCREW / SHAFT		
5909-315	AUGER FEED UNIT LID		

\* Part numbers: use 2010 for Matte, 2020 for Brown Majolica.

**Safety Label**

CozyCabin.com 518-623-4349

# Limited Warranty

## Hearthstone's Limited Warranty

See your Owner's packet for your copy of our warranty. These warranties give you specific legal rights. You may also have other rights that vary from State to State.

Check with your dealer in advance of arranging a warranty call for any specific costs to you. Some costs such as service charges are not covered by this warranty, and can vary from dealer to dealer.

**Hearthstone Quality Home Heating Products, Inc.**

317 Stafford Ave.

Morrisville, Vermont 05661-8695

E-Mail: [inquiry@Hearthstonestoves.com](mailto:inquiry@Hearthstonestoves.com)

[www.hearthstonestoves.com](http://www.hearthstonestoves.com)

# Appendix A – Residential Pellet Fuel

(Excerpt from “Pellet Hearth Systems Reference Manual Second Addition” December 2008)

In much of the world, the concept of home is linked directly to the ability to maintain a heated environment in winter months. With the energy crisis of the 1970's came the first notice that the source of that heat and comfort had to be scrutinized. The realization of limitations and eventual shortages for finite, irreplaceable, fossil fuels spurred a new interest in renewable, and therefore sustainable, alternative fuel sources.

Almost simultaneously, the issue of waste surfaced. The habits of our throwaway society not only resulted in costly waste of valuable energy resources, but also in a crisis in disposal space and methods. The development of residential pellet fuel responds to both the call for renewable biomass sources of home heating fuels and waste stream reduction.

## 1. PELLET PRODUCTION

As forest products companies produce lumber, plywood, and other goods, they create wood and bark residues that contain energy. In the form of sawdust, bark, and chips, these residues are bulky and vary greatly in moisture content. The process of pelletizing reduces their bulk by compression and increases their combustion manageability by controlling consistency. Originally produced for industrial and institutional use, pellets entered the residential fuel market with the introduction of the first home pellet appliances in the mid-1980's.

### 1.1 RAW MATERIALS

Although a wide variety of materials, including sawdust and wood scraps from hard and soft woods, shells and nut hulls, agricultural by-products, paper, and cardboard, is pelletized for use as fuel, residential pellets are primarily wood-based residues. Corn, because of its natural similarity to pellets, is used in some specially designed residential appliances. Because corn combustion differs from wood pellet combustion, corn should not be burned alone or mixed with wood pellets unless the appliance is specifically designed for corn combustion.

Because ash content and other factors presently limit or prevent the practical use of other agricultural and paper products in most residential appliances. Increasing competition for forest industry by-products and reduction in logging in some areas are a growing concern of pellet manufacturers. Pellet appliance design, however, is responding to fuel manufacturers' predictions of future shortages of premium grade fuel with research and development aimed at greater ash tolerance.

The amount of residues available from processing logs varies depending on factors such as log size, timber species, lumber dimensions, moisture content, and processing machinery. Typically, 5 to 10% of the original material is available for pellet fuel conversion. The raw materials may be received at the pellet processing plant as residues from kiln dried lumber or as residues from freshly processed (green) wood in which the weight of moisture may exceed the dry material weight. Heating, or caloric, value of finished pellets ranges from 7,000 to over 9,000 Btu (British thermal units) per pound (at 5% moisture), with resinous species (such as pines and fir) having slightly higher gross caloric values than non-resinous species (hardwoods) and bark. Average Btu content of pellets as received by the consumer is 8,300 Btu per pound at 5% moisture.

Softwoods, hardwoods, and blends of different species are used as raw materials and known as feed stock. Where hardwoods are generally the preferred species for cordwood appliances because of their higher Btu content and lower emissions, pellets from softwoods generally have slightly higher caloric value and lower ash content than pellets produced from hardwoods, particularly hardwoods containing bark. Resins in softwoods that are more difficult to burn in a cordwood appliance are not a problem in pellet appliances, which regulate the air for combustion and provide precise, gradual fuel feed in small amounts.

Raw material particle size ranges from fine sawdust to large chips that must be ground to uniform size. Careful handling of raw materials before the pelletizing process is important in reducing unwanted foreign materials.

## **1.2 MANUFACTURING PROCESS**

The production of pellet fuel begins with the raw materials, or feed stock. Contaminants must be removed by using magnets to remove iron and classifiers to remove stones and non-magnetic metals. Classifiers, also known as scalpers, are devices which employ air flow to move and separate the lighter wood particles from heavier unwanted materials. Storage facilities and methods for managing feed stock materials are determined by the moisture content of the materials; dry materials must be protected from the elements, and green materials must be processed in timely fashion to prevent microbiological deterioration. After storage, feed stock is pulverized and screened into small uniform pieces by hammer mills and grinders and conveyed to holding bins or silos. A cyclone process of swirling air collects the lighter fines, or dust, for use as dryer fuel.

In the case of green materials, the next step is the drying process. The most commonly used type of dryer is the rotary dryer, a large revolving drum (some more than 10 feet in diameter and 40 feet long) which continually lifts and tumbles the material through a hot gas stream. The drying process is regulated by a variable rate feed screw and by control instruments which measure and match heat input to demand. Uniform moisture is also achieved by the larger, wetter, heavier particles moving more slowly through the drum than finer, drier, lighter particles. Dryers are often fired by using a portion (about 8 to 10%) of the feed stock, mainly the fines, or smallest particles (also known as wood flour). The drying process generally reduces incoming moisture content (wet basis, see following) of 40-45% to 6-10%.



## MOISTURE CONTENT

Fuel moisture content has a dramatic effect on efficiency: wood at 50% moisture has a heating value of 4,000 Btu/lb., at 20% the heating value is 6,200 Btu/lb., and oven dry wood delivers up to 8,600 Btu/lb. One of the advantages of pellet fuel is its high Btu content (about 8,000 Btu/lb.) and consistently low moisture content, usually between 6-10%, calculated on the wet basis.

Because there are two methods for determining wood moisture content (M.C.), the wet basis and the dry basis, the concept can be confusing. The pellet fuel industry universally uses the wet basis when describing residential pellet feedstock and fuel. The dry basis is used primarily in labs and technical situations. The following M.C. calculations demonstrate the difference in the two methods.

In the dry basis, the wood is weighed wet, then dried to an oven dried condition. The oven-dried weight is subtracted from the wet wood weight to determine the weight of the lost water. Moisture content is then calculated by dividing the weight of the water by the weight of the oven dry wood. In the wet basis, the weight of the water is divided by the weight of the wet wood.

**Example:** A quantity of wood weighs 10 pounds. It is dried to oven-dry condition, and then it weighs 8 pounds. What is its wet basis M.C.?

Weight of the wet wood (10 lbs.) - weight of the oven dried wood (8 lbs.) = weight of the water (2 lbs.)

$$\frac{\text{Weight of water} \quad (2)}{\text{Weight of wet wood} \quad (10)} = .20 \text{ M.C. (Wet Basis)}$$

The dry basis used in labs follows the same procedure but divides the weight of the water by the weight of the dried wood.

Weight of wet wood minus weight of dried wood = weight of water

10 - 8 = 2 (pounds of water).

$$\frac{\text{Weight of water} \quad (2)}{\text{Weight of dried wood} \quad (8)} = .25 \text{ M.C. (Dry Basis)}$$

The dry basis moisture content is thus 25%, while the wet basis moisture content of this same quantity of wood is 20%. Customers are more likely to understand and relate to wet basis percentages since dry basis figures can exceed 100%. Pellet industry standards use the wet basis.

The dried materials are conveyed to the conditioning chamber where steam may be added to lubricate the materials and to help soften the natural lignens that act as a bonding agent to hold the pellets together. The materials (feedstock) go next to the pelleting chamber where they are extruded, or pressed, through thousands of 1/4 to 5/16" diameter holes in a steel die 1.5 to 3.5 inches thick. This extrusion process heats the newly formed pellets to temperatures approaching 250° F. The hot, still soft pellets are conveyed to a cooler to achieve room temperatures and hardening. Dust and loose fines are shaken off and recycled as the pellets proceed to be bagged.

## 2. FUEL STANDARDS

The importance of consistent fuel and quality controls became apparent in the early years of residential pellet appliances. Fuel characteristics are crucial factors in appliance performance and maintenance. The Fiber Fuels Institute (FFI) and the Association of Pellet Fuel Industries (APFI) adopted national standards recognizing acceptable criteria for these characteristics in 1991. FFI and APFI have now merged into one association, the Pellet Fuel Institute (PFI). Voluntary fuel quality certification is the responsibility of the pellet manufacturer. Not all pellet fuels carry the voluntary PFI guaranteed analysis, even though some packaging may be marked "Premium." End users may have to rely on experienced retailers in choosing appropriate fuel.

### 2.1 CRITERIA

PFI standards establish two grades of fuel, Premium and Standard. The following chart indicates that the only difference between the two grades is inorganic ash content. Table 1 outlines the fuel grade standards. However, each of the six criteria is important, because understanding them clarifies appliance performance and maintenance.

Understanding the rationale for each of the criteria begins the process of understanding appliance performance and maintenance.

#### 2.1.1 DENSITY

The density, or weight per cubic foot, reflects the amount of solid material packed into the pellet and therefore has a relationship to the heat content of the fuel. In the same number of auger turns, higher density fuel delivers more Btu content than a low density fuel. Additionally, lower density fuel burns faster and may affect low burn settings. Wide variations can require appliance adjustment, particularly in the case of excessively low density fuel which could cause the fire to go out. Density is also important as a gauge that adequate pressure and bonding have produced hard pellets that can withstand shipping and handling.

#### 2.1.2 DIMENSIONS

Pellet diameter is another factor that affects stove performance. The 1/4-5/16 inch standard reflects the common die size for residential fuel in the Americas. Industrial pellets can range as large as 1/2" in diameter and are unacceptable in residential appliances. The most common size for residential appliances is 1/4"; in fact, some appliance manufacturers report problems with some varieties of 5/16" pellets. Apparently, unusually hard pellets of this size may not cut easily when caught

between parts of the feeding mechanism and may cause feeding jams. It is therefore important to know whether an appliance manufacturer specifies the size of pellets to be used in a specific appliance.

### **2.1.3 FINES**

Fines are the smallest, dust-like particles produced in the pelleting process. They also occur in breakdown during shipping and handling. The production standard is intended to assure hard pellets that withstand handling. Excessive fines represent loss of usable fuel and cause performance and maintenance problems. They are also a source of irritation for appliance owners when the dust escapes into the home during pouring from the bag into the hopper. The fines are less likely to burn because they are easily blown away from the flame by combustion air. Fines cause performance problems, including loss of fuel feeding if they build up on the sides of the hopper and reduce the opening size to the fuel delivery system. Additionally, fines can increase the need for maintenance by filling ash traps prematurely and by jamming augers.

### **2.1.4 SODIUM**

The presence of excessive salt, specifically water soluble inorganic sodium, can cause severe damage from corrosion in appliances and venting systems. The sources of salt contamination include logs that have been floated in salt water, plywood, and particleboard. Manufacturers now test to ASTM E776, standard for sodium extraction. Additionally, the presence of trace amounts of alkaline salts can increase clinkering, due to a reduced ash melting point for silica.

### **2.1.5 INORGANIC ASH**

Ash is the term for the various noncombustible minerals that remain after combustion. Ash content is the basis for determining fuel grade since all other criteria are identical for both premium and standard grade. Later discussion of appliance design and maintenance requirements will indicate clearly how crucial this fuel characteristic is. On one hand, fused ash, or clinkers (see discussion under 3.1.1 Combustion below), can block combustion air inlets and affect performance adversely. On the other, fly ash that is blown from the fire chamber can accumulate on heat exchangers and in the venting system with problematic results. Simply put, ash content is the main factor determining the frequency of appliance maintenance. In some appliances, that frequency can make the use of higher ash fuels impractical. Predictions of premium quality low ash fuel shortages are consequently a growing concern that appliance manufacturers are addressing in appliance design.

Appliance sensitivity to ash content varies with design, venting system design, and recommended maintenance frequency. Even within the allowed 1% ash content of premium grade pellets, there are noticeable performance variations in some appliances. Changing from a .25% ash content fuel to a .75% ash content fuel can cause troublesome performance and maintenance in some appliances. Manufacturer's fuel recommendations and individual ongoing experience with locally used fuels are important for appliance adjustment and customer satisfaction. Some biomass and corn burning appliances have been introduced to deal with the 1-3% ash produced from these fuels. A fuel stirring/aeration device may be incorporated to mix the ash with the fuel and to increase fuel efficiency.

### **2.1.6 LENGTH**

Excessively long pellets can cause bridging, the condition of pellets getting stuck across the fuel delivery entrance of the hopper. The effect is that of a log jam, with fuel unable to feed past the blockage. Long pellets may also cause auger jams. Finally, long pellets deliver inconsistent amounts of fuel. Dramatic variations in fuel feed rates in turn causes performance problems since combustion air settings deliver a volume of air based on expectations of consistent amounts of fuel. PFI standards call for maximum pellet length of 1 1/2 inches. In spite of this standard, some appliances will bridge with this length pellet and can be difficult to diagnose. The appliance manufacturer should be consulted regarding their recommendations for maximum pellet length.

## 2.2 LABELING

PFI Fuel Standards recommend that manufacturers identify their product with a guaranteed analysis and parameters included in the label (example below).

## 3. EFFECTS ON PERFORMANCE AND MAINTENANCE

When compared to cordwood on a one to one basis, pellets offer some distinct advantages. Pellets are more consistent and predictable in moisture and Btu content. They are more compact, so they require less storage space. They are cleaner, easier to handle, and they burn cleaner. However, these characteristics have to be put into the perspective of the appliances they burn in to have real meaning. Pellet fuels narrow the wide variables of cordwood fuels, but pellet appliances, as mechanical, electrical based systems, also have a narrower range of fuel tolerance than wood stoves. Understanding the effects of fuel characteristics in pellet appliances is essential for optimum performance, adequate maintenance, and overall customer satisfaction.

### 3.1 PERFORMANCE

As will be discussed later, different appliance designs have different fuel requirements and tolerances. For now, we can look broadly at some effects of using unsuitable or impure fuel.

#### 3.1.1 COMBUSTION

A direct effect of fuel quality on combustion that is not included in the PFI Standards is silica content. Silica is essentially sand or dirt that is naturally in the bark of the tree or that enters the feed stock in the handling process. In the combustion process, silica is heated to fusion temperatures, melts, and solidifies as it is cooled. The result is clinkers, solid chunks of lava like material. The effect on combustion occurs if the clinkers stay in the grate area and block incoming combustion air.

Analysis of silica content is impractical because of the variations in growing conditions and because of the significant effect on fusion temperatures of small amounts of trace elements. The normal melting point of silica, 2,700° F., is reduced to 1,500° F. in the presence of minute amounts (1/4%) of alkaline salts (sodium chloride or potassium chloride). This reduction in the melting point promotes ash fusion at lower temperatures and increases clinkering. Combustion temperatures in the burn pot/grate area vary widely with appliance design, so fuel with silica may cause clinkering problems in a stove with high combustion chamber temperatures and not in another appliance that operates with lower temperatures.

Ash content has indirect effects on combustion. Excessive ash content, if not maintained properly, can restrict or block burn pot air holes and/or the venting system and result in poor combustion due to inadequate combustion air.

Improper pellet density can also have a direct effect on combustion by causing an abnormal feed rate. Low density pellets may feed too little combustible fuel and may cause the fire to go out, while excessively high density pellets can be difficult to start in automatic ignition appliances or they can

overfeed the stove, causing high temperatures or smothering the fire. Most appliances now have simple adjustment mechanisms to overcome these difficulties. Proper adjustment of fuel to air settings for the particular fuel must be made for maximum performance as the appliance owner changes the fuel source to one with different density.

Bridging and blockage or auger jamming caused by unsuitable pellet diameter or length, or by excessive fines, indirectly affects combustion by depriving the combustion chamber of fuel.

### **3.1.2 HEAT TRANSFER**

Fly ash gradually builds up on heat exchanger tubes or fins. The coating of ash acts as an insulator and prevents proper transfer of heat to the convection air passing through the tubes into the home. The frequency of cleaning heat exchangers is determined in large part by the ash content of the fuel.

### **3.1.3 MECHANICS**

High ash and fines content can build up on impellers and affect blower motor durability. Jamming from excessive fines or improper pellet size can affect auger durability.

## **3.2 MAINTENANCE**

Using a fuel that is not suited for a particular appliance increases the frequency of maintenance. Clinkers from high silica content fuel (or from lowered ash fusion temperatures brought about by the presence of alkaline salts) must be removed before they block combustion air, affect performance, or cause other maintenance needs. High ash and/or fines in fuel necessitate more frequent cleaning of the burn pot/grate, ash storage areas, heat exchangers and venting system. The systems and components of pellet appliances are interdependent and sensitive to proper maintenance. Simple maintenance tasks, left unattended, can become a need for total system maintenance as well as a source of owner frustration. The frequency of component replacement is also increased by the lack of regular, properly performed maintenance.

## **4. SUMMARY**

- 🔥 Residential pellet fuel is recovered biomass products processed to be of uniform size, density, moisture content, and ash content.
- 🔥 Feed stock is separated from unwanted contaminants, pulverized into small pieces, dried, compressed, cooled, and bagged in the pellet manufacturing process.
- 🔥 PFI standards for density, dimensions, fines, sodium and ash are voluntarily complied with by pellet manufacturers. Recommended labeling includes an analysis of these factors.
- 🔥 Ash content, the primary maintenance factor, is the only difference in composition between standard (up to 3%) and premium (less than 1%) grades of fuel in PFI standards.
- 🔥 The fuel quality standards include characteristics that affect performance, maintenance, durability, and customer satisfaction. Another factor not included in the standards is silica content, the primary cause of clinkering.