NOTE: A BUILDING PERMIT IS REQUIRED FOR THE INSTALLATION OF A FREE-STANDING STOVE OR FIREPLACE. THIS IS YOUR ASSURANCE OF A REASONABLY SAFE INSTALLATION.

MOBILE HOME OWNERS

Permits should be obtained from your State Mobile Home Division.

DEVELOPED THROUGH THE COOPERATIVE EFFORTS OF FIRE AND BUILDING OFFICIALS.

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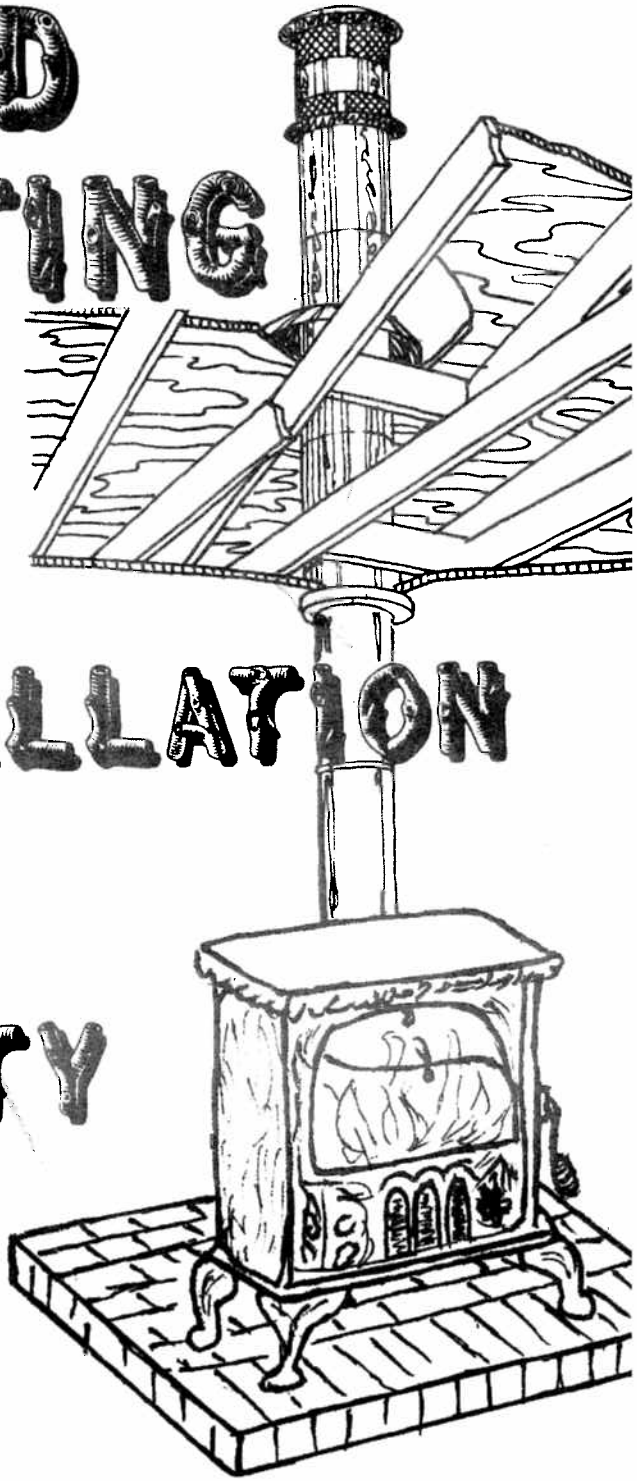
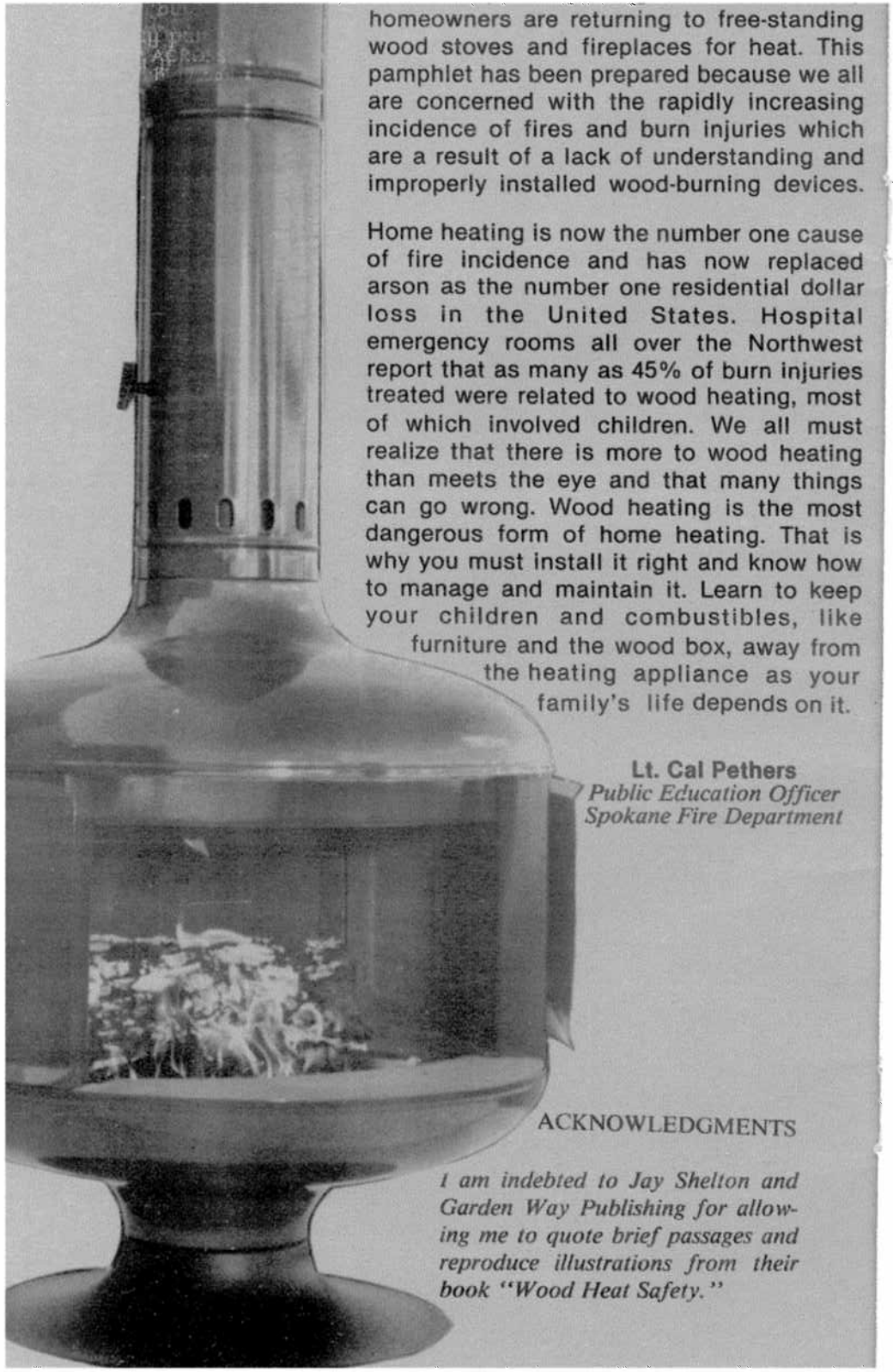
NORTHWEST FIRE EDUCATION CONSULTANTS
P. O. Box 61
Spokane, WA 99210

WOOD HEATING INSTALLATION & SAFETY



CITY OF GUNNISON



homeowners are returning to free-standing wood stoves and fireplaces for heat. This pamphlet has been prepared because we all are concerned with the rapidly increasing incidence of fires and burn injuries which are a result of a lack of understanding and improperly installed wood-burning devices.

Home heating is now the number one cause of fire incidence and has now replaced arson as the number one residential dollar loss in the United States. Hospital emergency rooms all over the Northwest report that as many as 45% of burn injuries treated were related to wood heating, most of which involved children. We all must realize that there is more to wood heating than meets the eye and that many things can go wrong. Wood heating is the most dangerous form of home heating. That is why you must install it right and know how to manage and maintain it. Learn to keep your children and combustibles, like furniture and the wood box, away from the heating appliance as your family's life depends on it.

Lt. Cal Pethers
Public Education Officer
Spokane Fire Department

ACKNOWLEDGMENTS

I am indebted to Jay Shelton and Garden Way Publishing for allowing me to quote brief passages and reproduce illustrations from their book "Wood Heat Safety."

STEP I

Plan ahead and choose a place in the room where you won't run into complications. Then select a heating device that suits your needs. (It will help if you read this pamphlet thoroughly first.)

Permits Reauired

For your protection local and national codes, as well as your insurance company, require a permit. The permit allows your installation to be inspected and approved. This becomes public record which may be essential for any insurance loss claim you may have at a later date.

Another reason for visiting your building department is to make sure that your installation meets all applicable safety codes. There are two national code-making authorities, and each locality has the option of adopting stricter safety codes. So, the situation can be somewhat confusing, especially if you buy a wood burning unit which is manufactured in another part of the country where the codes are slightly different. The accompanying installation guidelines which you might receive with the unit might not pertain to your city or county.

So, always check with your building department and they'll tell you what's right for your area.

Listed Appliances

One of the things you should consider in choosing a heating device is that it has been tested by a nationally recognized testing laboratory, such as ICBO or UL. These initials stand for the International Conference of Building Officials, and the Underwriters Laboratories. These units will have been tested under extreme conditions and are approved for installation with specifications for distances these units can be placed from combustible materials. You'll find a seal of approval from these testing laboratories affixed to the unit.

Unlisted Appliances

Unlisted appliances are any appliances that are not approved or tested for safety as stated in the previous section. All unlisted appliances, regardless of manufacturer, are required to be a minimum of thirty-six inches (36") from combustible materials.

Efficiency

Another consideration is the efficiency of the wood burning device, as they vary drastically — 10% for a fireplace, about 25% for a Franklin stove or parlor stove, and up to 60% for air-tight stoves. The amount of heat they produce for the wood they consume is in direct relationship to the efficiency of the unit. Wood stoves like the Franklin parlor or barrel type consume large amounts of wood for the heat produced. However, on the other side of the coin, the more efficient air-tight stoves produce more heat per cord but require proper management and understanding to prevent greater accumulations of creosote in the chimney, which can present a chimney fire hazard. The choice is not a simple one, and you should take the time to investigate thoroughly and decide which unit is best for your situation. Additional information may be obtained through agencies listed on the back cover of this booklet.

STEP II

After you have chosen the wood heating device that suits your needs, contact the Building Department to obtain the proper mechanical installation permit. The cost is small and guarantees that your fireplace or stove will get a proper safety and structural inspection. When you apply for your permit, it is helpful to bring a rough sketch showing where and how you plan to install the fireplace or stove.

STEP III

Hearth Protection

Build your hearth in such a way that it will give you maximum protection from flying sparks and radiated heat. The hearth should be designed as required by the fireplace or stove listing, but in no case less than these minimums: The hearth shall extend at least eighteen inches (18") in the front of the side of the appliance that opens; floor protection shall extend twelve inches (12") beyond the sides and rear. If the floor is combustible, it should be covered with a non-combustible sheet, such as sheet metal, cement board, Wonderboard, etc. If there are seams, they must be provided with a six inch (6") wide sheet metal strip extending three inches (3") under both pieces. Then cover with non-combustible materials at least three-eighths of an inch (3/8") thick. Suitable materials include slate, brick, thin brick, patio blocks, and quarry or ceramic tile, providing your stove has the required minimum of four inch (4") legs.

STEP IV

Installing Your Stove or Fireplace

Your stove should be placed at least 36 inches away from combustible materials, unless a reduced clearance is specified by the listing on your appliance.

A common error people make is to reduce the clearance distance by placing a brick wall or asbestos sheet against the combustible wall, thinking that they'll now have adequate protection. EVERYTHING ABSORBS HEAT — EVEN STONE, BRICK, METAL AND ASBESTOS. Any wood, drapes, or furniture adjacent could ignite. (EXAMPLE: A fire in a home involved a Franklin fireplace with twelve inches (12") clearance from a four-inch (4") thick veneer wall. The fireplace heated the brick, and the brick transferred the heat through the plaster board to the wood framing.)

If you heat a 2x4 stud, which is most commonly used in house framing, to a temperature of 600 degrees Fahrenheit, it will ignite on its own.

Many fires that start from improper clearances do not show up until 3 to 5 years after installation.

Each time you reheat wood, it breaks down in chemical composition, as it turns into pyroforic carbon. The ignition temperature is gradually lowered until any temperature in excess of 200 degrees Fahrenheit against a combustible is dangerous, as even steam pipes have set fires.

Often for esthetic reasons you may want to place your stove closer to the wall than the manufacturer or listing recommends.

DO YOU KNOW?

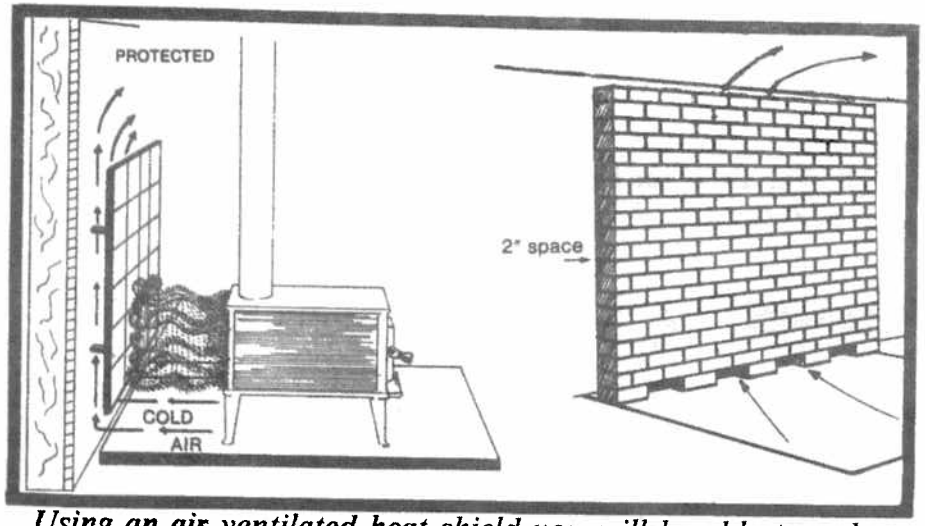
ONLY AIR SPACE AND AIR CIRCULATION AROUND A STOVE OR FIREPLACE PREVENT A FIRE.

Reduced Clearances

The safest way to reduce a required clearance is by using an air-ventilated shield. For example, use ¼-inch Asbestos cement board, Wonder board, or 16 ga. sheet metal, which can be covered with decorative tile.

You must allow at least a one-and-one-half (1½") air space from the wall and keep the heat shield raised a minimum of one inch above the hearth.

If you extend the heat shield to the ceiling be sure to allow at least a one-inch air space there as well. One-and-one-half (1½") pieces of pipe make excellent non-combustible spacers to hold the heat shield away from the wall.



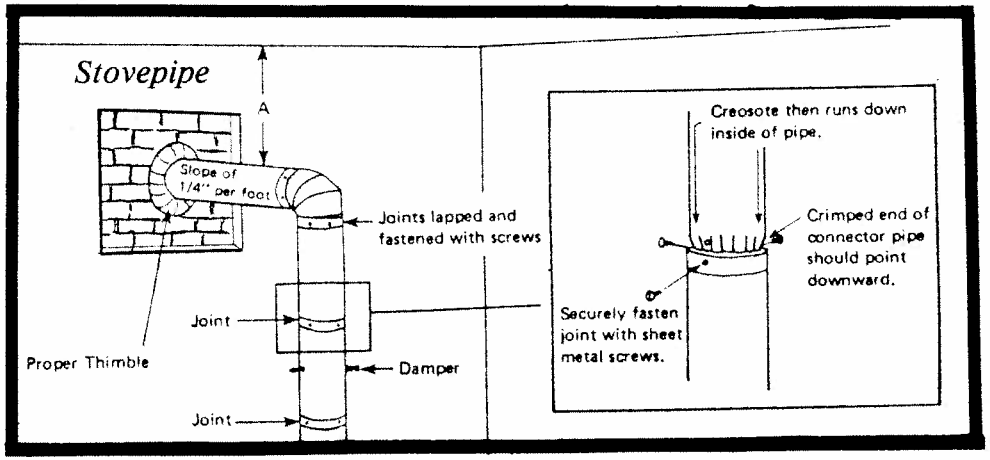
Using an air ventilated heat shield you will be able to reduce the stove manufacturer's recommended clearances in half.

This method, will not only provide reduced clearances, but will provide a heat exchange effect, drawing cold air off the floor, up behind the heat shield, thus improving air circulation and safety. It is then a simple task to face with a suitable non-combustible material, such as brick, thin brick, cultured stone, quarry, or ceramic tile.

Sheetrock or gypsum board should never be used for a heat shield as it is considered a combustible because the paper covering can burn and is the majority of its structural integrity.

Brick or rock can also be used for a ventilated heat shield providing adequate wall ties are used.

There are a wide variety of manufactured heat shields available which can also provide ventilated protection. Whether you purchase a manufactured heat shield or build one, remember it must extend at least 18 inches beyond the side as well as above your stove, and that your heat shield may have to extend wider than the minimum dimensions of your hearth.

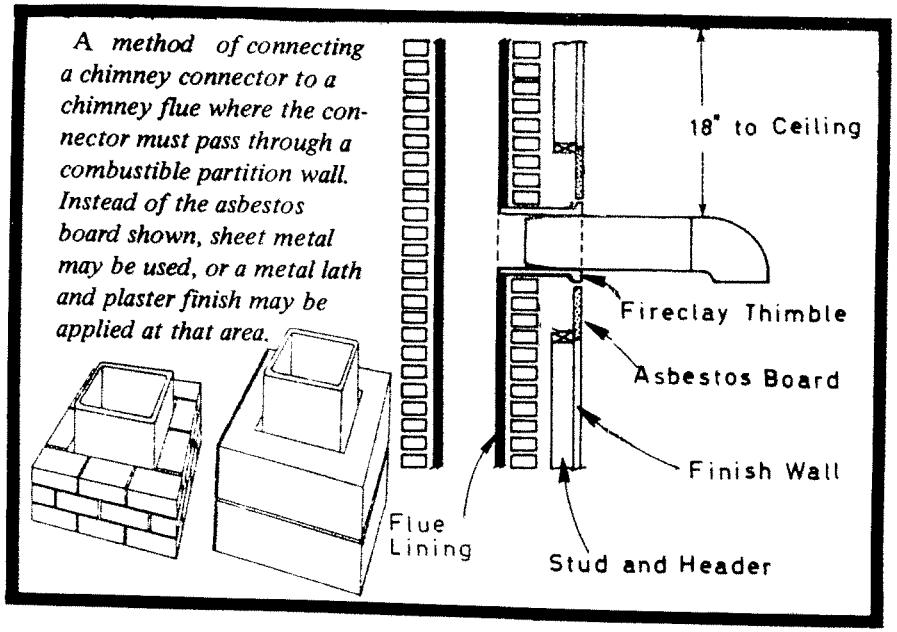


STOVE PIPE CLEARANCES

When running a single wall stovepipe to a chimney you must maintain a clearance from combustible ceilings and walls three times the diameter of the pipe. This clearance may be reduced by 50% providing an air ventilated heat shield is used; or as low as 2" by using an insulated pipe. The diameter of stovepipe you use should be the same diameter as the exhaust collar on your stove.

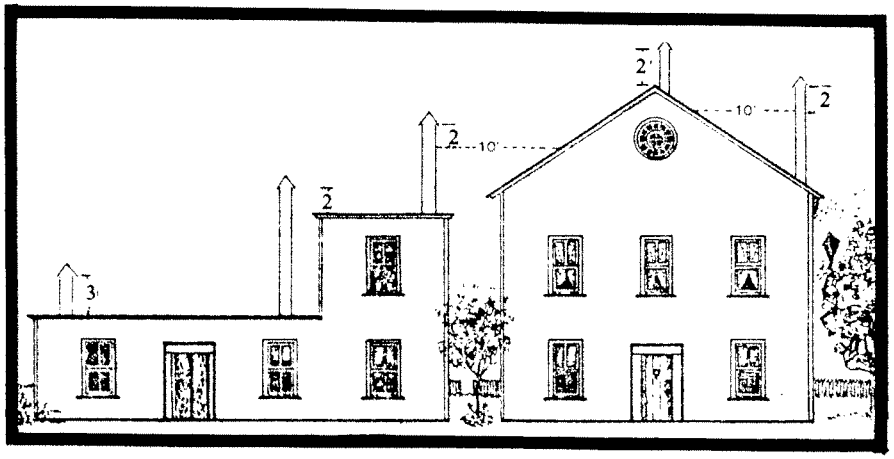
An unprotected single wall pipe must never pass through a wall, ceiling, or within 18 inches of a combustible material. Protection can be provided for single wall pipe to pass through a wall to the chimney, by removing all combustibles within 18 inches, or by using an air-ventilated thimble.

Before you proceed, however, consult your local building department, as they can assist you in designing the proper method for your particular installation.



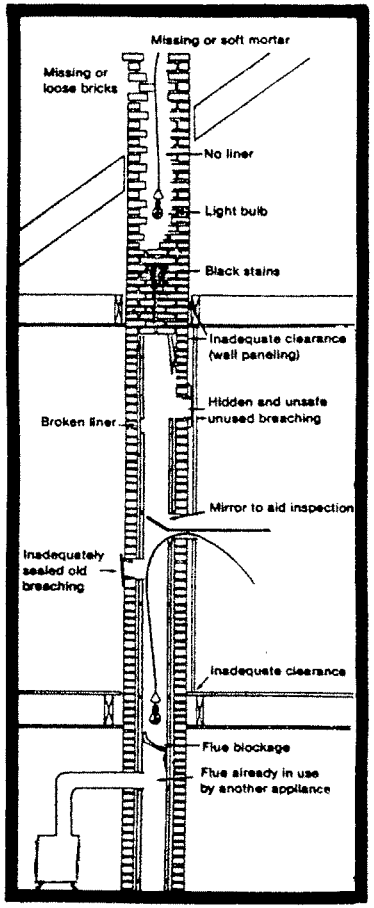
CHIMNEYS

All wood burning appliances must be vented through an approved masonry chimney built to Uniform Building Code requirements or a U. L. listed all-fuel chimney. Manufacturers recommended clearances from combustibles for metal chimneys are on each individual piece. All masonry or metal chimneys should have a minimum of two inches (2") clearance from attic insulation and a barrier (EXAMPLE: fourteen inches (14") aluminum roofing flashing)



EXISTING CHIMNEYS

An unused or existing chimney must be thoroughly inspected before use. Many fires have occurred because previous openings were not sealed properly when remodeled over. One fire resulted when a homeowner tapped into an existing chimney. When he built his first fire, he found out that the chimney had been torn down above the first floor. If you would like to use an existing chimney, engage the services of a competent chimney sweep who also specializes in chimney repair. He can clean and evaluate the condition of your chimney, making sure that the chimney has a proper liner. A settled foundation, shifting, cracked mortar or liner, blockage, chemical deterioration, or poor construction are all reasons why a chimney can fail a safety inspection. Most can be repaired, or a liner installed if unlined.



A poor chimney can be not only a fire hazard, but can be a health hazard as well. Never try to utilize a gas vent (type B) with a wood burning unit, even if you plan to install a gas log.

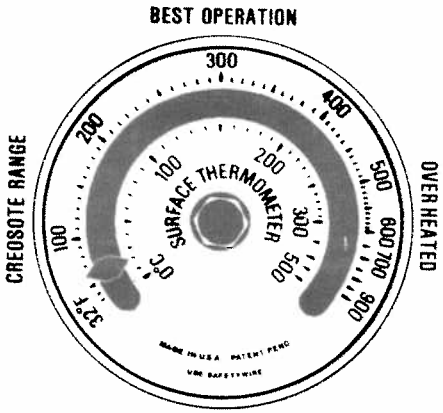
Multiple Venting

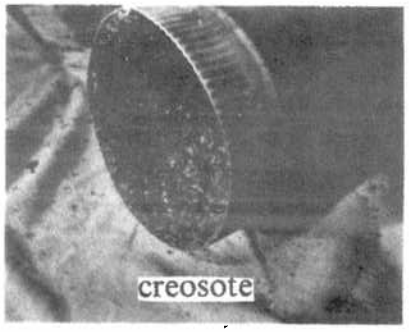
CAN MORE THAN ONE HEATING DEVICE BE INSTALLED ON THE SAME CHIMNEY FLUE? We recommend, as does the National Fire Protection Association, that you never multiple vent. Reasoning is with two or more air inlets into the same flue, you have an increased danger of uncontrollable chimney fires. Multiple venting creates turbulence and lowers efficiency of both the wood stove and the oil or gas furnace. Wood stoves produce accumulations of creosote, which can create flue restrictions or blockage than can cause a backup of carbon monoxide and other toxic products of combustion into the dwelling.

FIREPLACE INSERTS

An increasingly popular method of improving a fireplace is to install a fireplace insert. This can increase fireplace efficiency equal to many wood stoves. To install a fireplace insert, the damper must be blocked open or removed. Never seal the insert in permanently, as it will have to be removed for access to the smoke shelf when cleaning, unless a chim door is installed on the exterior fireplace, just above the smoke shelf to facilitate cleaning. A chim door must be installed by a qualified chimney repair service or a mason. One thing to remember about fireplace inserts is that if it extends into the room with a cooking surface, the 36-inch clearance to the mantle, sidewalls, or other combustibles, as well as the 18-inch hearth depth must be maintained. Fireplace inserts with a positive flue connection have an increased efficiency and less of a creosote problem, because flue size is in balance with the insert. Inserts with a positive flue are required in some areas.

CAUTION: Never install a fireplace insert in a zero clearance fireplace unless UL or ICBO approved for installation in a zero clearance fireplace.



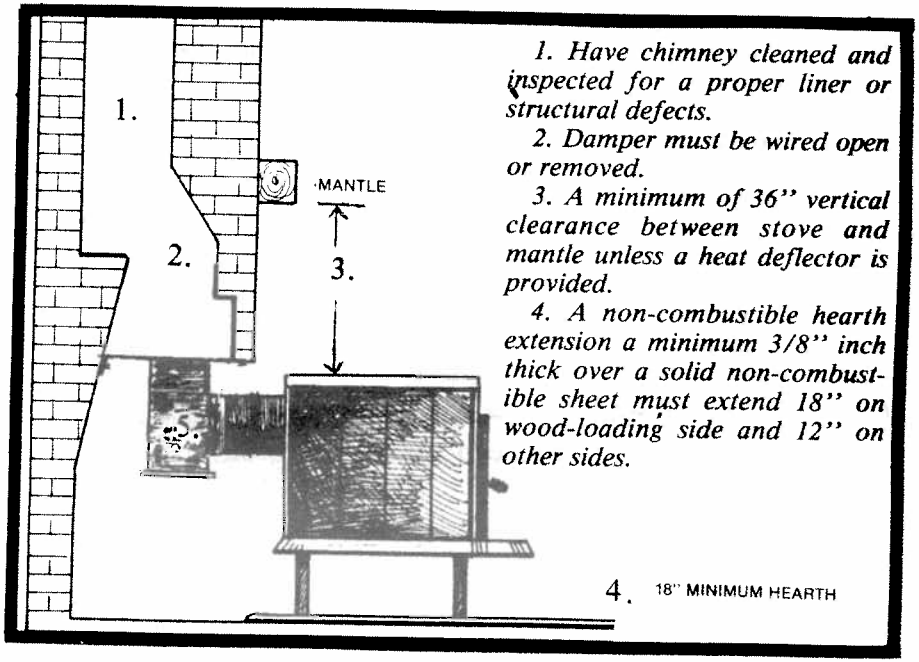


REDUCE CREOSOTE

A stove pipe thermometer will help you set your draft controls so that you are conserving, not wasting, heat up the flue, yet obtaining the proper air fuel mixture to reduce air pollution and creosote accumulation in your chimney. The ideal stove pipe temperature is 300 degrees Fahrenheit for those long overnight burns.

Using a Fireplace Opening to Vent a Wood Stove

If a wood stove is vented directly into a fireplace opening, dangerous accumulations of creosote will occur and an explosion could result. Fires have resulted when the metal plate and stove were catapulted into the room when the large amount of creosote within the cavity ignited during a chimney fire. A properly installed vent connector should extend through the firebox cavity into the flue, and the damper should be removed or blocked open. Then, if you wish, enclose the firebox opening with a removable steel cover which has been cut to accommodate the vent connector from the stove.



5. These tee assemblies are custom manufactured.

The first thing you do is measure the fireplace two inches (2") below the damper, then cut out a piece of cardboard and fit to proper size. Then take the cardboard and vent connector size to the tee manufacturer or sheet metal shop.

AIR-TIGHT STOVES

Caution should be observed when opening the fuel door. *Open very slowly* as the air-starved fire can increase explosively and is a common cause of burns.

ZERO CLEARANCE FIREPLACES

Zero clearance fireplaces are safe when installed properly. The majority of fires that have occurred in the floor area could have been prevented if the installation had included a piece of sheet metal extending a few inches under the front edge of the unit and extending out under the hearth. Other fires have occurred because insulation was used in areas designed for air circulation (air space between the unit and header the most common) when insulating a zero clearance cavity. Non-faced fiberglass should be used on the exterior wall only. The fireplace cavity should be fire stopped in the attic, with sheetrock or metal. In every case, follow the above information in addition to the manufacturer's minimum requirements. DO NOT PURCHASE A UNIT THAT IS NOT U.L. OR I.C.B.O. APPROVED or a unit that has been freight damaged.

Glass Doors Caution

Not all zero clearance fireplaces are safe with glass doors installed. Check to make sure yours doesn't violate the listing before installation or purchase.

STEP V

After you have completed work on the fireplace or stove and are happy with the results, call the Building Department for an inspection before you light your first fire. Usually an inspector can be there within a few days, so you won't have to wait long to enjoy your fireplace, and knowing you have a safe installation can add greatly to your peace of mind.

STEP VI

Now everything is ready, so you should stoke the firebox and enjoy your new fireplace. Remember not to stack wood, papers, or other combustibles near the fireplace or stove and do keep the screen closed at all times. Warn your children not to play near your heating device and remember the recommended clearances for a stove from anything combustible. Many people forget that furniture is combustible and pull a chair up too close. Any heat source that continually subjects a temperature over 150°F can cause a fire.

MOBILE HOME OWNERS

For those of you who wish to install a free-standing fireplace or stove in your mobile home, please remember that mobile home fireplaces and stoves are equipped with an outside air supply to the firebox and have built-in doors or a removable shield to close the fireplace opening. DO NOT INSTALL UNLISTED APPLIANCES in mobile homes. A list of approved mobile home fireplaces or stoves, as well as a permit for mobile home installations, should be obtained from the State Mobile Home Division.

FIRE MANAGEMENT REDUCES CREOSOTE

Since the moisture must be evaporated before the wood will burn, the wood should be cut and stored in a dry place, preferably a year before it is used. Burning seasoned dry wood results in more even burning and minimizes the condensation of water vapor and volatile distillates that form creosote deposits in chimney flues. Fire management is extremely important for air-tight stoves. We have reports of complete chimney blockage within 72 hours of installation.

To Start Your Fire

Build a hot kindling fire and let burn with the draft open. This will warm up the flue. Then in about 15 minutes, add your larger pieces and let burn for another five minutes before reducing draft controls to desired setting.

For Reloading

Open draft for a few minutes, then open door very slowly. Then add an additional log. After five minutes, return draft control to desired level. By following this procedure every day that you burn, you will reduce creosote buildup by as much as 30%

THREE-HOUR LOGS

(Duraflame, Pine Mountain, Sterno, etc.)

The three-hour variety of logs available in most supermarkets are made of up to 60% wax or sterno and should never be used in stoves or free-standing fireplaces. If you have a masonry fireplace, burn only one at a time and never with any other fuel. Never poke it. Take the time to read and follow the directions on the wrapper.

GLASS DOORS

Glass doors can allow you to view the fire without losing heat up the chimney. There are four cautions you should be aware of:

a. Many serious burns have occurred to children when they have fallen against the hot glass doors.

b. Logs have rolled against and broken glass. Use a proper grate and do not overload.

c. Sudden changes in temperature have caused doors to shatter (EXAMPLES: burning trash, overfiring, kid with a squirt gun, etc.).

d. Glass doors cannot be installed on all zero clearance fireplaces without becoming a fire danger. Check your brand and dealer to make sure it doesn't violate the listing.

CLEANING GLASS DOORS

Doors should be cool. Then spray with oven cleaner and sponge off. Follow up with window cleaner if necessary.

ABOUT WOODS AND CREOSOTE

Green soft woods burn so slowly and smoky that soot and moist tar (creosote) stick to the inside of the chimney. Later WHOOSH!!! It ignites and you've got a red hot chimney fire on your hands, throwing burning tar deposits onto your roof. When wood is burned slowly, it produces acetic and pyrolignious acids, which combine with expelled moisture to form creosote. The creosote vapors condense in the relatively cool chimney flue of a slow-burning fire. As a result, creosote residue accumulates on the flue lining and seeps into any mortar joints and any other exposed cracks. When ignited, this creosote makes an extremely hot fire, up to 2000°F.

Creosote deposits can be reduced by burning seasoned year-old wood, such as tamarack, fir, birch, or apple. Regardless of the type of wood you burn, it should be dried as much as possible. In addition, the available heat value from well-seasoned wood is greater. For example, freshly cut wood contains approximately 5000 BTUs per pound, where the same air dried will produce 7700 BTUs and less creosote. Artificial logs also produce more creosote than natural logs.

CHIMNEY FIRES

Chimney fires are usually started by allowing a stove or fireplace to get out of hand — overfiring or using it as a trash burner. Don't burn material like cardboard, milk cartons, and Christmas wrap, which produce higher temperatures than a normal fire. Trash burning has also contributed to several burns and injuries.

Any wood fire will produce accumulations of creosote, and these accumulations can be considered dangerous. Not only can they contribute to chimney fires, but such fires can cause structural damage to your home as well. The best preventative is frequent chimney cleaning and burning of well seasoned year-old wood.

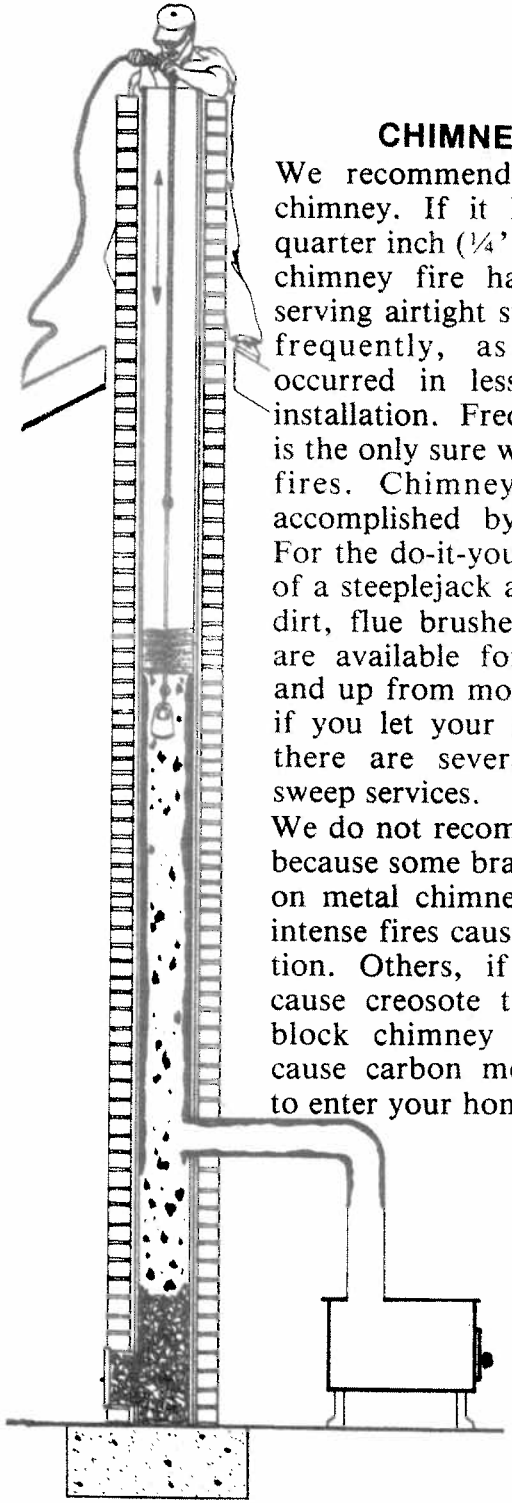
BE PREPARED FOR A FIRE

No wood-burning system is 100% safe and fireproof. A safe installation and extra care will help prevent fire, but accept the idea that there could be a fire and be prepared to handle it. Make certain everyone in the house is familiar with the warning signs of a chimney fire (sucking sounds, a loud roar, and shaking pipes). Instruct everyone on what to do. All adults should know how and when to use a fire extinguisher. Place Fire Department emergency phone stickers on every phone (available at your nearest fire station).

If you think you have a chimney fire:

1. Call the Fire Department immediately, before doing anything else.
2. Cut off the fire's air supply by closing any air intake vents to the fire box.
3. Get everyone out of the house and put them to work watching for sparks or signs of fire on the roof or nearby.
4. Keep a Class 1A10BC dry chemical fire extinguisher handy. If there is a danger of the house catching on fire, discharge it into the fire, standing back six to eight feet (6-8').

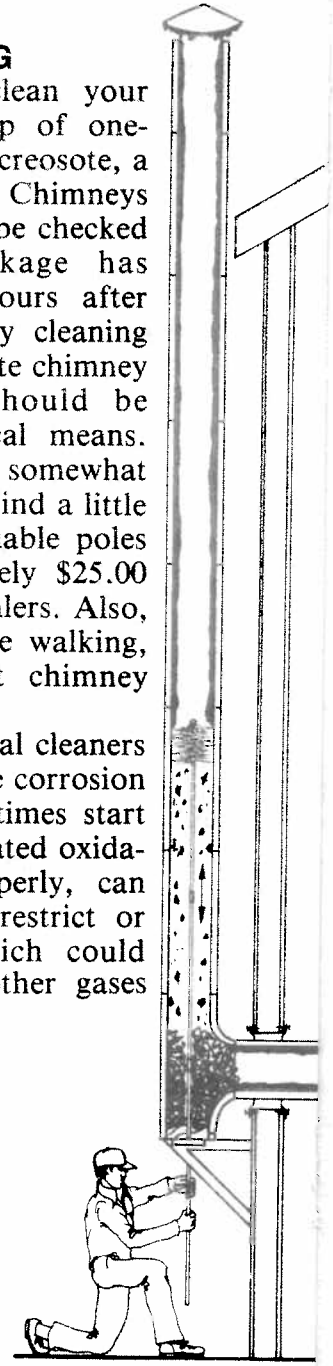
Never use a flammable liquid to kindle or rekindle a fire, because flammable vapors will explode as well as travel the length of a room.



CHIMNEY CLEANING

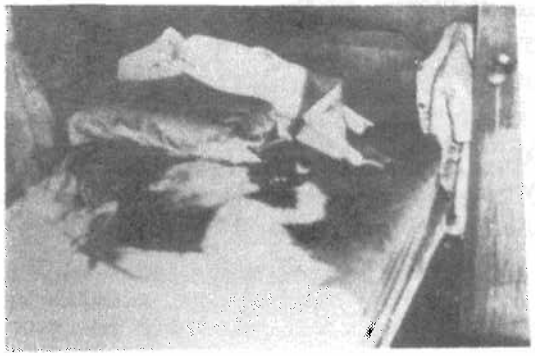
We recommend that you clean your chimney. If it has a buildup of one-quarter inch (¼") or more of creosote, a chimney fire hazard exists. Chimneys serving airtight stoves should be checked frequently, as total blockage has occurred in less than 72 hours after installation. Frequent chimney cleaning is the only sure way to eliminate chimney fires. Chimney cleaning should be accomplished by a mechanical means. For the do-it-yourselfer who's somewhat of a steeplejack and doesn't mind a little dirt, flue brushes with extendable poles are available for approximately $25.00 and up from most heating dealers. Also, if you let your fingers do the walking, there are several competent chimney sweep services.

We do not recommend chemical cleaners because some brands can cause corrosion on metal chimneys and sometimes start intense fires caused by accelerated oxidation. Others, if used improperly, can cause creosote to drop and restrict or block chimney or flues which could cause carbon monoxide or other gases to enter your home.



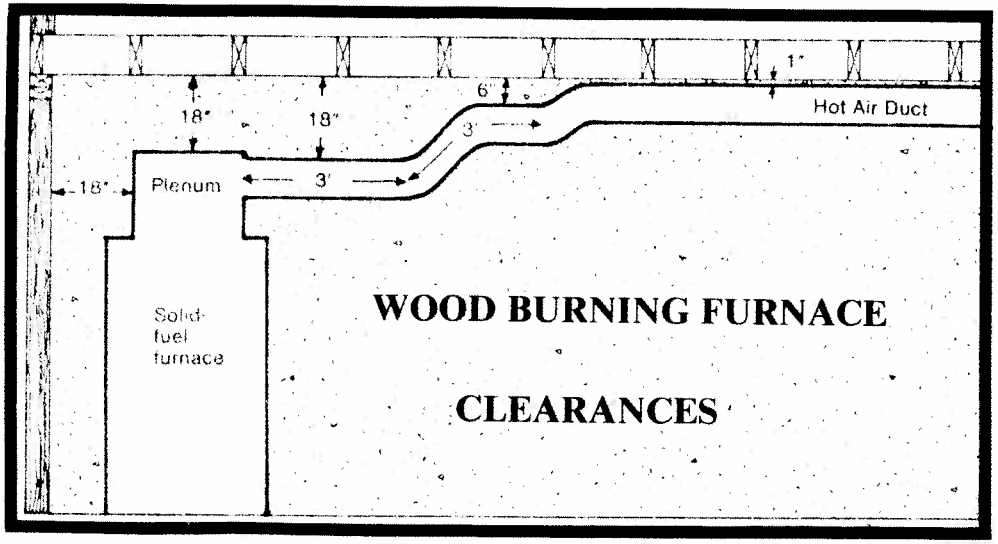
Smoke and Fire Protection

Smoke detectors in working condition and sleeping with the bedroom doors closed at night are important considerations for everyone, as 97% of the fire fatalities nationwide died of smoke inhalation without ever receiving a burn and 64% died in bed without ever knowing there was a fire. It has been estimated that one-third of these fatalities would have been prevented had they slept with their bedroom door closed at night.



The "smoke shadow" of a small girl who died of smoke inhalation along with two sisters, a brother, and her mother. Such accidents are much less likely in homes where the occupants sleep with bedroom doors closed and have operable smoke detectors.

With the introduction of wood heating, we often see doors open or grills installed to allow heat to circulate violating smoke and fire containment of the dwelling. There are safe alternatives. For example: In homes with a central forced air system, your cold air return duct can be remodeled with a grill at the ceiling level of the room with the wood heater. If the thermostat calls for additional heat, the warm air drawn into the system will supplement the furnace. It becomes the closest thing to automatic wood heat.



SUMMARY OF INSURANCE FOR WOOD HEATING

"What is your company's position in regard to granting a home fire insurance policy to someone with a wood stove?" This question was asked of seven representatives of seven different insurance organizations.

All the representatives expressed a "cautious attitude" toward wood stoves due primarily to the increasing number of fires attributed to stoves. The consensus was that if a stove is used for supplementary heating as opposed to central heating and has been professionally installed and/or inspected and, therefore, meets all local building code requirements, the policy would most likely be approved. If a stove is used as the main source of heat, the possibility of policy approval is considerably diminished.

Existing Home Owners Policies

It has been noted that many policies are null and void when heating equipment does not meet code requirements. For the companies that do pay regardless, they almost always cancel your policy after payment for a fire, placing you in a risk category with increased premiums. For your protection, it is my recommendation that you take out a permit, which allows you to have it inspected and approved. It then becomes a public record, saying yours is a reasonably safe installation.

ASH REMOVAL

Ashes removed may contain live coals which appear to be dead. Never use a vacuum cleaner to remove ashes. Place ashes in a metal container with a lid, then remove to the outside, well away from anything that can burn. It is a good idea to leave at least one inch (1") of ashes under the grate as ashes will help insulate the hearth and will act as a reflector, sending additional heat into the room.

USING COAL

Never use coal in a fireplace. Coal should be used only in stoves especially designed to burn coal. If the toxic gases produced enter the room, they can be fatal.

WOOD STOVE INSTALLATION SAFETY CHECKLIST

A nice wood stove or fireplace can add a lot of charm as well as warmth. However, if not installed properly, it can be a serious fire or health hazard. To protect your family, wood burning equipment must be installed and operated properly. Review this checklist before starting your first fire.

Hearth

Eighteen inches (18") in front of wood loading side ..... ☐
Twelve inches (12") on all other sides ..... ☐
Solid non-combustible sheet under hearth ..... ☐

Stove

Thirty-six inches (36") away from nearest combustibles (includes furniture, drapes, walls, mantle, etc.) ..... ☐
If less than thirty-six inches (36"), has an air-ventilated protector on wall or a U.L. or I.C.B.O. Listing for less than thirty-six inches (36") ..... ☐

Stovepipe

Is eighteen inches (18") from combustible wall or ceiling unless an air-ventilated protector is provided ..... ☐
Stovepipe sections are screwed together ..... ☐

Chimney

If existing chimney, it has been cleaned and thoroughly inspected for defects ..... ☐
If existing, it serves no other appliance ..... ☐
If existing, it has a proper flue liner ..... ☐
If a U.L. listed metal, clearances to combustibles on each section have been observed ..... ☐
Has a barrier been provided with a two-inch (2") air space from insulation? ..... ☐
Does the chimney terminate a minimum of two feet (2') above the nearest part of the roof within ten feet (10')? .. ☐
Are ashes removed and stored in a metal pail with a lid and removed outside, away from things that could burn? ..... ☐