Second Revision No. 8245-NFPA 70-2018 [Detail]

210.12(A) Item 5.

(5) If ~~RMC, IMC, EMT,~~ metal raceway, metal wireways, metal auxiliary gutters, or Type MC, or ~~steel-armored~~ Type AC ~~cables~~ cable meeting the applicable requirements of 250.118, with metal ~~wireways~~ boxes , metal ~~auxiliary gutters~~ conduit bodies , and metal o~~utlet and junction boxes~~ enclosures are installed for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, it shall be permitted to install a listed outlet branch-circuit-type AFCI at the first outlet to provide protection for the remaining portion of the branch circuit.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Wed Nov 07 15:36:50 EST 2018

Committee Statement

Committee Statement: Item (5) - This language adds clarity and uses similar terms found elsewhere in the code to describe the various metal wiring methods and pathways required for this particular application of AFCI protection.

Response Message: SR-8245-NFPA 70-2018

Public Comment No. 730-NFPA 70-2018 [Section No. 210.12(A)]

Second Revision No. 8246-NFPA 70-2018 [Detail]

210.52(C)

ADD THE FOLLOWING AFTER FIRST PARAGRAPH

For the purposes of this section, where using multioutlet assemblies, each 300 mm (12 in.) of multioutlet assembly containing two or more receptacles installed in individual or continuous lengths shall be considered to be one receptacle outlet.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Wed Nov 07 15:53:10 EST 2018

Committee Statement

Committee Statement: Multioutlet assemblies are used as a means to meet the countertop receptacle requirements. Text has been included to cover the installation of multioutlet assemblies used to provide receptacles at wall, island and peninsular countertops.

Response Message: SR-8246-NFPA 70-2018

Second Revision No. 8247-NFPA 70-2018 [Detail]

NOTE TO BE ADDED AS INFO NOTE NO. 1 BEFORE EXISTING INFORMATIONAL NOTE (NOW NOTE 2)

Informational Note No. 1 : See 406.5(E) and 406.5(G) for installation of receptacles in countertops and 406.5(F) and 406.5(G) for installation of receptacles in work surfaces. See 380.10 for installation of multioutlet assemblies.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Wed Nov 07 15:59:40 EST 2018

Committee Statement

Committee Statement: Informational Note No. 1 was reinstated from the 2017 edition to address concerns about the proper use and installation of receptacles in countertops and work surfaces. Text has been included in Informational Note No. 1 to cover the installation of multioutlet assemblies used to provide receptacles at wall, island and peninsular countertops.

Response Message: SR-8247-NFPA 70-2018

Second Revision No. 7594-NFPA 70-2018 [Definition: Bathroom.]

Bathroom.

An area including a ~~basin (sink)~~ sink (basin) with one or more of the following: a toilet, a urinal, a tub, a shower, a bidet, or similar plumbing fixtures. (CMP-2)

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Oct 22 16:44:55 EDT 2018

Committee Statement

Committee Statement: Currently the term "sink" is used for Kitchen area and the term "basin" is used for bathroom area. Basin is also used to mean depressions in the earth for transformers (450.270), hazardous Locations (515.3) Marinas (555.1) and manmade bodies of water (682.1 and 682.2). By changing sink to mean sink regardless of location will bring consistency and uniformity to the NEC.

Response Message: SR-7594-NFPA 70-2018

Public Comment No. 811-NFPA 70-2018 [Definition: Bathroom.]

Second Revision No. 7738-NFPA 70-2018 [Definition: Ground-Fault Circuit Interrupter (GFCI).]

Ground-Fault Circuit Interrupter (GFCI).

A device intended for the protection of personnel that functions to de-energize a circuit or portion thereof within an established period of time when a ground-fault current ~~to ground~~ exceeds the values established for a Class A device. (CMP-2)

Informational Note: Class A ground-fault circuit interrupters trip when the ground-fault current ~~to ground~~ is 6 mA or higher and do not trip when the ground-fault current ~~to ground~~ is less than 4 mA. For further information, see UL 943, *Standard for Ground-Fault Circuit Interrupters.*

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Wed Oct 24 14:10:32 EDT 2018

Committee Statement

Committee Statement: "Ground fault" is a better description of the current involved facilitating the operation of a ground fault circuit interrupter.

Response Message: SR-7738-NFPA 70-2018

Public Comment No. 1250-NFPA 70-2018 [Definition: Ground-Fault Circuit Interrupter (GFCI).]

Second Revision No. 7515-NFPA 70-2018 [Section No. 210.2]

~~Definition.~~ Dormitory Unit.

A building or a space in a building in which group sleeping accommodations are provided for more than 16 persons who are not members of the same family in one room, or a series of closely associated rooms, under joint occupancy and single management, with or without meals, but without individual cooking facilities. (CMP 2)

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Oct 22 11:44:15 EDT 2018

Committee Statement

Committee Statement: The term Dormitory Unit is being moved to Article 100 as it is used in more than one location within the NEC and the use of the term is the same throughout.

Response Message: SR-7515-NFPA 70-2018 Response to PC-1378: Adding "(dormitory)" was not accepted as other areas of the NEC modified the use of the word "dormitory" or "dormitories" as part of the first revision to correlate with the new definition of dormitory unit.

Public Comment No. 421-NFPA 70-2018 [Section No. 210.2]

Public Comment No. 1375-NFPA 70-2018 [Section No. 210.2]

Public Comment No. 379-NFPA 70-2018 [Section No. 210.2]

Public Comment No. 528-NFPA 70-2018 [Section No. 210.2]

Public Comment No. 1378-NFPA 70-2018 [New Part after I.]

Second Revision No. 7525-NFPA 70-2018 [Section No. 210.5(C)(1)]

(1) Branch Circuits Supplied from More Than One Nominal Voltage System.

Where the premises wiring system has branch circuits supplied from more than one nominal voltage system, each ungrounded conductor of a branch circuit shall be identified by phase or line and by system voltage class at all termination, connection, and splice points in compliance with 210.5(C)(1)(a) and (b). Different systems within the same premises that have the same system voltage class shall be permitted to use the same identification.

(a) *Means of Identification.* The means of identification shall be permitted to be by separate color coding, marking tape, tagging, or other approved means.

(b) *Posting of Identification Means.* The method utilized for conductors originating within each branch-circuit panelboard or similar branch-circuit distribution equipment shall be documented in a manner that is readily available or shall be permanently posted at each branch-circuit panelboard or similar branch-circuit distribution equipment. The label shall be of sufficient durability to withstand the environment involved and shall not be handwritten.

Exception: In existing installations where a voltage system(s) already exists and a different voltage system is being added, it shall be permissible to mark only the new system voltage. Existing unidentified systems shall not be required to be identified at each termination, connection, and splice point in compliance with 210.5(C)(1)(a) and (b). Labeling shall be required at each voltage system distribution equipment to identify that only one voltage system has been marked for a new system(s). The new system label(s) shall include the words "other unidentified systems exist on the premises."

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Oct 22 12:14:24 EDT 2018

Committee Statement

Committee Statement: The existing language uses the term "system". This is appropriate as multiple voltage systems may exist on a premises. Different systems within the same premises having the same system voltage class do not have to be identified differently.

Response Message: SR-7525-NFPA 70-2018

Public Comment No. 454-NFPA 70-2018 [Section No. 210.5(C)(1)]

Second Revision No. 7530-NFPA 70-2018 [Section No. 210.6(C)]

(C) 277 Volts to Ground.

Circuits exceeding 120 volts, nominal, between conductors ~~and~~ but not exceeding 277 volts, nominal, to ground shall be permitted to supply cord-and-plug-connected or permanently connected utilization equipment, or the following types of listed luminaires :

(1) ~~Listed electric~~ Electric -discharge ~~or listed light-emitting diode-type~~ luminaires with integral ballasts

(2) LED luminaires with LED drivers between the branch circuit and the lampholders

(3) ~~Listed incandescent~~ Incandescent or LED luminaires, equipped with medium-base or smaller screw shell lampholders, where the lampholders are supplied at 120 volts or less from the output of a stepdown autotransformer, LED driver, or other type of power supply that is an integral component of the luminaire ~~and the outer shell terminal is electrically connected to a grounded conductor of the branch circuit~~

Informational Note: See 410.90 for requirements regarding the connection of screw shell lampholders to grounded conductors.

(4) ~~Listed luminaires~~ Luminaires equipped with mogul-base screw shell lampholders

(5) ~~Listed luminaires~~ Luminaires equipped with lampholders, other than the screw shell type, when used within their voltage ratings of their lampholders

(6) ~~Listed luminaires~~ Luminaires without lampholders~~, such as luminaires with nonserviceable LEDs~~

Informational Note: Luminaires with nonserviceable LEDs are examples of luminaires without lampholders.

(7) Auxiliary equipment of electric-discharge or LED-type lamps

Informational Note: See 410.137 for auxiliary equipment limitations.

(7) ~~Cord-and-plug-connected or permanently connected utilization equipment~~

(8) ~~Listed luminaires~~ Luminaires converted with ~~a~~ listed retrofit kits incorporating integral LED light sources or accepting ~~to accept~~ LED lamps that also conforms with 210.6(C)(1), (C)(2), (C)(3), (C)(4), or (C)(5)

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Mon Oct 22 12:34:51 EDT 2018

Committee Statement

Committee Statement: In order to improve the readability and clarity of the requirements in 210.6(C), the following changes are being made:

(1) Old item (1) was split into (1) and (2) in order to clearly delineate between electric-discharge and LED luminaires;

(2) The statement “such as luminaires with nonserviceable LEDs”, which is not a requirement, is reformatted as an informational note;

(3) Item (7) was deleted and the reference to utilization equipment relocated to the main clause, allowing the redundant use of term “listed” as it applies to luminaires to be eliminated from the remaining list items.

(4) Instances of the term “light emitting diode” and the acronym “LED” are updated to standardize on the use of the well-understood acronym.

(5) An informational note is added to refer to Section 410.90 to address requirements related to the

connection of screw shells to the grounded circuit conductor.

Response Message: SR-7530-NFPA 70-2018 Public comments were rejected that propose to eliminate the maximum 120 volt limit on medium base or smaller screw lampholders. If these lampholders were to be connected directly to the 277 volt branch circuit, there would be a significant risk that an end-user may inadvertently install a 120 volt device (incandescent light bulb, CFL or LED lamp, etc.) into such a lampholder. While the expected failure from such an installation of a 120 volt incandescent light bulb may or may not cause the glass envelope to shatter, a 120 volt compact fluorescent lamp (CFL) or LED lamp is likely to fail energetically and unpredictably. The potential fire risk from this type of misuse outweighs the potential benefit of allowing 277 volt devices on these lampholders. It is noted that should this requirement in 410.90 be modified by CMP 18, the requirements for screw shells, as it exists in the 2017 Code, should be duplicated in Section 210.6(C), with appropriate wording to become part of the requirements in 210.6.

Public Comment No. 446-NFPA 70-2018 [Section No. 210.6(C)]

Public Comment No. 463-NFPA 70-2018 [Section No. 210.6(C)]

Public Comment No. 1313-NFPA 70-2018 [Section No. 210.6(C)]

Public Comment No. 2088-NFPA 70-2018 [Section No. 210.6(C)]

Second Revision No. 7697-NFPA 70-2018 [Section No. 210.8(A)]

(A) Dwelling Units.

All 125-volt through 250-volt receptacles installed in the locations specified in 210.8(A)(1) through (A) (11) and supplied by single-phase branch circuits rated 150 volts or less to ground ~~or less~~ shall have ground-fault circuit-interrupter protection for personnel.

(1) Bathrooms

(2) Garages~~,~~ and also accessory buildings that have a floor located at or below grade level not intended as habitable rooms and limited to storage areas, work areas, and areas of similar use

(3) Outdoors

Exception to (3): Receptacles that are not readily accessible and are supplied by a branch circuit dedicated to electric snow-melting, deicing, or pipeline and vessel heating equipment shall be permitted to be installed in accordance with 426.28 or 427.22, as applicable.

(4) Crawl spaces — at or below grade level

(5) ~~Finished and unfinished areas of basements~~ Basements

Exception to (5): A receptacle supplying only a permanently installed fire alarm or burglar alarm system shall not be required to have ground-fault circuit-interrupter protection.

Informational Note: See 760.41(B) and 760.121(B) for power supply requirements for fire alarm systems.

Receptacles installed under the exception to 210.8(A)(5) shall not be considered as meeting the requirements of 210.52(G).

(6) Kitchens — where the receptacles are installed to serve the countertop surfaces

(7) Sinks — where receptacles are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink

(8) Boathouses

(9) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall

(10) Laundry areas

Exception to (1) through (3), (5) through (8), and (10): Listed locking support and mounting receptacles utilized in combination with compatible attachment fittings installed for the purpose of serving a ceiling luminaire or ceiling fan shall not be required to be ground-fault circuit-interrupter protected. If a general-purpose convenience receptacle is integral to the ceiling luminaire or ceiling fan, GFCI protection shall be provided.

(11) Indoor damp and wet locations

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Tue Oct 23 16:34:25 EDT 2018

Committee Statement

Committee Statement: 210.8(A) - The editorial change of "or less" clarifies the intent of this section and makes the voltage to ground references clearer.

Item (5) - The language was revised to simply apply to basements.

Exception to list items: The language is revised in order to specifically address providing GFCI protection for general-purpose convenience receptacles. The language is revised to align with Article 410.

Response Message: SR-7697-NFPA 70-2018 RESPONSE TO PC-1384, PC-1437, PC-247, PC-563, PC-696, PC-901: The potential electrical hazards that reside in basements are not eliminated by establishing a demarcation of finished compared to unfinished. A prevalent moisture hazard exists with a person being in contact with a damp floor, independent of flooring type, and then interacting with the electrical system. RESPONSE TO 401: The proposed additional text to Item 6, Item 7 and Item 9 does not add clarity. The deletion of "single-phase" in the lead paragraph would extend the requirement to "three-phase" receptacles and is new material.

Public Comment No. 696-NFPA 70-2018 [Section No. 210.8(A)]

Public Comment No. 1437-NFPA 70-2018 [Section No. 210.8(A)]

Public Comment No. 1384-NFPA 70-2018 [Section No. 210.8(A)]

Public Comment No. 2020-NFPA 70-2018 [Section No. 210.8(A)]

Public Comment No. 901-NFPA 70-2018 [Section No. 210.8(A)]

Public Comment No. 247-NFPA 70-2018 [Section No. 210.8(A)]

Public Comment No. 401-NFPA 70-2018 [Section No. 210.8(A)]

Public Comment No. 1719-NFPA 70-2018 [Section No. 210.8(A)]

Public Comment No. 563-NFPA 70-2018 [Section No. 210.8(A)]

Second Revision No. 7724-NFPA 70-2018 [Section No. 210.8(B)]

(B) Other Than Dwelling Units.

All 125-volt through 250-volt receptacles supplied by single-phase branch circuits rated 150 volts or less to ground ~~or less~~ , 50 amperes or less, and all receptacles supplied by three-phase branch circuits rated 150 volts or less to ground ~~or less~~ , 100 amperes or less, installed in the locations specified in 210.8(B)(1) through (B)(12) shall have ground-fault circuit-interrupter protection for personnel.

(1) Bathrooms

(2) Kitchens or areas with a sink and permanent provisions for either food preparation or cooking

(3) Rooftops

Exception: Receptacles on rooftops shall not be required to be readily accessible other than from the rooftop.

(4) Outdoors

Exception No. 1 to (3) and (4): Receptacles that are not readily accessible and are supplied by a branch circuit dedicated to electric snow-melting, deicing, or pipeline and vessel heating equipment shall be permitted to be installed in accordance with 426.28 or 427.22, as applicable.

Exception No. 2 to (4): In industrial establishments only, where the conditions of maintenance and supervision ensure that only qualified personnel are involved, an assured equipment grounding conductor program as specified in 590.6(B)(2) shall be permitted for only those receptacle outlets used to supply equipment that would create a greater hazard if power is interrupted or having a design that is not compatible with GFCI protection.

(5) Sinks — where receptacles are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink

Exception No. 1 to (5): In industrial laboratories, receptacles used to supply equipment where removal of power would introduce a greater hazard shall be permitted to be installed without GFCI protection.

Exception No. 2 to (5): ~~For receptacles~~ Receptacles located in patient bed locations of Category 2 (general care) or Category 1 (critical care) spaces of health care facilities ~~other than those covered under 210.8(B) (1), GFCI protection shall not be required~~ shall be permitted to comply with 517.21 .

(6) Indoor damp and wet damp locations

(7) Locker rooms with associated showering facilities

(8) Garages, accessory buildings, service bays, and similar areas other than vehicle exhibition halls and showrooms

(9) Crawl spaces — at or below grade level

(10) Unfinished areas of basements

Exception to (1) through (5), (8), and (10): Listed locking support and mounting receptacles utilized in combination with compatible attachment fittings installed for the purpose of serving a ceiling luminaire or ceiling fan shall not be required to be ground-fault circuit-interrupter protected. If a general-purpose convenience receptacle is integral to the ceiling luminaire or ceiling fan, GFCI protection shall be provided.

(11) Laundry areas

(12) Bathtubs and shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall

Supplemental Information

File Name	Description	Approved
SR_7724_response_for_PC_1331_and_943.docx	this is response to PCs for this SR. It is not part of the substantiation. For ballot	

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Tue Oct 23 19:41:05 EDT 2018

Committee Statement

Committee Statement: 210.8(B) -The specification to “150 volts or less to ground” was revised for clarity in two places.

The voltage specification for single-phase receptacles in 210.8(B) should be consistent with 210.8(A). For that reason, the voltage specification was inserted between “All” and “receptacles”.

Item (6) - Damp locations was added to other than dwelling unit locations for clarity and consistency. The hazard is similar in other occupancy types.

Exception No. 2 to (5) - Referencing 517.21 in the exception will allow code users to find relevant installation information relating to Category 1 and Category 2 spaces in Article 517 and not risk missing something located in other sections of code.

Exception to list items: The language is revised in order to specifically address providing GFCI protection for general-purpose convenience receptacles. The language is revised to align with Article 410.

Response Message: SR-7724-NFPA 70-2018 RESPONSE TO PC-1331 and PC-943:

Public Comment No. 1331-NFPA 70-2018 [Section No. 210.8(B)]

Public Comment No. 854-NFPA 70-2018 [Section No. 210.8(A)]

Public Comment No. 1295-NFPA 70-2018 [Section No. 210.8(B)]

Public Comment No. 1720-NFPA 70-2018 [Section No. 210.8(B)]

Public Comment No. 943-NFPA 70-2018 [Section No. 210.8(B)]

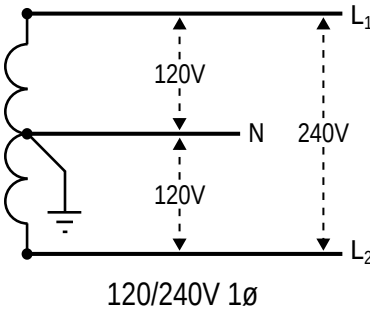
Public Comment No. 2051-NFPA 70-2018 [Section No. 210.8(B)]

To replace the single-phase branch circuit rating of “150 volts or less to ground” with “125 volt through 250 volt”, however, would negate that parallel specification with 210.8(A).

Class A GFCI protection applies to 150 volts or less to ground. Receptacles (single-phase) rated as 250-volts, in accordance with UL’s Listing Guide Information RTRT can be connected to branch and motor circuits providing 240 volts or 208 volts, single-phase.

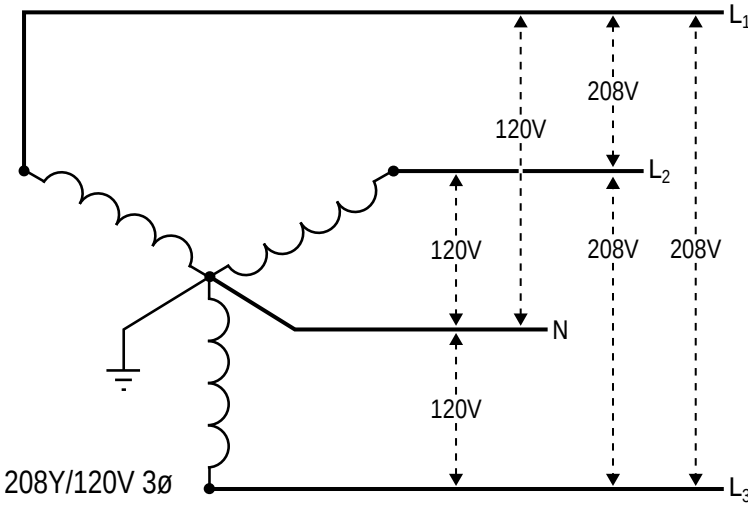
Some services providing 240 volts or 208 volts, single-phase, do so without exceeding GFCI Class A’s limit of 150 volts to ground, and are suitable for Class A GFCI protection at a receptacle rated as 250-volts. These include:

• 240 V from 120/240 V, 1-phase:



120/240V 1ø

• 208 V, 1-phase from 208Y/120 V, 3-phase:

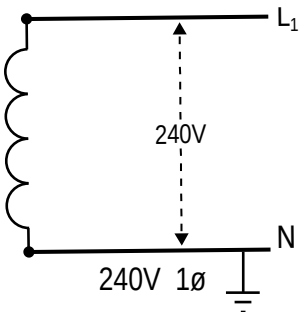


208Y/120V 3ø

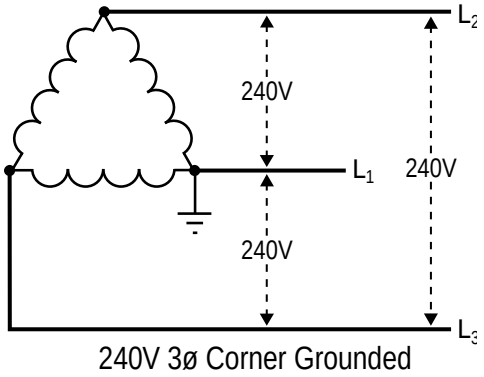
By contrast, some services providing 240 volts or 208 volts, single-phase, do so exceeding GFCI Class A’s limit of 150 volts to ground, and are not suitable for Class A GFCI protection at a receptacle rated as 250-volts. These include:

Important Notice: This document has been provided in Microsoft Word format for the purpose of NEC® Code-Making Panel Task Group work. This document is the property of the National Fire Protection Association (NFPA), and may not be used for any other purpose or distributed to any other persons or parties outside of the NEC® Code-Making Panels.

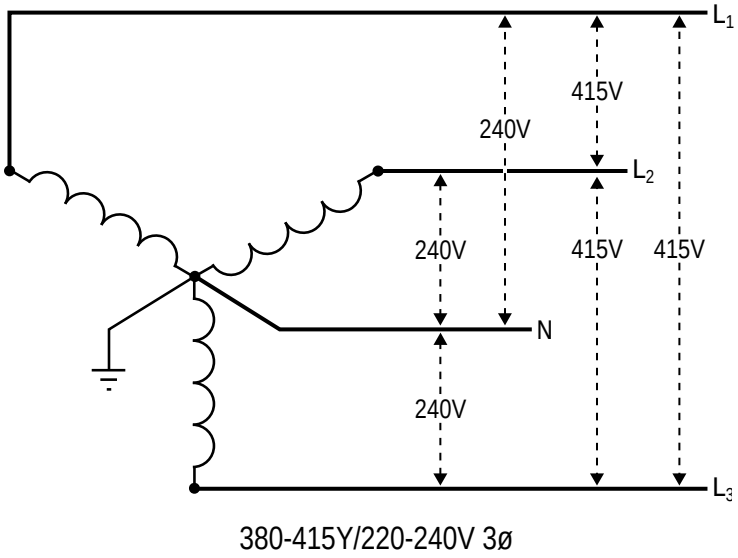
• 240 V from 240 V, 1-phase:



• 240 V, 1-phase from 240 V, 3-phase delta, corner grounded:



• 240 V, 1-phase from 380 – 415Y/220 - 240 V, 3-phase:

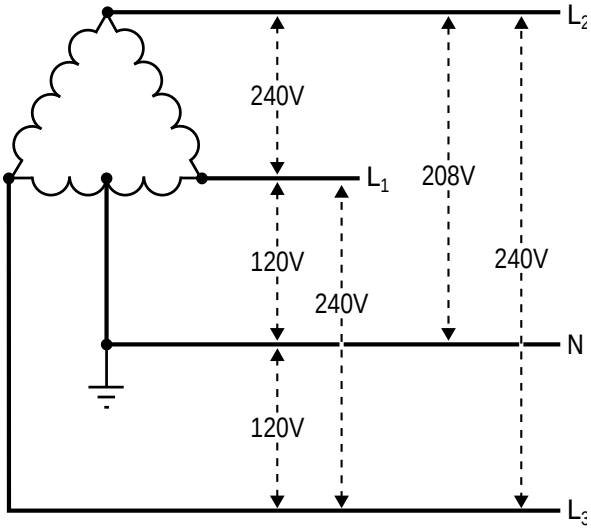


Finally, one service provides 240 volts and 208 volts, single-phase, does so exceeding GFCI Class A's limit of 150 volts to ground on the high leg (required to be colored orange per 110.15), and is not suitable for Class A GFCI protection at a receptacle rated as 250-volts,

Important Notice: This document has been provided in Microsoft Word format for the purpose of NEC® Code-Making Panel Task Group work. This document is the property of the National Fire Protection Association (NFPA), and may not be used for any other purpose or distributed to any other persons or parties outside of the NEC® Code-Making Panels.

but is within exceeding GFCI Class A's limit of 150 volts to ground on the "low" legs, and is suitable for Class A GFCI protection at a receptacle rated as 250-volts:

• Depending on which leg, 240 V, 1-phase from 240 V, 3-phase delta, center grounded:



120/240V 3ø Center Grounded

Important Notice: This document has been provided in Microsoft Word format for the purpose of NEC® Code-Making Panel Task Group work. This document is the property of the National Fire Protection Association (NFPA), and may not be used for any other purpose or distributed to any other persons or parties outside of the NEC® Code-Making Panels.

Second Revision No. 7733-NFPA 70-2018 [Section No. 210.8(C)]

~~(C) Boat Hoists.~~

~~GFCI protection shall be provided for outlets not exceeding 240 volts that supply boat hoists installed in dwelling unit locations.~~

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Wed Oct 24 12:02:44 EDT 2018

Committee Statement

Committee Statement: The section is deleted. GFCI protection for boat hoists is addressed in 555.9.

Response Message: SR-7733-NFPA 70-2018

Public Comment No. 843-NFPA 70-2018 [Section No. 210.8(D)]

Second Revision No. 7587-NFPA 70-2018 [New Section after 210.8(E)]

(E) Equipment Requiring Servicing.

GFCI protection shall be provided for the receptacles required by 210.63 .

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Oct 22 16:15:24 EDT 2018

Committee Statement

Committee Statement: The receptacles required as part of 210.63 are required for the expressed purpose of providing maintenance workers with the necessary access to power for use of portable tools. In addition, the receptacles may be located up to 25 feet away from the equipment, so extension cord use is expected, which can increase the hazard. For these reasons, a new subsection is added to 210.8 to require these receptacles to be provided with ground-fault circuit-interrupter protection for personnel.

Response Message: SR-7587-NFPA 70-2018

Public Comment No. 681-NFPA 70-2018 [Section No. 210.63 [Excluding any Sub-Sections]]

Second Revision No. 7676-NFPA 70-2018 [New Section after 210.8(E)]

(F) Outdoor Outlets.

All outdoor outlets for dwellings, other than those covered in 210.8(A) (3), Exception to (3), that are supplied by single-phase branch circuits rated 150 volts to ground or less, 50 amperes or less, shall have ground-fault circuit-interrupter protection for personnel.

Exception: Ground-fault circuit-interrupter protection shall not be required on lighting outlets other than those covered in 210.8(D) .

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Tue Oct 23 13:25:57 EDT 2018

Committee Statement

Committee Statement: A new section requiring GFCI protection on outdoor outlets supplied by single phase branch circuit rated 150V or less to ground, and 50A or less for dwellings addresses deaths associated with outdoor outlet connected equipment.

Substantiation for GFCI protection of outdoor equipment was included but not for lighting outlets; therefore, the exception was added.

Response Message: SR-7676-NFPA 70-2018

Public Comment No. 521-NFPA 70-2018 [Section No. 210.8]

Second Revision No. 7737-NFPA 70-2018 [Section No. 210.8(E)]

(D) Specific Appliances.

Unless GFCI protection is provided in accordance with 422.5(B)(3) through (B)(5), the outlets supplying the appliances specified in 422.5(A) shall have GFCI protection in accordance with 422.5(B)(1) or (B)(2).

Where the appliance is a vending machine as specified in 422.5(A)(5) and GFCI protection is not provided in accordance with 422.5(B)(3) or (B)(4), branch circuits supplying vending machines shall have GFCI protection in accordance with 422.5(B)(1) or (B)(2).

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Wed Oct 24 13:08:24 EDT 2018

Committee Statement

Committee Statement: The ground-fault hazard occurs when the connection method (supply cord or flexible raceway) is damaged and energizes the metal frame of the vending machine. Therefore, locating the GFCI either in the branch circuit, or within 12 inches of, or within, the attachment plug addresses this hazard.

Response Message: SR-7737-NFPA 70-2018

Public Comment No. 2206-NFPA 70-2018 [Section No. 210.8(E)]

Second Revision No. 7685-NFPA 70-2018 [Section No. 210.8 [Excluding any Sub-Sections]]

Ground-fault circuit-interrupter protection for personnel shall be provided as required in 210.8(A) through (F). The ground-fault circuit interrupter shall be installed in a readily accessible location.

Informational Note No. 1: See 215.9 for ground-fault circuit-interrupter protection for personnel on feeders.

Informational Note No. 2: See 422.5(A) for GFCI requirements for appliances.

Informational Note No. 3: See 555.9 for GFCI requirements for boat hoists.

Informational Note No. 4: Additional GFCI requirements for specific circuits and equipment are contained in Chapters 4 , 5 , and 6 .

For the purposes of this section, when determining the distance from receptacles the distance shall be measured as the shortest path the supply cord of an appliance connected to the receptacle would follow without piercing a floor, wall, ceiling, or fixed barrier, or the shortest path without passing through a window.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Tue Oct 23 13:58:54 EDT 2018

Committee Statement

Committee Statement: The numbering of the subsections is an editorial change to correlate the charging paragraph of 210.8 with the sections that follow.

Editorial grammatical changes have been made in the text.

New note No. 3 identifies the location of requirements for “Boat Hoists,” as this requirement was deleted in 210.8(C), and the requirement resides in Section 555.9. Since this requirement was previously included in Section 210.8, the new informational note assists users of the Code with locating the requirement in Article 555.

New note No. 4 provides explanatory text regarding the location of other GFCI requirements in Chapters 4, 5, and 6. As requirements, such as the ones for “Boat Hoists” are relocated, this informational note is intended to serve as a reminder to the user of the Code that GFCI requirements appear in locations other than Section 210.8.

The new informational notes are first steps in developing a table for references to GFCI requirements in other chapters of the Code.

Response Message: SR-7685-NFPA 70-2018 RESPONSE TO PC-387: GFCI protection is required for receptacles that are six feet or less from the potential hazard in 210.8 (A) and (B), regardless of any intervening doors of any kind, or doorways of any kind.

Public Comment No. 845-NFPA 70-2018 [Section No. 210.8]

Public Comment No. 747-NFPA 70-2018 [Section No. 210.8]

Public Comment No. 387-NFPA 70-2018 [Section No. 210.8 [Excluding any Sub-Sections]]

Second Revision No. 7740-NFPA 70-2018 [Section No. 210.12(A)]

Detail SR-8245

(A) Dwelling Units.

All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets or devices installed in dwelling ~~unit kitchens, family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, laundry areas, or similar rooms or areas~~ units shall be protected by any of the means described in 210.12(A)(1) through (A) (6):

(1) A listed combination-type arc-fault circuit interrupter~~,~~ installed to provide protection of the entire branch circuit

(2) A listed branch/feeder-type AFCI installed at the origin of the branch-circuit in combination with a listed outlet branch-circuit-type arc-fault circuit interrupter installed at the first outlet box on the branch circuit. The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.

(3) A listed supplemental arc protection circuit breaker installed at the origin of the branch circuit in combination with a listed outlet branch-circuit-type arc-fault circuit interrupter installed at the first outlet box on the branch circuit where all of the following conditions are met:

a. The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.

b. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.

c. The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.

(4) A listed outlet branch-circuit-type arc-fault circuit interrupter installed at the first outlet on the branch circuit in combination with a listed branch-circuit overcurrent protective device where all of the following conditions are met:

a. The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.

b. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.

c. The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.

d. The combination of the branch-circuit overcurrent device and outlet branch-circuit AFCI shall be identified as meeting the requirements for a system combination-type AFCI and shall be listed as such.

(5) If ~~RMC, IMC, EMT,~~metal raceway, metal wireways, metal auxiliary gutters, or Type MC, or ~~steel-armored~~ Type AC ~~cables~~cable meeting the applicable requirements of 250.118, with metal ~~wireways~~boxes, metal ~~auxiliary gutters~~conduit bodies, and metal ~~outlet and junction boxes~~enclosures are installed for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, it shall be permitted to install a listed outlet branch-circuit-type AFCI at the first outlet to provide protection for the remaining portion of the branch circuit.

(6) Where a listed metal or nonmetallic conduit or tubing or Type MC cable is encased in not less than 50 mm (2 in.) of concrete for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, it shall be permitted to install a listed outlet branch-circuit-type AFCI at the first outlet to provide protection for the remaining portion of the branch circuit.

Exception: AFCI protection shall not be required for an individual branch circuit supplying a fire alarm system installed in accordance with 760.41(B) or 760.121(B). The branch circuit shall be installed in a metal raceway, metal auxiliary gutter, steel-armored cable, Type MC or Type AC, meeting the applicable requirements of 250.118, with metal boxes, conduit bodies, and enclosures.

Informational Note No. 1: For information on combination-type and branch/feeder-type arc-fault circuit interrupters, see UL 1699-2011, *Standard for Arc-Fault Circuit Interrupters*. For information on outlet branch-circuit-type arc-fault circuit interrupters, see UL Subject 1699A, *Outline of Investigation for Outlet Branch Circuit Arc-Fault Circuit-Interrupters*.

Informational Note No. 2: See 29.6.3(5) of *NFPA 72-~~2013~~ 2019* , *National Fire Alarm and Signaling Code*, for information related to secondary power-supply requirements for smoke alarms installed in dwelling units.

Informational Note No. 3: See 760.41(B) and 760.121(B) for power-supply requirements for fire alarm systems.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Wed Oct 24 14:26:12 EDT 2018

Committee Statement

Committee Statement: CMP-2 ends the incremental approach for providing AFCI protection for all 15 and 20 ampere, 120-volt, branch circuits in dwelling units by removing the list of specific areas, thereby expanding the requirements to the entire dwelling unit.

Response Message: SR-7740-NFPA 70-2018

Public Comment No. 377-NFPA 70-2018 [Section No. 210.12(A)]

Public Comment No. 1244-NFPA 70-2018 [Section No. 210.12(A)]

Public Comment No. 1381-NFPA 70-2018 [Section No. 210.12(A)]

Second Revision No. 7657-NFPA 70-2018 [New Section after 210.13]

210.15 Reconditioned Equipment.

The following shall not be reconditioned:

(1) Equipment that provides ground-fault circuit-interrupter protection for personnel

(2) Equipment that provides arc-fault circuit-interrupter protection

(3) Equipment that provides ground-fault protection of equipment

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Tue Oct 23 11:54:15 EDT 2018

Committee Statement

Committee Statement: This new section prohibits reconditioning of products that are not allowed to be reconditioned due to the inherent safety characteristics and requirements for those products.

Response Message: SR-7657-NFPA 70-2018

Second Revision No. 7752-NFPA 70-2018 [Section No. 210.19(A)(1)]

(1) General.

Branch-circuit conductors shall have an ampacity not less than the larger of 210.19(A)(1)(a) or (A)(1)(b) and ~~shall meet the equipment termination provisions of~~ comply with 110.14(C) for equipment terminations .

(a) Where a branch circuit supplies continuous loads or any combination of continuous and noncontinuous loads, the minimum branch-circuit conductor size shall have an ampacity not less than the noncontinuous load plus 125 percent of the continuous load in accordance with 310.15(B).

(b) The minimum branch-circuit conductor size shall have an ampacity not less than the maximum load to be served after the application of any adjustment or correction factors in accordance with 310.15(B).

Exception No. 1 to (1)(a): If the assembly, including the overcurrent devices protecting the branch circuit(s), is listed for operation at 100 percent of its rating, the ampacity of the branch-circuit conductors shall be permitted to be not less than the sum of the continuous load plus the noncontinuous load in accordance with 110.14(C).

Exception No. 2 to (1)(a) and (1)(b): Where a portion of a branch circuit is connected at both its supply and load ends to separately installed pressure connections as covered in 110.14(C)(2), it shall be permitted to have an allowable ampacity, in accordance with 310.15(B), not less than the sum of the continuous load plus the noncontinuous load. No portion of a branch circuit installed under this exception shall extend into an enclosure containing either the branch-circuit supply or the branch-circuit load terminations.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Wed Oct 24 17:55:01 EDT 2018

Committee Statement

Committee Statement: The text in 210.19(A)(1) is revised to read "…and shall comply with 110.14(C) for equipment terminations," to comply with the style manual and remove the phrase "provisions of."

Text is added to clarify the items to which the exceptions apply. The text "to (1)(a)" is added after "Exception No. 1 and the text "to (1)(a) and (b)" is added after "Exception No. 2."

Response Message: SR-7752-NFPA 70-2018

Public Comment No. 847-NFPA 70-2018 [Section No. 210.19(A)(1)]

Second Revision No. 7644-NFPA 70-2018 [Section No. 210.52(C)]

Detail SR-8246

(C) Countertops and Work Surfaces.

In kitchens, pantries, breakfast rooms, dining rooms, and similar areas of dwelling units, receptacle outlets for countertop and work surfaces that are 300 mm (12 in.) or wider shall be installed in accordance with 210.52(C)(1)~~and~~ through (C)~~(2)~~ (3) and shall not be considered as the receptacle outlets required by 210.52(A).

For the purposes of this section, where using multioutlet assemblies, each 300 mm (12 in.) of multioutlet assembly containing two or more receptacles installed in individual or continuous lengths shall be considered to be one receptacle outlet.

(1) ~~Countertop and Work Surface~~ Wall Spaces .

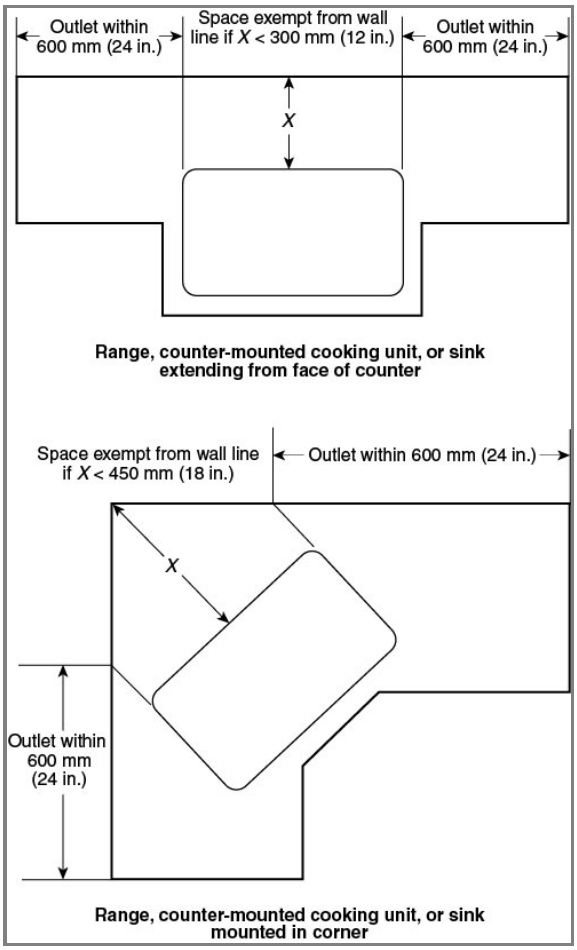
~~A receptacle outlet shall be installed at each countertop and work surface that is 300 mm (12 in.) or wider.~~ Receptacle outlets shall be installed ~~following either~~ 210.52(C)(1) ~~(a) or (C)(1)(b). No~~ so that no point along the wall line is more than 600 mm (24 in.) measured horizontally from a receptacle outlet in that space

(0) ~~No point along the wall line is more than 600 mm (24 in.) measured horizontally from a receptacle outlet in that space~~

(0) ~~No point on the countertop or work surface is more than 900 mm (36 in.) measured horizontally from a receptacle outlet in that space.~~

Exception: Receptacle outlets shall not be required directly behind a range, counter-mounted cooking unit, or sink in the installation described in Figure 210.52(C)(1).

Figure 210.52(C)(1) Determination of Area Behind a Range, Counter-Mounted Cooking Unit, or Sink.



(2) Island and Peninsular Countertops and Work Surfaces.

Receptacle outlets shall be installed in accordance with 210.52(C)(2)(a) and (C)(2)(b).

(a) At least one receptacle outlet shall be provided for the first 0.84 m^2 (9 ft^2), or fraction thereof, of the countertop or work surface. A receptacle outlet shall be provided for every additional 1.7 m^2 (18 ft^2), or fraction thereof, of the countertop or work surface.

(b) At least one receptacle outlet shall be located within 600 mm (2 ft) of the outer end of a peninsular countertop or work surface. Additional required receptacle outlets shall be permitted to be located as determined by the installer, designer, or building owner. The location of the receptacle outlets shall be in accordance with 210.52(C)(3) .

(3) Receptacle Outlet Location.

Receptacle outlets shall be located in one or more of the following:

(1) On or above countertop or work surfaces: On or above, but not more than 500 mm (20 in.) above, the countertop or work surface.

(2) In countertop or work surfaces: Receptacle outlet assemblies listed for use in countertops or work surfaces shall be permitted to be installed in countertops or work surfaces.

(3) Below countertop or works surfaces: Not more than 300 mm (12 in.) below the countertop or work surface. Receptacles installed below a countertop or work surface shall not be located where the countertop or work surface extends more than 150 mm (6 in.) beyond its support base.

Receptacle outlets rendered not readily accessible by appliances fastened in place, appliance garages, sinks, or rangetops as covered in 210.52(C)(1), Exception, or appliances occupying assigned spaces shall not be considered as these required outlets.

Informational Note No. 1: See 406.5(E) and 406.5(G) for installation of receptacles in countertops and 406.5(F) and 406.5(G) for installation of receptacles in work surfaces. See 380.10 for installation of multioutlet assemblies.

Informational Note No. 2: See Annex J and ANSI/ICC A117.1-2009, *Standard on Accessible and Usable Buildings and Facilities*.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Oct 22 19:32:17 EDT 2018

Committee Statement

Committee Statement: The First Draft version of 210.52(C) was revised as follows:

1. Created two separate sections for wall space, and island and peninsular countertops and work surfaces.

2. In the section for wall space, the option was removed to use the 900 mm (36 in.) measurement in lieu of the 600 mm (24 in.) measurement because power cords of small appliances are often limited to 2 feet.

3. In the section for island and peninsular countertop and work surfaces, the horizontal measurement was changed to a square foot calculation to determine the number of receptacles required.

In addition, guidance was provided as part of 210.52(C)(2)(a) as to where these receptacles shall be placed providing the installer, designer or building owner some flexibility with this regard. For peninsulas, it is important to ensure at least one receptacle within 2 ft. of the outer end.

The new square foot calculation is to allow for flexibility for the installer, designer or building owner. It recognizes a receptacle outlet is required for the first 9 sq. ft. Additional receptacle outlets are required for larger peninsulas for each additional 18 sq. ft.

For example, a peninsula countertop measuring 12 ft by 4 ft.(48 sq. ft.) would require the following:

a. One receptacle outlet is required for the first 9 sq. ft.

b. An additional receptacle outlet is required for each additional 18 sq. ft. or fraction thereof.

48 sq. ft. – 9 sq. ft. = 39 sq. ft.

39 sq. ft. / 18 sq. ft. = 2.17

3 additional receptacle outlets are required.

These additional required receptacle outlets are permitted to be placed by the installer, designer or

building owner. For the peninsula counter top at least one of the four receptacle outlets in this example must be installed within 2 ft. of the outer end.

This method of calculating the number of receptacle outlets was used to address concerns related to an acceptable number of receptacle outlets for larger peninsulas and islands.

Response Message: SR-7644-NFPA 70-2018 RESPONSE TO PC 419: The proposed text for the rewording of the exception does not add clarity or usability. Adding “readily accessible” as proposed changes the intended requirement so the original language was retained. RESPONSE TO PC 1893 and 1418: The wording “without permanent seating” was not included as there may be different interpretations of what “permanent seating” is. The requirement for the receptacle outlet where the seating arrangement was over 1.8 m (6 ft) was not included as the same complications exist with countertops or work surfaces installed for seating purposes regardless of the length. Also, the presence of chairs around a fixed countertop or work surface does not preclude the use of power at those areas for kitchen or other appliances. Unlike a table that can be moved closer to a receptacle outlet, fixed countertops and work surfaces do not provide that flexibility, thus the use of extension cords becomes the only option to provide power at those areas. The 18 sq. ft. calculation in addition to the flexibility of locating the receptacle outlets address the concerns about seating. RESPONSE TO PC 494: The wording permitting the receptacle outlet installed for a countertop wall space to apply for the peninsular countertop was not included as the changes are intended to require a receptacle outlet to be installed in accordance with 210.52(C)(3) at the outer edge of the peninsular countertops. RESPONSE TO PC 680: The 600 mm (24 in.) was retained as it is the well understood long standing requirement.

Public Comment No. 909-NFPA 70-2018 [Section No. 210.52(C)(1)]

Public Comment No. 34-NFPA 70-2018 [Section No. 210.52(C)(2)]

Public Comment No. 32-NFPA 70-2018 [Section No. 210.52(C)(1)]

Public Comment No. 419-NFPA 70-2018 [Section No. 210.52(C)]

Public Comment No. 494-NFPA 70-2018 [Section No. 210.52(C)(1)]

Public Comment No. 31-NFPA 70-2018 [Section No. 210.52(C) [Excluding any Sub-Sections]]

Public Comment No. 680-NFPA 70-2018 [Section No. 210.52(C)(1)]

Public Comment No. 537-NFPA 70-2018 [Section No. 210.52(C)(1)]

Public Comment No. 1893-NFPA 70-2018 [Section No. 210.52(C)(1)]

Public Comment No. 1433-NFPA 70-2018 [Section No. 210.52(C)(2)]

Public Comment No. 1418-NFPA 70-2018 [Section No. 210.52(C)]

Second Revision No. 7601-NFPA 70-2018 [Section No. 210.52 [Excluding any Sub-Sections]]

This section provides requirements for 125-volt, 15- and 20-ampere receptacle outlets. The receptacles required by this section shall be in addition to any receptacle that is as follows :

(1) Part of a luminaire or appliance, or

(2) Controlled by a listed wall ~~switch~~ -mounted control device in accordance with 210.70(A)(1), Exception No. 1, or

(3) Located within cabinets or cupboards, or

(4) Located more than 1.7 m (5½ ft) above the floor

Permanently installed electric baseboard heaters equipped with factory-installed receptacle outlets or outlets provided as a separate assembly by the manufacturer shall be permitted as the required outlet or outlets for the wall space utilized by such permanently installed heaters. Such receptacle outlets shall not be connected to the heater circuits.

Informational Note: Listed baseboard heaters include instructions that may not permit their installation below receptacle outlets.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Oct 22 17:02:09 EDT 2018

Committee Statement

Committee Statement: "Wall switch" was changed to "listed wall-mounted control device" to be consistent with changes made in the First Revision of 210.70(A)(1).

Response Message: SR-7601-NFPA 70-2018

Second Revision No. 7566-NFPA 70-2018 [Section No. 210.63]

210.63 ~~Areas Where~~ Equipment ~~Requires~~ Requiring Servicing.

A 125-volt, single-phase, 15- or 20-ampere-rated receptacle outlet shall be installed at an accessible location within 7.5 m (25 ft) of ~~locations~~ the equipment as specified in 210.63(A) and (B).

(A) Heating, Air-Conditioning, and Refrigeration Equipment ~~Outlet~~ .

The required receptacle outlet shall be located on the same level as the heating, air-conditioning, and refrigeration equipment. The receptacle outlet shall not be connected to the load side of the equipment's branch-circuit disconnecting means.

Exception: A receptacle outlet shall not be required at one- and two-family dwellings for the service of evaporative coolers.

(B) Other Electrical Equipment ~~Areas~~ .

In other than one- and two-family dwellings, a receptacle outlet shall be located as specified in ~~210.64(B)(1)~~ 210.63(B)(1) and (B)(2).

(1) Indoor Service Equipment.

The required receptacle outlet shall be located within the same room or area as the service equipment.

(2) ~~Dedicated~~ Indoor Equipment Requiring Dedicated Equipment Spaces ~~Without Service Equipment~~ .

~~The~~ Where equipment, other than service equipment, requires dedicated equipment space as specified in 110.26(E) , the required receptacle outlet shall be located within the same room or area as the electrical equipment and shall not be connected to the load side of the ~~equipment~~ equipment's branch-circuit disconnecting means.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Oct 22 14:16:59 EDT 2018

Committee Statement

Committee Statement: The following revisions are made:

(1) The text in the titles are revised for consistency and clarifies that the requirement is based on the type of equipment and not the space where the equipment is located.

(2) A correction is made to the reference 210.63(B)(1) and (B)(2).

(3) A reference is added to 110.26(E) so that it is clear what type of dedicated space is being referenced.

(4) Text was added to clarify that the service receptacle must be energized whether the equipment is energized or de-energized.

Response Message: SR-7566-NFPA 70-2018

Public Comment No. 1441-NFPA 70-2018 [Section No. 210.63(B) [Excluding any Sub-Sections]]

Public Comment No. 614-NFPA 70-2018 [Section No. 210.63(B) [Excluding any Sub-Sections]]

Public Comment No. 2156-NFPA 70-2018 [Section No. 210.63]

Public Comment No. 1505-NFPA 70-2018 [Section No. 210.63]

Public Comment No. 793-NFPA 70-2018 [Section No. 210.63(B)(2)]

Second Revision No. 7754-NFPA 70-2018 [Section No. 220.14(J)]

(J) Dwelling ~~Occupancies~~ Units .

In one-family, two-family, and multifamily dwellings, the minimum unit load shall be not less than 33 ~~VA~~ volt-amperes /m^2 (3 ~~VA~~ volt-amperes /ft^2). The lighting and receptacle outlets specified in 220.14(J)(1), (J)(2), and (J)(3) are included in the minimum unit load. No additional load calculations shall be required for such outlets. The minimum lighting load shall be determined using the minimum unit load and the floor area as determined in 220.11 for dwelling occupancies. Motors rated less than ⅛~~HP~~ hp and connected to a lighting circuit shall be considered part of the minimum lighting load.

(1) All general-use receptacle outlets of 20-ampere rating or less, including receptacles connected to the circuits in 210.11(C)(3) and 210.11(C)(4)

(2) The receptacle outlets specified in 210.52(E) and (G)

(3) The lighting outlets specified in ~~210.70(A) and (B)~~ 210.70

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Wed Oct 24 19:07:34 EDT 2018

Committee Statement

Committee Statement: The title "Dwelling Occupancies" has been revised to “Dwelling Units” to correlate with the language in Article 210.

The text “(A) and (B)” is deleted from List item 3.

Response Message: SR-7754-NFPA 70-2018

Public Comment No. 1235-NFPA 70-2018 [Section No. 220.14(J)]

Second Revision No. 7758-NFPA 70-2018 [Section No. 220.14(M)]

(M) Hotel and Motel Occupancies.

In guest rooms or guest suites of hotels and motels, the lighting and receptacle outlets specified in 220.14(M)(1), (M)(2), and (M)(3) are included in the minimum unit load in Table 220.12. No additional load calculations shall be required for such outlets. The minimum lighting load shall be determined using the minimum unit load and the floor area as determined in 220.11 for hotel and motel occupancies.

(1) All general-use receptacle outlets of 20-ampere rating or less, including receptacles connected to the circuits in 210.11(C)(3) and 210.11(C)(4)

(2) The receptacle outlets specified in 210.52(E)(3)

(3) The lighting outlets specified in ~~210.70(A) and (B)~~ 210.70

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Oct 25 11:25:24 EDT 2018

Committee Statement

Committee Statement: The text “(A) and (B)” is deleted from List item 3 in 220.14(M). This aligns the language revision with 220.14(J).

Response Message: SR-7758-NFPA 70-2018

Second Revision No. 7759-NFPA 70-2018 [Section No. 220.42]

220.42 General Lighting.

The demand factors specified in Table 220.42 shall apply to that portion of the total branch-circuit load calculated for general illumination. They shall not be applied in determining the number of branch circuits for general illumination.

Table 220.42 Lighting Load Demand Factors

Type of Occupancy	Portion of Lighting Load to Which Demand Factor Applies (Volt-Amperes)	Demand Factor (%)
Dwelling units	First 3000 at	100
	From 3001 to 120,000 at	35
	Remainder over 120,000 at	25
Hotels and motels, including apartment houses without provision for cooking by tenants*	First 20,000 or less at	~~50~~ 60
	From 20,001 to 100,000 at	~~40~~ 50
	Remainder over 100,000 at	~~30~~ 35
Warehouses (storage)	First 12,500 or less at	100
	Remainder over 12,500 at	50
All others	Total volt-amperes	100

*The demand factors of this table shall not apply to the calculated load of feeders or services supplying areas in ~~hospitals,~~ hotels~~,~~ and motels where the entire lighting is likely to be used at one time, as in ~~operating rooms,~~ ballrooms~~,~~ or dining rooms.

Supplemental Information

File Name	Description	Approved
SR_7759_220.42.docx	SR 7759 revised table 220.42--for staff use	

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Oct 25 11:34:33 EDT 2018

Committee Statement

Committee Statement: Table 220.42 has been updated to correlate with the revisions to Table 220.12 in the first draft stage. The unit lighting load values for hotels and motels were changed from 2.0 VA/sf to 1.7 VA/sf. The demand adjustments for hotels and motels are being adjusted to account for the unit lighting load reduction.

The notes to Table 220.42 has been editorially revised and references to hospitals and operating rooms have been deleted since the lighting demand factors for hospitals have been removed.

Response Message: SR-7759-NFPA 70-2018

Second Revision No. 7755-NFPA 70-2018 [Section No. 220.53]

220.53 Appliance Load — Dwelling Unit(s).

It shall be permissible to apply a demand factor of 75 percent to the nameplate rating load of four or more appliances rated ¼ hp or greater, or 500 watts or greater, that are fastened in place, ~~other than electric ranges, ovens and cooktop cooking appliances, clothes dryers, space-heating equipment, or air-conditioning equipment,~~ and that are served by the same feeder or service in a one-family, two-family, or multifamily dwelling. This demand factor shall not apply to:

(1) Household electric cooking equipment that is fastened in place

(2) Clothes dryers

(3) Space heating equipment

(4) Air-conditioning equipment

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Oct 25 11:18:45 EDT 2018

Committee Statement

Committee Statement: The paragraph is revised for clarity to place the specific appliances in list format.

Response Message: SR-7755-NFPA 70-2018

Public Comment No. 1011-NFPA 70-2018 [Section No. 220.53]

Second Revision No. 7756-NFPA 70-2018 [Section No. 220.87]

220.87 Determining Existing Loads.

The calculation of a feeder or service load for existing installations shall be permitted to use actual maximum demand to determine the existing load under all of the following conditions:

(1) The maximum demand data is available for a 1-year period.

Exception: If the maximum demand data for a 1-year period is not available, the calculated load shall be permitted to be based on the maximum demand (the highest average kilowatts reached and maintained for a 15-minute interval) continuously recorded over a minimum 30-day period using a recording ammeter or power meter connected to the highest loaded phase of the feeder or service, based on the initial loading at the start of the recording. The recording shall reflect the maximum demand of the feeder or service by being taken when the building or space is occupied and shall include by measurement or calculation the larger of the heating or cooling equipment load, and other loads that may be periodic in nature due to seasonal or similar conditions.

(2) The maximum demand at 125 percent plus the new load does not exceed the ampacity of the feeder or rating of the service.

(3) The feeder has overcurrent protection in accordance with 240.4, and the service has overload protection in accordance with 230.90.

Exception: If the feeder or service has any renewable energy system (i.e., solar photovoltaic systems or wind electric systems) or employs any form of peak load shaving, this calculation method shall not be ~~used~~ permitted .

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Oct 25 11:21:16 EDT 2018

Committee Statement

Committee Statement: The language is revised in the Exception to replace “shall not be used” with “shall not be permitted.”

Response Message: SR-7756-NFPA 70-2018

Public Comment No. 855-NFPA 70-2018 [Section No. 220.87]

Second Revision No. 7764-NFPA 70-2018 [Definition: Example D5(b) Optional Calculation for Multifam...]

Example D5(b) Optional Calculation for Multifamily Dwelling Served at 208Y/120 Volts, Three Phase

All conditions and calculations are the same as for Optional Calculation for the Multifamily Dwelling [Example D4(b)] served at 120/240 V, single phase except as follows:

Service to each dwelling unit would be two phase legs and neutral.

Minimum Number of Branch Circuits Required for Each Dwelling Unit

(see 210.11)

Range Circuit *(see Table 220.55, Column B):* 8000 VA at 80%÷ 208 V = 31 A or a circuit of two 8 AWG conductors and one 10 AWG conductor in accordance with 210.19(A)(3)

Space Heating: 6000 VA ÷ 208 V = 29 A

Two 20-ampere, 2-pole circuits required, 12 AWG conductors

Minimum Size Feeder Required for Each Dwelling Unit

120/208-V, 3-wire circuit

Net calculated load of 18,782 VA ÷ 208 V = 90 A

Net calculated load (lighting line to neutral):

3882 VA ÷ 2 legs ÷ 120 V per leg = ~~16 amperes~~ 16.2 A

Line to line = 14,900 VA ÷ 208 V = ~~72~~ 71.6 A

Total load = 16.2 A + 71.6 A = 88 A

Minimum Size Feeder Required for Service Equipment to Meter Bank (~~For~~ for 20 Dwelling Units)

Net Calculated Load

167,352 VA ÷ (208 V)(1.732) = 465 A

~~***Feeder Neutral Load***~~

~~65,080 VA ÷ (208 V)(1.732) = 181 A~~

~~***Minimum Size Main Feeder Required (Less House Load) (For 40 Dwelling Units)***~~

~~***Net Calculated Load***~~

~~246,624 VA ÷ (208 V)(1.732) = 685 A~~

~~***Main Feeder Neutral Load***~~

~~107,650 VA ÷ (208 V)(1.732) = 299 A~~

~~***Further Demand Factor***~~

~~*[see 220.61(B)]*~~

~~200 A at 100%~~	~~200.0 A~~
~~299 A - 200 A = 99 A at 70%~~	~~69 A~~
~~Net Calculated Load (neutral)~~	~~269 A~~

Feeder Neutral

Load for Feeder from Service Equipment to Meter Bank (for 20 Dwelling Units)

Lighting and Small-Appliance Load

20 units × 5520 VA = 110,400 VA first 3000 VA at 100% = 3000 VA

110,400 VA − 3000 VA = 107,400 VA at 35% = 37,590 VA

Net Calculated Load: 40,590 VA

Minimum Size Main Feeder (Less House Load) (for 20 Dwelling Units – 20 Ranges) for 208Y/120-V, 3-Phase, 4-Wire System

Ranges:

Maximum number between any two phase legs = 7

2 × 7 = 14

Table 220.55 demand = 29,000 VA

Per phase demand = 29,000 VA ÷ 2 = 14,500 VA

Equivalent 3-phase load = 43,500 VA

Net Calculated Neutral Load (total): 40,590 VA + 43,500 VA = 84,090 VA

84,090 VA ÷ (208 V)(1.732) = 234 A

Minimum Size Service Required (Less House Load) (for 40 Dwelling Units) (Assume Balanced Load)

Net Calculated Load:

246,624 VA ÷ (208 V)(1.732) = 685 A

Feeder Neutral Load for Feeder from Service Equipment to Meter Bank (for 40 Dwelling Units)

Lighting and Small-Appliance Load

40 units × 5520 VA = 220,800 VA

First 3000 VA at 100% = 3000 VA

Next 120,000 VA − 3000 VA = 117,000 VA

117,000 VA at 35% = 40,950 VA

Remainder 220,800 VA − 120,000 VA = 100,800 VA at 25% = 25,200 VA

Net Calculated Load: 69,150 VA

Minimum Size Main Feeder (Less House Load) (for 40 Dwelling Units — 40 with Ranges) for 208Y/120-V, 3-Phase, 4-Wire System

Ranges:

Maximum number between any two phase legs = 14

2 × 14 = 28

Table 220.55 demand = 15,000 VA + (1000 VA × 28) = 43,000 VA per phase

Demand = 43,000 VA ÷ 2 = 21,500 VA

Equivalent 3-phase load = 21,500 VA × 3 = 64,500 VA

Neutral Load = 64,500 VA at 70% [See Table 220.55 and 220.61(B)] Neutral Load = 45,150 VA

Net Calculated Neutral Load (total): 69,150 VA + 45,150 VA = 114,300 VA

114,300 VA ÷ (208 V)(1.732) = 317 A

Further Demand Factor

[see 220.61(B)]

200 A at 100%		200 A
317 A − 200 A = 117 A at 70%		82 A
	Net Calculated Load (neutral)	282 A

Supplemental Information

File Name	Description	Approved
SR_7564_Example_D5_b_.docx	SR 7564 remainder of D5(b) example--for staff use	

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Oct 25 11:56:34 EDT 2018

Committee Statement

Committee Statement: Example D5(b) has been revised to accurately reflect the neutral load calculation for a three phase system.

Response Message: SR-7764-NFPA 70-2018

Public Comment No. 415-NFPA 70-2018 [Definition: Example D5(b) Optional Calculation for Multifam...]

Second Revision No. 7596-NFPA 70-2018 [Definition: Feeder Neutral Conductor]

Feeder Neutral Conductor

(see 220.61)

Because 210.11(B) does not apply to these buildings, the load cannot be assumed to be evenly distributed across phases. Therefore the maximum imbalance must be assumed to be the full lighting load in this case, or 11,600 VA. (11,600 VA ~~/~~ ÷ 277 V = 42 ~~amperes~~ A .) The ability of the neutral-to-return fault current *[see 250.32(B) Exception No. 2]* is not a factor in this calculation.

Because the neutral runs between the main switchboard and the building panelboard, likely terminating on a busbar at both locations, and not on overcurrent devices, the effects of continuous loading can be disregarded in evaluating its terminations *[see 215.2(A)(1) Exception No. 2]*. That calculation is (11,600 VA ÷ 277 V = 42 ~~amperes~~ A), to be evaluated under the 75°C column of Table 310.16. The minimum size of the neutral might seem to be 8 AWG, but that size would not be sufficient to be depended upon in the event of a line-to-neutral fault *[see ~~215.2(A)(1)~~ 215.2(A)(2) , second paragraph]*. Therefore, because the minimum size equipment grounding conductor for a ~~150 ampere circuit~~ circuit wired with 2/0 AWG conductors , as covered in ~~Table 250.122~~ 250.122 , is 6 AWG, that is the minimum neutral size required for this feeder.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Oct 22 16:49:21 EDT 2018

Committee Statement

Committee Statement: The text was revised to correlate with the revised approach taken by CMP 5 in FR 8069.

Response Message: SR-7596-NFPA 70-2018 If CMP 5 reverses direction at the Second Draft stage, the Correlating Committee will need to revisit this Second Draft Revision, reversing this action should Section 250.122 revert to the format in the 2017 Code.

Public Comment No. 1908-NFPA 70-2018 [Definition: Feeder Neutral Conductor]

Public Comment No. 887-NFPA 70-2018 [Definition: Example D3(a) Industrial Feeders in a Common Ra...]

Second Revision No. 7773-NFPA 70-2018 [Definition: Further Demand Factor]

Further Demand Factor

[see 220.61(B)]

200 A at 100%		200 A
390 A − 200 A = 190 A at 70%		133 A
	Net Calculated Load (neutral)	333 A

[See Table 310.16 through Table 310.21, and 310.15(B), ~~(B)(3)~~ (C) , and ~~(B)(5)~~ (E) .]

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Thu Oct 25 13:21:50 EDT 2018

Committee Statement

Committee Statement: This Second Draft Revision reconciles all references to Articles 310 and 311.
Response Message: SR-7773-NFPA 70-2018

Second Revision No. 7772-NFPA 70-2018 [Definition: Ungrounded Feeder Conductors]

Ungrounded Feeder Conductors

The conductors must independently meet requirements for (1) terminations, and (2) conditions of use throughout the raceway run.

Minimum size conductor at the overcurrrent device termination *[see 110.14(C) and 215.2(A)(1), using 75°C ampacity column in Table 310.16]*: 1/0 AWG.

Minimum size conductors in the raceway based on actual load *[see Article 100, Ampacity, and 310.15(C) ~~(a)~~ (1) and correction factors to Table 310.16]*:

95,500 VA ~~/~~ ÷ 0.7 ~~/~~ ÷ 0.96 = 142,000 VA

[70% = 310.15(C)~~(a)~~ (1)] & [0.96 = Correction factors to Table 310.16]

Conversion to amperes:

142,000 VA ~~/~~ ÷ (480 V × √3) = 171 A

Note that the neutral conductors are counted as current-carrying conductors *[see 310.15(E)(3)]* in this example because the discharge lighting has substantial nonlinear content. This requires a 2/0 AWG conductor based on the 90°C column of Table 310.16. Therefore, the worst case is given by the raceway conditions, and 2/0 AWG conductors must be used. If the utility corridor were at normal temperatures [(30°C (86°F)], and if the lighting at each building were supplied from the local separately derived system (thus requiring no neutrals in the supply feeders), the raceway result (95,500 VA ~~/~~ ÷ 0.8 = 119,000 VA; 119,000 VA ~~/~~ ÷ (480 V × √3) = 143 A, or a 1 AWG conductor @ 90°C) could not be used, because the termination result (1/0 AWG) based on the 75°C column of Table 310.16 would become the worst case, requiring the larger conductor.

In every case, the overcurrent protective device shall provide overcurrent protection for the feeder conductors in accordance with their ampacity as provided by this *Code (see 240.4)*. A 90°C 2/0 AWG conductor has a Table 310.16 ampacity of 195 amperes. Adjusting for the conditions of use (35°C ambient temperature, 8 current-carrying conductors in the common raceway),

195 ~~amperes~~ A × 0.96 × 0.7 = 131 A

The 150-ampere circuit breaker protects the 2/0 AWG feeder conductors, because 240.4(B) permits the use of the next higher standard size overcurrent protective device. Note that the feeder layout precludes the application of 310.14(A)(2) Exception.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Oct 25 13:15:38 EDT 2018

Committee Statement

Committee Statement: This Second Draft Revision reconciles all references to Articles 310 and 311.

Response Message: SR-7772-NFPA 70-2018 References to Article 310 were reviewed. It was noted that revisions to reflect the relocated sections within Article 310 were made by NFPA staff when compiling the First Draft Report. Those revisions were compared to the structure of Articles 310 and 311 as published in the First Draft Report. Most of those revisions were validated as accurate; however, a few references required correction by CMP-2.

Public Comment No. 2207-NFPA 70-2018 [Global Input]