

RISK CONTROL SERVICES

CARBON MONOXIDE SAFETY



Carbon monoxide (CO), a naturally occurring gas, is commonly referred to as the “silent killer” since it is colorless, odorless, and tasteless. Many household items produce harmless amounts of [carbon monoxide fumes](#). However, when these items are damaged or improperly installed, they can raise carbon monoxide concentrations to hazardous levels.

Burning fuels such as diesel, natural gas, oil, propane, gasoline, wood, or coal can produce dangerous carbon monoxide levels if not properly vented. Vehicles, small engines, stoves, lanterns, grills, fireplaces, stovetop ranges, building appliances, and building mechanical systems are also carbon monoxide sources. Exposure to elevated carbon monoxide levels can lead to carbon monoxide poisoning, resulting in severe injuries or death.

Common symptoms of **carbon monoxide poisoning** include:

- Flu-like symptoms
- Weakness
- Shortness of breath
- Upset stomach and vomiting
- Nausea
- Chest pain
- Dizziness
- Confusion

If any of these symptoms occur, vacate the area, find fresh air as quickly as possible, and notify your local first responders.

Carbon monoxide exposure

The concentration of carbon monoxide, measured in parts per million (ppm), is a determining factor in an average adult’s symptoms. The following chart explains the exposure risks [outlined by the National Fire Protection Association \(NFPA\)](#):

Exposure (ppm)	Symptoms
50 ppm	No adverse effects after 8 hours of exposure
200 ppm	Mild headache after 2-3 hours of exposure
400 ppm	Headache and nausea after 1-2 hours of exposure
800 ppm	Headache, nausea, and dizziness after 45 minutes; collapse and unconsciousness after 1 hour of exposure
1,000 ppm	Loss of consciousness after 1 hour of exposure
1,600 ppm	Headache, nausea, and dizziness after 20 minutes of exposure
3,200 ppm	Headache, nausea, and dizziness after 5-10 minutes; collapse and unconsciousness after 30 minutes of exposure
6,400 ppm	Headache and dizziness after 1-2 minutes; unconsciousness and danger of death after 1-3 minutes of exposure
12,800 ppm	Immediate physiological effects, unconsciousness, and danger of death after 1-3 minutes

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Preventing carbon monoxide poisoning

Carelessness and human error often lead to dangerous carbon monoxide levels. Take the below precautions to prevent carbon monoxide poisoning:

- Never run a vehicle or other fueled engine or motor indoors, even if garage doors are open.
- Clear exhaust pipes from vehicles during snowstorms.
- Ensure all fuel-burning appliances are properly installed and maintained by a certified technician. During and after a snowstorm, make sure vents for the dryer, furnace, stove, and fireplace are clear of snow buildup.
- Never use a portable generator indoors or in any other enclosed space such as a garage.
- Never use barbeque grills indoors.
- Never use a gas range or oven for heating as this can cause a high concentration of carbon monoxide.
- Note any visible damage or improper working mechanisms for machinery, utility systems, or equipment within a building, and contact a certified contractor to repair immediately.
- All building mechanical systems should remain on a monthly or annual inspection schedule prescribed by the manufacturer.



Carbon monoxide detectors

[Legislation adopted](#) as part of the COVID-19 relief bill signed into law in December 2020 [requires carbon monoxide detectors](#) in housing subsidized by the U.S. Department of Housing and Urban Development. The legislation, which provides \$300 million in funding over three years, was first introduced in 2019 after an [investigation found](#) at least 13 public housing residents have died from carbon monoxide poisoning since 2003.

The requirement [applies to](#):

- Supportive housing for the elderly and persons with disabilities;
- traditional public housing units;
- rental housing for which the owner receives low-income voucher assistance; and
- certain rural housing.

Housing authorities and private owners of federally-assisted properties have until December 27, 2022 to comply with the new requirement. If you have questions about compliance and funding, consult with legal counsel and your [local HUD office](#).

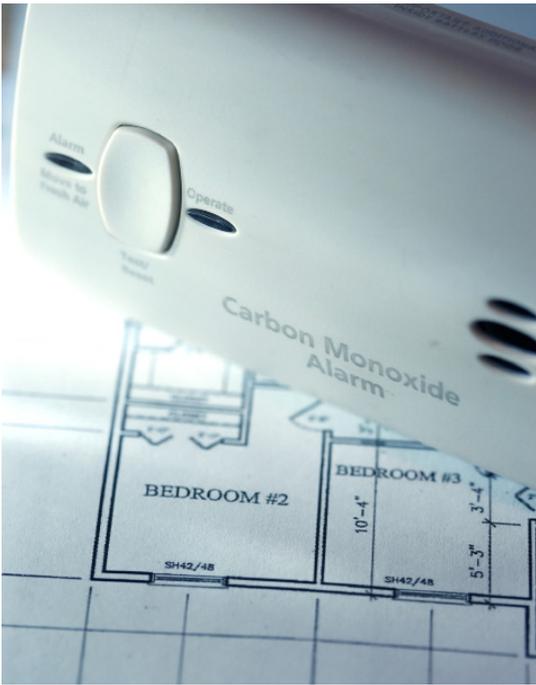
Placement

When [installed properly](#), carbon monoxide detectors are an effective method for sounding the alarm on elevated carbon monoxide levels. One of the most significant risks associated with carbon monoxide is inadequate installation and maintenance of detectors. If a neglected detector malfunctions and fails to detect even the smallest increase in carbon monoxide levels, the [results can be deadly](#).

The installation of hard-wired carbon monoxide detectors (with battery backup) is highly recommended for increased reliability.

Follow these tips to [install and maintain detectors](#) properly:

- Install carbon monoxide detectors on each level of a building/home and outside each sleeping area. Other locations may be necessary per applicable laws, codes, or standards.
- Always follow manufacturer installation guidelines. Place detectors at least 5 feet above the floor or on the ceiling since



- carbon monoxide is slightly lighter than air and mixes with warm, rising airflows.
- Don't place detectors in corners (lack of air circulation), next to doors and windows, or near fire-producing appliances. Do not block detectors with furniture, drapes, or other objects.
 - Keep detectors out of reach from children and pets.
 - Interconnect carbon monoxide detectors so when one sounds, they all sound.
 - Make sure detectors are [UL-listed](#).
 - Detectors should be tested and maintained per manufacturer guidelines. Battery-powered detectors should be tested weekly, with batteries replaced annually.
 - Include a checkbox for testing smoke and carbon monoxide detectors on all work order forms. Direct maintenance personnel to check detectors upon every entry into a unit, regardless of the issue. (Testing terms can be included in lease agreements and reviewed with residents.)
 - Replace detectors every seven to 10 years, or according to the manufacturer's instructions.
 - Contact your local fire department's non-emergency number to find out what number to call if a detector sounds.

IF A CARBON MONOXIDE DETECTOR SOUNDS

Know the difference between the sound of a carbon monoxide alarm and a smoke alarm.

Move outside to fresh air immediately and account for everyone in the building.

Contact emergency personnel and do not re-enter the building until they deem it is safe.

Communicate that residents should report non-emergency carbon monoxide incidents such as faulty detectors to maintenance. Ensure such incidents are addressed and corrected.

Document all resident reports and maintenance follow-ups.

Contact our Risk Control Services Team

for more resources and answers to your housing organization's risk-related questions.

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