

## **Carbon Monoxide – Causes, Warnings & Detectors**

Carbon monoxide (CO) is a deadly, colorless, odorless, flavorless, poisonous gas that kills hundreds of people annually. CO is the leading cause of accidental poisoning deaths in the United States. About 50% of all CO poisonings occur in the home. Especially vulnerable people include pregnant women, developing fetuses, and people with cardiovascular or cerebral vascular illnesses. Carbon monoxide is produced by the incomplete burning of fuels such as: coal, wood, charcoal, oil, kerosene, propane and natural gas. Internal combustion engines also produce carbon monoxide.

### **Causes & Warnings**

- The origin of CO in the home is many and varied:
  - Unvented appliances such as using a gas cooker for heating, or portable space heaters.
  - A cracked furnace heat exchanger or a furnace poorly maintained with little maintenance history.
  - An exhaust flue that is damaged, improperly installed, sized, or blocked. For example, a flue terminating through the roof with a missing and/or damaged guard runs the risk of an animal entering, nesting, and possibly dying inside the flue and thus creating an obstruction to proper exiting of flue gases.
  - Backward flowing (backdrafting) exhaust flue gases. Combustion equipment is designed to vent all exhaust gases to the outside. Basic science dictates that all fluids (gases) flow from high pressure to low pressure. Backdrafting occurs when exhaust gases flow to the interior (the wrong way) because a lower interior pressure (compared to the outside) has been created. Backdrafting may be caused by a poorly designed or maintained combustion system, but more often it is a combination of factors and changes the original combustion system was not designed. Renovating a home with new, tighter, construction materials and methods, adding or improving bathroom fans, and improved appliances that move more air (clothes dryers, bath fans) may decrease interior air pressure levels and thus increase the potential for backdrafting.
- CO will insidiously displace oxygen in the red blood cells (carboxyhemoglobin) and thus cause flu like symptoms without the fever. The heart will work faster raising blood pressure and pulse as it tries to distribute oxygen deprived blood throughout the body.
  - Lower level of CO exposure causes milder symptoms that include: headache, fatigue, shortness of breath, nausea, and dizziness.
  - Higher level of CO exposure causes severe symptoms that include: vomiting, loss of muscular coordination, mental confusion, loss of consciousness and ultimately death.
- Professional HVAC companies should always test and verify that acceptable CO levels are present.

### **Choosing a carbon monoxide detector**

- Carbon monoxide detectors work by sensing the density of carbon monoxide in the air. CO detectors should have an Underwriters Laboratories or similar markings from an independent product safety certification verifying unit functionality. Do not allow CO detectors to freeze. If exposed to freezing temperatures, replace the unit.
- There are four types available: Infrared and electrochemical (used primarily in industrial and specialty applications), and semiconductor sensor, and enzyme sensor types which are used primarily for residential applications.
  - The semiconductor type requires 120 volt continuous power. They analyze the air every two or three minutes. If power is lost, the backup battery will last only a few hours.
  - The enzyme sensing type is the least expensive. It uses a battery as a power source. They analyze using a chemical gel which absorbs CO at the same rate as real blood. The gel will cloud up when absorbing the CO. A sensor monitors the LED light passing through gel. When the gel becomes cloudy and thus blocks the light, the alarm will sound. The gel can become clogged from airborne particulates (burning wood/cigarettes) or humidity which may cause nuisance alarms.
- **Location:**
  - CO detectors should be placed in the basement and on each floor level except attics or garages.
  - Within 15 feet of each sleeping area. ***(Most CO fatalities occur when occupants are sleeping)***
  - In proximity of any mechanical device that uses a fuel other than electricity.

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