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Catalytic Woodstoves

Installation, Operation, and Maintenance

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Why You Should Read This Brochure

As an owner of a catalytic woodstove, the way you use your stove can pay dividends for your family's and neighbors' hearth and your pocketbook. This EPA brochure presents important tips you can easily use with most catalytic woodstoves, and will supplement the model-specific instructions found in your owner's manual. In all cases, follow the instructions that come with your stove. Along with your owner's manual, this brochure can help you with installation, and help you operate and maintain your stove to keep the air you breathe cleaner, reduce your fuel and maintenance costs, and make your home safer.

There are several steps to getting the fullest benefit from your stove, such as sizing and selection, installation, operation, and maintenance. A companion brochure, *Buying an EPA-Certified Woodstove*, provides a convenient method for determining what size stove is best for your heating needs. It's available either from your woodstove dealer or by writing or calling EPA at one of the addresses listed on the back of this brochure.

The advice in this brochure applies only to catalytic woodstoves. If you aren't sure if your woodstove is catalytic, contact the manufacturer or a local woodstove retailer.

Installing Your Catalytic Woodstove

Improper installation of your woodstove can result in a house fire and cause greater pollution. If a stove isn't installed properly, it can also affect the draft of the stove (i.e., ability to draw combustion air and expel exhaust). Proper draft is critical to reducing pollution and maintaining high efficiency. Before having your stove installed, be sure to check with local authorities regarding building codes and permits, and notify your fire insurance company. The following tips discuss the importance of proper installation.

What You Should DO

DO have your woodstove professionally installed by a certified

installer.

BECAUSE: A certified installer can determine the proper draft for your stove, make sure all the seals are tight, and ensure that your stove is installed with all safety measures in mind.

DO consult a certified installer about the need for a flue liner in your masonry chimney.

BECAUSE: Lining the chimney can help maintain proper draft and prevent icing, which can block your chimney.

DO use the manufacturer's recommended flue diameter.

BECAUSE: An improperly sized flue will not provide the draft needed to operate the stove. Also, smoke may leak into your house through the air inlets without proper draft.

DO make certain that all seals connecting the stove to the flue, and within the flue, are as tight as possible.

BECAUSE: Tight seals will prevent smoke from leaking into your house and contribute to good draft.

#### Operating Your Catalytic Woodstove

Follow the procedures below to operate your stove for maximum efficiency and minimum pollution. The catalyst plays an important part in how well your stove does its job. The catalyst in your stove, similar to the catalytic converter in your car, burns the unburned fuel (smoke) from the fire before it exits through the flue. A catalyst will start burning the smoke coming from the fire when it has reached a temperature of between 350 deg. and 600 deg. F. At this point, the catalyst is said to "light-off." In some models, the catalyst will begin to glow when the temperature rises above 1000 deg. F.

#### What You Should DO

DO burn only dry, well-seasoned wood, not wet or freshly cut wood. Season wood at least six months; store outdoors, loosely covered, to allow air to circulate freely through the pile.

BECAUSE: "Green" or wet wood releases less heat because energy from the fire must first evaporate the moisture before producing useful heat.

DO build and maintain moderately hot fires quickly after loading the wood.

BECAUSE: A hot initial fire will help your catalyst light-off faster. However, once lit, the catalyst will stay lit even if the fire burns lower. Catalyst temperatures of 1000 deg. F or more are typical in normal operation. Once a catalyst lights-off, it will stay lit at temperatures of about 500 deg. F

DO burn moderate to full loads of wood that will provide several

hours of uninterrupted burning and minimize door openings.

BECAUSE: Minimizing door openings keeps the temperatures high, which reduces pollution. Frequent door openings increase pollution both inside and outside your home.

DO operate your stove in the bypass mode initially (i.e., smoke bypasses the catalyst). Wait until the stove is hot enough before engaging the catalyst, but be careful not to overheat the stove.

BECAUSE: To some extent, the catalyst may reduce the draft. With poor draft, the fire will take longer to develop and the catalyst will take longer to light-off.

DO operate the stove's internal fans (if your stove has them) in strict accordance with the operating instructions. Some manufacturers recommend leaving the fans turned off for 30 minutes after start-up and refueling, and setting them on low for small fires.

BECAUSE: Fans remove heat from the fire; cooler fires result in more pollution.

DO buy a catalyst temperature monitor (if your stove doesn't come with one). Monitor catalytic temperature to determine when the catalyst lights-off.

BECAUSE: If you engage the catalyst before light-off, it will reduce the draft in your stove without reducing the pollution. If you engage the catalyst too late after light-off, you won't be benefiting from its operation.

#### What You Should NOT DO

DO NOT burn trash, treated wood, particle board, plywood, or other fuels (such as coal, kerosene, or lighter fluid) unless they are listed on your stove's permanent label.

BECAUSE: Trash produces fly ash. Treated wood, particle board, and plywood contain chemicals that, when burned and inhaled, are hazardous. Burning other fuels may poison your catalyst or damage your stove. Cardboard, foil, and plastic may block exhaust flow through the catalyst, causing smoke to spill into your room.

DO NOT operate your stove in the catalyst bypass mode after the catalyst has reached the recommended temperature (350 deg. to 600 deg. F).

BECAUSE: At this point, your catalyst should be working for you (to produce more heat using less firewood) and for the environment (destroying smoke and the cancer-causing pollution in the smoke).

DO NOT overfire your stove, especially when the catalyst is engaged. Avoid catalyst temperatures near or above 1600 deg. F. This is another reason to use a catalyst temperature monitor.

BECAUSE: Catalysts can be damaged or destroyed by prolonged high

heat. If temperatures are above 1600 deg. F, switch to bypass mode and allow the catalyst to cool down to about 1000 deg. F before resuming normal catalytic operation.

DO NOT open the ash pan while catalyst is engaged.

BECAUSE: This will lead to overheating.

#### Maintaining Your Catalytic Woodstove

Follow the procedures below to maintain your stove.

#### What You Should DO

DO check the catalyst when the stove is cool by shining a bright flashlight (where possible) onto the catalyst's surface from above and viewing from inside the stove; look for gaps between the catalyst and the gasket. Replace gasket if necessary.

BECAUSE: The amount of light you can see coming through the gaps in the catalyst's surface is a good indication of how clean the catalyst is. Creosote buildup will block much of the light. Gaps between the catalyst and gasket can allow smoke to bypass the catalyst.

DO check the catalyst for crumbling, peeling, or other signs of physical damage and for buildup of ash or creosote that can plug up the catalyst. Buildup can be burned off by building a hot fire and partially engaging the catalyst (i.e., open catalyst bypass halfway, if possible). When catalyst is cool, brush with a soft brush or vacuum the catalyst face carefully. Replace catalyst if necessary.

BECAUSE: Buildup can occur on the catalyst and interfere with its proper operation. This will diminish the catalyst's efficiency and increase pollution.

DO replace the catalyst if it's damaged, if large parts are missing, or it's obvious that the catalyst has deteriorated (i.e., fails to light-off when it should). Follow your owner's manual for replacement instructions. Be sure there are no leaks around the catalyst gaskets.

BECAUSE: When a catalyst fails to operate because of either physical or chemical deterioration, you will lose the benefits of reduced pollution and improved efficiency. It's a violation of federal law to operate your stove if the catalyst is deactivated or removed.

DO check for catalyst deterioration by either of these two methods: 1) observe the chimney, both before and after the catalyst has engaged, to determine if the catalyst has reduced the amount of smoke, or 2) inspect the inside of the chimney for creosote buildup.

BECAUSE: Although there will still be some pollution and creosote buildup from operating catalytic stoves properly, the rates of

pollution and buildup should be much lower than in conventional stoves. The sky provides a solid light background, you should be able to see a difference between the pollution from a stove before and after the catalyst is engaged.

DO remove the catalyst at least every two years and soak it in diluted (50/50) vinegar for 30 minutes, followed by two 15-minute rinses in boiling water (unless specified otherwise by the manufacturer). Replace the gasket after this cleaning operation. Check with your catalyst manufacturer for more details.

BECAUSE: Vinegar will dissolve the residual impurities that aren't removed by dusting and other routine maintenance.

DO use your catalyst warranty if your catalyst fails within the first two years or crumbles within three years of purchase.

BECAUSE: You've paid for the right to a properly working catalyst in your purchase price.

DO check all gasket material, the bypass damper, and on cast iron stoves, the seams, once a year; replace frayed or worn material. Re-cement the seams as necessary. Check the catalyst gaskets and the gasket that seals the bypass mechanism (if your stove has one). Hint. One way to test the tightness of a gasket seal is to close the door on a dollar bill. Pull gently on the dollar bill. If it pulls easily out of place, the seal isn't tight and the gasket should be replaced. Repeat this test in several locations to check the seal all around the door.

BECAUSE: Gaskets in good condition will provide an airtight seal. A poor seal around a catalyst bypass allows smoke to pass through unburned, thereby increasing pollution. Like gaskets, the bypass damper and seams are areas where leaks can develop.

DO check the wood-loading door and the ash drawer for tightness.

BECAUSE: These two areas are subject to warp or worn gaskets. Poor fit may result in overheating or may allow smoke to escape into the room.

DO make sure the thermostat (if your stove is equipped with one) is working properly; replace as necessary. Refer to parts list in your owner's manual.

BECAUSE: A broken thermostat can prevent air inlets and dampers from opening and closing properly.

DO check the flue twice a month and have it cleaned at least once a year. After cleaning, check the seals and retighten joints in the flue and to the stove.

BECAUSE: Buildup of creosote on the flue walls can re-ignite and cause fires. Tight seals and joints prevent leaks.

DO replace firebrick and other insulating materials when you see crumbling or if pieces are missing.

BECAUSE: These insulating materials are critical to your stove's heating efficiency and pollution-reduction properties.

#### What You Should NOT DO

DO NOT remove or tamper with the preset operating or temperature controls.

BECAUSE: It's against the law, it will void your stove's warranty, and it will create a safety hazard. The stove will be less efficient and more expensive to operate. Thermostats control either primary or secondary air, or both. Tampering may ruin the precisely designed secondary combustion capabilities, resulting in lower efficiencies, higher operating costs, and greater pollution.

DO NOT abuse your catalyst. Don't drop or scrape the catalyst, remove the metal band (if your model has one), or use high-pressure air to clean. Don't clean the catalyst with water when it is hot and in the stove.

BECAUSE: Catalysts can be damaged, thereby reducing their effectiveness.

#### For More Information

For additional copies of this brochure; a copy of the brochure Noncatalytic Woodstoves: Installation, Operation, and Maintenance; or a copy of the brochure Buying an EPA-Certified Woodstove, write to:

Public Information Center (PM-211B)  
U.S. Environmental Protection Agency  
401 M Street, SW  
Washington, D.C. 20460

For a current list of EPA-certified woodstoves or for more information about wood burning and EPA's regulations, write or call:

Wood Heater Program (EN-341W)  
U.S. Environmental Protection Agency  
401 M Street, SW  
Washington, D.C. 20460  
(703) 308-8688

U.S. Environmental Protection Agency  
Washington, D.C. 20460