NCEHSA Conference

Carbon Monoxide Detector Regulations for Lodging Establishments

(S.L. 2013-413)

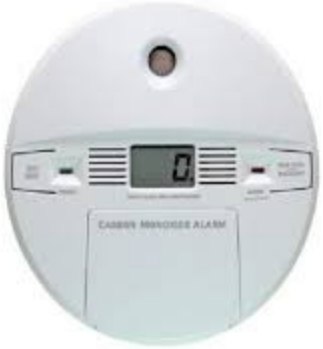
NORTH CAROLINA DEPARTMENT OF INSURANCE
OSFM
OFFICE OF STATE FIRE MARSHAL

Purpose of this session

- The purpose of this session is to review the provisions of Session Law 2013-413 as it addresses the requirements for CO alarms in lodging establishments.
- The session will highlight the requirements of the law and who is responsible for enforcement.
- We will review installation requirements for CO detectors

Purpose of this session

- We will review alarm and detection system requirements of the NC Building Codes;
- We will discuss resources and proposed changes to NC Building Codes.



How CO alarms work

- CO alarms function differently from smoke alarms. Smoke alarms sound when the alarm detects particles of smoke/combustion whereas a CO alarm responds to CO exposure over a determined period of time.
- CO alarms are listed in accordance with UL 2034 (single or multiple station alarms) or UL 2075 (detectors/systems).
- Underwriter's Laboratories has established the following limits for CO exposure that alarms must respond to:

How CO alarms work

- UL exposure limits
  - **30 ppm for 30 days**
  - **150 ppm for 10-50 minutes**
  - **70 ppm for 60-240 minutes**
  - **400 ppm for 4-15 minutes**
- Scope of UL 2034

1.1 These requirements cover electrically operated single and multiple station carbon monoxide (CO) alarms intended for protection in ordinary indoor locations of dwelling units, including recreational vehicles, mobile homes, and recreational boats with enclosed accommodation spaces and cockpit areas.

How CO alarms work

- Scope of UL 2075
- 1.1 These requirements cover toxic and combustible gas and vapor detectors and sensors intended to be portable or employed in indoor or outdoor locations in accordance with the National Electrical Code, NFPA 70. A gas detector and/or sensor and/or vapor detector, as covered by these requirements, consists of an assembly of electrical components coupled with a sensing means inside a chamber, or by separate components to detect toxic and/or combustible gases or vapors. The detector includes provision for the connection to a source of power and signaling circuits.

What the law says?

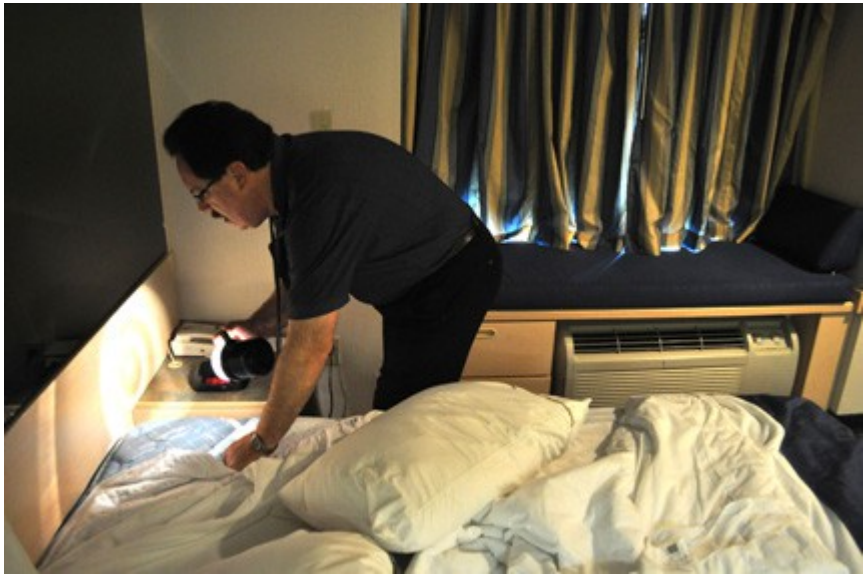
- While OSFM staff cannot provide interpretations of General Statutes, the following is our understanding of the law.
- Effective Oct. 1, 2013 all new and existing lodging establishments are required to install either a battery powered, electrical plug in or permanently wired CO alarm in every enclosed space having a fossil fuel burning heater, appliance, or fire place, or in any enclosed space including sleeping rooms that share a common wall, floor, or ceiling of the enclosed space [S.L. 2013-413 Section 19.(b)].

What the law says?

- Section 19.(b) sunsets September 30, 2014.
- Section 19.(c) becomes effective October 1, 2014.
- This section requires all new and existing lodging establishments regulated by G.S. 130A-248 to be equipped with listed CO alarms that receive their primary power from the building's wiring where such wiring is from a commercial source and they shall receive power from a battery when primary power is interrupted.
- This may include plug-in or permanently wired alarms.

Enforcement

- Since the requirements of Sections 19.(b) and 19.(c) are part of G.S. 130A-248 enforcement will be the responsibility of the local health department.
- Building and fire inspectors would not be responsible for this portion of the law.



Enforcement

- Section 19.(a) of the law directs the NC Building Code Council (BCC) to adopt code language that addresses the requirement for CO alarms in new lodging establishments.
- Until the BCC approves CO code language the other provisions of the law do not affect local building and fire code officials.
- At the Sept. 2013 BCC meeting, the NC Fire Service Code Revision Committee submitted a proposed code change addressing CO alarms in Group R and some Group I occupancies.

Enforcement

- The proposed code language is based on the 2012 International Fire Code (IFC) requirements for CO alarms. Underlined text are modifications to the 2012 IFC code text.
- Note: NC's 2012 Fire Code is based on the 2009 IFC.
- That language states: **908.7. Carbon monoxide alarms.** Group I-1, 1-2, I-4 or R occupancies located in a building containing a fuel-burning heater, appliance, or fireplace or in a building which has an attached garage shall be equipped with single-station carbon monoxide alarms.

Proposed NC Fire Code change

- The carbon monoxide alarms shall be listed as complying with UL 2034 and be installed and maintained in accordance with NFPA 720 and the manufacturer's instructions. An open parking garage, as defined in Chapter 2 of the Building Code or an enclosed parking garage ventilated in accordance with Section 404 of the Mechanical Code shall not be considered an attached garage.

Proposed NC Fire Code change

- **Exception:** Sleeping units or dwelling units which do not themselves contain a fuel-burning heater, appliance, fireplace or have an attached garage, but which are located in a building with a fuel-burning heater, appliance, fireplace or an attached garage, need not be equipped with single-station carbon monoxide alarms provided that:

  1. The sleeping unit or dwelling unit is located more than one story above or below any story which contains a fuel-burning heater, appliance, fireplace or attached garage.

Proposed NC Fire Code change

2. **The sleeping or dwelling unit is not connected by duct work or ventilation shafts to any room containing a fuel-burning heater, appliance, fireplace or to an attached garage; and**
3. **The building is equipped with a common area carbon monoxide alarm system.**

908.7.1 Carbon monoxide detection systems. Carbon monoxide detection systems, which include carbon monoxide detectors and audible notification appliances installed and maintained in accordance with NFPA 720 shall be permitted. The carbon monoxide detectors shall be listed with UL 2075.

Proposed NC Fire Code change

- A public hearing on this proposal will be held at the December 10, 2013 BCC meeting in Raleigh.
- Comments and input from this association are welcomed.

Let's define it

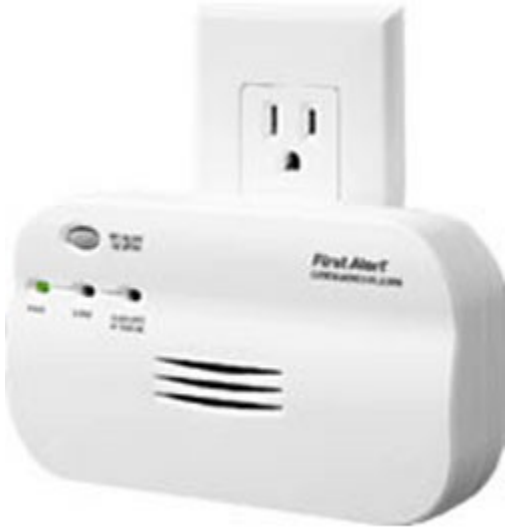
- **Alarm** – While S.L. 2013-413 refers to the devices as carbon monoxide detectors, the correct terminology for devices listed by UL 2034 is single or multiple-station carbon monoxide alarms.
- **ANSI** – American National Standards Institute accredits standards such as UL standards. UL 2034, 2075 and 217 are all ANSI accredited standards.

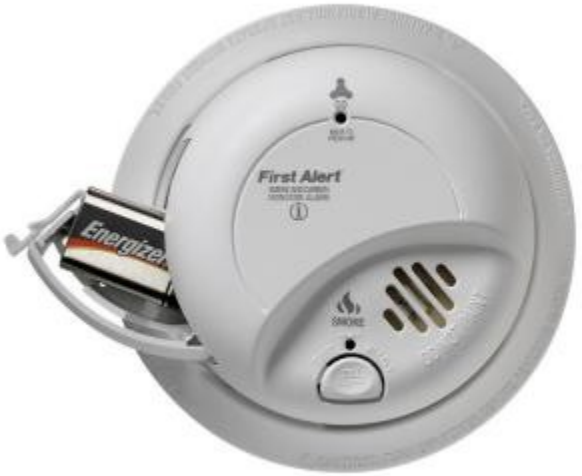
Let's define it

- **Detectors**- CO detectors are generally part of a gas detection system. Detectors that are part of these systems have to be listed to UL 2075.
- **Combination smoke/co alarms** –Combination smoke/co alarms will be listed to UL 217 (smoke) and UL 2034 (CO). These alarms are acceptable with the new legislation.
- **Battery power** – Many electric smoke and/or CO alarms are also equipped with battery back-up power. The alarm's primary power source is

Let's define it

- 120 volt (permanent wiring or plug-in). The battery power's intent is to provide short term protection in the event of a power failure.





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Let's define it

- **Enclosed space** – There is no code definition of enclosed space. For the purpose of enforcement of this law, the definition of enclosed space will follow the September 25, 2013 Position Statement from the Division of Public health that advises local health departments to utilize the definition of enclosed area found in S.L. 2009-27 until enclosed space can be further defined by the NC BCC.
- **Primary power from the building's wiring** – can be permanent wired alarms (direct wire) or plug –in 120 V alarms.

Installation

- Section 19.(g) and Section 19.(c) of the legislation state that the alarms should be installed in accordance with NFPA standards or the minimum protection designated in the manufacturer's instructions.
- The NFPA standard that addresses the installation of CO alarms and detectors is NFPA 720.
- NFPA 720 applies to the installation of single and multiple-station CO alarms and CO detection systems.

Installation (NFPA 720)

- Section 9.1.2. CO alarms shall be installed in all occupancies where required by local laws, codes or standards.
- Section 9.3.2. CO warning equipment shall be installed in accordance with the listing and manufacturer's published instructions.
- Let's take a look at what a major manufacturer of CO alarms states in their instructions.

Installation (Kidde instructions)

- In Kidde's installation instructions they advise of the following:
- WHEN CHOOSING YOUR INSTALLATION LOCATIONS, MAKE SURE YOU CAN HEAR THE ALARM FROM ALL SLEEPING AREAS. IF YOU INSTALL ONLY ONE CARBON MONOXIDE ALARM IN YOUR HOME, INSTALL THE ALARM NEAR BEDROOMS, NOT IN THE BASEMENT OR FURNACE ROOM.

Installation (Kidde instructions)

Where Not to Install Your CO Alarm

To avoid causing damage to the CO alarm, to provide optimum protection, and to prevent unnecessary alarms, follow the directions below where NOT to install this CO alarm:

- It is recommended that you DO NOT install this CO alarm in garages, kitchens or furnace rooms. Installation in these areas could lead to nuisance alarms, may expose the sensor to substances that could damage or contaminate it, or the alarm may not be heard by persons in other areas of the home, especially if they are sleeping.

Installation (Kidde instructions)

- In the garage, vehicle exhaust can contain some carbon monoxide. These levels are higher when the engine is first started. CO levels in a garage may not be sufficient to activate the alarm immediately. Within hours of starting a vehicle and backing it out of the garage, the levels present over time can activate the alarm and become a nuisance
- In the kitchen and furnace room, some gas appliances can emit a short burst of carbon monoxide upon startup. This is normal.

Installation (Kidde instructions)

- If your CO alarm is mounted too close to these appliances, it may alarm often and become a nuisance. If you must install a Kidde CO alarm near a cooking or heating appliance, **install at least 5 feet away from the appliance.**
- Do not install in excessively dusty, dirty or greasy areas. Dust, grease or household chemicals can contaminate or coat the alarm's sensor, causing the unit not to operate properly.

Installation (Kidde instructions)

- Do not obstruct the vents of the CO alarm. Place the CO alarm where drapes, furniture or other objects do not block the flow of air to the vents.
- Do not install in dead air space, such as peaks of vaulted ceilings or gabled roofs, where carbon monoxide may not reach the sensor in time to provide early warning.
- Do not install in turbulent air from ceiling fans. Do not install near doors and windows that open to the outside, near fresh air vents, or anywhere that is drafty.

Installation (Kidde instructions)

- Rapid air circulation from fans or fresh air from outside may affect the unit's alarm response time.
- Do not install this CO alarm in a switch- or dimmer-controlled outlet (Choose a standard un-switched 120 volt outlet to plug the unit into).
- Do not install in areas where the temperature is colder than 40°F (4.4°C) or hotter than 100°F (37.8°C). These areas include unconditioned crawl spaces, attics, porches and garages. Extreme temperatures will affect the sensitivity of the CO alarm.

Manufacturer's instructions

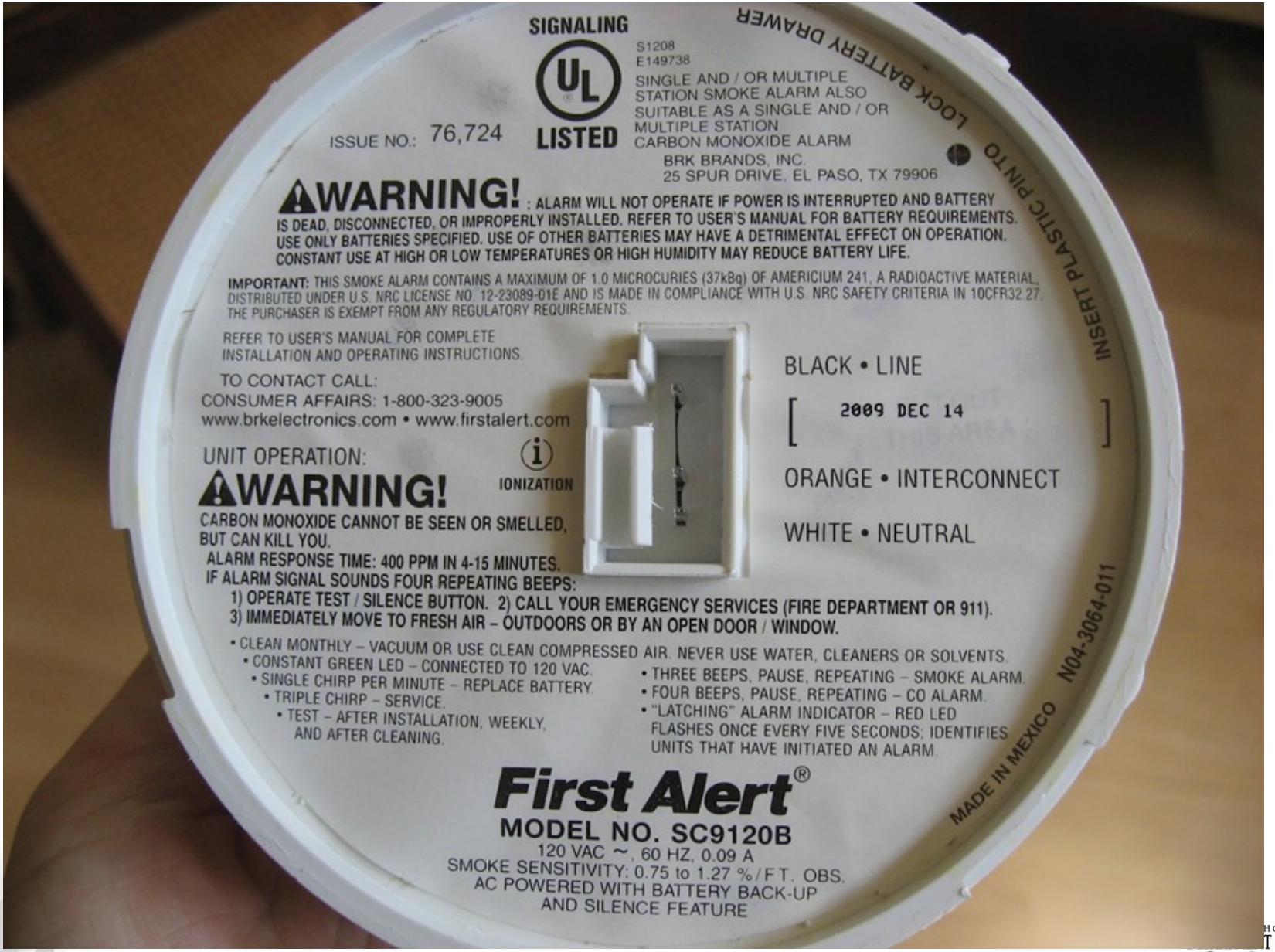
- Sections 19.b(g) and 19.c(g) of the legislation states that the manufacturer's instructions shall be retained by the lodging establishment where the alarms are being installed as proof of compliance.
- The lodging establishment should also follow the manufacturer's requirements for maintenance and battery replacement.

Manufacturer's Instructions

- Kidde Model C3010-D is a battery powered alarm with a 10 year sealed battery.
- • **Sealed-in Lithium Battery** – Sealed-in lithium power supply; no battery replacement required over the 10 year life of the alarm. Eliminates worry about battery removal or unauthorized deactivation of alarm.
- Kidde Nighthawk 900 CO detector has a 7 year life and the batteries have to be replaced annually.
- First Alert CO 410 has a 10 year life but batteries have to be replaced annually.

Where do I find the UL listing?

- This information will be found on the label generally located on the back of the alarm.
- You may have to remove the alarm from it's base to access the label.
- You won't always see the specific UL Number such as UL 2034, but rather language that states that it is a listed single or multiple-station CO alarm.



Other design options?

- Can the CO system be connected to the lodging establishment's existing fire alarm system?
- Yes, provided the existing fire alarm system is designed to accommodate the CO system. The system would have to be designed to meet NFPA 720 and NFPA 72 (National Fire Alarm Code).
- Any modifications to a fire alarm system requires plans sealed by a NC P.E. to be submitted to the local Fire Marshal for approval and permitting.

Other design options?

- Can a wireless system be used?
- Yes. A wireless system operates from a 120V control panel with battery back-up meeting all of the requirement of the law.
- Wireless systems may be a preferred design option for existing establishments due to simplicities in wiring.

Permits

- A permit should be obtained from the local building/and or fire code official when any of the following work is performed.
- Installation of any direct or permanent wired CO alarms (Electrical permit required).
- Installation of any CO detection system. (Building, Electrical and Fire permit required).
- Modification to an existing fire alarm system involving a CO system (Electrical and Fire permit required).

What's next?

- Section 19.(d) of the legislation directs the NC Building Code Council, Department of Public Health and Human Services and the Commission for Public Health to study the requirements for the placement of CO alarms and to assure that the law provides sufficient coverage for guests and occupants.
- These agencies shall report their findings to the legislature no later than April 15, 2014.

Questions?

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