

# Technical Help F.A.Q.

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## Do I need an EPA certified or CSAB415.1-10 certified heater?

You first have to identify what your needs are. If you are looking for ambiance, a temporary heat source in a cottage or a camp, or a simple back-up heat source in case of power failure, you do not necessarily need to invest more money in order to buy an EPA or CSAB415.1-10 certified wood heater. However, if your goal is to heat on a regular basis, the extra dollars will prove to be a good investment. Furthermore, it must be noted that certified heaters release up to 90% less particles into the atmosphere, which makes wood a renewable and clean source of heat. As a result, if the style and size of the heater you are looking for is available in a certified version, it is highly recommended that you invest in this advanced combustion technology. You will help the environment and reduce your wood consumption by up to 30%.

NOTE: If you live in the United States, British Columbia, Ontario, Quebec, Nova Scotia, New Brunswick or Newfoundland, EPA certified wood heaters are mandatory. Exceptions apply for certain categories of products, such as decorative fireplaces. Certain municipalities may also have by-laws that require the installation of an EPA or CSAB415.1-10 wood heater, even though the province does not have an official regulation on wood heating. It must also be noted that in Canada, the CSAB415.1-10 Standard is equivalent to the EPA Standard. A wood heater that meets this Standard will generally comply with the regulation in place.

## How do I determine the size of heater I need and where should I install it?

Before answering this question, it is very important that you clearly identify what your needs are. Some people will buy a heater simply to enhance the ambiance of a room, while others will buy a heater as their main source of heat. There is no good or bad reason for buying a wood-heat system. If you simply want to enhance the ambiance of a room, most small to medium size heaters will suit your needs. Simply choose the style you like best, and put the unit in the room where you spend the most time. The heat and look of a glowing fire will create an atmosphere of warmth and coziness.

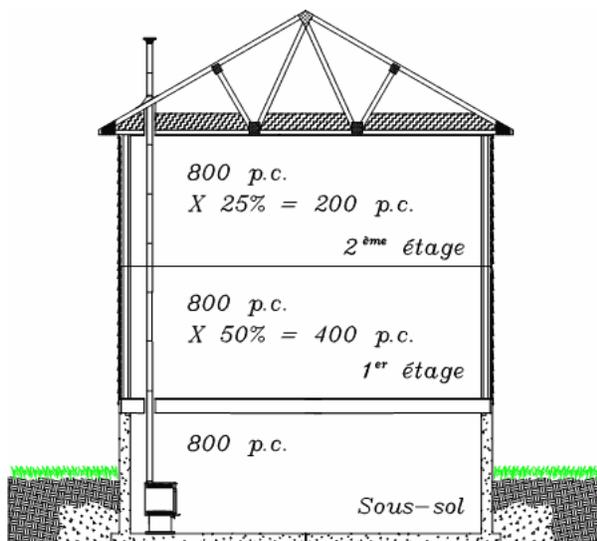
If your primary need is to heat, you must verify the heating capacity of your heater based on the technical data provided by the manufacturer. For instance, if you want to heat an 800-square-foot area on one floor, you need to buy a heater with a minimum capacity of 800 sq. ft.

If you need to heat more than one floor, keep in mind that heat rises. Therefore, a heater located in your basement will help you heat the main floor as well. However, the contrary is not true; a heater located on the main floor (ground floor) will not heat the basement. Keep in mind also that the more divisions there are in the house, the harder it will be to distribute the heat evenly.

If you need to heat two floors, calculate the surface of the lower floor. Then, add 50% of the surface of the upper floor. For instance, if you install a wood-heating system in the basement and you have 800 sq.ft., you will need a heater with a minimum capacity of 1,200 sq.ft. ( $800 + 400 = 1,200$ ).

If you need to heat more than two floors, calculate the surface of the lower floor (where the wood-heating system is located). Then, add 50% of the surface of the middle floor, and 25% of the surface of the upper floor. For instance, if you install a heater in the basement and you have 800 sq.ft., you will need a heater with a minimum capacity of 1,400 sq.ft. ( $800+400+200= 1,400$ ). Consult the drawing below. It will help you understand the explanations provided in this section.

**REMEMBER:** We are talking about "zone" heating, not central heating. The room where the heater is located and the rooms directly above it will always reach higher temperatures than the rooms distant from the unit. If you want an even temperature throughout the house, you need to consider a central heating system, such as a warm air wood furnace. Furthermore, you must keep in mind that the size of the heater you need may vary based on the insulation of your house, its exposure to wind, and the number of windows. It will always be prudent to buy a heater with a capacity that is slightly higher than the minimum capacity that you need. For instance, if you need a minimum capacity of 1,400 sq.ft., it will be more prudent to buy a heater with a capacity of 1,600 sq.ft., if not 1,800 sq.ft. There are three main advantages in buying a larger appliance: the increased heating capacity, the ease of loading more and larger logs (as a result of the greater firebox volume), and the increased combustion time (given the higher loading capacity).



The drawing above gives an example of the minimum heating capacity required for a wood-heating system installed in a house with three floors of 800 sq.ft. each. We assume that the house is well insulated and that air can circulate between each floor through an open stairway and/or floor traps.

### Do I need a floor protection under and around my heater?

Yes, floor protection is required for any wood appliance unless the unit already sits on a non-combustible surface. You have many choices, such as stone, brick, cement board, or tile. You need to consult your owner's manual in order to know the dimensions of the floor protection specific to your model. In Canada, the floor protection must extend in front of the unit by at least 18 inches and by at least 8 inches on each side. In the USA,

the floor protection must extend at least 8 inches on each side of the appliance (measured from the door opening) and at least 16 inches in front of the door opening.

## What type of exhaust system do I need?

Your exhaust system is comprised of two main elements: a chimney and a connector (commonly called "stove pipe").

### Connectors

Connectors are simply steel pipes that connect the appliance to the insulated chimney. They are normally needed unless the appliance is already inserted into an enclosure (for instance, in the case of a zero-clearance wood fireplace). Connectors do not pass through combustible materials. The term "black pipe" is also often used in the industry. There are two types of connectors:

- Single-wall pipes
- Double-wall pipes

As their name indicates, single-wall pipes have just one wall. A minimum of 18 inches is required between the pipe and a combustible wall. In general, single-wall pipes provide less insulation than double-wall pipes do and therefore require more clearance. This is the main drawback of single-wall pipes. Their advantage is in their cost; they are nearly three times less expensive than double-wall pipes.

As their name indicates, double-wall pipes have a second wall, i.e., an interior one made of stainless steel. The cushion of air between the two walls provides thermal insulation allowing the appliance to be installed much closer to walls. This is the main advantage of double-wall pipes. The required distance for each heater model is based on the safety tests conducted with each type of connector. You therefore need to properly consult the appliance's owner's manual in order to know the prescribed clearances from combustible materials.

### Chimney

There are two types of chimneys: an insulated (or prefabricated) chimney or a masonry chimney. If you have a masonry chimney, it must meet the local building code. It must be lined with refractory bricks or tiles joint together with refractory cement. The chimney diameter should be the same as the appliance's flue outlet (6 inches for most models). It is rarely the case with masonry chimneys. Their diameter is often bigger than the appliance's flue outlet. The way to deal with this is to insert inside the masonry chimney a stainless steel liner that has the same diameter as the appliance's flue outlet. Unless a liner is installed, serious draft problems can occur.

An insulated chimney (or prefab chimney) is a stainless steel flue that has been tested to resist temperature as high as 2100F. It has a double wall filled with insulating wool. The majority of insulated chimneys have 2 inches of insulation, while some have just 1

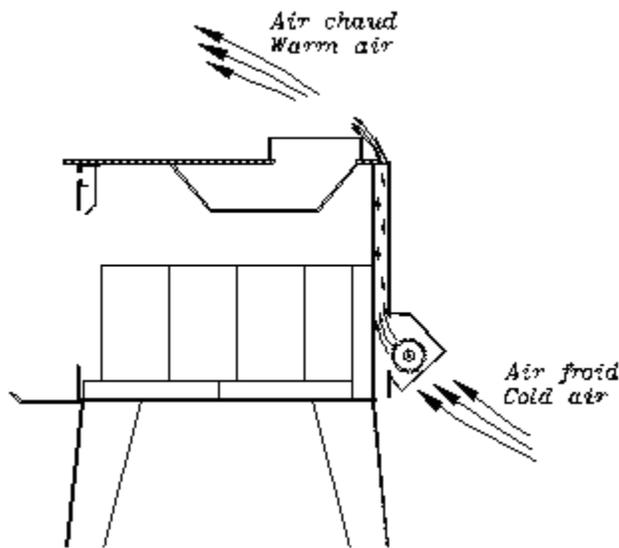
inch. Others are air-insulated and have 3 walls; they are referred to as “triple-wall air-cooled chimneys.

When we speak of a 6-inch chimney, we are referring to its interior diameter. If the chimney has 2 inches of insulation, the flue will have an exterior diameter of 10 inches.

In wood-heat system installations, we must use an insulated chimney for any flue that passes through walls, ceilings, attics and closets (i.e., all combustible surfaces in general). This chimney must also be installed outside the house.

### Why should I install a blower on my wood heater?

A blower can be installed at the back of most models. This option enables you to redistribute the heat from the back of your heater to the front of it and into the room. By forcing hot air toward the front of the heater, the blower extends the radiation power of your unit. Most appliances can also have a thermodisc installed. A thermodisc is a heat sensor connected to the back of the appliance and wired-up to the blower. It will start the blower automatically when the air temperature in the back heat shield reaches approximately 115 °F. Likewise, it will turn the blower off when the temperature in the back heat shield goes below 100 °F.



### Why is the efficiency as per the EPA’s test data smaller than the publicized optimum efficiency?

EPA refers to the CSAB415.1-10 standard for the calculation of the appliance’s efficiency. The efficiency reported as per EPA’s directives consists of an average between four different burn rates, ranging from the lowest burn rate (air intake completely closed) to the highest burn rate (air intake completely open). The optimum efficiency that we publicize is the efficiency obtained according to the same test data,

but for the low burn rate only. This efficiency is more realistic for a majority of users whose heating needs require that the unit be used to maximize burn times.

### Can I vent my heater using an existing masonry chimney?

It is possible to install a heater using your existing masonry chimney. The chimney must comply with the building code of your country, state or province. It usually needs to be lined with refractory bricks, metal, or clay tiles sealed together with fire cement. The diameter of the chimney must be the same as the appliance's flue outlet. If your masonry chimney does not have the same diameter as the appliance's flue outlet, you need to insert a stainless steel liner having the proper diameter. Otherwise, you may face draft problems. There are two types of liners: rigid and flexible liner. Both types are made of stainless steel. They must be certified for venting solid-fuel burning appliances. Flexible liner is particularly useful when the masonry chimney has one or more deviations.

### Can I cook on the top of my wood stove?

It is definitely possible to cook on the top of your stove. This can be very useful in case of power failure. A stove fully loaded with wood will easily reach 500 to 700 °F on top. This is sufficient to cook. The use of a pan or other cookware may scratch the paint. An option is to use a cast iron cooking grid or simply lay a piece of stainless steel on top of the stove.

### Can I remove the legs or pedestal of my stove and convert it into a fireplace insert?

Unfortunately, there is a major design difference between a freestanding wood stove and a wood insert. The wood insert (like all other inserts) has an extra steel jacket that covers about 2/3 of its firebox on the sides and all of its back. This serves to accumulate the heat radiated by the firebox. The heat is then pushed in front of the unit and into the room by a blower. Without this feature, the heat radiated by the insert would be lost into the masonry cavity. Hence, a stove inserted into a masonry fireplace would not have the same efficiency. Furthermore, its clearances to combustible materials could vary. If the stove has not been tested for this type of installation, it cannot be inserted into a masonry opening.

CATEGORY	QUALIFY OF :	OBTAIN ONE POINT IF :
Wood or pellet stoves	They meet the EPA or CSAB415.1 standards <u>and</u> are connected to outside combustion air.	For non-catalytic stoves, their emissions do not exceed 4.5g/h.
Wood or pellet inserts	They meet the EPA or CSAB415.1 standards <u>and</u> are connected to outside combustion air.	For non-catalytic inserts, their emissions do not exceed 4.5g/h.
High-efficiency wood fireplaces	They meet the EPA or CSAB415.1 standards <u>and</u> are connected to outside combustion air.	For non-catalytic fireplaces, their emissions do not exceed 4.5g/h.
Decorative wood fireplaces	Have a minimum burn rate exceeding 5kg/h <u>and</u> are connected to outside combustion air.	Their emissions do not exceed the 7.3g/kg limit imposed under the <i>EPA Voluntary Low Mass Fireplace Program</i> . The limit is 5.1 g/kg starting in 2013.

## Why doesn't my heater produce enough heat?

Possible causes and solutions:

1- The moisture content of your wood is too high.

Solution: Make sure you use good, seasoned wood. The wood you burn plays an important role in the overall performance of your heater. Your wood should have been properly dried for about one year. Furthermore, it is better to use hardwood, such as oak, maple, beech, or ash. For the same volume, hardwood will produce more heat. Storage is also very important. Wood that has been cut for one, two or even more years, will not necessarily be dry if it has been stored in poor conditions. Under extreme conditions, it may have rotted instead of drying. Smaller pieces of wood will dry faster. The wood should be stored in a place where the grass is not too long, and where the

wind will be able to circulate between the logs. A 12-inch gap should be kept between the cords. The wood should be placed in the sunniest area and should be protected from the rain and snow on top, but not on the sides. Use a moisture reader to measure the moisture content of your wood. Ideally, it should be below 25%.

### ***2- The air control mechanism is not open enough.***

Solution: Adjust the air control mechanism in order to keep the flue temperature within the comfort zone (between 250 °F and 475 °F) on your chimney thermometer. The air control mechanism must always be closed gradually. You need to obtain a good bed of red embers and the logs must be completely lit up before you close the air control completely. This can easily take up to one hour.

### ***3- The logs that you are using are too big.***

Solution: Use smaller pieces of wood and place them to allow proper air circulation between the logs. The same weight of wood cut in many small pieces will produce more heat than fewer, larger logs. Only add big logs when you have a good bed of red embers. Logs with a diameter exceeding 6 inches should always be split. Avoid stacking logs to the top of the firebox.

### **4- The chimney draft is too weak.**

Solution #1: In many cases, a weak draft is simply due to insufficient heat in the exhaust system. Build a small, intense fire, and leave the door ajar (never leave the heater unattended). Before inserting larger logs, use dry kindling to obtain a good bed of red embers. Gradually increase the size of the logs. Close the unit's door when you reach a flue temperature of approximately 475 °F on the chimney thermometer. Leave the air intake fully open for approximately 15 minutes. Then, gradually close the air intake control. Note that there is no danger in letting the temperature inside the flue reach approximately 700 °F during the start-up. This is even favorable in order to properly start your heater. You must, however, avoid maintaining excessive temperatures (above the comfort zone on your thermometer) during a long period of time. Your chimney thermometer should be positioned on the exhaust pipe, approximately 18 inches above the unit.

Solution #2: Your heater may not have all the oxygen it needs to allow for a sufficient draft. You first need to ensure that the room where the heater is located is sufficiently large and well ventilated. Open the nearest window by approximately 2 inches. If you notice a significant improvement, it is a sign that the unit needs more oxygen. The room may be too insulated or too small. Without an additional source of oxygen, the draft will remain weak and cause the glass stay dirty.

Solution #3: The chimney may be too short. In order to obtain a sufficient draft, your chimney must have a minimum height. Twelve feet (from the heater to the chimney cap outside the house) is a minimum. A height of 15 feet or higher is ideal.

Solution #4: Your exhaust system may be too restrictive or may lack a sufficient rise. Ideally, your exhaust system should not have more than one 90° elbow. Furthermore, all

horizontal sections should be as short as possible and have a minimum slope of ¼" per foot.

**Solution #5:** Your exhaust system may be oversized. When your chimney is oversized, the volume of air that needs to be warmed-up is larger. It is therefore difficult to reach temperatures that will allow for a sufficient draft. Most advanced combustion systems (those certified to EPA/CSAB415.1-10) have a 6" flue outlet (152 mm). If your exhaust system does not have a 6" diameter, a solution is to insert a stainless liner with a 6" diameter inside the exhaust system.

If you have verified all the points mentioned above and your heater works fine, but still does not produce enough heat, you may be asking for more than what your appliance can realistically give you.

Stoves, fireplaces, and inserts are used for "zone heating". It is normal that the heat is distributed unevenly inside your home. It will always be colder in the rooms that are distant from the heater. Furthermore, since heat rises, a heater located at the ground-floor level will not heat your basement.

**Solution 6:** It is possible to increase heat circulation between the floors by installing floor traps. The location of your heater is also important. Try to install it in a central location. If you want to heat both your basement and the ground floor, install your heater in the basement. The heat will rise to the upper floors. Verify that the area you try to heat respects your appliance's heating capacity. Your appliance's heating capacity can be found on the printed literature, in the owner's manual, or in the technical data section on our web site. Keep in mind that your appliance's heating capacity assumes optimum conditions. It may be too low in situations where a house is poorly insulated, or highly exposed to wind. If you already have an appliance with a high heating capacity that works normally but does not heat enough, you probably need a central heating system, such as a warm air wood furnace.

## Why does the fire go out when I close the loading door?

Possible causes and solutions:

### **1- The moisture content of your wood is too high.**

**Solution:** Make sure you use good, seasoned cord wood. The wood you burn plays an important role in the overall performance of your heater. Your wood should have been properly dried for approximately one year. Storage is also key. Wood that has been cut for one, two or even more years will not necessarily be dry if it has been stored in poor conditions. Under extreme conditions, it may have rotten instead of drying. Smaller pieces of wood will dry faster. The wood should be stored in a place where the grass is not too long, and where the wind will be able to circulate between the logs. A 12-inch gap should be kept between the cords. The wood should be placed in the sunniest area and should be protected from the rain and snow on top, but not on the sides. Use a moisture reader to measure the moisture content of your wood. Ideally, it should be below 25%.

## **2- The air control mechanism is not open enough.**

Solution: Adjust the air control mechanism in order to keep the flue temperature within the comfort zone (between 250 °F and 475 °F) on your chimney thermometer. The air control mechanism must always be closed gradually. You need to obtain a good bed of red embers and the logs must be completely lit up before you close the air control completely. This can easily take up to one hour.

## **3- The logs that you are using are too big.**

Solution: Use smaller pieces of wood and place them to allow proper air circulation between the logs. The same weight of wood cut in many small pieces will produce more heat than fewer, larger logs. Only add big logs when you have a good bed of red embers. Logs with a diameter exceeding 6 inches should always be split. Avoid stacking logs to the top of the firebox.

## **4- The chimney draft is too weak.**

Solution #1: In many cases, a weak draft is simply due to insufficient heat in the exhaust system. Build a small, intense fire, and leave the door ajar (never leave the heater unattended). Before inserting larger logs, use dry kindling to obtain a good bed of red embers. Gradually increase the size of the logs. Close the unit's door when you reach a flue temperature of approximately 475 °F on the chimney thermometer. Leave the air intake fully open for approximately 15 minutes. Then, gradually close the air intake control. Note that there is no danger in letting the temperature inside the flue reach approximately 700 °F during the start-up. This is even favorable in order to properly start your heater. You must, however, avoid maintaining excessive temperatures (above the comfort zone on your thermometer) during a long period of time. Your chimney thermometer should be positioned on the exhaust pipe, approximately 18 inches above the unit.

Solution #2: Your heater may not have all the oxygen it needs to allow for a sufficient draft. You first need to ensure that the room where the heater is located is sufficiently large and well ventilated. Open the nearest window by approximately 2 inches. If you notice a significant improvement, it is a sign that the unit needs more oxygen. The room may be too insulated or too small. Without an additional source of oxygen, the draft will remain weak and cause the glass stay dirty.

Solution #3: The chimney may be too short. In order to obtain a sufficient draft, your chimney must have a minimum height. Twelve feet (from the heater to the chimney cap outside the house) is a minimum. A height of 15 feet or higher is ideal.

Solution #4: Your exhaust system may be too tortuous or may lack a sufficiently steep slope. Ideally, your exhaust system should not have more than one 90° elbow. Furthermore, all horizontal sections should be as short as possible and have a minimum slope of 1/4" per foot.

Solution #5: Your exhaust system may be oversized. When your chimney is oversized, the volume of air that needs to be warmed-up is larger. It is therefore difficult to reach temperatures that will allow for a sufficient draft. Most advanced combustion systems

(those certified to EPA/CSAB415.1-10) have a 6" flue outlet (152 mm). If your exhaust system does not have a 6" diameter, a solution is to insert a stainless liner with a 6" diameter inside the exhaust system.

### Why is the BTU according to EPA test data smaller than the one advertised?

You will notice a difference between the BTU output as per the EPA's test data and what is advertised on our web site and/or product literature. The maximum BTU output we advertise is what will be obtained with a full load of seasoned cordwood inserted inside the firebox. The EPA output, on the other hand, is what has been obtained during emissions testing. The EPA test procedure requires that a special type of wood is used and positioned inside the firebox in a manner that does not represent the way the firebox volume would normally be utilized using seasoned cordwood. The EPA test load is typically much smaller. Hence, the BTU as per the EPA's test data is reduced. The BTU output that should be considered by a normal user is the one we advertise for seasoned cordwood.

## What R factor is required for my floor protection and how do I calculate it?

Certain stoves, fireplaces or inserts may require a floor protection with a minimum R value. This is due to the fact that an appliance may radiate enough heat to cause the floor to potentially overheat. A thermal barrier is therefore required. A non-combustible material with an R value equal or higher than the minimum required by the appliance's manufacturer must be installed. For esthetical reasons, the material chosen is often covered with another non-combustible decorative material. For instance, a Micore® board covered with ceramic tile constitutes an ideal combination because it is both insulating and esthetically pleasant.

There are two ways to calculate the R factor of the floor protection. First, by adding the R-values of the proposed materials or if some K and thickness values are given, by converting them to R values. To calculate the R factor for a composite floor protection made of a combination of alternative materials, simply add the R-values of those materials. If the result is equal to or larger than the required R value, the combination is acceptable. For R-values of some selected materials, consult the table below.

**Example:**

Required floor protection R of 1.00. Proposed materials: four inches of brick and one inch of Durock® board

Four inches of brick ( $R = 4 \times 0,2 = 0,8$ ) plus 1 inch of Durock® ( $R = 1 \times 0,52 = 0,52$ ).  
 $0,8 + 0,52 = 1,32$ .

This R value is larger than the required 1.00 and is therefore **acceptable**

In the case of a known K and thickness of alternative materials to be used in combination, convert all K values to R by dividing the thickness of each material by its K value. Add the R values of your proposed materials as shown in the previous example.

**Example:**

K value = 0.75  
 Thickness = 1  
 R value = Thickness/K =  $1/0,75 = 1,33$

### THERMAL CHARACTERISTICS OF COMMON FLOOR PROTECTION MATERIALS\*

MATERIAL	CONDUCTIVITY (k) PER INCH	RESISTANCE (R) PER INCH THICKNESS
Micore® 160**	0.39	2.54
Micore® 300**	0.49	2.06
Durock®	1.92	0.52
Hardibacker®	1.95	0.51
Hardibacker® 500	2.3	0.44
Wonderboard®	3.23	0.31
Cement mortar	5.00	0.2
Common brick	5.00	0.2
Face brick	9.00	0.11
Marble	14.3 – 20.00	0.07 – 0.05
Ceramic tile	12.5	0.008
Concrete	1.050	0.950
Mineral wool insulation	0.320	3.120
Limestone	6.5	0.153
Ceramic board (Fibremax)	0.450	2.2
Horizontal still air*** (1/8")	0.135	0,92

\*Information as reported by manufacturers and other resources.

\*\*Micore 300 is recommended due to its higher density. Even though ceramic tile can be installed directly over Micore, the insertion of a 1/2" Durock cement board between the Micore and the ceramic tile is advisable. This will prevent the potential deformation of the Micore board, which could occur if a heavy object is permanently placed over the ceramic tile. A slight deformation of the Micore board could cause some ceramic joints to crack.

\*\*\*For a 1/8" thickness. You cannot «stack» horizontal still air to accumulate R-values; you must separate each later of horizontal still air with another noncombustible material.

## What burn time will I get from my wood heater?

The combustion time for an EPA or CSAB415.1-10 certified, non-catalytic wood appliance depends on many factors, the most important being the size of its firebox. Heaters with a 2.0 cubic foot firebox or more will normally have longer burn-times. From 6 to 8 hours is about the burn time you will get. Some companies will advertise longer burn times, but be careful, this calculation is made from the time you light the fire to the time there is absolutely no combustible left into the firebox. No matter what the appliance model is, the maximum BTU output will be obtained over approximately 33% of the total burn cycle. This represents 2 to 3 hours for a medium-size stove. So realistically, you will have to reload the unit every 3 or 4 hours in order to get the maximum heat out of your appliance when you are home. If you don't reload the heater and let it burn the remaining fuel, your output will slowly decrease until there is no useful heat left to produce (we call this the "tail end" of the combustion cycle). This "tail end" will provide heat for another 4 to 5 hours. So if you are looking for a 6 to 8-hour burn time, make sure you choose an EPA or CSAB415.1-10 certified wood heater with a BTU output (using cordwood) of 60,000 BTU or more. Appliances with that kind of output all have fairly large fireboxes. If you are going to rely mostly on wood for heating and your house has more than 2,000 square feet, do not hesitate to choose one of our larger units (>85,000 BTU). Those appliances will have a burn time of approximately 8 to 10 hours.

## Can I install an EPA or CSAB415.1-10 certified heater on an 8-inch chimney?

EPA or CSAB415.1-10 certified heaters function best on a 6-inch chimney (interior diameter). The problem with an 8-inch chimney is that the appliance may struggle to heat-up the air volume contained inside the chimney. A hot chimney is required to create enough draft. Poor draft will inevitably lead to poor combustion, which will cause smoke roll backs, a dirty glass, lack of heat, and a large quantity of unburned fuel inside the firebox. It is therefore highly recommended installing a 6-inch liner inside the 8-inch chimney. This liner may be rigid or flexible.

## What makes a heater mobile-home approved?

Mobile-home approved stoves have gone through specific testing to show that they can source their combustion air entirely from outside the house. This is required because mobile homes (or manufactured homes) are often very airtight. Should there be a lack of combustion air, harmful levels of CO (carbon monoxide) could accumulate in the house. This is why mobile-home approved stoves have an adapter that hooks-up to the unit and connects to a fresh air intake on the outside wall of the house through an insulated pipe.

## Do I need to install a fresh air intake on my wood heater?

A fresh air intake is not mandatory for your wood heater, unless the unit is installed in a mobile home or if the local building code or the manufacturer requires it. If the heater is installed in an open room, in a house that is more or less air-tight, combustion air will normally be easily replaced. In this case, the installation of a fresh air intake is not required. It must, however, be noted that a fresh air intake, even if it is not mandatory, will always provide the advantage of better balancing the house with regards to combustion air. If the house has a powerful mechanical exhaust system that may be used while the heater is burning (ex: range hood), a fresh-air intake will be required.