National Fire Protection Association

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WORKING DRAFT OF NEC CODE-MAKING PANEL 2 MEETING OUTPUT

CONTENT NOT FINAL – SUBJECT TO REVISION PRIOR TO LETTER BALLOT AND PUBLICATION OF FIRST DRAFT REPORT

Document: National Electrical Code®

Revision Cycle: A2025

Meeting Dates: January 15 - 20, 2024

Panel Activity: Input Stage

This is a working draft, prepared by NFPA staff, to record the output generated at the Code-Making Panel 2 First Draft Meeting. It includes draft copies of the First Revisions and any Global Revisions.

It is being made available to Panel members for the purpose of facilitating early review, particularly for those Panel members who may be seeking input from their respective organizations in preparation for the First Draft Ballot.

First Revision No. 8210-NFPA 70-2024 [Global Input]

Revise the following sections of Article 210 and Annex D, as shown, to align the terminology used for overcurrent protection:

[210.4(A)]

Branch circuits recognized by this article shall be permitted as multiwire circuits. A multiwire circuit shall be permitted to be considered as multiple circuits. Except as permitted in 300.3(B)(4), all conductors of a multiwire branch circuit shall originate from the equipment containing the branch-circuit overcurrent protective device (OCPD) ~~or protective devices~~ .

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[210.4(C)]

Exception No. 2: A multiwire branch circuit shall be permitted to supply line-to-line loads if all ungrounded conductors of the multiwire branch circuit are opened simultaneously by the branch-circuit OCPD ~~overcurrent device~~ .

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[210.11(B)]

Where the load is calculated on the basis of volt-amperes per square meter or per square foot, the wiring system up to and including the branch-circuit panelboard(s) shall be provided to serve not less than the calculated load. This load shall be evenly proportioned among multioutlet branch circuits within the panelboard(s). Branch-circuit ~~overcurrent devices~~ OCPD and circuits shall be required to be installed only to serve the connected load.

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[210.12(A)]

(A) Means of Protection.

AFCI protection shall be provided by any of the following means:

(1) A listed combination-type AFCI installed at the origin of the branch circuit to protect 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 AFCI installed on the branch circuit at the first outlet box, which shall be marked to indicate that it is the first outlet of the branch 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 AFCI installed on the branch circuit at the first outlet box if all of the following conditions are met:

a. The branch-circuit wiring shall be continuous from the branch-circuit ~~overcurrent device~~ OCPD to the outlet branch-circuit AFCI.

b. The maximum length of the branch-circuit wiring from the branch-circuit ~~overcurrent device~~ OCPD 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 shall be marked to indicate that it is the first outlet of the branch circuit.

(4) A listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet in combination with a listed branch-circuit ~~overcurrent protective device~~ OCPD if all of the following conditions are met:

a. The branch-circuit wiring shall be continuous from the branch-circuit ~~overcurrent device~~ OCPD to the outlet branch-circuit AFCI.

b. The maximum length of the branch-circuit wiring from the branch-circuit ~~overcurrent device~~ OCPD 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 shall be marked to indicate that it is the first outlet of the branch circuit.

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

(5) A listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet in combination with a listed branch-circuit ~~overcurrent protective device~~ OCPD installed at the service equipment if all of the following conditions are met:

a. The branch-circuit wiring shall be unspliced and untapped from the branch-circuit ~~overcurrent device~~ OCPD to the outlet branch-circuit AFCI.

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

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

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

(6) If metal raceway, metal wireways, metal auxiliary gutters, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, metal conduit bodies, and metal enclosures are installed for the portion of the branch circuit between the branch-circuit ~~overcurrent device~~ OCPD and the first outlet, a listed outlet branch-circuit-type AFCI installed at the first outlet to protect this remaining portion of the branch circuit.

(7) 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~~ OCPD and the first outlet, a listed outlet branch-circuit-type AFCI installed at the first outlet to protect this remaining portion of the branch circuit.

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[210.18]

Branch circuits recognized by this article shall be rated in accordance with the maximum permitted ampere rating or setting of the ~~overcurrent device~~ OCPD . The rating for other than individual branch circuits shall be 10, 15, 20, 30, 40, and 50 amperes. Where conductors of higher ampacity are used for any reason, the ampere rating or setting of the specified ~~overcurrent device~~ OCPD shall determine the circuit rating.

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[210.19(A)]

Branch-circuit conductors shall have an ampacity not less than the larger of the following and comply with 110.14(C) for equipment terminations:

(1) 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 310.14.

Exception to (1): If the assembly, including the ~~overcurrent devices protecting the branch circuits~~ branch-circuit ~~OCPDs~~ , 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).~~

(2) 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.

Exception to (1) and (2): 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), an allowable ampacity in accordance with 310.15 not less than the sum of the continuous load plus the noncontinuous load shall be permitted. 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.

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[210.20]

Branch-circuit conductors and equipment for circuits not exceeding 1000 volts ac or 1500 volts dc nominal shall be protected by branch-circuit ~~overcurrent protective~~ ~~devices~~ OCPDs that have a rating or setting that complies with 210.20(A) through (D).

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[210.20(A)]

Where a branch circuit supplies continuous loads or any combination of continuous and noncontinuous loads, the rating of the branch-circuit ~~overcurrent~~ ~~device~~ OCPD shall not be less than the noncontinuous load plus 125 percent of the continuous load.

Exception: Where the assembly, including the branch-circuit OCPDs ~~overcurrent devices protecting the branch circuit(s)~~ , is listed for operation at 100 percent of its rating, the ampere rating of the branch-circuit OCPD ~~overcurrent device~~ shall be permitted to be not less than the sum of the continuous load plus the noncontinuous load.

***

[210.20(C)]

The rating or setting of the branch-circuit OCPD ~~overcurrent protective device~~ shall not exceed that specified in the applicable articles referenced in Table 240.3 for equipment.

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[Annex D, Example D3(a)]

Overcurrent protection

(see 215.3)

The branch-circuit ~~overcurrent protective~~ ~~device~~ OCPD must accommodate 125% of the continuous load, plus the noncontinuous load:

Continuous load	56,600 VA
Noncontinuous load	38,900 VA

Subtotal, actual load [actual load in amperes]	**95,500 VA**
.	
[99,000 VA ÷ (480V × √3) = 119 A]	
(25% of 56,600 VA) (*See 215.3*)	**14,200 VA**
Total VA	**109,700 VA**

Conversion to amperes using three significant figures: 109,700 VA / (480V × √3) = 132 A

Minimum size branch-circuit ~~overcurrent protective device~~ OCPD : 132 A

Minimum standard size branch-circuit ~~overcurrent protective device~~ OCPD *(see 240.6)*: 150 amperes

Where the branch-circuit ~~overcurrent protective device~~ OCPD and its assembly are listed for operation at 100 percent of its rating, a 125 ampere branch-circuit ~~overcurrent protective device~~ OCPD would be permitted. However, branch-circuit ~~overcurrent protective device~~ OCPD assemblies listed for 100 percent of their rating are typically not available at the 125-ampere rating. *(See 215.3 Exception.)*

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 branch-circuit ~~overcurrent device~~ OCPD termination *[see 110.14(C) and 215.2(A), 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)(1) and correction factors to Table 310.16]*:

95,500 VA ÷ 0.7 ÷ 0.96 = 142,000 VA

[70% = 310.15(C)(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 branch-circuit ~~overcurrent protective device~~ OCPD 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 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 branch-circuit ~~overcurrent protective device~~ OCPD . Note that the feeder layout precludes the application of 310.14(A)(2) Exception.

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 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 branch-circuit ~~overcurrent devices~~ OCPD , the effects of continuous loading can be disregarded in evaluating its terminations *[see 215.2(A)(1) Exception No. 3]*. That calculation is (11,600 VA ÷ 277 V = 42 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(B), second paragraph]*. Therefore, because the minimum size equipment grounding conductor for a 150 ampere circuit wired with 2/0 AWG conductors, as covered in Table 250.122, is 6 AWG, that is the minimum neutral size required for this feeder.

Supplemental Information

File Name	Description	Approved
70_CMP2_FR8210_Global.docx	staff use	

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Fri Jan 19 19:49:22 EST 2024

Committee Statement

Committee Statement: This revision applies consistent usage of the defined term “branch circuit overcurrent protective device."

Response Message: FR-8210-NFPA 70-2024

Revise the following sections of Article 210 as shown to align the terminology for overcurrent protection:

[210.4(A)]

Branch circuits recognized by this article shall be permitted as multiwire circuits. A multiwire circuit shall be permitted to be considered as multiple circuits. Except as permitted in 300.3(B)(4), all conductors of a multiwire branch circuit shall originate from the equipment containing the branch-circuit overcurrent protective device (OCPD)~~or protective devices~~.

***

[210.4(C)]

Exception No. 2: A multiwire branch circuit shall be permitted to supply line-to-line loads if all ungrounded conductors of the multiwire branch circuit are opened simultaneously by the branch-circuit OCPD~~overcurrent device~~.

***

[210.11(B)]

Where the load is calculated on the basis of volt-amperes per square meter or per square foot, the wiring system up to and including the branch-circuit panelboard(s) shall be provided to serve not less than the calculated load. This load shall be evenly proportioned among multioutlet branch circuits within the panelboard(s). Branch-circuit ~~overcurrent devices~~OCPD and circuits shall be required to be installed only to serve the connected load.

***

[210.12(A)]

(A) Means of Protection.

AFCI protection shall be provided by any of the following means:

(1) A listed combination-type AFCI installed at the origin of the branch circuit to protect 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 AFCI installed on the branch circuit at the first outlet box, which shall be marked to indicate that it is the first outlet of the branch 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 AFCI installed on the branch circuit at the first outlet box if all of the following conditions are met:

a. The branch-circuit wiring shall be continuous from the branch-circuit ~~overcurrent device~~OCPD to the outlet branch-circuit AFCI.

b. The maximum length of the branch-circuit wiring from the branch-circuit ~~overcurrent device~~OCPD 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 shall be marked to indicate that it is the first outlet of the branch circuit.

(4) A listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet in combination with a listed branch-circuit ~~overcurrent protective device~~OCPD if all of the following conditions are met:

a. The branch-circuit wiring shall be continuous from the branch-circuit ~~overcurrent device~~OCPD to the outlet branch-circuit AFCI.

b. The maximum length of the branch-circuit wiring from the branch-circuit ~~overcurrent device~~OCPD 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 shall be marked to indicate that it is the first outlet of the branch circuit.

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

(5) A listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet in combination with a listed branch-circuit ~~overcurrent protective device~~OCPD installed at the service equipment if all of the following conditions are met:

a. The branch-circuit wiring shall be unspliced and untapped from the branch-circuit ~~overcurrent device~~ OCPD to the outlet branch-circuit AFCI.

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

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

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

(6) If metal raceway, metal wireways, metal auxiliary gutters, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, metal conduit bodies, and metal enclosures are installed for the portion of the branch circuit between the branch-circuit ~~overcurrent device~~OCPD and the first outlet, a listed outlet branch-circuit-type AFCI installed at the first outlet to protect this remaining portion of the branch circuit.

(7) 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~~OCPD and the first outlet, a listed outlet branch-circuit-type AFCI installed at the first outlet to protect this remaining portion of the branch circuit.

***

[210.18]

Branch circuits recognized by this article shall be rated in accordance with the maximum permitted ampere rating or setting of the ~~overcurrent device~~OCPD. The rating for other than individual branch circuits shall be 10, 15, 20, 30, 40, and 50 amperes. Where conductors of higher ampacity are used for any reason, the ampere rating or setting of the specified ~~overcurrent device~~OCPD shall determine the circuit rating.

***

[210.19(A)]

Branch-circuit conductors shall have an ampacity not less than the larger of the following and comply with 110.14(C) for equipment terminations:

(1) 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 310.14.

Exception to (1): If the assembly, including the ~~overcurrent devices protecting the branch circuits~~branch-circuit OCPDs, 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).

(2) 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.

Exception to (1) and (2): 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), an allowable ampacity in accordance with 310.15 not less than the sum of the continuous load plus the noncontinuous load shall be permitted. 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.

***

[210.20]

Branch-circuit conductors and equipment for circuits not exceeding 1000 volts ac or 1500 volts dc nominal shall be protected by branch-circuit ~~overcurrent protective devices~~OCPDs that have a rating or setting that complies with 210.20(A) through (D).

***

[210.20(A)]

Where a branch circuit supplies continuous loads or any combination of continuous and noncontinuous loads, the rating of the branch-circuit ~~overcurrent device~~OCPD shall not be less than the noncontinuous load plus 125 percent of the continuous load.

Exception: Where the assembly, including the branch-circuit OCPDs~~overcurrent devices protecting the branch circuit(s)~~, is listed for operation at 100 percent of its rating, the ampere rating of the branch-circuit OCPD~~overcurrent device~~ shall be permitted to be not less than the sum of the continuous load plus the noncontinuous load.

***

[210.20(C)]

The rating or setting of the branch-circuit OCPD~~overcurrent protective device~~ shall not exceed that specified in the applicable articles referenced in Table 240.3 for equipment.

***

[Example D3(a)]

Overcurrent protection

(see 215.3)

The branch-circuit ~~overcurrent protective device~~OCPD must accommodate 125% of the continuous load, plus the noncontinuous load:

Continuous load	56,600 VA
Noncontinuous load	38,900 VA
Subtotal, actual load [actual load in amperes]	
.	**95,500 VA**
[99,000 VA ÷ (480V × √3) = 119 A]	
(25% of 56,600 VA) (*See 215.3*)	**14,200 VA**
Total VA	**109,700 VA**

Conversion to amperes using three significant figures: 109,700 VA / (480V × √3) = 132 A

Minimum size branch-circuit ~~overcurrent protective device~~OCPD: 132 A

Minimum standard size branch-circuit ~~overcurrent protective device~~OCPD *(see 240.6)*: 150 amperes

Where the branch-circuit ~~overcurrent protective device~~OCPD and its assembly are listed for operation at 100 percent of its rating, a 125 ampere branch-circuit ~~overcurrent protective device~~OCPD would be permitted. However, branch-circuit ~~overcurrent protective device~~OCPD assemblies listed for 100 percent of their rating are typically not available at the 125-ampere rating. *(See 215.3 Exception.)*

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 branch-circuit ~~overcurrent device~~OCPD termination *[see 110.14(C) and 215.2(A), 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)(1) and correction factors to Table 310.16]*:

95,500 VA ÷ 0.7 ÷ 0.96 = 142,000 VA

[70% = 310.15(C)(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 branch-circuit ~~overcurrent protective device~~OCPD 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 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 branch-circuit ~~overcurrent protective device~~OCPD. Note that the feeder layout precludes the application of 310.14(A)(2) Exception.

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 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 branch-circuit ~~overcurrent devices~~OCPD, the effects of continuous loading can be disregarded in evaluating its terminations *[see 215.2(A)(1) Exception No. 3]*. That calculation is (11,600 VA ÷ 277 V = 42 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(B), second paragraph]*. Therefore, because the minimum size equipment grounding conductor for a 150 ampere circuit wired with 2/0 AWG conductors, as covered in Table 250.122, is 6 AWG, that is the minimum neutral size required for this feeder.

Commented [R1]: TG 4, FR 1

First Revision No. 7908-NFPA 70-2024 [Detail]

In 210.8 (A), revise list item (2) to create two separate list items as shown below and renumber subsequent items.

(1) Garages

(2) ~~and also~~ ~~a~~ A ccessory 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

Supplemental Information

File Name	Description	Approved
NEC_CMP2_Detail_FR-7908_210.8_A_list_2_.docx		

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 18 00:14:56 EST 2024

Committee Statement

Committee Statement: Existing list Item (2) is separated into two list items (“garages” and “accessory buildings...”) for clarity. In addition, the words “that have a floor located at or below grade level” are removed as the location of the floor does not remove the electrical shock hazard that GFCI is meant to address.

Response Message: FR-7908-NFPA 70-2024

Public Input No. 1334-NFPA 70-2023 [Section No. 210.8(A)]

Public Input No. 1096-NFPA 70-2023 [Section No. 210.8(A)]

210.8(A) Dwelling Units.

(1) Garages

(2) ~~Garages and also accessory~~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

First Revision No. 7909-NFPA 70-2024 [Detail]

In 210.8(F), revise 50 to 60 within the charging statement as shown below.

(F) Outdoor Outlets.

For dwellings, all outdoor outlets, other than those covered in 210.8(A), Exception No. 1, including outlets installed in the following locations, and supplied by single-phase branch circuits rated 150 volts or less to ground, ~~50~~ 60 amperes or less, shall be provided with GFCI protection:

(1) Garages that have floors located at or below grade level

(2) Accessory buildings

(3) Boathouses

If equipment supplied by an outlet covered under the requirements of this section is replaced, the outlet shall be supplied with GFCI protection.

Exception No. 1: GFCI protection shall not be required on lighting outlets other than those covered in 210.8(C).

Exception No. 2: GFCI protection shall not be required for listed HVAC equipment. This exception shall expire September 1, 2026.

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Thu Jan 18 00:19:45 EST 2024

Committee Statement

Committee Statement: The branch circuit rating was increased from 50A to 60A as solutions are readily available and the hazard is the same.

Response Message: FR-7909-NFPA 70-2024

Public Input No. 3285-NFPA 70-2023 [Section No. 210.8(F)]

First Revision No. 7910-NFPA 70-2024 [Detail]

In Parent statement for 210.8 include text as follows:

A listed Class A or Class A-HF GFCI shall provide protection in accordance with 210.8(A) through (F). The GFCI shall be installed in a readily accessible location.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 18 00:26:29 EST 2024

Committee Statement

Committee Statement: The UL 943 technical committee is working on GFCI product standards that are intended to provide relief to compatibility concerns, as shown in the UL study. This work includes the development of requirements for GFCIs that may be designated as “Class A-HF” or “Class A-HF+”.

The UL 101 technical committee has developed consensus requirements for high frequency leakage current for appliances.

CMP-2 seeks comment on this change and expects to align final terminology with the UL standard, when published.

Response Message: FR-7910-NFPA 70-2024

First Revision No. 7912-NFPA 70-2024 [Detail]

This text revises the Exception in 210.8(B) as follows:

Exception No. 3: ~~Receptacles or cord-and-plug-connected fixed and stationary appliances installed within 1.8 m (6 ft) from the top inside edge of a bowl of a sink shall not be required to be GFCI protected in industrial establishments where the conditions of maintenance and supervision ensure that only qualified personnel are involved, an assured equipment grounding conductor program in accordance with 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 that has a design not compatible with GFCI protection.~~ At industrial establishments where conditions of maintenance and supervision ensure that only qualified personnel are involved, if a greater hazard is created by power interruption to outdoor fixed and stationary cord-and-plug-connected equipment or that has a design that is not compatible with GFCI protection , an assured equipment grounding conductor program in accordance with 590.6(B)(2) shall be implemented and enforced in lieu of GFCI protection provided at the receptacle outlet.

Supplemental Information

File Name	Description	Approved
210.8_B_-_Detail.docx	Clarification for proposed change.	

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Thu Jan 18 00:49:00 EST 2024

Committee Statement

Committee Statement: Exception No. 3 has been replaced with language from the 2020 Edition of the NEC which was deleted during the NEC 2023 Code cycle. This change brings back the exception for industrial establishments for outdoor receptacle outlets and removes the previous exception for receptacles and equipment within 6 ft. of sinks. The assured equipment grounding conductor program that was previously optional has been modified to be required for that equipment supplied by receptacle outlets that would create a greater hazard if power is interrupted or is of a design that is not compatible with GFCI protection for an additional consideration should GFCI protection not be provided.

Response Message: FR-7912-NFPA 70-2024

Public Input No. 9-NFPA 70-2023 [Section No. 210.8(B)]

SL Note: This text replaces the new Exception No. 2 in FR-XXXX that was the previous Exception No. 3 in the previous edition.

210.8(B)

Exception No. 2: ~~Receptacles or cord-and-plug-connected fixed and stationary appliances installed within 1.8 m (6 ft) from the top inside edge of a bowl of a sink shall not be required to be GFCI protected in industrial establishments where the conditions of maintenance and supervision ensure that only qualified personnel are involved, an assured equipment grounding conductor program in accordance with 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 that has a design not compatible with GFCI protection.~~

At industrial establishments where conditions of maintenance and supervision ensure that only qualified personnel are involved, if a greater hazard is created by power interruption to outdoor fixed and stationary cord-and-plug-connected equipment or that has a design that is not compatible with GFCI protection, an assured equipment grounding conductor program in accordance with 590.6(B)(2) shall be implemented and enforced in lieu of GFCI protection provided at the receptacle outlet.

First Revision No. 7913-NFPA 70-2024 [Detail]

In 210.8(F), insert new text before Exception No. 1, as follows:

(F) Outdoor Outlets

For dwellings, all outdoor outlets, other than those covered in 210.8(A), Exception No. 1, including outdoor outlets installed at the following locations, and supplied by single-phase branch circuits rated 150 volts or less to ground, 50 amperes or less, shall be GFCI protected:

(1) Garages that have floors located at or below grade level

(2) Accessory buildings

(3) Boathouses

If equipment supplied by an outlet covered under the requirements of this section is replaced, the outlet shall be supplied with GFCI protection.

Effective September 1, 2026, GFCI or SPGFCI protection shall be provided for listed HVAC equipment.

Exception No. 1: GFCI protection shall not be required on lighting outlets other than those covered in 210.8(C).

Exception No. 2: GFCI protection shall not be required for listed HVAC equipment. This exception shall expire September 1, 2026.

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Thu Jan 18 08:26:50 EST 2024

Committee Statement

Committee Statement: The date found in Exception No. 2 was not modified but the parent text will now permit either the GFCI or a SPGFCI as of September 1, 2026, to provide options when compatibility issues exist with HVAC equipment that does not include a standard thermal magnetic circuit breaker.

Response Message: FR-7913-NFPA 70-2024

Public Input No. 4203-NFPA 70-2023 [Section No. 210.8(F)]

First Revision No. 8196-NFPA 70-2024 [Detail]

In 210.12(B), (C) and (D) include "nominal" in the charging statement as follows:

(B) Dwelling Units.

All 120-volt nominal , single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A)(1) through (A)(6):

(1) Kitchens

(2) Family rooms

(3) Dining rooms

(4) Living rooms

(5) Parlors

(6) Libraries

(7) Dens

(8) Bedrooms

(9) Sunrooms

(10) Recreation rooms

(11) Closets

(12) Hallways

(13) Laundry areas

(14) Similar areas

Exception No. 1: 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, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, conduit bodies, and enclosures.

Exception No. 2: AFCI protection shall not be required for the individual branch circuit supplying an outlet for arc welding equipment in a dwelling unit until January 1, 2025.

Informational Note No. 1: See *NFPA 72*-2022, *National Fire Alarm and Signaling Code*, 29.9.4(5), for information on secondary power source requirements for smoke alarms installed in dwelling units.

Informational Note No. 2: See 760.41(B) and 760.121(B) for power source requirements for fire alarm systems.

(C) Dormitory Units.

All 120-volt nominal , single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A)(1) through (A)(6):

(1) Bedrooms

(2) Living rooms

(3) Hallways

(4) Closets

(5) Bathrooms

(6) Similar rooms

(D) Other Occupancies.

All 120-volt nominal , single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A)(1) through (A)(6):

(1) Guest rooms and guest suites of hotels and motels

(2) Areas used exclusively as patient sleeping rooms in nursing homes and limited-care facilities

(3) Areas designed for use exclusively as sleeping quarters in fire stations, police stations, ambulance stations, rescue stations, ranger stations, and similar locations

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 19 18:51:25 EST 2024

Committee Statement

Committee Statement: This revision is made to add clarity regarding the voltage of AFCI-protected branch circuits relative to “nominal voltage” cited in 110.4.

Response Message: FR-8196-NFPA 70-2024

Public Input No. 16-NFPA 70-2023 [Sections 210.12(B), 210.12(C), 210.12(D)]

First Revision No. 8197-NFPA 70-2024 [Detail]

In 210.12(B), revise Exception No.2 to remove the date and add "its garages, and its accessory buildings", as follows:

Exception No. 2: AFCI protection shall not be required for the individual branch circuit supplying an outlet for arc welding equipment in a dwelling unit, its garages, and its accessory buildings ~~*until January 1, 2025*~~ .

Supplemental Information

File Name	Description	Approved
70_CMP2_FR8197_210.12_B_Detail-2.docx		

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Fri Jan 19 19:05:12 EST 2024

Committee Statement

Committee Statement: The date in Exception No. 2 was deleted and the exemption of arc welding equipment from AFCI protection was extended to dwelling unit garages and accessory buildings.

Response Message: FR-8197-NFPA 70-2024

Public Input No. 534-NFPA 70-2023 [Section No. 210.12(B)]

In 210.12(B) update Exception No.2 as follows:

(B) Dwelling Units.

All 120-volt, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A)(1) through (A)(6):

(1) Kitchens

(2) Family rooms

(3) Dining rooms

(4) Living rooms

(5) Parlors

(6) Libraries

(7) Dens

(8) Bedrooms

(9) Sunrooms

(10) Recreation rooms

(11) Closets

(12) Hallways

(13) Laundry areas

(14) Similar areas

Exception No. 1: 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, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, conduit bodies, and enclosures.
Exception No. 2: AFCI protection shall not be required for the individual branch circuit supplying an outlet for arc welding equipment in a dwelling unit ~~until January 1, 2025~~, its garages, and its accessory buildings.

Informational Note No. 1: See *NFPA 72*-2022, *National Fire Alarm and Signaling Code*, 29.9.4(5), for information on secondary power source requirements for smoke alarms installed in dwelling units.
Informational Note No. 2: See 760.41(B) and 760.121(B) for power source requirements for fire alarm systems.

First Revision No. 8227-NFPA 70-2024 [Detail]

In 210.12, 210.12(B), 210.12(C), 210.12(D), and 210.12(E), change "210.12(A)(1) through (A)(6)" to "210.12(A)", as follows:

210.12

Arc-fault circuit-interrupter (AFCI) protection shall be installed in accordance with 210.12(B) through (E) by any of the means described in 210.12(A)~~(1) through (A)(6)~~ . The AFCI shall be listed and installed in a readily accessible location.

***

(B) Dwelling Units.

All 120-volt, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A)~~(1) through (A)(6)~~ :

(1) Kitchens

(2) Family rooms

(3) Dining rooms

(4) Living rooms

(5) Parlors

(6) Libraries

(7) Dens

(8) Bedrooms

(9) Sunrooms

(10) Recreation rooms

(11) Closets

(12) Hallways

(13) Laundry areas

(14) Similar areas

Exception No. 1: 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, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, conduit bodies, and enclosures.

Exception No. 2: AFCI protection shall not be required for the individual branch circuit supplying an outlet for arc welding equipment in a dwelling unit until January 1, 2025.

Informational Note No. 1: See *NFPA 72*-2022, *National Fire Alarm and Signaling Code*, 29.9.4(5), for information on secondary power source requirements for smoke alarms installed in dwelling units.

Informational Note No. 2: See 760.41(B) and 760.121(B) for power source requirements for fire alarm systems.

(C) Dormitory Units.

All 120-volt, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A)~~(1) through (A)(6)~~ :

(1) Bedrooms

(2) Living rooms

(3) Hallways

(4) Closets

(5) Bathrooms

(6) Similar rooms

(D) Other Occupancies.

All 120-volt, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A)~~(1) through (A)(6)~~ :

(1) Guest rooms and guest suites of hotels and motels

(2) Areas used exclusively as patient sleeping rooms in nursing homes and limited-care facilities

(3) Areas designed for use exclusively as sleeping quarters in fire stations, police stations, ambulance stations, rescue stations, ranger stations, and similar locations

(E) Branch Circuit Wiring Extensions, Modifications, or Replacements.

If branch-circuit wiring for any of the areas specified in 210.12(B), (C), or (D) is modified, replaced, or extended, the branch circuit shall be protected by one of the following:

(1) By any of the means described in 210.12(A)~~(1) through (A)(6)~~

(2) A listed outlet branch-circuit-type AFCI located at the first receptacle outlet of the existing branch circuit

Exception: AFCI protection shall not be required where the extension of the existing branch-circuit conductors is not more than 1.8 m (6 ft) and does not include any additional outlets or devices, other than splicing devices. This measurement shall not include the conductors inside an enclosure, cabinet, or junction box.

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Fri Jan 19 23:34:26 EST 2024

Committee Statement

Committee Statement: The reference to list items (1) through (6) of 210.12(A) in the parent text, 210.12(B), (C), (D) and (E) is deleted. It is unnecessary to reference all the list items when all are optional means of compliance.

Response Message: FR-8227-NFPA 70-2024

Public Input No. 3492-NFPA 70-2023 [Section No. 210.12 [Excluding any Sub-Sections]]

First Revision No. 7503-NFPA 70-2024 [Definition: Counter (Countertop).]

Counter (Countertop).

A fixed or stationary surface typically intended for food ~~preparation and~~ or beverage preparation, food or beverage serving, personal lavation, or laundering or a similar surface that presents a routine risk of spillage of larger quantities of liquids upon outlets mounted directly on or in the surface. (CMP-2)

Informational Note No. 1: See UL 498, *Receptacles and Attachment Plugs*, and UL 943, *Ground-Fault Circuit Interrupters*, which establish the performance evaluation criteria and construction criteria.

Informational Note No. 2: See 406.5(E), 406.5(G)(1), and 406.5(H) for information on receptacles for counters and countertops distinguished from receptacles for work surfaces.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Jan 15 09:00:24 EST 2024

Committee Statement

Committee Statement: The definition is modified to recognize beverage preparation and beverage serving in addition to food as the definition clearly references the risk of spillage of liquids. This change also separates preparation from serving as either and not both are important in the application of this defined term.

Response Message: FR-7503-NFPA 70-2024

Public Input No. 175-NFPA 70-2023 [Definition: Counter (Countertop).]

First Revision No. 7506-NFPA 70-2024 [Definition: Dormitory Unit.]

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. [**101:** 3.3.68] (CMP 2)

Informational Note: Rooms within dormitories intended for the use of individuals for combined living and sleeping purposes are guest rooms or guest suites. Examples of dormitories are college dormitories, fraternity and sorority houses, and military barracks. [**101:** A.3.3.68] (CMP 2)

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Mon Jan 15 09:12:16 EST 2024

Committee Statement

Committee Statement: The language is modified as extracted text from NFPA 101 Section 3.3.68 to add clarity and consistency within the NEC and between it and other NFPA documents.
Response Message: FR-7506-NFPA 70-2024

Public Input No. 798-NFPA 70-2023 [Definition: Dormitory Unit.]

First Revision No. 7606-NFPA 70-2024 [Definition: Ground-Fault Circuit Interrupter, Special Purpo...]

Ground-Fault Circuit Interrupter, Special Purpose (SPGFCI). (Special Purpose Ground-Fault Circuit Interrupter)

A device intended for the detection of ground-fault currents ~~, used in circuits with voltage to ground greater than 150 volts,~~ that functions to de-energize a circuit or portion of a circuit within an established period of time ~~when a ground-fault current exceeds the values~~ established for Class C, D, or E devices. (CMP-2)

Informational Note: See UL 943C, *Outline of Investigation for Special Purpose Ground-Fault Circuit Interrupters*, for information on Classes C, D, or E special purpose ground-fault circuit interrupters.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Jan 15 16:14:00 EST 2024

Committee Statement

Committee Statement: The way this definition was written previously did not correlate to how it is described in the UL 943C Outline of Investigation for Special Purpose GFCIs, and did not accommodate for applications that are below 150 volts to ground.

Response Message: FR-7606-NFPA 70-2024

First Revision No. 7509-NFPA 70-2024 [Definition: Work Surface.]

Work Surface.

A fixed, stationary, or portable surface typically intended for dry use and for tasks other than food or beverage preparation, food or beverage serving, personal lavation, or laundering that presents an incidental risk of spillage of smaller quantities of beverages and other liquids upon outlets mounted directly on or recessed in the surface. (CMP-2)

Informational Note No. 1: See UL 111, *Outline of Investigation for Multioutlet Assemblies*, and UL 962A, *Furniture Power Distribution Units*, which establish the performance evaluation criteria and construction criteria.

Informational Note No. 2: See 406.5(F), 406.5(G)(1), and 406.5(H) for information on receptacles for work surfaces distinguished from receptacles for counters and countertops.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Jan 15 09:37:47 EST 2024

Committee Statement

Committee Statement: The definition is modified to recognize beverage preparation and beverage serving in addition to food as the definition clearly references the risk of spillage of liquids. This change also separates preparation from serving as either and not both are important in the application of this defined term.

Response Message: FR-7509-NFPA 70-2024

First Revision No. 7515-NFPA 70-2024 [Section No. 210.1]

210.1 Scope.

This article provides the general requirements for branch circuits not over 1000 volts ac, 1500 volts dc, nominal.

Informational Note: See ~~Part II of~~ Article 235, Part II for requirements for branch circuits over 1000 volts ac, 1500 volts dc, nominal.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Jan 15 09:59:20 EST 2024

Committee Statement

Committee Statement: This revision brings this text into alignment with Style Manual Section 4.1.4, regarding the use of Parts.

4.1.4 References to an Entire Article requires that references shall not be made to an entire article, except for Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.

Response Message: FR-7515-NFPA 70-2024

Public Input No. 2626-NFPA 70-2023 [Section No. 210.1]

First Revision No. 7517-NFPA 70-2024 [Section No. 210.2]

210.~~2~~ 3 Reconditioned Equipment.

The following reconditioned equipement shall not be ~~reconditioned~~ installed :

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

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

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Jan 15 10:05:04 EST 2024

Committee Statement

Committee Statement: This revision aligns with the NEC Style Manual requirements of Section 2.2.1 titled "Parallel Numbering Required," and recognizes the fact that the National Electrical Code is an installation requirements document and cannot control what happens to products that are not installed. This change makes it clear that the requirement pertains to reconditioned equipment requiring that it not be installed.

Public Input 1317 – The phrase "shall not be permitted" is not accepted as it is no different than shall not. The phrase "shall not be installed" is clear and concise.

Response Message: FR-7517-NFPA 70-2024

Public Input No. 2598-NFPA 70-2023 [Section No. 210.2]

Public Input No. 1317-NFPA 70-2023 [Section No. 210.2]

First Revision No. 7520-NFPA 70-2024 [Section No. 210.3]

210.3 ~~—~~ 14 _ Other Articles for Specific-Purpose Branch Circuits.

Table 210.3 14 _ lists references for specific equipment and applications not located in Chapters 5, 6, and 7 that amend or supplement the requirements of this article.

Table 210.3 ~~Specific~~ 14 Specific -Purpose Branch Circuits

Equipment	Article	Section
Air-conditioning and refrigerating equipment	-	440.6, 440.31, and 440.32
Busways	-	368.17
Central heating equipment other than fixed electric space-heating equipment	-	422.12
Fixed electric heating equipment for pipelines and vessels	-	427.4
Fixed electric space-heating equipment	-	424.4
Fixed outdoor electrical deicing and snow-melting equipment	-	426.4
Infrared lamp industrial heating equipment	-	422.48 and 424.3
Motors, motor circuits, and controllers	430	- , Part III and Part IV
Switchboards and panelboards	-	408.52

Supplemental Information

File Name	Description	Approved
PI-979.docx		

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Jan 15 10:16:49 EST 2024

Committee Statement

Committee Statement: This revision brings this text into alignment with Style Manual Section 4.1.4, regarding the use of Parts.

4.1.4 References to an Entire Article requires that references shall not be made to an entire article, except for Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.

Part III was added as the title of Part III is ""Motor and branch-circuit overload protection".

Part IV was added as the title of part IV is “motor branch circuit short circuit and ground

fault protection."

Section 210.3 is moved to 210.14 to accommodate the change to moving 210.2 for reconditioned equipment to 210.3 in accordance with the NEC Style Manual section 2.2.1.

Response Message: FR-7520-NFPA 70-2024

Public Input No. 979-NFPA 70-2023 [Section No. 210.3]

210.14~~3~~ Other Articles for Specific-Purpose Branch Circuits.

Table 210.14~~3~~ lists references for specific equipment and applications not located in Chapters 5, 6, and 7 that amend or supplement the requirements of this article.

Table 210.14~~3~~ Specific-Purpose Branch Circuits

Equipment	Article	Section
Air-conditioning and refrigerating equipment		440.6, 440.31, and 440.32
Busways		368.17
Central heating equipment other than fixed electric space-heating equipment		422.12
Fixed electric heating equipment for pipelines and vessels		427.4
Fixed electric space-heating equipment		424.4
Fixed outdoor electrical deicing and snow-melting equipment		426.4
Infrared lamp industrial heating equipment		422.48 and 424.3
Motors, motor circuits, and controllers	430, Part III and Part IV	
Switchboards and panelboards		408.52

First Revision No. 7523-NFPA 70-2024 [Section No. 210.5(C)]

(C) Identification of Ungrounded Conductors.

Ungrounded conductors shall be identified in accordance with 210.5(C)(1) ~~or~~ , (2), or (3), as applicable.

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

Where the premises wiring system has branch circuits supplied from one nominal voltage system, branch circuit ungrounded conductors shall be identified in accordance with 310.6(C).

(2) 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 nominal voltage system at all termination, connection, and splice points in accordance with 210.5(C)(~~1~~ 2)(a) and (C)(~~1~~ 2)(b). Different systems within the same premises that have the same nominal voltage 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 used for conductors originating within each ~~branch-circuit~~ enclosed 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 accordance with 210.5(C)(~~1~~ 2)(a) and (C)(~~1~~ 2)(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."

(~~2~~ 3) Branch Circuits Supplied from Direct-Current Systems.

Where a branch circuit is supplied from a dc system operating at more than 60 volts, each ungrounded conductor of 4 AWG or larger shall be identified by polarity at all termination, connection, and splice points by marking tape, tagging, or other approved means; each ungrounded conductor of 6 AWG or smaller shall be identified by polarity at all termination, connection, and splice points in compliance with 210.5(C)(~~2~~ 3)(a) and (b). The identification methods utilized for conductors originating within each ~~branch-circuit~~ enclosed 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.

(a) *Positive Polarity, Sizes 6 AWG or Smaller.* Where the positive polarity of a dc system does not serve as the connection point for the grounded conductor, each positive ungrounded conductor shall be identified by one of the following means:

(2) A continuous red outer finish

(3) A continuous red stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or black

(4) Imprinted plus signs (+) or the word POSITIVE or POS durably marked on insulation of a color other than green, white, gray, or black and repeated at intervals not exceeding 610 mm (24 in.) in accordance with 310.8(B)

(5) An approved permanent marking means such as sleeving or shrink-tubing that is suitable for the conductor size, at all termination, connection, and splice points, with imprinted plus signs (+) or the word POSITIVE or POS durably marked on insulation of a color other than green, white, gray, or black

(f) *Negative Polarity, Sizes 6 AWG or Smaller.* Where the negative polarity of a dc system does not serve as the connection point for the grounded conductor, each negative ungrounded conductor shall be identified by one of the following means:

(1) A continuous black outer finish

(2) A continuous black stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or red

(3) Imprinted minus signs (–) or the word NEGATIVE or NEG durably marked on insulation of a color other than green, white, gray, or red and repeated at intervals not exceeding 610 mm (24 in.) in accordance with 310.8(B)

(4) An approved permanent marking means such as sleeving or shrink-tubing that is suitable for the conductor size, at all termination, connection, and splice points, with imprinted minus signs (–) or the word NEGATIVE or NEG durably marked on insulation of a color other than green, white, gray, or red

Supplemental Information

File Name	Description	Approved
70_CMP2_FR7523_210.5_C_.docx	staff use	

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Jan 15 10:36:17 EST 2024

Committee Statement

Committee Statement: New second level subdivision is added to give users of the Code clear requirements for the proper identification of branch circuits supplied from a single nominal voltage system. The reference to Section 310.6(C) provides the link to the requirements on how to properly identify these ungrounded conductors from one nominal voltage system. The remainder of 210.5(C) has been renumbered to accommodate the addition.

In addition, the word “enclosed” was appropriately located and the words "branch-circuit" were removed, where necessary, to align with the new defined term “enclosed panelboard” and for technical accuracy.

Response Message: FR-7523-NFPA 70-2024

Public Input No. 782-NFPA 70-2023 [Section No. 210.5(C)(2)]

Public Input No. 3060-NFPA 70-2023 [Section No. 210.5(C)]

Public Input No. 781-NFPA 70-2023 [Section No. 210.5(C)(1)]

(C) Identification of Ungrounded Conductors.

Ungrounded conductors shall be identified in accordance with 210.5(C)(1) or (2), as applicable.

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

Where the premises wiring system has branch circuits supplied from one nominal voltage system, branch circuit ungrounded conductors shall be identified in accordance with 310.6(C).

(~~1~~2) 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 nominal voltage system at all termination, connection, and splice points in accordance with 210.5(C)(1)(a) and (C)(1)(b). Different systems within the same premises that have the same nominal voltage 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 used for conductors originating within each ~~branch-circuit~~enclosed 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 accordance with 210.5(C)(1)(a) and (C)(1)(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."

(~~2~~3) Branch Circuits Supplied from Direct-Current Systems.

Where a branch circuit is supplied from a dc system operating at more than 60 volts, each ungrounded conductor of 4 AWG or larger shall be identified by polarity at all termination, connection, and splice points by marking tape, tagging, or other approved means; each ungrounded conductor of 6 AWG or smaller shall be identified by polarity at all termination, connection, and splice points in compliance with 210.5(C)(2)(a) and (b). The identification methods utilized for conductors originating within each ~~branch-circuit~~ enclosed 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.

(a) *Positive Polarity, Sizes 6 AWG or Smaller.* Where the positive polarity of a dc system does not serve as the connection point for the grounded conductor, each positive ungrounded conductor shall be identified by one of the following means:

(1) A continuous red outer finish

(2) A continuous red stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or black

(3) Imprinted plus signs (+) or the word POSITIVE or POS durably marked on insulation of a color other than green, white, gray, or black and repeated at intervals not exceeding 610 mm (24 in.) in accordance with 310.8(B)

(4) An approved permanent marking means such as sleeving or shrink-tubing that is suitable for the conductor size, at all termination, connection, and splice points, with imprinted plus signs (+) or the word POSITIVE or POS durably marked on insulation of a color other than green, white, gray, or black

(b) *Negative Polarity, Sizes 6 AWG or Smaller.* Where the negative polarity of a dc system does not serve as the connection point for the grounded conductor, each negative ungrounded conductor shall be identified by one of the following means:

(1) A continuous black outer finish

(2) A continuous black stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or red

(3) Imprinted minus signs (−) or the word NEGATIVE or NEG durably marked on insulation of a color other than green, white, gray, or red and repeated at intervals not exceeding 610 mm (24 in.) in accordance with 310.8(B)

(4) An approved permanent marking means such as sleeving or shrink-tubing that is suitable for the conductor size, at all termination, connection, and splice points, with imprinted minus signs (−) or the word NEGATIVE or NEG durably marked on insulation of a color other than green, white, gray, or red

First Revision No. 7593-NFPA 70-2024 [Section No. 210.6(D)]

(D) 1000 Volts ac or 1500 Volts dc Between Conductors.

Circuits ~~exceeding~~ over 277 volts, nominal, to ground and not ~~exceeding~~ over 1000 volts ac or 1500 volts dc, nominal, between conductors shall be permitted to supply the following:

(1) The auxiliary equipment of electric-discharge lamps mounted in permanently installed luminaires where the luminaires are mounted in accordance with one of the following:

(2) Not less than a height of 6.7 m (22 ft) on poles or similar structures for the illumination of outdoor areas such as highways, roads, bridges, athletic fields, or parking lots

(3) Not less than a height of 5.5 m (18 ft) on other structures such as tunnels

Informational Note: See 410.137 for auxiliary equipment limitations.

(4) Cord-and-plug-connected or permanently connected utilization equipment other than luminaires

(5) Luminaires powered from direct-current systems where either of the following apply:

(6) The luminaire contains a listed, dc-rated ballast that provides isolation between the dc power source and the lamp circuit and protection from electric shock when changing lamps.

(7) The luminaire contains a listed, dc-rated ballast and has no provision for changing lamps.

Exception No. 1 to (B), (C), and (D): For lampholders of infrared industrial heating appliances as provided in 425.14.

Exception No. 2 to (B), (C), and (D): For railway properties as described in 110.19.

Supplemental Information

File Name	Description	Approved
70_CMP2_FR7593_210.6_D_.docx	staff use	

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Mon Jan 15 15:39:53 EST 2024

Committee Statement

Committee Statement: Wording has been standardized to reflect the medium voltage demarcation. The use of common phrases improves usability by ensure consistency and ease of electronic searching. Preferred phrasing is to identify requirements as apply to "… not over 1000 Volts ac, 1500 volts dc, nominal…" and "…over 1000 volts ac, 1500 volts dc, nominal…".

Response Message: FR-7593-NFPA 70-2024

(D) 1000 Volts ac or 1500 Volts dc Between Conductors.

Circuits ~~exceeding~~ over 277 volts, nominal, to ground and not ~~exceeding~~ over 1000 volts ac or 1500 volts dc, nominal, between conductors shall be permitted to supply the following:

(1) The auxiliary equipment of electric-discharge lamps mounted in permanently installed luminaires where the luminaires are mounted in accordance with one of the following:

a. Not less than a height of 6.7 m (22 ft) on poles or similar structures for the illumination of outdoor areas such as highways, roads, bridges, athletic fields, or parking lots

b. Not less than a height of 5.5 m (18 ft) on other structures such as tunnels

Informational Note: See 410.137 for auxiliary equipment limitations.

(2) Cord-and-plug-connected or permanently connected utilization equipment other than luminaires

(3) Luminaires powered from direct-current systems where either of the following apply:

a. The luminaire contains a listed, dc-rated ballast that provides isolation between the dc power source and the lamp circuit and protection from electric shock when changing lamps.

b. The luminaire contains a listed, dc-rated ballast and has no provision for changing lamps.

Exception No. 1 to (B), (C), and (D): For lampholders of infrared industrial heating appliances as provided in 425.14.
Exception No. 2 to (B), (C), and (D): For railway properties as described in 110.19.

First Revision No. 7704-NFPA 70-2024 [Section No. 210.8(A)]

(A) Dwelling Units.

All 125-volt through 250-volt receptacles installed in the following locations and supplied by single-phase branch circuits rated 150 volts or less to ground 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

(4) Crawl spaces — at or below grade level

(5) Basements

(6) Kitchens

(7) Areas with sinks and permanent provisions for food preparation, beverage preparation, or cooking

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

(9) Boathouses

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

(11) Laundry areas

(12) Indoor damp ~~and~~

(13) Indoor wet locations

Exception No. 1: 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: ~~A~~ GFCI protection shall not be required for a receptacle supplying only a permanently installed premises security system shall be permitted to omit ground-fault circuit-interrupter protection.

Exception No. 3: ~~Listed~~ GFCI protection shall not be required for listed weight-supporting ceiling receptacles (WSCR) utilized in combination with compatible weight-supporting attachment fittings (WSAF) installed for the purpose of supporting a ceiling luminaire or ceiling-suspended fan ~~shall be permitted to omit ground-fault circuit-interrupter protection~~ . If a general-purpose convenience receptacle is integral to the ceiling luminaire or ceiling-suspended fan, GFCI protection shall be provided.

Exception No. 4: Factory-installed receptacles that are not readily accessible and are mounted internally to ~~bathroom~~ exhaust fan assemblies shall not require GFCI protection unless required by the installation instructions or listing.

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

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Tue Jan 16 13:54:57 EST 2024

Committee Statement

Committee Statement: List item (12) is now separated into two list items for clarity to address the issue of the use of the word “and” between indoor damp locations and indoor wet locations. These are two separate areas that are not shown as two list items. This change adds clarity. [Public inputs 182, 1335 and 1949]

Exception No’s 2 and 3 are reworded for clarity. The removal of Kitchens from list item (6) in 210.8(A) and list item (2) in 210.8(B) is not accepted as it could create confusion. Identifying “kitchens” clearly in 210.8 adds clarity and increases usability of the Code. A kitchen is well defined and not in all cases does 210.8(A)(7) cover a kitchen. Not all of the criteria in 210.8(A)(7) are included for kitchens. 210.8(A)(7) says “or cooking” and the definition of a kitchen says “and cooking”. [Public Input 264]

Exception No. 4 is modified to remove “bathroom” as exception should not only apply to bathroom exhaust fans. It would also be a valid exception in utility laundry areas where that GFCI protection would otherwise be required. [Public Inputs 1388, 1764, 3384]

Response Message: FR-7704-NFPA 70-2024

Public Input No. 182-NFPA 70-2023 [Section No. 210.8(A)]

Public Input No. 1335-NFPA 70-2023 [Section No. 210.8(A)]

Public Input No. 1949-NFPA 70-2023 [Section No. 210.8(A)]

Public Input No. 1764-NFPA 70-2023 [Section No. 210.8(A)]

Public Input No. 1388-NFPA 70-2023 [Section No. 210.8(A)]

Public Input No. 3384-NFPA 70-2023 [Section No. 210.8(A)]

First Revision No. 7911-NFPA 70-2024 [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, 50 amperes or less, and all receptacles supplied by three-phase branch circuits rated 150 volts or less to ground, 100 amperes or less, installed in the following locations shall be provided with GFCI protection:

(1) Bathrooms

(2) Kitchens

(3) Areas with sinks and permanent provisions for food preparation, beverage preparation, or cooking

(4) Buffet serving areas with permanent provisions for food serving, beverage serving, or cooking

(5) Rooftops

(6) Outdoors

(7) Sinks where receptacles or cord-and-plug-connected fixed or stationary appliances are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink

(8) Indoor damp ~~or~~ locations

(9) Indoor wet locations

(10) Locker rooms with associated showering facilities

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

(12) Crawl spaces at or below grade level

(13) Unfinished areas of basements

(14) Aquariums, bait wells, and similar open aquatic vessels or containers, such as tanks or bowls, where receptacles are installed within 1.8 m (6 ft.) from the top inside edge or rim or from the conductive support framing of the vessel or container

(15) Laundry areas

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

Exception No. 1: 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: Receptacles

~~on rooftops shall not be required to be readily accessible other than from the rooftop. Exception No. 3: Receptacles~~

or cord-and-plug-connected fixed and stationary appliances installed within 1.8 m (6 ft) from the top inside edge of a bowl of a sink shall not be required to be GFCI protected in industrial establishments where the conditions of maintenance and supervision ensure that only qualified personnel are involved, an assured equipment grounding conductor program in accordance with 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 that has a design not compatible with GFCI protection.

Exception No.

~~4~~

3 : Receptacles or cord-and-plug-connected fixed and stationary appliances installed within 1.8 m (6 ft) from the top inside edge of a bowl of a sink shall not be required to be GFCI protected in industrial laboratories where the receptacles are used to supply equipment if removal of power would introduce a greater hazard.

Exception No.

~~5~~

4 : Receptacles located in patient bed locations of Category 2 (general care) or Category 1 (critical care) spaces of health care facilities shall be permitted to comply with 517.21 .

Exception No.

~~*6: Listed*~~

5: GFCI protection shall not be required for listed , weight-supporting ceiling receptacles (WSCR) utilized in combination with compatible weight-supporting attachment fittings (WSAF) installed for the purpose of serving a ceiling luminaire or ceiling-suspended fan

~~*shall be permitted to omit GFCI protection*~~

. If a general-purpose convenience receptacle is integral to the ceiling luminaire or ceiling-suspended fan, GFCI protection shall be provided.

Supplemental Information

File Name	Description	Approved
70_CMP2_FR7911_210.8_B_.docx	staff use	

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Thu Jan 18 00:35:33 EST 2024

Committee Statement

Committee Statement: List item (8) is separated into two list items to align with changes made in 210.8(A) and for clarity as these are two separate locations.

Exception No. 2 is deleted as this exception was moved to the parent text of 210.8 as part of a separate first revision. [Public Input 264]

Exception No. 6 is reworded for clarity. [Public Input 264]

Response Message: FR-7911-NFPA 70-2024

(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, 50 amperes or less, and all receptacles supplied by three-phase branch circuits rated 150 volts or less to ground, 100 amperes or less, installed in the following locations shall be provided with GFCI protection:

(1) Bathrooms

(2) Kitchens

(3) Areas with sinks and permanent provisions for food preparation, beverage preparation, or cooking

(4) Buffet serving areas with permanent provisions for food serving, beverage serving, or cooking

(5) Rooftops

(6) Outdoors

(7) Sinks where receptacles or cord-and-plug-connected fixed or stationary appliances are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink

(8) Indoor damp ~~or wet~~ locations

(9) Indoor wet locations

(~~9~~10) Locker rooms with associated showering facilities

(~~10~~11) Garages, accessory buildings, service bays, and similar areas other than vehicle exhibition halls and showrooms

(~~11~~12) Crawl spaces at or below grade level

(~~12~~13) Unfinished areas of basements

(~~13~~14) Aquariums, bait wells, and similar open aquatic vessels or containers, such as tanks or bowls, where receptacles are installed within 1.8 m (6 ft.) from the top inside edge or rim or from the conductive support framing of the vessel or container

(~~14~~15) Laundry areas

(~~15~~16) Bathtubs and shower stalls where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall

Exception No. 1: 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: Receptacles on rooftops shall not be required to be readily accessible other than from the rooftop.*~~

Exception No. ~~3~~2: Receptacles or cord-and-plug-connected fixed and stationary appliances installed within 1.8 m (6 ft) from the top inside edge of a bowl of a sink shall not be required to be GFCI protected in industrial establishments where the conditions of maintenance and supervision ensure that only qualified personnel are involved, an assured equipment grounding conductor program in accordance with 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 that has a design not compatible with GFCI protection.

Exception No. ~~4~~3: Receptacles or cord-and-plug-connected fixed and stationary appliances installed within 1.8 m (6 ft) from the top inside edge of a bowl of a sink shall not be required to be GFCI protected in industrial laboratories where the receptacles are used to supply equipment if removal of power would introduce a greater hazard.

Exception No. ~~5~~4: Receptacles located in patient bed locations of Category 2 (general care) or Category 1 (critical care) spaces of health care facilities shall be permitted to comply with 517.21.

Exception No. ~~6~~5: ~~Listed~~ GFCI protection shall not be required for listed weight-supporting ceiling receptacles (WSCR) utilized in combination with compatible weight-supporting attachment fittings (WSAF) installed for the purpose of serving a ceiling luminaire or ceiling-suspended fan ~~shall be permitted to omit GFCI protection~~. If a general-purpose convenience receptacle is integral to the ceiling luminaire or ceiling-suspended fan, GFCI protection shall be provided.

First Revision No. 7724-NFPA 70-2024 [Section No. 210.8(C)]

(C) Crawl Space Lighting Outlets.

GFCI protection shall be provided for lighting outlets not exceeding 120 volts nominal installed in crawl spaces.

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Tue Jan 16 15:10:47 EST 2024

Committee Statement

Committee Statement: Adding the word “nominal” for 120 volts nominal is accepted and consistent with the use of the term in other areas of Article 210.
Response Message: FR-7724-NFPA 70-2024

Public Input No. 92-NFPA 70-2023 [Section No. 210.8(C)]

First Revision No. 7736-NFPA 70-2024 [Section No. 210.8(D)]

(D) Specific Appliances.

GFCI protection shall be provided for the branch circuit or outlet supplying the following appliances rated 150 volts or less to ground and 60 amperes or less, single-phase or 100 Amperes or less, 3-phase:

(1) Automotive vacuum machines
(2) Drinking water coolers and bottle fill stations
(3) High-pressure spray washing machines
(4) Tire inflation machines
(5) Vending machines
(6) Sump pumps
(7) Dishwashers
(8) Electric ranges
(9) Wall-mounted ovens
(10) Counter-mounted cooking units
(11) Clothes dryers
(12) Microwave ovens

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Tue Jan 16 15:38:21 EST 2024

Committee Statement

Committee Statement: This first level subdivision is modified to align with the existing requirements found in 210.8(B) for three-phase branch circuits rated 150 volts or less to ground, 100 amperes or less. Appliances in three-phase applications are in use that are beyond the 60 A value currently stated and GFCI devices are commercially available at this amperage rating.

The following items from public input 2092 were not accepted:

1) The voltage was not changed from 150 volts or less to ground as the existing language is adequate and clear.

2) The branch-circuit rating was not moved from 60 Amperes to 50 Amperes as substantiation was not provided to reduce the level of protection currently afforded by 210.8(D).

3) Adding dewatering pumps was not accepted as this is not a defined term and could cause confusion.

4) An exception for elevator pits is not accepted as the GFCI protection requirements can be found in Article 620 as part of 620.6.

5) Removing list items (8) through (12) was also not accepted as substantiation was not provided to reduce the current level of protection afforded by these requirements. Substantiation was provided as part of SR 7596 during the 2023 Code cycle when these items were added. The panel statement noted that the CPSC database demonstrated 104 electrocutions from 2011-2020, of which 81 percent were working on an appliance or other type of appliance or equipment.

Response Message: FR-7736-NFPA 70-2024

Public Input No. 4477-NFPA 70-2023 [Section No. 210.8(D)]

Public Input No. 2092-NFPA 70-2023 [Section No. 210.8(D)]

First Revision No. 7748-NFPA 70-2024 [Section No. 210.8(F)]

(F) Outdoor Outlets.

For dwellings, all outdoor outlets, other than those covered in 210.8(A), Exception No. 1, including outdoor outlets installed ~~in~~ at the following locations, and supplied by single-phase branch circuits rated 150 volts or less to ground, 50 amperes or less, shall ~~be provided with GFCI protection~~ be GFCI protected :

(1) Garages that have floors located at or below grade level

(2) Accessory buildings

(3) Boathouses

If equipment supplied by an outlet covered under the requirements of this section is replaced, the outlet shall be supplied with GFCI protection.

Exception No. 1: GFCI protection shall not be required on lighting outlets other than those covered in 210.8(C).

Exception No. 2: GFCI protection shall not be required for listed HVAC equipment. This exception shall expire September 1, 2026.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Tue Jan 16 16:06:44 EST 2024

Committee Statement

Committee Statement: The language found in the parent text of 210.8(F) was modified to identify that the outlets are outdoor outlets which aligns with the title of 210.8(F) and that the outlets are installed at and not in the locations listed. In addition, (Reference Public Input No. 264), the language “shall be provided with GFCI protection” was modified to add clarity stating that these outlets “shall be GFCI protected”. The existing language could be read as requiring outlets installed in garages, accessory buildings and boathouses to have GFCI protection. This change will make it clear that only outdoor outlets require GFCI protection. Note that the rule in 210.8(A) will continue to require GFCI protection for receptacle outlets installed in these locations.

Response Message: FR-7748-NFPA 70-2024

Public Input No. 157-NFPA 70-2023 [Section No. 210.8(F)]

Public Input No. 1582-NFPA 70-2023 [Section No. 210.8(F)]

First Revision No. 7788-NFPA 70-2024 [Section No. 210.8 [Excluding any Sub-Sections]]

A listed Class A GFCI shall provide protection in accordance with 210.8(A) through (F). The GFCI shall be installed in a readily accessible location.

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

Informational Note: See 215.9 for GFCI protection on feeders.

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

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Wed Jan 17 09:21:51 EST 2024

Committee Statement

Committee Statement: The exception for receptacles on rooftops was moved to the parent text of 210.8 as this exception applies regardless of what type of occupancy. Type of occupancy doesn't dictate the accessible nature of the receptacle.

Response Message: FR-7788-NFPA 70-2024. The following items from PI 264 were not accepted: 210.8(F): Section 210.8(F) suggested changes were not accepted as clarity is not added and the existing language is sufficient. The existing language does not indicate that GFCI protection must be provided as a wiring device only. The language uses the word "protection" which indicates protection is provided either at the device or upstream of the device. 210.8(A) and 210.8(B): The removal of Kitchens from list item (6) in 210.8(A) and list item (2) in 210.8(B) is not accepted as it could create confusion. Identifying "kitchens" clearly in 210.8 adds clarity and increases usablity of the Code. A kitchen is well defined and not in all cases does 210.8(A)(7) cover a kitchen. Not all of the criteria in 210.8(A)(7) are included for kitchens. 210.8(A)(7) says "or cooking" and the definition of a kitchen says "and cooking".

Public Input No. 264-NFPA 70-2023 [Section No. 210.8]

First Revision No. 7538-NFPA 70-2024 [Section No. 210.11(C)(1)]

(1) Small-Appliance Branch Circuits.

In addition to the number of branch circuits required by other parts of this section, two or more 20-ampere small-appliance branch circuits shall be provided for all receptacle outlets specified by 210.52(B). Such circuits shall have no other outlets.

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Mon Jan 15 11:19:26 EST 2024

Committee Statement

Committee Statement: Although 210.52(B)(2) states that small-appliance branch circuits in dwelling units shall have no other outlets, the added sentence is consistent with 210.11(C)(2), (3), and (4).

Response Message: FR-7538-NFPA 70-2024

Public Input No. 2389-NFPA 70-2023 [Section No. 210.11(C)(1)]

First Revision No. 7543-NFPA 70-2024 [Section No. 210.11(C)(2)]

(2) Laundry Area Branch Circuits.

In addition to the number of branch circuits required by other parts of this section, at least one additional 120-volt nominal 20-ampere branch circuit shall be provided to supply the laundry area receptacle outlet(s) required by 210.52(F). This circuit shall have no other outlets.

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Mon Jan 15 11:34:23 EST 2024

Committee Statement

Committee Statement: The word “area” is added to be consistent with the defined term “laundry area”.

This revision word “nominal” is made included to add clarity regarding the voltage of small-appliance branch circuits relative to “nominal voltage” cited in 110.4.

The phrase “120-volt” is added to add clarity clarify that the required 20-ampere branch circuit for the laundry area and is for 120-volt nominal equipment such as flat irons, washing machines, and for heat-pump clothes dryers or gas clothes dryer ignitions, and to clarify that this requirement applies to receptacle outlets in a laundry area as define in Article 100.

Response Message: FR-7543-NFPA 70-2024

Public Input No. 985-NFPA 70-2023 [Section No. 210.11(C)(2)]

First Revision No. 7558-NFPA 70-2024 [Sections 210.11(C)(3), 210.11(C)(4)]

Sections 210.11(C)(3), 210.11(C)(4)

(3) Bathroom Branch Circuits.

In addition to the number of branch circuits required by other parts of this section, one or more 120-volt nominal , 20-ampere branch circuit shall be provided to supply bathroom(s) receptacle outlet(s) required by 210.52(D) and any countertop and similar work surface receptacle outlets. Such circuits shall have no other outlets.

Exception: Where the 20-ampere circuit supplies a single bathroom, outlets for other equipment within the same bathroom shall be permitted to be supplied in accordance with 210.23(B)(1) and (B)(2).

(4) Garage Branch Circuits.

In addition to the number of branch circuits required by other parts of this section, at least one 120-volt nominal , 20-ampere branch circuit shall be installed to supply receptacle outlets, including those required by 210.52(G)(1) for attached garages and in detached garages with electric power. This circuit shall have no other outlets.

Additional branch circuits rated 15 amperes or greater shall be permitted to serve receptacle outlets other than those required by 210.52(G)(1).

Exception No. 1: This circuit shall be permitted to supply outdoor receptacle outlets.

Exception No. 2: Where the 20-ampere circuit supplies a single vehicle bay garage, other outlets ~~for other equipment~~ within the same garage shall be permitted to be supplied in accordance with 210.23(B)~~(1) and (B)(2)~~ .

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Mon Jan 15 13:16:19 EST 2024

Committee Statement

Committee Statement: This revision is made to add clarity that the voltage of bathroom branch circuits is relative to “nominal voltage” cited in 110.4.

This revision is made to add clarity by replacing “outlets for other equipment” by “other outlets” as the restrictions on other equipment within the same garage are sufficiently addressed in 210.23(B). Outlets for luminaires are also covered in 210.23(B).

Response Message: FR-7558-NFPA 70-2024

Public Input No. 23-NFPA 70-2023 [Sections 210.11(C)(3), 210.11(C)(4)]

Public Input No. 2575-NFPA 70-2023 [Section No. 210.11(C)(4)]

Public Input No. 483-NFPA 70-2023 [Section No. 210.11(C)(4)]

First Revision No. 8032-NFPA 70-2024 [Section No. 210.12(A)]

(A) Means of Protection.

AFCI protection shall be provided by any of the following means:

(1) A listed combination-type AFCI installed ~~to provide protection~~ at the origin of the branch circuit to protect 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 AFCI installed on the branch circuit at the first outlet box, which shall be marked to indicate that it is the first outlet of the branch 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 AFCI installed on the branch circuit at the first outlet box if all of the following conditions are met:

(4) The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit AFCI.

(5) 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.

(6) The first outlet box shall be marked to indicate that it is the first outlet of the branch circuit.

(7) A listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet in combination with a listed branch-circuit overcurrent protective device if all of the following conditions are met:

(8) The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit AFCI.

(9) 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.

(10) The first outlet box shall be marked to indicate that it is the first outlet of the branch circuit.

(11) 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 listed as such.

(12) If metal raceway, metal wireways, metal auxiliary gutters, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, metal conduit bodies, and metal 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 installed at the first outlet to ~~provide protection for the~~ protect this remaining portion of the branch circuit.

(13) 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 installed at the first outlet to ~~provide protection for the~~ protect this remaining portion of the branch circuit.

Informational Note: See UL 1699-2011, *Standard for Arc-Fault Circuit-Interrupters*, for information on combination-type and branch/feeder-type AFCI devices. See UL Subject 1699A, *Outline of Investigation for Outlet Branch Circuit Arc-Fault Circuit-Interrupters*, for information on outlet branch-circuit type AFCI devices. See UL Subject 1699C, *Outline of Investigation for System Combination Arc-Fault Circuit Interrupters*, for information on system combination AFCIs.

Supplemental Information

File Name	Description	Approved
70_CMP2_FR8032_210.12_A_.docx	staff use	

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 18 22:29:39 EST 2024

Committee Statement

Committee Statement: Editorial changes are made in 2nd level subdivision list items 210.12(A)(5) and (6) to change the language from permissible to mandatory to comply with the parallel construction requirement of Section 2.1.8.2 of the NEC Style Manual.

List item (1) is revised to add the words “at the origin” to ensure that all list items have parallel construction.

Response Message: FR-8032-NFPA 70-2024

Public Input No. 1230-NFPA 70-2023 [Section No. 210.12]

(A) Means of Protection.

AFCI protection shall be provided by any of the following means:

(1) A listed combination-type AFCI installed ~~to provide protection of~~ at the origin of the branch circuit to protect 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 AFCI installed on the branch circuit at the first outlet box, which shall be marked to indicate that it is the first outlet of the branch 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 AFCI installed on the branch circuit at the first outlet box if 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 AFCI.

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 shall be marked to indicate that it is the first outlet of the branch circuit.

(4) A listed outlet branch-circuit-type AFCI installed on the branch circuit at the first outlet in combination with a listed branch-circuit overcurrent protective device if 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 AFCI.

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 shall be marked to indicate that it is the first outlet of the branch 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 listed as such.

(5) If metal raceway, metal wireways, metal auxiliary gutters, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, metal conduit bodies, and metal 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 installed at the first outlet to ~~provide protection for the~~ protect this 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 installed at the first outlet to ~~provide protection for the~~ protect the remaining portion of the branch circuit.

Informational Note: See UL 1699-2011, *Standard for Arc-Fault Circuit-Interrupters*, for information on combination-type and branch/feeder-type AFCI devices. See UL Subject 1699A, *Outline of Investigation for Outlet Branch Circuit Arc-Fault Circuit-Interrupters*, for information on outlet branch-circuit type AFCI devices. See UL Subject 1699C, *Outline of Investigation for System Combination Arc-Fault Circuit Interrupters*, for information on system combination AFCIs.

First Revision No. 8195-NFPA 70-2024 [Section No. 210.12(B)]

(B) Dwelling Units.

All 120-volt, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices ~~installed in the following locations~~ shall be protected by any of the means described in 210.12(A)(1) through (A)(6):

- ~~Kitchens~~
- ~~Family rooms~~
- ~~Dining rooms~~
- ~~Living rooms~~
- ~~Parlors~~
- ~~Libraries~~
- ~~Dens~~
- ~~Bedrooms~~
- ~~Sunrooms~~
- ~~Recreation rooms~~
- ~~Closets~~
- ~~Hallways~~
- ~~Laundry areas~~
- ~~Similar areas~~

~~*Exception No. 1*~~ *Exception No. 1: AFCI protection shall not be required in laundry areas, kitchens, and garages.*

Exception No. 2 : 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, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, conduit bodies, and enclosures.

Exception No. ~~2~~ 3 : AFCI protection shall not be required for the individual branch circuit supplying an outlet for arc welding equipment in a dwelling unit until January 1, 2025.

Exception No. 4: AFCI protection shall not be required for listed HVAC equipment.

Informational Note No. 1: See *NFPA 72*-2022, *National Fire Alarm and Signaling Code*, 29.9.4(5), for information on secondary power source requirements for smoke alarms installed in dwelling units.

Informational Note No. 2: See 760.41(B) and 760.121(B) for power source requirements for fire alarm systems.

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Fri Jan 19 18:39:45 EST 2024

Committee Statement

Committee Statement: The section has been revised to make the NEC more user-friendly. Expansion to the remaining circuits of dwelling units, except for garages, continues the incremental steps to protect the entire dwelling as electrical fires can occur on these 10-A, 15-A, and 20-A circuits regardless of the area or room they serve. The entire length of conductors presents opportunities for causing an electrical fire. This Arc-fault protection expansion to all dwelling unit 10-A, 15-A, and 20-A branch circuits increases safety by reducing the likelihood of electrical fires.

Electrical fire statistics demonstrate that electrical fires exist in dwelling units that might have been prevented by AFCI protection.

Kitchens, Laundry areas, and Listed HVAC equipment have been excepted from AFCI protection due to incompatibility concerns.

Response Message: FR-8195-NFPA 70-2024

Public Input No. 1438-NFPA 70-2023 [Section No. 210.12(B)]

Public Input No. 3380-NFPA 70-2023 [Section No. 210.12(B)]

Public Input No. 3408-NFPA 70-2023 [Section No. 210.12(B)]

Public Input No. 3155-NFPA 70-2023 [Section No. 210.12(B)]

Public Input No. 3966-NFPA 70-2023 [Section No. 210.12(B)]

Public Input No. 4450-NFPA 70-2023 [Section No. 210.12(B)]

Public Input No. 889-NFPA 70-2023 [Section No. 210.12(B)]

Public Input No. 3372-NFPA 70-2023 [Section No. 210.12(B)]

Public Input No. 3407-NFPA 70-2023 [Section No. 210.12(B)]

First Revision No. 7917-NFPA 70-2024 [Section No. 210.12(C)]

(C) ~~Dormitory Units~~ Dormitories .

All 120-volt, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A)(1) through (A)(6):

(1) Bedrooms
(2) Living rooms
(3) Hallways
(4) Closets
(5) Bathrooms
(6) Similar rooms

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Thu Jan 18 09:06:26 EST 2024

Committee Statement

Committee Statement: Changing the title of 210.12(C) from “Dormitory Units” to “Dormitories” is to enhance Code usability and to better correlate with NPFA 101 and NFPA 5000.

Response Message: FR-7917-NFPA 70-2024. Bathrooms in dormitories have been AFCI-protected in the NEC since 2017. Insufficient substantiation has been provided to delete this requirement. CMP-2 is not aware of any incompatibility issues related to this requirement. The phrase “similar rooms” refers to all other locations listed in 210.12(C) to ensure that AFCI protection is provided despite a different name that may be similar to the list items.

Public Input No. 800-NFPA 70-2023 [Section No. 210.12(C)]

First Revision No. 7921-NFPA 70-2024 [Section No. 210.12(E)]

(E) Branch Circuit Wiring Extensions, Modifications, or Replacements.

If branch-circuit wiring for any of the areas specified in 210.12(B), (C), or (D) is modified, replaced, or extended, the branch circuit shall be protected by one of the following:

(1) By any of the means described in 210.12(A)(1) through (A)(6)

(2) A listed outlet branch-circuit-type AFCI located at the first receptacle outlet or switch of the existing branch circuit

Exception: AFCI protection shall not be required where the extension of the existing branch-circuit conductors is not more than 1.8 m (6 ft) and does not include any additional outlets or devices, other than splicing devices. This measurement shall not include the conductors inside an enclosure, cabinet, or junction box.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 18 09:27:58 EST 2024

Committee Statement

Committee Statement: Adding 'or switch' gives installers the option to provide AFCI protection via an AFCI switch device if the circuit is extended, modified, or replaced.

Response Message: FR-7921-NFPA 70-2024

Public Input No. 2341-NFPA 70-2023 [Section No. 210.12(E)]

First Revision No. 7565-NFPA 70-2024 [Section No. 210.13]

210.13 Ground-Fault Protection of Equipment.

Each branch-circuit disconnecting means rated 1000 amperes or more and installed on solidly grounded wye electrical systems of more than 150 volts to ground, but not exceeding 1000 volts phase-to-phase, shall be provided with ground-fault protection of equipment in accordance with 230.95.

Informational Note: See 517.17 for requirements on buildings that contain health care occupancies.

Exception No. 1: This section shall not apply to a disconnecting means for a continuous industrial process where a nonorderly shutdown will introduce additional or increased hazards.

Exception No. 2: This section shall not apply if ground-fault protection of equipment is provided on the supply side of the branch circuit and on the load side of any transformer supplying the branch circuit.

Exception No. 3: For fused disconnects, where the available fault current, at the fused disconnect, is 10,000 amperes or greater, the ground-fault protection provisions of this section shall not apply if the fuses have a clearing time of 0.07 seconds or less at the lower of the calculated minimum available arcing current or 38% of the available fault current , or if the disconnect switch complies with Section 240.67(B)(1), 240.67(B)(3), or 240.67(B)(4) and is set to operate at the lower of the calculated minimum arcing current or 38% of the available fault current.

Exception No. 4: For circuit breakers, where the available fault current, at the circuit breaker, is 10,000 amperes or greater, the ground-fault protection provisions of this section shall not apply if the circuit breaker complies with Section 240.87(B)(2), 240.87(B)(4), 240.87(B)(5), or 240.87(B)(6) and is set to operate at the lower of the calculated minimum arcing current or 38% of the available fault current.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Jan 15 13:32:40 EST 2024

Committee Statement

Committee Statement: This FR revision correlates with changes to 215.10 (PI 1641) and 230.95 (PI 1645) which eliminate the need for a second level of GFPE to achieve selective coordination, greatly simplifying selective coordination. The FR revision does not prohibit GFPE, but rather makes it optional when very specific arc-flash energy reduction methods are utilized. Equipment damage is reduced because arc-flash energy reduction, used for personnel protection, is much faster than GFPE that is used for equipment protection.

Response Message: FR-7565-NFPA 70-2024

Public Input No. 1633-NFPA 70-2023 [Section No. 210.13]

First Revision No. 7568-NFPA 70-2024 [Section No. 210.17]

210.17 Guest Rooms and Guest Suites.

Guest rooms and guest suites in the following occupancies that are provided with permanent provisions for cooking shall have branch circuits installed to meet the rules for dwelling units:

(1) Hotels

(2) Motels

(3) Assisted living facilities

(4) Dormitories

Informational Note No. 1: See 210.11(C)(2) and 210.52(F), Exception No. 2, for information on laundry branch circuits and receptacle outlets.

Informational Note No. 2: See NFPA *101*-~~2021~~ 2024 , *Life Safety Code*, 3.3.~~198~~ 205 .12 and A.3.3.~~198~~ 205 .12(5), for the definition of *assisted living facilities*.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Jan 15 13:37:02 EST 2024

Committee Statement

Committee Statement: "Dormitories" was included in the occupancies listed to improve usability of the NEC® and to correlate consistently with the defined term's cited extraction sources NFPA 101® Life Safety Code®, revised since being included originally in NEC®, 3.3.205 (2024) and A.3.3.205 (2024), regarding individual guest rooms and individual guest suites of dormitories versus the entire dormitory occupancy. This revision, together with the revised definition of "Dormitory" in place of "Dormitory Unit", will bring the treatment of this occupancy in the NEC® into correlation with its usage in NFPA 101®, NFPA 5000 Building Construction and Safety Code, and other codes.

Response Message: FR-7568-NFPA 70-2024

Public Input No. 799-NFPA 70-2023 [Section No. 210.17]

First Revision No. 7573-NFPA 70-2024 [Section No. 210.19 [Excluding any Sub-Sections]]

Branch-circuit conductors ~~for circuits not exceeding 1000 volts ac or 1500 volts dc~~ shall be sized in accordance with 210.19(A) through (D).

Informational Note: Conductors for branch circuits as defined in Article 100, sized to prevent a voltage drop exceeding 3 percent at the farthest outlet of power, heating, and lighting loads, or combinations of such loads, and where the maximum total voltage drop on both feeders and branch circuits to the farthest outlet does not exceed 5 percent, provide reasonable efficiency of operation. See 215.2(A)(2), Informational Note No. 2, for information on voltage drop on feeder conductors.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Jan 15 13:59:21 EST 2024

Committee Statement

Committee Statement: With the identification in the title and scope of the Article that the requirements apply to certain voltage ranges, the inclusion of this detail in this section is redundant and unnecessary.

Response Message: FR-7573-NFPA 70-2024

First Revision No. 8024-NFPA 70-2024 [Section No. 210.20 [Excluding any Sub-Sections]]

Branch-circuit conductors and equipment ~~for circuits not exceeding 1000 volts ac or 1500 volts dc~~ shall be protected by overcurrent protective devices that have a rating or setting that complies with 210.20(A) through (D).

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 18 17:25:50 EST 2024

Committee Statement

Committee Statement: With the identification in the title and scope of the Article that the requirements apply to certain voltage ranges, the inclusion of this detail in this section is redundant and unnecessary.

Response Message: FR-8024-NFPA 70-2024

First Revision No. 7635-NFPA 70-2024 [Section No. 210.22]

210.22 Permissible Loads, Individual Branch Circuits.

An individual branch circuit shall be permitted to supply any load for which it is rated, but in no case shall the load exceed the branch-circuit ampere rating.

Exception: A 10-ampere individual branch circuit shall not be permitted to supply a receptacle outlet.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Tue Jan 16 08:15:59 EST 2024

Committee Statement

Committee Statement: Section 210.23 provides restrictions for 10-A multi-outlet branch circuits, but 210.22 did not. An exception was added to clearly prohibit receptacles on 10-A individual branch circuits, as is the case for 10-A multi-outlet branch circuits.

Response Message: FR-7635-NFPA 70-2024

First Revision No. 7637-NFPA 70-2024 [Section No. 210.23(A)]

(A) 10-Ampere Branch Circuits.

~~A~~ 10-ampere branch ~~circuit shall comply with the requirements of~~ 210.23(A)(1) ~~and (A)(2).~~

~~**(1)** Loads Permitted for 10-Ampere Branch Circuits.~~

~~A 10-ampere branch circuit shall be permitted to supply one or more~~

circuits shall be limited to supply any of the following:

(1) Lighting outlets

(2) Dwelling unit exhaust fans on bathroom or laundry room lighting circuits

- ~~A gas fireplace unit supplied by an individual branch circuit~~

~~**(2)** Loads Not Permitted for 10-Ampere Branch Circuits.~~

~~A 10-ampere branch circuit shall not supply any of the following:~~

(1) ~~Receptacle outlets~~

(2) ~~Fixed appliances, except as permitted for individual branch circuits~~

(3) ~~Garage door openers~~

(4) ~~Laundry equipment~~

Supplemental Information

File Name	Description	Approved
70_CMP2_FR7637_210.23_A_.docx	staff use	

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Tue Jan 16 08:22:36 EST 2024

Committee Statement

Committee Statement: To enhance Code usability and to add clarity, 210.23(A) was rewritten to clearly identify what loads are permitted to be supplied by 10-A multi-outlet branch circuits. The gas fireplace unit was removed because it was for an individual branch circuit. An exception was added to 210.22 to address receptacles on a 10-A individual branch circuit.

Response Message: FR-7637-NFPA 70-2024

Public Input No. 2497-NFPA 70-2023 [Section No. 210.23(A)(1)]

Public Input No. 1643-NFPA 70-2023 [Section No. 210.23(A)(2)]

Public Input No. 1644-NFPA 70-2023 [Section No. 210.23(A) [Excluding any Sub-Sections]]

(A) 10-Ampere Branch Circuits.

~~A~~ 10-ampere branch circuit~~s~~ shall ~~comply with the requirements of 210.23(A)(1) and (A)(2).~~be limited to supply any of the following:

1) Lighting outlets
~~1)~~2) Dwelling unit exhaust fans on bathroom and laundry room lighting circuits

~~**(1) Loads Permitted for 10-Ampere Branch Circuits.**~~

~~A 10-ampere branch circuit shall be permitted to supply one or more of the following:~~

~~(1) Lighting outlets~~

~~(2) Dwelling unit exhaust fans on bathroom or laundry room lighting circuits~~

~~(3) A gas fireplace unit supplied by an individual branch circuit~~

~~**(2) Loads Not Permitted for 10-Ampere Branch Circuits.**~~

~~A 10-ampere branch circuit shall not supply any of the following:~~

~~(1) Receptacle outlets~~

~~(2) Fixed appliances, except as permitted for individual branch circuits~~

~~(3) Garage door openers~~

~~(4) Laundry equipment~~

First Revision No. 8192-NFPA 70-2024 [Section No. 210.52(C)]

(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) through (C)(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) Wall Spaces.

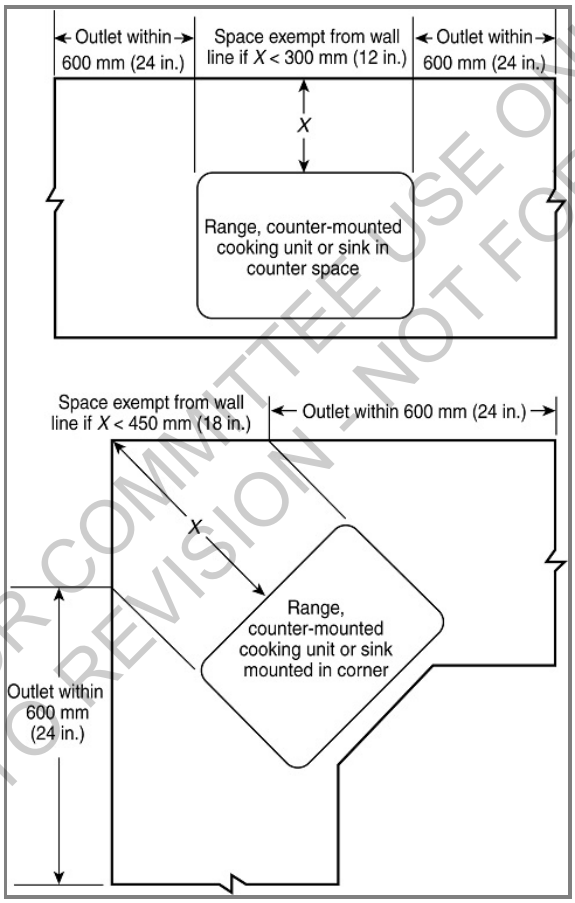
Receptacle outlets shall be installed so that no point along the wall line is more than 600 mm (24 in.) measured horizontally from a receptacle outlet in that space. The location of the receptacles shall be in accordance with 210.52(C)(3).

Exception No. 1: 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).

Exception No. 2: Where a required receptacle outlet cannot be installed in the wall areas shown in Figure 210.52(C)(1), the receptacle outlet shall be permitted to be installed as close as practicable to the countertop area to be served. The total number of receptacle outlets serving the countertop shall not be less than the number needed to satisfy 210.52(C)(1). These outlets shall be located in accordance with 210.52(C)(3).

Exception No. 3: Receptacle outlets located in the specified location in 210.52(A)(2)(3) shall not be located within 610 mm (24 in.) of the countertop or worksurface.

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, if installed~~ If provided to serve an island or peninsular countertop or work surface, receptacle outlets shall be installed in accordance with 210.52(C)(3) and (4) . If a receptacle outlet is not provided to serve an island or peninsular countertop or work surface, electrical provisions shall be provided at the island or peninsula for future addition of a receptacle outlet to serve the island or peninsular countertop or work surface.

(3) Receptacle Outlet Location.

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

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

(2) In a countertop using receptacle outlet assemblies listed for use in countertops

(3) In a work surface using receptacle outlet assemblies listed for use in work surfaces or listed for use in countertops

Receptacle outlets rendered not readily accessible by appliances fastened in place, appliance garages, sinks, or rangetops as covered in 210.52(C)(1), Exception No. 1, or appliances occupying assigned spaces shall not be considered as these required outlets.

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

Informational Note No. 2: See Informative Annex J and ANSI/ICC A117.1-~~2009~~ 2017 , *Standard on Accessible and Usable Buildings and Facilities*, for additional information.

(4) Receptacle Outlet Locations Prohibited.

Required and permitted receptacle outlets shall not be installed on cabinet sides or wall surfaces that are below countertops and work surfaces. Required and permitted receptacle outlets shall not be installed on adjacent walls extending from the base cabinets within 610 mm (24 in.) horizontally and downward from the countertop and work surface edge within 610 mm (24 in.) vertically.

Exception No. 1: Receptacle outlets installed in a drawer shall be permitted to be installed below countertops and work surfaces.

Exception No. 2: Receptacle outlets located in the specified location in 210.52(A)(2)(3) shall not be located within 610 mm (24 in.) of the countertop or worksurface.

Supplemental Information

File Name	Description	Approved
70_CMP2_FR8192_210.52_C_.docx		

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 19 18:19:41 EST 2024

Committee Statement

Committee Statement: CMP 2 reaffirms receptacle outlets are not required to be installed at island and peninsular countertops and work surfaces. Such locations may be designed where the requirements in 210.52(C)(3) and (4) cannot be met. The requirement for “future provisions” is also retained as certain construction methods may not allow receptacle outlet that meet the requirements of 210.52(C)(3) and (4) to be added at a later date. 210.52(C)(4) has been added to clarify as to where receptacle outlets can and cannot be installed, at new construction or a future date.

Response Message: FR-8192-NFPA 70-2024

Public Input No. 81-NFPA 70-2023 [Section No. 210.52(C)(3)]

Public Input No. 3335-NFPA 70-2023 [Section No. 210.52(C)(3)]

Public Input No. 3995-NFPA 70-2023 [Section No. 210.52(C)(2)]

Public Input No. 4313-NFPA 70-2023 [Section No. 210.52(C)(2)]
Public Input No. 318-NFPA 70-2023 [Section No. 210.52(C)(2)]
Public Input No. 4408-NFPA 70-2023 [Section No. 210.52(C)(2)]
Public Input No. 3405-NFPA 70-2023 [New Section after 210.52(C)(3)]
Public Input No. 1658-NFPA 70-2023 [Section No. 210.52(C)(2)]
Public Input No. 2338-NFPA 70-2023 [Section No. 210.52(C)(3)]
Public Input No. 1155-NFPA 70-2023 [Section No. 210.52(C)(2)]
Public Input No. 3404-NFPA 70-2023 [Sections 210.52(C)(2), 210.52(C)(3)]
Public Input No. 1228-NFPA 70-2023 [Section No. 210.52(C)(2)]
Public Input No. 2574-NFPA 70-2023 [Section No. 210.52(C)(2)]
Public Input No. 1316-NFPA 70-2023 [Sections 210.52(C)(1), 210.52(C)(2)]

(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) through (C)(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) Wall Spaces.

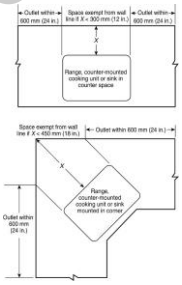
Receptacle outlets shall be installed so that no point along the wall line is more than 600 mm (24 in.) measured horizontally from a receptacle outlet in that space. The location of the receptacles shall be in accordance with 210.52(C)(3).

Exception No. 1: 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).

Exception No. 2: Where a required receptacle outlet cannot be installed in the wall areas shown in Figure 210.52(C)(1), the receptacle outlet shall be permitted to be installed as close as practicable to the countertop area to be served. The total number of receptacle outlets serving the countertop shall not be less than the number needed to satisfy 210.52(C)(1). These outlets shall be located in accordance with 210.52(C)(3).

Exception No. 3: Receptacle outlets located in the specified location in 210.52(A)(2)(3) shall not be located within 610 mm (24 in.) of the countertop or worksurface.

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, if installed to serve an island or peninsular countertop or work surface,~~If provided to serve an island or peninsular countertop or work surface, receptacle outlets shall be installed in accordance with 210.52~~(C)~~©(3) and (4). If a receptacle outlet is not provided to serve an island or peninsular countertop or work surface, electrical provisions shall be provided at the island or peninsula for future addition of a receptacle outlet to serve the island or peninsular countertop or work surface.

(3) Receptacle Outlet Location.

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

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

(2) In a countertop using receptacle outlet assemblies listed for use in countertops

(3) In a work surface using receptacle outlet assemblies listed for use in work surfaces or listed for use in countertops

Receptacle outlets rendered not readily accessible by appliances fastened in place, appliance garages, sinks, or rangetops as covered in 210.52(C)(1), Exception No. 1, or appliances occupying assigned spaces shall not be considered as these required outlets.

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

Informational Note No. 2: See Informative Annex J and ANSI/ICC A117.1-~~2009~~2017, *Standard on Accessible and Usable Buildings and Facilities*, for additional information.

(4) Receptacle Outlet Locations Prohibited.

Required and permitted receptacle outlets shall not be installed on cabinet sides or wall surfaces that are below countertops and work surfaces. Required and permitted receptacle outlets shall not be installed on adjacent walls extending from the base cabinets within 610 mm (24 in.) horizontally and downward from the countertop and work surface edge within 610 mm (24 in.) vertically.

Exception No. 1: Receptacle outlets installed in a drawer shall be permitted to be installed below countertops and work surfaces.

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Exception No. 2: Receptacle outlets located in the specified location in 210.52(A)(2)(3) shall not be located within 610 mm (24 in.) of the countertop or worksurface.

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First Revision No. 8037-NFPA 70-2024 [Section No. 210.52(D)]

(D) Bathrooms.

Receptacle outlets shall be installed in accordance with 210.52(D)(1) through (3).

(1) Receptacle Outlet Requirement.

At least one receptacle outlet shall be installed in bathrooms within 900 mm (3 ft) of the outside edge of each sink.

(2) Receptacle Outlet Location.

The receptacle outlet shall be located on a wall or partition that is adjacent to the sink or sink countertop, located on the countertop, or installed on the side or face of the sink cabinet. In no case shall the receptacle be located more than 300 mm (12 in.) below the top of the sink or sink countertop.

(3) Countertops.

Receptacle outlet assemblies listed for use in countertops shall be permitted to be installed in the countertop.

Informational Note: See 406.5(E) and 406.5(G) for requirements on installation of receptacles in countertops.

Supplemental Information

File Name	Description	Approved
70_CMP2_FR8037_210.52_D_.docx		
70_CMP2_FR8037_210.52_D.docx	For prod use	

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Thu Jan 18 23:41:29 EST 2024

Committee Statement

Committee Statement: The section is revised to comply with NEC Style Manual 3.5.1.2.
Response Message: FR-8037-NFPA 70-2024

Public Input No. 3646-NFPA 70-2023 [Section No. 210.52(D)]

(D) Bathrooms.

Receptacle outlets shall be installed in accordance with 210.52(D)(1) through (3).~~At least one receptacle outlet shall be installed in bathrooms within 900 mm (3 ft) of the outside edge of each sink. The receptacle outlet shall be located on a wall or partition that is adjacent to the sink or sink countertop, located on the countertop, or installed on the side or face of the sink cabinet. In no case shall the receptacle be located more than 300 mm (12 in.) below the top of the sink or sink countertop. Receptacle outlet assemblies listed for use in countertops shall be permitted to be installed in the countertop.~~

~~Informational Note: See 406.5(E) and 406.5(G) for requirements on installation of receptacles in countertops.~~

(1) Receptacle Outlet Requirement.

At least one receptacle outlet shall be installed in bathrooms within 900 mm (3 ft) of the outside edge of each sink.

(2) Receptacle Outlet Location.

The receptacle outlet shall be located on a wall or partition that is adjacent to the sink or sink countertop, located on the countertop, or installed on the side or face of the sink cabinet. In no case shall the receptacle be located more than 300 mm (12 in.) below the top of the sink or sink countertop.

(3) Countertops.

Receptacle outlet assemblies listed for use in countertops shall be permitted to be installed in the countertop.

Informational Note: See 406.5(E) and 406.5(G) for requirements on installation of receptacles in countertops.

First Revision No. 7607-NFPA 70-2024 [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 wall switch or listed wall-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 Jan 15 16:28:03 EST 2024

Committee Statement

Committee Statement: The language has been revised to provide consistency with 210.70. Section 404.14 requires switches to be listed.

Response Message: FR-7607-NFPA 70-2024 PI-1849: The submitter did not provide substantiation for deleting the reference to 210.70(A)(1), Exception No. 1.

Public Input No. 1849-NFPA 70-2023 [Section No. 210.52 [Excluding any Sub-Sections]]

First Revision No. 7982-NFPA 70-2024 [Section No. 210.60]

210.60 Guest Rooms ~~,~~ and Guest Suites of Hotels , ~~Dormitory Units, and Similar Occupancies~~ Motels and Dormitories .

(A) General.

Guest rooms or guest suites in hotels~~ or motels, sleeping rooms in dormitory units, and similar occupancies~~ , motels and dormitories shall have receptacle outlets installed in accordance with 210.52(A) and (D). Guest rooms or guest suites provided with permanent provisions for cooking shall have receptacle outlets installed in accordance with all of the applicable rules in 210.52.

(B) Receptacle Placement.

The total number of receptacle outlets shall not be less than required in 210.52(A). These receptacle outlets shall be permitted to be located conveniently for permanent furniture layout. At least two receptacle outlets shall be readily accessible. Where receptacles are installed behind the bed, the receptacle shall be located to prevent the bed from contacting any attachment plug that may be installed or the receptacle shall be provided with a suitable guard.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 18 14:25:47 EST 2024

Committee Statement

Committee Statement: The terminology and usage for dormitories and for guest rooms and guest suites of dormitories in NFPA 70® is being clarified, to be consistent with NFPA 101 and to avoid enforcement confusion.

Response Message: FR-7982-NFPA 70-2024

Public Input No. 801-NFPA 70-2023 [Section No. 210.60]

First Revision No. 8191-NFPA 70-2024 [Section No. 210.63(B)]

(B) Other Electrical Equipment.

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

~~**(1)** Indoor Service Equipment.~~

~~The required~~

required for premises wiring systems that include a solidly-grounded system operating at less than 150 V to ground. The receptacle outlet shall be

~~located within~~

located within the same room or area as

~~the service equipment.~~

~~**(2)** Indoor Equipment Requiring Dedicated Equipment Spaces.~~

~~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's disconnecting means~~

indoor switchboards, switchgear, panelboards, motor control centers, and service equipment .

Supplemental Information

File Name	Description	Approved
70_CMP2_FR8191_210.63_B_.docx		

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Fri Jan 19 17:58:54 EST 2024

Committee Statement

Committee Statement: The language has been simplified to align with revisions to the dedicated electrical space established in the 2023 NEC. The language requiring the receptacle to not be located on the load side of the equipment disconnecting means is removed.

Response Message: FR-8191-NFPA 70-2024

Public Input No. 10-NFPA 70-2023 [Section No. 210.63(B)(2)]

Public Input No. 498-NFPA 70-2023 [Section No. 210.63(B)(2)]

Public Input No. 772-NFPA 70-2023 [Section No. 210.63(B)(2)]

Public Input No. 4009-NFPA 70-2023 [Section No. 210.63(B)(2)]

Public Input No. 272-NFPA 70-2023 [Section No. 210.63(B)]

(B) Other Electrical Equipment.

In other than ~~one- and two-family~~within a dwelling unit~~s~~, a receptacle outlet shall be required for premises wiring systems that include a solidly-grounded system operating at less than 150 V to ground. The receptacle outlet shall be located within the same room or area as indoor switchboards, switchgear, panelboards, motor control centers, and service equipment.~~located as specified in 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) Indoor Equipment Requiring Dedicated Equipment Spaces.~~

~~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's disconnecting means.~~

First Revision No. 7969-NFPA 70-2024 [Section No. 210.70(A)(1)]

(1) Habitable Rooms, Kitchens, Laundry Areas, and Bathrooms.

At least one lighting outlet controlled by a wall switch or listed wall-mounted control device shall be installed in every habitable room, kitchen, laundry area, and bathroom. The wall switch or wall -mounted control device shall be located near an entrance to the room on a wall.

Exception No. 1: In other than kitchens, laundry areas, and bathrooms, one or more receptacles controlled by a wall switch or listed wall-mounted control device shall be permitted in lieu of lighting outlets.

Exception No. 2: Lighting outlets shall be permitted to be controlled by occupancy sensors that are (1) in addition to wall switches or listed wall-mounted control devices or (2) located at a customary wall switch location and equipped with a manual override that will allow the sensor to function as a wall switch.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 18 13:29:42 EST 2024

Committee Statement

Committee Statement: The language is revised to align with the parent language to include “wall switch” for consistency and usability.

Response Message: FR-7969-NFPA 70-2024

Public Input No. 2187-NFPA 70-2023 [Section No. 210.70(A)(1)]

Public Input No. 184-NFPA 70-2023 [Section No. 210.70(A)(1)]

First Revision No. 7974-NFPA 70-2024 [Section No. 210.70(A)(2)]

(2) Additional Locations.

Additional lighting outlets shall be installed in accordance with the following:

(1) At least one lighting outlet controlled by a wall switch or listed wall-mounted control device shall be installed in hallways, stairways, attached garages, detached garages, and accessory buildings with electric power.

(2) For dwelling units, attached garages, and detached garages with electric power, at least one exterior lighting outlet controlled by a wall switch or listed wall-mounted control device shall be installed to provide illumination on the exterior side of outdoor entrances or exits with grade-level access. A vehicle door in a garage shall not be considered as an outdoor entrance or exit.

Exception to (2): For an outdoor, grade-level bulkhead door with stairway access to a sub-grade-level basement, the required lighting outlet that provides illumination on the stairway steps shall be permitted to be located in the basement interior within 1.5 m (5 ft) horizontally of the bottommost stairway riser. This interior lighting outlet shall be permitted to be controlled by a wall switch or listed wall-mounted control device or by a unit switch of the interior luminaire or interior lampholder.

(3) Where lighting outlets are installed for an interior stairway with six or more risers between floor levels, there shall be a wall switch or listed wall-mounted control device at each floor level and at each landing level that includes a stairway entry to control the lighting outlets.

Exception to (1), (2), and (3): Remote, central, or automatic control of lighting shall be permitted in hallways, in stairways, and at outdoor entrances.

(4) Dimmer control of lighting outlets installed in accordance with 210.70(A)(2)(3) shall not be permitted unless the listed control devices can provide dimming control to maximum brightness at each control location for the interior stairway illumination.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 18 13:44:46 EST 2024

Committee Statement

Committee Statement: The language is revised to align with the parent language to include “wall switch” for consistency and usability.

Response Message: FR-7974-NFPA 70-2024

Public Input No. 2188-NFPA 70-2023 [Section No. 210.70(A)(2)]

First Revision No. 7978-NFPA 70-2024 [Section No. 210.70(B)]

(B) Guest Rooms or Guest Suites.

In hotels, motels, or similar occupancies, guest rooms or guest suites shall have at least one lighting outlet controlled by a wall switch or listed wall-mounted control device installed in every habitable room and bathroom.

Exception No. 1: In other than bathrooms and kitchens where provided, one or more receptacles controlled by a wall switch or listed wall-mounted control device shall be permitted in lieu of lighting outlets.

Exception No. 2: Lighting outlets shall be permitted to be controlled by occupancy sensors that are (1) in addition to a wall switch or listed wall-mounted control devices or (2) located at a customary wall switch location and equipped with a manual override that allows the sensor to function as a wall switch.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 18 14:04:42 EST 2024

Committee Statement

Committee Statement: The language is revised to align with the parent language to include “wall switch” for consistency and usability.

Response Message: FR-7978-NFPA 70-2024

Public Input No. 2190-NFPA 70-2023 [Section No. 210.70(B)]

First Revision No. 7980-NFPA 70-2024 [Section No. 210.70(C)]

(C) All Occupancies.

For attics and underfloor spaces, utility rooms, and basements, at least one lighting outlet containing a switch or controlled by a wall switch or listed wall-mounted control device shall be installed where these spaces are used for storage or contain equipment requiring servicing - and shall comply with the following:

(1) A point of control shall be at each entry that permits access to the attic and underfloor space, utility room, or basement.

(2) Where a lighting outlet is installed for equipment requiring service, the lighting outlet shall be installed at or near the equipment.

(3) Control by automatic means shall not be permitted to control all illumination in attics, underfloor spaces, or utility rooms unless a manual means to bypass the control is provided.

Supplemental Information

File Name	Description	Approved
70_CMP2_FR7980_210.70_C_.docx	staff use	

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 18 14:11:36 EST 2024

Committee Statement

Committee Statement: The structure of the section is revised to align with the NEC Style Manual. Item 3 is added to prohibit exclusive automatic control of lighting in these areas because automatic controls could leave an occupant stranded in the dark.

Response Message: FR-7980-NFPA 70-2024

Public Input No. 1538-NFPA 70-2023 [Section No. 210.70(C)]

(C) All Occupancies.

For attics and underfloor spaces, utility rooms, and basements, at least one lighting outlet containing a switch or controlled by a wall switch or listed wall-mounted control device shall be installed where these spaces are used for storage or contain equipment requiring servicing and shall comply with the following: ~~A point of control shall be at each entry that permits access to the attic and underfloor space, utility room, or basement. Where a lighting outlet is installed for equipment requiring service, the lighting outlet shall be installed at or near the equipment.~~

1) A point of control shall be at each entry that permits access to the attic and underfloor space, utility room, or basement.
2) Where a lighting outlet is installed for equipment requiring service, the lighting outlet shall be installed at or near the equipment.
~~1)~~3) Control by automatic means shall not be permitted to control all illumination in attics, underfloor spaces, or utility rooms unless a manual means to bypass the control is provided.

First Revision No. 7966-NFPA 70-2024 [Section No. 210.70 [Excluding any Sub-Sections]]

Lighting outlets shall be installed where specified in 210.70(A), (B), and (C).~~ The switch or wall-mounted control device shall not rely exclusively on a battery unless a means is provided for automatically energizing the lighting outlets upon battery failure.~~

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 18 13:19:16 EST 2024

Committee Statement

Committee Statement: The exhaustion of a battery in a control device does not pose any greater threat to safe egress than the failure of any other element of a lighting branch circuit such as a failed lamp, loss of utility power, or a tripped circuit breaker. The committee also recognizes that the automatic energization of the lighting could also create a safety issue. Additionally, the need for safe egress lighting falls within the scope of the NFPA 101.

Response Message: FR-7966-NFPA 70-2024

Public Input No. 4444-NFPA 70-2023 [Section No. 210.70 [Excluding any Sub-Sections]]

Public Input No. 795-NFPA 70-2023 [Section No. 210.70 [Excluding any Sub-Sections]]

Public Input No. 1833-NFPA 70-2023 [Section No. 210.70 [Excluding any Sub-Sections]]

Public Input No. 1086-NFPA 70-2023 [Section No. 210.70 [Excluding any Sub-Sections]]

Public Input No. 4286-NFPA 70-2023 [Section No. 210.70 [Excluding any Sub-Sections]]

First Revision No. 7992-NFPA 70-2024 [Section No. 220.5(A)]

(A) Voltages.

Unless other voltages are specified, for purposes of calculating branch-circuit and feeder loads, nominal system voltages of 120, 120/240, 208Y/120, 240, 347, 416Y/240, 480Y/277, 480, 600Y/347, and 600 volts shall be used.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 18 15:26:59 EST 2024

Committee Statement

Committee Statement: Many industrial and commercial facilities, such as data centers, now use a 416Y/240 volt system. Adding this as a standard voltage to Article 220 assists users of the Code when performing load calculations for these systems.

Response Message: FR-7992-NFPA 70-2024

Public Input No. 2916-NFPA 70-2023 [Section No. 220.5(A)]

Public Input No. 3129-NFPA 70-2023 [Section No. 220.5(A)]

First Revision No. 7994-NFPA 70-2024 [Section No. 220.5(B)]

(B) Fractions of an Ampere.

~~Calculations~~ Load calculations shall be permitted to be rounded to the nearest whole ampere, with decimal fractions smaller than 0.5 dropped.

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Thu Jan 18 15:31:00 EST 2024

Committee Statement

Committee Statement: Adding the word “Load” provides clarity to this paragraph as to when rounding up or down is permitted.
Response Message: FR-7994-NFPA 70-2024

Public Input No. 1514-NFPA 70-2023 [Section No. 220.5(B)]

First Revision No. 7991-NFPA 70-2024 [New Section after 220.5(C)]

(D) DC Loads.

For dc equipment, volt-amperes (VA) shall be considered equivalent to watts (W), and kilovolt-amperes (kVA) shall be considered equivalent to kilowatts (kW), for loads calculated in this Article.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 18 15:24:27 EST 2024

Committee Statement

Committee Statement: Throughout Article 220 there are requirements for utilizing “volt-ampere” ratings for conducting load calculations. However, dc-rated equipment and dc loads are routinely rated in watts (W) and kilowatts (kW). For dc circuits, these are equivalent to volt-amperes (VA) and kilovolt-amperes (kVA), respectively. This new sub-section for 220.5 recognizes the electrical power equivalency and clarifies the load calculation rules as applicable to DC-rated equipment and loads.

Response Message: FR-7991-NFPA 70-2024

Public Input No. 4267-NFPA 70-2023 [Section No. 220.5]

First Revision No. 8190-NFPA 70-2024 [New Section after 220.5(C)]

(E) 125-Percent Multiplier.

Load calculations shall not require continuous loads to be calculated at 125 percent.

Informational Note: A 125-percent multiplier could be required for reasons other than continuous load. Continuous loads impact the sizing of the conductor and overcurrent device but might not influence the load.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 19 17:54:17 EST 2024

Committee Statement

Committee Statement: For the 1999 NEC Code Cycle the TCC Task Group on the Usability of the NEC, submitted a proposal with the following substantiation: “The proposal serves to make Article 220 a true calculations article and relocate any other requirements (such as conductor or overcurrent device sizing) to the appropriate parts of Articles 210” (refer to NEC-ROP-1998, Proposal 2-5). Load calculations in Article 220 are not intended to require a 125- percent multiplier simply due to the fact that the load is considered continuous. However, there are Sections in Article 220 that do require a 125 percent multiplier. To improve clarity, a new sub-section is added to Section 220.5 that addresses this issue. Also included is an Informational Note that explains that being a continuous load impacts the sizing of the conductor and overcurrent device, but not necessarily the computation of the load when performing a load calculation.

Response Message: FR-8190-NFPA 70-2024

First Revision No. 7995-NFPA 70-2024 [Section No. 220.5(C)]

(C) Floor Area.

The floor area for each floor shall be calculated from the outside dimensions of the building, dwelling unit, or other area involved. For dwelling units, the calculated floor area shall not include detached garages, open porches or unfinished areas not adaptable for future use as a habitable room or occupiable space.

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Thu Jan 18 15:33:09 EST 2024

Committee Statement

Committee Statement: Including “detached garages” to the list of areas not included in floor area calculations clears up the confusion of whether or not to include detached garages. When “garages” were removed from the requirement for the 2023 NEC, the removal of “detached garages” was not identified.

Response Message: FR-7995-NFPA 70-2024

Public Input No. 1763-NFPA 70-2023 [Section No. 220.5(C)]

Public Input No. 1389-NFPA 70-2023 [Section No. 220.5(C)]

First Revision No. 8017-NFPA 70-2024 [Section No. 220.10]

220.10 General.

Branch-circuit loads shall be calculated in accordance with the following sections:

(1) 220.14 for other loads — all occupancies

(2) 220.16 for additions to existing installations

(3) 220.~~41~~ 13 for dwelling units

(4) 220.42 for lighting loads for non-dwelling occupancies

(5) 220.44 for hotel and motel occupancies

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 18 16:48:36 EST 2024

Committee Statement

Committee Statement: In order to avoid impacting (reducing) the number of branch circuits serving general lights and receptacles in dwellings due to the changes in 220.41, 220.10, Item (3) is revised to reference a new section 220.13. This new section, located in Part II of the article, maintains branch circuit calculations at the current value of 3 va/ft2.

The minimum load for general lights and receptacles over-estimates the load when high-efficacy light sources (e.g., LED, CFL) are used. In new dwelling units, building code requirements for high-efficacy lighting are ubiquitous in the US. In addition, recent rulemaking by the US Department of Energy (DOE) prohibits the sale of any general service lamp (GSL) that does not meet a minimum efficacy standard of 45 lumens per watt (10 CFR 430.32(dd)). This rulemaking effectively prohibits the sale of all incandescent and halogen GSL in the US.

Lawrence Berkely National Lab (LBNL) has recently reported on sub-metering in 896 occupied US dwellings showing median general lights and receptacle density of 2.3 watts/ft2, including dwellings with a variety of lighting types. Similarly, LBNL reported on lighting audit data from 2,053 existing dwellings in the Pacific Northwest. The installed lighting density was strongly dependent on the fraction of LED/CFL light sources, with an observed reduction in lighting density of 0.015 va/ft2 for each percent of LED or CFL light sources in the dwelling. 100% CFL or LED lighting reduced lighting density by 1.5 va/ft2.

The new value of 2 va/ft2 [in 220.41] assumes approx. 80% LED or CFL lighting in the dwelling (3 va/ft2 – 0.80*0.012). Note -– The 0.015 va/ft2 from LBNL is reduced in this calculation to 0.012 va/ft2 using an 80% power factor (this is consistent with treatment of lighting loads in Table 220.42(A)).

Response Message: FR-8017-NFPA 70-2024

First Revision No. 8003-NFPA 70-2024 [Section No. 220.11(A)]

(A) Motor-Operated and Combination Loads.

Where a circuit supplies only motor-operated loads, the conductor sizing requirement specified in 430.22 shall apply. Where a circuit supplies only air-conditioning equipment, refrigerating equipment, or both, the requirements of 440.6 shall apply. For circuits supplying loads consisting of motor-operated utilization equipment that is fastened in place and has a motor larger than ⅛ hp in combination with other loads, the total calculated load shall be ~~based on~~ not less than 125 percent of the largest motor load plus the sum of the other loads in accordance with 430.24.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 18 16:03:30 EST 2024

Committee Statement

Committee Statement: The current wording is clarified to indicate that the 125 percent multiplier is a minimum value.

Response Message: FR-8003-NFPA 70-2024

First Revision No. 8004-NFPA 70-2024 [Section No. 220.11(B)]

(B) ~~Inductive and LED~~ _ Lighting Loads.

For circuits supplying lighting units that have ballasts, transformers, autotransformers, or LED drivers, the calculated load shall be based on the total ampere ratings of such units and not on the total watts of the lamps.

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Thu Jan 18 16:05:35 EST 2024

Committee Statement

Committee Statement: The sub-section heading includes more details than necessary. To align with other sub-section titles for this Section, the title is modified to reflect "Lighting Loads".
Response Message: FR-8004-NFPA 70-2024

First Revision No. 8018-NFPA 70-2024 [New Section after 220.11(C)]

220.13 Dwelling Units – Branch Circuit Loads.

In dwelling units, the minimum unit load shall be not less than 33 volt-amperes/m2 (3 volt-amperes/ft2) for calculating minimum branch circuits required.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 18 16:51:39 EST 2024

Committee Statement

Committee Statement: In order to avoid impacting (reducing) the number of branch circuits serving general lights and receptacles in dwellings, this new section, located in Part II of the article, maintains branch circuit calculations at the current value of 3 va/ft2.

The minimum load for general lights and receptacles over-estimates the load when high-efficacy light sources (e.g., LED, CFL) are used. In new dwelling units, building code requirements for high-efficacy lighting are ubiquitous in the US. In addition, recent rulemaking by the US Department of Energy (DOE) prohibits the sale of any general service lamp (GSL) that does not meet a minimum efficacy standard of 45 lumens per watt (10 CFR 430.32(dd)). This rulemaking effectively prohibits the sale of all incandescent and halogen GSL in the US.

Lawrence Berkely National Lab (LBNL) has recently reported on sub-metering in 896 occupied US dwellings showing median general lights and receptacle density of 2.3 watts/ft2, including dwellings with a variety of lighting types. Similarly, LBNL reported on lighting audit data from 2,053 existing dwellings in the Pacific Northwest. The installed lighting density was strongly dependent on the fraction of LED/CFL light sources, with an observed reduction in lighting density of 0.015 va/ft2 for each percent of LED or CFL light sources in the dwelling. 100% CFL or LED lighting reduced lighting density by 1.5 va/ft2.

The new value of 2 va/ft2 [in 220.41] assumes approx. 80% LED or CFL lighting in the dwelling (3 va/ft2 – 0.80*0.012). Note -– The 0.015 va/ft2 from LBNL is reduced in this calculation to 0.012 va/ft2 using an 80% power factor (this is consistent with treatment of lighting loads in Table 220.42(A)).

Response Message: FR-8018-NFPA 70-2024

First Revision No. 8049-NFPA 70-2024 [Section No. 220.14(B)]

(B) Electric Dryers and Electric Cooking Appliances in Dwellings and Household Cooking Appliances Used in Instructional Programs.

Load calculations shall be permitted as specified in 220.~~54 for electric dryers and in 220.~~ 55 for electric ranges and other cooking appliances. Electric dryers branch load shall be calculated using 5000 watts (volt-amperes) or nameplate whichever is greater for each dryer served.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 19 09:11:41 EST 2024

Committee Statement

Committee Statement: References to electric dryers, and the reference to 220.54, are removed from this section so that changes implemented in 220.54 do not impact dryers on an individual branch circuit. With this change, 5 or more dryers would no longer be supplied by an individual branch circuit with a demand factor applied. The existing provision to require treatment of the dryer at the nameplate rating, or 5000 watts, whichever is greater, is now stated in 220.14 for the branch circuit.

Response Message: FR-8049-NFPA 70-2024

First Revision No. 8005-NFPA 70-2024 [Section No. 220.14(D)]

(D) Luminaires.

An outlet supplying a luminaire(s) shall be calculated ~~based on~~ at not less than the maximum volt-ampere rating of the equipment and lamps for which the luminaire(s) is rated.

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Thu Jan 18 16:06:57 EST 2024

Committee Statement

Committee Statement: The current wording is clarified to indicate that the maximum volt-ampere rating of the equipment and lamps is a minimum value.
Response Message: FR-8005-NFPA 70-2024

First Revision No. 8002-NFPA 70-2024 [Section No. 220.14(K)]

(K) Other Outlets.

Other outlets not covered in 220.14(A) through (J) shall be calculated ~~based on~~ at not less than 180 volt-amperes per outlet.

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Thu Jan 18 16:00:41 EST 2024

Committee Statement

Committee Statement: Outlets not covered by 220.14(A) through 220.14(J) may include loads that are known to be greater than 180 volt-amps per outlet. The current wording is clarified to indicate that the 180 volt-ampere per outlet is a minimum value.

Response Message: FR-8002-NFPA 70-2024

Public Input No. 290-NFPA 70-2023 [Section No. 220.14(K)]

First Revision No. 8009-NFPA 70-2024 [Section No. 220.16(A)]

(A) Dwelling Units.

Loads added to an existing dwelling unit(s) shall ~~comply with the following as applicable: Loads for structural additions to an existing dwelling unit or for a previously unwired portion of an existing dwelling unit shall~~ be calculated in accordance with 220.14 .

- ~~Loads for new circuits or extended circuits in previously wired dwelling units shall be calculated in accordance with 220.14 .~~

Supplemental Information

File Name	Description	Approved
70_CMP2_FR8009_220.16_A_.docx	staff use	

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 18 16:26:51 EST 2024

Committee Statement

Committee Statement: The requirement is revised for clarity. All of 220.14 should be referenced. With this reference to the entire Section, other requirements referred to in 220.14, such as 220.41 (refer to 220.14(I)) are included.

Response Message: FR-8009-NFPA 70-2024

Public Input No. 827-NFPA 70-2023 [Section No. 220.16(A)]

Public Input No. 915-NFPA 70-2023 [Section No. 220.16(A)]

(A) Dwelling Units.

Loads added to an existing dwelling unit(s) shall be calculated in accordance with 220.14.~~comply with the following as applicable:~~

~~(1) Loads for structural additions to an existing dwelling unit or for a previously unwired portion of an existing dwelling unit shall be calculated in accordance with 220.14.~~

~~(2) Loads for new circuits or extended circuits in previously wired dwelling units shall be calculated in accordance with 220.14.~~

First Revision No. 8013-NFPA 70-2024 [Section No. 220.41]

220.41 Dwelling Units, Minimum Unit Load.

In one-family, two-family, and multifamily dwellings, the minimum unit load shall be not less than ~~33 volt~~ 22 volt -amperes/m^2 (~~3 volt~~ 2 volt -amperes/ft^2).

Unit loads include the following lighting and receptacle outlets, and no additional load calculations shall be required:

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

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

(3) The lighting outlets specified in 210.70

The minimum lighting load shall be determined using the minimum unit load and the floor area as determined in 220.5(C) for dwelling occupancies. Motors rated less than ⅛ hp and connected to a lighting circuit shall be considered part of the minimum lighting load.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 18 16:33:43 EST 2024

Committee Statement

Committee Statement: The minimum load for general lights and receptacles over-estimates the load when high-efficacy light sources (e.g., LED, CFL) are used. In new dwelling units, building code requirements for high-efficacy lighting are ubiquitous in the US. In addition, recent rulemaking by the US Department of Energy (DOE) prohibits the sale of any general service lamp (GSL) that does not meet a minimum efficacy standard of 45 lumens per watt (10 CFR 430.32(dd)). This rulemaking effectively prohibits the sale of all incandescent and halogen GSL in the US.

Lawrence Berkely National Lab (LBNL) has recently reported on sub-metering in 896 occupied US dwellings showing median general lights and receptacle density of 2.3 watts/ft2, including dwellings with a variety of lighting types. Similarly, LBNL reported on lighting audit data from 2,053 existing dwellings in the Pacific Northwest. The installed lighting density was strongly dependent on the fraction of LED/CFL light sources, with an observed reduction in lighting density of 0.015 va/ft2 for each percent of LED or CFL light sources in the dwelling. 100% CFL or LED lighting reduced lighting density by 1.5 va/ft2.

The new value of 2 va/ft2 assumes approx. 80% LED or CFL lighting in the dwelling (3 va/ft2 – 0.80*0.012). Note -– The 0.015 va/ft2 from LBNL is reduced in this calculation to 0.012 va/ft2 using an 80% power factor (this is consistent with treatment of lighting loads in Table 220.42(A)).

In order to avoid impacting (reducing) the number of branch circuits serving general lights and receptacles in dwellings, 220.10 is also revised to reference a new section 220.13. This new section, located in Part II of the article, maintains branch circuit calculations at the current value of 3 va/ft2.

Response Message: FR-8013-NFPA 70-2024

Public Input No. 3236-NFPA 70-2023 [Section No. 220.41]

First Revision No. 8021-NFPA 70-2024 [Section No. 220.50(B)]

(B) Air-Conditioning Equipment.

The conductor sizing requirements specified in ~~Part IV of~~ Article 440, Part IV shall be used to determine air-conditioning loads for hermetic refrigerant motor-compressors.

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Thu Jan 18 16:55:48 EST 2024

Committee Statement

Committee Statement: The text is reformatted to comply with Section 4.1.4 of the NEC Style Manual.
Response Message: FR-8021-NFPA 70-2024

Public Input No. 2629-NFPA 70-2023 [Section No. 220.50(B)]

First Revision No. 8044-NFPA 70-2024 [Section No. 220.54]

220.54 Electric Clothes Dryers — Dwelling Unit(s).

The load for household electric clothes dryers in a dwelling unit(s) shall be ~~either~~ the nameplate rating when available or 5000 watts (volt-amperes) ~~or the nameplate rating~~, whichever is larger, for each dryer served. The use of the demand factors in Table 220.54 shall be permitted. Where two or more single-phase dryers are supplied by a 3-phase, 4-wire feeder or service, the total load shall be calculated on the basis of twice the maximum number connected between any two phases. Kilovolt-amperes (kVA) shall be considered equivalent to kilowatts (kW) for loads calculated in this section.

Table 220.54 Demand Factors for Household Electric Clothes Dryers

Number of Dryers	Demand Factor (%)
~~1–4~~ 1–5	~~100~~ 80
~~5~~	~~85~~
6	75
7	65
8	60
9	55
10	50
11	47
12–23	47% minus 1% for each dryer exceeding 11
24–42	35% minus 0.5% for each dryer exceeding 23
43 and over	25%

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Fri Jan 19 08:51:37 EST 2024

Committee Statement

Committee Statement: The demand factor for clothes dryers is revised. The value of 80% is based on analysis shared by Lawrence Berkely National Lab (LBNL) of sub-metering end-use data in 953 occupied US dwellings. LBNL observed the following median demand factors for electric resistance clothes dryers: Clothes Dryer (resistance) (n=574), mean of 64% demand factor (median of 77%).

Response Message: FR-8044-NFPA 70-2024

Public Input No. 4151-NFPA 70-2023 [Section No. 220.54]

First Revision No. 8054-NFPA 70-2024 [Section No. 220.56]

220.~~56~~ 56 Instantaneous Water Heaters and Kitchen Equipment — Other Than Dwelling Unit(s).

Calculating the load for instantaneous water heaters and commercial electric cooking equipment, dishwasher booster heaters, water heaters, and other kitchen equipment in accordance with Table 220.56 shall be permitted. Other kitchen equipment shall include equipment that is fastened in place and rated ¼ hp or greater, or 500 watts or greater. These demand factors shall be applied to all instantaneous water heaters or equipment that has either thermostatic control or intermittent use as kitchen equipment. These demand factors shall not apply to space-heating, ventilating, or air-conditioning equipment.

However, in no case shall the feeder or service calculated load be less than the sum of the largest two kitchen equipment loads.

Table 220.56 Demand Factors for Instantaneous Water Heaters and Kitchen Equipment — Other Than Dwelling Unit(s)

Number of Units of Equipment	Demand Factor (%)
1	100
2	100
3	90
4	80
5	70
6 and over	65

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 19 09:36:05 EST 2024

Committee Statement

Committee Statement: Instantaneous water heaters have been identified in the text for clarity that these demand factors apply to all types of electric water heaters.

Response Message: FR-8054-NFPA 70-2024

Public Input No. 1005-NFPA 70-2023 [Section No. 220.56]

First Revision No. 8060-NFPA 70-2024 [Section No. 220.57]

220.57 Electric Vehicle Supply Equipment (EVSE) Load.

The EVSE ~~load~~ loads shall be calculated at either 7200 watts (volt-amperes) or the nameplate rating of the equipment, whichever is larger, for each EVSE served, unless modified by 625 .42.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 19 10:08:04 EST 2024

Committee Statement

Committee Statement: Adding "each EVSE served" clarifies how to apply the requirement when multiple EVSE loads are installed. A reference to 625.42 is added to address the ability to utilize the rules for energy management systems in load calculations.

Response Message: FR-8060-NFPA 70-2024

First Revision No. 8181-NFPA 70-2024 [Section No. 220.60]

220.~~60~~ 6 Noncoincident Loads.

~~If it is unlikely that~~ For two or more noncoincident loads~~ will be in use simultaneously, using only the largest load(s) that will be used at one time for calculating the total load of a feeder or service shall be permitted. If a motor or air-conditioning load is part of the noncoincident load and is not the largest of the noncoincident loads, 125 percent of either the motor load or air-conditioning load, whichever is larger, shall be used in the calculation.~~ , it shall be permitted to use the single largest of these loads in the calculation of the total load. Determination of the largest noncoincident load shall include treatment of any motor-operated and combination loads as specified in 220.11(A). Noncoincident loads shall be considered to be one of the following:

(1) For Feeders –or Services - Two or more loads that are unlikely to be in use simultaneously

(2) For Branch-Circuits, Feeders, –or Services - Two or more loads that are prevented from being in use simultaneously by listed equipment

Supplemental Information

File Name	Description	Approved
70_CMP2_FR8181_220.60.docx		

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 19 16:54:31 EST 2024

Committee Statement

Committee Statement: Section 220.60 has been rewritten and restructured to clarify the determination and treatment of noncoincident loads.

Requirements regarding the “125 percent of either the motor load or air-conditioning load, whichever is larger” were originally added to clarify that the value included application of the motor-operated and combination loads as specified in 220.11(A) (Refer to FR 8062-NFPA 70-2018; note that 220.11(A) was 220.18(A) in the 2020 NEC). The present wording is confusing, so rather than restate the requirement, the statement is revised to refer to 220.11(A), thus maintaining the original intent of the requirement.

List items were added to specify what is considered as non-coincident loads, with feeders and services maintaining the traditional usage of “two or more loads that are unlikely to be in use simultaneously”, and a more rigorous requirement applying to branch-circuits, since those loads do not benefit from diversity of multiple loads.

Section 220.60 is also relocated to 220.6, in Part I (General), to allow the provision to apply to load calculation throughout Article 220, including branch-circuits in addition to feeders and services.

Response Message: FR-8181-NFPA 70-2024

Public Input No. 3024-NFPA 70-2023 [Section No. 220.60]

Public Input No. 2049-NFPA 70-2023 [Section No. 220.60]
Public Input No. 3996-NFPA 70-2023 [Section No. 220.60]
Public Input No. 309-NFPA 70-2023 [Section No. 220.60]
Public Input No. 1261-NFPA 70-2023 [Section No. 220.60]
Public Input No. 4298-NFPA 70-2023 [Section No. 220.60]
Public Input No. 83-NFPA 70-2023 [Section No. 220.60]
Public Input No. 4235-NFPA 70-2023 [Section No. 220.60]
Public Input No. 1826-NFPA 70-2023 [Section No. 220.60]

220.6~~220.60~~ Noncoincident Loads.

For two or more noncoincident loads, it shall be permitted to use the single largest of these loads in the calculation of the total load. Determination of the largest noncoincident load shall include treatment of any motor-operated and combination loads as specified in 220.11(A).
Noncoincident loads shall be considered to be one of the following:~~If it is unlikely that two or more noncoincident loads will be in use simultaneously, using only the largest load(s) that will be used at one time for calculating the total load of a feeder or service shall be permitted. If a motor or air-conditioning load is part of the noncoincident load and is not the largest of the noncoincident loads, 125 percent of either the motor load or air-conditioning load, whichever is larger, shall be used in the calculation.~~

1. For Feeders–or Services - Two or more loads that are unlikely to be in use simultaneously
2. For Branch-Circuits, Feeders,–or Services - Two or more loads that are prevented from being in use simultaneously by listed equipment

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First Revision No. 8064-NFPA 70-2024 [Section No. 220.61(B)]

(B) Permitted Reductions.

A service or feeder supplying the following loads shall be permitted ~~to have an additional demand factor of 70 percent applied to the amount in~~ in accordance with 220.61(B)(1) and ~~a portion of the amount in~~ 220.61(B)(2).

(1) Household Electric Ranges, Wall-Mounted Ovens, Counter-Mounted Cooking Units, and Dryers.

A demand factor of 70 percent shall be permitted to be applied to the feeder or service supplying household electric ranges, wall-mounted ovens, counter-mounted cooking units, and electric dryers, where the maximum unbalanced load has been determined in accordance with Table 220.55 for ranges and Table 220.54 for dryers.

(2) Unbalanced Load in Excess of 200 Amperes.

~~That~~ A demand factor of 70 percent shall be permitted to be applied to the portion of the unbalanced load in excess of 200 amperes where the feeder or service is supplied from a 3-wire dc or single-phase ac system; a 4-wire, 3-phase system; a 3-wire, 2-phase system; or a 5-wire, 2-phase system.

Informational Note: See Informative Annex D, Examples D1(a), D1(b), D2(b), D4(a), and D5(a) for examples of unbalanced feeder or service neutral loads.

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Fri Jan 19 10:30:21 EST 2024

Committee Statement

Committee Statement: The 70 percent demand factor is relocated to sub-sections (1) and (2) for improved clarity.
Response Message: FR-8064-NFPA 70-2024

Public Input No. 3071-NFPA 70-2023 [Section No. 220.61(B)]

Public Input No. 1540-NFPA 70-2023 [Section No. 220.61(B) [Excluding any Sub-Sections]]

First Revision No. 8184-NFPA 70-2024 [Section No. 220.70]

~~The setpoint value of the EMS shall be considered a continuous load for the purposes of load calculations~~

220.70 ~~Energy Management Systems (EMSs).~~

~~If an energy management system (EMS) is used to limit the current to a feeder or service in accordance with 750.30 , a single value equal to the maximum ampere setpoint of the EMS shall be permitted to be used in load calculations for the feeder or service.~~

7 Power Control System (PCS) .

PCS shall be permitted to be used for branch-circuit, feeder, or service load calculations. When used in load calculations, the installation shall comply with 220.7(A) through (D).

(A) PCS Requirements. The PCS shall comply with Article 750, Part II.

(B) PCS Current Setpoint. The PCS current setpoint shall be determined by qualified personnel and shall be set to no greater than 80 percent of the rating of the overcurrent protective device for the circuit for which the PCS is providing overload control.

(C) Load Calculations Using PCS. Load calculations that use PCS shall be based on the monitoring and control configuration of the PCS and shall comply with one or both of the following:

(1) Monitoring Only Controlled Loads. When the PCS monitors only controlled loads, the current setpoint of the PCS shall be used in place of the controlled loads in load calculations.

(2) Monitoring Controlled and Non-Controlled Loads. When the PCS monitors both controlled and non-controlled loads, the minimum operating current of the controlled loads shall be used in load calculations

Informational Note: Minimum operating current is a value greater than or equal to zero representing the minimum current allowed for each load by the PCS.

(D) Non-Controlled Loads. The load calculations for loads that are not controlled by the PCS shall meet the requirements in Parts II – VII of this article.

Informational Note: See Informative Annex D, Examples D14(a) – D14(d) for examples of load calculations with loads managed by PCS .

Supplemental Information

File Name	Description	Approved
70_CMP2_FR8184_220.70.docx		
70_CMP2_FR8184_220.70.docx	For prod use	

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 19 17:10:28 EST 2024

Committee Statement

Committee Statement: Section 220.70 was relocated to Article 220 Part I to reinforce that a Power Control System can be used for load calculations throughout Article 220. The new 220.7 restructures the requirements into 5 sub-sections for clarity.

Energy Management System (EMS) was renamed to Power Control System (PCS) to differentiate an EMS with overload control from an EMS without overload control. 220.7(A) refers to Part II of Article 750, which is the subject of a PI for CMP 13 to identify requirements for EMS with overload control functionality. Should CMP 13 not create part II, this action will need to be revisited.

A requirement was added that the setpoint shall be determined by “Qualified Personnel”.

Response Message: FR-8184-NFPA 70-2024

Public Input No. 4238-NFPA 70-2023 [Section No. 220.57]

Public Input No. 4488-NFPA 70-2023 [Section No. 220.83(A)]

Public Input No. 4491-NFPA 70-2023 [Section No. 220.83(B)]

Public Input No. 4498-NFPA 70-2023 [Section No. 220.84(C)]

Public Input No. 3025-NFPA 70-2023 [Section No. 220.70]

Public Input No. 4237-NFPA 70-2023 [Section No. 220.82(B)]

Public Input No. 4357-NFPA 70-2023 [Section No. 220.70]

Public Input No. 4302-NFPA 70-2023 [Section No. 220.70]

220.~~70 7 Energy Management Systems (EMSs)~~Power Control System (PCS).

~~If an energy management system (EMS) is used to limit the current to a feeder or service in accordance with 750.30, a single value equal to the maximum ampere setpoint of the EMS shall be permitted to be used in load calculations for the feeder or service.~~

~~The setpoint value of the EMS shall be considered a continuous load for the purposes of load calculations.~~

PCS shall be permitted to be used for branch-circuit, feeder, or service load calculations. When used in load calculations, the installation shall comply with 220.7(A) through (D).

(A) PCS Requirements. The PCS shall comply with Article 750, Part II.

(B) PCS Current Setpoint. The PCS current setpoint shall be determined by qualified personnel and shall be set to no greater than 80 percent of the rating of the overcurrent protective device for the circuit for which the PCS is providing overload control.

(C) Load Calculations Using PCS. Load calculations that use PCS shall be based on the monitoring and control configuration of the PCS and shall comply with one or both of the following:

(1) Monitoring Only Controlled Loads. When the PCS monitors only controlled loads, the current setpoint of the PCS shall be used in place of the controlled loads in load calculations.

(2) Monitoring Controlled and Non-Controlled Loads. When the PCS monitors both controlled and non-controlled loads, the minimum operating current of the controlled loads shall be used in load calculations

Informational Note: Minimum operating current is a value greater than or equal to zero representing the minimum current allowed for each load by the PCS.

(D) Non-Controlled Loads. The load calculations for loads that are not controlled by the PCS shall meet the requirements in Parts II – VII of this article.

Informational Note: See Informative Annex D, Examples D14(a) – D14(d) for examples of load calculations with loads managed by PCS.

First Revision No. 8081-NFPA 70-2024 [Section No. 220.82(A)]

(A) Feeder and Service Load.

This section applies to a dwelling unit having the total connected load served by a single 120/240-volt or 208Y/120-volt set of 3-wire service or feeder conductors with an ampacity of 100 or greater. It shall be permissible to calculate the feeder and service loads in accordance with this section instead of the method specified in Part III of this article. The calculated load shall be the result of adding the loads from 220.82(B) ~~and~~ , (C), and (D) . Feeder and service-entrance conductors whose calculated load is determined by this optional calculation shall be permitted to have the neutral load determined by 220.61.

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Fri Jan 19 11:03:03 EST 2024

Committee Statement

Committee Statement: A reference to the new sub-section (D) is added.
Response Message: FR-8081-NFPA 70-2024

Public Input No. 2407-NFPA 70-2023 [Section No. 220.82(A)]

First Revision No. 8082-NFPA 70-2024 [Section No. 220.82(B)]

(B) General Loads.

The general calculated load shall be not less than 100 percent of the first ~~10 kVA~~ 8 kVA plus 40 percent of the remainder of the following loads:

(1) ~~33 volt~~ 22 volt -amperes/m^2 or ~~3 volt~~ 2 volt -amperes/ft^2 for general lighting and general-use receptacles. The floor area ~~for each floor shall be calculated from the outside dimensions of the dwelling unit. The calculated floor area shall not include open porches, garages, or unused or unfinished spaces not adaptable for future use~~ shall be determined in accordance with 220.5(C) .

(2) 1500 volt-amperes for each 2-wire, 20-ampere small-appliance branch circuit and each laundry branch circuit covered in 210.11(C)(1) and (C)(2).

(3) The nameplate rating of the following:

(4) All appliances that are fastened in place, permanently connected, or located to be on a specific circuit

(5) Ranges, wall-mounted ovens, counter-mounted cooking units

(6) Clothes dryers that are not connected to the laundry branch circuit specified in 220.82(B)(2)

(7) Water heaters

(8) The nameplate ampere or kVA rating of all permanently connected motors not included in 220.82(B)(3).

Supplemental Information

File Name	Description	Approved
70_CMP2_FR8082_220.82_B_.docx	staff use	

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Fri Jan 19 11:07:19 EST 2024

Committee Statement

Committee Statement: In response to data provided by Lawrence Berkeley National Labs (Refer to Committee Statement related to First Revision in Section 220.41), the requirement of 3 VA per ft2 is reduced to 2 VA per ft2.

Additionally, the treatment of the first 10 kW of load at 100% is reduced to 8 kW at 100%, based on analysis performed by Lawrence Berkely National Lab (LBNL) on sub-metering data from 942 occupied US dwellings. LBNL assessed the connected loads in these homes (based on observed maximum power demand for each branch circuit) and compared this with the metered maximum power demand for the whole dwelling. The report demonstrates that the 8 kW value leads to accurate load calculations in 95% of dwellings, where the predicted load is greater than the metered load. The 10 kW

assumption performs similarly, while negatively impacting homes with fewer loads by overestimating their loads.

Lastly, inconsistencies have emerged between 220.5(C) and 220.82(B)(1). The description of the floor area should match between these two sub-sections, but due to changes in 220.5(C), that alignment has been lost. Rather than repeat the text from 220.5(C), a reference to that sub-section is provided.

Response Message: FR-8082-NFPA 70-2024

Public Input No. 838-NFPA 70-2023 [Section No. 220.82(B)]

Public Input No. 3067-NFPA 70-2023 [Section No. 220.82(B)]

Public Input No. 643-NFPA 70-2023 [Section No. 220.82(B)]

Public Input No. 1886-NFPA 70-2023 [Section No. 220.82(B)]

Public Input No. 3239-NFPA 70-2023 [Section No. 220.82(B)]

(B) General Loads.

The general calculated load shall be not less than 100 percent of the first 10 kVA plus 40 percent of the remainder of the following loads:

(1) ~~33~~ 22 volt-amperes/m^2 or ~~3~~ 2 volt-amperes/ft^2 for general lighting and general-use receptacles. The floor area shall be determined in accordance with 220.5(C).~~for each floor shall be calculated from the outside dimensions of the dwelling unit. The calculated floor area shall not include open porches, garages, or unused or unfinished spaces not adaptable for future use.~~

(2) 1500 volt-amperes for each 2-wire, 20-ampere small-appliance branch circuit and each laundry branch circuit covered in 210.11(C)(1) and (C)(2).

(3) The nameplate rating of the following:

a. All appliances that are fastened in place, permanently connected, or located to be on a specific circuit

b. Ranges, wall-mounted ovens, counter-mounted cooking units

c. Clothes dryers that are not connected to the laundry branch circuit specified in 220.82(B)(2)

d. Water heaters

(4) The nameplate ampere or kVA rating of all permanently connected motors not included in 220.82(B)(3).

First Revision No. 8079-NFPA 70-2024 [New Section after 220.82(C)]

(D) EVSE Loads.

The total load of an EVSE shall be calculated at 100 percent in accordance with 220.57.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 19 10:59:23 EST 2024

Committee Statement

Committee Statement: EVSE are becoming more commonplace and represent a significant load. As such, a new sub-section (D) is added to refer back to 220.57, which provides requirements for calculating the load attributed to EVSE.

Response Message: FR-8079-NFPA 70-2024

Public Input No. 2282-NFPA 70-2023 [New Section after 220.82]

Public Input No. 3204-NFPA 70-2023 [Section No. 220.82(B)]

First Revision No. 8188-NFPA 70-2024 [Section No. 220.83]

220.83 Existing Dwelling Unit.

This section shall be permitted to be used to determine if the existing service or feeder is of sufficient capacity to serve additional loads~~. Where~~ , where the dwelling unit is served by a 120/240-volt or 208Y/120-volt, 3-wire service or feeder~~, calculating the total load in accordance with 220~~ . ~~83(A) or (B) shall be permitted.~~

~~**(A)** Where Additional Air-Conditioning Equipment or Electric Space-Heating Equipment Is Not to Be Installed.~~

The percentages listed in Table 220.83

~~(A)~~

shall be used for existing and additional new loads.

~~**Table 220.83(A) Without Additional Air-Conditioning or Electric Space-Heating Equipment**~~

~~Load (kVA) Percent of Load First 8 kVA of load at 100 Remainder of load at 40 Load~~

~~The larger connected load of air-conditioning or space heating, but not both, shall be used.~~

Load calculations shall include the following:

(1) General lighting and general-use receptacles at ~~33 volt~~ 22 volt -amperes/m^2 or ~~3 volt~~ 2 volt -amperes/ft^2 ~~as determined by 220.42~~

(2) 1500 volt-amperes for each 2-wire, 20-ampere small-appliance branch circuit and each laundry branch circuit covered in 210.11(C)(1) and (C)(2)

~~The percentages listed in Table 220.83(B) shall be used for existing and additional new loads. The larger connected load of air conditioning or space heating, but not both, shall be used.~~

~~Table 220.83(B) With Additional Air-Conditioning or Electric Space-Heating Equipment~~

~~Load Percent of Load Air-conditioning equipment 100 Central electric space heating 100 Less than four separately~~

~~controlled space-heating units 100 First 8 kVA of all other loads 100 Remainder of all other loads 40~~

~~Other loads shall include the following:~~

(1) ~~General lighting and general-use receptacles at 33 volt-amperes/m^2 or 3 volt-amperes/ft^2 as determined by 220.42~~

(2) ~~1500 volt-amperes for each 2-wire, 20-ampere small-appliance branch circuit and each laundry branch circuit covered in 210.11(C)(1) and (C)(2)~~

~~The nameplate rating of the following:~~

(3) ~~All appliances that are fastened in place, permanently connected, or located to be on a specific circuit~~

(4) ~~Ranges, wall-mounted ovens, counter-mounted cooking units~~

(5) ~~Clothes dryers that are not connected to the laundry branch circuit specified in item (2)~~

~~Water heaters~~

(6) ~~The nameplate rating of the following:~~

(7) ~~All appliances that are fastened in place, permanently connected, or located to be on a specific circuit~~

(8) ~~Ranges, wall-mounted ovens, counter-mounted cooking units~~

(9) ~~Clothes dryers that are not connected to the laundry branch circuit specified in item (2)~~

(10) ~~Water heaters~~

~~**(B)** Where Additional Air-Conditioning Equipment or Electric Space-Heating Equipment Is to Be Installed.~~

(1)

a. Electric Vehicle Supply Equipment (EVSE) supplied by an individual branch circuit

Table 220.83 Existing Dwelling Unit Load Percentages

Load (kVA)	Percent of Load
First 8 kVA of existing and new load	100
Remainder of existing load	40
New Electric Vehicle Supply Equipment (EVSE)	80
New central electric resistance space heating	80
All other new loads	50

Supplemental Information

File Name	Description	Approved
70_CMP2_FR8188_220.83.docx		
70_CMP2_FR8188_220.83.docx	For prod use	

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Fri Jan 19 17:26:49 EST 2024

Committee Statement

Committee Statement: 220.83 differentiates when adding or not adding new HVAC equipment. This is not justified based on analysis of 8,529 individually sub-metered end-uses in existing dwellings reported by Lawrence Berkeley National Lab (LBNL). Most new HVAC equipment added to dwellings contributes much less than 100% of its nameplate rating to dwelling maximum demand. In contrast, other loads are currently allowed to be added using 220.83 at 40%, but their contributions are substantially underestimated (for example, EVSE, water heaters and clothes dryers). LBNL also reported analysis of metering data from 9,093 existing Vermont dwellings that installed cold climate heat pumps. They observed only a 5% demand factor across this population of dwellings, with new heat pumps rated at an average of 3.6 kW, increasing whole dwelling maximum demand by only 0.2 kW.

Consistent with these findings, 220.83 is revised as follows:

• Differential treatment when adding new HVAC is eliminated, condensing 220.83(A) and 220.83(B) into a single section 220.83, with a single Table 220.83 for load percentages.

• General lights and general receptacles loads are reduced from 3 to 2 va/ft2, consistent with other revisions (see 220.41).

• Treatment of existing loads remains the same (first 8 kVA at 100%, remainder at 40%).

• All new loads being added to existing dwellings is treated at a more conservative 50% demand factor, which is consistent with median values observed in sub-metering data for water heating, clothes dryers and a variety of HVAC loads.

• Two notable exceptions are treated with higher demand factors of 80%—EVSE and Central Electric Resistance Space Heating—because sub-metering showed they were large loads with the highest demand factors.

Response Message: FR-8188-NFPA 70-2024

Public Input No. 850-NFPA 70-2023 [Section No. 220.83(A)]

Public Input No. 308-NFPA 70-2023 [Section No. 220.83]

Public Input No. 916-NFPA 70-2023 [Section No. 220.83]

Public Input No. 1234-NFPA 70-2023 [Section No. 220.87]

Public Input No. 3319-NFPA 70-2023 [Section No. 220.83]

Public Input No. 851-NFPA 70-2023 [Section No. 220.83(B)]

Public Input No. 3028-NFPA 70-2023 [Section No. 220.83]

220.83 Existing Dwelling Unit.

This section shall be permitted to be used to determine if the existing service or feeder is of sufficient capacity to serve additional loads~~. ,~~ ~~Where~~ where the dwelling unit is served by a 120/240-volt or 208Y/120-volt, 3-wire service or feeder~~, calculating the total load in accordance with 220.83(A) or (B) shall be permitted~~. The percentages listed in Table 220.83 shall be used for existing and additional new loads. The larger connected load of air-conditioning or space heating, but not both, shall be used.

~~(A) Where Additional Air-Conditioning Equipment or Electric Space-Heating Equipment Is Not to Be Installed.~~

~~The percentages listed in Table 220.83(A) shall be used for existing and additional new loads.~~

~~Table 220.83(A) Without Additional Air-Conditioning or Electric Space-Heating Equipment~~

~~Load (kVA)~~	~~Percent of Load~~
~~First 8 kVA of load at~~	~~100~~
~~Remainder of load at~~	~~40~~

Load calculations shall include the following:

1. ~~General lighting and general-use receptacles at 33 volt-amperes/m^2 or 3 volt-amperes/ft^2 as determined by 220.42~~
2. ~~1500 volt-amperes for each 2-wire, 20-ampere small-appliance branch circuit and each laundry branch circuit covered in 210.11(C)(1) and (C)(2)~~
3. ~~The nameplate rating of the following:~~
    1. ~~All appliances that are fastened in place, permanently connected, or located to be on a specific circuit~~
    2. ~~Ranges, wall-mounted ovens, counter-mounted cooking units~~
    3. ~~Clothes dryers that are not connected to the laundry branch circuit specified in item (2)~~
    4. ~~Water heaters~~

~~(B) Where Additional Air-Conditioning Equipment or Electric Space-Heating Equipment Is to Be Installed.~~

~~The percentages listed in Table 220.83(B) shall be used for existing and additional new loads.~~

~~The larger connected load of air-conditioning or space heating, but not both, shall be used.~~

~~Table 220.83(B) With Additional Air-Conditioning or Electric Space-Heating Equipment~~

~~Load~~	~~Percent of Load~~
~~Air-conditioning equipment~~	~~100~~
~~Central electric space heating~~	~~100~~
~~Less than four separately controlled space-heating units~~	~~100~~
~~First 8 kVA of all other loads~~	~~100~~
~~Remainder of all other loads~~	~~40~~

~~Other loads shall include the following:~~

1. General lighting and general-use receptacles at ~~33~~ 22 volt-amperes/m^2 or ~~3~~ 2 volt-amperes/ft^2 ~~as determined by 220.42~~

2. 1500 volt-amperes for each 2-wire, 20-ampere small-appliance branch circuit and each laundry branch circuit covered in 210.11(C)(1) and (C)(2)
3. The nameplate rating of the following:
    a. All appliances that are fastened in place, permanently connected, or located to be on a specific circuit
    b. Ranges, wall-mounted ovens, counter-mounted cooking units
    c. Clothes dryers that are not connected to the laundry branch circuit specified in item (2)
    d. Water heaters
    ~~d.~~e. Electric Vehicle Supply Equipment (EVSE) supplied by an individual branch circuit

Load (kVA)	Percent of Load
First 8 kVA of existing and new load	100
Remainder of existing load	40
New Electric Vehicle Supply Equipment (EVSE)	80
New central electric resistance space heating	80
All other new loads	50

First Revision No. 8092-NFPA 70-2024 [Section No. 220.84(C)]

(C) Calculated Loads.

The calculated load to which the demand factors of Table 220.84(B) apply shall include the following:

(1) ~~33 volt~~ 22 volt -amperes/m^2 or ~~3 volt~~ 2 volt -amperes/ft^2 for general lighting and general-use receptacles

(2) 1500 volt-amperes for each 2-wire, 20-ampere small-appliance branch circuit and each laundry branch circuit covered in 210.11(C)(1) and (C)(2)

(3) The nameplate rating of the following:

(4) All appliances that are fastened in place, permanently connected, or located to be on a specific circuit

(5) Ranges, wall-mounted ovens, counter-mounted cooking units

(6) Clothes dryers that are not connected to the laundry branch circuit specified in item (2)

(7) Water heaters

(8) The nameplate ampere or kVA rating of all permanently connected motors not included in item (3)

(9) The larger of the air-conditioning load or the fixed electric space-heating load

Supplemental Information

File Name	Description	Approved
70_CMP2_FR8092_220.84_C_.docx	staff use	

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 19 11:46:13 EST 2024

Committee Statement

Committee Statement: The minimum load for general lights and receptacles over-estimates the load when high-efficacy light sources (e.g., LED, CFL) are used. In new dwelling units, building code requirements for high-efficacy lighting are ubiquitous in the US. In addition, recent rulemaking by the US Department of Energy (DOE) prohibits the sale of any general service lamp (GSL) that does not meet a minimum efficacy standard of 45 lumens per watt (10 CFR 430.32(dd)). This rulemaking effectively prohibits the sale of all incandescent and halogen GSL in the US.

Lawrence Berkely National Lab (LBNL) has recently reported on sub-metering in 896 occupied US dwellings showing median general lights and receptacle density of 2.3 watts/ft2, including dwellings with a variety of lighting types. Similarly, LBNL reported on lighting audit data from 2,053 existing dwellings in the Pacific Northwest. The installed lighting density was strongly dependent on the fraction of LED/CFL light sources, with an observed reduction in lighting density of 0.015 va/ft2 for each percent of LED or CFL light

sources in the dwelling. 100% CFL or LED lighting reduced lighting density by 1.5 va/ft2.

The new value of 2 va/ft2 assumes approx. 80% LED or CFL lighting in the dwelling (3 va/ft2 – 0.80*0.012). Note -– The 0.015 va/ft2 from LBNL is reduced in this calculation to 0.012 va/ft2 using an 80% power factor (this is consistent with treatment of lighting loads in Table 220.42(A)).

Response Message: FR-8092-NFPA 70-2024

Public Input No. 3242-NFPA 70-2023 [Section No. 220.84(C)]

(C) Calculated Loads.

The calculated load to which the demand factors of Table 220.84(B) apply shall include the following:

(1) ~~33~~ 22 volt-amperes/m^2 or ~~3~~ 2 volt-amperes/ft^2 for general lighting and general-use receptacles

(2) 1500 volt-amperes for each 2-wire, 20-ampere small-appliance branch circuit and each laundry branch circuit covered in 210.11(C)(1) and (C)(2)

(3) The nameplate rating of the following:

a. All appliances that are fastened in place, permanently connected, or located to be on a specific circuit

b. Ranges, wall-mounted ovens, counter-mounted cooking units

c. Clothes dryers that are not connected to the laundry branch circuit specified in item (2)

d. Water heaters

(4) The nameplate ampere or kVA rating of all permanently connected motors not included in item (3)

(5) The larger of the air-conditioning load or the fixed electric space-heating load

First Revision No. 8204-NFPA 70-2024 [New Definition after Definition: Example D13 Cable Tray Cal...]

Example D14 Load Calculations Using Power Control Systems (PCS)

A new dwelling has a total service load of 29,040 volt-amperes (121 A, 240-V) calculated according to Article 220, Parts III-VII. The available service from the electric utility is limited to 100 A. In order to accommodate the connected loads on the 100 A service, a Power Control System is used in accordance with 220.7. Examples D14(a) – D14(d) illustrate treatment of different PCS configurations in load calculations for the service.

Example D.14(a) Monitoring Controlled and Non-Controlled Loads, 50 A EVSE

The EVSE rated at 12,000 volt-amperes (50 A, 240-V) is controlled by a PCS. The PCS is configured to monitor the service and to modulate the EVSE demand whenever the service exceeds the current setpoint of the PCS. The minimum operating current of the EVSE is 0 A. The PCS current setpoint is established by qualified personnel at 80 A, based on the maximum 80% of the 100 A OCPD protecting the service. In this configuration, the PCS monitors both controlled and non-controlled loads, so the controlled EVSE is treated using the minimum operating current of the PCS. The non-controlled loads are treated as specified in Article 220. Parts III-VII.

Total Load Before Application of the PCS

29,040 volt amperes (121 A, 240-V)

Application of the PCS

Non-Controlled Loads - Treated according to Article 220, Parts III-VII = 17,040 volt-amperes (71 A, 240-V)

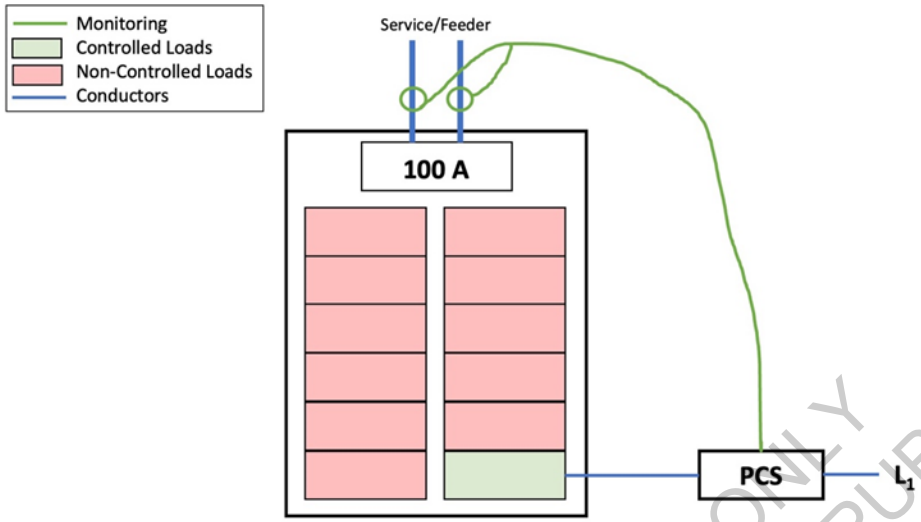
Controlled Loads – Treated at minimum operating current of PCS = 0 volt-amperes (0 A, 240-V)

Total Load After Application of the PCS

Total service load is non-controlled plus controlled loads = 17,040 volt-amperes (71 A, 240-V)

See Figure D14(a).

Figure D14(a) Monitoring Controlled and Non-Controlled Loads, 50 A EVSE.



Example D.14(b) Monitoring Controlled and Non-Controlled Loads, 30 A EVSE

The EVSE rated at 7,200 volt-amperes (30 A, 240-V) is controlled by a PCS. The PCS is configured to monitor the service and to modulate the EVSE demand whenever the service exceeds the current setpoint of the PCS. The minimum operating current of the EVSE is 8 A. The PCS current setpoint is established by qualified personnel at 80 A, based on the maximum 80% of the 100 A OCPD protecting the service. In this configuration, the PCS monitors both controlled and non-controlled loads, so the controlled EVSE is treated using the minimum operating current of the PCS. The non-controlled loads are treated as specified in Article 220, Parts III-VII.

Total Load Before Application of the PCS

29,040 volt amperes (121 A, 240-V)

Application of the PCS

Non-Controlled Loads - Treated according to Article 220, Parts III-VII = 21,840 volt-amperes (91 A, 240-V)

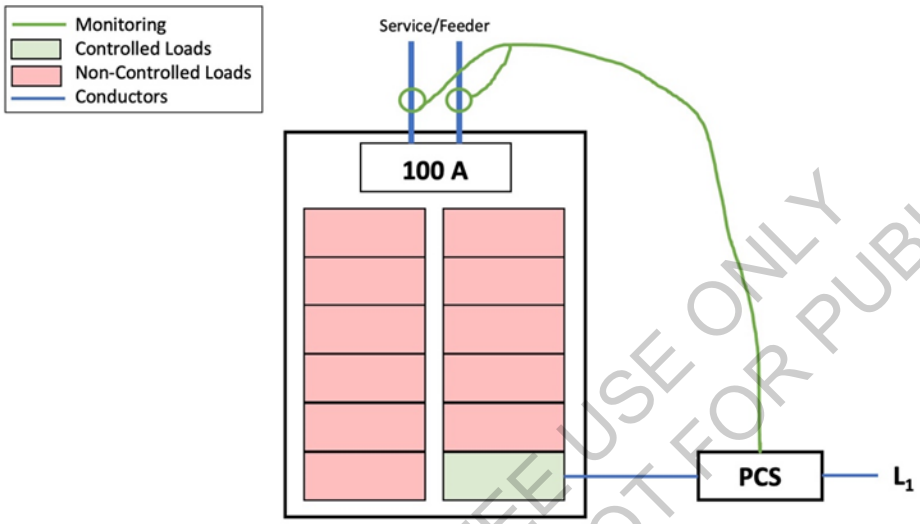
Controlled Loads – Treated at minimum operating current of PCS = 1,920 volt-amperes (8 A, 240-V)

Total Load After Application of the PCS

Total service load is non-controlled plus controlled loads = 23,760 volt-amperes (99 A, 240-V)

See Figure D14(b).

Figure D14(b) Monitoring Controlled and Non-Controlled Loads, 30 A EVSE.



Example D14(c) Monitoring Only Controlled Loads, 35 A EVSE, 20 A Pool Pump, and 30 A HVAC Heat Pump

The EVSE rated at 8,400 volt-amperes (35 A, 240-V), Pool Pump rated at 4,800 volt-amperes (20 A, 240-V) and HVAC Heat Pump rated at 7,200 volt-amperes (30 A, 240-V), are all placed under PCS control. The PCS is configured to monitor each of the branch circuits serving the three loads being controlled. The PCS modulates the EVSE, Pool Pump and HVAC Heat Pump loads to ensure that their combined demand does not exceed the current setpoint of the PCS. The PCS current setpoint is established by qualified personnel at 35 A, which is less than the maximum 80% of the 100 A OCPD protecting the service. Each individual branch circuit remains protected by its own OCPD. In this configuration, the PCS monitors only the controlled loads, so the controlled EVSE, Pool Pump and HVAC Heat Pump are treated in service load calculations using the PCS current setpoint of 35 A. The non-controlled loads are treated as specified in Article 220, Parts III-VII.

Total Load Before Application of the PCS

29,040 volt amperes (121 A, 240-V)

Application of the PCS

Non-Controlled Loads - Treated according to Article 220, Parts III-VII = 14,640 volt-amperes (61 A, 240-V)

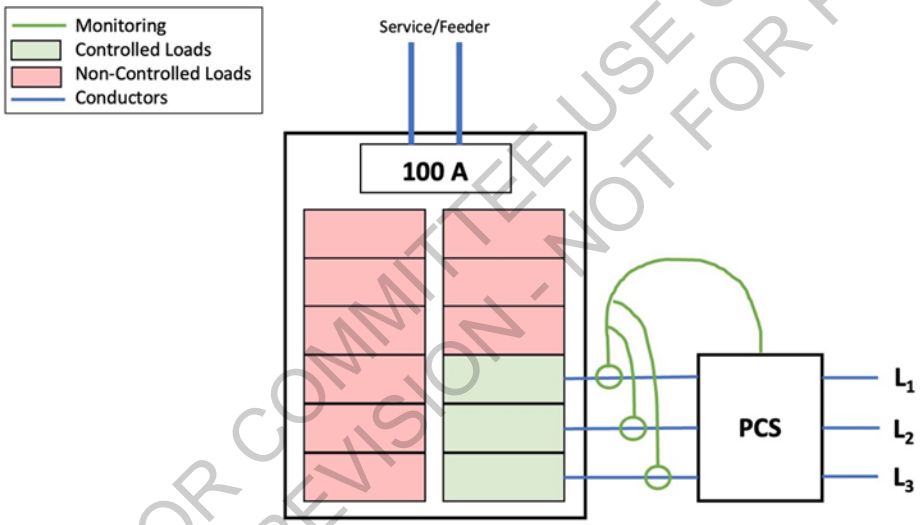
Controlled Loads – Treated at current setpoint of PCS = 8,400 volt-amperes (35 A, 240-V)

Total Load After Application of the PCS

Total service load is non-controlled plus controlled loads = 23,040 volt-amperes (96 A, 240-V)

See Figure D14(c).

Figure D14(c) Monitoring Only Controlled Loads, 35 A EVSE, 20 A Pool Pump, and 30 A HVAC Heat Pump.



Example D.13(d) – Monitoring Only Controlled Loads, All Loads Controlled

The PCS is configured to monitor the service and to modulate all loads. The PCS current setpoint is established by qualified personnel at 80 A, based on the maximum 80% of the 100 A OCPD protecting the service. In this configuration, the PCS monitors only controlled loads, so the controlled loads are treated in service load calculations using the PCS current setpoint of 80 A.

Total Load Before Application of the PCS

29,040 volt amperes (121 A, 240-V)

Application of the PCS

Non-Controlled Loads - Treated according to Article 220, Parts III-VII = 0 volt-amperes (0 A, 240-V)

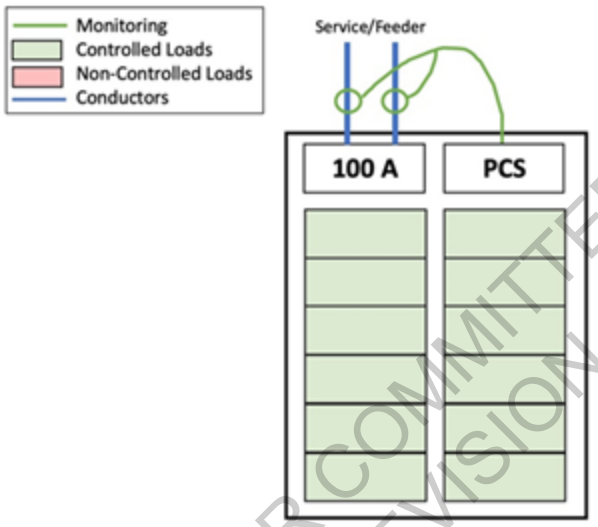
Controlled Loads – Treated at current setpoint current of PCS = 19,200 volt-amperes (80 A, 240-V)

Total Load After Application of the PCS

Total service load is non-controlled plus controlled loads = 19,200 volt-amperes (80 A, 240-V)

See Figure D14(d).

Figure D14(d) Monitoring Only Controlled Loads, All Loads Controlled.



Supplemental Information

File Name	Description	Approved
70_CMP2_FR8204_Annex_D14.docx		

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Fri Jan 19 19:30:43 EST 2024

Committee Statement

Committee Statement: Four examples are added to Annex D to aid in the application of the requirements related to Power Control Systems (PCS) included in the Section 220.7 (formerly 220.70). As a new provision in the Code, with multiple options, these examples are intended to ensure clear understanding of the requirement.

Response Message: FR-8204-NFPA 70-2024

Example D14 Load Calculations Using Power Control Systems (PCS)

A new dwelling has a total service load of 29,040 volt-amperes (121 A, 240-V) calculated according to Article 220, Parts III-VII. The available service from the electric utility is limited to 100 A. In order to accommodate the connected loads on the 100 A service, a Power Control System is used in accordance with 220.7. Examples D14(a) – D14(d) illustrate treatment of different PCS configurations in load calculations for the service.

Example D.14(a) Monitoring Controlled and Non-Controlled Loads, 50 A EVSE

The EVSE rated at 12,000 volt-amperes (50 A, 240-V) is controlled by a PCS. The PCS is configured to monitor the service and to modulate the EVSE demand whenever the service exceeds the current setpoint of the PCS. The minimum operating current of the EVSE is 0 A. The PCS current setpoint is established by qualified personnel at 80 A, based on the maximum 80% of the 100 A OCPD protecting the service. In this configuration, the PCS monitors both controlled and non-controlled loads, so the controlled EVSE is treated using the minimum operating current of the PCS. The non-controlled loads are treated as specified in Article 220. Parts III-VII.

Total Load Before Application of the PCS

29,040 volt amperes (121 A, 240-V)

Application of the PCS

Non-Controlled Loads - Treated according to Article 220, Parts III-VII = 17,040 volt-amperes (71 A, 240-V)

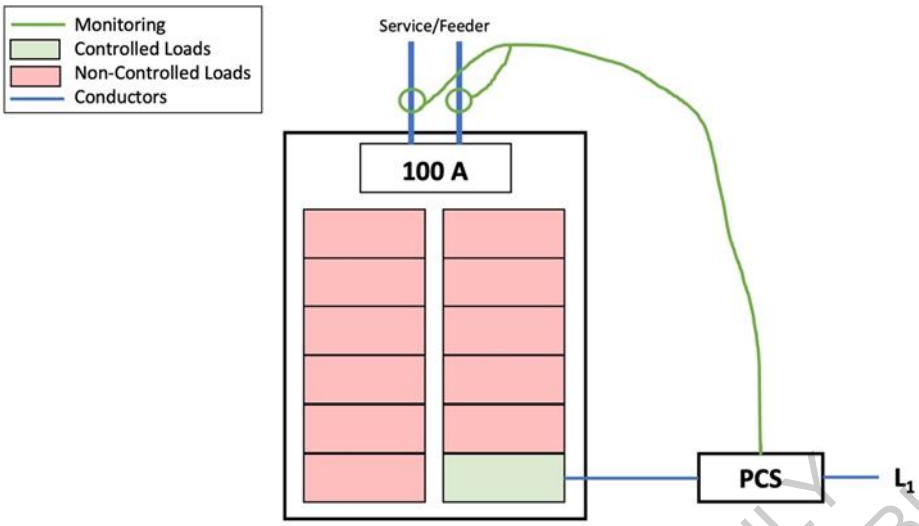
Controlled Loads – Treated at minimum operating current of PCS = 0 volt-amperes (0 A, 240-V)

Total Load After Application of the PCS

Total service load is non-controlled plus controlled loads = 17,040 volt-amperes (71 A, 240-V)

See Figure D14(a).

Figure D14(a) Monitoring Controlled and Non-Controlled Loads, 50 A EVSE.



Example D.14(b) Monitoring Controlled and Non-Controlled Loads, 30 A EVSE

The EVSE rated at 7,200 volt-amperes (30 A, 240-V) is controlled by a PCS. The PCS is configured to monitor the service and to modulate the EVSE demand whenever the service exceeds the current setpoint of the PCS. The minimum operating current of the EVSE is 8 A. The PCS current setpoint is established by qualified personnel at 80 A, based on the maximum 80% of the 100 A OCPD protecting the service. In this configuration, the PCS monitors both controlled and non-controlled loads, so the controlled EVSE is treated using the minimum operating current of the PCS. The non-controlled loads are treated as specified in Article 220, Parts III-VII.

Total Load Before Application of the PCS

29,040 volt amperes (121 A, 240-V)

Application of the PCS

Non-Controlled Loads - Treated according to Article 220, Parts III-VII = 21,840 volt-amperes (91 A, 240-V)

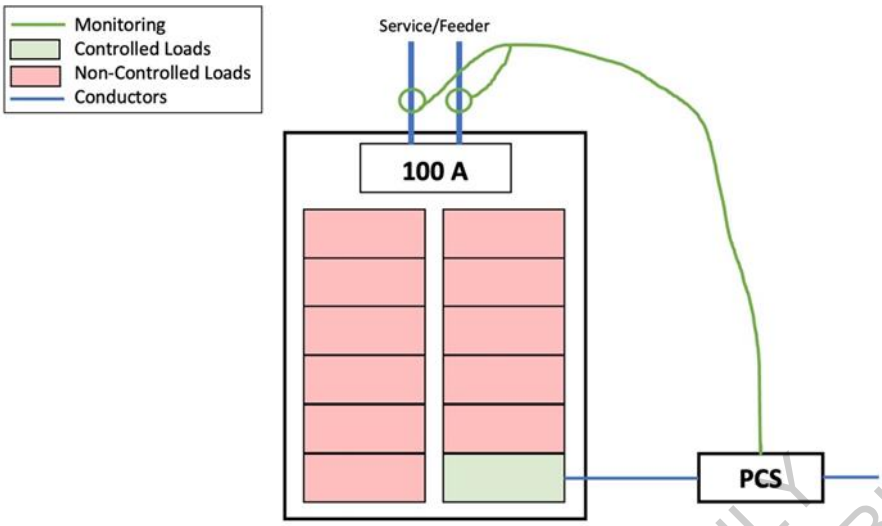
Controlled Loads – Treated at minimum operating current of PCS = 1,920 volt-amperes (8 A, 240-V)

Total Load After Application of the PCS

Total service load is non-controlled plus controlled loads = 23,760 volt-amperes (99 A, 240-V)

See Figure D14(b).

Figure D14(b) Monitoring Controlled and Non-Controlled Loads, 30 A EVSE.



Example D14(c) Monitoring Only Controlled Loads, 35 A EVSE, 20 A Pool Pump, and 30 A HVAC Heat Pump

The EVSE rated at 8,400 volt-amperes (35 A, 240-V), Pool Pump rated at 4,800 volt-amperes (20 A, 240-V) and HVAC Heat Pump rated at 7,200 volt-amperes (30 A, 240-V), are all placed under PCS control. The PCS is configured to monitor each of the branch circuits serving the three loads being controlled. The PCS modulates the EVSE, Pool Pump and HVAC Heat Pump loads to ensure that their combined demand does not exceed the current setpoint of the PCS. The PCS current setpoint is established by qualified personnel at 35 A, which is less than the maximum 80% of the 100 A OCPD protecting the service. Each individual branch circuit remains protected by its own OCPD. In this configuration, the PCS monitors only the controlled loads, so the controlled EVSE, Pool Pump and HVAC Heat Pump are treated in service load calculations using the PCS current setpoint of 35 A. The non-controlled loads are treated as specified in Article 220, Parts III-VII.

Total Load Before Application of the PCS

29,040 volt amperes (121 A, 240-V)

Application of the PCS

Non-Controlled Loads - Treated according to Article 220, Parts III-VII = 14,640 volt-amperes (61 A, 240-V)

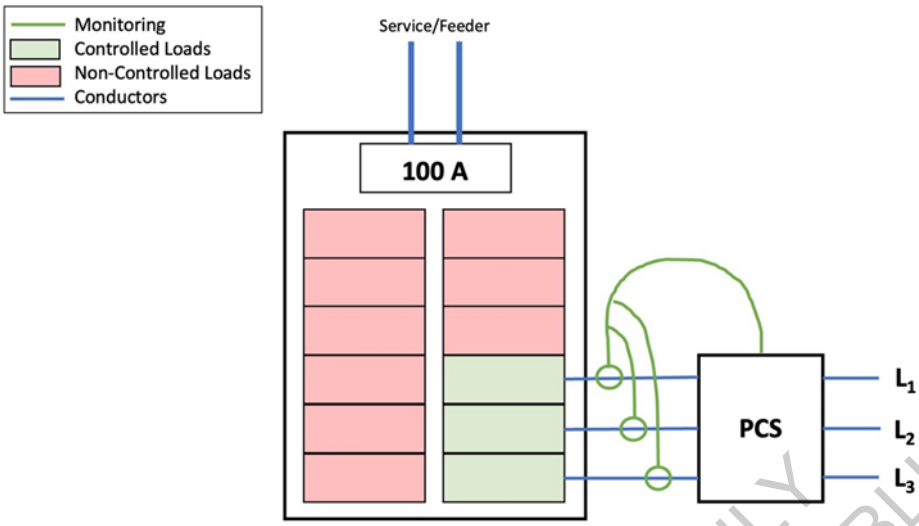
Controlled Loads – Treated at current setpoint of PCS = 8,400 volt-amperes (35 A, 240-V)

Total Load After Application of the PCS

Total service load is non-controlled plus controlled loads = 23,040 volt-amperes (96 A, 240-V)

See Figure D14(c).

Figure D14(c) Monitoring Only Controlled Loads, 35 A EVSE, 20 A Pool Pump, and 30 A HVAC Heat Pump.



Example D.13(d) – Monitoring Only Controlled Loads, All Loads Controlled

The PCS is configured to monitor the service and to modulate all loads. The PCS current setpoint is established by qualified personnel at 80 A, based on the maximum 80% of the 100 A OCPD protecting the service. In this configuration, the PCS monitors only controlled loads, so the controlled loads are treated in service load calculations using the PCS current setpoint of 80 A.

Total Load Before Application of the PCS

29,040 volt amperes (121 A, 240-V)

Application of the PCS

Non-Controlled Loads - Treated according to Article 220, Parts III-VII = 0 volt-amperes (0 A, 240-V)

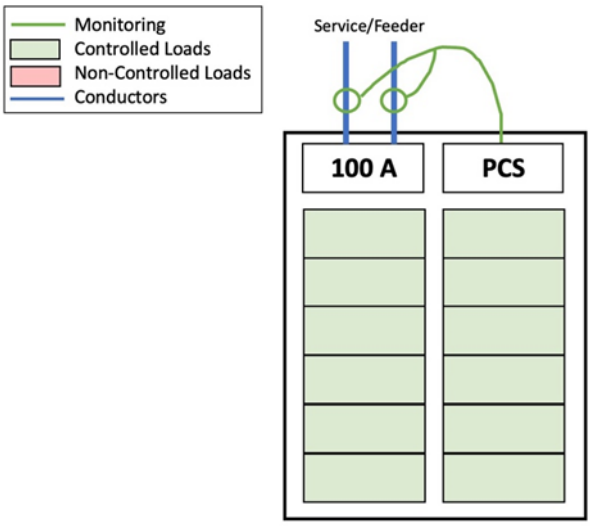
Controlled Loads – Treated at current setpoint current of PCS = 19,200 volt-amperes (80 A, 240-V)

Total Load After Application of the PCS

Total service load is non-controlled plus controlled loads = 19,200 volt-amperes (80 A, 240-V)

See Figure D14(d).

Figure D14(d) Monitoring Only Controlled Loads, All Loads Controlled.



First Revision No. 8122-NFPA 70-2024 [Definition: Example D1(a) One-Family Dwelling [Excluding an...]

The dwelling has a floor area of 1500 ft^2, exclusive of an unfinished cellar not adaptable for future use, unfinished attic, and open porches. Appliances are a 12-kW, 120/240-V range and a 5.5-kW, 120/ 240-V dryer. Assume range and dryer kW ratings equivalent to kVA ratings in accordance with 220.54 and 220.55.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 19 14:19:52 EST 2024

Committee Statement

Committee Statement: In the example, the voltage for the range is not mentioned, but considering the calculation indicates a neutral load for the range, indicating it is rated 120/240 volts is appropriate. A similar revision is included to reflect that the dryer is rated 120/240 volts (as it also indicates a neutral load in the calculation).

Response Message: FR-8122-NFPA 70-2024

Public Input No. 62-NFPA 70-2023 [Definition: Example D1(a) One-Family Dwelling [Excluding an...]

Public Input No. 64-NFPA 70-2023 [Definitions (D): Calculation... to Calculated ...]

First Revision No. 8125-NFPA 70-2024 [Definition: Example D4(a) Multifamily Dwelling [Excluding a...]

A multifamily dwelling has 40 dwelling units.

Meters are in two banks of 20 each with individual feeders to each dwelling unit.

One-half of the dwelling units are equipped with 120/240-V electric ranges not exceeding 12 kW each. Assume range kW rating equivalent to kVA rating in accordance with 220.55. Other half of ranges are gas ranges.

Area of each dwelling unit is 840 ft^2.

Laundry facilities on premises are available to all tenants. Add no circuit to individual dwelling unit.

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Fri Jan 19 14:24:21 EST 2024

Committee Statement

Committee Statement: In the example, the voltage for the range was not mentioned, but considering the calculation indicates a neutral load for the range, it is appropriate to indicate that it is rated 120/240 volts.

Response Message: FR-8125-NFPA 70-2024

Public Input No. 66-NFPA 70-2023 [Definition: Example D4(a) Multifamily Dwelling [Excluding a...]

First Revision No. 8127-NFPA 70-2024 [Definition: Example D4(b) Optional Calculation for Multifam...]

A multifamily dwelling equipped with electric cooking and space heating or air conditioning has 40 dwelling units.

Meters are in two banks of 20 each plus house metering and individual feeders to each dwelling unit.

Each dwelling unit is equipped with an electric range of 8-kW, 120/240-V nameplate rating, four 1.5-kW separately controlled 240-V electric space heaters, and a 2.5-kW, 240-V electric water heater. Assume range, space heater, and water heater kW ratings equivalent to kVA. Calculate the load for the individual dwelling unit by the standard calculation (Part III of Article 220).

A common laundry facility is available to all tenants *[see 210.52(F), Exception No. 1].*

Area of each dwelling unit is 840 ft^2.

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Fri Jan 19 14:27:26 EST 2024

Committee Statement

Committee Statement: In the example, the voltage for the range is not mentioned, but considering the calculation indicates a neutral load for the range, it is appropriate to indicate that it is rated 120/240 volts.

Response Message: FR-8127-NFPA 70-2024

Public Input No. 67-NFPA 70-2023 [Definition: Example D4(b) Optional Calculation for Multifam...]