



WOOD FUEL HEATING TIPS



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These recommendations are generally accepted safety standards. Following them does not guarantee conformance with any building codes, or federal, state, or local regulations, and does not ensure the absolute safety of your operations, residence, or place of business.

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Why Get Informed?

Burning wood is one of the most hazardous ways to heat your home, farm, or business. If you have a wood-burner or are considering installing one, this booklet is designed to help make you an informed wood fuel user. An informed wood fuel user is a safe wood fuel user.

Woodburning is different from heating with oil, electricity, or fuel gases. A wood stove cannot be completely controlled with a wall thermostat. Fuel cannot be cut off by flipping a switch or turning a valve. Wood doesn't burn cleanly like modern fuels. Wood stoves get hotter than conventional furnaces and produce hotter exhaust gases. Wood requires more physical work. And wood stoves require frequent cleaning and generate large volumes of waste.

Installing and using a wood stove is a lifestyle change for most people. It has been compared by some to adopting a new child into your home. It involves a lot of work, care, attention, and knowledge, even if you don't cut your own wood. Many people are not using the wood burners they spent a lot of money to install for these reasons. Others are taking dangerous shortcuts because they won't make the commitment to woodburning and the lifestyle changes required to do it safely. **If you are not willing to do the work and to become an informed wood fuel user, you risk your home and family every time the wood stove is lit.**

Before You Buy

Check with your local building code officials, fire department, and insurance agent before purchasing a woodburner. (In most cases, a building permit is required to legally install one.) These people can provide vital information about safe installation and operation and do the inspection services to help assure your family's safety.

Check your local library, bookstore, government agencies, and university extension services for good, reliable, **current** information about woodburning and safety. *The National Consensus Standards for Woodburning Safety was changed by the National Fire Protection Association on February 11, 2000. Any material written before the changes may not be up to date.*

Talk to people who are woodburning in your area about problems they've encountered and the lifestyle changes they have had to make. Talking to them may be the best way to determine if woodburning is for you.

Wood Stoves in Mobile Homes

We do not insure mobile homes with wood stoves installed in the residence. They have proved to be very hazardous in mobile homes because of limited space, airtight construction and use of lightweight combustible material in construction. **If you insist on installing a wood stove in a mobile home, purchase only a complete system listed by Underwriters' Laboratories for use in a mobile home and install and use it exactly as the manufacturer recommends.**

Wood Heat is a System

Once you've made an informed decision to use wood as a heat source, you're ready to buy your heating system. It is a system, not just a stove, because you must think of your wood heat as a total system. The system must include a source of **seasoned wood, a good heating device, proper clearances, floor protection, smokepipe, a proper chimney, draft control, care and maintenance.**

This entire system must be put together with your home or building and your lifestyle in mind. The cost of the stove alone is often less than half the cost of the entire wood heat system. Any improper parts or mistakes in putting together the system can greatly increase your chances of a disastrous fire.

⚠ CAUTION: Wood Heat is Hazardous!

Please realize that wood heat is hazardous and even if you comply with all suggestions and regulations **a fire or other mishap can occur.** There are no known wood heat devices that are 100 percent safe.

The best place to buy your wood heat system is from a reputable wood stove dealer. He can sell you an entire system — not just a stove and assorted parts. A reputable dealer can advise how to use and care for your woodburner installation and can provide the accessories needed for safe and economical operation.

Don't risk home and family by buying a bargain basement system from someone who can't provide good service and adequate information.

The Woodburning Device

The core of your system is the woodburning device. There are many from which to choose, but it's important to pick a quality device that will fit well into the area where you want it installed while maintaining proper clearances to combustibles.

Some points when picking a wood stove:

- Reputable manufacturer
- Relatively efficient design
- Plate steel (at least 1/8 inch thick) or quality cast iron construction (unlisted sheet metal stoves, barrel stoves, and poor quality cast iron stoves may eventually burn through or crack — resulting in a serious fire)
- Well-written instructions and installation manual emphasizing safety and providing clear directions and illustrations
- Labeling by a recognized testing laboratory

The advantages of buying a wood stove labeled by a testing laboratory are:

- It is evidence that the stove has passed stringent testing on many aspects of its use. Although the testing procedures are extensive and standardized — because every use pattern cannot be anticipated — not everything that might cause loss or injury from a wood stove is tested.
- Some building officials do not permit installation of unlisted wood stoves.
- Many listed stoves are tested for reduced clearances to combustibles — an important point when you must save space with installation.
- Labeling is a good indicator of stove quality and the manufacturer's commitment to safety.
- Labeled devices must have good instruction manuals.
- Listed stoves must be manufactured under a recognized quality control program.

Widely recognized testing laboratories for woodburning equipment are:

UL — Underwriter's Laboratories, Inc.

ETL — Electrical Testing Lab

PFS — PFS Corporation

ULC — Underwriters' Lab of Canada

WH — Warnock Hersey Intl. Inc.

DIN — Deutsche Industrie Norm
(German Industrial Standard)

CSA — Canadian Standards Assn.

CL — Cleveland Test Lab

HL — Hauser Labs

SER — Shelton Energy Research

RFG — R.F. Geisser & Assoc., Inc.

TCI — Testing Consultants, Inc.

AKA — Albert Knott & Assoc.

GML — Gas & Mechanical Lab

TCT — Twin Cities Testing

APEX Testing & Engineering

Auburn Testing Lab

Northwest Labs

Certicon of America

Energy Systems, Inc.

Pacific Inspection & Resh. Lab., Inc.

Terralab Engineers, Inc.

This list may be incomplete

Controlled combustion (airtight) stoves may be either radiant or circulating. They have very airtight fireboxes and all doors and openings are gasketed or finely machined so the amount of air entering the stove can be controlled. They can be more efficient than non-airtight stoves because the precise draft control governs the burning rate. Many of these stoves also include advanced design features like baffle arrangements, special draft patterns, thermostatically controlled draft and secondary combustion air to improve efficiency. Airtight stoves can increase creosote buildup when run frequently in an air-starved condition (we'll talk more about creosote later). They may also puff back and burn the operator if the door is opened before the draft controls are opened. This occurs because the sudden increase of oxygen caused by the open door on a hot smoldering fire creates a fireball as volatiles ignite. Therefore, safe operating procedures are a must.



▲ CAUTION: Some stoves on the market resemble airtight stoves but they are so leaky that the air controls have no effect on the fire.

Types of Wood Fuel Units

Most wood stoves are either of radiant or circulating design. The **radiant type** has one layer of metal enclosing the fire with no circulating air space. The exterior gets very hot.

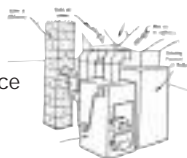
The **circulating design** has a second metal enclosure creating an air space between it and the firebox. Air is heated in the space. This design often needs lesser safety clearances from combustibles and reduces the chance of accidental burns.



Box stoves and parlor stoves are small, non-airtight radiant stoves. They are inexpensive and generally inefficient. This type of stove is suitable for heating one room but it requires a lot of attention.



Wood furnaces, add-on furnaces, wood-fired boilers and dual fuel furnaces are designed to fit into or replace the existing central heating



system in the house. They are generally efficient and airtight. Installation is very critical and professional help is recommended. Also, any unit of this type should have passed the national standard tests.

Homemade and barrel stoves are not recommended. Burn-throughs and other defects allowing the fire to escape the firebox are so common that we do not consider them suitable for any use. Most building officials will not permit them.



Wood-fired ranges or cookstoves are increasing in popularity. Many in use are antiques. Modern, efficient designs, however, are reaching the market. They can be used both for cooking and heating. Many also heat domestic hot water. *Care must be taken with any wood stove with a built-in water coil or heater where sufficient expansion space, circulation, water storage, and pressure relief is provided so a steam explosion cannot occur.*



Fireplace stoves are designed so they can be operated with the door open to provide a view of the fire. Some of these units are airtight and of very high quality.



Fireplace Inserts are factory-built, field-installed products consisting of a firebox assembly designed to be installed within or partially within the fire chamber of a fireplace that uses the fireplace flue to vent the products of combustion. This is a popular way to make an open fireplace more efficient. Many units feature circulating designs for even more heat efficiency. Some important points when using a fireplace insert are:

- Use inserts only with masonry fireplaces (including masonry heat frame units). They are not safe to use in zero-clearance fireplaces, unless specifically listed by a testing laboratory for zero-clearance fireplace use.
- A hearth extension will probably have to be used to extend at least 18 inches in front of the insert.
- Block open or remove the existing damper on the fireplace before installing the insert. Some building codes may require a permanent pipe attachment to the flue.
- Use only an insert that can be removed easily for cleaning. Clean behind the insert regularly because a dangerous amount of creosote can accumulate there.

If you plan to vent a conventional wood stove through a fireplace, we recommend you either:

1. Seal the damper on fireplace and install your smokepipe through the chimney wall above the fireplace, **or**
2. Have a sheet metal contractor fashion a reducer that fits in your fireplace's existing damper space and onto which your smokepipe will attach. It should be removable so the chimney and smokesheft can be cleaned. This will work only if your wood stove is shorter than your fireplace opening.

Outdoor Wood Boilers and Outdoor Forced Air Wood Furnaces should be installed with adequate clearance to the dwelling. Caution should be used when operating these units. These wood fuel units must meet the following requirements:

- The unit must be labeled by a testing laboratory.
- If it is a pressurized system, it must have a working pressure relief valve.

- The unit must be at least 25 feet from any insured dwelling or building.
- The unit should sit on a full concrete slab with the slab extending at least 4 feet in front of the unit to enable the area to be kept clean of ashes and wood chips.
- Firewood must be stored at least 10 feet from the unit and the area between kept clean.
- In colder climates, the unit must have anti-freeze added to the system to prevent the freezing of the underground lines.
- The unit must be installed by a qualified heating professional.
- Do not install a unit without complete limit and fan controls.
- Do not attach these units to any counterflow heating installation.
- If you are installing a wood-fired boiler make sure it has been tested to meet the American Society of Mechanical Engineers (ASME) Pressure Vessel Code. Get the help of an experienced steamfitter or boiler mechanic or a devastating steam explosion might occur.

Creosote and Clearances

The two most common fire problems with woodburning systems are creosote accumulations and improper clearances from combustibles. You should understand why creosote accumulates and how pyrolysis works.

Creosote

Creosote deposits in your chimney and chimney connector provide the fuel for chimney fires. Chimney fires can destroy the most substantial chimneys and ignite houses. Creosote is a natural by-product of woodburning. It is a dark, tarry substance that can range from being solid and hard to liquid and runny depending upon the conditions under which it was deposited. It is also very corrosive and can damage metal parts of your system.

Wood burns in three stages:

1. Moisture is driven off. Heat from this stage does not warm the stove or room.
2. The wood starts to break down chemically and volatile matter is vaporized. These vapors contain between 50-60 percent of the heat value of the wood.
3. Charcoal remains and combustion of the charcoal completes the process.

All three stages of combustion are usually

Furnaces, Add-Ons and Boilers

A detailed discussion of these devices is beyond the scope of this booklet.

We recommend you buy only systems that have passed the national standard tests. There will be extensive and detailed instructions for quality units of this type. They must be followed. It will probably be necessary to consult an experienced heating contractor to properly set up these systems, especially to properly measure the draft and set up a barometric draft regulator. Some hints about installing and using these systems:

- Don't permit intentional or accidental hot air flow through the cold air return system ductwork. (Use only manufacturer-suggested arrangements and proper backflow dampers.)
- Use a draft gauge to determine if you have adequate draft.
- Use proper hot air ductwork clearances (18 inches to plenum and ductwork within 3 feet of furnace, 6 inches clearance between 3 feet and 6 feet of furnace, and 1 inch clearance for all other warm air ducts). Proper wall and ceiling heat shields can be used to reduce these clearances.

occurring in your wood stove at the same time until all wood in the last loading is converted to charcoal. Creosote is formed in the second stage of woodburning. If the hydrocarbon volatile gases are not burned in the firebox, the draft carries them into the chimney connector and chimney in the form of dense smoke. They encounter cooler temperatures in the chimney system and may condense on the chimney walls to form creosote.

Up to half the heat energy available from the wood you burn is contained in the volatiles that form creosote. Thus, it makes sense for both safety and efficiency to burn these volatile gases in the firebox before they can escape up the chimney and form troublesome creosote.

This is not as easy as it sounds because firebox temperatures must be maintained at 1100°F and above to burn these creosote-forming gases. However, you can learn to operate your system with a minimum of creosote development by frequently inspecting your chimney and adjusting operating procedures accordingly. Experts formerly recommended an annual chimney inspection. With today's efficient airtight systems, an annual inspection probably isn't adequate because an airtight stove usually operated during air starvation conditions can completely clog a chimney with creosote in as little as two weeks. **We now recommend a chimney inspection each 1-2 weeks in the beginning until you become confident you're operating your system to reduce creosote.**

Monthly inspections may then be adequate. Accumulations of as little as 1/4 inch in your chimney can cause a serious fire. **Therefore, we recommend you clean your chimney several times a year.** (We'll explain more about chimney

inspection and cleaning later.)

How do you operate the stove to reduce creosote? Here are some tips:

- Burn only dry, well-seasoned wood. Green wood contains up to 50 percent water. Wood seasoned a year has only 20 percent moisture content. When green wood is burned much of the fire's heat is wasted driving off excess water (stage one combustion) so your firebox temperature is lower and more volatile gas can escape the chimney. Make sure all wood you burn is seasoned at least a year. If you buy firewood, do it a year in advance.
- Don't shut down the air controls or damper to make the fire smolder until most of the wood in the firebox is charcoal. Charcoal (or stage three burning) produces very little creosote.
- Split large pieces of wood into smaller chunks so they can pass through stages one and two faster and not smolder as long.
- The practice of filling the stove with large chunks of wood at bedtime, closing down the air control or damper and letting the logs smolder all night produces a lot of creosote. It is better to build up a large bed of charcoal before bedtime then close down the air control. The charcoal will probably last all night in an efficient stove and provide a reasonable level of heat. You can ensure sleeping comfort by using thick comforters, electric blankets, or reduced output from your conventional heating system.
- Monitor your stack gas temperatures. There are several relatively inexpensive thermometers that attach to your chimney connector that can be of great help in teaching safe wood fuel burning. The insert-type thermometers work better than the magnetic surface ones. They are available from good wood stove dealers. They can warn when the

smoke leaving your stove is too cool (less than 300 – 350°F) and is likely to condense on the chimney system as creosote. They can also warn if the exhaust smoke is too hot (over 1000°F) and is likely to ignite creosote deposits or cause structural damage to the chimney. By frequently inspecting your chimney and regulating the wood fire by the stack thermometer, you can learn to operate your system efficiently with very little creosote accumulation. There is also a new alarm system on the market that performs this function and gives a loud alarm when conditions are right for a chimney fire. False alarms, however, may be a problem.

- Many experienced wood burners used a brief hot fire once a day or once a week to burn out or drive out chimney creosote deposits. This method seems to work well if you are sure there is very little there. **If you want to try this method, inspect your chimney first or you could have a very serious chimney fire!**
- Do not burn trash or paper in your wood stove. This causes smoldering fires and flying sparks that can ignite creosote. Fire department records show that many chimney fires occur on Christmas Day when families are burning wrapping paper and ever-green boughs.
- Some stoves are equipped with catalytic converters. You may consider purchasing one of these units. It may reduce creosote and air pollution.

Clearances

Parts of your wood heat system get very hot and can radiate that heat to nearby combustibles such as walls, floors, ceilings, doors, furniture, woodboxes, etc. Over sufficient periods of time even temperatures as low as 200°F have been known to ignite wood

through a process known as pyrolysis. Combustibles near woodburning systems can get a lot hotter than that so ignition might occur in a matter of days or weeks. To reduce the chances of ignition of combustibles, the National Fire Protection Association changed the clearance requirements for solid fuel burning equipment in the February 11, 2000, edition of the national consensus standard ANSI/NFPA #211 "Chimneys, Fireplaces, Vents and Solid Fuel-Burning Appliances." The new minimum clearances from combustibles are shown in Table 1 page 10.

▲ CAUTION: Even with proper clearances and listed devices, continual overfiring of a woodburning device can result in a fire from overheated combustibles.

- For installation on combustible floors. See the Floor Protection section.
- The above clearances are for wood, drywall or plaster walls (drywall and plaster provide no protection to the wood underneath them for clearance purposes). **Materials such as paper, fabrics, draperies, and furniture must have greater clearances.**
- If a combustible door is located near your woodburner, all parts of the arc of the door swing must be outside the required clearance area.

Where to Locate

Try to locate the stove centrally in the main living area of the house. Large open areas are easier to heat than small rooms with poor air circulation.

Wood space heaters require lots of room **unless** the walls or combustibles are properly protected. Cut out a piece of

Table 1. Standard Clearances for Solid Fuel-Burning Appliances

Kind of Appliance	Above Top of Casing or Appliance, Above Top and Sides of Furnace			
	Plenum or Bonnet	from front	from back*	from sides*
Residential				
All water walled or jacketed	6"	48"	6"***	6"***
Steam boilers — 15 psi (103 kPa)	6	48	6	6
Water boilers — 250°F (121°C) max.	6	48	6	6
Water boilers — 200°F (93°C) max.	6	48	6	6
Furnaces				
Gravity and forced air	18	48	18	18
Room heaters, fireplace stoves, fireplace inserts, combinations	36	36	36	36
Ranges				
Lined fire chamber	30†	36	24	18
Unlined fire chamber	30†	36	36	18

* Provisions for fuel storage shall be located at least 36 in. from any side of the appliance.

** Adequate clearance for cleaning and maintenance shall be provided.

† To combustible material or metal cabinets. If the underside of such combustible material or metal cabinet is protected with sheet metal of not less than 24 gauge 0.024 in., spaced out 1 in., the distance shall be permitted to be reduced to not less than 24 in.

Only two exceptions are permitted for the clearances specified in Table 1. They are:

1. If the wood burning device is tested and listed for lesser clearance by a recognized testing laboratory that lesser clearance may be used.
2. Wall protectors and heat shields may be used to reduce clearances. These devices are covered in the section of this booklet called Clearance Reduction.

Extracted from NFPA No.211, *Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances*, 2000 Edition, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269

cardboard the size of the space heater you are considering and try it in the area you are planning to install the device. Can you get proper clearance? If not, you will need wall protection according to our Clearance Reduction section or you can try to find a device that is listed for lesser clearance by a testing laboratory. Don't forget to consider chimney access when planning the location.

Smokepipe Clearances

The smokepipe is used to connect the stove to the chimney. It is also called "vent pipe," "chimney connector," and "stack pipe." Use a porcelain-enameled, black-painted or dark-finished smokepipe for good heat transfer. Up to 15 percent of the heat from your system is given off by your smokepipe and dark surfaces

radiate heat best. Don't use a galvanized or zinc-coated smokepipe because at temperatures above 750°F toxic zinc oxide fumes will be given off which could cause headaches and metal fume fever. See Figure A on page 11.

Proper Clearance from smokepipe to combustibles is 18 inches. There are two exceptions to the clearance requirement:

- If the specific material you are using for a smokepipe is listed by a recognized testing laboratory at a different clearance, use that clearance.
- You can reduce the clearance, if necessary, by using a wall shield or heat protector as described in our Clearance Reduction section.


Rules for installing and using a smokepipe are:

1. Keep loose combustibles away

Diagram illustrating the installation of a factory-built chimney through a roof and masonry. Key components and labels include:

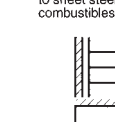
- Factory built chimney length
- Solid insulated listed factory-built chimney length
- Nonsoluble refractory cement
- Chimney length flush with inside of flue
- Masonry chimney constructed to NFPA 211
- Sheet steel supports
- Chimney flue
- Chimney connector
- Air space 9 in. (229 mm) min.
- Minimum chimney clearance from masonry to sheet steel supports and combustibles 2 in. (51 mm)
- Minimum clearance 9 in. (229 mm)
- Use chimney mfg. parts to attach connector securely

Minimum
ventilated thimble,
having two
ventilating
channels
each 1 in. (25 mm)
dia.



Two ventilated air
channels each
1 in. (25 mm)
dia.
Construction of
sheet steel

Minimum chimney clearance
to sheet steel supports
and combustibles 2 in. (51 mm)



Two air channels
each 1 in. (25 mm)
dia.

Chimney flue

Chimney connector

Minimum 6 in.
(152 mm) glass
fiber insulation

Sheet steel
supports

Masonry chimney
constructed to
NFPA 211.

Minimum chimney clearance to sheet steel supports and combustibles 2 in. (51 mm)

Sheet steel supports

Chimney section

Chimney connector

Air space 2 in. (51 mm)

Minimum clearance 2 in. (51 mm)

1 in. (25 mm) air space to chimney length

Chimney connector

Chimney length

Sheet steel supports

Masonry chimney constructed to NFPA 211

3. Any material used to close up an opening for the connector must be of noncombustible material.
4. A connector to a masonry chimney, except for System A, must extend to in piece through the wall pass-through system and the chimney wall to the inner face of the flue liner, but not beyond.

from the smokepipe and stove.
It is a poor place to dry wet towels.

2. Use a smokepipe made of 24-gauge metal or heavier.
3. Keep smokepipe as short and straight as feasible and located as close as possible to the chimney or vent. The horizontal length of a smokepipe to a natural draft chimney or vent serving a single appliance shall be not more than 75 percent of the height of the vertical portion of the chimney or vent above the smokepipe inlet. If two or more complete 90° elbows exist in your smokepipe, you may have a problem keeping a good draft.
4. Lap stovepipe joints 2 inches and secure with three sheet metal screws at each connection. Connect pipe with male ends down so creosote won't leak out of joints.
5. If smokepipe is over five feet long, support with hanger straps every five feet.
6. Use a proper stainless steel, cast iron or clay tile thimble at the chimney inlet. Extend it into the room so a secure attachment can be made. The smokepipe must snugly fit the chimney inlet. This fit is critical. Consult an experienced installer or dealer for ideas about how to make this a secure connection.
7. The horizontal part of the smokepipe must have at least 1/4 inch of rise per linear foot. The end at the chimney inlet is the highest point.
8. When you clean the chimney, clean the smokepipe.
9. Avoid running the smokepipe through a combustible interior wall. If you must do it, protect that wall in one of the following ways:
 - a. Use Underwriter's Laboratories list of all fuel or solid fuel chimney material for that section of the stovepipe that passes through the wall. Install it in accordance with the listing and the manufac-

turer's instructions. Use only solid insulation packed chimney pieces. Thermomasyphoning-type A11 Fuel chimneys won't work in a horizontal position.

- b. Use a metal ventilated thimble at least 12 inches larger in diameter than the smokepipe to protect the wall. (If you cannot purchase such a thimble, a local heating contractor or sheet metal shop can make it for you.)
- c. Use a metal or burned fire clay thimble built into brickwork or other solid fire resistive material extending at least 8 inches from all sides of the thimble.

SMOKEPIPE DON'Ts

- Don't run smokepipe through closets, attics or any concealed area.
- Don't use smokepipe for a chimney.
- Don't run smokepipe through an exterior wall or window.

Clearance Reduction

Clearances from hot parts of your system to combustibles can be reduced by using proper heat shields and wall protectors.

You may reduce required clearances by the use of materials and techniques as specified in Table 2 on page 13.

In addition to the materials and methods listed in Table 2, there are now wall protectors and heat shields on the market that have been tested and listed by recognized testing laboratories. These products are acceptable when installed and used in accordance with their listing. Most are more decorative and attractive than the protection listed in Table 2. They are available from quality wood stove dealers.

Other wall and combustible protection systems are acceptable if they are

designed by a registered professional engineer using criteria set forth in NFPA standards for Chimneys, Fireplaces, Vents and Solid Fuel-Burning Appliances (NFPA #211-2000) Paragraph 9-6.2.1 and 6-5.1.2 and are approved by local building code authorities.

Installation Notes

For clearance reduction systems using

air space between the combustible wall and the wall protector, adequate air circulation shall be provided. Adequate air circulation can be provided by leaving all edges of the wall protected with an air gap of at least 1 inch. An air space of 1 inch is usually required behind most heat shields and wall protectors. This 1 inch air space is critical to allow air flow to remove heat from behind

Table 2. Reduction of Appliance Clearance with Specified Forms of Protection

Clearance reduction applied to and covering all combustible surfaces within the distance specified as required clearance with no protection

Maximum Allowable Reduction in Clearance (%)

Clearances shown below are minimum allowable where required clearance with no protection is 36". For other required clearances with no protection, calculate minimum allowable from maximum allowable reduction.

	As Wall Protector	As Ceiling Protector	As Wall Protector	As Ceiling Protector
3.5 in. masonry wall without ventilated air space	33%	—	24"	—
0.5 in. noncombustible insulated board over 1 in. glass fiber or mineral wool batts without ventilated air space	50	33	18	24
0.024 in., 24 gauge sheet metal over 1 in. glass fiber or mineral wool batts reinforced with wire, or equivalent, on rear face with ventilated air space	66	50	12	18
3.5 in. masonry wall with ventilated air space	66	—	12	—
0.024 in., 24 gauge sheet metal with ventilated air space	66	50	12	18
0.5 in. noncombustible insulation board with ventilated air space	66	50	12	18
0.024 in. 24 gauge sheet metal with ventilated air space over 0.024 in. 24 gauge sheet metal with ventilated air space	66	50	12	18
1 in. glass fiber or mineral wool batts sandwiched between two sheets 0.024 in. 24 gauge sheet metal with ventilated air space	66	50	12	18

Notes:

1. Spacers and ties shall be of noncombustible material and shall not be used directly behind appliance or conductor.
2. With all clearance reduction systems using a ventilated air space, adequate air circulation shall be provided. There shall be at least 1 in. between the clearance reduction system and combustible walls and ceilings.
3. Mineral wool batts (blanket or board) shall have a minimum density of 8 lb/ft3 (128.7 kg/m3) and have a minimum melting point of 1500°F (816°C).

4. Insulation material used as part of clearance reduction system shall have a thermal conductivity of 1.0 (Btu-in.)/(ft2-hr-°F) or less. Insulation board shall be formed of noncombustible material.
5. If a single-wall connector passes through a masonry wall used as a wall shield, there shall be at least ½ in. of open, ventilated air space between connector and masonry.
6. There shall be at least 1 in. between appliance and protector. In no case shall the clearance between appliance

- and wall surface be reduced below that allowed in this table.
7. Clearances in front of the loading door or ash removal door, or both, of the appliance shall not be reduced.
 8. All clearances and thicknesses are minimums; larger clearances and thicknesses shall be permitted.

Extracted from NFPA No.211, Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances, 2000 Edition, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269

the shield. Even a 4 inch thick brick wall will not protect a combustible wall directly behind it without this 1 inch air space. The space may be more than 1 inch, but not less. Remember to allow at least 1 inch space at the bottom of the shield to allow air circulation. Also remember the heat shield must cover all combustible material within the minimum distance specified in Table 1 on page 8. Suggestions for spacers are channel irons, porcelain knobs or nails driven in part way. Flexible heat shields such as sheet metal must be supported or spaced out every 16 inches to prevent them from flexing and touching the combustible wall.

Floor Protection

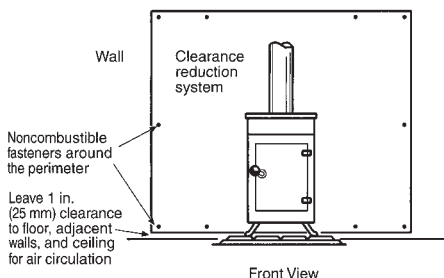
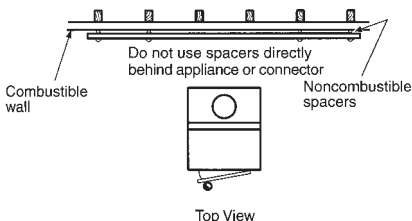
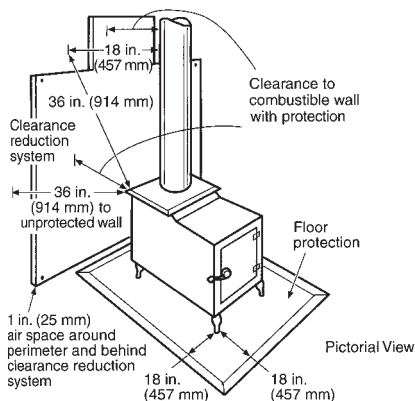
A floor protector is a noncombustible surface applied to the floor area underneath and extending in front, to the sides, and to the rear of a heat-producing appliance. If you install your stove on a combustible surface you must provide a floor protector extending to 18 inches on all sides of the stove. On an existing installation 6 inches on the sides and 18 inches on the front is acceptable. If in doubt, check with the local authority having jurisdiction in your area for recommended existing codes.

You may not install a woodburning furnace, add-on furnace or boiler on a combustible floor unless it has been specifically listed for such installation by a recognized testing laboratory. Carpeting should be removed under the stove and floor protector.

Several good floor protectors have been listed by recognized testing laboratories. These are acceptable when used according to their listing and are available from quality wood stove dealers.

Figure B. Distance to Combustibles

A clearance reduction system for a heat-producing appliance. The system is a barrier of metal, metal and insulating material, or masonry heat-resistive material with an air space between the barrier and a combustible surface.



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The amount or type of floor protection depends on the leg height of the stove. Leg height refers to the ventilated open air space beneath the fire chamber or base of the unit.

Leg Height	Protection Needed
18" or more	24-gauge layer of sheet metal
6" to 18"	24-gauge layer of sheet metal over or under 2" of closely spaced masonry units of brick, concrete or stone
6" to 2"	Use 4" of hollow masonry laid to provide air circulation through the masonry layer covered by a sheet of 24-gauge sheet metal
Less than 2"	May not be installed over combustible floor unless listed by a testing laboratory

The Chimney

The chimney is the exhaust system of your woodburning setup. It is critical to remove carbon monoxide, smoke and other poisonous combustion products from your building. To do this, it relies on the natural draft created by the principle that warm air rises. The draft created by a chimney is related to:

1. Height of the chimney
2. The interior cross sectional area of the chimney
3. Amount of air that can enter the wood-fired system
4. The difference between inside and outside temperature
5. Exterior obstructions to flow, such as rooflines and trees
6. Temperature of the chimney liner

An adequate draft can be developed by controlling the above variables. Most wood stoves come with instructions as to

height of chimney and size of flue required for most situations to have an adequate draft. For draft problem situations, an experienced heating contractor with draft measuring equipment should be consulted.

In general, a chimney must extend above the roofline and other obstructions as shown in Figure C for an adequate draft and to control downdrafts.

Downdrafts

A downdraft is when the smoke fails to rise in the chimney. Instead, air flows downward forcing smoke and dangerous carbon monoxide into the house. If you have the problem, correct it. Your heating contractor has draft test equipment and most likely can assist in determining corrective action.

Keeping Your Chimney Safe

There are two types of chimneys, one that is safe and one that could burn your house down. And, just because your chimney is safe today, does not mean it will be safe next year.

Wind can damage your chimney. A loose brick can fall inside the flue causing a blockage and a house full of smoke. So can a bird's nest or a hive of wild bees. A chimney fire can crack or buckle the chimney. A fire that burns too hot can also damage a chimney when it is new or being used for the first time in the heating season. Keep the first few fires small to dry out the flue.

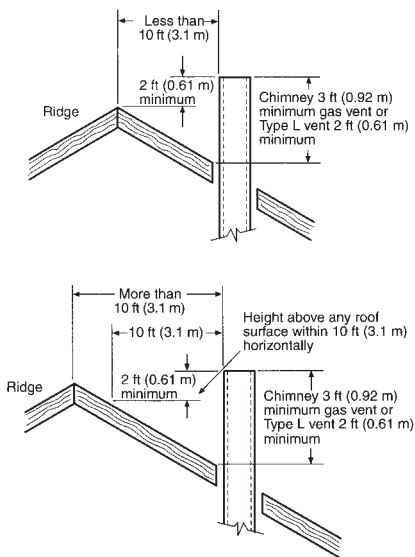
Chimneys get tired with age, mortar weakens and disappears, buildings shift, foundations settle and crack chimneys. So be wise and inspect your chimney before each heating season.

Chimney Inspection & Cleaning

Good access for chimney cleaning and

inspection should be built into your system from the beginning. Plan the clean-out doors or accessways so they are readily accessible. You may inspect the chimney from the bottom using a mirror. You may have to remove the chimney cap to get enough light to see properly.

Figure C. Termination of Vents and Chimneys above Buildings



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You may wish to lower a flashlight down the chimney on a line in order to carefully view all joints and parts. Be careful if using a drop cord hooked up to house current. A broken bulb or snagged cord could lead to electrocution, especially with a metal chimney.

The best way to clean your chimney is to hire a reputable professional chimney sweep. He will do a thorough job with the right tools and equipment and should not make a mess of your house. If you must

clean a chimney yourself, get the proper tools and advice from a wood stove dealer. Another important reason to have your chimney regularly inspected, cleaned and maintained is any device that burns fuel, such as wood, is a potential threat of carbon monoxide poisoning.

⚠ CAUTION: Working on roofs can be very hazardous without the proper equipment or experience.

⚠ CAUTION: Chimneys can be easily damaged during cleaning. Metal brushes should not be used on some metal chimneys.

To our knowledge, none of the chemicals sold to be burned in a fireplace to clean the flue are effective. They cannot replace a thorough chimney cleaning.

Chimney Fires

Do not disregard odd rumbling, roaring or rushing noises coming from your chimney. Investigate the cause. A rumbling noise is many times made by a chimney fire. Feel the outside of the chimney — is it hotter than normal? Check outside — are flames coming out of the chimney? Your smokepipe may also vibrate rapidly during a chimney fire.

If a chimney fire occurs:

1. Call the fire department.
2. Shut off oxygen supply to chimney.
3. Use your fire extinguisher and chimney fire flares.

Shut off the oxygen supply by closing draft openings. An airtight stove is an advantage since by closing draft openings, the oxygen supply is easily shut off.

If you do not have an airtight stove, close the damper. You may get some smoke in the house after closing the damper so be sure to open a door or some windows to

get plenty of fresh air. Put out the fire as soon as possible to avoid smoke and carbon monoxide build-up in the house.

When installing your system, instruct all family members on what to do. **Evacuate the house at the first sign that the fire has escaped from the chimney.**

If you do have a chimney fire, carefully inspect the chimney for damage before again using it. Check the inside (with a mirror) for blockage and cracks. Check the outside for cracks, be sure to check concealed areas such as the attic. If you cannot get up on the roof, maybe the fire department will inspect the chimney before they leave.

If the chimney is found to be damaged, repair or replace the chimney before using.

We recommend that a questionable flue be smoke tested. A small fire is made at the base of the flue (use material that produces dense smoke or a special smoke test candle) and when the flue is full of smoke, block the top. Examine the exterior of the chimney for leakage from the top to bottom. **Careful** — don't smoke up the entire house.

Two Types of Chimneys

There are two types of chimneys for woodburning system use — a **masonry** chimney or a **factory-built** All-fuel or Solid Fuel Chimney. We will discuss each type separately.

Masonry Chimneys

A masonry chimney is a field-constructed chimney of solid masonry units, bricks, stones, listed masonry chimney units, or reinforced portland cement concrete that is lined with suitable chimney flue liners and built by an experienced mason or conform to accepted masonry practice.

Interior chimneys are better than those built outside an exterior wall because they stay warmer when surrounded by in-house air. Warm chimneys have better drafts and cause less creosote to condense on their surface. Exterior hollow concrete block chimneys can be a problem because they cool faster than brick or stone and are much more susceptible to water and moisture damage. Hollow concrete block chimneys are very economical but if installed on the outside of a building they should be made of special moisture resistant blocks or should be painted or treated with a moisture proof coating every two years.

Let's review some basics about suitable masonry chimneys:

1. A safe masonry chimney must have a tile clay liner. Such liners are smooth and hard and crack easily. Liners are made of material like a clay flowerpot, but are harder. Such a liner protects the masonry exterior from the flue gases.

An unlined chimney may be lined by using a special stainless steel pipe listed by a recognized testing lab for such purpose. The stainless steel pipe is installed in the chimney and rigidly connected to the vent pipe from the stove. Make sure to leave access for proper cleaning of the stainless steel pipe.

There is a process for lining an old chimney that uses a high temperature cement-type material poured or pumped around a special balloon inside an existing chimney. It appears to be an effective relining technique and is acceptable if done by a trained contractor. When masonry chimneys are relined, the liner shall be listed or of approved material that resists corrosion, softening or cracking from flue gases at temperatures appropriate to the

class of chimney service. Listed liner systems shall be installed in accordance with the listing.

Neither method of lining should be tried unless the chimney is otherwise structurally sound.

2. The chimney must not be used to support any part of the structure since a settling or shifting of the house will crack it. There should be 2 inches of free clearance around an interior chimney. This keeps excess heat from igniting combustibles.
3. A masonry chimney used for wood heat must be built from the ground up; a chimney supported by brackets can easily be damaged by a chimney fire and a house fire may result. A shifting or sagging of the bracket will cause the chimney to crack.
4. If your chimney has more than one smokepipe inlet, cover these with a piece of tile clay liner and fill up the inlet with masonry material equal to the chimney thickness. Thin metal snap-in covers are not safe. The initial explosion of a chimney fire often blows out such a cover. This opening would then provide oxygen for the chimney fire. You can no longer control it and often the house catches fire at this point. (See Chimney Fires section for control of chimney fires.)
5. Your chimney must have a metal clean-out door at the bottom. Clean-out openings shall be equipped with ferrous metal, pre-cast cement, or other approved noncombustible doors and frames arranged to remain tightly closed and secured when not in use. You need this to remove soot loosened after a chimney cleaning. Otherwise, the chimney will eventually fill with soot and plug the smokepipe resulting in a house full of smoke. A good mason can usually install a clean-out door in an existing chimney. The clean-out door is handy for

inspecting the inside of the chimney.

6. Another reminder is to check the inside of the flue with a mirror before the heating season. It is surprising what can happen. On one occasion, a chimney was blocked with a wad of insulation which blew over from a nearby construction project.
7. Vent only one heating device into a flue. (A chimney may contain several separate flues.) Several things can happen including an automatic furnace failing to ignite and raw fuel is pumped into the chimney. Hot exhaust from a wood fire could then cause an explosion. Fuel oil furnaces and space heaters often fail to function properly, wasting fuel and potentially causing a house full of smoke. Also, the remaining space surrounding a chimney liner, gas vent, special gas vent or plastic piping installed within a chimney flue shall not be used to vent another appliance.
8. Masonry chimneys serving appliances shall be sized and configured in accordance with the appliance manufacturer's instructions.

What happens if a chimney fire occurs?

You cannot control it because you cannot shut off the draft openings of a gas or fuel oil device. With only a wood space heater vented into a chimney, you can control the chimney fire by shutting off the draft (air supply). Dangerous combustion gases also may be forced into the dwelling.

Multiple venting can also reduce the efficiencies of all devices attached to the same flue because the draft created by one appliance will draw warm, already heated air through the other appliance(s) at a faster rate, resulting in energy waste.

9. Screening material that is attached to chimney or vent caps to prevent the entry of animals and insects

should be installed in such a manner to not adversely affect the chimney or vent draft.

10. Spark arresters, where required by the authority having jurisdiction for chimneys attached to solid fuel burning equipment, shall meet the following requirements:
 - The net-free area of the arrester shall be no less than four times the net-free area of the outlet of the chimney flue it serves.
 - The arrester screen shall have heat and corrosion resistance equivalent to 19-gauge (0.041 inch) galvanized steel or 24-gauge (0.024 inch) stainless steel.
 - Openings shall not allow the passage of spheres having a diameter larger than $\frac{1}{2}$ inch or block the passage of spheres having a diameter of less than $\frac{3}{8}$ inch.
 - The spark screen shall be accessible for cleaning, and the screen or chimney cap shall be removable to allow cleaning of the chimney flue.

Where spark arresters are part of a listed chimney termination system, they shall be constructed and installed in accordance with the listing.

MASONRY DON'Ts

- Don't use an old chimney without a proper liner.
- Don't use a chimney built on brackets.
- Don't use a chimney with poor mortar.
- Don't use single-wall metal chimneys or unlisted metal chimneys.

Factory-Built Chimneys

Factory-built chimneys are intended for venting gas, liquid, and solid-fuel fired residential-type appliances and building heating appliances in which the maximum continuous flue-gas outlet

temperatures do not exceed 1000°F (538°C). Factory-built chimneys are intended for installation in accordance with the Standard for Chimneys, Fireplaces, Vents, and Solid-Fuel Burning Appliances, NFPA 211, and in accordance with codes such as the BOCA National Mechanical Code, the Standard Mechanical Code, and the Uniform Mechanical Code. They are intended for installation inside or outside of buildings or both, in a manner that provides a vertical (30 degree maximum offset) conduit or passageway to transport flue gases to the outside.

There is some evidence that at least certain kinds of factory-built chimneys fail easily and early when subjected to chimney fires, resulting in a burned house. This may be due to design defects, to rapid deterioration of the chimney in "real world" conditions or to inadequate test methods. Work is being done in all these areas to find an answer to the problem. Meanwhile, if you choose to use a factory-built chimney, we recommend the following:

1. Inspect your chimney frequently (every 1-2 weeks during the heating season). Clean the chimney as needed to prevent creosote accumulations. Look for any corrosion or other damage, especially at joints and fittings. Replace or repair damaged chimneys before continuing use.
2. Use a thermometer to monitor stack gas temperatures. These temperatures should be above 300°F and well below 1000°F.
3. If you experience a chimney fire, do not use your chimney until it is thoroughly inspected by an experi-

enced heating contractor or chimney sweep.

Factory-built chimneys should be rated **"All Fuel or Solid Fuel"** by Underwriter's Laboratories, Inc. "All Fuel or Solid Fuel" means the chimney is built to use with wood fuel. These chimneys were formerly called "CLASS A" chimneys.

There are four types of All Fuel or Solid Fuel factory-built chimneys. They are:

1. **Insulated type** — This is a double-walled stainless steel pipe packed with a mineral insulating product. It is suitable for use with wood stoves provided joints between sections are clamped together with the optional locking rings provided for these chimneys. Without the locking rings or other rigid support, the joints could wear out because of vibration from the wind or a chimney fire and cause heat and smoke to leak into the house. Some designs of this type of chimney buckle and collapse in severe chimney fires because of thermal expansion differences between materials.
2. **Triple wall thermosyphon chimneys** — These are three pipes — one inside the other. Flue gases flow up the center pipe. Cold air is drawn down the inside of the outer shell of the chimney all the way to the bottom of the chimney. There it heats up and rises up the inner shell of the chimney to cool the flue. This is a natural convection process. These chimneys run very cool and consequently can build up creosote rapidly. These chimneys were designed for and must be used with zero-clearance fireplaces. They are often not suitable for use with wood stoves unless specifically called for by the manufacturer of a listed fireplace stove.

3. **Air insulated triple wall chimneys** (sometimes called modified thermosyphon chimneys) — These chimneys are similar to the thermosyphon type above but have internal baffling and provision to allow air exchange between the two outer shells at each joint. This produces a warmer chimney and makes it suitable for woodburning stoves.

4. **Insulated triple wall** — This is a type of chimney that has an inner pipe which is made of a heavy refractory material. It combines the advantages and reduces the disadvantages of the other types of factory-built chimneys, but it makes a very heavy chimney. Additional structural support may be needed.

If you decide to purchase a factory-built chimney, do first what many people do last — read the manufacturer's instructions. Install exactly per those instructions. If you are not sure, get help. (It's easier than calling the fire department later on.)

FACTORY-BUILT DON'Ts

- Don't use a Class B, BW, L or single-wall chimney. Wood heat melts these.
- Don't use smokepipes for a chimney.
- Never multiple vent into factory-built chimneys.
- Don't mix parts from various types of chimneys or different manufacturers in your chimney system.

Metal chimneys are made so the weight is carried on a special base furnished with the chimney. This base can be installed in a ceiling or in a floor. If your chimney goes through more than one floor or ceiling, we recommend a masonry chimney.

Other Considerations

Dampers

A manual damper is a shut-off plate installed in the stove or smokepipe. You can regulate the draft through the stove and the burning rate with it.

Check the manufacturer's instructions that came with your stove. Some stoves have automatic dampers or draft controls and a manual damper should not be used with all models. In stoves without a built-in damper, install one in the smokepipe.

Always use a "cast iron" damper if you must install a damper in the smokepipe.

Never use an automatic damper — one that shuts completely — with a wood-burning device. You have to have a draft at all times when there is a fire going.

(This does not apply to factory-installed automatic dampers.)

Heat Reclaimers

We do not recommend installation and use of heat reclaimers on smokepipes. Heat reclaimers are devices installed in the smokepipe between the stove and the chimney that transfers heat from the flue gases that would ordinarily be vented out of the chimney. These devices allow more heat to remain in the living area, which would seem like a good idea. However, these devices can cause problems such as lowering the temperature of the flue gases allowing creosote build-up inside the chimney.

And, unless cleaned often, they may quickly get plugged with soot and/or creosote blocking the smokepipe. Heat reclaimers will generally cause problems on short chimneys. If you do use one, make sure it has a cleaning device on it and make sure to clean it often.

Also, use a heat reclaimer only when you have a hot fire. The flue temperature

on a low fire may be too low already, and using the device compounds possible creosote buildup.

There are thermostatically controlled heat reclaimers that should reduce creosote buildup by operating only when exhaust gas is hot enough above the reclaimer to carry volatiles out the chimney.

Never use a heat reclaimer as a clearance reduction device.

Fans

Generally, use only a fan designed by the manufacturer for your stove or device. Install the fan per manufacturer's instructions.

Do not place a floor or window fan so it blows on or around the device. The fan may increase the draft causing it to overheat or may suck smoke or even hot ashes from the device.

Smoke Detectors, Fire Extinguishers, & Carbon Monoxide Detectors

These are a good investment and should be standard with a wood heat system.

Smoke detectors should be listed by a testing laboratory. They need to be located where normal products of combustion that escape in small amounts from any woodburning device do not set them off.

Fire extinguishers should be listed by Underwriter's Laboratories for Class A (ordinary combustible) fires. We recommend extinguishers that are rated 2A-10BC because they provide good extinguishing capability and can be used on burning liquid and electrical fires, too.

Chimney fire extinguishing flares may be effective in fighting chimney fires. You might have several on hand to supplement your regular fire extinguisher. Carbon Monoxide detectors should be used with nearly all types of heating systems. Wood heat creates carbon monoxide gas. It is an odorless, tasteless,

and colorless gas that can be harmful and even fatal when you are exposed to dangerous levels. It is recommended that carbon monoxide detectors be placed near the living room and/or bedrooms.

Fresh Air

Because today's homes are built tighter, it may be necessary to provide fresh air for a wood stove. One way is to install an air duct from the outside to a location near the stove. Try opening a window if you have a problem with correct operation of your stove.

Some stoves now on the market incorporate outside air ducts in their design. You might consider this type of unit to boost your system's efficiency.

Wood Fuel

Choosing the kind of firewood to burn naturally depends on what is available. Softwoods like pine, spruce, and fir are easy to ignite. They burn rapidly with a hot flame and burn out quickly.

If you have a choice, for a long-lasting fire use the heavier hardwoods such as ash, beech, birch, maple, and oak. These hardwoods burn less vigorously than softwoods and with a shorter flame. They produce a good bed of coals. Whatever type of wood you select, be sure it is seasoned before you use it. Seasoned wood has been dried so the moisture content is about 20 percent. Green wood increases creosote accumulation.

It takes at least six months to air dry (season) fresh cut green wood, 12 months is better. **Plan** ahead for your fuel supply. Splitting the wood will reduce drying time. So will single stacking with both cut ends exposed. You will recover more heat value from dry wood than from green wood.

Provide for at least some dry storage of wood. Snow and rainy weather will temporarily soak dry wood. Arrange your dry storage area so you can keep it full but have access to the driest wood.

Firing a Wood Stove

Start a fire with a small pile of paper under some kindling. Place heavier wood on kindling. **Never use flammable liquids!**

If you have no experience at burning wood, read the stove manufacturer's instructions. Then start with small amounts of wood, gradually increasing the amount as you gain experience in setting the damper and/or draft controls.

FIRING A WOOD STOVE DON'Ts

- Don't operate a stove with the fire door open. (Unless it's designed for such use and equipped with a good spark screen.)
- Don't throw water on a hot stove.
- Don't store flammables in any part of the house heated by wood heat.

Ash Disposal

Hot sparks and burning embers can exist in your wood stove ashes for several days. Many fires have been started when ashes cleaned from wood stoves are placed in combustible containers or dumped with ordinary trash. We recommend you have a separate metal container or bucket with a tight-fitting lid only for disposal of ashes. It should be kept outside except when in use for wood stove cleaning.

Wood ash makes excellent garden fertilizer, provided it isn't mixed with coal ash, burned plastic residue, or other contaminants.

Other Fuels

Some people try to burn fuels other than wood in their wood stoves. This can be a dangerous practice unless the stove is designed to handle them. (Consult

your stove manufacturer's instructions.)

Coal is the most common fuel other than wood that's burned in stoves. Some stoves are designed to permit the burning of both but the burning characteristics of coal are so different that it cannot usually be burned efficiently in a stove designed predominantly for wood.

Some stoves designed primarily for coal can burn wood relatively efficiently but their firebox size is often very limited. Bituminous and anthracite coal require different types of coal stoves to efficiently burn these different fuels. Coal stoves are equipped with shaker grates to remove ash without excessively disturbing the firebed. Bituminous coal produces large, hard clinkers of fused ash that must regularly be removed from the firebox. Improperly burned anthracite coal can also produce clinkers. Efficient coal burning is an art that must be learned. A good place to start is from a coal instruction manual.

Properly burning coal doesn't produce creosote but it does produce soot and corrosive smoke that may damage chimney linings (especially the stainless steel variety) if regular chimney cleaning is not done. Coal stoves usually need barometric draft regulators on their smokepipes to provide a proper constant draft. Also, smokepipes for coal stoves usually are installed with the male connectors up because escape of carbon oxides from the exhaust system is more critical than creosote dripping out of the joints.

Coal ash shouldn't be used as a fertilizer. Thoroughly clean the inside of a coal-fired system after each heating season because moisture over the summer can cause acids in the residue to severely corrode the system.

"Fireplace coal" or "Cannel" coal produces large volumes of volatile gas and a very active, sparky fire. It is not safe to use this type of coal in a closed stove. Numerous flashbacks and small explosions may occur because of the volatile gas. This is probably true of peat.

Compressed logs or pellets made of sawdust or woody plant by-products may be acceptable for your stove if they are recommended by both the manufacturer and the maker of the logs or pellets. A pellet fuel system consists of a solid processed fuel of specified size and composition capable of being fed to an appliance combustion system at a controlled rate. Some appliances burn so efficiently they do not need a chimney.

Decorative fireplace logs of compressed sawdust, chemicals, and a wax or paraffin binder are not safe to use in a closed wood stove because they produce too much volatile gas and the chemicals used to make the pretty colored flames may corrode parts of your woodburning system.

Summary

Wood heat has a poor fire record. Take the time to instruct all members of the family in the proper operation of your wood heat system.

Do not skimp on proper materials or safety. Do inspect your equipment often.

Wood heat will require lots of attention and a lot of your time. It will involve hard work. If you are not willing to do both — then perhaps wood heat is not for you.

For Additional Information

Wood Heat Safety by Jay Shelton, published by Garden Way Publishing, Charlotte, VT 05445

Publications from the National Fire Protection Association, Publications Sales Department, Batterymarch Park, Quincy, MA 02269, including:

NFPA No. 211 — Chimneys, Fireplaces, Vents and Solid Fuel-Burning Appliances, 2000 Edition Using Coal and Wood Stoves Safely

Heating with Wood, U.S. Department of Energy, Washington, D.C. 20585

Coal Burning Facts, Malleable Iron Range Co., Monarch Range and Heater Div., Dept. CPH96, Beaver Dam, WI 53916

Building and Fire Research Laboratory, www.bfrl.nist.gov

Chimney Safety Institute of America, www.csia.org



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