



## FOREST RESOURCES ASSOCIATION INC.

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## CARBON MONOXIDE DETECTION AND CONTROL

*Safety: general*

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**INTRODUCTION:** A forestry operation demands the high usage and maintenance of petroleum-fueled vehicles. Personnel are transported in pickup trucks burning gasoline; woods roads are built and maintained with diesel-powered excavators; and the wood is harvested with diesel-powered equipment. Each machine burns a hydrocarbon, gasoline or diesel, and the combustion process produces carbon monoxide. Combustion engines, gas space heaters, furnaces, and kilns all commonly produce carbon monoxide. Carbon monoxide is an odorless, colorless, and tasteless gas.

**THE RISK:** You can't feel it, taste it, see it, or smell it, but carbon monoxide can kill you. In fact, carbon monoxide gas is called "The Silent Killer," because it can rapidly suffocate a victim without warning. Carbon monoxide gas is inhaled and absorbed through the lungs and is a chemical asphyxiate, meaning it restricts the ability of the blood system to carry necessary oxygen to body tissues. Prolonged exposure to carbon monoxide can result in death or permanent damage to body parts that require a high level of oxygen such as the heart and brain. If you are exposed long enough, even a small concentration can slowly build up in your blood and kill you.

**SOURCES & HUMANS LIKELY TO BE EXPOSED:** During the engine combustion process, gasoline, diesel, or LP gas is rapidly burned, and the exhaust gasses emit carbon monoxide. Outside in the normal environment, carbon monoxide gas is quickly diluted in the natural ambient air. When the CO gas is contained in an enclosed environment, it displaces the oxygen. When hydrocarbon fuels do not completely burn, or exhaust gases do not reach high temperatures, the exhaust contains higher levels of carbon monoxide. Carbon monoxide is a hazard year-round, but more commonly kills in the winter, when fuels are burned inside tightly enclosed buildings or where ventilation is poor. A poorly maintained exhaust system or a poorly tuned engine running inside an enclosed garage is a silent threat to life.

### COMMON SOURCES:

- Engine running inside contained buildings
- Vehicle – leaking exhaust system
- Vehicle – trapped in a snow bank with engine running
- Poorly burning LP gas space heaters
- Poorly burning LP gas forklifts

### HUMAN SYMPTOMS / CO POISONING – SIGNS OF EXPOSURE LEVELS

- *Mild exposure* - slight headache located in your forehead that gradually increases in intensity. Feeling of drowsiness, dizziness and nausea.
- *Moderate exposure* - Weakness and confusion combined with a



Fig. 1: The "AirAware" monitor, suitable for installation in a garage, detects "trigger" CO levels and sounds an alarm.

throbbing headache and a loss of coordination.

- *Severe Exposure* – Loss of consciousness, vomiting, red skin, and heavy breathing signal advanced stages of poisoning.

#### **TREATMENT OF CO POISONING**

- Evacuate and leave the area immediately; seek fresh air and stop physical activity.
- Call for medical help immediately.
- More serious cases of CO poisoning will require administration of oxygen and possibly CPR (cardiopulmonary resuscitation).

#### **CONTROLS**

- Avoid running engines inside buildings
- Maintain proper ventilation systems
- Do not use LP gas heaters in enclosed spaces
- Maintain equipment in good running condition
- Install CO monitors/alarms

**MONITORING APPLICATION:** Installing a carbon monoxide sensor in garages and work environments where engines are operated inside decreases the risk of exposure.

**GENERAL FEATURES & OPERATION:** The “AirAware” monitor is simple and easily installed in a central area of a garage. The unit measures the CO level once a second and can be reset from the front panel. The first audible alarm is activated at 35 PPM (parts per million), and the unit has the ability to be wired to an external ventilation fan; the fan will activate and remain on until the sensor CO level is below 35 PPM. The second alarm is activated at 75 PPM, the level when humans should evacuate the building. (NOTE: OSHA’s action level is 50 PPM.) The unit has a digital PPM display and a low and high alarm indicator. The unit is powered by a 120VAC-power supply that provides 24 VDC and can be wired directly to a battery source for remote location use.

**COST:** The unit, available from Priority One (Box 35, Imperial, Pennsylvania 15126-0035; 877/746-1266; [www.prio1.com](http://www.prio1.com)) costs approximately \$650.

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