The Lange Stove Catalog

and

Wood Heat Guide

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Firing Instructions for Wood Stoves

- Cover the bottom of the stove with an inch or so of sand. This protects the floor and the bottom plate from extremes of heat.
- To start the fire, place a small pile of paper and kindling at the front of the stove. Place heavier wood on the kindling. A wad of paper placed in front of the kindling works well; the draft will draw flame from the paper through the kindling, igniting it.
- Most Lange woodburning stoves have two draft regulators on the door, one above the other. Open both regulators fully as you start the fire. Once the fire is burning well, close the lower regulator completely; use only the upper regulator to govern the fire. The length of time you leave the lower regulator open is something that will vary with different models and different chimneys and burning conditions. Once the fire is burning well, leaving the lower regulator open only wastes wood and drives heat up the chimney.
- On Lange Model 6302A there is a knob in the front panel of the stove above the door. Pull this out to by-pass the baffle and get the fire off to a quick start. Close it as soon as the wood is ignited; leaving it open wastes heat.
- When you first fire a new stove, a condensate may be formed. The condensate contains acid which can stain enamel or etch iron permanently. To avoid stains, prop the lid of the stove open slightly the first time you fire it. Something the thickness of a wooden match will do as a prop. Wipe off any condensate that may appear. Once the stove has been thoroughly heated, there will be no more condensation.
- Make your first two or three fires moderate, not raging infernos.
- Don't do anything that will cause sudden, sharp changes in the temperature of the cast iron. Don't throw cold water on a hot stove. Don't use the stove as an incinerator for trash, or see if you can get it red hot by burning it full of pine kindling with both drafts open, or with the door open.
- In Scandinavian stoves, the fire tends to burn from front to back in the firebox. Wood burns like a cigar. When the fire has burned down, there will be a pile of coals at the back of the stove. Rake the coals to the front of the firebox and place new logs on top. Your dealer should have a fire tool available that can serve as both poker and rake.
- Don't close the draft all the way. The stove requires air to support combustion. Shutting the draft too much will cause incomplete combustion and the buildup of creosote in the chimney. Leave the draft open a bit even at night. The correct amount will vary according to the draft in your chimney and the weather. You'll learn from experience. A common procedure is to leave the draft open two and one-half turns at night; in the morning there should be ample coals to restart the fire. In below-zero weather the temperature differential will be greater between the inside and outside of the house; the draft will then be stronger and the regulator can be shut down more.
- Air-tight construction and baffles make dampers unnecessary on these stoves in normal circumstances. In fact we advise against their use; the stoves are designed for use without them. But occasionally a house will have a chimney with an exceptionally strong draft, so that it's difficult to hold a fire even with the regulators nearly shut. In such instances a damper can be useful. In 99 cases out of 100, no damper is needed.
- Big wood burns slowly; small diameter or split wood more quickly. Save the big logs for holding fires overnight; use smaller, split pieces for quick heat.
- Never use gasoline, kerosene, charcoal starter, or similar liquid to start a fire!

Wood Heat Guide

Scandinavian Stoves

The stove-making tradition in Scandinavia goes back hundreds of years. It goes back to an earlier energy crisis, when wood became scarce in northern Europe. Wood was as vital then as oil is in today's economy. Wood heated the home; wood was essential to iron production, glassmaking, other industries; a shortage was extremely serious.

By the Eighteenth Century the scarcity had become acute enough for Frederick the Great of Germany to sponsor a public competition. He wanted improved designs for stoves that gave more heat and used less wood. There was a similar competition in Denmark. And in both Norway and Sweden many experiments aimed at producing more efficient stoves to save wood. The ferment was quite similar to that created today by the oil situation.

From the many experiments came generation after generation of wood stoves, improving steadily in design and efficiency. And by an irony of history, stoves designed to solve a wood shortage in Scandinavia 200 years ago, are today helping to solve another energy crisis for thousands of Americans.

Scandinavian stoves are known not only for their efficiency, but also for their steady, even heat output. They are known as well for high quality of workmanship, for sturdiness and durability, for safety and attractive appearance. Taking all these factors into account, we believe Scandinavian stoves are the best in the world today.

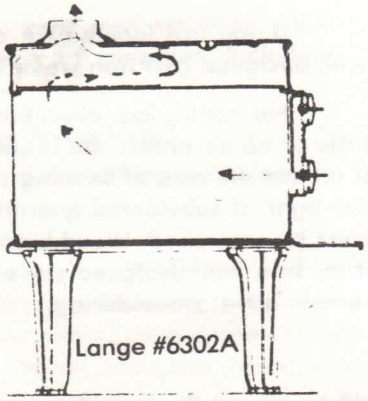
Only a handful of companies still make stoves in Scandinavia. Among them is L. Lange & Co., of Svendborg, Denmark, stove-builders for 125 years. We believe their products are unsurpassed, anywhere.

- All models are made of cast iron, heavy plates that are durable and safe, that hold heat and radiate it evenly.
- The stoves are tightly made, with joints cemented. Tight stoves are a key to efficiency. They permit controlled burning, so that you can hold a fire for many hours on one load of wood. The door of each Lange stove is hand-filed to insure a tight fit.
- In the larger stoves baffles or heat exchangers channel heated air within the stove. The effect is to radiate more heat into the room. Less heat goes up the chimney.
- The design of the stoves permits long burning and an even rate of heat output, the same thing a thermostat achieves, but without the need for one.
- The stoves are available in standard black, or in an enamel finish: red, blue, green, brown or glossy black. The enamel is a permanent finish. It makes stove-blacking unnecessary.

Baffles

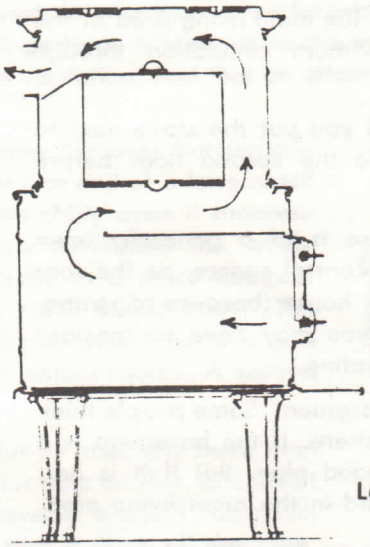
On the following pages, you'll hear from time to time about baffles. Baffles recirculate air within the stove. They bring the heated air in closer contact with the stove plates that radiate heat into the room. Baffles are particularly effective in larger stoves, where the hot part of the fire is at a greater distance from stove plates. In the smallest stove, no baffle is necessary because the design of the stove places the fire close to all stove plates.

The simplest baffles are single more-or-less horizontal plates inside the stove, as in Models 6203 and 6204. A more complex system occurs in Model 6302A (See diagram). Air leaves the firebox through two small openings at the rear of the firebox, moves forward through two channels in an upper chamber toward the front of the stove, then doubles back through a central channel to the stovepipe outlet.

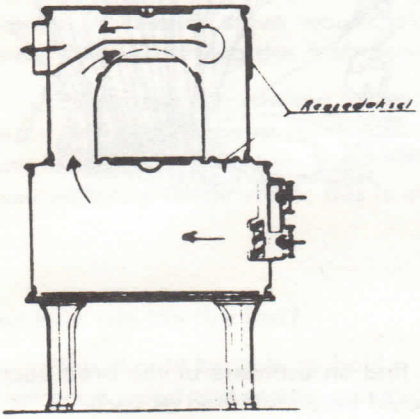


Lange #6302A

The most sophisticated baffle systems occur in two-tier stoves (See diagrams below). A second tier increases the size of a stove's radiating surface, as well as its heat-holding mass. The second tier may also (as in model 6302K) provide cooking space and an oven. All this without increasing fuel consumption.



Lange #6302K



Lange #6303

What stove to buy?

Stoves produce heat by radiation, the kind of heat you feel from the sun or an electric heater. The bigger the stove, the bigger the radiator.

The more mass a stove has, the longer it will hold heat after the fire burns low, and the more even the heat output. So consider the weight of the stove you buy, it's an important factor in what the stove will do for you. Weight is also a good indicator of how sturdily the stove is built.

Cast iron has been the metal of choice for good wood stoves ever since the first ones were cast by the Chinese nearly 2000 years ago. If you want a single reason why cast iron is the best metal for a wood stove, visit an antique shop; cast iron stoves are the ones that have lasted long enough to earn antique status.

The University of Maine has published a bulletin on the subject of wood stoves. It speaks as follows: "The better stoves are made of cast iron...Cast iron holds up well under heat, is not subject to rapid deterioration, will spread the heat away from hot spots in the fire, and generally will not warp."

If you are looking for a stove to use steadily over a period of years in your home, then a well-designed cast iron stove is the best investment — for safety, durability and appearance.

For controlled, even burning you want an air-tight stove. Or one that is so constructed that little or no air enters the firebox when the drafts are closed. A tight firebox is the key to efficiency; it means the rate of burning can be controlled completely by the draft regulator. If the firebox is not tight, if substantial quantities of air enter even with the draft closed, then the rate of burning can't be controlled. Wood burns up too rapidly, and the firebox may overheat when you don't want it to. In a well-designed stove, if you close the drafts entirely the fire should go out or just barely remain alive, smouldering.

Where to put the stove?

Locate the stove centrally, in the main living area of the house, where heat will get maximum circulation through the rooms.

Remember that heat rises. If you put the stove next to a stairwell, much heat will rise to the second floor before ground floor rooms are warmed.

Consider whether your house is of a generally open construction, heated easily from a central source, or the contrary. If air circulates poorly in your house (because of strung-out design or many small rooms) you may have to consider two or more stoves for adequate heating.

Furnaces usually live in the basement. Some people think automatically of putting the stove there. If the basement is a major living area, this can be a good plan. But if it is not, the stove will be more useful placed in the main living area.

"Coal and wood-burning stoves are radiant heaters," says the National Fire Protection Association. "Radiant heat usually provides greater comfort than other types of heat, such as heat from forced air systems. . . A person may feel comfortable in an area heated to a relatively low temperature by radiant heat if the heated area is protected from drafts."

On a cold January morning, you'll be more comfortable with the stove up where you live, not down in the basement.

How big an area will the stove heat?

Along with other stove specifications in this catalog, you'll find an estimate of the area each model may be expected to heat. This is a rough estimate, and should be understood as such.

Individual situations differ greatly in terms of climate, house location, house construction, etc. This makes it difficult to speak in general terms about what a given stove will heat, without lapsing into the kind of technical answer that for most people will offer little help.

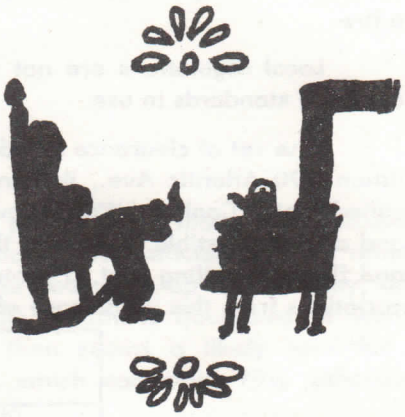
We've based our estimates on what we've seen the stoves do in houses in New Hampshire, a cold place. We think most people will find the estimates conservative. Someone living in a drafty barn in northern Canada may find them exaggerated. The estimates are not applicable to drafty barns in northern Canada.

A little common sense is required in applying these estimates to your own situation. How well a stove performs in your home will depend on a rather large number of variables, including these:

- Is the house on a cold north slope, or a south slope where sun reaches it regularly?
- Is the house insulated, and how well? To electric heat standards, or to something considerably less?
- Is the house in Maine or Virginia? Is it exposed to strong cold winds?
- Does the chimney have an adequate draft?
- Are you using dry, well-seasoned wood of good quality?
- Does the air circulate well in your house, or poorly?

If the answers to these questions are positive in heating terms, you can figure that in your house a given model will handle at least the maximum area for which it's rated. If the answers are largely negative, the stove should still perform at least up to the minimum standard in your house. But we do assume the house has some insulation, and that an effort has been made to weatherproof the house.

Warm air rises with ease. Indoors it moves horizontally with less vigor. If you place a stove at one end of a long ranch house, rooms at the other end may be chilly even if theoretically the stove has adequate capacity to handle the whole house. The same stove placed centrally in a more compact house of equal size will operate to much better effect. The difference is good air circulation. Some wood burners use blowers or fans to move warm air to distant rooms. A second stove is the other solution.



Try not to buy a stove too big for its task, any more than one too small. Ask your stove dealer for help on this, or consult neighbors who burn wood. A big stove in a small room will overheat it. The tendency will be to turn it down all the time. This means a smouldering fire and creosote buildup in the chimney. A smaller stove would provide the correct amount of heat without turning the draft down too far.

If you have a sprawling house, the best solution may be a large stove located centrally, and one or two small ones at more distant locations. The smaller stoves may come in use only during exceptionally cold weather. But a substantial number of people discover they can heat the entire house with one Lange stove; this is often the case in houses insulated for electric heat.

How long will the fire last?

You should be able to hold a fire overnight in any Lange stove. The ability to do so presupposes good wood and certain minimal fire-building skills.

How many hours will the fire hold?

The answer depends on which model is under discussion. The larger the firebox, the more wood it will hold. And the longer the fire will burn. We know from experience that all Lange stoves will hold a fire for the eight hours most people are asleep. We know also that fires are often held quite a bit longer than that in several models, the length of time depending on wood, the skill of the operator, etc. (using the longest possible log is important in holding the fire for long periods — see section on wood).

But there are limits to the length of time one should try to hold a fire. Someone told us the other day they'd held a fire 36 hours in Model 6302A. It didn't surprise us too much. Other people have told us of holding a fire 24 hours and more in the same stove. But we *don't* recommend doing this. Setting a world record for fire-holding will only make your chimney dirty. (See section on creosote).

Set the draft to hold the fire as long as you need to hold it for overnight burning, and no longer. That way you'll get more out of the wood you're burning, and have a cleaner chimney.

If you do run your stove for long periods at a low rate of heat output (i.e. with the draft shut way down) then be prepared to clean your chimney frequently. A low fire means incomplete combustion and soot buildup in the chimney, with the potential for chimney fire unless it's cleaned out.

If you are a firebuilder of moderate skill, and find you cannot hold a fire overnight even with low draft, the problem may be in your chimney. If you have an exceptionally strong draft, a damper may be required. But this is only rarely the case.

Installation

The most important consideration in installing your stove is adequate clearance between the stove and any combustible surface. A stove placed too close to a wall or to furniture can cause a fire.

Local regulations are not uniform on clearances. In fact there are at least two commonly accepted standards in use.

One set of clearance standards follows the suggestions of the National Fire Protection Association (470 Atlantic Ave., Boston, Mass. 02210). The NFPA publishes a bulletin (NFPA No. HS-8) called "Using Coal and Wood Stoves Safely." This calls for thirty-six inch clearance between a stove and any combustible surface to the front, back or sides. It calls for eighteen inches between stove and floor or, failing that, a protective pad beneath the stove. The table (from NFPA HS-8) shows variations from this in the case of cookstoves.

Minimum Clearance in Inches
Free-Standing Stoves

Type Heater	Above Top	From Front	From Back	From Sides	
Room Heater	36	36	36	36	
Cook Stove Clay Lined Firepot	30		24	Firing Side 24	Opposite Side 18
Cook Stove Unlined Firepot	30		36	36	18

NFPA stovepipe installation procedure calls for eighteen inches minimum clearance between pipe and any combustible surface.

The second commonly-used clearance standard is one we've found recommended by various fire departments as well as the Society for the Protection of New Hampshire Forests. The Portland Maine Fire Department, for example, says in its safety literature that "Under normal circumstances a stove should be installed with a minimum of 18" clearance behind and to the sides of the stove from all combustible material. The stove should be set with a minimum of at least 6" clearance underneath with a non-flammable pad provided. The entrance into the chimney should be made with a proper chimney connector, sealed with a fire-proof substance such as asbestos or furnace cement." The Keene, N.H. Fire Department follows similar standards and reports that they are based on the BOCA code.

A variety of pads may be used under the stove. Perhaps the most common is a metal-covered asbestos stove board available in hardware stores. A sheet of asbestos may also be used, or a layer of brick or tile set in place by a mason. We've used a metal tray two inches deep filled with gravel and water. The stove sits on bricks in the tray; the water evaporates, putting moisture into the air as does the kettle on top of the stove. The NFPA recommends that the pad under the stove extend eighteen inches beyond the ash removal door at the front or side of the stove.

The recommended clearances can all be reduced considerably if combustible walls are protected with some fireproof material: asbestos, brick, tile, metal. An air space between the wall and the protective layer is helpful; so is reflective foil placed behind the insulation. Various ready-made insulating panels are coming on the market at present. Check with the maker as to correct clearances.

Connect the stove to the chimney with the shortest possible span of single-thickness pipe. Avoid long horizontal spans. Instead use 45 degree angles to create an upward slope in the flue connector pipe. Try to have no more than one right angle turn between stove and chimney. These precautions will help minimize creosote (See sections on creosote and chimneys).

Many people have made the discovery that a fireplace is an inefficient heater; ninety percent of the heat goes up the chimney, and the thing eats enormous quantities of wood. The hearth then seems a likely spot for a good stove, which can offer 70% efficiency when well-run.

If you want to put the stove in front of the fireplace, first it's necessary to close off the front. It can be closed permanently with brick (as many were in the Nineteenth Century) or temporarily with sheet metal or asbestos. Whatever the method it's important that the front of the fireplace be closed off tightly, and caulking around the sheet metal or asbestos is a good procedure. If the damper is a large one, it may not be necessary to block the entire front of the fireplace. A metal plate with stovepipe sized hole can replace the damper. Again, the fit must be tight.

Chimneys

If you intend to use an existing chimney for your stove, see that it is sound and has a flue lining. If the chimney lacks flue tiles, or if the masonry is cracked, consult a mason about repairs. Fire in an unlined or cracked chimney can spread into the house.

If at all possible, see that your stove has its own chimney, with nothing else connected to it. Sometimes two or even more heating devices can be hooked to a common chimney flue, but often this is a source of trouble. The trouble may come in the form of flue gases drawn into the house through an unused opening, or in the form of poor draft and creosote accumulation.

When stove problems are reported to us, frequently we find that the real source of trouble is the chimney. These are some of the common sources of difficulty:

- Chimney not tall enough, causing draft problems with puff-back of smoke into the house. The chimney should rise two or three feet above any roof ridge that comes within ten feet of it.
- Too many heating devices on a common flue.
- House located in forest clearing. Wind moves across tree tops, drops down into the clearing and down the chimney as well, creating draft problems. A hill or a large building can cause the same kind of difficulty when the wind is right. The evidence will be smoke puff-backs.
- Dirty chimney. Blockage can be caused by soot buildup, bird nests, fallen masonry, etc.

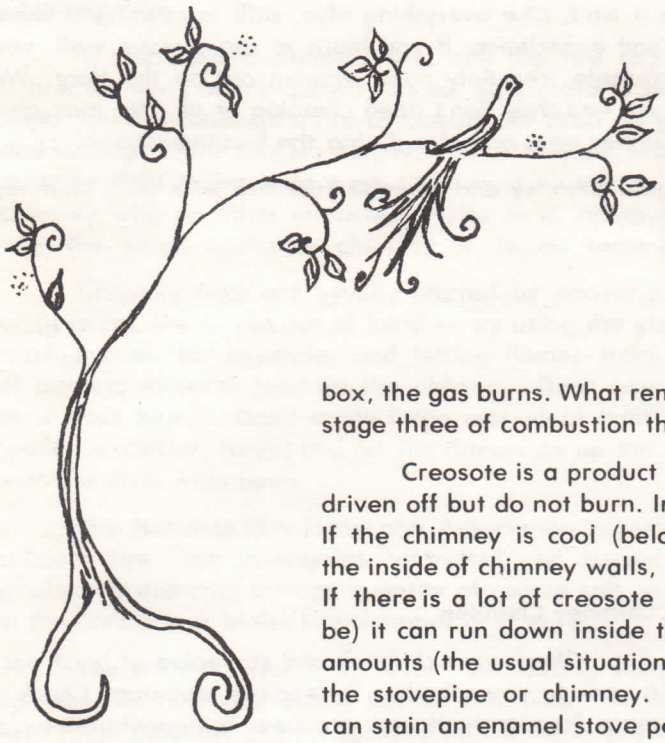
In the case of smoke puff-back caused by winds, a chimney pot or rotating wind cap can solve the problem. If your smoke puff-back problem occurs only when the wind is in a certain quarter, and if you know your chimney is clean, a pot or wind cap may be the solution.

If you need a new chimney for your stove, pre-fabricated models with insulation and stainless steel linings are available. Anyone handy with tools can install one, but it's important to observe the manufacturer's instructions as to safe clearance from beams or other combustible surfaces. Often stove dealers install pre-fab chimneys, or can recommend a reliable contractor. Pre-fabricated chimneys are effective and relatively inexpensive. They offer the advantage of heating up rapidly and (in the case of the insulated type) of retaining heat well; this is helpful in avoiding creosote problems.

Masonry chimneys offer their own advantages. They act as large heat-sinks and can radiate warmth into the house long after the stove cools. A well-built masonry chimney also offers good protection against chimney fire, if one occurs. A masonry chimney will cost more than a pre-fab, though in the case of a block chimney perhaps not a great deal more. Stone chimneys are the most expensive, then brick, then block.

Masonry chimneys today are usually set on foundations dug below frost line. But often in the past relatively small stove chimneys were built right on the floor of the house. Recently I saw a chimney on the second floor of an old house. It stood seventeen feet tall, and the floor on which it rested hadn't sagged an inch in seventy years. It's important that your floor be strong enough to take the weight of such a chimney. Consult a mason or builder to determine whether it is; if the floor isn't strong enough, perhaps it can be reinforced.

Put the chimney inside the house, not outside the wall. Inside, the chimney absorbs heat from fire or stove and radiates it back into the living space. The early colonists who built central chimneys in New England were well aware of this. Many contemporary builders put the chimney on an outside wall, where it pours heat into the outdoors — a monument to the era of cheap oil. Running stovepipe out a window and up the outside wall of the house is another poor idea, to be avoided; it will lead to creosote problems. The same thing applies to a pre-fab chimney; run it up inside the house.



Creosote and soot

Seasoned and air-dried wood contains about 20% moisture. Combustion occurs in three stages, and in stage one this moisture is driven off. During stage two various kinds of volatile matter are driven off as gas; if there is enough oxygen and heat in the firebox, the gas burns. What remains of the wood now is charcoal, and during stage three of combustion the charcoal burns, leaving ash.

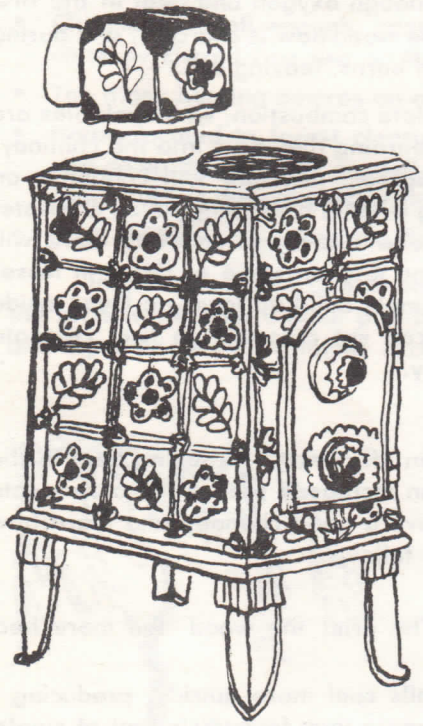
Creosote is a product of incomplete combustion, when volatiles are driven off but do not burn. Instead of burning they pass into the chimney. If the chimney is cool (below 250 degrees) moisture will condense on the inside of chimney walls, depositing what is commonly called creosote. If there is a lot of creosote (and if you're burning green wood there will be) it can run down inside the pipe and drip on stove or floor. In lesser amounts (the usual situation) it will simply build up layer on layer inside the stovepipe or chimney. A spark can set creosote on fire; creosote can stain an enamel stove permanently.

Scandinavian stoves (as well as other efficient makes) gain efficiency by keeping heat in the stove longer. This means cooler stack temperatures, and thus an increased probability of creosote formation. Creosote need not, however, be a problem if you have a good chimney and learn how to run your stove well. You avoid creosote problems by doing as follows:

1. Use dry and well-seasoned wood, preferably hardwood. The drier the wood, the more heat you gain and the less creosote you form.
2. Use a minimum of single-thickness stovepipe. The thin walls cool more quickly, producing a cooler chimney and increasing creosote risks. Try to use no more than four to six feet of single-thickness pipe; use less if possible; try to use single-thickness pipe vertically rather than horizontally; avoid horizontal runs and get an upward pitch to the pipe by using 45 degree bends instead of 90's.
   Old time woodburners sometimes recommend long spans of single-thickness stovepipe as a heating device. This idea had some merit when used with inefficient stoves where much heat went up the pipe. Efficient stoves extract right in the firebox as much heat as you should extract and still maintain adequate stack temperature. So long stovepipes are not recommended with these stoves.
3. If you've paid attention to items one and two, and you're still getting creosote, open the draft more; you aren't allowing the fire enough oxygen. Experience will indicate how much you can close the draft without causing creosote.
4. Spring and fall are the times when creosote buildup occurs most frequently. Weather is cool but not cold; a minimal fire is needed for heat, and there is a tendency to let the fire smoulder for long periods. Smouldering means incomplete combustion. When you don't need much heat, try quick, short, hot fires; you'll get the heat you need without creosote. Or, if you're determined to let your fire smoulder, clean your pipe more often at this time of year.
5. Put a cap on your chimney, or chimney pot; it will keep rain out and help hold heat in.

If all this sounds complex, in practice it isn't. Like everything else, skill in running a wood stove is something that improves with time and experience. If you learn to run a stove well, you should have plenty of heat and very little creosote, certainly none running out on the floor. We inspect our chimneys once a year and often we find they don't need cleaning at all. We may also clean the pipe connecting our stove to the chimney once or twice during the heating season.

If you burn good wood, have an adequate chimney and manage your fire with skill, chimney cleaning should be only an occasional chore.



Chimney Cleaning

Check your chimney and stovepipe at least once a year to see whether it requires cleaning. Check it more frequently if you are new to woodburning, or have reason to believe you are building up soot.

It isn't unusual to have a little smoke come into the room as you open the stove door to add wood. You can generally avoid this by opening the draft wide for a minute or two before you open the fuel door. But if your stove begins to smoke increasingly as you open the door to add wood, a chimney blockage may be at fault.

To find out what's wrong, look into the chimney from above or from below. If either is inconvenient, use a mirror and flashlight. The cleanout door is a handy place to use a mirror to look up the flue.

Once you've installed the stovepipe connecting your stove to the chimney, tap the pipe hard with your fingernail. Remember the sound it makes; it will be a "ting" echoing inside the pipe. If later you tap and hear a muffled thud, you are building up soot in the pipe and should clean it.

Various cleaning methods can be used. Some people favor a bunch of tire chains raised and lowered on a rope inside the chimney. A burlap sack filled with straw or chicken wire can be used in the same way. Drop a rope down the chimney to a helper, then pull the sack up and down inside the chimney. Some people substitute a small spruce tree for the burlap sack. My own chimneys are not terribly tall; I tie a burlap sack to the end of a long pole and use it like a giant swab. We recently heard of someone who tried to use a sack full of rocks and a weak rope. The sack got stuck. The rope broke. This is not a recommended procedure.

Chemical chimney cleaners are on the market. Check at your hardware store. These are generally thrown on a hot fire and cause creosote to crumble and disintegrate. We can't testify as to what the long-range effect on the chimney may be.

Chimney Fires

If you have a chimney fire, call the fire department. If firemen don't arrive quickly, an air tight stove is an advantage. You can control the fire by closing the draft on the stove and cutting off the oxygen supply. Your stovepipe connections **must** be tight if this is to work. You must also have a sound chimney with no other air access holes in it, another reason why the single-appliance chimney is to be recommended.

Chimney fires are usually started by allowing a stove or fireplace fire to get out of hand — by using the stove as a trash burner, for example, and letting flames from a mass of burning material roar up the chimney. Don't use a stove as a trash burner. Don't ignite large masses of light material (paper, excelsior, twigs) and let the flames go up the chimney with the draft wide open.

The National Fire Protection Association reports that a chimney fire "can usually be controlled and possibly extinguished by dumping a large quantity of coarse salt on the fire in the fireplace or in the fire chamber of a stove."

The N.F.P.A. warns to "avoid introducing water into the chimney itself, the water could damage the relatively brittle heated flue liner." A woodburner we know, however, reports that very small amounts of mist sprayed into a metal pre-fab chimney through a vaporizer can quickly control a fire. In order to make it possible to use his vaporizer, this woodburner has installed a tee with a cleanout plug in his stovepipe. In the event of fire, he can pull the plug, put a few squirts of mist into the chimney, and close it again.

Wood

Burn dry and well-seasoned hardwood. Season wood ***at least*** six months, preferably a year to eighteen months. Woodburners who ignore this advice are likely to have dirty chimneys and inadequate heat from their stoves.

Theoretically there are about 8600 B.T.U. available as heat from each pound of wood. It takes 1000 B.T.U. to evaporate each pound of moisture in a log. The wetter the wood, the more energy it takes to get the moisture out of your firewood, and the less energy is available to heat your house.

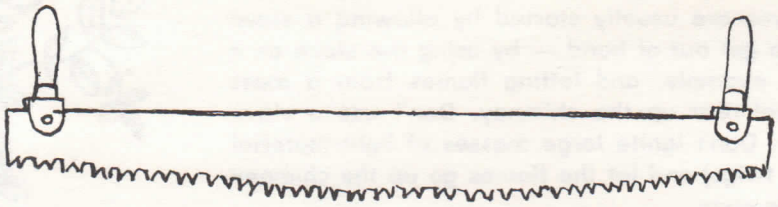
Seasoned wood will produce less creosote, the stuff that gums up your chimney and can catch fire. (See section on creosote). Seasoned wood also produces more usable heat, 20-25% more in the case of some common hardwoods, as much as 44% more in the case of southern yellow pine.

The moral is: Don't burn green wood. If you buy green wood, season it before using. With some experience, you can spot green wood easily. It's heavier; it looks different. Seasoned wood will often show cracks radiating outward from the heartwood toward the bark, like wheel spokes. Green wood won't show this pattern of cracks.

Old time woodburners sometimes advise putting green wood with dry to hold a fire longer. As with the long stovepipe, this is advice that applied to loosely-constructed, inefficient stoves. The older stoves often let in a good deal of air even with the draft fully closed; the rate of burning was thus poorly controlled and a fire with dry wood wouldn't last long. In an air-tight stove the burning rate is controlled, and dry wood will burn overnight. So there's no need to suffer the loss of heat and the creosote problems that come from using green wood to slow the burning rate.

Use the longest piece of wood that will conveniently fit the firebox. The wood will tend to burn (especially with the draft turned low) from front to back in the firebox. The longer the stick, the longer the fire will hold.

You'll get roughly the same amount of heat from a pound of wood no matter what species of tree it comes from. But wood isn't sold by the pound, it's sold by volume — by the cord. Therefore the dense, heavy woods are the ones to buy, the ones that give you more pounds per cord.



The following figures compiled by the U.S. Forest Products Laboratory indicate the amount of heat available per cord of wood from a few representative tree species:

	Available Heat per cord in millions of BTU		Percent More Heat from Air-dry Wood
Species	**Green wood**	**Air-dry**	
Ash	16.5	20.0	21
Aspen (popple poplar)	10.3	12.5	25
Beech, American	17.3	21.8	26
Birch, yellow	17.3	21.3	23
Douglas Fir, heartwood	13.0	18.0	38
Elm, American	14.3	17.2	20
Hickory, shagbark	20.7	24.6	19
Maple, red	15.0	18.6	24
Maple, sugar	18.4	21.3	16
Oak, red	17.9	21.3	19
Oak, white	19.2	22.7	18
Pine, eastern white	12.1	13.3	10
Pine, southern yellow	14.2	20.5	44

Other good, to moderately good, firewoods would include apple, walnut, pecan, dogwood, cypress, sycamore and gum, the latter two both hard to split, as is elm.

Yellow birch is a very good fuel; gray birch makes poor fuel; white birch falls somewhere in between and is definitely not worth the premium prices sometimes paid for it.

Another way of looking at the value of different seasoned woods (also devised by the U.S. Forest Products Laboratory) is this:

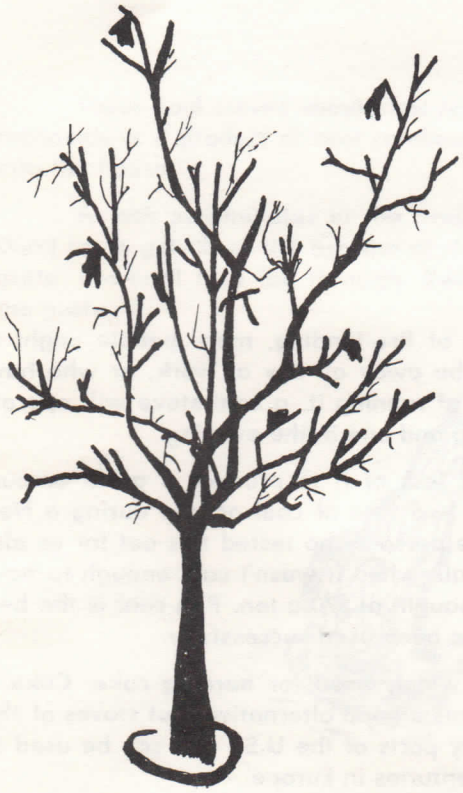
One ton of coal equals:

- One cord of dense, heavy wood like hickory, oak, ash, beech, yellow birch, hard maple, elm, locust, longleaf, cherry.
- One and one-half cords of medium-weight wood like shortleaf pine, western hemlock, red gum, Douglas fir, sycamore, soft maple.
- Two cords of light wood like cedar, redwood, poplar (popple), catalpa, cypress, basswood, spruce, white pine.

This should tell you that a cord of oak has roughly twice the heat value of a cord of poplar. The moral is: Don't buy a cord of poplar at $40 if you can get oak at the same price.

Soft woods like white pine make good kindling. They give a quick, hot fire that will ignite the slower-burning hardwoods. The softwoods often have a high resin content. Resins have about twice the heating value of wood, and this is good. But resins also contribute heavily to creosote buildup unless consumed by a hot fire, and this is bad. If for any reason you must burn softwoods, allow the fire enough air to consume the resins; a smouldering fire will tend to build creosote in the chimney.

The following table* is for western woodburners. It gives the density in pounds per cubic foot of a number of western tree species.



Tree species	Density of dry wood - lb. sq. ft.
Douglas fir	28
Western hemlock	24
Ponderosa pine	24
Ledgepole pine	24
Sitka spruce	23
Western red cedar	19
Redwood	24
Red alder	23
Black cottonwood	20
Bigleaf maple	27
Oregon ash	31
Oregon white oak	37

* Taken from ***Wood and Bark as Fuel***, by Stanley E. Corder, Research Bulletin 14 of the Forest Research Laboratory, School of Forestry, Oregon State University.

A cord of wood measures four by four by eight feet. A cord of four-foot logs thus stacked occupies 128 cubic feet and contains about eighty feet of solid wood, the rest being air space between logs.

If you buy a cord of wood split and cut into, say, sixteen inch lengths, you'll find it doesn't occupy 128 cubic feet when stacked. You haven't necessarily been cheated. A cord cut to length and split packs more tightly and occupies less space.

If you want your wood to dry as quickly as possible, cut it to length and split it. Stack it where air can move through the pile, and shelter it from the weather. A wood shed with air vents in the sidewalls, like a tobacco-drying barn, is effective.

If you cut trees in summer, let them lie awhile. Until the leaves wither, they will draw moisture from the wood, drying it more quickly than if you limbed the tree immediately.

A good time to cut your own wood is in late winter or early spring, as soon as the woods are free of snow. Then hold the wood for use in eighteen months. This is often the best time to buy wood, too. Green wood can sometimes be had at rock bottom prices in spring or early summer, then held for use eighteen months later.

Coal, coke and peat

Where the objective is space heat with a minimum of fire-tending, more people ought to consider coal. This is especially true for people who must be away all day at work, or who have difficulty finding or storing wood. When you get the knack of running it, a coal stove will operate quite effectively on two fuelings per day, one in the morning and one in the evening.

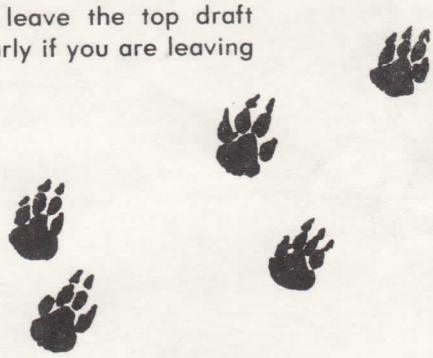
Coal has a greater heat value than wood; you need less of it to produce a given amount of heat. In steady use, a Lange coal stove will burn about two tons of coal or less during a New Hampshire winter while heating about 4,000 cubic feet. (The person who tested this out for us also burned something over a cord of wood during spring and fall, when it wasn't cold enough to have the coal fire going.) The fuel used was anthracite pea coal bought at $70 a ton. Pea coal is the best fuel for use in the Lange coal stove, though nut coal has also been used successfully.

In Europe, stoves like the Lange Model 6304RA are widely used for burning coke. Coke is not readily available in most areas of the U.S. Pea coal makes a good alternative. But stoves of this type can also burn charcoal or peat. Peat bogs exist in many parts of the U.S., and can be used as a cheap fuel source here just as they have been for many centuries in Europe.

To start a coal fire, use paper and wood kindling. As the wood kindling begins burning well, add coal a little at a time. When the coal is burning well, add more as needed.

The Lange coal stove has two doors and two drafts, plus an exterior handle for shaking the grate. The lower draft should be used to admit air to the fire, and to govern the rate of burning. The upper draft may be used to damp down the fire, but its main function is to carry off volatile gases that will be produced when fresh coal is added to the fire.

As fresh coal is added in small quantities, these gases will normally be burned immediately in the hot fire. But if the fire has been allowed to cool and a lot of coal is put on, gases may build up. If the upper draft is open, these gases will be carried off. If not, a small explosion may occur as the gases build and later ignite. This could rattle the stove lid or even knock the pipe loose. ***Always*** leave the top draft cracked open after you add coal, particularly if you are leaving the house.



These coal stoves should ***not*** require a damper, and you are better off without one. Carbon monoxide is a product of coal combustion, and if a damper is accidentally closed it can force this into the house.

As ash accumulates in the firebox, shake the grate to let it fall into the ash removal box. Don't try to get all of the ash out of the firebox; shake only until you can see glowing coals at the grate, not until they fall through. Keep the ash box clean; don't allow a buildup of ash to reach the grate.

LANGE DANISH STOVES

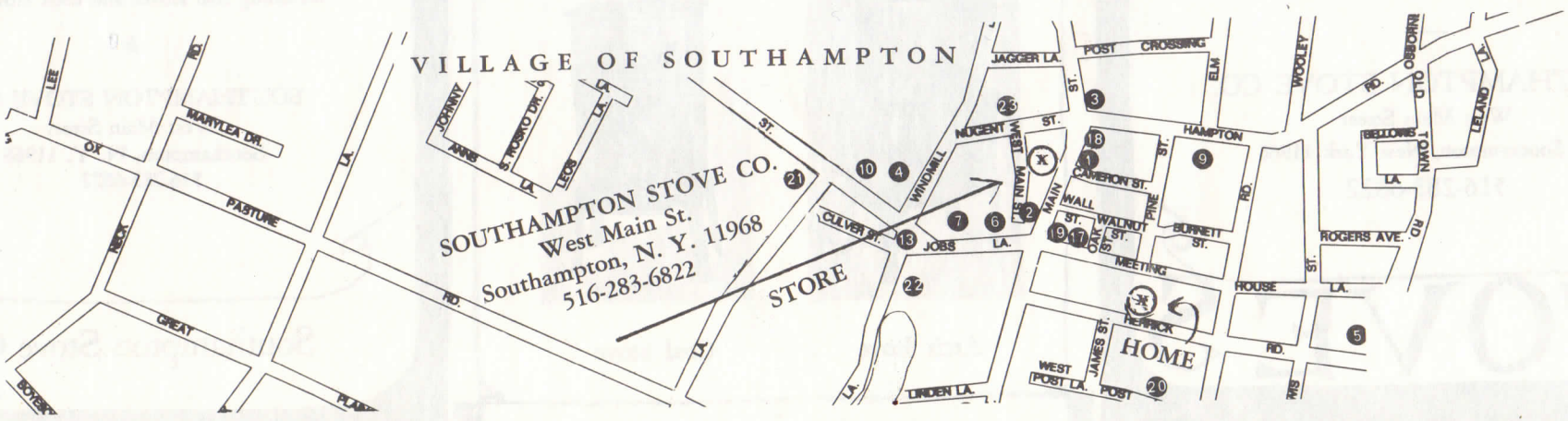
Wood Burning Stoves

Specifications:

Lange Model #		Height	Width	Length	Height to top of Flue Opening	Flue Outlet	Shipping Weight	Stove Pipe Size	Log Length or Fire Box Length	Heating Capacity
6303A	Small Box	23½"	16"	25"	25"	Top	145 lbs.	5"	20½"	3,000-5,000 cu. ft.
6303	Arch	37½"	16"	25"	36½"	Back	220 lbs.	5"	20½"	4,000-6,000 cu. ft.
6302A	Big Box	34"	16"	34"	35½"	Top	212 lbs.	5"	26"	7,000-9,000 cu. ft.
6302K	Double Box	50½"	16"	34"	47¼"	Back	370 lbs.	5"	26"	8,000-10,000 cu. ft.
6203BR	Small Upright	41"	13"	20"	41"	Top	213 lbs.	5"	16"	4,000-6,000 cu. ft.
6204BR	Big Upright	41"	13"	25"	41"	Top	250 lbs.	5"	21"	5,500-7,500 cu. ft.
6304RA	Coal Stove	31¾"	15¼"	17"	30½"	Back	154 lbs.	5"	9 x 10"	3,000-5,000 cu. ft.
6732	Ships Stove	21"	13½"	13½"	22½"	Top	165 lbs.	4⅛"	Coal	3,000-4,000 cu. ft.
911W	Cook Stove	33¼"	36¼"	24"	34¾"	Top or Back	375 lbs.	5"	17"	4,000-5,000 cu. ft.
61MF	Combination	38"	20½"	19"	37¼"	Back	286 lbs.	7"	14"	5,000-7,000 cu. ft.

EXTERIOR FINISHES—Available in Black Cast Iron or Red, Blue, Green, Brown or Black Enamel with matching enamel pipe.

** full stove depth incl. flue at back 17"*



SOUTHAMPTON STOVE CO.
75 Herrick Road
Southampton, New York 11968
516-283-6822

ADVANTAGES OF THE WOOD STOVE OVER A FIREPLACE OR FRANKLIN STOVE

The modern air tight stove is a technical triumph over a fireplace or Franklin stove. What makes a stove so much better and more efficient than a fireplace? Nearly everything about it!

Most fireplaces burn wood and allow 80 to 90% of the heat to excape right up the flu. They are a romantic way to suck cold air into a room, heat it and send it up the chimney. It is estimated that about 3,000 cu. ft. of heated air is exhausted from your house per hour. This air has to come into your house from outside and is cold. Your furnace heats a large volume of the air going to the fireplace and in most cases it results in a 20 % increase in your fuel bill to replace this heated air. When you retire for the night you can not close the damper and you loose furnace heated air all night. It is obvious that the average fireplace operating in a heated house does not add any heat to the house and in most homes draws up to 20% of the furnace heated air out of the house-a costly operation.

A fireplace consumes large amounts of wood compared to a stove. We estimate a fireplace will burn 10 times the wood that a stove will consume. If the fireplace were burned 24 hours like a stove, consumption would go up to 20 times. In the average house over a winter's heating season you are talking about $60 of wood (1 cord at $60 per) for a stove vs. 10 cords of wood or $600 for a fireplace. You are getting no heat for $600 and running up your fuel bill at the same time.

A stove will give a steady heat-10 to 12 hours on a fill of 4 to 5 logs.

The care of a fireplace involves carrying a lot of wood and ash hauling.

A well run stove can be tended 2 or 3 times per day- you carry 1/10th the wood. Ashes are removed only every 2 to 6 weeks depending on type of wood burned and draft.

The far more efficient air tight stove by means of baffles extracts the maximum heat possible from each log. The stove is hot and the flu relatively cool.

The stove draws only a very small amount of air from your house. It will cut your fuel oil gas or electrical consumption by 80% to 90% depending on house size and insulation, wind exposure, storm windows, etc. We have even noticed a reduction in our electrical bill as our oil burner motor and circulating hot water pumps are on standby!

Conclusion: A fireplace removes heat from your house, and is costly to operate in terms of high wood consumption. The modern air tight stove with efficient combustion, and air pre-heater, baffle and precise draft control will recover most of the 8,600 BTU's available per pound of wood and will heat your home economically and comfortably. A fireplace removes heat from your house - a stove heats it. You get more heat for less from a renewable asset, our timber lands. Improve your health, split wood not atoms.

Sources:

"Wood Stove Know How" by Peter Coleman, Dir. Garden Way Research
"The Complete Book of Heating with Wood" by Larry Gay
"Making and Using Wood Fuel" Cornell Univ. Extension Bulletin #940
"Firewood for Heat" Soc. for the Protection of New Hampshire Forests.