



FIRE SAFETY

in Solid Fuel-Burning Systems

A solid fuel safety reference guide

References

NFPA 211 ~ Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Systems (2016 Edition)

NFPA 921 ~ Guide for Fire and Explosion Investigations (2017 Edition)

HEATING WITH WOOD ~ Minnesota Department of Energy (*excerpts and clip art reprinted with permission*)

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Introduction

RAM Mutual Insurance provides reinsurance for township mutual insurance companies. These locally-owned and operated companies provide fire insurance to their policyholders. RAM, since its beginning in 1931, has worked very closely with these township mutuals in fire loss prevention. This booklet is presented in the hope that it will be helpful in preventing tragic fire losses.

Be sure to check with your insurance company before purchasing or installing any solid fuel-burning system. **Be aware that insurance policies may void coverage if the hazard is increased by an improperly installed solid fuel-burning system.** Most insurance companies will require that these systems be inspected for fire insurance underwriting purposes. Solid fuel-burning systems in particular can pose a greater fire hazard than the use of conventional oil or gas heating appliances. A violation of any of the installation or safety requirements may lead to the endangerment of lives and property.

This publication is a fire insurance underwriting guide for the proper installation, operation, and maintenance of solid fuel-burning systems. Where practical, this publication will reference applicable NFPA (National Fire Protection Association) standards and UL (Underwriters Laboratories) Listings in addition to fire insurance underwriting requirements. However, where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual(s) such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department or health department; building official; electrical inspector; or others having statutory authority. **For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction.**

DISCLAIMER

The information and recommendations contained in this booklet have been obtained from sources which we believe to be competent and reliable and tend to represent the best opinion on the subject. RAM Mutual Insurance does not make any warranty, guarantee, or representation as to whether or not any representation is absolutely correct or sufficient. No responsibility is assumed by RAM Mutual Insurance, and it cannot be assumed that all acceptable safety measures are listed in this booklet. Under particular circumstances or conditions, additional measures may be required for the safe installation and operation of your solid fuel-burning system.

For installation of solid fuel-burning systems in buildings not referenced in this publication, consult with your insurance company.

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General Definitions

Air-Space Clearance: The clear air-space distance between a heat-producing appliance, chimney, chimney connector, vent, vent connector or plenum, and other combustible surfaces.

Authority Having Jurisdiction: Where public safety is primary, the authority having jurisdiction may be: a federal, state, local, or other regional department or individual(s) such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. **For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction.**

Boiler - Central Hot Water: A self-contained indirect fired or electrically heated appliance designed to supply heated water (liquid) through pipes to spaces remote from or adjacent to the appliance location.

Chimney: A structure containing one or more vertical or nearly vertical passageways for conveying flue gases to the outside atmosphere.

Chimney Flue: The passage in a chimney for conveying the flue gases to the outside atmosphere (clay, tile, stainless steel, cast-in-place, etc.).

Combustible Material: Material made of or surfaced with wood, compressed paper, plant fibers, plastics, or other material that can ignite and burn, whether flameproof or not, or whether plastered or unplastered. **(NOTE: Drywall or gypsum board is considered combustible as the paper facing on either side will burn, and heat will readily transfer through drywall.)**

Corn Fuel: Corn-burning stoves are designed to burn shelled corn. **CAUTION: Do not burn high wax-content corn, treated corn, or seed corn. Burn clean, dry (11-12 percent moisture), shelled corn.**

Damper: A valve or plate for controlling draft or the flow of gases, including air.

Direct Vent Appliance (Sealed Combustion System Appliance): A system consisting of an appliance, combustion air and flue gas connections between the appliance and the outside atmosphere, and a vent cap supplied by the manufacturer and constructed so that all air for combustion is obtained from the outside atmosphere and all flue gases are discharged to the outside atmosphere.

Draft: A pressure difference that causes gases or air to flow through a chimney, vent, flue, or appliance.

Draft - Mechanical: Draft produced by a fan or an air or steam jet.

Draft - Natural: Draft produced by the difference in the weight of a column of flue gases within a chimney or vent system and a corresponding column of air of equal dimension outside the chimney or venting system.

Draft Regulator - Barometric: A device built into a fuel-burning appliance, or made a part of the chimney connector or vent connector, that functions to reduce excessive draft through an appliance to a desired value by admitting ambient air into the appliance chimney, chimney connector, vent, or vent connector.

Factory-Built Appliance: A manufactured appliance furnished by the manufacturer as a single assembly or as a package set of subassemblies or parts and including all the essential components necessary for it to function normally when installed as intended.

Factory-Built Chimney (Residential-Type and Building Heating Appliance-Type): A chimney suitable for continuous use at 1000 degrees F composed of Listed factory-built components that may be fully enclosed in combustible residential-type construction and that is assembled in accordance with the terms of the Listing to form the completed chimney.

Floor Protector: A non-combustible surfacing applied to the floor area underneath and extending in front, to the sides, and to the rear of a heat-producing appliance.

Flue: The general term for a passage through which gases are conveyed from the combustion chamber to the outer air.

Furnace - Central Warm-Air: A self-contained indirect fired or electrically heated appliance designed to supply heated air through ducts to spaces remote from or adjacent to the appliance location.

Furnace - Combination Fuel: A single furnace unit designed to burn more than one type of fuel (gas, oil, or electric), either separately or simultaneously, using either separate or common combustion chambers and flues.

Furnace - Supplementary: A furnace designed to burn one type of fuel (gas, oil, or solid) that is intended for supplementing a central warm-air furnace burning another type of fuel (gas, oil, or solid) by means of a common warm-air supply plenum.

Header: Where referring to chimneys, a beam (usually made of wood) set at right angles to floor or roof joists to provide support and framing around the opening.

Hearth: The floor area within the fire chamber of a fireplace or a fireplace stove.

Heat Exchanger: A chamber in which heat, resulting directly from the combustion of fuel or heat from a medium such as air, water, or steam, is transferred through the wall of the chamber to air passing through the exchanger or a chamber in which heat from electric resistors is transferred to the air.

Heat Reclaimer - Chimney Connector Type: A heat exchanger intended to be installed in a chimney connector between a heating appliance and the chimney to transfer heat from the flue gases through metal to air or water.

Labeled: Equipment or materials to which has been attached a label, symbol, or other identifying mark of a testing organization that is acceptable to the authority having jurisdiction. Such organization is concerned with product evaluation and usually maintains periodic inspection of production of labeled equipment or materials and by whose labeling the manufacturer indicates compliance with appropriate standards of performance in a specified manner.

Listed: Equipment, materials, or services included in a list published by an organization acceptable to the authority having jurisdiction and concerned with evaluation of products or services that maintains periodic inspection of production of Listed equipment or materials, or periodic evaluation of services, and whose Listing states either that the equipment, material, or service meets identified standards or has been tested and found suitable for a specified purpose. **(EXAMPLE: Underwriters Laboratories or any other nationally recognized testing facility.)**

Mantel: A shelf or facing ornament above a fireplace opening.

Masonry Chimney: 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.

Non-combustible Material: A material that, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat.

Pellet Fuel: A solid processed fuel of specified size and composition capable of being fed to the appliance combustion system at a controlled rate. **(EXAMPLE: wood pellets.)**

Pellet Fuel-Burning System: A closed combustion pellet fuel-burning appliance incorporating a fuel-fed control mechanism, which connects to a pellet vent or chimney.

Pellet Vent: A venting system composed of Listed factory-built components assembled in accordance with the manufacturers' instructions for conveying flue gases from a Listed pellet fuel-burning appliance to the outside atmosphere.

Pyrolysis: A process in which material is decomposed, or broken down, into simpler molecular compounds by the effects of heat alone. **For Example:** Continuous or even recurrent exposure to heat will dry wood with the result that the time needed to ignite the wood may be lowered.

Room Heater: A self-contained, freestanding, air-heating appliance intended for installation in the space being heated and not intended for duct connection.

Smoke Chamber: The transitional area from the damper opening to the beginning of the flue liner in a fireplace system.

Smoke Test: A procedure for ascertaining the tightness of a chimney and for detecting any cracks in a masonry chimney flue or deterioration or breaks in the integrity of a factory-built or metal chimney flue. The procedure involves igniting a smoke bomb or building a smoky fire in a fireplace or solid fuel-burning system, covering the chimney termination, and checking for smoke escape through the

chimney walls.

Solid Fuel: Wood, coal, corn, pellet, or multi-fuel organic materials and any combination of them.

Solid Masonry Construction: A bonded assembly of stones or solid masonry units.

Spark Arrestors: Screening material or a screening device attached to a chimney termination to prevent the passage of sparks and brands to the outside atmosphere.

Thimble: A fixed or removable ring, tube, or lining usually located in the hole where the chimney connector or vent connector passes through a wall or enters a chimney or vent.

Venting: Removal of combustion products as well as noxious or toxic fumes to the outside atmosphere.

Wall Protector (Shield): A non-combustible object positioned between the wall and the heat-producing appliance for the purpose of reducing the air-space clearance.

Wythe: A course, thickness, or continuous vertical section of separating flues in a masonry chimney.

SECTION A

General Safety Precautions

Do Not Use or Install the Following

Heat Savers/Heat Reclaimers (Installed between the stove and the chimney):

Heat savers **will not** be permitted for use on solid fuel-burning stoves for fire insurance underwriting purposes.

These devices reduce the temperature in the chimney flue and may cause excessive creosote accumulation in the stovepipe and chimney. A disastrous chimney fire may follow.



Metal Pipe/Iron Pipe (Single-wall pipe used as a chimney):

Use of single-wall metal pipe, stovepipe, or iron pipe **will not** be permitted as a chimney for solid fuel-burning systems in dwellings or outbuildings.

Decorative Stoves/Fireplaces or Sheet Metal Stoves:

Light gauge metal or decorative stoves and fireplaces are not intended to be primary sources of heat. They will not withstand over-firing and should not be considered for more than supplemental or occasional heat.

Barrel Stoves/Home-Built Stoves: Use of barrel-type or home-built stoves **will not** be permitted in a dwelling or any structure for fire insurance underwriting purposes.

Manufactured Logs: These logs are available for use in fireplaces, fire pits, and camp fires. **CAUTION:** Per manufacturers' specifications, these logs are not designed to be used in air-tight solid fuel-burning systems.

Safety Notices and Warnings

Chimney Fires: Chimney fires occur when creosote on the inside of a chimney wall burns. Chimney fires are likely to occur during a very hot fire such as when cardboard or wood is burned at a high rate. A crackling sound is often heard and, as intensity grows, the stovepipe may shake violently and air will be forcefully drawn in through the stove causing the stovepipe to glow red. A roaring sound may also be heard and a plume of flame and sparks will rise from the top of uncapped chimneys.

When a chimney fire starts:

1. close the dampers and draft controls to limit the air supply to the fire;
2. call the fire department and get everyone out of the house to a safe place; and
3. use a “CHIMFEX” chimney fire extinguisher, placed in the chimney through the clean-out door or directly in the stove to control the fire.



(NOTE: If you have sustained a chimney fire, have the chimney inspected by a qualified chimney sweep. Refer to pages 11 under “Maintenance ~ Inspection/Cleaning, Chimneys”.)

Over-Firing of Heating System: Be careful not to over-fire the stove or get the stovepipe glowing red. Don’t burn household trash, plastics, or paper in a solid fuel-burning stove or fireplace. The resulting hot fire may ignite a chimney fire, and chemicals released from burning trash may cause damage to the stove and/or chimney.

Ash Disposal: Ashes removed from a solid fuel-burning appliance may contain hot (live) embers which remain live for days. Place ashes in a **metal container**

equipped with a lid or cover, and place the container outside away from combustibles. **(NOTE: Improper handling of ashes is the cause of many fires each year.)**

Storage of Wood: Store wood at least 36 inches away from the wood-heating appliance (48 inches for outdoor wood-heating units). Keep the area and floor surrounding the heating appliance clear of combustibles, wood chips, bark, and debris. **(NOTE: Sparks emitted while firing the heating appliance can ignite stored wood, chips, bark, and debris on the floor which causes many fires each year.)**

Negative Pressure Issues

Integrating solid fuel-burning systems in modern homes is a bit more difficult to do than in the past. One of the key problems is related to negative pressure. You may have a negative pressure problem when your solid fuel-burning unit smokes, especially when starting up or as the fire diminishes at the end of a burn cycle. This is characterized by having smoky smells in the house on a frequent basis. The phenomenon is known as backdrafting or spillage.

Negative pressure in modern homes is often related to the home being constructed in tighter fashion to save energy and by a lack of understanding by architects and designers as to where appliances with atmospherically drafted chimneys will work best. Understanding these issues in the design or planning stages will help homeowners avoid these problems.

What Causes Negative Pressure?

Several common causes for negative pressure include:

1. exhaust fans such as kitchen range hoods, bathroom fans, and clothes dryers;
2. ducted heating systems that are not balanced;
3. other appliances with chimneys or vents;

4. stack effect; and
5. wind.

Exhaust fans generally pull air out of a home. When a home is constructed tightly, for heating and cooling efficiency, large exhaust fans must not be used while a wood stove is in use. Air, along with smoke and/or odors, may be drawn down the chimney into the home. Also, leaky furnace return-air ductwork, located in basements where a solid fuel-burning stove is also operating, may cause similar problems.

Stack effect is related to warm air rising which creates positive pressure the higher you go in a home. If there are any leaks located up high in the upper levels in a home, warm air will escape from the home. Because the home, by nature, wants to stay in balance, air will flow in from points lower, such as a fireplace, solid fuel-burning stove, or furnace. The most vulnerable appliances are those lowest in the home. Examples of upper level leaks are insulated attic access doors, unsealed recessed lights, or open upstairs windows. Wind can cause pressure problems due to unusual topography, tall trees, or other buildings surrounding a home.

Cleaning Your Heating System

Removing creosote on a regular schedule is a must for safe operation. Clean the chimney when creosote deposits are a maximum of one-quarter inch thick. Inspect the flue at both the stove end and chimney top. Remember that cooler surfaces will have the thickest creosote deposits. Outside chimneys may require more frequent cleaning depending on weather and firing conditions. Slow burning wood-heating appliances, such as air-tight units, generate creosote much faster because of their long, slow burning characteristics. New stove installations should be inspected every few weeks until you determine creosote buildup rates. Different species of wood and switching from heavy heating in the winter to light heating in the spring can

also affect creosote buildup. A quality steel-bristled chimney brush is a good investment for chimney cleaning. Stovepipes must also be checked for soot and creosote buildup. Use your thumbnail to snap against the stovepipe. A muffled 'thud' sound indicates dirty pipes, while a 'tinging' sound is representative of soot-free pipes.

Maintenance

Initial Installation: The installation of chimneys, fireplaces, and vents requires an inspection of the surroundings to determine that the required air-space clearances have been maintained and that correct provisions for support, stabilization, future inspection, and maintenance are in place. A leak test is recommended on newly installed chimneys.

Inspection/Cleaning, Chimneys: Chimneys, fireplaces, and vents must be inspected at least once a year for structural integrity, clear of obstructions, and required clearances. Chimneys should be inspected monthly, when in use, for buildup of creosote deposits and cleaned when a maximum of one-quarter inch or more buildup exists. Connectors, spark arrestors, clean-outs, and tee fittings for chimneys and for pellet-venting systems are to be inspected at least once a year for soundness and creosote deposits.

Damaged or Deteriorated Liners: If the flue liner in a chimney has softened, cracked, or otherwise deteriorated, it must be either removed and replaced, repaired, or relined with a Listed liner system or other approved material or method. (Refer to Section E of this publication for recommended products and methods.)

Leaks or Cracks in the Chimney: If you suspect leaks or cracks in your solid fuel-burning system, call on a professional chimney sweep or solid fuel-burning equipment dealer to perform a leak test. This is best done following a thorough cleaning of the stove, chimney, and connectors. A crack in the chimney may allow dangerous

combustion gases and creosote to escape the venting system.

Safety Equipment



Smoke Alarms: Per state fire codes, smoke alarms are required for all living spaces with one alarm on each level of the home and one in each bedroom. Install Listed smoke alarms, and test and change batteries annually.

Carbon Monoxide Alarms:

Every fuel-burning device in a home is a potential carbon monoxide source. Knowing the carbon monoxide level in your home is important. Alarms that are Listed are set to sound at high levels (*which can kill*) and at low levels that continue over time (*which can sicken*). It is required that every dwelling has an approved carbon monoxide alarm installed within 10-feet of each room lawfully used for sleeping purposes.



Fire Extinguishers:

Fire extinguishers are required in homes and outbuildings where solid fuel-systems are used. Purchase type ABC dry-chemical fire extinguishers which are refillable and equipped with a flexible hose. Preferable sizes are 5-pound and 10-pound. "CHIMFEX" brand chimney fire extinguishers are also available for use in controlling chimney fires. "CHIMFEX" extinguishers look similar to a safety flare and are used to control chimney fires by placement inside the stove or in the chimney through the clean-out door. The extinguisher limits or cuts off oxygen to the fire.



SECTION B

Freestanding Solid Fuel-Burning Systems

Follow the manufacturers' specifications on all solid fuel-burning systems regarding installation, clearance to combustibles, and maintenance.

The types of freestanding solid fuel-burning stoves are circulating, radiant, open or closed-type, and fireplace stoves. It is recommended that solid fuel-burning systems be Listed by a nationally recognized testing facility acceptable to the authority having jurisdiction. Solid fuel-burning systems should also meet EPA (Environmental Protection Agency) certified clean burning criteria.

NFPA 211 states that: "solid fuel-burning systems shall not be installed in any location where gasoline or any other flammable vapors or gases are likely to be present. Also, solid fuel-burning systems shall not be installed in any garage."

Room Heater - Circulating

This solid fuel-burning system has an outer jacket surrounding the heat exchanger arranged with openings at the top and bottom so that air circulates between the heat exchanger and the outer jacket. Room heaters that have openings in an



outer jacket to allow some direct radiation from the heat exchanger are classified as a radiant-type. Circulating stoves are generally equipped with fans and thermostats to regulate heat output.

Room Heater - Radiant

This solid fuel-burning system is designed to transfer heat primarily by direct radiation. Radiant stoves give off most of their heat as infrared radiation.



Room Heater - Combination Stove



This solid fuel-burning system is designed to be operated with the fire chamber either open or closed. Open-type stoves are also known as Franklin Stoves. They require frequent stoking to obtain a steady heating rate and cannot keep a fire overnight.

Pellet Stoves

This solid fuel-burning system is designed specifically and only for use with pelletized fuels. Purchase units that are tested and Listed for residential installation as freestanding room heaters or hearth inserts (for installation into a masonry or factory-built fireplace).



Install a pellet vent system which is a system composed of Listed factory-built components assembled in accordance with the manufacturers' instructions for conveying flue gases from a Listed pellet fuel-burning appliance to the

outside atmosphere. **These components must have a stainless steel liner.**

Corn and Multi-Fuel-Burning Stoves



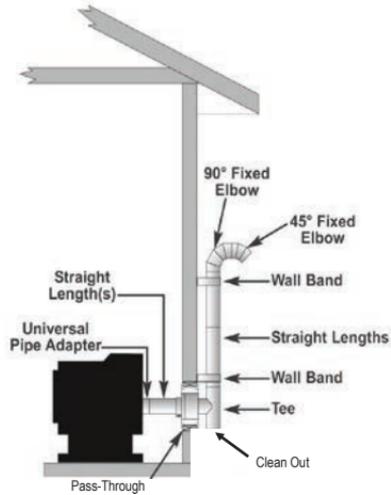
Corn-burning stoves are designed to burn shelled corn and are typically available in free-standing pedestal styles. Various models of the stoves are multi-fuel and are designed to burn corn, wood pellets, and some new biomass and silage pellets.

Purchase units that are tested and Listed by a recognized testing agency. Solid fuels such as corn and pellets create ash as the fuel is burned. Follow the manufacturers' maintenance schedule regarding ash removal/cleanout. **Always dispose of ashes in a metal container with a lid or cover.**

It is important to follow the manufacturers' recommendations regarding moisture content for use in the stoves. Do not burn seed corn, pesticide-treated corn, or corn with a high wax-content (waxy corn). Keep your corn in a clean and dry place in sealed bags to prevent it from absorbing moisture. Burning wet corn will cause rapid plugging and deterioration of the stove and exhaust system, which can lower the heat output and may void product warranties. Burning high wax-content corn produces heavy soot and may stain the siding near the vent as well as the interior of your home. Corn should be free of debris that can damage the components of your stove. Corn from the field will often have stalk and cob debris which can plug the auger and cause damage to the motor and auger.

Corn and/or pellet-burning stoves must be vented to the outside per manufacturer and code requirements. This requires the use of a Listed 3" or 4" pellet vent exhaust system which is typically installed through the wall using a thimble. Some manufacturers allow venting into an existing masonry chimney using the proper pellet vent for the entire

vertical run. The required vent system features a double-wall, air-insulated design utilizing a stainless steel inner flue combined with a galvanized outer wall. Most manufacturers also recommend outside air for combustion provided by a separate fresh air intake pipe. A non-combustible hearth pad is required for floor protection with free-standing stoves. Proper installation is crucial for safe and efficient operation. It is recommended that only an authorized or trained installer install your corn and/or pellet stove and venting system. For fire insurance underwriting purposes, the installation must be done by a professional installer.



RAM Mutual recommends a minimum clearance of 10 feet from all combustibles and structures for outdoor pellet and corn-burning hot water boiler systems.

SPECIAL NOTE: NFPA 211 states that: “unless listed for such connection, solid fuel-burning systems shall not be connected to a chimney flue serving another appliance burning other fuels (gas/oil).”

SECTION C

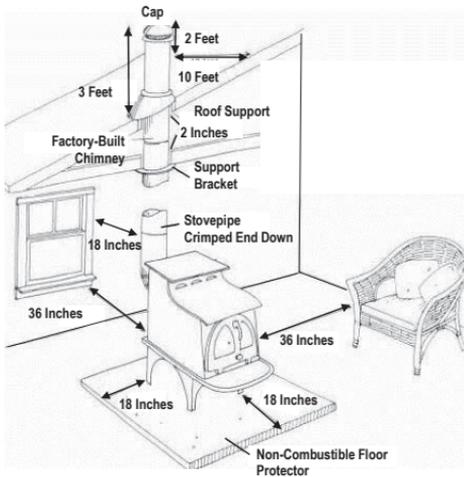
Installation Clearances/Walls, Ceiling, and Floor Protection

Solid Fuel-Burning Systems

Follow the manufacturers' specifications on all solid fuel-burning systems regarding installation, clearance to combustibles, and maintenance.

All solid fuel-burning stoves require a minimum 36-inch air-space clearance to unprotected combustibles on top and on all sides of the stove. A single-wall stovepipe must have an 18-inch air-space clearance to combustible walls and ceilings, measured at right angles to the pipe. All radiant and circulating stoves are considered in one category unless specifically tested and Listed by a nationally recognized laboratory stating

reduced clearances to a combustible material. Clearances for solid fuel-burning systems will be shown on the manufacturers' Listing label attached to the stove and in the owner's manual.



Stoves, connectors, and chimneys require air-space clearance from combustible floors, walls, ceilings, wall

NOTE: Sheetrock on wood framing is considered a combustible material.

studs, joists, roofs, and other combustible materials for safety. Some materials ignite more easily and should have additional air-space clearance or protective shields installed. Brick, stone, cement, and cement board are fire-resistive materials; however, they do not protect combustibles from heat. Heat will conduct through these fire-resistive materials to the combustible wall behind them and cause a fire unless the brick, stone, cement, cement board, or other fire-resistive material is separated from the combustible wall by 1-inch or more air-space. All air-space clearances are to be measured from the outer surface of the combustible material to the nearest point on the surface of the stove, pipe, or any component of the heating appliance, disregarding any fire-resistive protection that is applied directly to the combustible material.

NFPA 211 states that: “solid fuel-burning systems shall not be installed in any location where gasoline or any other flammable vapors or gases are likely to be present. Also, solid fuel-burning systems shall not be installed in any garage.”

Fire X, Sheetrock

Type X gypsum board, also known as Fire X Sheetrock, will withstand fire impingement longer than standard Sheetrock. This product, however, still allows heat to pass through to a combustible wall and does not change any of the air-space clearance requirements.

Imitation Brick/Rock

Decorative products such as imitation brick or so-called “fake” brick or rocks, etc., do not protect combustible surfaces from radiant heat produced by solid fuel-burning systems.

Standard Air-Space Clearances for Solid Fuel-Burning Systems

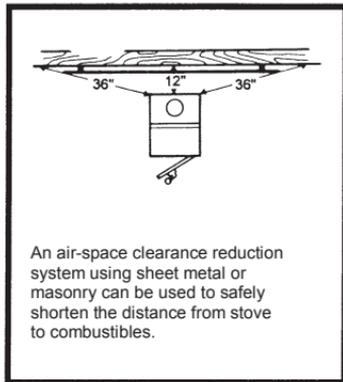
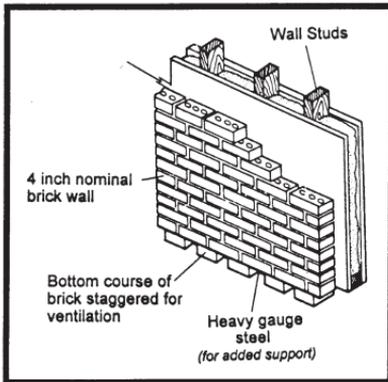
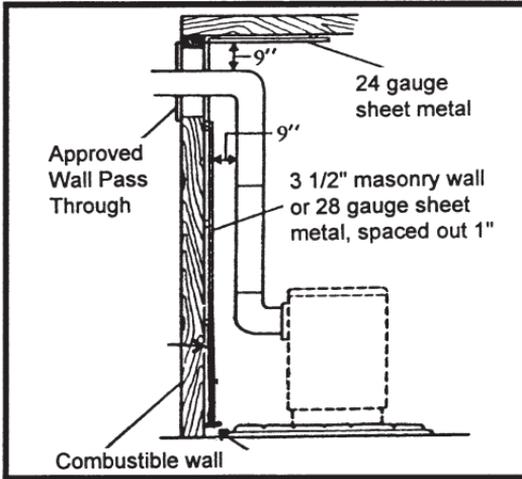
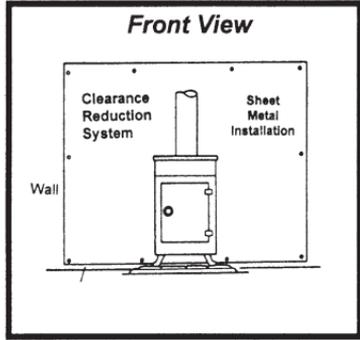
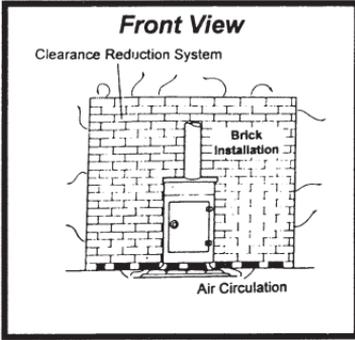
Kind of Appliance	Above top of casing or appliance. Above top and sides of furnace plenum or bonnet.	From Front	From Back (1)	From Sides (1)
Room Heaters, Fireplace Stoves, Combinations	36 in.	36 in.	36 in.	36 in.
Furnaces (Gravity, Forced-Air, Dual-Fuel, and Add-On)	18 in.	48 in.	18 in.	18 in.
Residential Appliances Steam Boilers - .16 psi Water Boilers - 250 deg. F max Water Boilers - 200 deg. F max All Water Walled or Jacketed	6 in.	48 in.	6 in.	6 in.
(1) Provisions for fuel storage must be located at least 36 inches from any side of the appliance.				

Reduced Air-Space Clearances When Using Protective Materials

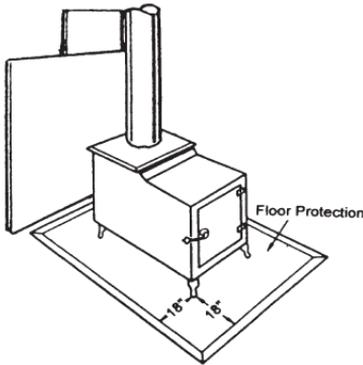
It is possible to reduce the 36-inch minimum air-space clearance from solid fuel-burning systems to combustible surfaces by installing protective materials. The following are suggested materials and methods of protecting combustible walls and ceilings from heat. The required air-space clearances, with no protection, are 36 inches for solid fuel-burning stoves and 18 inches for stovepipes. The following charts show the minimum allowable air-space clearances using protective materials.

Combustible Surface Covering	As Wall Protector (Stove)	As Ceiling Protector (Stove)	Wall or Ceiling (Stovepipe)
3 1/2-inch thick masonry wall without ventilated air-space	24 in.	—	12 in.
1/2-inch thick non-combustible insulation board over 1-inch glass fiber or mineral wool batts without ventilated air-space	18 in.	24 in.	9 in.
3 1/2-inch thick masonry wall with 1-inch ventilated air-space	12 in.	—	9 in.
24-gauge sheet metal with 1-inch ventilated air-space	12 in.	18 in.	9 in.
1/2-inch thick non-combustible insulation board with 1-inch ventilated air-space	12 in.	18 in.	9 in.
1-inch glass fiber or mineral wool batts sandwiched between two sheets of 24-gauge sheet metal with 1-inch ventilated air-space	12 in.	18 in.	6 in.
*** See illustrations on page 21 ***			

NOTE: Additional references to types of protective coverings and specified air-space clearance reductions are listed in NFPA 211. All methods of protection require adequate ventilation between protective material and adjacent combustible walls and ceilings. Mineral wool batts (blanket or board) are to have a minimum density of 8 pounds per foot and a minimum melting point of 1500 degrees F. If a single-wall connector passes through the masonry wall, there should be at least a 1/2-inch open ventilated air-space between the connector and the masonry. One-inch spacers shall be of non-combustible materials such as stacked washers, small diameter pipe, tubing 'ceramic' fence insulator, or electrical conduit. The spacers should not be installed directly behind the appliance or connector.



Floor Protection



The floor underneath and surrounding any solid fuel-burning system must be protected from radiant heat. On the loading side of the stove, the floor must be shielded from sparks or other burning materials. Stove pads or other suitable floor protectors are required when solid fuel-burning systems are placed on any flooring material other than masonry.

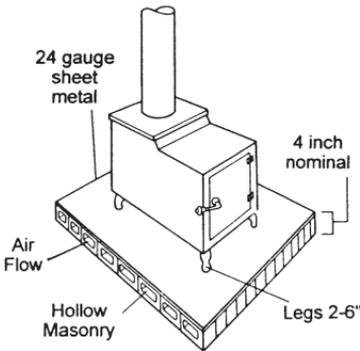
Determining the size of the floor protector will depend on the length of the stove legs and the type of stove. It is important to read and follow the manufacturers' installation instructions.

Protected Floors

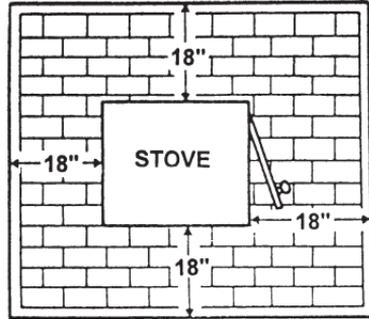
All combustible floors must be protected, and many types of materials are available for this protection. Manufacturers of Listed stoves usually specify the type of material required for floor protection, and, if available, these materials should be used. If the manufacturer does not specify a particular material for floor protection, you may purchase one or more of the safety-tested and Listed factory-built stove materials on the market. The type of floor protection recommended depends on stove leg length. Stoves with legs that are less than 2 inches in height can only rest on floor protection as specified by the manufacturer, safety-tested and Listed factory-built stove materials, or a non-combustible floor. If your stove has legs 2 inches or greater in height, you are allowed to use a combination of sheet metal and masonry as specified by NFPA 211. The arrangement of sheet metal and masonry for floor protection is dependent upon the length of the stove legs.

The following are additional acceptable methods of providing floor protection:

1. **Solid fuel-burning systems with legs or pedestals 6 inches long or longer.** Cover the floor with closely spaced masonry units of brick, concrete, or stone which is at least 2 inches thick. Such materials must be covered with sheet metal not less than 24-gauge in thickness.



Top View



2. **Solid fuel-burning system with 2-inch to 6-inch legs or pedestals.** Floor protection must extend 18 inches in all directions. Protect the floor with 4-inch thick hollow masonry blocks positioned to allow air circulation through the blocks. Masonry must then be covered with 24-gauge sheet metal.

Consult your local dealer for a Listed floor protection system.

NOTE: Solid fuel-burning systems with legs or pedestals that are less than 2 inches shall not be placed on any combustible floor.

SECTION D

Stovepipes, Connectors, and Wall Pass-Throughs

Follow the manufacturers' specifications on all solid fuel -burning systems regarding installation, clearance to combustibles, and maintenance.

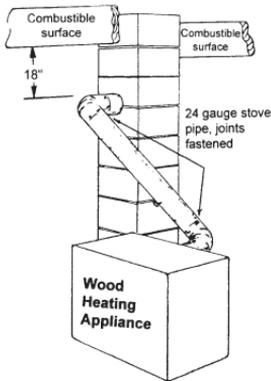
Under NO circumstances will single-wall stovepipe be allowed for use as a chimney. The purpose of stovepipe is to provide a means of connection from the appliance to the chimney. When a stovepipe must pass through a wall or ceiling, a Listed or NFPA 211-approved wall pass-through device must be installed. **This is a critical area of fire safety in the solid fuel-burning installation.**

CAUTION:

- Unless Listed for such connection, solid fuel-burning appliances shall not be connected to a chimney flue serving another appliance burning other fuels such as gas or fuel oil.
- Single-wall metal chimneys or metal chimneys, which are not Listed, shall not be used inside or outside of any structure.
- A chimney connector or vent connector (stovepipe) shall not pass through any floor or ceiling, or through a fire wall or fire partition.
- Single-wall metal pipe shall not originate in any unoccupied attic or concealed space and shall not pass through any attic, inside wall, concealed space, or any floor or ceiling.
- A connector serving a gas or oil appliance shall not be connected to a chimney flue serving a factory-built fireplace. (A connector serving a gas or oil appliance

shall be permitted to be connected to a masonry fireplace flue, provided the fireplace opening is sealed or the chimney flue that vents the fireplace is permanently sealed below the connection.)

- Vent and chimney connectors shall not be covered with insulation. Vent connectors serving appliances vented by natural draft shall not be connected into any portion of mechanical draft systems (power vents) operating under positive pressure.



Stovepipes

The chimney connector (or vent connector) is commonly known as a “stovepipe”. This single-wall metal pipe is **not** a chimney. It connects the stove to the chimney. Stovepipe should be 24-gauge or heavier blue or black metal. **(NOTE: The lower the gauge number, the thicker the pipe walls.)** For safety reasons, the stovepipe should be

as short as possible; however, installations with up to 10 feet of pipe are acceptable. When installing the stovepipe, be sure to follow these instructions:

1. Do not use more than two 90-degree elbows.
2. When the stovepipe is going horizontally, slope the pipe at least 1/4-inch rise for each foot of pipe length. (This slope should be toward the stove to allow creosote to run back into the stove.)
3. All stovepipe joints should be fastened with at least three sheet metal screws.
4. The crimped end of the stovepipe should be installed towards the stove. This will allow creosote and moisture to drip back into the stove.
5. The stovepipe cannot be less than 18 inches from combustible ceilings or walls unless proper protection is used. (Refer to Installation Clearances in Section C.)

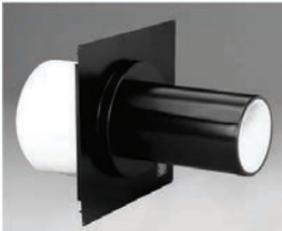
Double-Wall Black Stovepipe

Several manufacturers offer Listed double-wall black stovepipe which will allow a reduced air-space clearance from the stovepipe to combustibles. Typical air-space clearance requirements for double-wall stovepipe are 6 inches to walls and 8 inches to ceilings. Double-wall stovepipe is available in 6, 7, and 8-inch diameters and is constructed with a stainless steel inner wall for long-lasting performance and safety. Follow the manufacturers' instructions for proper installation and clearances.



Factory-Built Listed Wall Pass-Through Device

A factory-built wall pass-through device is a high heat-resistant thimble and insulating sleeve for use when the stovepipe must pass through any combustible wall. This device is used to protect the combustible wall from radiant heat given off by the stovepipe. Most solid fuel-burning stove installations require going through combustible Sheetrock or plaster wall to get to the chimney. This would apply to chimneys located inside the home as well as outside. A chimney connector or vent connector shall not pass



Tested to 2100 F according to NFPA 211

through any floor or ceiling, nor through a fire wall or fire partition. Accomplishing this connection using a factory-built Listed wall pass-through device is the safest method known at this time. There are factory-built wall pass-through devices Listed to UL 103HT that meet the

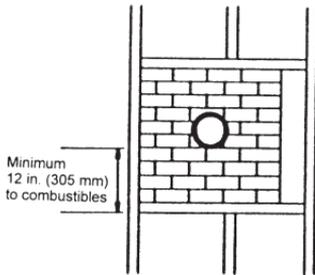
requirements of NFPA 211 and comply with fire insurance underwriting requirements. These factory-built Listed devices are available through solid fuel-burning system dealers and may be installed by following instructions provided with each unit.

Additional Wall Pass-Through Methods

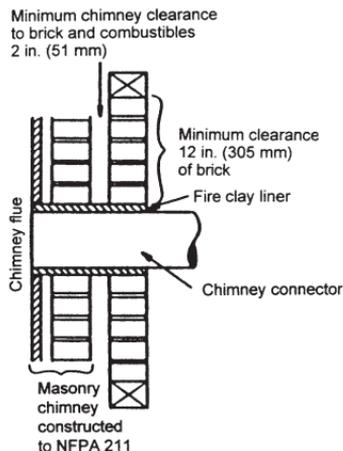
There are additional acceptable methods for connecting solid fuel-burning appliances through combustible walls as provided by NFPA 211. The following are two methods which are acceptable for fire insurance underwriting requirements. Followed closely, either of these methods may be used in place of purchasing a factory-built wall pass-through device.

Method A

This method requires removal of a section of combustible wall in its entirety. The opening must be large enough to allow for 12 inches of standard 3 1/2-inch brick, measured in all directions from the outer wall of the stovepipe connector.



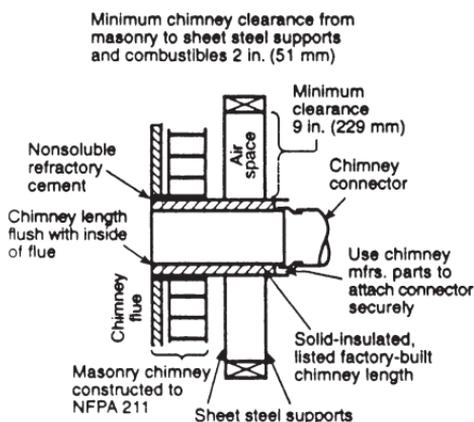
The result will be a brick wall in place of the standard combustible wall. A 5/8-inch fire clay liner is required to be installed in the center of the brick wall, extending into the chimney, firmly cemented into place.



(NOTE: do not extend the fire clay liner beyond the inner surface of the chimney flue liner. Refer to the diagrams.)

Method B

This requires purchasing a minimum 1-foot section of factory-built UL 103HT Listed metal chimney. The chimney section must be of the solid-pack insulated type.



A section of combustible wall must be removed in its entirety, creating an opening large enough to provide 9 inches of clearance, measured in all directions from the outer wall of the chimney section. Install the chimney section, supported

on both sides, with 24-gauge sheet steel supports. The supports must be securely fastened to the wall surface on all sides. Select the diameter of chimney section to match the stovepipe size, typically 6 to 8-inch inside diameter. Do not insulate the air-space surrounding the chimney.

SPECIAL NOTE: NFPA 211 states that: “unless listed for such connection, solid fuel-burning systems shall not be connected to a chimney flue serving another appliance burning other fuels (gas/oil).”

SECTION E

Types of Chimneys, Liners, and Relining Methods

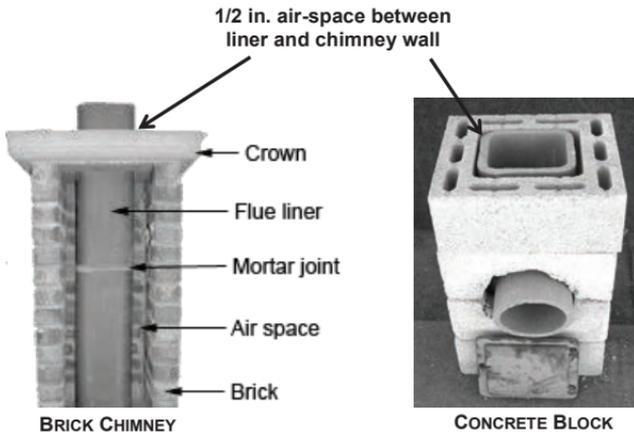
Follow the manufacturers' specifications on all solid fuel-burning systems regarding installation, clearance to combustibles, and maintenance.

Types of Chimneys

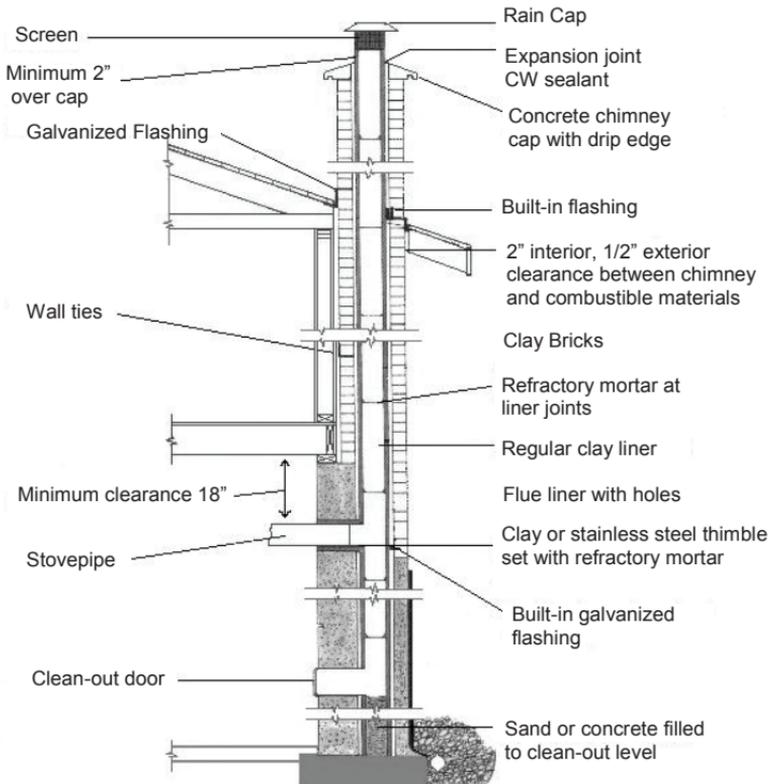
The proper selection, installation, operation, and maintenance of a chimney is a critical part of your solid fuel-burning system. Existing chimneys must be inspected and approved by a chimney sweep or professional prior to use. NFPA 211 recognizes two types of chimneys which are masonry and factory-built.

Masonry Chimney

The basic components of a masonry chimney are the foundation or footing, chimney walls (brick, block, or cement), flue liner, clean-out door, weather cap, and connector. Consideration should be given to locating the



chimney inside the home. Exposure to outdoor temperature leads to greater heat loss and creosote deposits inside the flue. An outside chimney may be protected by constructing an insulated enclosure. Do not wrap the chimney with blanket insulation or spray any type of foam insulation directly on



the chimney. Methods such as pouring vermiculite in the space between the flue and inner walls of the chimney are not recommended. Some chimneys are built with more than one flue and/or are constructed in combination with a fireplace. **Each solid fuel-burning system, as well as gas or oil-fired appliances, must be vented into a separate flue.**

A solid fuel-burning system may not be vented into a flue serving a fireplace. Masonry chimney construction should be performed by a reputable mason. The following are basic safety recommendations for masonry chimney construction. This information is provided to assist in selecting a competent contractor and to assure proper chimney construction.

1. A minimum of 4-inch thick solid masonry (brick, block, or cement) is required. Hollow bricks or blocks are permissible only if at least 6 inches thick, and all cavities are completely filled with mortar.
2. The heart of a masonry chimney is a safe flue liner. Where vitreous clay liners, often called flue tiles, are used, they must be 5/8-inch thick and the joints must be butted together with refractory cement. (Stainless steel or cast-in-place liners may also be used.) Start the flue liner not less than 8 inches below the lowest chimney connector.
3. An air-space is required between most flue liners (clay tile and stainless steel) and the inner chimney wall. A minimum of 1/2-inch unobstructed air-space is required to allow for thermal expansion. (Refer to illustration on page 31.)
4. An interior masonry chimney must be separated from the house structure and its contents by a minimum 2-inch air-space. Where the chimney passes through a floor, a fire stop must fit snugly against the chimney on all sides. (**Example:** minimum 26-gauge galvanized steel or minimum 1/2-inch other non-combustible sheet material) Exterior chimneys require a 1-inch air-space clearance to combustibles; however, outside masonry fireplace chimneys require 2 inches of clearance.
5. No portion of the chimney should be used to support the structure.
6. Install tightly sealed clean-out doors for each flue. Multiple flue chimneys require a solid 4-inch masonry divider wall or wythe to physically separate each flue.

7. Install a clay tile or stainless steel connector in the chimney to accommodate the stovepipe and/or wall pass-through connection.
8. Exterior chimneys of modular block construction should be sealed against moisture with an approved masonry waterproofing product.
9. The chimney should be anchored every third course of block.
10. The chimney should extend 3 feet above the roof and at least 2 feet above any portion of the building within 10 feet. (See illustration on Page 36)

Optional Chimney Liners and Relining Methods

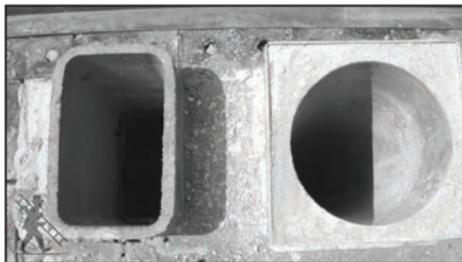


UNLINED MASONRY CHIMNEY

Many homes have masonry chimneys used to vent solid fuel-burning stoves and fireplaces that do not meet residential masonry chimney requirements and are unsafe. A typical example is a chimney constructed of 4-inch brick without a flue liner. Masonry chimneys of

double-brick construction or with back-plastered interiors do not meet requirements without a flue liner. Masonry

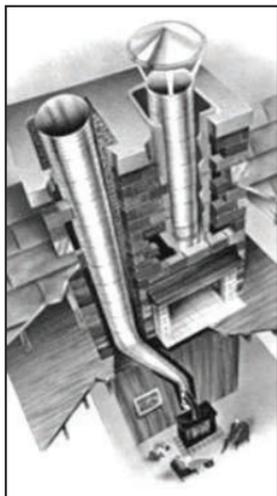
chimneys must be inspected to determine if a flue liner exists and whether the liner extends the entire height of the chimney and is in safe condition. In order for a



CLAY FLUE LINER

POURED-IN LINER

masonry chimney to qualify for safe use with solid fuel-burning systems, a flue liner is required. While it is possible to install a clay tile liner into an existing masonry chimney, there are several alternative relining methods and products available. The liner options include commercially available 24-gauge stainless steel flue, poured-in-place, or thermal concrete.



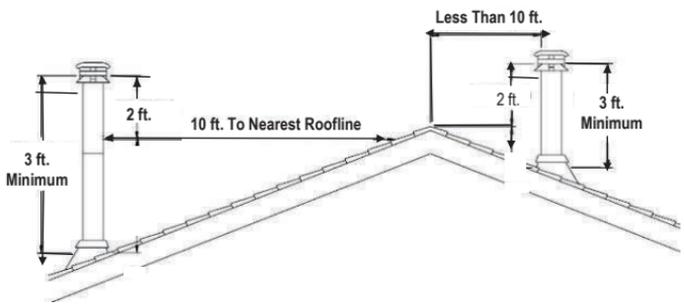
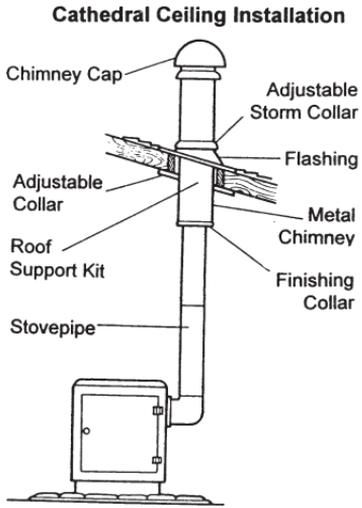
Thermal concrete or cast-in-place liners are a cement-like mixture usually poured or pumped into the chimney in liquid form around a former. This mixture fills into cracks and solidifies, strengthening the chimney and also providing high insulation value. Installation is

done by trained professionals and manufacturers offering from 10 to 20-year warranties. Several manufacturers of both metal and poured-in-place reliners have qualified their products by testing to national standards. Whenever possible, purchase products that have been tested and Listed by UL 103HT, UL 1777, or ULC S629M. Masonry chimney relining products are available through solid fuel-burning system dealers, professional chimney sweeps, and contractors specializing in chimney relining. Any chimney relining method will be only as good as the quality and workmanship of the installation. Therefore, place special emphasis on selecting a qualified and reputable professional to do the work.

Factory-Built Chimneys

Factory-built chimneys, often called manufactured chimneys, Listed chimneys, or factory-built metal chimneys, may be used to vent solid fuel-burning systems (subject to fire insurance underwriting requirements and applicable codes). Factory-built chimneys for use with solid fuel-burning systems must be Listed to UL 103HT and/or

ULC S629M. These Listings require factory-built chimneys to withstand a maximum of 2100 degrees F flue gas temperature during testing. When purchasing a factory-built chimney, be sure to check for the Listing label which is stamped on each section of the chimney. Factory-built metal chimneys have been on the market for several years and, prior to the early 1980s, were Listed to a less stringent standard, UL 103. If you have an existing factory-built metal chimney, check the Listing label. If it does not read UL 103HT or ULC S629M, the chimney does not meet fire insurance underwriting requirements for use with solid fuel-burning stoves and furnaces. Discontinue using the chimney and replace it with a new properly Listed product.



CAUTION: Chimneys for factory-built fireplaces are tested and Listed to UL 127 and are sold as a component of the fireplace. They are NOT approved for use with other solid fuel-burning systems or furnaces.

DOUBLE-WALL CHIMNEY



TRIPLE-WALL CHIMNEY



Factory-Built Metal Chimneys

There are generally two types of factory-built metal chimneys on the market: double-wall insulated or triple-wall ventilated. Both have stainless steel liners.

A few manufacturers have designed chimneys that feature a ceramic-type insulation along with an outer air-ventilated wall for additional efficiency and safety. Of particular importance is the installation of factory-built chimneys. A 2-inch air-space clearance is required between the chimney exterior and combustibles. Follow the manufacturers' specifications, as some triple-wall chimneys require a starter section. As with conventional masonry chimneys, you should consider that an outside chimney is subject to outdoor temperatures and may accumulate creosote deposits. A critical area of factory-built chimney installations is where the chimney passes through the attic. Make sure to use the manufacturers' attic insulation shield system when penetrating through attics. Alternatively, keep attic insulation a minimum of 6 inches away from the chimney. It is best to construct a fire-resistant (sheet metal) barrier around the chimney to maintain this clearance.

SPECIAL NOTE: Inspect factory-built metal chimneys for discoloration, warped or distorted inner flue liners, loose or leaky joints, or other visible damage. A single chimney fire may render a factory-built metal chimney unsafe for continued use. If in doubt, retain the services of a qualified chimney sweep or inspector to examine the chimney.

Cold Flue Effect

The cold flue effect is evident where a chimney, or much of it, is outside the envelope of the home. Outside chimneys and chimneys with long runs above the roof, etc., are in this category. These chimneys are always cold when not in use, and the column of cold, dense, heavy air inside the chimney is always pushing down inside the flue because the air inside the home is less dense and lighter. When starting a fire in an appliance connected to a cold flue chimney, there is always a down-rush of cold air out of the chimney, causing smoke to enter the room.

A chimney that is constructed inside the home that penetrates the highest insulated portion of the home will stay warm and be less susceptible to cold flue effect as well as the other causes of negative pressure. Vertical chimneys work better than offset systems.

SECTION F

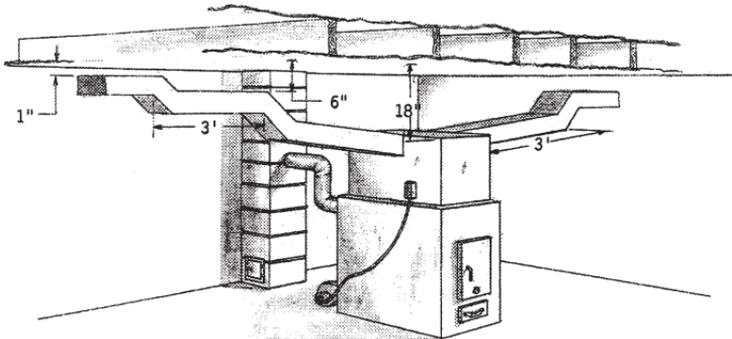
Dual-Fuel and Add-On Solid Fuel-Burning Systems

Follow the manufacturers' specifications on all solid fuel-burning systems regarding installation, clearance to combustibles, and maintenance.

Dual-fuel or combination furnaces are designed to burn wood and oil or wood and gas (LP/natural) in one unit with a single stovepipe or vent connector to the chimney. Add-on or auxiliary units are stand-alone furnaces or stoves usually installed adjacent to an existing gas or oil-fired furnace connecting into existing ductwork.

Combination or Dual-Fuel Systems

Dual-fuel furnaces generally feature wood as the primary source of fuel and oil or gas as the back-up or auxiliary fuel. They are designed with either a single combustion chamber for both fuels or a separate chamber for each fuel. Most combination or dual-fuel furnaces are Listed. For fire insurance underwriting requirements, select only Listed



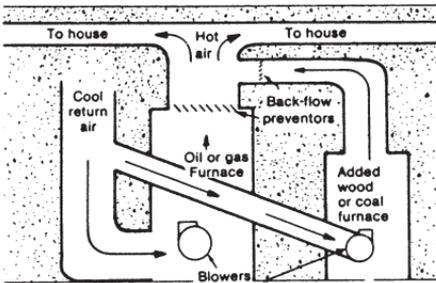
FURNACE PLENUM AND DUCT CLEARANCES

dual-fuel furnaces. Dual-fuel furnaces require special safety features and are designed with one stovepipe connection. (Refer to Section E for chimney requirements.)

CAUTION: NFPA 211 states that: “solid fuel-burning systems shall not be installed in any location where gasoline or any other flammable vapors or gases are likely to be present. Solid fuel-burning systems shall not be installed in any garage”.

Auxiliary/Add-On Systems

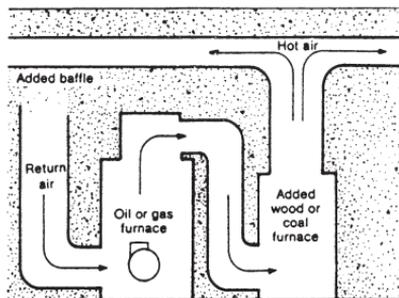
PREFERRED PARALLEL INSTALLATION



Add-on or auxiliary furnaces require a separate stovepipe connection into a masonry or factory-built chimney. **Do not connect to the same chimney with a gas or oil furnace.**

The heat plenum from the add-on furnace will generally connect into an existing furnace ductwork system. There are 2 basic types of installation: parallel and series, both of which are acceptable with strict limitations. (Refer to illustrations of preferred parallel and series ductwork connections.) Never hook up the hot air plenum from the solid fuel-burning furnace to the return cold-air side of the furnace ductwork.

PREFERRED SERIES INSTALLATION

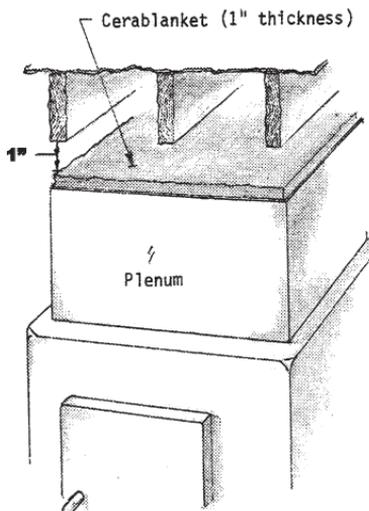


Most solid fuel-burning systems can produce much hotter air than oil or gas-fired units. As a result, the clearances from the existing ducts and plenum are usually inadequate with an auxiliary or add-on unit. Follow NFPA 211 furnace duct air-space clearances from combustibles: 18 inches for the plenum and first 3 feet of heat duct; 6 inches for the next 3 feet of heat duct; and 1-inch for all remaining runs of heat ducting.

Specific clearances must be observed for installation and ductwork. (Refer to illustration on Page 39.) Follow the manufacturers' instructions for installation, operation, and maintenance of these units. Dual-fuel furnace systems require professional installation by a qualified heating contractor.

Installers often find it difficult, if not impossible, to obtain the NFPA 211 required heat duct clearances. This is due to limited space available in basements as measured from floor to ceiling joists.

Your insurance company may accept an alternative method of meeting heat duct air-space clearance requirements using a refractory fiber insulating blanket. The products are Cerablanket, Ceramic Wool, or MaxWool which are special high temperature-rated insulation (not glass fiber insulation) available in roll form for use in fire protection applications.



ALTERNATIVE HEAT DUCT CLEARANCE

Use the 1-inch thick insulation blanket between the furnace plenum and heat duct runs and combustible ceiling joists. (Refer to illustration on page 41.) This method also requires a minimum 1-inch air-space clearance for the plenum and heat duct.

SPECIAL NOTE: The alternative heat duct air-space clearance method may not be acceptable to meet building code requirements. Be sure to consult with your local building official and your insurance company for approval.

SECTION G

Fireplaces, Inserts, and Fireplace Conversions

Follow the manufacturers' specifications on all solid fuel -burning systems regarding installation, clearance to combustibles, and maintenance.

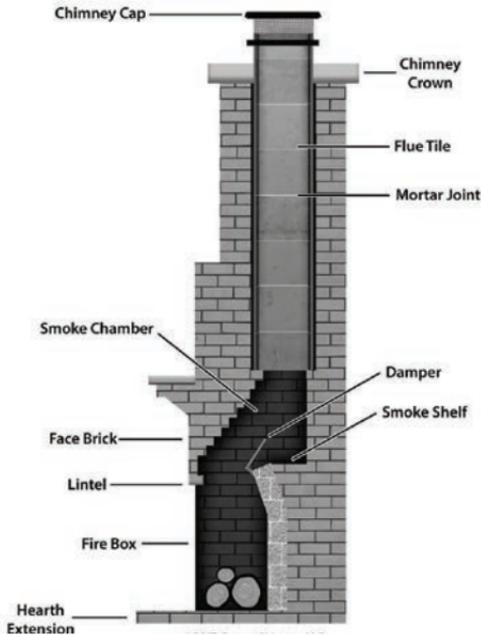
Masonry Fireplace Construction

Fireplaces shall be constructed of solid masonry units or of reinforced or refractory cement concrete. Masonry fireplaces shall be supported on foundations of one of the following:

- Masonry
- Reinforced Portland cement concrete
- Refractory cement concrete
- Other non-combustible construction having a fire resistance rating of not less than 3 hours, provided such supports are adequate for the load.

At minimum, a 5/8-inch clay tile flue liner is required in fireplace construction, and the total thickness of the back and sides of the fireplace, including the liner, shall not be less than 8 inches. All wood beams, joists, studs, and other combustible material shall have a clearance of not less than 2 inches of air-space from the front faces and sides of masonry fireplaces. Spaces between headers or trimmers of combustible material and masonry fireplaces shall be fire stopped with non-combustible material. The material used for fire stopping should be galvanized steel not less than 26-gauge in thickness. Woodwork, such as wood trim, mantels, and other combustible materials, shall not be placed within 6 inches of a fireplace opening.

Combustible material above and projecting more than 1 1/2 inches from a fireplace opening shall not be placed less than 12 inches from the top of the fireplace opening. These are masonry fireplace construction requirements referenced in NFPA 211.



Existing Masonry Fireplaces

An existing masonry fireplace must be carefully inspected and evaluated for any usage beyond occasional firing for aesthetic purposes. There are usually unknowns regarding the construction and safety of existing fireplaces. If it is possible, locate the original builder and verify the type of construction and whether it was code compliant. Concerns for safety from fire are foremost. For example, the header is a wood beam that extends across the front of the fireplace above the mantel and is usually concealed by brick or masonry. If there is no air-space clearance surrounding the header, heat will transfer from the fireplace

and flue to cause possible ignition of the wooden beam. Fireplace walls and adjacent combustible walls should not be more than warm to the touch during normal fireplace operation. Any areas that are hot to the touch may signify a serious fire hazard. If any of the above-mentioned conditions exist, the fireplace should not be used, and an expert should be retained to inspect the entire unit.

Manufactured fireplace inserts are available which will convert a standard masonry fireplace into an airtight or controllable unit which increases its efficiency. The construction of masonry fireplaces must conform to the IRC (International Residential Code) or NFPA 211. Contact your local area building inspector for specifications to meet local and national building codes and to obtain a permit for construction. The following information is provided to highlight critical areas of fireplace construction, use, and modifications. Retain the services of competent masonry or fireplace professionals to evaluate your particular needs and to perform the actual construction.

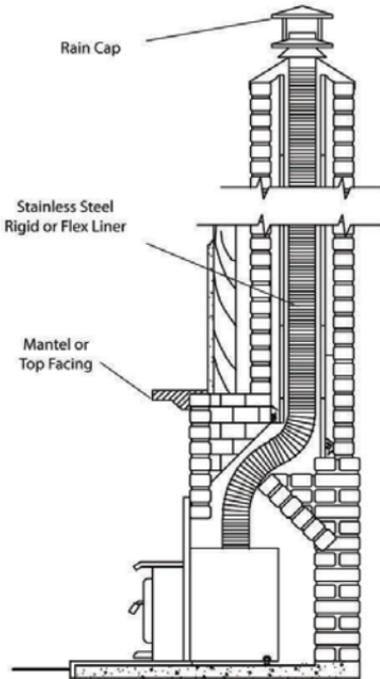
Fireplace Inserts

It is very important that fireplaces being considered for inserts be thoroughly inspected, internally and externally, for structural integrity. They should have secure tile liners and tight brickwork with no cracks or mortar erosion.

Fireplace inserts fit into the existing fireplace assembly and use the existing chimney for venting. To meet fire insurance underwriting requirements, inserts should be Listed by a recognized testing laboratory, and the installation requires a full reline, meaning the flue is continuous from the insert to the top of the chimney.

CAUTION: Consult with a reputable dealer/installer as certain fireplaces are not suitable for the installation of a solid fuel-burning conversion.

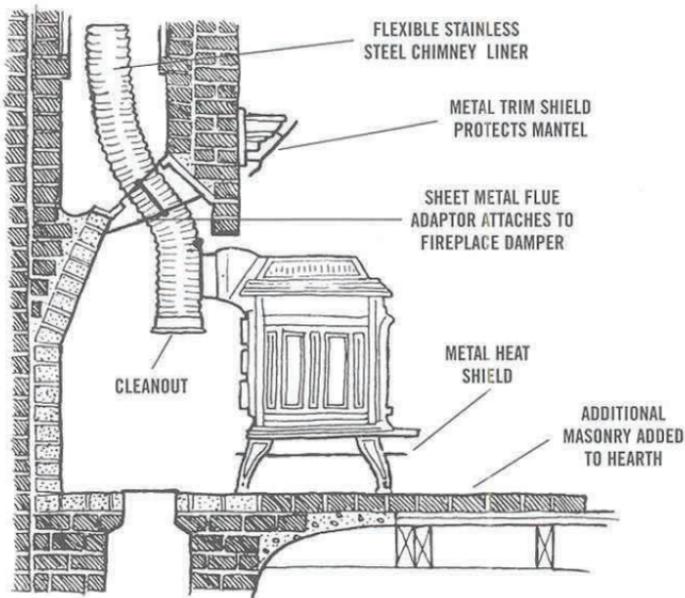
Manufactured stainless steel liners and adapter kits that are specifically designed and Listed for this purpose are available from manufacturers. A full liner from the breach of the insert to the termination of the chimney is the safest and preferred system. One of the more important safety concerns relating to fireplace inserts is the buildup of creosote. Existing fireplace inserts that do not have a positive connection to the chimney flue pose a serious fire hazard from creosote accumulation in the spaces surrounding the insert. Follow the manufacturers' installation, operation, and maintenance instructions. Hire a professional to install or inspect an existing fireplace insert for safety.



Fireplace Stove Conversions

An existing masonry fireplace may be converted to accommodate a solid fuel-burning stove connection. There are generally 2 methods of accomplishing this; however, the fireplace must first be tightly closed and sealed at the damper in the flue. One method is to connect the stovepipe directly into the existing masonry chimney above the fireplace opening such as for a fireplace insert. (refer to illustration above.)

A second method involves placing a solid fuel-burning appliance in front of the hearth and connecting the unit to the stainless steel flue liner (refer to illustration below).



Factory-Built Fireplaces

A factory-built metal fireplace and chimney is designed to be installed with minimal clearances to combustibles. These manufactured fireplaces will not withstand over-firing and should not be considered for more than supplemental or occasional heat. Factory-built metal fireplaces are Listed and include the chimney for a complete assembly. Interchanging different types or brands of components within the system presents an increased fire hazard. Be sure to check with your insurance company prior to purchasing and/or using a factory-built fireplace.

Inserts & Factory-Built Fireplaces

For fire insurance underwriting requirements, most insurance companies will not allow inserts to be installed into factory-built fireplaces. Check with your insurance company before installing or using any such system as described above.

CAUTION: Chimneys for factory-built fireplaces are tested and Listed to UL 127 and are sold as a component of the fireplace. Therefore, they may NOT be used with other solid fuel-burning systems or furnaces.

SECTION H

Outdoor Wood-Burning Systems

Outdoor wood-burning systems are generally designed to be used independently with an existing hot water or forced-air heating system. You will need to know if your existing heating system lends itself to heating a portion or all of the dwelling with an outdoor wood-burning system. Depending on the size and design of the outdoor wood-burning system, it may lend to heating additional outbuildings as well. The predominant type of outside wood-burning systems are hot water, with piping extending underground to the buildings being heated.

Common Problems with Outdoor Wood-Burning Systems

Due to corrosion within 4 to 6 years of operation, hot water system tanks have frequently failed. Periodic water testing for pH balance should be conducted and, if necessary, the water should be treated with chemicals to minimize corrosion. (Contact the manufacturer for water test kits.) Upon losing water, the system overheats, resulting in a warped firebox and often total destruction of the wood-burning system. Foam insulation on the exterior of the tank can lead to ignition from overheating, leading to destruction of the tank and any structural enclosure surrounding the system. Additional fire damage can occur from wood being stored too close to the boiler area, poor housekeeping (wood chips, bark, and debris), and improper handling and storage of ashes removed from fireboxes.

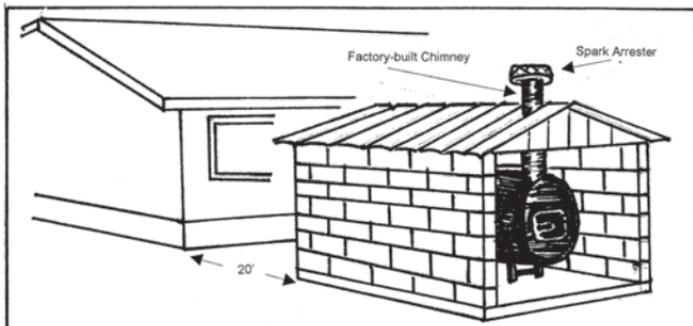
Outdoor Hot Water-Heating Systems

Outdoor hot water-heating systems must be placed a **safe distance** away from the building(s) being heated. Some units must be enclosed from the elements while others are designed to stand out in the open. The following are general installation guidelines to comply with fire insurance underwriting requirements:



1. Outdoor hot water, wood-burning systems must be located 50 feet from any combustibles or structures. Spark arrester screens are required on the smoke stack.
2. Installation should be made and inspected by a reputable contractor who is knowledgeable about the type of system being installed.
3. Wood-heating systems may contain hot (live) embers which remain live for days. It is important to place ashes in a metal container equipped with a lid or cover.
4. Store wood at least 48 inches away from the wood-heating system. Keep the areas surrounding the heating system clear of combustibles or wood chips, bark, and debris. **(NOTE: Sparks emitted while firing the heating appliance can ignite stored firewood, chips, bark, and debris on the ground, which causes many fires each year.)**

5. Clearance may be reduced to 20 feet provided that the unit is enclosed in a non-combustible building (steel or concrete). A factory-built or masonry chimney with a spark arrester screen is also required. (refer to illustration below)



6. Check with your insurance company for fire insurance underwriting requirements.

Forced-Air Outdoor Wood-Burning Systems

Forced-air heating systems are designed to be installed adjacent to the building to which it is supplying heat. Because of the increase in fire hazards caused by these units, **forced-air outdoor wood-burning systems are not acceptable for fire insurance underwriting purposes.**

SECTION I

Solid Fuel-Burning in Mobile Homes and Outbuildings

Insurance companies restrict installation and use of solid fuel-burning systems in mobile homes and certain types of outbuildings. Such restrictions or underwriting requirements are imposed as a result of adverse experience with fire losses in these structures. Be sure to check with your insurance company prior to installing or using any type of solid fuel-burning system or fireplace in mobile homes or outbuildings. Outbuildings may include garages, workshops, livestock, poultry, or animal buildings, or commercial buildings.

NFPA 211 states that: “solid fuel-burning systems shall not be installed in any location where gasoline or any other flammable vapors or gases are likely to be present. Solid fuel-burning systems shall not be installed in any garage”.

Solid Fuel-Burning in Mobile Homes

The installation or use of any type of solid fuel-burning stove, furnace, or fireplace in a mobile home is *not acceptable* for fire insurance underwriting purposes. Under certain conditions, a solid fuel-burning system may be installed in a permanent addition to the mobile home. The addition must be constructed on a permanent foundation and be large enough to accommodate the unit. Installation of solid fuel heat in a partial or full masonry basement under a mobile home may also be allowed. The installation, chimney, and clearance requirements must meet all of the standards as specified in this publication as well as applicable codes.

An outside solid fuel-burning system may be used to heat a mobile home if the installation complies with the requirements in Section H.

Factory-installed fireplaces in mobile homes should not be used without notifying your insurance company. The insurance company will inspect the system and determine insurability.

Solid Fuel-Burning in Outbuildings

For fire insurance underwriting purposes, solid fuel-burning stoves and furnaces *are not* allowed inside of buildings housing livestock and poultry. Any outdoor solid fuel-burning system used to heat livestock and poultry buildings may not be closer than 50 feet from the building. The installation must include a factory-built chimney and meet all of the applicable requirements specified in Section H. All combustibles, including firewood, are to be kept at least 4 feet away from the area surrounding the heating unit.

For installation of solid fuel-burning systems in buildings not referenced in this publication, consult with your insurance company. Most insurance companies will welcome inquiries concerning insurability and safety requirements for solid-heating installations.

DISCLAIMER

The information and recommendations contained in this booklet have been obtained from sources which we believe to be competent and reliable, and tend to represent the best opinion on the subject. RAM Mutual Insurance does not make any warranty, guarantee, or representation as to whether or not any representation is absolutely correct or sufficient. No responsibility is assumed by RAM Mutual Insurance, and it cannot be assumed that all acceptable safety measures are listed in this booklet. Under particular circumstances or conditions, additional measures may be required for the safe installation and operation of your solid fuel-burning system.

For installation of solid fuel-burning systems in buildings not referenced in this publication, consult with your insurance company.



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