

**NC Department of Insurance
Office of the State Fire Marshal - Engineering Division
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General Rules for GFCI Protection of Receptacles in Non-Dwelling Applications

Code: 2017 Electrical Code

Date: August 12, 2019

Section: 210.8(B)

Question 1:

For new installations, are ground fault circuit interrupters (GFCI) required for protection of receptacles in commercial kitchens?

Answer 1:

Yes.

In kitchens that are in “other than dwellings”, section 210.8(B)(2) requires GFCI protection for personnel for all receptacles that possess either of the following characteristics:

1. Single-Phase, 0-150 volts to ground, and 0-50 amps
2. Three-Phase, 0-150 volts to ground, and 0-100 amps

Note: “GFCI protection for personnel” has specific meaning within the context of the NEC and is distinguishable from “GFCI protection of equipment”. See Article 100 Definitions for Ground-Fault Circuit Interrupter; and Ground-Fault Protection of Equipment.

Question 2:

If the receptacles that possess the aforementioned characteristics in Answer 1 are located in commercial kitchens and are replaced, will GFCI protection for personnel be required for such replaced receptacles when the original Code compliant installation did not possess GFCI protection.

Answer 2:

Yes, unless the exception in section 406.4(D)(3) applies.

Replacement of receptacles must comply with section 406.4(D) of the 2017 NC Electrical Code. Section 406.4(D)(3) requires that replaced receptacles possess GFCI protection where other sections of the electrical code require GFCI protection. Therefore, section 406.4(D) requires the replaced receptacles in the commercial kitchen possess GFCI protection for personnel in accordance with section 210.8(B)(2).

Question 3:

Can a Class C device be used to achieve GFCI protection for receptacles described in section 210.8(B)?

Answer 3:

No.

Section 210.8 requires ground-fault circuit-interrupter protection for personnel. The definition of a ground-fault circuit-interrupter in Article 100 requires characteristics for that of a Class A device. Because a Class C device exceeds the current to ground fault levels of a Class A device, protection with a Class C device cannot be defined as ground-fault circuit-interrupter protection for personnel.

This interpretation only clarifies that where the Code requires GFCI protection for personnel, that a Class A device shall be installed. This interpretation is not suggesting that a Class C device or any similar protective devices cannot be installed where the Code does not require GFCI protection or in addition to a Class A device.

Question 4:

There is a cord-and-plug type machine in the service bay of a commercial garage that requires a three-phase receptacle be supplied by a circuit that has no less than a 60-amp circuit ampacity and protected by a 60-amp three-phase circuit breaker. Section 210.8(B)(8) requires that such receptacle possess GFCI protection for personnel. However, there appears to be no manufacturer fabricating a GFCI 60-amp three-phase receptacle or circuit breaker. Is there any Code compliant method that will allow the receptacle to be installed without GFCI protection?

Answer 4:

Yes.

Whenever the NEC requires a device be utilized that is not yet available at the time the Code is adopted by the State, section 90.4 of the 2017 NEC permits the installation to comply with the most recent previous addition of the NEC where such installation can be deemed Code compliant without use of such device. Upon discovering an installation has no ability to comply with the 2017 NEC due to a product requirement that is unattainable, the installer shall notify the electrical inspector of this circumstance.

At this time, the State Electrical Division deems three-phase GFCI-type receptacles as unavailable. Additionally, the State Electrical Division only recognizes three-phase GFCI-type circuit breakers in the following amperages as available: 15, 20, 30, 40, and 50.

Question 5:

There is a cord-and-plug type cooking appliance in a commercial kitchen that requires a three-phase receptacle be supplied by a circuit that has no less than a 30-amp circuit ampacity and protected by a 30-amp three-phase circuit breaker. Section 210.8(B)(8) generally requires that such receptacle possess GFCI protection for personnel. Square D appears to be the only manufacturer that has a 30-amp three-phase circuit breaker on the market. The panelboard currently serving the kitchen is not manufactured by Square D and will not accept the installation of Square D circuit breakers. Is there any Code compliant method that will allow the receptacle to be installed without GFCI protection?

Answer 5:

No.

The addition of a subpanel manufactured by Square D can be installed by feeding such panel from the non-Square D panelboard currently serving the kitchen. In extreme cases, the current non-Square D panelboard currently serving the kitchen could be replaced with a Square D panelboard. Because the three-phase circuit for the 30-amp receptacle has the ability to be GFCI protected in accordance with the 2017 NEC, the receptacle must possess GFCI protection for personnel in accordance with section 210.8(B)(2).

Question 6:

There are multiple receptacles in a building requiring GFCI protection in accordance with section 210.8(B). These receptacles are supplied by multiple branch circuits from a panelboard. Can a GFCI-type circuit breaker protecting the feeder supplying the panelboard or a GFCI-type main breaker within the panelboard be used in lieu of providing GFCI protection for each individual circuit.

Answer 6:

It depends.

Section 215.9 allows for the feeder's breaker (which includes a main breaker) to be GFCI-type in lieu of GFCI protecting each individual branch circuit only in lieu of the provisions specified in section 210.8 and 590.6(A).

Example 1: A 120-volt, 20-amp outdoor receptacle where only section 210.8(B)(4) requires GFCI protection for personnel. The feeder supplying the panel that supplies the branch circuit for the outdoor receptacle is allowed to have the required GFCI protection for personnel in lieu of the provisions of section 210.8(B)(4).

Example 2: A 120-volt, 20-amp outdoor receptacle is installed ten (10) feet from the inside wall of a swimming pool. Because the provisions of section 680.22(A)(4) and section 210.8(B)(4) require this receptacle to be GFCI protected, section 215.9 does not apply. This receptacle shall possess GFCI protection for personnel by either GFCI protecting the branch circuit, wiring the receptacle at this location off the load side of another GFCI-type receptacle or device, or by installing a GFCI-type receptacle at this location.