

# Wood Stove Trouble-Shooting Guide

## Problem 1: Difficult to Start

<u>Possible Cause</u>	<u>Solution</u>
<b>Not Enough Air</b>	Open primary air or open the door a crack until kindling catches <b>(do not leave unattended when door is open)</b> .  On catalytic stoves be sure by-pass damper is open.
<b>Bad Kindling</b>	With several sheets of crumpled newspaper use several pieces of small split dry kindling no more than 1" in diameter to start and slowly add larger pieces. Always remember: The smaller the better, the drier the better.
<b>Down Draft/Cold Chimney</b>	Heat up chimney flue. Twist up some newspaper to create a torch and hold up into the stovepipe until draft is reversed.

*Note: Many times, difficulty lighting a stove is a direct result of a cold chimney/down draft.*

### Tips

- If you consistently have problems lighting a stove, it may be helpful to reconsider the way you're building the fire and perhaps even have the salesperson who sold the stove, show you how to light one that will burn in your specific stove.
- The hearth and BBQ industry offer many products that can simplify or eliminate the need for kindling. These products are fire starter materials that can usually be used directly with small pieces of wood.
- Burn only solid wood directly on the bottom of the stove; do not elevate the fire in any way even with grates. Never use gasoline or other flammable liquids to start a fire, and always keep such liquids far from the stove.

## Problem 2: Odor/Smoking

<u>Possible Cause</u>	<u>Solution</u>
<b>Wood Quality</b>	Burn only quality dry wood (on average, wood that has been cut, split and stacked outside with protection from rain, for a period of 6 - 14 months, is considered dry-seasoned wood and will produce the most amount of heat). Burning 'young' wood will generate large amounts of smoke and very little heat. This is due to the high moisture content in 'young' wood. Wood that hisses while burning has not been seasoned enough.

<u>Possible Cause</u>	<u>Solution</u>
<b>Chimney Height</b>	Most wood stoves require a minimum chimney height of 12' - 14' (including the connecting pipe). All solid fuel

chimneys must meet the 10' & 2' or 3' rule. "A chimney flue shall extend not less than (a) 3' above the highest point at which the chimney comes in contact with the roof, **and** (b) 2' above the highest roof surface or structure within 10' of the chimney."

**Chimney Liner/Size** Most wood stoves must be installed into a chimney that incorporates an approved liner and is in good condition with no cracks or missing mortar or a prefabricated chimney complying with the requirements for ULC S629. The fireclay liner must have a nominal size of 8" X 8" O.D. (outer diameter), and not larger than 8" X 12" O.D., while round liners/chimneys must have an inside diameter of 6" and not greater than 8".

*Never connect a wood-burning appliance to a flue serving another appliance of any kind. Be sure that all other openings to the chimney flue are sealed.*

**Chimney Blocked/Obstructed** Check chimney and stovepipe for blockage (i.e. birds nest). A yearly chimney inspection and possible cleaning by a licensed professional is recommended.

It is recommended to remove any tree branches that grow within 6' to 8' of chimney top. Branches can alter wind and airflow patterns at the top of the chimney making it difficult for smoke to exit the chimney and in some cases making it difficult to establish 'draft'.

**Stovepipe - Horizontal** It is always better to slope horizontal runs  $\frac{1}{4}$ " per foot up toward the chimney.

**Stovepipe - Elbows** Elbows create restrictions for the flow of smoke. Therefore always limit the number of elbows used in any installation. Restrict the number of 90° elbows used in an installation to 2. For the best performance stovepipe should be as short and direct as possible. Use 45° or 30° elbows when ever possible. They offer less restriction.

**Stovepipe - Length** The maximum total length of single wall stove pipe is 10'. Longer runs require a listed double-wall pipe. Single-wall must be 24 gauge welded steel - *galvanized is not permitted.*

**Stovepipe - Old** Replace any old and worn stovepipe. The average life of single-wall stovepipe varies depending on stove use and location within the home but should be replaced every 3 - 5 years.

**Cold Exterior Chimney** If possible, reline chimney with liner. Box in exterior chimneys inside an insulated chase.

## Possible Cause

## Solution

### **Operating Errors**

Open the stove damper, stovepipe damper and/or primary air shortly before opening the stove to re-load. When loading the stove, open the loading door slowly. Burning the stove at high temperatures will generate less smoke, and keep the chimney warmer, generating a stronger draft.

### **Air Systems**

Do not install a stove within 12' of a cold air return of a heating/cooling system, exhaust fan, or house fan. In **tight homes** install an outside air kit directly to the stove. Use weather stripping in the upstairs windows and doors in older, **less tight homes**.

## **Tips**

- a. A stove that leaks does not cause smoking or odor! Most people want to believe that their "air tight" stove is defective. This just simply is not the case. Airtight simply means that special attention has been taken to limit the amount of air the stove can draw out of the home and to control the heat output. Therefore if the stove were "leaking" and the chimney has the appropriate draft it would therefore be drawing more air *out of the house* and up the chimney not leaking smoke into the house.
- b. Remember that it is the chimney that makes the stove work not the stove that makes the chimney work. This is because a chimney actually creates suction, called "draft" which pulls air through the stove and along with it the smoke. When a smoke or odour problem persists, the immediate area of concern should be the chimney. It is the chimney's job to vent the stove.
- c. Remember that newer stoves are more efficient and cleaner burning. As a result they emit less smoke and emission particulates thereby affecting draft requirements. It is important to know the venting requirements for all stoves and install based on those requirements. Knowing what is required before you start can eliminate this potential problem.

## **Problem 3: Short Burn Time**

### Possible Cause

### Solution

#### **Wood Load**

Many people do not load the stove to capacity. Larger pieces of wood will burn longer than smaller pieces. Once a bed of coals is established use LARGE pieces of hard wood. Use the maximum length of wood the stove will allow; using short wood will decrease the burn time. Use hard wood that has been cut, split and stacked outside for at least 6-14 months. It should then have a moisture content reading of 20% or less.

#### **Chimney-Height**

The taller the chimney the stronger the draft. Chimneys over 35' can create excessive draft, which can cause high stove temperatures and short burn times. Limit chimney heights to 30'. Install a stovepipe damper (butter-fly damper).

#### **Operating Errors**

The primary air control lever should be slowly adjusted toward

the closed position and then finally completely closed as the fire is established. *Do not burn the stove with the ash pan door open at any time.* Only operate the stove with the doors open. When using a screen (if approved), position the doors fully open, any other position can create over firing conditions.

## Tips

- a. If quality of wood is an issue, once a bed of embers is established it may be possible to mix in some green wood with your seasoned wood. Keep in mind however, that a lot of energy goes into drying the green wood before it will burn. Meaning: It will burn and *it will* extend the burn time but heat output maybe slightly compromised.
- b. **Burn-time:** The amount of time the stove will burn with a full load of wood yet leaving a sufficient amount of embers to start up the fire without the use of a match when reloading! So load it up- it's OK.
- c. Many people believe that when the primary air is completely closed the stove is not getting any air. **NOT TRUE, NOT TRUE!** First, when the primary air control lever is in the closed position the air slider is designed to be slightly open (you can't see it but its true). Secondly, all non-catalytic stoves use secondary combustion air to meet EPA emission standards. This air is introduced into the firebox to help re-burn the smoke.

## Problem 4: Back Puffing

### Possible Cause

### Solution

#### **Closing Air Prematurely**

Gradually close the primary air, so that when closed there is sufficient heat to mix with secondary air to create secondary combustion (burning of the smoke). When reloading the stove with fuel it may be necessary to wait up to 30 minutes before completely re-closing primary air.

#### **Sec. Air Supply Blocked**

Check for ash build-up and be sure secondary air holes are free of debris.

**Wood Quality** Always burn wood that has been cut, split and seasoned outside for at least 6-14 months. It should then have a moisture content reading of 20% or less. Wood that hisses while burning has not been seasoned enough. Green wood requires enormous amounts of energy to dry out before it will burn and therefore it will not allow the fire to reach high temperatures. In the event that wood is more than 18 months to 2 years old, it could be igniting too fast and all at once. Mix the older wood with some green wood.

#### **Operating Temperatures**

Manufacturers recommend the use of stovetop thermometers to monitor the surface temperature of the stove. The optimum surface temperature range for the most efficient burn is between 400° and 600° F (200° - 300° C). Operating at temperatures below this will generate large amounts of smoke and temperatures

above this will over fire the stove.

**Insufficient Draft** Make sure that the chimney requirements for the stove have been met, i.e. chimney height, flue size etc. (see installation instructions for details). Install a chimney cap - they help to keep the chimney warm.

### Tips

- a. **Back Puffing:** The spontaneous ignition of built up gases. Usually a result of the stove burning in a closed air mode where the gases build and build until oxygen is introduced through an opening in the door or through the primary air supply and cause a rapid ignition of the gases similar to a small explosion. The resulting explosion can force gases out of the stove through the path of least resistance i.e. door seals, flue collars, and air intake holes.
- b. Some people complain about back puffing in the spring and fall months but not during the winter months. This is a direct result of draft. Because the temperature differences inside the house and outside the house are not drastic the draft is not as strong. Provide more air to the fire by opening the primary air control. Complete closure of the primary air is not recommended during mild weather months.

## Problem 5: Hard to Control/Over-Firing

<u>Possible Cause</u>	<u>Solution</u>
<b>Poor Gasket Seals</b>	Be sure doors are latched tightly. Check gaskets on all doors for tightness. Close and latch the doors on a dollar bill and slowly try to pull the dollar bill free. If it can be easily removed then the seal is not sufficient. Replace the gaskets. Check several spots along the door edge and repeat the process on any other gaskets as well.
<b>Doors Not Latched Tight</b>	Be sure front doors and <u>ash pan door</u> are latched tightly.
<b>Wood Quality</b>	Only burn wood that has been cut, split and seasoned outside for 6-14 months. It should then have a moisture content reading of 20% or less. Never burn old pallet wood, kiln dried wood, trash, or wax products. Mix in green wood with wood that has dried excessively. Wood that hisses while burning has not been seasoned enough.
<b>Leaky Stove Seams</b>	After performing a leak test (see below) on a <i>cast iron</i> stove, repack the necessary seams with furnace cement. Replace any cracked or warped parts. It may be necessary to completely rebuild a cast iron stove that is 10 years or older using new cement to seal the seams.
<b>Chimney Height</b>	The taller the chimney the stronger the draft. Chimneys over 35' can create <b>excessive draft</b> , which can cause high stove temperatures and short burn times. Limit chimney height to 30'. Install a stovepipe damper (butter-fly damper) in the stovepipe. Use less primary air into the stove.

## Tips

- a. **Smoke-Test:** Light the stove and establish a surface temperature of 400°F. With the doors closed and the primary air control in the full open position pass an incense stick, cigarette or smoke pencil along all the stove's seams. If the smoke is drawn into the stove then a leak is present. Old cement should be removed before new cement is applied to an area. Use a damp rag to remove excessive cement from the outside of the stove.
- b. REMEMBER THAT DAMAGE CAUSED BY OVERFIRING A STOVE IS NOT COVERED UNDER MANUFACTURERS WARRANTY POLICY. If any part of the stove or chimney glows, you are over firing the stove and serious damage to the stove or house could result.
- c. Manufacturers recommend the use of stovetop thermometers to monitor the surface temperature of the stove. The optimum surface temperature range for the most efficient burn is between 400° and 600° F (200° - 300° C). Operating at temperatures below this will generate large amounts of smoke and temperatures above this will over fire the stove.

## Problem 6: Excessive Creosote

<u>Possible Cause</u>	<u>Solution</u>
<b>Operation Errors</b>	Burn the stove at a surface temperature of 400° - 600° F (200° - 300° C). Be sure to establish a hot bed of embers before gradually closing the air supply. When reloading the stove with fuel it may be necessary to wait up to 30 minutes before slowly closing the air down.
<b>Wood Quality</b>	Always burn wood that has been cut, split and seasoned outside for 6 - 14 months. Wood that hisses while burning has not been seasoned enough. Green wood has high moisture content and will generate high amounts of smoke. Split wood will season better. <b>Dead wood is not seasoned wood!</b>
<b>Chimney Size</b>	Be sure the stove is installed into the correctly sized lined flue. All wood stoves must be installed into a chimney that incorporates an approved liner or a prefabricated chimney complying with the requirements for ULC S629. The fireclay liner must have a nominal size of 8" X 8" O.D, and not larger than 8" X 12" O.D, while round liners must have an inside diameter of 6" and not greater than 8". Never connect a wood-burning appliance to a flue serving another appliance <i>of any kind</i> . Be sure that all other openings to the chimney flue are sealed.
<b>Exterior Chimney</b>	If possible reline chimney with stainless liner. Box in exterior chimneys inside an insulated chase. Install a chimney cap - they help to keep the chimney flue warm.
<b>Chimney Height</b>	Most wood stoves require a minimum chimney height of 12' - 14' (including the connecting pipe). All solid fuel chimneys must meet the 10' & 2' or 3' rule. "The chimney must be 3' higher than the high side of point of roof penetration when passing through the roof within 10' of the peak. If greater than 10' from the peak, the chimney must be 2' higher than the roofline measured 10' horizontally.
<b>Stove Size</b>	Operating temperature is very important. If the stove is too large for the area and cannot burn at a surface temperature of 400° - 600° F (200° - 300° C) because it makes the room/house uncomfortably hot, change the stove to a smaller model and burn hotter.

### Tips

- a. **Creosote:** When wood is burned slowly and at low temperatures, it produces tar and other organic vapours, which combine with moisture to form creosote. The slow moving smoke carries the creosote vapours, which condense in the cooler chimney flues, and this creosote then sticks to the chimney walls. The creosote that accumulates in the chimney is highly flammable and is the **fuel** of chimney fires.

To prevent chimney fires it is important to have the chimney and chimney connector pipe inspected and/or cleaned semi-annually. A qualified chimney sweep or other authorized service person can provide this service. It is also important to remember that chimney size, temperature and height all affect draft which in turn effects the formation of creosote. Be sure to follow the installation and operation guidelines established in each manual.

- b. To prevent the build up of creosote inside the stove and flue after low air burns (over night burns) burn the stove at a surface temperature of 700° F (375° C). for one hour daily to burn off any creosote that will build up during these low air burns. Do not leave the stove unattended during these burns. Doing this daily will help reduce the build up of creosote inside the stove and flue. However, it is also important to inspect the system and/or clean annually by a qualified service person.

## **Problem 7: Low Heat**

### **Possible Cause**

### **Solution**

**Wood Quality** Burn only quality dry wood (on average, wood that has been stacked outside for a period of 6-14 months is considered dry-seasoned wood and will produce the most amount of heat). It should then have a moisture content reading of 20% or less. Burning "young" wood will generate large amounts of smoke and very little heat. This is due to the high moisture content in "young" wood.

**Chimney** If possible reline masonry chimney with liner. Box in exterior chimneys inside an insulated chase. Make sure that the chimney requirements for the stove have been met, i.e. chimney height, flue size etc. (see your installation instructions). Install a chimney cap - they help to keep the chimney warm.

**Operating Errors** Manufacturers recommend the use of stovetop thermometers to monitor the surface temperature of the stove. The optimum surface temperature range for the most efficient burn is between 400° and 600° F (200° - 300° C). Provide more primary air to the firebox. Many people do not load the stove to capacity. Once a bed of coals is established use larger pieces of hard wood.

**House Construction** In newer homes with tighter construction, install outside air to the stove. Use weather stripping and insulation in older homes as appropriate to reduce heat loss.



## Tips

- a. When people complain of low heat there are two things that should come to mind immediately:

1. What's no heat? How hot are they actually getting the stove (surface temperature)?


The stove should easily burn at a temperature of 400° - 600° F (200° - 300° C). If you can't answer the question, purchase a stovetop thermometer. If a higher surface temperature is required, then the stove is *too small* for your needs.

2. Are you loading the stove with the appropriate amount of wood?


Many times a person is 'tossing' in a piece of wood every hour or so. Be sure you're loading the stove to capacity and maintaining a surface temperature of 400° - 600° F (200° - 300° C). Use the primary air control to regulate the heat output.

# BURN SMART

## TO MINIMIZE AIR POLLUTION FROM YOUR WOODSTOVE:



Firewood should be seasoned by splitting and stacking it at least eight months before it is burned. Your woodpile should be covered in a way that keeps rain and snow off but allows air to circulate through it. Dry, seasoned wood burns best!


A message from the  
 BRITISH COLUMBIA LUNG ASSOCIATION

# BURN SMART

## TO MINIMIZE AIR POLLUTION FROM YOUR WOODSTOVE:



Burn only clean, dry wood in your woodstove. Never burn green, wet, painted or treated wood including plywood, pressboard, railway ties or utility poles. Never burn household garbage in your woodstove or fireplace!


A message from the  
 BRITISH COLUMBIA LUNG ASSOCIATION

# BURN SMART

## TO MINIMIZE AIR POLLUTION FROM YOUR WOODSTOVE:



Burn only small, bright fires. Start the fire using small pieces of wood kindling, and keep the fire moderately hot, adding larger pieces of split wood as required. Do not damper down the fire too much, as this will produce a smoky, oxygen-starved fire.


A message from the  
 BRITISH COLUMBIA LUNG ASSOCIATION

# BURN SMART

## TO MINIMIZE AIR POLLUTION FROM YOUR WOODSTOVE:




Watch for signs of incomplete burning such as visible smoke coming from your chimney or long, lazy flames in the firebox. When you see these signs, more air is needed to improve your fire. You must open the dampers to allow additional air into the stove.

A message from the  
 BRITISH COLUMBIA LUNG ASSOCIATION


# 8 TIPS TO BURN CLEAN

# BURN SMART

## TO MINIMIZE AIR POLLUTION FROM YOUR WOODSTOVE:

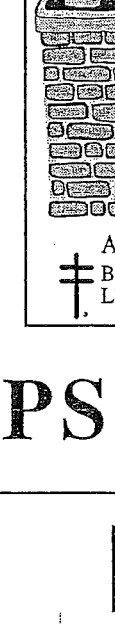


Don't burn on poor air-quality days. Your woodsmoke will add significantly to the problem, particularly on days of atmospheric inversions and still winds.


A message from the  
 BRITISH COLUMBIA LUNG ASSOCIATION

# BURN SMART

## TO MINIMIZE AIR POLLUTION FROM YOUR WOODSTOVE:



Buy the right stove for your needs. The most common mistake is choosing a stove too large for the area to be heated. A stove that is too large for your home will have to be dampered down to maintain a comfortable temperature, thus creating smoke and increasing air pollution.


A message from the  
 BRITISH COLUMBIA LUNG ASSOCIATION

# BURN SMART

## TO MINIMIZE AIR POLLUTION FROM YOUR WOODSTOVE:




Don't burn in moderate temperatures. Save your wood for cold days. When you do use your woodstove or fireplace, keep the fire small and bright, and burn only clean, dry wood.


A message from the  
 BRITISH COLUMBIA LUNG ASSOCIATION

# BURN SMART

## TO MINIMIZE AIR POLLUTION FROM YOUR WOODSTOVE:



Don't damper down your fire, as this will produce a smoky, oxygen-starved fire. Ensure that you follow the manufacturer's instructions for the safe operation and maintenance of your particular stove. Check your chimney frequently for creosote buildup...a common cause of house fires.

A message from the  
 BRITISH COLUMBIA LUNG ASSOCIATION