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G82-600 Chimneys: *Their Installation and Upkeep*

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Chimneys

Their Installation and Upkeep

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Anyone who is thinking of putting in a wood stove has a lot of different things to consider. One of the most important is providing a good means for getting rid of combustion gases through some type of chimney. This may be a masonry chimney, some type of prefabricated chimney, or it may mean the repair of a chimney now on the house that may not have been used for many years.

All wood burning stoves need a tight, well-designed and properly constructed chimney to get rid of gases. This chimney must help in the efficient use of the stove and must also be built for safe use. Most homeowners who add a stove will either have to build a chimney or check to see if the existing chimney is in good condition.

A well-designed, properly constructed chimney provides a means for getting rid of combustion products, and at the same time forms a vacuum to draw air into the stove for combustion of the fuel.

Draft is caused primarily by the natural rising of warm air up the chimney. A warm chimney provides greater draft than a cool one. Stoves generally perform better after they have been burned long enough to warm the chimney than they do when first started. For the same reason, chimneys that are located within the house have better draft than those located completely outside since they are not cooled as readily as outside chimneys. When starting a fire, some people roll up a newspaper, light it, and hold it up in the base of the chimney to establish a draft. I don't know if this has been proven to work, but I saw it done many times during my youth when my parents or neighbors started wood or coal burning stoves.

Outside air currents can affect draft if they swirl around obstructions and blow down the chimney rather than across the outlet. Eddy currents of air that affect draft are most often caused by wind blowing

across nearby parts of the roof or trees in the near vicinity. Certain clearances for chimney height have been developed to lessen this problem. For example, a chimney must extend at least 3 feet above a flat roof and at least 2 feet above a roof ridge or any raised part of the roof within 10 feet horizontally.

To prevent downdrafts and fire from sparks, chimney height must be at least 2 feet above any roof surface within 10 feet horizontally.

You might want to consider a chimney cap or hood to prevent rain from entering the chimney, and also to prevent swirling winds from moving down the chimney.

The opening in the chimney through which smoke passes is called the flue. To provide adequate room for smoke passage and draft development, flues must be carefully sized in relation to stove capacity and chimney height. A good rule of thumb is that the flue size should be 25 percent larger than the size of the stove pipe that connects the chimney. An 8-inch diameter chimney has 90 percent more capacity than a 6-inch diameter chimney; the 6-inch diameter has 55 percent more capacity than a 5-inch diameter chimney.

Round flues are supposedly more efficient for moving smoke than square or rectangular ones because they have less resistance. The inner surface of any flue should be as smooth as possible.

A common question relating to chimneys is whether a stove can be connected to a flue that already serves another stove or furnace. *The answer is no.* This holds true whether the other appliance is a fireplace, stove or furnace. Most chimneys are not large enough to handle double venting. You need to increase the flue area by 50 percent for each additional device attached to the flue. Few chimneys have this capacity.

Some chimneys, especially those designed for natural gas, cannot withstand high temperatures and may corrode or oxidize if a solid fuel is burned. Double venting also increases creosote problems by preventing the chimney from reaching the high stack temperatures needed to keep creosote from condensing.

With double venting, either or both of the heaters can vent improperly. Flue gases may then back up into the second device and explode, or the poisonous fumes (carbon monoxide) can seep into the house. A venting problem is particularly dangerous when dealing with a natural fuel appliance such as an oil or gas furnace. A backdraft can blow sparks out of the furnace and around the room. Likewise, controlling a chimney fire would be impossible since the flue opening to an oil or gas furnace cannot be closed.

Stove Connections

The best chimney system has as few connections as possible with as short a length of pipe as possible. Connections that change direction cut down the flow of air. A general rule is not to use more than two ninety degree turns, and it is better to use forty-five degree turns. This helps to improve the flow of flue gases and thus cut down on a creosote buildup. It also puts the pipe at a forty-five degree angle-the straighter the flow into the flue, the less problem you are apt to have.

Masonry Chimneys

Most chimneys in new and existing homes are constructed of a noncombustible material. This may be brick, concrete block, or some other type of stone. Brick held by mortar is the preferred type. Since these chimneys are heavy, it is necessary that the chimney be placed on good footings. Concrete footings on

one story houses should be at least 8 inches thick, rest on compacted soil, and extend out at least 6 inches from the outside edges of the chimney. Two story houses should have footings at least 12 inches thick.

Masonry chimneys should be lined with vitrified clay tile that is at least 5/8 inch thick. Flue tiles are connected together with cement mortar joints struck smooth on the inside. There should be an inch of space between the outside of the flue tile and the surrounding masonry to reduce heat loss.

If your chimney requires minor repair, remove the crumbling mortar with a cold chisel until there is a hole or groove about an inch deep. Fill this groove with mortar. You can buy premixed mortar, or you can buy the components and mix them yourself using 1 part Portland Cement, 1 part hydrated lime, and 3 parts mortar sand. You can also plaster the exterior of a chimney with this same mix. Prior to doing this, however, you must have all the bricks firm.

Masonry chimneys must be separated from combustible materials by at least 2 inches on all sides. This means that framing and other burnable material in walls, floors, ceilings, and roofs must stop at least 2 inches from the chimney. This space can be filled with some type of noncombustible material.

The part of the chimney into which the pipe goes is called the thimble. The thimble should go no further into the pipe than the inner surface of the chimney.

It is ideal to have a clean-out door at the base of the chimney. This solves the problem of removing the stove pipe each time you want to clean the chimney. Never hook TV or CB antennas to masonry chimneys. Wind can cause antennas to vibrate, which can weaken the mortar joints.

Prefabricated Chimney Units

Masonry chimney units cannot be easily added to many existing homes. Consequently, a prefabricated metal chimney unit may be the best choice for wood stoves or fireplaces in these homes. The prefabricated chimney is also easier to install than a masonry unit.

Prefabricated chimneys must meet the Underwriters Laboratory (UL) label and be designated as "all fuel" chimney units. UL listed "vent" type units are not satisfactory for use with wood stoves.

Insulated prefabricated chimneys are made of a stainless steel outer casing, 1 inch of insulation and a stainless steel liner. Some triple-wall chimneys are constructed so that the outside air passes down between the outer walls of the triple-wall chimney and up along the interior wall. This movement of air cools the chimney. Some tests indicate that this may cool the chimney too much, however, and thus encourage creosote buildup. This does not occur with sealed end triple-wall chimneys.

Prefabricated chimneys are available in several sizes and there is a variety of accessories to accommodate different types of installations. Once again, remember that there should be 2 inches of clearance between these units and combustible materials

Possible Causes of Smoky Fires

With the quality of home building we now have, less outside air may be coming into the house. Winter insulation and weather stripping seal off outside air sources. Operating a woodburning unit uses a large volume of air. The wood heater takes the air from the inside of the house. If this air is not replaced immediately, air pressure will drop inside the house. When air cannot enter the house, this difference

can cause less air to move up the chimney which might lead to smoky fires. In order to equalize the air pressure, air may actually move back down the chimney. Opening a nearby window may alleviate this problem.

In houses with two chimneys, one may draw much better than the other. If enough air is not available, the chimney with the stronger draft may win out.

Some people are now bringing air into their fireplaces or stoves from an outside source. This gives them plenty of air for combustion and does not remove heated air from inside the house.

Determining Creosote Buildup

Backdrafting or smoking from your fireplace or stove may be an indication that creosote is building up. Lack of heat may be another indicator.

If you have a straight chimney, you can check the chimney by opening the damper on the fireplace and shining a flashlight down the chimney. With a stove, open the clean-out and place a light inside so that it can be seen from the top of the chimney. If you do not have a clean-out, remove the stove pipe and place the light in the stovepipe entry into the chimney. A mirror might also be used at the base of the chimney. In this method, you can shine the light down the chimney and get a reflection back from the mirror.

Some chimneys are not straight up and down. I have seen some older masonry chimneys that may go straight up a ways, angle off at forty-five degrees and then go straight up through the roof.

If you find more than 1/4 inch of creosote buildup, cleaning is needed. This can be done with cleaning rods and brushes that can be purchased from a stove supply company, or by dragging a sack filled with chains or some other heavy items up and down the chimney. Make sure you have the chimney well blocked off when you do this since the soot can make a terrible mess on rugs.

People with an outside storage building area may want to store the stove there during the summer. This gives a little more room in the house for those 4 or 5 months. One of our spring rituals at home was to take the chimney and stove out onto the lawn. The stovepipes were cleaned inside and outside. In fact, each part was thoroughly washed inside and outside. After drying, the pipes were inspected for leaks. If they were in good shape, they were painted with stovepipe black. The stove was then totally cleaned out and stored in one of the outer sheds. It too, was inspected and made ready for the next winter's use.

Signs of a Chimney Fire

Chimney fires can be a most frightening experience. They need not happen, however, if we follow proper installation and maintenance practices. Prevention is your best protection.

If you do have a chimney fire, the following are some of the things you might notice:

1. A distinct crackling noise in the chimney
2. An in-rush of air into the chimney, somewhat like a blowtorch effect
3. The stovepipe may shake, and the house itself may actually shake
4. The stovepipe may glow red hot. This means it has reached a temperature of at least 1500°F
5. Sparks and flames may shoot out of the chimney. Pieces of burning creosote may be blown into the air much like Mt. St. Helens erupting

If a chimney fire does occur, immediately shut off the draft of the stove. Next call your local fire department. Give them all of the details and make sure you give them complete directions on how to reach your home.

Dry chemical extinguishers may be helpful in holding the fire down until the fire department gets to the scene. In some instances, the dry powder extinguisher may put out the fire. There is no health hazard in using the Class ABC powders or the Class BC powder. If you're planning to buy a dry chemical extinguisher, make sure you get one with a big capacity. In my home, I have a number of extinguishers, most of which are 5 lbs. of powder or larger.

Most people do not have water hoses hooked up during the heating season. However, water is good to have available to wet the roof area. This helps to cut down on the possibility of a roof fire from glowing particles of burning creosote.

Wood stoves and fireplaces can help to ease the fuel bills. Take time to do the job right when installing this equipment. Keep in mind that upkeep is essential. Your life and the life of your family depends on it.

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