



## Small Business Assistance Program

Colorado Department of Public Health and Environment  
<http://www.cdphe.state.co.us/ap/sbap.asp>

### A Guide to Air Regulations for:

## **Domestic Wood-burning in Colorado**

Wood smoke that escapes from your wood stove or fireplace unburned is wasted fuel that will stick in your chimney as creosote or be released as air pollution. The Air Pollution Control Division (APCD) at the Colorado Department of Public Health and Environment regulates air emissions from many domestic wood-burning devices such as wood-burning stoves, fireplaces, masonry heaters, and pellet stoves. This document provides an overview of air quality requirements for wood-burning appliances, a discussion of approved wood-burning devices, and provides tips for safely burning wood in your home.

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### **BACKGROUND**

Wood-burning appliances may emit large quantities of unburned air pollutants, including nitrogen oxides, carbon monoxide, organic gases, and particulate matter, many of which can have adverse health effects and are regulated by the APCD. Most of the particulate matter emitted is equal to or less than 10 micrometers in size (PM-10). These particles can be inhaled into our lungs. Breathing wood smoke has been shown to increase cardiovascular problems such as angina, irritate lungs and eyes, trigger headaches, and worsen respiratory diseases such as asthma, emphysema, and bronchitis. About five percent of Denver's wintertime brown cloud is caused by wood smoke.

Before installing any wood-burning system, you should contact your local building codes department and local or state health department about wood-burning regulations that may apply in your area. An old or poorly installed wood stove in your home can result in higher maintenance costs, greater risk of smoke in the dwelling, and more environmental pollution. Today's wood stove models offer improved safety and efficiency. Properly installed EPA-certified wood stove and fireplace inserts offer many benefits. They heat your home effectively, require less firewood, and produce less smoke or ash. They can be sized to heat almost any dwelling.

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## ➤ **COLORADO REGULATION NO. 4**

Colorado's Air Pollution Control Regulation No. 4 provides guidance for the sale, installation, and operation of various new (on or after January 1, 1987) wood-burning appliances such as wood-burning stoves, fireplaces, masonry heaters, pellet stoves and exempt devices. It specifies which types of appliances can be legally sold in the state, along with provisions under which they can be used, e.g., high pollution days.

### ➤ **DOES REGULATION NO. 4 APPLY WHERE I LIVE?**

Regulation No. 4 applies to all residential dwellings in the seven-county Denver-Metropolitan area, which includes the counties of Denver, Broomfield, Boulder, Jefferson, Douglas, Adams, and Arapahoe. This means that in most of the Denver-Metro area, there is a mandatory ban on the use of *uncertified* wood-burning appliances, regardless of the type of fuel burned (compressed wood, corn pellets, etc), on "red" advisory days (high pollution days) during the annual high pollution season (November 1 through March 31). Uncertified appliances include traditional fireplaces and any uncertified stove or insert. Exempt areas in the Denver-Metro area include those locations above 7,000 feet in elevation or east of Kiowa Creek in Adams and Arapahoe counties. A list of local and state government residential burning ordinances and contact information is available online at [www.cdphe.state.co.us/ap/woodlocal.asp](http://www.cdphe.state.co.us/ap/woodlocal.asp). You should be familiar with the specific requirements in your area before using your wood-burning appliance.

### ➤ **HOW DO I KNOW IF IT IS A HIGH POLLUTION DAY?**

You can find out whether it is a high pollution day by calling the 24-hour Air Quality Advisory hotline during the high pollution season at (303) 758-4848. The Air Quality Bulletin hotline at (303) 782-0211 also carries current advisory information during the season (and other pollution information year-round). Many local newspapers, radio, and television stations also provide updates. The Colorado Department of Public Health and Environment posts advisories on its website at <http://apcd.state.co.us/psi/advisory.html>.

### ➤ **IS MY WOOD-BURNING APPLIANCE EXEMPT?**

Your wood-burning appliance is exempt from regulations on high pollution days if it is a certified EPA Phase II (Colorado Phase III) wood stove or insert, approved pellet stove or insert, or approved masonry heater. The EPA administers a national wood-burning stove certification program that forms the core of the approved wood stoves legal in Colorado. Some appliances, such as cook stoves, are exempt simply because the appliance does not meet the EPA's definition of a wood-burning stove (listed in Regulation No. 4 under definitions). New wood stoves, pellet stoves, and masonry heaters are tested, certified, and labeled by the manufacturer for emission performance in accordance with criteria and procedures specified in the federal regulations 40 CFR Part 60 Subpart AAA, Appendix A. The lists of approved wood-burning appliances are available online at <http://www.cdphe.state.co.us/ap/woodhome.asp>. This site also provides a link to the U.S. EPA wood stoves webpage where you can find more information on approved wood-

burning appliances. The EPA testing criteria for approved wood-burning appliances is listed below.

- **EPA Phase II wood stoves** must meet the particulates emission standard of no more than 7.5 grams/hour for non-catalytic stoves and 4.1 grams/hour for catalytic stoves (Reg. No. 4, Section II). Phase II stoves may be used on high pollution days in almost all areas.
- **Approved pellet stoves** are held to the EPA Phase II catalytic stove standard of 4.1 grams/hour. Any pellet stove meeting this standard and the requirements of Section III (EPA approval and test procedures) of the regulation are approved for usage on high pollution days.
- **Masonry heaters** must meet the particulates emission standard of no more than 6.0 g/kg. Any masonry heater meeting this standard and the requirements of Section IV (EPA approval and test procedures) of the regulation are approved for usage on high pollution days. If you have a conventional masonry fireplace, you can use it on high pollution days if it is equipped with gas logs, an EPA Phase II insert, an approved pellet insert, if it uses electricity as the heat source, and if state or local ordinances do not prohibit it.

#### *What is a masonry heater?*

Masonry heaters are similar to fireplaces but can be distinguished by their ability to store a large amount of heat. Masonry heaters are gaining popularity as a cleaner burning and heat efficient form of primary and supplemental heat. Masonry heaters include a firebox, a large masonry mass (such as bricks), and long, twisting smoke channels (compared to a straight, vertical channel in a fireplace) that run through the masonry mass. Their fireboxes are lined with firebrick, refractory concrete, or similar materials that can handle temperatures of over 2,000°F (1,093°C). The masonry absorbs the heat from a fire, and slowly releases it into the house over a period of 12-20 hours. Masonry heaters commonly reach a combustion efficiency of 90%.

#### ➤ **CAN I BUY, INSTALL, OR SELL AN UN-CERTIFIED WOOD-BURNING APPLIANCE?**

Fireplace installation is banned in the Denver-Metro area, unless they are equipped with an EPA Phase II wood-burning insert, an approved pellet-burning insert, gas logs, or an electric heating device. High pollution day usage restrictions (the actual operation of a wood-burning appliance on high pollution days) in Colorado apply only below 7,000 feet in elevation but the ban on the actual installation of unapproved appliances applies regardless of elevation. The sale and installation of new or used, uncertified wood-burning appliances is prohibited in the Denver-Metro area.

➤ **HOW DO I GET AN EXEMPTION TO USE MY UN-CERTIFIED WOOD-BURNING APPLIANCE ON HIGH POLLUTION DAYS IF IT IS MY SOLE SOURCE OF HEAT?**

Regulation No. 4 does allow high pollution day exemptions for the operation of unapproved wood-burning appliances for homes requiring such based on sole-source-of-heat scenarios (the appliance provides more than half the annual heating demands for the residence). You should contact your local or state health department for an exemption to use a non-Phase II wood stove as a primary source of heat.

➤ **HOW DO I CHOOSE A WOOD-BURNING APPLIANCE?**

You can choose from a new generation of wood- and pellet-burning appliances that are cleaner burning, more efficient, and powerful enough to heat many average-sized homes. It's also important to use a properly sized appliance for the space to be heated. When an appliance is too big, residents tend to burn fires at a low smolder to avoid overheating, which wastes fuel and is one of the biggest causes of air pollution. A reputable dealer should talk with you about size requirements, but a good rule-of-thumb is that a stove rated at 60,000 British Thermal Units (Btu) can heat a 2,000 square foot home, while a stove rated at 42,000 Btu can heat a 1,300 square foot space.

If you have an older wood-burning appliance, consider upgrading to one of the new appliances certified by the EPA. Many include a catalytic combustor that allows combustion gases to burn at lower temperatures, thereby cleaning the exhaust gas while generating more heat. All wood stoves sold today should bear an EPA certification sticker. High-efficiency appliances not only have lower emissions, but they are also often safer since complete combustion helps to prevent a buildup of flammable chimney deposits called creosote. For more information on energy efficient products and tips for your home, visit the EPA Energy Star website at [www.energystar.gov](http://www.energystar.gov).

➤ **HOW DO I USE MY WOOD-BURNING APPLIANCE SAFELY?**

- Have your wood stove or fireplace professionally installed by a certified technician to ensure its safety and performance. A properly installed wood stove always has a vent to the exterior.
- EPA-certified wood stoves burn wood about 90% cleaner and one-third more efficiently than older conventional models. That means a lot less smoke outside and lower forest impacts because less wood is used. They also release about 60-80% less smoke up the chimney.
- You should never smell smoke in your home. Smoke is unhealthy to breathe. Smoke in your home indicates that your wood stove is not operating efficiently or safely.

- Your chimney should run inside the house because if it runs up an outside wall, there is a good chance that smoke, odors, and cold air will flow backwards into the house.
- Your chimney must match the size of the appliance meaning the flue size should match the stove outlet. If a chimney is bigger than the stove outlet, exiting exhaust slows, increasing creosote buildup, and reducing efficiency.
- Have your wood stove, chimney, and vents professionally inspected and cleaned each year to keep them in safe working order. The Chimney Safety Institute of American (<http://www.csia.org>) provides a list of certified chimney sweeps, searchable by state. Chimneys.com provides useful tips for wood stove operation and maintenance.
- Catalytic combustors need to be inspected at least three times every heating season and replaced according to the manufacturer's recommendations. Most catalytic stoves or inserts have a view window or thermometer to help you check the combustor. The catalytic cell is removable and replaceable and costs approximately \$75.00 to \$160.00.
- Cleaning out the inside of your wood-burning appliance with a wire brush periodically will also help heat your home efficiently. Even a one-tenth inch of soot can drop the heat transfer efficiency of the metal by 50%.
- For pellet-fuel appliances, you should follow the manufacturer's instructions for operation and maintenance. Inspect fans and motors regularly, and maintain them properly. Manufacturers advise removing unused pellets from the stove hopper and feed system at the end of the heating season to reduce the chance of rusting that can cause expensive damage to the appliance.
- Clean the flue on a regular basis to prevent soot building up.

#### ➤ **SAFE WOOD-BURNING PRACTICES**

- Keep all flammable household items (drapes, furniture, newspapers, and books) far away from your wood stove.
- Start fires only with clean newspaper and dry kindling. Never start a fire with gasoline, kerosene, charcoal starter, or a propane torch.
- Do not burn wet or green (unseasoned) logs. Wet or green logs do not burn efficiently and produce more smoke. Properly seasoned fuel is processed in the spring and stacked in an area open to sun and wind for the summer; store outdoors, loosely covered, to allow air to circulate freely through the pile.
- With seasoned wood, correct air settings, and proper loading arrangement, you should expect instant ignition of a new load of wood – the bottom pieces should be flaming by the time the door is closed.

- Properly processed wood is cut to the correct length and split to the correct range of sizes for the appliance. Having wood the right length and range of sizes makes it easy to build good, clean burning fires.
- Keep the doors of your wood stove closed unless loading or stoking the live fire to keep the temperatures high and reduce pollution. Frequent door openings increase pollution both inside and outside your home.
- Do not use logs made from a combination of wax and sawdust in your wood stove or fireplace. They are made for open-hearth fireplaces. If you use manufactured logs, choose those made from 100% compressed sawdust.
- Do not burn trash, treated wood, particleboard, plywood, or other fuels unless they are listed on your stove's permanent label.
- Build small, hot fires (it should be flaming until only charcoal remains). A smoldering fire is not a safe or efficient fire.
- Regularly remove ashes from your wood stove into a metal container with a cover. Store the container of ashes outdoors on a concrete or brick slab (not on a wood deck or near wood).
- Keep a fire extinguisher handy.
- Install and maintain a smoke alarm to alert you and your family in the event of a fire. Properly installed and maintained smoke alarms in the home are considered one of the best and least expensive means of providing an early warning of potentially deadly fire.
- Install and maintain a carbon monoxide (CO) detector. You can't see or smell CO, but at high levels, it can kill within minutes. A digital CO detector is recommended because it displays the concentration of CO in parts per million (ppm) and makes a warning sound that increases as the concentration increases. For information about CO detectors and preventing CO poisoning, visit EPA's Indoor Air Publication, "Protect Your Family and Yourself from CO Poisoning" at [www.epa.gov/iaq/pubs/coftsht.html](http://www.epa.gov/iaq/pubs/coftsht.html).

➤ **OTHER RESOURCES**

Compliance Monitoring: Wood stoves (EPA Phase II Stoves).  
[www.epa.gov/compliance/resources/publications/monitoring/caa/woodstoves/certifiedwood.pdf](http://www.epa.gov/compliance/resources/publications/monitoring/caa/woodstoves/certifiedwood.pdf). U.S. Environmental Protection Agency.

Emission Factor Documentation for AP-42 Section 1.9 – Residential Fireplaces.  
 Office of Air Quality Planning and Standards, Technical Support Division.  
[www.epa.gov/ttn/chief/ap42/index.html](http://www.epa.gov/ttn/chief/ap42/index.html). U.S. Environmental Protection Agency.

Fireplaces and Wood-burning Stoves.

[www.consumerenergycenter.org/homeandwork/homes/inside/heatandcool/fireplaces.html](http://www.consumerenergycenter.org/homeandwork/homes/inside/heatandcool/fireplaces.html). California Energy Commission's Consumer Energy Center.

A Consumer's Guide to Energy Efficient and Renewable Energy.

[www.eere.energy.gov/consumer/your\\_home/space\\_heating\\_cooling/index.cfm/mytopic=12570](http://www.eere.energy.gov/consumer/your_home/space_heating_cooling/index.cfm/mytopic=12570). U.S. Department of Energy.

Masonry Heaters. <http://mha-net.org/html/whats.htm>. Masonry Heaters Association of North America.

What You Should Know About Combustion Appliances and Indoor Air Pollution.

[www.cpsc.gov/cpsc/pub/pubs/452.html](http://www.cpsc.gov/cpsc/pub/pubs/452.html). Consumer Product Safety Commission.

Burning Issues. [www.webcom.com/~bi/welcome.html](http://www.webcom.com/~bi/welcome.html). Clean Air Revival, Inc.

### ➤ **HELP IS AVAILABLE**

The Colorado Small Business Assistance Program (SBAP) provides free services to small businesses and homeowners seeking help in understanding and complying with air, hazardous waste, and other environmental regulations. If you have questions or concerns, contact the SBAP team at (303) 692-3175 or (303) 692-3148 or contact the wood-burning certification program at the Colorado Department of Public Health and Environment at (303) 692-3165 or by e-mail to [comments.apcd@state.co.us](mailto:comments.apcd@state.co.us).

## Small Business Assistance Program Colorado Department of Public Health and Environment

Home Page: [www.cdphe.state.co.us/ap/sbap.asp](http://www.cdphe.state.co.us/ap/sbap.asp)

### **Program Contacts:**

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