

Combustion Safety - CO Alarms Installed

Last Updated: 03/16/2015

Scope



Install a carbon monoxide alarm in a central location, in the immediate vicinity of each separate sleeping area.

DOE Zero Energy Ready Home Notes

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 Notes

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 by either CSA 6.19-01 or UL 2034.

Description

CO is produced through the incomplete combustion of carbon-based fuels. In properly maintained and calibrated equipment, efficient combustion processes limit CO production and reduce the release of volatile organic compounds (VOCs) to trace amounts.

However, 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.

In addition, CO and other combustion pollutants produced from an idling vehicle in an attached garage can migrate into adjacent living spaces of the home in a number of ways. See the “Attached Garage” section for a more detailed description of the means by which this migration can occur.

Indoor airPLUS requires that builders install furnaces, boilers, hot-water heaters, fireplaces, and wood stoves that provide adequate venting of CO and other combustion pollutants to the outdoors (See Specification 5.1). A CO alarm is a valuable and low-cost solution that provides a second level of protection for occupant safety.

Any Indoor airPLUS home containing a combustion appliance or having an attached garage must have a CO alarm installed in a central location in the immediate vicinity of each separate sleeping area of the home. CO alarms that are certified by either CSA 6.19-01 or UL 2034 should be selected and placed according to NFPA 720 requirements. The alarms should be hard-wired to the home’s electrical system, an Indoor airPLUS requirement that exceeds the UL 2034 Standard.



Example CO alarm (Image courtesy of PNNL).

Ensuring Success

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. Exact code language is copyrighted and 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](#)

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More Info.

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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: August, 2015

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. [Standard for Residential CO Alarms](#)

Author(s): 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

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