

# AGRICULTURAL GUIDE

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Wood Stoves

## Operating procedure for starting a fire in a wood stove

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People who are dissatisfied with wood stoves say they're dissatisfied because of the hassles and problems they have when starting fires in them. Starting a fire in a wood stove is a considerable undertaking when compared to starting a fire in a gas or oil furnace. They require only turning up the thermostat.

To obtain the best results in starting a wood fire, you should have a well thought-out "standard operating procedure."

### Procedure for starting a wood stove fire

Diligent wood stove operators will have all the necessary fire-starting materials readily available at the stove site. Materials include newspaper, 2-inch cardboard strips, kindling, small pieces of cordwood and matches.

Separate four or five full pieces of newspaper. Bunch and compress some newspapers with your hands and lay them on the bed of the fire box just in front of the door. Lay four or five strips of cardboard on top of the newspaper and place several pieces of small kindling wood or dry bark on top of it. Finally, place one or two small pieces of cordwood split to about a 2-inch diameter on top of the pile. Open the stove vent as far as it will go and light-off (Fig. 1).

After the cordwood pieces have ignited and burned for several minutes, add one or two larger pieces of wood. It is a good idea to turn and bunch the burning debris together before adding the larger pieces. Keep the air vents open for several minutes or until the larger pieces are well ignited. Then adjust the vents according to the desired heat output of the stove.

In terms of flammability cardboard strips about 2 inches wide and 6 inches long are good materials. Most fires can be started without cardboard, but if you have cardboard boxes around the house, this is a useful way to get rid of them. The cardboard

cuts up easily if you use a bread knife with a serrated edge. Studies show cardboard probably produces a faster and more positive start-up.

### Other factors

Exceptions to the standard procedure exist. Most of the factors discussed in the following section apply to conventional air tight wood stoves but not necessarily to stoves that incorporate a catalytic combustor.

An experienced and knowledgeable wood stove operator knows he or she can be confronted with variable factors when starting a fire. Some variables include:

1. **Moisture content of materials** used to start a fire. These materials should be as dry as possible. Green kindling will not give you the results you want.

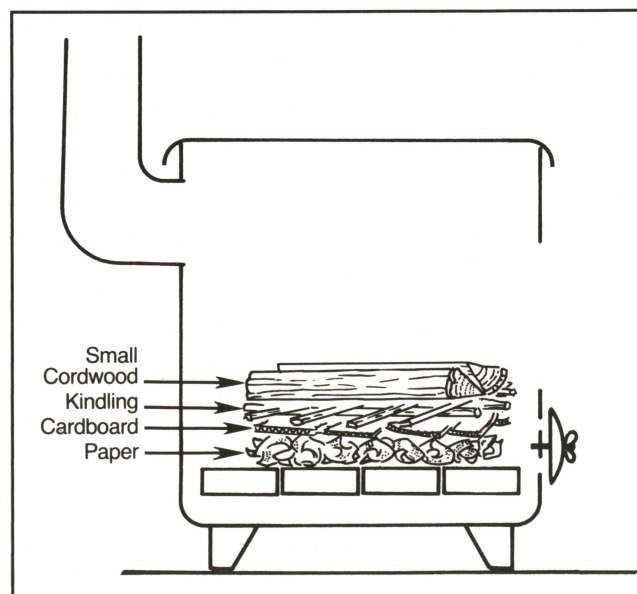


Figure 1. Layer materials to start a fire.



2. **Speed and direction of the wind** outside in relation to the chimney. Generally a fairly windy day will create a good draw on a properly designed chimney. Sometimes winds are blocked by obstacles such as trees or other buildings. Results are not as good when the wind is blowing from "blocked" directions. On calm days when there is very little wind blowing, you may experience difficulty in getting the chimney to "draw."<sup>\*</sup>
3. **The difference in temperature** between the inside of the house and the outside can affect the draw. The greater the difference in temperature, the greater the drawing effect. On a cold day, you can expect to have a temperature effect even if the wind speed outside is low. On a mild day, (outside temperature greater than 32 degrees F) the temperature differential will be lower and the temperature draw effect will be reduced.

You can check the general draw of a stove any time by simply opening the stove door and striking a match. If a good draw exists, the flame will bend toward the fire box and may even be blown out by the strength of the air movement. On the other hand, the match may indicate a negative draw and the flame will bend away from the fire box. If little or no draw exists, the match will burn easily and the flame will remain upright.

## Difficult situations

We have identified three basic elements that control "draw" in a wood stove. They, in turn, control the stove's operability. The elements are:

1. Dryness and flammability of starting materials.
2. Outside wind.
3. Temperature difference between outside and inside.

If the elements are all favorable, you should have no trouble with the "draw," assuming the chimney is properly designed and built. If all the elements are unfavorable, it probably would be wise to turn to your alternative heat source on that day. However, if you have no alternate source, you may be forced to try to start a fire under unfavorable conditions.

On a cold, calm day you may find it difficult to light-off a fire because the draw is affected by the lack of wind passing over the top of the chimney. If you were to try the match "flame" test, you may find a negative pressure present. The question is, "How do I start a fire under these conditions?"

<sup>\*</sup>Draw: The movement or flow of air from the inside of the house, through the vent and fire box and up the chimney. Draw is created by physical factors such as differences in pressure or temperature between the fire box and the top of the chimney.

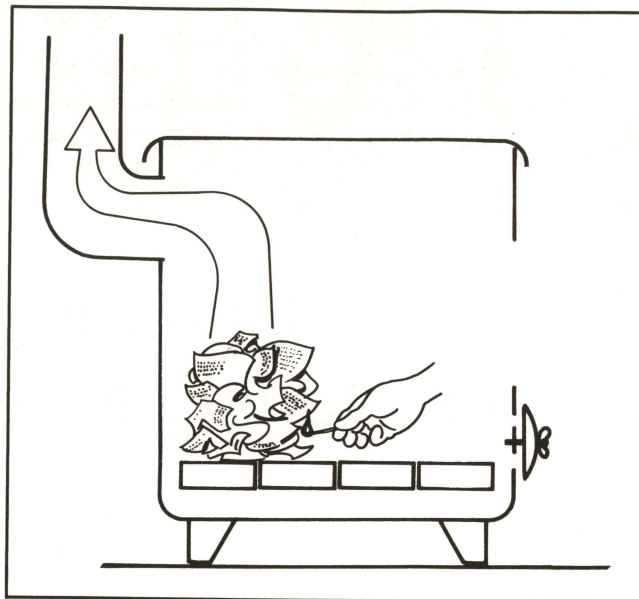


Figure 2. Ignite a wad of paper to start a fire when fire-starting conditions are unfavorable.

We assume you have plenty of dry materials. You must emphasize the large temperature differential between inside and outside temperatures. Remember, hot air rises in a proportionate manner—the greater the temperature differences, the *faster* the rate of rising. In this case, rather than trying to start the fire in a conventional way, compress five or six sheets of newspaper into a wad and place the wad immediately below the stove pipe leading into the fire box. Ignite it (Fig. 2). The paper will burn rapidly, warming the chimney. This creates a positive draw. Quickly add more paper and fine kindling. This heats the chimney more and eventually establishes a favorable situation for a continued fire. The temperature differential between the inlet air at the vent (assume 70 degree F room temperature) and the temperature at the top of the chimney (assume 0 degree F design temperature) is 70 degrees F before the fire is started and is 800 degrees to 1,000 degrees after the fire is established. Once the fire is going well and you have accumulated some hot coals, you will find the fire will require more frequent attention on a day of this type.

## Other suggestions and strategies

1. Wood stoves are not good sources of "quick" heat. Compared to an oil or a gas stove or furnace, a wood stove requires a longer start-up time. Even after the new fire is established in a wood stove, it requires an additional period to heat the stove and accumulate a hot bed of coals. This can be coupled with the fact that wood stoves are usually a "point" source of heat. They often aren't connected to a duct distribution system, which is usually the case with gas and oil furnace systems.

2. Wood stoves are not an efficient source of heat for "taking the chill off" on cool fall or spring mornings. Use alternate sources for this purpose.

3. Because wood stoves do not operate efficiently when the draft (oxygen) is cut back (not including stoves with catalytic combustors), large stoves are frequently self defeating. For a wood fire to burn efficiently and cleanly, it must burn *hot* most of the time. Many wood stove purchasers feel that a larger stove is better. This is not always the case. Stoves burning with the draft turned down are burning at a greatly reduced efficiency—about half the active (hot) burning rate. It is also during the low or cold burn stage that most creosote is produced.

4. Wood stoves are not designed to "hold" a fire. Many people want to "bank" their stoves at night. They slow the fire to smoldering overnight so they can *conveniently* open the draft in the morning to begin heating the house. However, very little heat is

given off by a "banked" stove. Therefore, the stove cannot be considered an effective heat source for banking a fire.

5. Instead of "banking" a stove at night, allow the fire to die out after the members of the household go to bed. In the morning, you will need to build a new fire. If heat will be needed only for a short time, it probably would be wise and efficient to use an auxiliary "quick response" source such as an oil or natural gas stove or furnace.

6. A wood stove is most effective (efficient and safe) when it is used in cold weather (below 32 degrees F and falling) and for longer than one hour. Remember, a wood stove is really a *cold weather heat source*. There is nothing scientific about the above temperature and time period. Those are simply suggested levels to assist you with a burning strategy.

7. Do not use petroleum fuels to start a fire in a wood stove. This includes charcoal starters.

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