



# Smoke and Carbon Monoxide Alarms Advanced 2023 Florida Building Code Internet

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## Course Information

Smoke and Carbon Monoxide Alarms Advanced 2023 Florida Building Code Internet

1 Hour General Credit

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# SMOKE AND CARBON MONOXIDE ALARMS

## RESIDENTIAL SMOKE ALARMS



### NFPA 72 - National Fire Alarm and Signaling Code

This code provides the minimum requirements for the installation, performance, operation, and maintenance of fire alarm systems, including smoke detectors.



### Florida Building Code, Residential Section 314

R314.1 General. Smoke alarms shall comply with NFPA 72 and Section R314.

These standards provide comprehensive guidelines for the design, installation, and performance of smoke alarms in residential occupancies.

## LISTING OF SMOKE ALARMS



### UL217 Standard

UL217 is a safety standard for smoke alarms and smoke detectors, establishing requirements for their construction, performance, and installation.



### Smoke Alarm Requirements

The standard covers requirements for smoke alarm sensitivity, response time, stability, and durability to ensure reliable and effective smoke detection.



### Installation Guidelines

UL217 provides guidelines for the proper installation of smoke alarms, including placement, spacing, and electrical connections to ensure optimal coverage and performance.

Adhering to the UL217 standard ensures that smoke alarms and detectors meet rigorous safety and performance criteria, providing reliable protection in the event of a fire.

## R314.2 WHERE REQUIRED



### New construction

Smoke alarms must be installed in all new dwelling units.



### Alterations, repairs, and additions

When alterations, repairs, or additions **requiring a permit** occur, or when sleeping rooms are added or created in existing dwellings, the individual dwelling unit must be equipped with smoke alarms.



### Existing Building Exceptions

Exterior work, such as roofing, siding, window/door replacement, or porch/deck addition, as well as plumbing or mechanical system installation, alteration, or repairs, are exempt from the smoke alarm requirement.

In summary, this section outlines the requirements for providing smoke alarms in dwelling units, both in new construction and when alterations, repairs, or additions are made to existing dwellings.

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## ALTERATIONS, ADDITIONS, AND REPAIRS



### Repairs and Level 1 Alterations

Must insure the existing smoke detectors are installed in accordance with applicable codes or install new devices.

Devices must be connected to utility power or utilize a 10-year nonremovable and nonreplaceable battery.

Level 1 alterations include the removal and replacement or the covering of existing materials, elements, equipment, or fixtures using new materials, elements, equipment, or fixtures that serve the same purpose.



### Other Alterations and Additions

Smoke alarms required throughout addition in accordance with codes for new construction.

Existing area of building must be retrofitted with smoke alarms if not installed.

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## R314.3 LOCATION

### Sleeping Rooms

Smoke alarms shall be installed in each sleeping room.

### Sleeping Area Vicinity

Smoke alarms shall be installed outside each separate sleeping area in the immediate vicinity of the bedrooms.

### Additional Levels

Smoke alarms shall be installed on each additional story of the dwelling, including basements and habitable attics, but not including crawl spaces and uninhabitable attics.

### Bathroom Placement

Smoke alarms shall be installed not less than 3 feet (914 mm) horizontally from the door or opening of a bathroom that contains a bathtub or shower, unless this would prevent placement of a smoke alarm required by the code.

## ENERGY STORAGE SYSTEM AREAS



### Fire Detection

Rooms and areas within dwelling units, basements, and attached garages where Energy Storage Systems (ESS) are installed must be protected by smoke alarms.



### Smoke Alarm Installation

Smoke alarms must be installed in accordance with Section R314 of the applicable code.



### Heat Detector Requirement

A heat detector, listed and interconnected to the smoke alarms, shall be installed in locations within dwelling units and attached garages where smoke alarms cannot be installed based on their listing.

Proper fire detection and alarm systems are crucial for ensuring the safety of occupants in dwellings where ESS are installed.

## SMOKE ALARM INSTALLATION NEAR COOKING APPLIANCES

Smoke Alarm Type	Minimum Distance from Cooking Appliance
Ionization Smoke Alarms	20 feet (6096 mm) horizontally
Ionization Smoke Alarms with Alarm-Silencing Silencing Switch	10 feet (3048 mm) horizontally
Photoelectric Smoke Alarms	6 feet (1828 mm) horizontally
Smoke Alarms Marked 'Helps Reduce Cooking Nuisance Alarms'	6 feet (1828 mm) horizontally

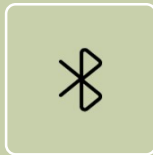
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## SMOKE ALARM INTERCONNECTION



### Interconnection of smoke alarms

Where multiple smoke alarms are required in a dwelling unit, they must be interconnected so that when one alarm activates, all alarms in the unit will sound.



### Physical interconnection not required required

If listed wireless smoke alarms are installed, physical interconnection is not required if all all alarms sound when one is activated.



### Actuation of one alarm activates all

The interconnection of smoke alarms must be such that the actuation of one alarm will activate all alarms in the individual dwelling unit.

The code requires that multiple smoke alarms within a dwelling unit be interconnected, either physically either physically or wirelessly, to ensure that the activation of one alarm triggers all alarms in the unit.  
in the unit.

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## EXISTING BUILDING SMOKE ALARM INTERCONNECTION EXCEPTION



### Smoke Alarm Interconnection

Existing areas are not required to have interconnected smoke alarms if alterations or repairs do not involve removing interior wall or ceiling finishes that expose the structure, unless there is an accessible attic, crawl space or basement.



### Exposed Structure Access

If the structure is exposed during alterations or repairs, interconnection of smoke alarms is required, unless there is an attic, crawl space or basement that provides access without removing interior finishes.



### Accessibility for Interconnection

The presence of an attic, crawl space or basement can provide access to interconnect smoke alarms without the need to remove interior wall or ceiling finishes.

This exception allows flexibility in smoke alarm interconnection requirements when existing areas are being altered or repaired, as long as the changes do not expose the structure or provide accessible pathways for interconnection.

## R314.6 POWER SOURCE



### Primary Power Source

Smoke alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source.



### Backup Power Source

Where primary power is interrupted, smoke alarms shall receive power from a battery.



### Wiring Requirements

Wiring shall be permanent and without a disconnecting switch other than those required for overcurrent protection.

Smoke alarms must have a reliable primary power source from the building's electrical system, as well as a backup battery power source to ensure continuous operation in the event of a power outage.

## LEVEL 1 ALTERATIONS SMOKE ALARM POWER SUPPLY



### One-family and two-family dwellings and townhomes undergoing a repair or a Level 1 alteration

These types of dwellings may use smoke alarms powered by 10-year nonremovable, nonreplaceable batteries instead of retrofitting with smoke alarms powered by the dwelling's electrical system.



### Exceptions to the battery requirements

The battery requirements do not apply to fire alarms, smoke detectors, or smoke alarms that are part of a centrally monitored or supervised alarm system, use low-power radio frequency wireless communication, or contain multiple sensors (e.g., smoke and carbon monoxide).

The slide outlines the requirements for smoke alarms in one-family, two-family, and townhome dwellings undergoing repairs or Level 1 alterations, including the use of 10-year nonremovable, nonreplaceable battery-powered smoke alarms and the exceptions to these requirements.

## 314.7 FIRE ALARM SYSTEMS



### Fire alarm systems

Fire alarm systems can be used instead of smoke alarms and must comply with the provisions of the code and NFPA 72 for household fire warning equipment.



### Smoke detectors

Smoke detectors must be listed in accordance with UL 268 and installed in the locations specified in Section R314.3.

Fire alarm systems can be used as an alternate to single and interconnected smoke alarms.



# NFPA 72 NATIONAL FIRE ALARM AND SIGNALING CODE

- **29.11.1.1**

All equipment shall be installed in accordance with the manufacturer's published instructions and applicable electrical standards.

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## NFPA 72 29.11.1.4

- **Instruction Booklet**  
An instruction booklet illustrating typical installation layouts for the warning equipment.
- **Operation and Maintenance Instructions**  
Instruction charts describing the operation, method, and frequency of testing and maintenance of the warning equipment.
- **Emergency Evacuation Plan**  
Printed information for establishing an emergency evacuation plan.
- **Repair and Replacement Service**  
Printed information to inform system owners where they can obtain repair or replacement service, and where and how parts requiring regular replacement, such as batteries or bulbs, can be obtained within 2 weeks.
- **Smoke Alarm Replacement**  
Information noting that smoke alarms shall be replaced when they fail to respond to tests, and they shall not remain in service longer than 10 years from the date of manufacture unless otherwise provided by the manufacturer's published instructions.
- **Additional Instructions**  
The instructions required in sections 29.14.2 and 29.14.4.

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## NFPA 72 29.11.2.1

- **Interconnection of Alarms**

The interconnection of alarms shall comply with the following requirements.

- **Manufacturer's Instructions**

Alarms shall not be interconnected in numbers that exceed the manufacturer's published instructions.

- **Unsupervised Interconnection**

In no case shall more than 18 initiating devices be interconnected (of which 12 can be smoke alarms) where the interconnecting means is not supervised.

- **Supervised Interconnection**

In no case shall more than 64 initiating devices be interconnected (of which 42 can be smoke alarms) where the interconnecting means is supervised.

- **Compatibility of Alarms**

Alarms of different manufacturers shall not be interconnected unless listed as being compatible with the specific model.

- **Audible Response**

When alarms of different types are interconnected, all interconnected alarms shall produce the appropriate audible response for the phenomena being detected or remain silent.

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## NFPA 72 29.11.3

- **Peaked Ceilings**

Smoke alarms or smoke detectors mounted on a peaked ceiling shall be located within 36 inches (910 mm) horizontally of the peak, but not closer than 4 inches (100 mm) vertically to the peak.

- **Sloped Ceilings**

Smoke alarms or smoke detectors mounted on a sloped ceiling having a rise greater than 1 foot in 8 feet (1 meter in 8 meters) horizontally shall be located within 36 inches (910 mm) of the high side of the ceiling, but not closer than 4 inches (100 mm) from the adjoining wall surface.

- **Wall Mounting**

Smoke alarms or smoke detectors mounted on walls shall be located not farther than 12 inches (300 mm) from the adjoining ceiling surface.

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## NFPA 72: 29.11.3.4



### Ambient Conditions

Smoke alarms and smoke detectors should be installed in locations where the ambient conditions, such as humidity and temperature, are within the limits specified by the manufacturer's instructions.



### Unfinished Attics and Garages

Smoke alarms and smoke detectors should not be installed in unfinished attics or garages, or in other spaces where temperatures can fall below 40°F (4.4°C) or exceed 100°F (38°C).



### Mounting Surfaces

If the mounting surface could become considerably warmer or cooler than the room, such as a poorly insulated ceiling below an unfinished attic or an exterior wall, smoke alarms and smoke detectors should be mounted on an inside wall.

By following these guidelines, you can ensure that your smoke alarms and smoke detectors are installed in the most effective locations and function properly in a variety of environmental conditions.

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## NFPA 72: 29.11.3.4

- Smoke alarms and smoke detectors placement**  
 Smoke alarms and smoke detectors shall not be installed within a 10 ft (3.0 m) radial distance along a horizontal flow path from a stationary or fixed cooking appliance, unless listed for installation in close proximity to cooking appliances.
- Smoke alarms and smoke detectors between 10 ft and 20 ft**  
 Smoke alarms and smoke detectors installed between 10 ft (3.0 m) and 20 ft (6.1 m) along a horizontal flow path from a stationary or fixed cooking appliance shall be equipped with an alarm-silencing means or use photoelectric detection.
- Smoke alarms and smoke detectors at a distance greater than 6 ft**  
 Smoke alarms or smoke detectors that use photoelectric detection shall be permitted for installation at a radial distance greater than 6 ft (1.8 m) from any stationary or fixed cooking appliance when the kitchen or cooking area and adjacent spaces have no clear interior partitions or headers, and the 10 ft (3.0 m) area of exclusion would prohibit the placement of a smoke alarm or smoke detector required by other sections of this Code.

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## RESTRICTED SMOKE ALARM LOCATIONS



36 in. (910 mm) horizontal path from a door to a bathroom containing a shower or tub

Smoke alarms and smoke detectors shall not be installed within this distance unless they are listed for installation in close proximity to such locations.



36 in. (910 mm) horizontal path from the **supply** registers of a forced air heating or cooling system

Smoke alarms and smoke detectors shall not be installed within this distance and shall be installed outside of the direct airflow from those registers.



36 in. (910 mm) horizontal path from the tip of the blade of a ceiling-suspended (paddle) fan

Smoke alarms and smoke detectors shall not be installed within this distance, unless the room configuration restricts meeting this requirement.

The installation of smoke alarms and smoke detectors must comply with these specific distance requirements to ensure proper functionality and safety.

## SMOKE ALARM PLACEMENT



### Smoke alarm placement in stairways

Smoke alarms or smoke detectors should be located in stairways leading to other occupiable levels, where smoke rising in the stairway cannot be prevented from reaching the alarm by an intervening door or obstruction.

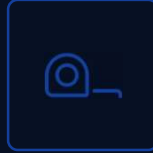


### Smoke alarm placement in basement stairways

For stairways leading up from a basement, smoke alarms or smoke detectors should be located on the basement ceiling near the entry to the stairs.

Proper placement of smoke alarms and detectors in stairways is crucial for early fire detection and ensuring the safety of building occupants.

## SMOKE ALARM PLACEMENT TRAY CEILINGS



### Smoke alarm and detector placement

Smoke alarms and detectors must be installed on the highest portion of the ceiling or on the sloped portion of the ceiling within 12 inches (300 mm) vertically down from the highest point.

Proper placement of smoke alarms and detectors is crucial for the safety of occupants in buildings with tray-shaped or coffered ceilings.

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## CARBON MONOXIDE PROTECTION



### Carbon monoxide protection

Every separate building or an addition to an existing building for which a permit for new construction is issued shall have an operational carbon monoxide alarm installed.



### Fossil-fuel-burning equipment

Buildings with fossil-fuel-burning heaters, appliances, fireplaces, or attached garages that emit carbon monoxide as a byproduct of combustion are required to have a CO alarm.



### Placement of CO alarms

CO alarms must be installed within 10 feet of each room used for sleeping purposes to ensure early detection and safety.

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Proper installation of operational carbon monoxide alarms is crucial to protect building occupants from the dangers of CO exposure, especially in structures with fossil-fuel-burning equipment or attached garages.

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### 315.1.1 CARBON MONOXIDE ALARM OPTIONS



#### Hard-wired carbon monoxide alarm

This type of alarm is permanently connected to the home's electrical system and does not require batteries.



#### Battery-powered carbon monoxide alarm

This type of alarm runs on battery power, making it a portable and flexible option.



#### Hard-wired combination carbon monoxide and smoke alarm

This alarm combines both carbon monoxide and smoke detection in a single unit that is hard-wired into the home's electrical system.



#### Battery-powered combination carbon monoxide and smoke alarm

This alarm combines both carbon monoxide and smoke detection in a single unit that runs on battery power.

By providing one of these four alarm options, homeowners can ensure their home is equipped with the appropriate carbon monoxide detection system.

### COMBINATION SMOKE/CARBON MONOXIDE ALARMS



#### Combination Smoke/Carbon Monoxide Alarms

Alarms that can detect both smoke and carbon monoxide in a single unit.



#### Listed and Labeled

Alarms must be certified by a nationally recognized testing laboratory.



#### Requirements

Alarms must meet specific standards and requirements set by the building code.

Combination smoke/carbon monoxide alarms may be used where devices are required.

