



Space Heater Safety: Using Kerosene and Propane

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Safety

Safety is a top consideration when using space heaters. The U.S. Consumer Product Safety Commission estimates that more than 25,000 residential fires every year are associated with the use of space heaters, causing more than 300 deaths. An estimated 6,000 persons receive hospital emergency room care for burn injuries associated with contacting hot surfaces of space heaters.

Consumers should be aware of the following hazards when buying and using kerosene and propane (liquid-fueled) space heaters:

- Fires and burns caused by contact with or close proximity to the flame, heating element, or hot surface area.
- Fires and explosions caused by flammable fuels.
- Indoor air pollution caused by improper venting or incomplete combustion of fuel-burning equipment.
- Carbon monoxide poisoning caused by improper venting of fuel-burning equipment.

Before purchasing a liquid-fueled heater, make sure local building and fire codes permit use in residential structures. Check with your insurance carrier to determine what impact the use of these heaters may have on your homeowner's policy. Use only heaters that carry an Underwriters' Laboratories (UL) label. This means the product has been tested for safety.

Convection and Radiant Heaters

Space heaters use two different methods to heat a room: Convection or radiant heating. *Convection heaters* use the circulation of air in a room to warm the area. *Radiant heaters* emit infrared radiation that directly heats up objects and people that are within their line of sight. Radiant heaters are a more efficient choice when used in a room for only a few hours.

Liquid-fueled space heaters are classified as *unvented*. These units are not recommended for use inside the home due to health hazards associated with the pollutants they emit into the air.

These pollutants include carbon monoxide (CO), nitrogen dioxide, and other gases. Because these fuels consume oxygen, ventilation must be provided to replace oxygen and to remove gases in order to prevent asphyxiation or respiratory problems.

Vented and Unvented Combustion Heaters

Space heaters are classified as vented and unvented, or "vent free." *Vented units* are designed to be permanently located next to an outside wall, so that the flue gas vent can be installed through a ceiling or directly through the wall to the outside.

Health Hazards of Combustion Products

Carbon monoxide (CO) is a colorless, odorless gas that interferes with oxygen availability throughout the body. Low levels of CO can cause fatigue and chest pain in people with chronic heart disease. As CO exposures increase, symptoms progressively worsen through headaches, drowsiness, nausea,

vomiting, confusion and disorientation. At very high CO exposures, loss of consciousness and death are possible.

Nitrogen dioxide can irritate the skin and the mucous membranes in the eyes, nose, and throat. Depending upon the level and duration of exposure, respiratory effects range from slight irritation to burning and chest pain, coughing, and shortness of breath.

Reducing Exposure to Combustion

Products

Take special precautions when operating unvented space heaters. Follow the manufacturer's directions about the proper fuel and providing fresh air while the heater is in use. This can be accomplished by keeping doors open to the rest of the house from the room where the heater is being used. If you must operate the heater in a room with the door closed, open a window to the outside by approximately an inch to permit fresh air to effectively dilute the pollutants.

Home-Safety Information

For all types of space heaters, follow these specific suggestions:

- Be certain that the space heater is placed on a level, hard and nonflammable surface, not on rugs or carpets.
- Keep the heaters properly adjusted and clean. Appliances that are not working properly can release harmful and even fatal amounts of pollutants.
- Never operate a defective heater. Have all necessary repairs done by qualified repair persons.

Kerosene Space Heaters

- Never use gasoline in a kerosene heater. Even very small quantities of gasoline in the heater tank can cause a fire.
- Use only crystal-clear 1-K grade kerosene. Never use yellow or contaminated kerosene or any other fuel.
- Never fill the fuel tank of a kerosene heater beyond the full mark because as the fuel warms, it expands and could spill and cause a fire.
- Do not attempt to remove the fuel tank, or refuel the heater when it is operating or hot.
- Never attempt to move the heater while it is operating. The heater should have an automatic safety switch to shut off if it's tipped over.
- Keep kerosene stored outside in a metal container with a tight-fitting lid that is clearly marked "kerosene."

Propane Space Heaters

- Propane is a cleaner fuel than kerosene. When burned, it emits ultra-low emissions of carbon monoxide. However, unvented propane space heaters still require proper ventilation from outside air.
- Propane is heavier than air. If a leak occurs, or if you believe a leak has occurred, go to an outside phone to call the fire department. Do not operate any electrical switches or telephones in the building where the leak has occurred because a spark could cause an explosion.

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Sources:

What you should know about space heaters. U.S. Consumer Product Safety Commission, Washington DC. February 2001.

A consumer's guide to energy efficiency and renewable energy. U.S. Department of Energy – Energy Efficiency and Renewable Energy. Retrieved April 25, 2008, from http://www.eere.energy.gov/consumer/your_home/

For more information, contact the Cooperative Extension Service Juneau District
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Visit the Cooperative Extension Service Website at www.uaf.edu/ces

Comparing Kerosene or Propane to Electricity Costs

The costs of various forms of energy are calculated in several different ways. This can make it difficult for consumers to compare the actual cost of the energy fuel they are using. It may be helpful to compare the cost of kerosene, propane and electricity. What follows is an easy way to calculate costs.

First some facts:

- BTU (British Thermal Unit), the standard measure for heat energy.
- kwh (Kilowatt Hour), the standard unit to measure electrical output.

The average BTU content for kerosene, propane and electricity:

- Kerosene 135,000 BTU per gallon
- Propane 91,800 BTU per gallon
- Electricity 3,413 BTU per kwh

A standard unit for all of these fuels is needed in order to compare them. In this case we will use the amount of fuel required to obtain one million BTUs of energy :

- Kerosene 7.4 gal/million BTU
- Propane 10.9 gal/million BTU
- Electricity 293 kwh/million BTU

The actual formula needed to compare these has to do with the amount of kerosene, propane or electricity to obtain one million BTU, multiplied by the present cost in dollars (cost per million BTU).

Formula: (Energy Source quantity per million BTUs) x (Cost in Dollars)

Example for kerosene:

$$7.4 \text{ gallons of kerosene}^* \times \$ 2.25 \text{ (per gallon)} = \$ 16.65$$

Example for propane:

$$10.9 \text{ gallons of propane}^* \times \$ 3.00 \text{ (per gallon)} = \$ 32.70$$

Example for electricity:

$$293 \text{ kilowatt hours} \times \$ 0.11 \text{ (per kilowatt hour)} = \$ 32.23$$

Example for electricity at the anticipated rate during the current electrical crisis in Juneau:

$$293 \text{ kilowatt hours} \times \$.33 \text{ (per kilowatt hour)} = \$ 96.69$$

$$293 \text{ kilowatt hours} \times \$.54 \text{ (per kilowatt hour)} = \$ 158.22$$

*The prices for propane and kerosene vary so make sure to get the current price per gallon.