Using space heaters safely

Introduction
Propane, kerosene or electric space heaters are widely used in a variety of businesses. They are simple to operate, have few moving parts and, when used correctly, provide warm relief from the winter weather. However, if space heaters are not kept clear from combustible materials, are used improperly, or are not functioning properly, they can cause fire or produce carbon monoxide (CO) gas.

The following information discusses the hazards associated with the improper use of space heaters, the signs and symptoms of CO poisoning, proper maintenance and setup procedures, and government requirements for today's space heaters.

Hazards
Workers should be aware of the following hazards when using propane, kerosene or electric space heaters:
1. Fires and burns caused by contact with or close proximity to the flame, heating element or hot surfaces
2. Fire and explosion caused by flammable fuels or defective wiring
3. Indoor air pollutants caused by improper ventilation or incomplete combustion of fuels
4. CO poisoning caused by improper ventilation or incomplete combustion of fuels
5. High humidity released by propane-fired heaters that can lend to mold growth within buildings under construction

Carbon monoxide
CO is a colorless, odorless gas produced by the incomplete burning of any carbon-containing material, including gasoline, natural gas, propane, coal or wood.

CO is dangerous because it replaces oxygen in the blood and interferes with the transport of needed oxygen to cells in the body.

Limited exposure to high levels of CO [400 to 800 parts per million (ppm)] can cause headache, nausea, drowsiness and confusion. Higher concentrations of CO [1200 ppm] can kill you within minutes, often without significant warning signs.

The OSHA Permissible Exposure Limit (PEL) for CO is 50 ppm. This means that over an eight-hour workday, you can be exposed to an average concentration of 50 ppm of CO gas without adverse health effects. The National Institute for Occupational Safety and Health (NIOSH) has established a recommended exposure limit (REL) for carbon monoxide of 35 ppm (40 mg/m³) as an 8-hour TWA. Current good practice recommends controlling exposure to an average of only 25 ppm.

Symptoms of CO poisoning
Symptoms of CO poisoning can mimic those of the flu or food poisoning. Early exposure symptoms may include:

- Dizziness
- Nausea
- Headache
- Weakness
- Inattention
- Fatigue
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Prolonged exposure can lead to the following symptoms:

- Increasing fatigue
- Lack of coordination
- Confusion
- Extreme weakness
- Loss of consciousness
- Death

Because CO poisoning symptoms mimic the flu or food poisoning, it is important to inform medical responders of the possibility of exposure to excessive amounts of CO. Poisoning can be reversed if caught in time, but acute poisoning may result in permanent damage to the heart and brain.

**Emergency treatment**

1. Get the victim into the open air as quickly as possible.
2. Check for respiration and pulse. If both are absent, begin CPR.
3. If breathing is absent, but there is a pulse, begin mouth-to-mouth resuscitation and continue until the victim begins breathing or help arrives. Have an up-to-date CPR kit with mouth protector available due to exposures to bodily fluids.
4. Begin administering oxygen as soon as one is available and if you are trained to do so.
5. Get the victim to a hospital as soon as possible.

**Setup and use**

When setting up a space heater, remember to keep it at least 30 inches from any flammable materials and set it up on the floor, unless it is designed otherwise.

Areas where space heaters are used should be free of combustible materials like wood, paper, rags and flammable liquids. Do not set them up on easily ignited or flammable surfaces, such as rugs or carpets, or use them to dry wet clothing.

When possible, it is a good practice to use ducting to move warm air into work areas. This keeps the heaters away from workers in the event of a malfunction.

Space heaters used inside mobile job trailers are required to be electric or vented fuel-fired. Have the ductwork and exhaust flue checked for blockage and leaks annually or whenever a trailer is moved from one job to another.

When using a space heater in an enclosed area, it is a good idea to leave a window or door partially open to allow for fresh air to enter. This will prevent CO buildup or a depletion of oxygen. Never take a gas fired or kerosene heater into a confined space. The results could be deadly.

All unvented heaters manufactured after 1983 should be equipped with an oxygen depletion sensor (ODS). The ODS will shut a heater off if it detects a reduced level of oxygen in the area where the heater is being used. All gas heaters should be equipped with a pilot safety valve. This device will shut off the gas to the heater if the pilot light should go out, preventing the risk of explosion by not allowing the accumulation of gas.

If the pilot light goes out, remember the following safety tips:

- If you smell gas, do not attempt to light the pilot. Turn off all controls, open a window or door and leave the area.
- Remember that propane is heavier than air and does not dissipate rapidly. If you smell gas, do not touch any electrical switches or use a radio or telephone in the area where you smell gas. Do not smoke. A spark could ignite the gas.
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It also is a good idea to light a match before you turn on the gas to the pilot. This reduces the risk of flashback, which could occur if gas is allowed to accumulate before lighting the pilot.

Electric heaters should be kept on the floor unless designed for use in wet conditions. They should be kept out of wet or moist places like bathrooms. Water or corrosion could lead to a fire or shock hazard.

**Maintenance and inspection**

All gas and kerosene heaters should be inspected annually by a qualified person to ensure that they are properly adjusted and clean.

Maintenance and inspections should include checking the following items:

- Condition of safety devices
- Efficiency of burners
- Condition of fuel lines and tanks
- Vents and gaskets
- Exhaust ducting and flues
- Exhaust flow
- Condition of electrical cords
- Condition of guards
- Missing guards and controls

**Summary**

When selecting space heaters, choose space heaters that have been tested and certified by a nationally recognized testing laboratory.

Inspect them annually (at a minimum) and use caution when setting up a space heater to avoid CO poisoning and the risk of fire.

By taking a few preventative measures, space heaters can be a welcome winter addition.

**References**

What You Should Know About Space Heaters, U.S. Consumer Product Safety Commission


Questions and Answers About Carbon Monoxide Poisoning, National Safety Council

National Safety Council, Carbon Monoxide

Carbon Monoxide Poisoning, Columbia University College of PandS

OSHA 29 CFR1926.55 Gases, vapors, fumes, dust and mists

Threshold Limit Values – 2008, American Conference of Governmental Industrial Hygienists  Cincinnati, OH 2008

**Additional resources**

Carbon Monoxide – Travelers Risk Control Supervisor Talk


CPSC Warns Of Hazards from Furnaces, Space Heaters and Fireplaces

Occupational Safety and Health Guideline for Carbon Monoxide
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For more information, log in to the Risk Control Customer Portal at travelers.com/riskcontrol. (Need help? Read our Registration Quick Guide.) You also can contact your Risk Control consultant or email Ask-Risk-Control@travelers.com.