

Carbon Monoxide

The Silent Killer

Facts

- According to the Center for Disease Control, nearly 500 unintentional deaths and more than 1,700 suicides are related to carbon monoxide poisoning each year in the United States.
- An estimated 3,000 to 5,000 people are treated annually for carbon monoxide poisoning in hospital emergency rooms, but it is believed that many more are misdiagnosed or never seek medical care.
- CO is the leading cause of accidental poisoning deaths.

Symptoms

- Early exposure to CO mimics flu-like symptoms; headaches, nausea, dizziness, shortness of breath and confusion.

CO Sources

- CO is produced when fossil fuels burn incompletely as a result of insufficient oxygen. Fuels include natural gas, propane, kerosene, gasoline, coal, wood and charcoal.
- Sources of CO include the furnace, water heater, oven, range, clothes dryer, fireplace, space heater, charcoal grill, wood-burning stove or an idling vehicle in an attached garage.

CO Incidents

- Improper installation or poor maintenance of appliances.
- Inadequate ventilation of appliances, including fuel burning space heaters.
- Automobile exhaust.
- In tightly sealed homes, negative pressure can force flue gases (such as those from wood stoves or water heaters) to reverse flow or backdraft into the living space. These incidents are the most difficult to detect.



Santa Clara County Fire Department

408.378.4010 or 1.800.800.1793
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Age, overall health, length of exposure and the concentration of the exposure (measured in parts per million) all determine the degree to which a person becomes affected by CO.

A source of carbon monoxide poisoning, such as a smoldering fire, faulty furnace, kitchen range or water heater can produce up to 1,600 ppm. A charcoal grill 3,200 ppm and tailpipe exhaust can easily produce in excess of 70,000 ppm. The table below shows typical symptoms based on concentration and time of exposure.

CO Exposure — parts per million (ppm)

9 ppm	EPA residential standard—not to exceed 9 ppm in 8 hours
35 ppm	EPA residential standard—not to exceed 35 ppm in 1 hour
50 ppm	OSHA workplace standard—not to exceed 50 ppm in an 8 hour period
200 ppm	Slight headache, fatigue, dizziness, nausea after 2-3 hours.
400 ppm	Frontal headaches within 1-2 hours. Life threatening after 3 hours.
800 ppm	Dizziness, nausea and convulsions within 45 minutes. Unconsciousness within 2 hours. Death within 2 –3 hours.
1,600 ppm	Headache, dizziness and nausea within 20 minutes. Death within 1 hour.
12,800 ppm	Death within 1-3 minutes.

CO detectors/alarms always have been and still are designed to alarm before potentially life-threatening levels of CO are reached. The UL standard 2034 (1998 revision) has stricter requirements that the detector/alarm must meet before it can sound. As a result, the possibility of nuisance alarms is decreased.

Underwriters Laboratories (UL) Standards for CO Alarms @ 85 decibels

30 ppm present	Alarm will sound when present for more than 30 days (Alarm required to ignore low-level concentration of CO unless present long-term)
70 ppm present	Alarm will sound within 1-4 hours (Alarm required to ignore concentration levels of 70 ppm for at least 1 hour before alarm will sound)
150 ppm present	Alarm will sound within 10-50 minutes
400 ppm present	Alarm will sound within 4-15 minutes

For more information about carbon monoxide poisoning and prevention tips:

- Centers for Disease Control www.cdc.gov
- Consumer Product Safety Commission www.cpsc.gov
- Environmental Protection Agency www.epa.gov
- Federal Emergency Management Agency www.fema.gov