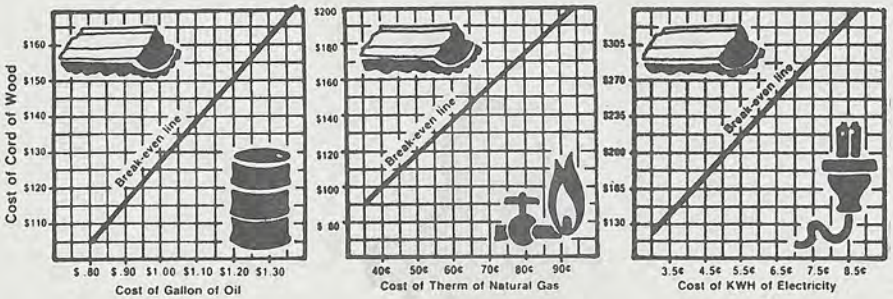
Pickwick & Poppin's Hints for Home Heating with Wood

Woodburning has grown increasingly popular as a supplement or alternative to oil, gas, and electric in home heating. This growth is due to the public's awareness of how much money can be saved by installing a wood-heating system. A grassroots movement of woodstove owners accounts for more energy production than all of the nuclear generating plants in America. It is not a return to "the good old days" as much as it is a renewed and growing industry.



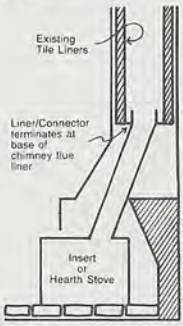
The solid fuel industry (wood and coal as opposed to liquid or gas fuels) is growing approximately 10% per year nationwide. Locally, a 1983 survey conducted by Atlantic Electric found that 12.5% (41,470) of their South Jersey customers had installed wood or coal stoves, and 6.4% (21,240) had installed fireplace inserts. Over 6.5% (21,400) of their customers use solid fuel appliances as primary sources of heat.

Woodburning, whether in an open fireplace or a closed stove, has strong aesthetic appeal. Its warmth is penetrating and peaceful. Many woodstove users enjoy the self-reliance they have gained as much as the money they have saved. But all the money saved and all the cozy comfort is quickly lost if the system is unsafe and a fire results in the loss of property or life.

As certified sweeps and members of the National Chimney Sweep Guild, Pickwick and Poppins is dedicated to educating the public to the enlightened use of solid fuel appliances. We share this information to promote respect for solid fuel safety. It will provide helpful hints to make wood-burning safer and more economical.

The National Fire Protection Association in its latest revision of standards for chimneys, #211, has called for measures that are aimed at reducing the amount of creosote and the glazed nature of the creosote formed by fireplace vented woodstoves. One change involves the "positive-connection" of the stove to the fireplace's flue. This will require stoves to have pipe installed from their vent collars, through the damper area and smoke chamber, into the bottom of the lined section of the chimney. (A formidable task!) Also, NFPA has set limits to the size of the fireplace flue being used. It will not be allowed to exceed 3 times the cross-sectional area of the stove's own vent collar. Both measures work to increase the draft and the temperature of the flue. Eventually these standards will be adopted by the national code bodies and effect all future installations. This action by the NFPA gives an indication of the extent of the problem. It is widespread, witnessed by homeowners and sweeps across the country. It is a chief concern of ours because most of our insert customers have some amount of glazed creosote in their chimneys.

Not enough can be said about the importance of proper burning habits when operating a fireplace insert. Regular daily hot fires are vital to keeping the chimney dry and warm. Slow burning, smoldering fires should never be burned in cases where glaze is a severe problem. Burning only well seasoned wood is essential to keep moisture out of the developing creosote. Other than proper burning, what can you do if glazing is a problem with your fireplace insert?

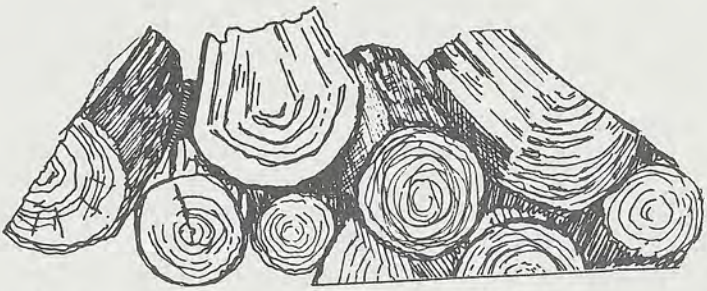


POSITIVE CONNECTION

The ultimate solution is to reline the chimney. In essence, running a properly sized pipe from the stove to the top of the chimney. Stainless steel is usually used, but there are many grades of stainless, and some will hold up better than others. Having a high grade of stainless installed may be expensive, but it is still cheaper than building a new chimney, and the benefits in terms of safety, improved stove performance, and efficiency, make the investment worth it. If you had installed a free-standing woodstove, chances are that the cost of constructing a chimney would have been part of the initial expense. Most fireplace insert owners have not had that initial added expense.

The other way the problem is being addressed is by two new chemical cleaners. One, Anti-Creo-Soot, is used during the burning season. It chemically drys out the glazed creosote so that it can be brushed out. The other product, WI-5, is used to dissolve the glaze, allowing it to be rinsed out of the chimney with water.

"An ounce of prevention is worth a pound of cure."—Ben Franklin



Two objectives are sought in seasoning wood. First, to remove the existing moisture, and second, to prevent rain or other moisture from resaturating it. For this reason ***it is important to cover the top of the woodpile with plastic, or build a woodshed.*** Stack the wood to permit maximal air flow through the pile for quicker drying. Seasoned wood is dried to a moisture content of 20% and can be identified by the gray-toned color and cracked cross sectional ends.

Burning wet wood slows down combustion, increases the moisture going up the chimney, and creates excessive amounts of creosote. It also significantly reduces, by as much as 50% the amount of heat generated by the stove since a lot of energy is wasted converting the water to a vapor before the wood can burn. Adding a little green wood to the fire slows down the burn rate to help achieve overnight burns. Other than that there is no advantage to green wood.

Hardwoods, like oak, are best to burn because they are denser, contain less moisture, and have a higher BTU value than softwoods like pine. If you have free pine, you can burn it after seasoning it for at least two years. Research indicates that there is no significant difference in the rate of creosote formation with well seasoned pine vs. oak. Finally, never burn treated lumber, driftwood, wax logs, or trash in a woodstove.

FIREPLACE INSERTS

Fireplace inserts are woodstoves designed to vent into a fireplace chimney. In some cases venting a woodstove into a fireplace is an adequate arrangement, but in many cases it is unsafe.

By design the fireplace is not well suited for venting a woodstove. Most fireplace flues are too large, and oversized flues have poor draft and are hard to keep warm. Also, the offsets in the damper area and smoke chamber, work to further reduce the draft and cool the smoke. These conditions (poor draft and cool chimneys) contribute to excessive condensation of moisture, and rapid rates of creosote deposition. Usually this moisture-laden creosote forms a glaze that cannot be removed by conventional chimney cleaning methods. Eventually, after years of use, the chimney becomes so loaded with glazed creosote that a chimney fire would be very intense and dangerous.

"Woodburning is the highest cause of home fires in the U.S. today."
Independent Safety Commission.

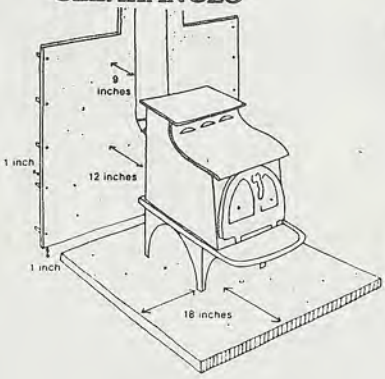
SAFETY

In 1982 over 29% of all residential house fires in the United States were started by solid fuel appliances. This is an alarming and growing percentage. Records indicate that most of these fires were caused by faulty installations with inadequate clearances from combustibles like walls, floors, furniture, etc. Normally a stove should be 36 inches and the stovepipe 18 inches from a combustible. The best way to reduce clearances is to create a non-combustible barrier of brick or sheet metal with an inch of air space next to the surface being protected. Check the drawings below. Stoves which have been UL tested for safety at shorter distances will be labeled with appropriate information.

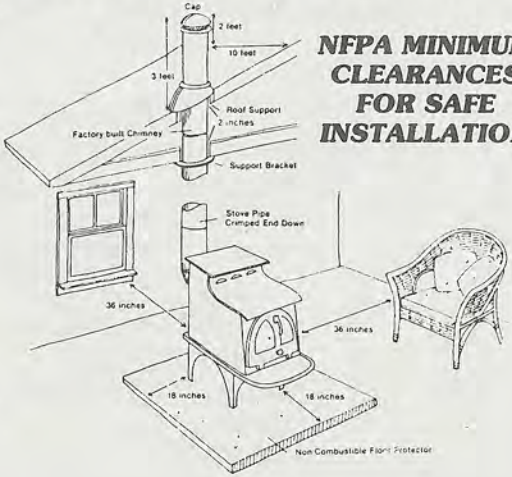
Chimney fires contribute to significant numbers of solid fuel fires because during the brief but intense fire objects too close to the stove or chimney, which might be warm during normal usage, can get hot enough to ignite. Chimney fires are caused by creosote, a flammable by-product of woodburning, which builds up in the flue (the inside chimney walls). Once ignited, the creosote burns at excessively high temperatures which can top 2000°F. The chimney is not a combustion chamber. A fire can damage it, making subsequent chimney fires even more dangerous because the weakened or cracked chimney can allow the fire to spread into the house.

The National Fire Protection Association (NFPA) recommends that a chimney be cleaned whenever 1/4 inch of creosote builds up on the flue. One cleaning a year is no guarantee against a chimney fire. We recommend that the homeowner check his or her stovepipes and chimney periodically during the heating season and clean the pipes if warranted, or call us to provide the service. Actually, metal chimneys and stovepipes should be cleaned when 1/8 inch of creosote has built up. With slow burning of wet wood a dangerous amount of creosote can form in a short period of time. So until you are familiar with the rate at which creosote forms, check your pipes more frequently.

FOR REDUCED CLEARANCES



NFPA MINIMUM CLEARANCES FOR SAFE INSTALLATION

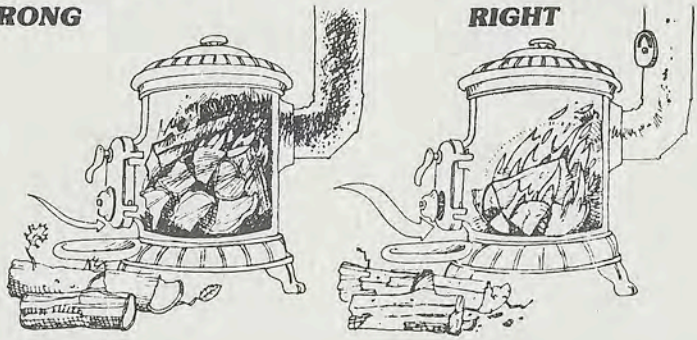


Smoke detectors should be part of every wood-heating system. If you still don't have one, we can install one for you. Simple, inexpensive, flare-like chimney fire extinguishers ought to be kept near the stove at all times. They are best used at the onset of a chimney fire because they lose their effectiveness as the fire intensifies. Finally, concerning safe use of your stove — never overload it or leave it unattended while the air intakes or doors are wide open. Don't use liquids like kerosene to start a fire. Provide extra protection for children and teach everyone to respect the stove, it is not a toy.

PROPER BURNING and EFFICIENCY

To understand proper burning of your woodstove you must know how wood burns. There are three stages in the combustion of wood. In the first, moisture is driven out of the wood. In the second, volatile gases are emitted from the wood and burn if enough heat and oxygen are present. The final stage is called the charcoal stage, with the burning of red hot coals. In a woodstove, roughly half of the heat can come from the burning gases of the second stage. In an open stove you can see these gases burning as yellow flames. The rest of the heat is derived from the charcoal burning.

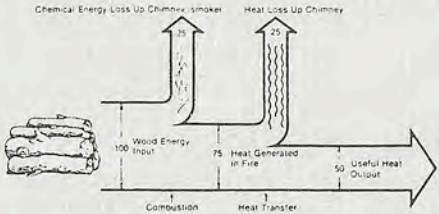
When little air is supplied to the stove the potential heat of the gases is wasted up the chimney. These unburned volatile gases create creosote and pollution. The charcoal continues to generate heat. And because air moves through the stove slowly, a greater proportion of the heat is allowed to transfer to the room. When more air is supplied to the stove combustion is more complete, but the air is traveling through the stove more rapidly. The faster the air moves through the stove, the faster the heat escapes, reducing the proportion that transfers to the room. So the stove's overall efficiency is a balance between the combustion efficiency and the heat-transfer efficiency. Stove manufacturers often add baffles and dampers (which amount to metal plates across the inside of the stove) designed to increase air turbulence for more complete combustion and to slow down the heat escaping, improving heat transfer.

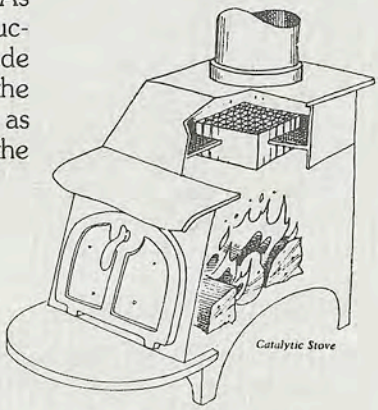


Solid fuel professionals recommend burning smaller hotter fires. This means supplying more air to the stove. A slow-burning, smoldering fire is allowable to keep the stove burning overnight but should not be the normal operating mode for the conventional airtight stove. At night load the stove one hour before retiring and allow air to burn off some of the gases before banking it down when you go to bed. If you smolder the fire all night it is advisable to start in the morning with a small hot fire to dry out and heat up the chimney. Allow hot air to go up the chimney daily for at least ½ hour. How hot? A stovepipe thermometer in most cases (depending on stove design and thermometer placement) should read between the medium/hot range near 500°F. Be sure to institute this practice on a clean chimney and to maintain it daily. You could be asking for a chimney fire if after long periods of slow burning you decide to invest heat into the chimney.

According to the latest research, conventional airtight stoves were rated between 40% -50% efficient, non airtight stoves at less than 40%, and the latest high-tech catalytic stoves at over 70%. The reason for such high efficiencies from the catalytic stoves is that at slow-burn rates, with less air supplied to the stove, the gases that normally go wasted up the chimney are burned in the catalytic combustor. This allows combustion efficiencies to remain high while heat-transfer efficiencies are also high. As one might expect, creosote is drastically reduced. Catalytic retrofits are available to upgrade conventional airtights. They will improve the stove's efficiency, but they will not perform as well as stoves that are engineered around the catalyst.

CATALYTIC RETROFIT





CATALYTIC STOVE

FIREWOOD

Any serious woodburner ought to purchase wood a year in advance and season it themselves. Wood is purchased in cords, which is a specific, legal unit of measure equaling 4 feet by 4 feet by 8 feet. Generally, it is a good idea to measure the wood on the truck where it has been tightly stacked for delivery. When your wood is delivered, if it is obviously short, you have recourse with the Atlantic County Division of Consumer Affairs, Office of Weights and Measures. Local prices range from $65 - $125. Green or fresh cut wood bought in the spring can be half the cost of seasoned in September.

In Case of Chimney Fire

1. Call the fire department.
2. For woodstoves—close all air intakes to smother the fire. Use your chimney fire extinguisher.
   For fireplaces—throw rock salt or sand, not water, to put out the fire.
3. If possible, hose down the roof, around (not in) the chimney. Guard against sparks igniting bushes, trees or neighboring buildings.

When you want a certified, insured, experienced, traditional chimney sweep call . . .

"Eminently Sootable"

Pickwick & Poppins Chimney Sweeps

SERIOUS ABOUT SOLID FUEL SAFETY

Certified Member of The National Chimney Sweep Guild

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