

Combustion Safety - CO Alarms Installed

Last Updated: 07/19/2017

Scope



Install a carbon monoxide alarm in any home equipped with combustion appliance(s) or an attached garage.

- Install the alarm in a central location, in the immediate vicinity of each separate sleeping area.
- Hard-wire the alarm(s) to the home's electrical system and provide a battery back-up.

See the [Compliance Tab](#) for related codes and standards, and criteria to meet national programs such as ENERGY STAR, DOE's Zero Energy Ready Home program, and EPA's Indoor airPLUS.

Description

Carbon monoxide (CO) is an odorless colorless gas produced through the incomplete combustion of carbon-based fuels. It can be deadly to humans. Any home containing a combustion appliance or having an attached garage should have a CO alarm installed in a central location in the immediate vicinity of each separate sleeping area of the home.

Incomplete combustion is more likely to occur in combustion equipment that is not maintained regularly or calibrated properly, thereby causing CO production to increase. CO can be released into living spaces from any of the following:

- an improperly adjusted burner;
- a combustion appliance with an insufficient supply of air;
- a combustion appliance paired with a disconnected or leaking vent pipe;
- an unvented space heater; or
- back-drafting of combustion products from a combustion appliance.
- an idling vehicle in an attached garage.

Properly installing, venting, and maintaining combustion equipment will encourage efficient combustion processes which will limit CO production and reduce the release of volatile organic compounds (VOCs) into the home. Ensuring that any installed combustion appliances are sealed combustion, direct vent models will also reduce the likelihood of having CO in the home. However, equipment malfunctions can go unnoticed. A CO alarm (Figure 1) is a valuable and low-cost solution that provides a second level of protection for occupant safety.

CO alarms should be certified to either the Canadian Standards Association (CSA) 6.19-01 or Underwriters Laboratory (UL) 2034 and should be placed according to the National Fire Protection Agency (NFPA) 720 requirements. The alarms should be hard-wired to the home's electrical system; this is an Indoor airPLUS requirement that exceeds the UL 2034 Standard.



Figure 1. A carbon monoxide (CO) alarm (Image courtesy of PNNL).

How to Install a Carbon Monoxide Alarm

1. Install a carbon monoxide alarm in any home equipped with combustion appliance(s) or an attached garage.
2. Select a monitor that is certified to either the CSA 6.19-01 or Underwriters Laboratory (UL) 2034.
3. Locate the monitor in accordance with NFPA 720 requirements.
 - Install the alarm in a central location, in the immediate vicinity of each separate sleeping area.
 - Hard-wire the alarm(s) to the home's electrical system and provide a battery back-up.
4. Provide the homeowner with maintenance, testing, and replacement instructions.
 - Vacuum the alarm monthly.

- Do not paint over the alarm.
- Avoid spraying aerosols around the alarm.
- Test weekly or as described by the manufacturer by pushing the test/reset button.
- If the alarm shows an end of life indication, replace the unit promptly.

Ensuring Success

Verify that the alarm is certified to either CSA 6.19-01 or UL 2034 and test the alarm after installation.

Climate

No climate-specific information applies.

Training

Right and Wrong Images

None Available

CAD

None Available

Compliance

The Compliance tab contains both program and code information. Code language is excerpted and summarized below. For exact code language, refer to the applicable code, which may require purchase from the publisher. While we continually update our database, links may have changed since posting. Please contact our [webmaster](#) if you find broken links.

[DOE Zero Energy Ready Home](#)

The U.S. Department of Energy (DOE) Zero Energy Ready Home National Program Requirements includes as a mandatory requirement (Exhibit 1, Item 6) that all homes meet the U.S. Environmental Protection Agency Indoor airPLUS Construction Specifications.

[EPA Indoor airPLUS](#)

The Indoor airPLUS Verification Checklist, Item 5.2, states

- All homes equipped with combustion appliance(s) or an attached garage shall have a carbon monoxide (CO) alarm installed in a central location in the immediate vicinity of each separate sleeping zone (e.g., in a hallway adjacent to bedrooms.) The alarm(s) shall be hard-wired with a battery back-up function and placed according to NFPA 720. The alarms shall be certified to either CSA 6.19-01 or UL 2034.

[NFPA 720](#)

Standard for the Installation of Carbon Monoxide(CO) Detection and Warning Equipment

More Info.

Access to some references may require purchase from the publisher. While we continually update our database, links may have changed since posting. Please contact our [webmaster](#) if you find broken links.

Case Studies

1. [Technology Solutions Case Study: Combustion Safety for Appliances Using Indoor Air](#)

Author(s): NSTAR, PARR

Organization(s): NSTAR, PARR

Publication Date: May, 2014

Case study describing a method for evaluating safe installation and operation of combustion appliances in homes undergoing energy efficiency upgrades where indoor air is used for combustion and venting.

References and Resources*

1. [DOE Zero Energy Ready Home National Program Requirements](#)

Author(s): DOE

Organization(s): DOE

Publication Date: April, 2017

Standard requirements for DOE's Zero Energy Ready Home national program certification.

2. [Indoor airPLUS Construction Specifications Version 1 \(Rev. 03\)](#)

Author(s): EPA

Organization(s): EPA

Publication Date: October, 2015

Document outlining specifications that were developed by the U.S. Environmental Protection Agency (EPA) to recognize new homes equipped with a comprehensive set of indoor air quality (IAQ) features.

3. [Introduction to Indoor Air Quality \(IAQ\), Carbon Monoxide](#)

Author(s): EPA

Organization(s): EPA

Publication Date: March, 2013

Source for information about Carbon Monoxide including health effects and measures to reduce exposure.

4. [NFPA 720: Standard for the Installation of Carbon Monoxide \(CO\) Detection and Warning Equipment](#)

Author(s): National Fire Protection Association

Organization(s): NFPA

Publication Date: January, 2015

Standard containing requirements for carbon monoxide (CO) detection and warning equipment intended to protect lives by warning occupants of the presence of CO in sufficient time to allow occupants to escape or take other appropriate action.

5. [Standard for Residential CO Alarms](#)

Author(s): Canadian Standards Association (CSA) International

Organization(s): CSA International

Publication Date: March, 2001

Document addressing multiple surfacing options for composite wood panels with regards to their abilities to act as emission barriers.

*Publication dates are shown for formal documents. Dates are not shown for non-dated media. Access dates for referenced, non-dated media, such as web sites, are shown in the measure guide text.

Contributors to this Guide

The following authors and organizations contributed to the content in this Guide.

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