



## INDOOR COMBUSTION FACT SHEET

### What combustion products pollute the home?

Combustion products that serve as sources for indoor air pollution include unvented kerosene and gas space heaters, woodstoves, fireplaces, and gas stoves. The major pollutants released from these sources include carbon monoxide, nitrogen dioxide, and particles. Unvented kerosene heaters also generated acid aerosols. Combustion gases and particles can come from chimneys and flues that are improperly installed or maintained, and cracked furnace heat exchangers. Pollutants from fireplaces and woodstoves with no dedicated outdoor air supply can be "back-drafted" from the chimney into living spaces, particularly in weatherized homes.

### What are the health effects of these combustion products?

Carbon monoxide -- This is a colorless, odorless gas that interferes with the delivery of oxygen throughout the body. At high concentrations it can cause unconsciousness and death. Lower concentrations can cause a range of symptoms from headaches, dizziness, weakness, nausea, confusion, and disorientation, to fatigue in healthy people and episodes of increased chest pain in persons with chronic heart disease. The symptoms of carbon monoxide poisoning are sometimes confused with the flu or food poisoning. Fetuses, infants, elderly people, and people with anemia or with a history of heart or respiratory disease can be especially sensitive to carbon monoxide exposures.

Nitrogen Dioxide -- This is a colorless, odorless gas that irritates the mucous membranes in the eye, nose, and throat, and causes shortness of breath after exposure to high concentrations. There is evidence that high concentrations or continued exposure to low levels of nitrogen dioxide increases the risk of respiratory infection. There is also evidence from animal studies that repeated exposure to elevated nitrogen dioxide levels may lead or contribute to the development of lung diseases such as emphysema. People at particular risk from exposure to nitrogen dioxide include children and individuals with asthma and other respiratory diseases.

Particles -- These are released when fuels are incompletely burned, and can lodge in the lungs and irritate or damage lung tissue. A number of pollutants, including radon and benzo(a)pyrene, both of which can cause cancer, attach to smaller particles that are inhaled and then carried deep into the lung.

How can I reduce my exposure to these pollutants?

Take special precautions when operating fuel-burning unvented space heaters -- Consider potential effects of indoor air pollution if you use an unvented kerosene or gas space heater. Follow the manufacturer's directions, especially instructions on the proper fuel and keeping the heater properly adjusted. A persistent yellow-tipped flame is generally an indicator of maladjustment and increased pollutant emissions. While a space heater is in use, open a door from the room where the heater is located to the rest of the house or open a window slightly.

Install and use exhaust fans over gas cooking stoves and ranges and keep the burners properly adjusted -- Using a stove hood with a fan vented to the outdoors greatly reduces exposure to pollutants during cooking. Improper adjustment, often indicated by a persistent yellow-tipped flame, causes increased pollutant emissions. Ask your gas company to adjust the burner so that the flame tip is blue. If you purchase a new gas stove or range, consider buying one with pilotless ignition, because it does not have a pilot light that burns continuously. Never use a gas stove to heat your home. Always make certain that the flue in your gas fireplace is open when the fireplace is in use.

Keep woodstove emissions to a minimum -- Choose properly sized new stoves that are certified as meeting EPA emission standards. Make certain that doors in old woodstoves are tight fitting. Use aged or cured (dried) wood only, and follow the manufacturer's directions for starting, stoking, and putting out the fire in the woodstove. Chemicals are used to pressure-treat wood; such wood should never be burned indoors.

Have central air handling systems, furnaces, flues, and chimneys inspected annually and promptly repair cracks or damaged parts -- Blocked, leaking, or damaged chimneys or flues release harmful combustion gases and particles and even fatal concentrations of carbon monoxide. Strictly follow all service and maintenance procedures recommended by the manufacturer, including those that tell you how frequently to change the filter. Proper maintenance is important even for new furnaces, because they can corrode and leak combustion gases, including carbon monoxide.

How can I get more information about these contaminants?

For more information, you can call the City of Alexandria's Office of Environmental Quality, at 703-746-4065.