



Carbon Monoxide Detectors in New and Existing Buildings

January 2018 / 2017 OFC

Code provisions analyzed/referenced: Rev. Code § 3737.73

OAC § 1301:7-7-9(O); OFC §915

OAC § 1301:7-7-11(A)(1); OFC § 1101.1

OAC § 1301:7-7-11(C)(9); OFC § 1103.9

The 2017 Ohio Fire Code (OFC) became effective on December 15, 2017. New language added at section 915, entitled “Carbon Monoxide Detection,” affects carbon monoxide detection in **new buildings**. New language has also been added at section 1103.9 that affects carbon monoxide detection in **existing buildings**. The instant Bulletin is intended to provide guidance and clarification regarding these new requirements and to educate those affected by the new provisions as to when (and where) compliance will be required.

I. NEW AND EXISTING BUILDINGS

New OFC provisions state that carbon monoxide (CO) detection is now required in Group I-1, I-2, I-4, and R occupancies and in classrooms in Group E occupancies if certain conditions exist. Both new and existing buildings are affected by this new requirement.

Any **new building**¹ of one of the listed occupancy groups that is built after the effective date of the 2017 OFC (i.e., on or after December 15, 2017) is required to have CO detection in dwelling units, sleeping units, and classrooms **IF** any of the relevant conditions (discussed below in **Section II**) are present. (See OFC §§ 915.1 – 915.1.1.)

Generally – unless a distinct hazard exists – existing buildings are not required to comply with new requirements in the OFC that are enacted after the building is built. In some instances, however, language is added to the OFC that does apply new provisions retroactively to existing buildings. Such is the case here. Provisions were added to the 2017 OFC regarding CO detection that state that **existing buildings** ARE required to have CO detection – in dwelling units, sleeping units, and classrooms in Group I-1, I-2, I-4, and R occupancies and in classrooms in Group E occupancies **IF** any of the relevant conditions (discussed below in **Section II**) are present. (See OFC § 1101.1, Exception 2, and § 1103.9.)

¹ For the purposes of this provision, “new buildings” are buildings built after the effective date of the 2017 Ohio Fire Code - or after December 15, 2017. [except those already being built or having been approved???

If a new or existing building is required to have CO detection, detection must be provided by either a CO alarm or a CO detection system. (See **Section III.**) For new buildings, of course, the CO detection must be installed during the construction process. Existing buildings will have until January 1, 2019 to install CO detection systems. (See OFC § 1103.9.) For new buildings, the CO detection must receive power from the building's wiring if power is commercially available. However, **for existing buildings only**, the CO detection can be solely battery operated. This allowance for battery operation does not apply to new buildings. This language was added for existing buildings to avoid the costly necessity of having to upgrade an existing system or to retrofit a system into an existing building to accommodate CO detectors.

II. CONDITIONS REQUIRING CO DETECTION

In determining whether CO detection is required, an interested party must first determine whether they have one of the relevant occupancies (I-1, I-2, I-4, R or Classroom in E). If yes, the next question becomes whether any sleeping unit, dwelling unit, or classroom has any of the following relevant conditions which now require CO detection.

First, CO detection is now required in any dwelling unit, sleeping unit, or classroom that contains a fuel burning appliance or a fuel-burning fireplace. (See OFC § 915.1.2.)

Second, CO detection is now required in any dwelling unit, sleeping unit or classroom that is served by a fuel-burning, forced-air furnace. (See OFC § 915.1.3.) However, an exception exists for any dwelling unit, sleeping unit, or classroom that is served by a fuel-burning, forced-air furnace where the first room or area served by each main duct leaving the furnace has CO detection AND the CO alarm signals are automatically transmitted to an approved location. Where the first room or area served has CO detection and the alarm automatically transmits, CO detection is NOT required in the dwelling unit, sleeping unit or classroom also served by that same fuel-burning, forced-air furnace. If, however, the first room or area served does not have CO detection or the alarm does not automatically transmit, CO detection IS required in any dwelling unit, sleeping unit or classroom also served by that same fuel-burning, forced-air furnace.

The third condition where CO detection is now required states that CO detection must be provided in any dwelling unit, sleeping unit or classroom that is located in a building that contains a fuel-burning appliance or fuel-burning fireplace. (See OFC § 915.1.4.) There are two exceptions to this general rule. The first exception states that if a building contains a fuel-burning appliance or fireplace, but there are no communicating openings between the appliance or fireplace and the dwelling unit, sleeping unit, or classroom, then the dwelling unit, sleeping unit, or classroom does not have to have CO detection. The second exception states that CO detection is not required in dwelling units, sleeping units, or classrooms that are in a building that contains a fuel-burning appliance or fuel-burning fireplace IF CO detection is provided in one of two locations: a) an approved location between the appliance or fireplace and the affected unit or room, or b) on the ceiling of the room containing the appliance or fireplace.

Finally, the fourth condition where CO detection is now required, states that CO detection must be provided in any dwelling unit, sleeping unit, or classroom that is located in a

building with an attached private garage.² (See OFC § 915.1.5.) This requirement, however, also has exceptions. A dwelling unit, sleeping unit, or classroom that is located in a building with an attached private garage is not required to have CO detection if any of the following apply: a) there are no communicating openings between the private garage and the dwelling unit, sleeping unit or classroom; b) the dwelling unit, sleeping unit, or classroom is located more than one story above or below the private garage; c) the private garage connects to the building through an open-ended corridor; or d) CO detection is provided in an approved location between openings to the private garage and the dwelling unit, sleeping unit or classroom.

If any of the affected occupancies have any of the 4 conditions listed above, and none of the exceptions apply, CO detection is now required in the affected dwelling units, sleeping units and classrooms. Please see section **IV. Locations**, for a discussion regarding where the detectors have to be placed.

III. TYPES OF DETECTION REQUIRED

If carbon monoxide detection is required, it must be provided by either a CO alarm or a CO detection system. (See OFC § 915.3.) The new code provisions set forth specific parameters that each must meet.

If CO alarms are utilized (see OFC § 915.4), the alarms must be listed in accordance with UL 2034 (2008) and must receive their primary power from the building wiring if the wiring is served from a commercial source. In the event of an interruption of primary power, the alarms must receive backup power from a battery. Wiring for the alarms must be permanent and cannot have a disconnecting switch other than what might be required for overcurrent protection.

If a building does not have commercial power, a battery powered CO alarm is acceptable.

Combination CO/smoke alarms are also an acceptable alternative to alarms that are solely CO alarms. Combination alarms must be listed in accordance with UL 2034 (2008) and UL 217 (2015). If the combination alarm is not so listed, it is not acceptable for meeting compliance **with the OFC**.

If CO detection systems are utilized (see OFC § 915.5), the systems must comply with NFPA 720 (2015) and must be listed in accordance with UL 2075 (2013). However, in the event of a conflict, CO detectors shall be installed in locations specified in this rule (as discussed below), rather than as set forth in NFPA 720.

Combination CO/smoke detectors are acceptable for installation in CO detection systems IF they are listed in accordance with UL 2075 (2013) and UL 268 (2016). If a combination alarm is not so listed, it is not acceptable for meeting compliance **with the OFC**.

² **Please note:** for the purposes of this rule “attached private garage” does NOT mean an open parking garage complying with section 406.5 of the Ohio Building Code or an enclosed parking garage complying with section 406.6 of the Ohio Building Code.

IV. LOCATIONS WHERE CO DETECTION MUST BE INSTALLED

If CO detection is required, the new OFC provisions require the detection to be in specified locations, as follows:

Dwelling Units (See OFC § 915.2.1.)

If a dwelling unit is required to have CO detection, the detection has to be installed in the dwelling unit outside of each separate sleeping area in the immediate vicinity of the bedrooms.

If a fuel-burning appliance is located within a bedroom or its attached bathroom, the detection must be installed within the bedroom.

Sleeping Units (See OFC § 915.2.2.)

If a sleeping unit is required to have CO detection the detection must be installed in the sleeping unit.

The only exception to this provision is where the sleeping unit or its attached bathroom does not contain a fuel-burning appliance and is not served by a forced air furnace. If the sleeping unit or its attached bathroom does not contain a fuel-burning appliance and are not served by a forced air furnace the CO detection can be installed outside of each separate sleeping area in the immediate vicinity of the sleeping unit. If the sleeping unit or an attached bathroom does contain a fuel-burning appliance or is served by a forced air furnace, the CO detection will have to be located in the sleeping unit.

Classrooms in Group E (See OFC § 915.2.3.)

If a classroom is required to have CO detection, the detection must be installed in the classroom. Unless the occupant load is 30 or less alarm signals must be automatically transmitted to an on-site location that is staffed by school personnel. If the occupant load is 30 or less, the signal does not have to automatically transmitted. However, if the occupant load is over 30, automatic transmission is required.

V. MAINTENANCE

CO alarms and CO detection systems must be maintained in accordance with NFPA 720 (2015). If an alarm or a detector becomes inoperable or begins producing end-of-life signals, it must be replaced. (See OFC § 915.6.)

This Technical Bulletin is intended only as an informational tool. Affected individuals and code enforcement officials should consult their legal advisor to determine specific requirements, their applicability, and courses of action that should be taken to ensure compliance with all applicable requirements and standards.

Question 1: Am I in a dwelling unit, sleeping unit or classroom in an I-1, I-2, I-4, R occupancy or in a Classroom in an E occupancy?

NO: CO detection requirements are not applicable

YES: Go to Question 2

Question 2: Is one of the following relevant conditions present?

Unit or room contains a fuel-burning appliance/fireplace

Unit or room is served by a fuel-burning forced air furnace

Unit or room is in a building that contains a fuel-burning appliance/fireplace

Unit or room is in a building that contains an attached private garage

NO: CO detection requirements are not applicable

YES: Go to Question 3

Question 3: Is there an applicable exception?

For a unit or room that contains a fuel-burning appliance/fireplace

– there are no exceptions; CO detection is required

For a unit or room that is served by a fuel-burning forced air furnace

– does the 1st area served by each main duct have CO detection and is the detection automatically transmitted to an approved location?

NO: CO is required

YES: No CO is required

For a unit or room that is in a building that contains a fuel-burning appliance/fireplace

– are there any communicating openings between the unit or room and the appliance or fireplace?

NO: No CO is required

YES: CO is required

– is there CO detection in an approved location between the room or unit and the appliance or fireplace, OR is there CO detection on the ceiling of the room where the appliance or fireplace is located?

NO: CO is required

YES: No CO is required

For a unit or room that is in a building that contains an attached private garage

– are there any communicating opening between the appliance/fireplace and the unit or room?

NO: No CO is required

YES: CO is required

– is the unit or room more than 1 story above or below the garage?

NO: CO is required

YES: No CO is required

– is the garage connected to the building through an open-ended corridor?

NO: CO is required

YES: No CO is required

– is there Co detection in an approved location between garage openings and the unit or room?

NO: CO is required

YES: No CO is required

1301:7-7-09 Fire protection systems.

(O) Section 915 Carbon monoxide detection

(1) **915.1 General.** Carbon monoxide detection shall be installed in new buildings in accordance with *paragraphs (O)(1)(a)(915.1.1) to (O)(6)(915.6) of this rule*. Carbon monoxide detection shall be installed in existing buildings in accordance with *paragraph (C)(9)(1103.9) of rule 1301:7-7-11 of the Administrative Code*.

(a) **915.1.1 Where required.** Carbon monoxide detection shall be provided in Group I -1, I-2, I-4 and R occupancies and in classrooms in Group E occupancies in the locations specified in *paragraph (O)(2)(915.2) of this rule* where any of the conditions in *paragraphs (O)(1)(b)(915.1.2) to (O)(1)(f)(915.1.6) of this rule* exist.

(b) **915.1.2 Fuel-burning appliances and fuel-burning fireplaces.** Carbon monoxide detection shall be provided in dwelling units, sleeping units and classrooms that contain a fuel-burning appliance or a fuel-burning fireplace.

(c) **915.1.3 Forced-air furnaces.** Carbon monoxide detection shall be provided in dwelling units, sleeping units and classrooms served by a fuel-burning, forced-air furnace.

Exception: Carbon monoxide detection shall not be required in dwelling units, sleeping units and classrooms where carbon monoxide detection is provided in the first room or area served by each main duct leaving the furnace, and the carbon monoxide alarm signals are automatically transmitted to an approved location.

(d) **915.1.4 Fuel-burning appliances outside of dwelling units, sleeping units and classrooms.** Carbon monoxide detection shall be provided in dwelling units, sleeping units and classrooms located in buildings that contain fuel burning appliance or fuel-burning fireplaces.

Exceptions:

1. Carbon monoxide detection shall not be required in dwelling units, sleeping units and classrooms where there are no communicating openings between the fuel-burning appliance or fuel-burning fireplace and the dwelling unit, sleeping unit or classroom.

2. Carbon monoxide detection shall not be required in dwelling units, sleeping units and classrooms where carbon monoxide detection is provided in one of the following locations:

2.1. In an approved location between the fuel-burning appliance or fuel-burning fireplace and the dwelling unit, sleeping unit or classroom.

2.2. On the ceiling of the room containing the fuel-burning appliance or fuel-burning fireplace.

(e) **915.1.5 Private garages.** Carbon monoxide detection shall be provided in dwelling units, sleeping units and classrooms in buildings with attached private garages.

Exceptions:

1. Carbon monoxide detection shall not be required where there are no communicating openings between the private garage and the dwelling unit, sleeping unit or classroom.
2. Carbon monoxide detection shall not be required in dwelling units, sleeping units and classrooms located more than one story above or below a private garage.
3. Carbon monoxide detection shall not be required where the private garage connects to the building through an open-ended corridor.
4. Where carbon monoxide detection is provided in an approved location between openings to a private garage and dwelling units, sleeping units or classrooms, carbon monoxide detection shall not be required in the dwelling units, sleeping units or classrooms.

(f) **915.1.6 Exempt garages.** For determining compliance with *paragraph (O)(1)(e)(915.1.5) of this rule*, an open parking garage complying with Section 406.5 of the *building code as listed in rule 1301:7-7-80 of the Administrative Code* or an enclosed parking garage complying with Section 406.6 of the *building code as listed in rule 1301:7-7-80 of the Administrative Code* shall not be considered a private garage.

(2) **915.2 Locations.** Where required by *paragraph (O)(1)(a)(915.1.1) of this rule*, carbon monoxide detection shall be installed in the locations specified in *paragraphs (O)(2)(a)(915.2.1) to (O)(2)(c)(915.2.3) of this rule*.

(a) **915.2.1 Dwelling units.** Carbon monoxide detection shall be installed in dwelling units outside of each separate sleeping area in the immediate vicinity of the bedrooms. Where a fuel-burning appliance is located within a bedroom or its attached bathroom, carbon monoxide detection shall be installed within the bedroom.

(b) **915.2.2 Sleeping units.** Carbon monoxide detection shall be installed in sleeping units.

Exception: Carbon monoxide detection shall be allowed to be installed outside of each separate sleeping area in the immediate vicinity of the sleeping unit where the sleeping unit or its attached bathroom does not contain a fuel burning appliance and is not served by a forced air furnace.

(c) **915.2.3 Group E occupancies.** Carbon monoxide detection shall be installed in classrooms in Group E occupancies. Carbon monoxide alarm signals shall be automatically transmitted to an on -site location that is staffed by school personnel.

Exception: Carbon monoxide alarm signals shall not be required to be automatically transmitted to an on -site location that is staffed by school personnel in Group E occupancies with an occupant load of 30 or less.

(3) **915.3 Detection equipment.** Carbon monoxide detection required by *paragraphs (O)(1)(915.1) to (O)(2)(c)(915.2.3) of this rule* shall be provided by carbon monoxide alarms complying with *paragraph (O)(4)(915.4) of this rule* or carbon monoxide detection systems complying with *paragraph (O)(5)(915.5) of this rule*.

(4) **915.4 Carbon monoxide alarms.** Carbon monoxide alarms shall comply with *paragraphs (O)(4)(a)(915.4.1) to (O)(4)(c)(915.4.3) of this rule*.

(a) **915.4.1 Power source.** Carbon monoxide alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than that required for overcurrent protection.

Exception: Where installed in buildings without commercial power, battery-powered carbon monoxide alarms shall be an acceptable alternative.

(b) **915.4.2 Listings.** Carbon monoxide alarms shall be listed in accordance with UL 2034 *as listed in rule 1301:7-7-80 of the Administrative Code.*

(c) **915.4.3 Combination alarms.** Combination carbon monoxide/smoke alarms shall be an acceptable alternative to carbon monoxide alarms. Combination carbon monoxide/smoke alarms shall be listed in accordance with UL 2034 and UL 217 *as listed in rule 1301:7-7-80 of the Administrative Code.*

(5) **915.5 Carbon monoxide detection systems.** Carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide alarms and shall comply with *paragraphs (O)(5)(a)(915.5.1) to (O)(5)(c)(915.5.3) of this rule.*

(a) **915.5.1 General.** Carbon monoxide detection systems shall comply with NFPA 720 *as listed in rule 1301:7-7-80 of the Administrative Code.* Carbon monoxide detectors shall be listed in accordance with UL 2075 *as listed in rule 1301:7-7-80 of the Administrative Code.*

(b) **915.5.2 Locations.** Carbon monoxide detectors shall be installed in the locations specified in *paragraph (O)(2)(915.2) of this rule.* These locations supersede the locations specified in NFPA 720 *as listed in rule 1301:7-7-80 of the Administrative Code.*

(c) **915.5.3 Combination detectors.** Combination carbon monoxide/smoke detectors installed in carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide detectors, provided they are listed in accordance with UL 2075 and UL 268 *as listed in rule 1301:7-7-80 of the Administrative Code.*

(6) **915.6 Maintenance.** Carbon monoxide alarms and carbon monoxide detection systems shall be maintained in accordance with NFPA 720 *as listed in rule 1301:7-7-80 of the Administrative Code.* Carbon monoxide alarms and carbon monoxide detectors that become inoperable or begin producing end -of-life signals shall be replaced.

1301:7-7-11 Construction requirements for existing buildings.

(A) Section 1101 General

(1) **1101.1 Scope.** The provisions of this *rule* shall apply to existing buildings constructed prior to the adoption of this code *in accordance with paragraph (B)(1)(c)(102.1) of rule 1301:7-7-01 of the Administrative Code.* *The provisions of this rule shall not apply to existing buildings unless the conditions at the building constitute a distinct hazard to life or property in the opinion of the fire code official in accordance with paragraph (B)(1)(c)(102.1) of rule 1301:7-7-01 of the Administrative Code.*

Exceptions:

1. *The provisions of paragraph (D)(1104) of this rule shall apply to all existing buildings.*

2. *The provisions of paragraph (C)(9)(1103.9) of this rule shall apply to all existing occupancies identified in paragraph (C)(9)(1103.9) of this rule.*

(C) Section 1103 Fire safety requirements for existing buildings

(9) 1103.9 Carbon monoxide alarms. On or before January 1, 2019, existing Group I-1, I-2, I-4, R and E occupancies shall be equipped with carbon monoxide alarms in accordance with *paragraph (O)(915) of rule 1301:7-7-09 of the Administrative Code*, except that the carbon monoxide alarms shall be allowed to be solely battery operated.