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M E M O R A N D U M

TO: Code-Making Panel 2

FROM: Sarah Caldwell, *Committee Administrator*

DATE: April 15, 2021

SUBJECT: NEC[®] First Draft TC FINAL Ballot Results (A22)

According to the final ballot results, all ballot items received the necessary affirmative votes to pass ballot with the exception of **First Revisions No. 9003, 9006, 9015, 9091, 8953, 9165, 8963 and 9092** as shown in the attached report.

When a First Revision fails Ballot, the changes proposed in the failed Revision shall be considered rejected and shall be deleted from the First Draft. Failed Revisions shall be redesignated as a Committee Input and shall be published in the Input section of the First Draft Report.

15 Members Eligible to Vote
0 Members Not Returned

The attached report shows the number of affirmative, negative, and abstaining votes as well as the explanation of the vote for each revision.

To pass ballot, each revision requires: (1) a simple majority of those eligible to vote and (2) an affirmative vote of $\frac{2}{3}$ of ballots returned. See Sections 3.3.4.3.(c) and 4.3.10.1 of the ***Regulations Governing the Development of NFPA Standards***.



First Revision No. 9188-NFPA 70-2021 [Global Input]

See attached Word document for restructuring of Article 220.

Supplemental Information

<u>File Name</u>	<u>Description Approved</u>
Article_220_Restructure_for_Global_FR.docx	For staff use
NEC_Global_FR-9188_Article_220_for_ballot.pdf	For ballot

Submitter Information Verification

Committee: NEC-P02

Submission Date: Sat Jan 16 19:07:04 EST 2021

Committee Statement

Committee Statement: Create First Revision-Article 220 reorganization

CMP 2 reorganizes Article 220 for usability and clarity (Refer to Public Input 4240). Changes are noted as follows:

- Section 220.11 is located in “Part II. Branch-Circuit Load Calculations”; however, requirements for floor area apply more generally, so the requirement is relocated to “Part I. General” as 220.5(C).
- Section 220.12 is located in “Part II. Branch-Circuit Load Calculations”; however, these requirements are related to feeder and service load calculations, so this revision relocates these to “Part III. Feeder and Service Load Calculations”. With the relocation of 220.12 to 220.42, existing 220.42 is relocated to 220.45.
- Sections 220.14(J), 220.14(K), and 220.14(M) are relocated to new Sections 220.41, 220.43, and 220.44, respectively. In all instances, the requirements deal with “loads” and the title to 220.14 is “All Occupancies”; however, sub-sections (J), (K), and (M) are written for specific occupancies and are not a load. Relocating these to a new Section in “Part III. Feeder and Service Load Calculations” is appropriate. Existing Sections 220.42, 220.43, and 220.44 are renumbered as necessary to address the addition of the new Sections. Text is added to introduce 220.14, establishing how the branch circuit load calculation is performed with the requirements in 220.14.
- Section 220.18 is relocated to Section 220.10, as the requirements are more appropriately located in the Section of “General” requirements for all branch circuits.
- This first revision only reorganizes the current content of Article 220 and no technical changes are made in this first revision.

Response Message: FR-9188-NFPA 70-2021

[Public Input No. 4240-NFPA 70-2020 \[Article 220\]](#)

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

10 Affirmative All

5 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Boynton, Charles L.

Agree

Cook, Mark Daniel

agree

McCamish, John

While I favor reorganization of this Article with the intent of making it more user friendly, contrary to the statement regarding the public input technical changes have been made to the article. With these changes present, I would not continue to support this FR. Table 220.12 has been moved from the branch circuit section, along with Dwelling unit branch circuits, Office Building receptacles, Hotel and Motel Occupancies. With these sections removed from Branch Circuit requirements, a user of the NEC does not have a pathway to calculate how many branch circuits would be required for any of the applications above. These sections have been moved to the part of Article 220 covering feeder and services, but now how many branch circuits are required for any of the sections mentioned above that have been moved? How many branch circuits are required for a 2000 square foot dwelling? Where is the reference? I can show where the service or feeder demand is, but with the information removed from Branch Circuits, there is no longer a path to follow. What is to stop me from using one fifteen amp branch circuit? Receptacles in a dwelling have no VA requirement. These has been historically based on square footage of the dwelling. What about receptacles where none are specified in an office space that has not been occupied yet? Minimum number of lighting branch circuits? The list goes on. One other issue is in the proposed 220.10(A), there are references to 220.17, 220.18,

220.19 and 220.20 which do not exist as written.

Neubauer, Fred

agree

Article 220 Branch-Circuit, Feeder, and Service Load Calculations

Part I. General

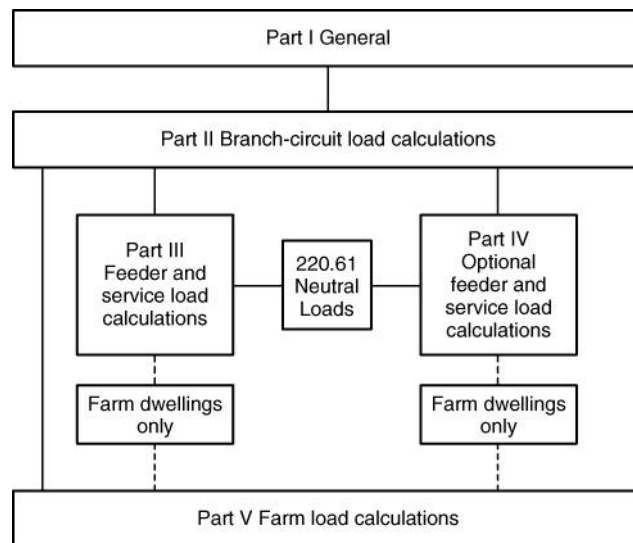
220.1 Scope.

This article provides requirements for calculating branch-circuit, feeder, and service loads. Part I provides general requirements for calculation methods. Part II provides calculation methods for branch-circuit loads. Parts III and IV provide calculation methods for feeder and service loads. Part V provides calculation methods for farm loads.

Informational Note No. 1: See examples in Informative Annex D.

Informational Note No. 2: See [Informational Note](#) Figure 220.1 for information on the organization of Article 220.

Informational Note Figure 220.1 Branch-Circuit, Feeder, and Service Load Calculation Methods.



220.3 Other Articles for Specific-Purpose Calculations.

Table 220.3 shall provide references for specific-purpose calculation requirements not located in Chapters 5, 6, or 7 that amend or supplement the requirements of this article.

Table 220.3 Specific-Purpose Calculation References

Calculation	Article	Section (or Part)
Air-conditioning and refrigerating equipment, branch-circuit conductor sizing	440	Part IV
Fixed electric heating equipment for pipelines and vessels, branch-circuit sizing	427	427.4
Fixed electric space-heating equipment, branch-circuit sizing	424	424.3
Fixed outdoor electric deicing and snow-melting equipment, branch-circuit sizing	426	426.4
Motors, feeder demand factor	430	430.26
Motors, multimotor and combination-load equipment	430	430.25
Motors, several motors or a motor(s) and other load(s)	430	430.24
Over 600-volt branch-circuit calculations	210	210.19(B)
Over 600-volt feeder calculations	215	215.2(B)

Calculation	Article	Section (or Part)
Phase converters, conductors	455	455.6
Storage-type water heaters	422	422.11(E)

220.5 Calculations.

(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, 480Y/277, 480, 600Y/347, and 600 volts shall be used.

(B) Fractions of an Ampere.

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

(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 open porches, garages, or unused or unfinished spaces not adaptable for future use.

Part II. Branch-Circuit Load Calculations

220.10 General.

[Move text to (A)] ~~Branch-circuit loads shall be calculated as shown in 220.12, 220.14, and 220.16.~~

(A) Load Calculation.

Branch-circuit loads shall be calculated as shown in ~~220.12, 220.14, and 220.16~~, 220.18, 220.19, and 220.20.

(B) Maximum Load.

The total load on a branch circuit shall not exceed the rating of the branch circuit and it shall not exceed the maximum loads specified in 220.10(B)(1) through (B)(3) under the conditions specified therein.

(1) Motor-Operated and Combination Loads.

Where a circuit supplies only motor-operated loads, Article 430 shall apply. Where a circuit supplies only air-conditioning equipment, refrigerating equipment, or both, Article 440 shall apply. For circuits supplying loads consisting of motor-operated utilization equipment that is fastened in place and has a motor larger than 1/8 hp in combination with other loads, the total calculated load shall be based on 125 percent of the largest motor load plus the sum of the other loads.

(2) 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.

(3) Range Loads.

It shall be permissible to apply demand factors for range loads in accordance with Table 220.55, including Note 4.

220.11 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 open porches, garages, or unused or unfinished spaces not adaptable for future use.

220.12 Lighting Load for Non-Dwelling Occupancies: [From 220.12 to 220.42]

(A) General:

A unit load of not less than that specified in Table 220.12 for non-dwelling occupancies and the floor area determined in 220.11 shall be used to calculate the minimum lighting load. Motors rated less than ~~1/8~~ HP and connected to a lighting circuit shall be considered general lighting load.

Informational Note: The unit values of Table 220.12 are based on minimum load conditions and 100 percent power factor and may not provide sufficient capacity for the installation contemplated.

(B) Energy Code:

Where the building is designed and constructed to comply with an energy code adopted by the local authority, the lighting load shall be permitted to be calculated using the unit values specified in the energy code where the following conditions are met:

- (1) A power monitoring system is installed that will provide continuous information regarding the total general lighting load of the building.
- (2) The power monitoring system will be set with alarm values to alert the building owner or manager if the lighting load exceeds the values set by the energy code. Automatic means to take action to reduce the connected load shall be permitted.
- (3) The demand factors specified in 220.42 are not applied to the general lighting load.
- (4) The continuous load multiplier of 125 percent shall be applied.

Table 220.12 General Lighting Loads by Non-Dwelling Occupancy

Type of Occupancy	Unit Load	
	Volt- amperes/ m ²	Volt- amperes/ ft ²
	m ²	ft ²
Automotive facility	16	1.5
Convention center	15	1.4
Courthouse	15	1.4
Dormitory	16	1.5
Exercise center	15	1.4
Fire station	14	1.3
Gymnasium ^a	18	1.7
Health-care clinic	17	1.6
Hospital	17	1.6

Type of Occupancy	Unit Load	
	Volt- amperes/ m ²	Volt- amperes/ ft ²
	⋮	⋮
Hotels and motels, including apartment houses without provisions for cooking by tenants ^b	18	1.7
Library	16	1.5
Manufacturing facility ^c	24	2.2
Motion picture theater	17	1.6
Museum	17	1.6
Office ^d	14	1.3
Parking garage ^e	3	0.3
Penitentiary	13	1.2
Performing arts theater	16	1.5
Police station	14	1.3
Post office	17	1.6
Religious facility	24	2.2
Restaurant ^f	16	1.5
Retail ^{g,h}	20	1.9
School/university	33	3
Sports arena	33	3
Town hall	15	1.4
Transportation	13	1.2
Warehouse	13	1.2
Workshop	18	1.7

Note: The 125 percent multiplier for a continuous load as specified in 210.20(A) is included when using the unit loads in this table for calculating the minimum lighting load for a specified occupancy.

^aArmories and auditoriums are considered gymnasium type occupancies.

^bLodge rooms are similar to hotels and motels.

^cIndustrial commercial loft buildings are considered manufacturing type occupancies.

^dBanks are office type occupancies.

^eGarages—commercial (storage) are considered parking garage occupancies.

^fClubs are considered restaurant occupancies.

^gBarber shops and beauty parlors are considered retail occupancies.

^hStores are considered retail occupancies.

220.14 Other Loads — All Occupancies.

Branch-circuit load calculations shall include calculation of a minimum load on each outlet as calculated in 220.14(A) through (J) and then summed to establish the load on the branch circuit.

In all occupancies, the minimum load for each outlet for general-use receptacles and outlets not used for general illumination shall not be less than that calculated in 220.14(A) through (J), the loads shown being based on nominal branch-circuit voltages.

Exception: The loads of outlets serving switchboards and switching frames in telephone exchanges shall be waived from the calculations.

(A) Specific Appliances or Loads.

An outlet for a specific appliance or other load not covered in 220.14(B) through (J) shall be calculated based on the ampere rating of the appliance or load served.

(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.

(C) Motor Outlets.

Loads for motor outlets shall be calculated in accordance with the requirements in 430.22, 430.24, and 440.6.

(D) Luminaires.

An outlet supplying luminaire(s) shall be calculated based on the maximum volt-ampere rating of the equipment and lamps for which the luminaire(s) is rated.

(E) Heavy-Duty Lampholders.

Outlets for heavy-duty lampholders shall be calculated at a minimum of 600 volt-amperes.

(F) Sign and Outline Lighting.

Sign and outline lighting outlets shall be calculated at a minimum of 1200 volt-amperes for each required branch circuit specified in 600.5(A).

(G) Show Windows.

Show windows shall be calculated in accordance with either of the following:

- (1) The unit load per outlet as required in other provisions of this section
- (2) At 200 volt-amperes per linear 300 mm (1 ft) of show window

(H) Fixed Multioutlet Assemblies.

Fixed multioutlet assemblies used in other than dwelling units or the guest rooms or guest suites of hotels or motels shall be calculated in accordance with (H)(1) or (H)(2). For the purposes of this section, the calculation shall be permitted to be based on the portion that contains receptacle outlets.

- (1) Where appliances are unlikely to be used simultaneously, each 1.5 m (5 ft) or fraction thereof of each separate and continuous length shall be considered as one outlet of not less than 180 volt-amperes.

- (2) Where appliances are likely to be used simultaneously, each 300 mm (1 ft) or fraction thereof shall be considered as an outlet of not less than 180 volt-amperes.

(I) Receptacle Outlets.

Except as covered in 220.14(J) and (K), receptacle outlets shall be calculated at not less than 180 volt-amperes for each single or for each multiple receptacle on one yoke. A single piece of equipment consisting of a multiple receptacle comprised of four or more receptacles shall be calculated at not less than 90 volt-amperes per receptacle. This provision shall not be applicable to the receptacle outlets specified in 210.11(C)(1) and (C)(2).

~~(J) Dwelling Units.~~ [From 220.12(J) to 220.41]

~~In one-family, two-family, and multifamily dwellings, the minimum unit load shall be not less than 33 volt-amperes/m² (3 volt-amperes/ft²). The lighting and receptacle outlets specified in 220.14(J)(1), (J)(2), and (J)(3) are included in the minimum unit load. No additional load calculations shall be required for such outlets. The minimum lighting load shall be determined using the minimum unit load and the floor area as determined in 220.11 for dwelling occupancies. Motors rated less than 1/8 hp and connected to a lighting circuit shall be considered part of the minimum lighting load.~~

- ~~(1) All general-use receptacle outlets of 20-ampere rating or less, including receptacles connected to the circuits in 210.11(C)(3) and 210.11(C)(4)~~
- ~~(2) The receptacle outlets specified in 210.52(E) and (G)~~
- ~~(3) The lighting outlets specified in 210.70~~

~~(K) Office Buildings.~~ [From 220.12(K) to 220.43]

~~In office buildings, the receptacle loads shall be calculated to be the larger of (1) or (2):~~

- ~~(1) The calculated load from 220.14(I) after all demand factors have been applied~~
- ~~(2) 11 volt-amperes/m² or 1 volt-ampere/ft²~~

~~(L) Other Outlets.~~

Other outlets not covered in 220.14(A) through (K) shall be calculated based on 180 volt-amperes per outlet.

~~(M) Hotel and Motel Occupancies.~~ [From 220.12(M) to 220.44]

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

- ~~(1) All general-use receptacle outlets of 20-ampere rating or less, including receptacles connected to the circuits in 210.11(C)(3) and 210.11(C)(4)~~
- ~~(2) The receptacle outlets specified in 210.52(E)(3)~~
- ~~(3) The lighting outlets specified in 210.70~~

220.16 Loads for Additions to Existing Installations.

(A) Dwelling Units.

Loads added to an existing dwelling unit(s) shall 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.

(B) Other Than Dwelling Units.

Loads for new circuits or extended circuits in other than dwelling units shall be calculated in accordance with either 220.12 or 220.14, as applicable.

~~220.18 Maximum Loads.~~

~~The total load shall not exceed the rating of the branch circuit, and it shall not exceed the maximum loads specified in 220.18(A) through (C) under the conditions specified therein.~~

~~(A) Motor-Operated and Combination Loads.~~

~~Where a circuit supplies only motor-operated loads, Article 430 shall apply. Where a circuit supplies only air-conditioning equipment, refrigerating equipment, or both, Article 440 shall apply. For circuits supplying loads consisting of motor-operated utilization equipment that is fastened in place and has a motor larger than 1/8 hp in combination with other loads, the total calculated load shall be based on 125 percent of the largest motor load plus the sum of the other loads.~~

~~(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.~~

~~(C) Range Loads.~~

~~it shall be permissible to apply demand factors for range loads in accordance with Table 220.55, including Note 4.~~

Part III. Feeder and Service Load Calculations

220.40 General.

The calculated load of a feeder or service shall not be less than the sum of the loads on the branch circuits supplied, as determined by Part II of this article, after any applicable demand factors permitted by Part III or IV or required by Part V have been applied.

Informational Note: See Examples D1(a) through D10 in Informative Annex D. See 220.18(B) for the maximum load in amperes permitted for lighting units operating at less than 100 percent power factor.

220.41 Dwelling Units(s), Minimum Unit Load. [From 220.12(J) to 220.41]

In one-family, two-family, and multifamily dwellings, the minimum unit load shall be not less than 33 volt-amperes/m² (3 volt-amperes/ft²). ~~The lighting and receptacle outlets specified in 220.14(J)(1), (J)(2), and (J)(3) are included in the minimum unit load. No additional load calculations shall be required for such outlets. The minimum lighting load shall be determined using the minimum unit load and the floor area as determined in 220.11 for dwelling occupancies. Motors rated less than 1/8 hp and connected to a lighting circuit shall be considered part of the minimum lighting load.~~

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 ~~210.11~~(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 1/ 8 hp and connected to a lighting circuit shall be considered part of the minimum lighting load.

220.12 Lighting Load for Non-Dwelling Occupancies. [From 220.12 to 220.42]

(A) General.

A unit load of not less than that specified in ~~Table 220.12~~Table 220.42(A) for non-dwelling occupancies and the floor area determined in ~~220.11~~220.5(C) shall be used to calculate the minimum lighting load. Motors rated less than 1/8 HP and connected to a lighting circuit shall be considered general lighting load.

Informational Note: The unit values of ~~Table 220.42(A)~~Table 220.12 are based on minimum load conditions and 100 percent power factor and may not provide sufficient capacity for the installation contemplated.

(B) Energy Code.

Where the building is designed and constructed to comply with an energy code adopted by the local authority, the lighting load shall be permitted to be calculated using the unit values specified in the energy code where the following conditions are met:

- (1) A power monitoring system is installed that will provide continuous information regarding the total general lighting load of the building.
- (2) The power monitoring system will be set with alarm values to alert the building owner or manager if the lighting load exceeds the values set by the energy code. Automatic means to take action to reduce the connected load shall be permitted.
- (3) The demand factors specified in 220.~~42-44~~ are not applied to the general lighting load.
- (4) The continuous load multiplier of 125 percent shall be applied.

Table 220.12(A) General Lighting Loads by Non-Dwelling Occupancy. [Move table to (A)]

Type of Occupancy	Unit Load	
	Volt- amperes/	Volt- amperes/
	m ²	ft ²
Automotive facility	16	1.5
Convention center	15	1.4
Courthouse	15	1.4
Dormitory	16	1.5
Exercise center	15	1.4
Fire station	14	1.3

Type of Occupancy	Unit Load	
	Volt- amperes/ m ²	Volt- amperes/ ft ²
	.	.
Gymnasium ^a	18	1.7
Health care clinic	17	1.6
Hospital	17	1.6
Hotels and motels, including apartment houses without provisions for cooking by tenants ^b	18	1.7
Library	16	1.5
Manufacturing facility ^c	24	2.2
Motion picture theater	17	1.6
Museum	17	1.6
Office ^d	14	1.3
Parking garage ^e	3	0.3
Penitentiary	13	1.2
Performing arts theater	16	1.5
Police station	14	1.3
Post office	17	1.6
Religious facility	24	2.2
Restaurant ^f	16	1.5
Retail ^{g,h}	20	1.9
School/university	33	3
Sports arena	33	3
Town hall	15	1.4
Transportation	13	1.2
Warehouse	13	1.2
Workshop	18	1.7

Note: The 125 percent multiplier for a continuous load as specified in 210.20(A) is included when using the unit loads in this table for calculating the minimum lighting load for a specified occupancy.

^aArmories and auditoriums are considered gymnasium-type occupancies.

^bLodge rooms are similar to hotels and motels.

^cIndustrial commercial loft buildings are considered manufacturing-type occupancies.

^dBanks are office-type occupancies.

^eGarages — commercial (storage) are considered parking garage occupancies.

^fClubs are considered restaurant occupancies.

^gBarber shops and beauty parlors are considered retail occupancies.

^hStores are considered retail occupancies.

220.43 Office Buildings. [From 220.12(K) to 220.43]

In office buildings, the receptacle loads shall be calculated to be the larger of (1) or (2):

- (1) The calculated load from 220.14(I) after all demand factors have been applied
- (2) 11 volt-amperes/m² or 1 volt-ampere/ft²

220.44 Hotel and Motel Occupancies. [From 220.12(M) to 220.44]

In guest rooms or guest suites of hotels and motels, the following lighting and receptacle outlets specified in 220.14(M)(1), (M)(2), and (M)(3) are included in the minimum unit load in Table 220.42, and no additional load calculations shall be required for such outlets. The minimum lighting load shall be determined using the minimum unit load and the floor area as determined in 220.11 for hotel and motel occupancies.:

- (1) All general-use receptacle outlets of 20-ampere rating or less, including receptacles connected to the circuits in 210.11(C)(3) and 210.11(C)(4)
- (2) The receptacle outlets specified in 210.52(E)(3)
- (3) The lighting outlets specified in 210.70

220.45 General Lighting.

The demand factors specified in Table 220.45 shall apply to that portion of the total branch-circuit load calculated for general illumination. They shall not be applied in determining the number of branch circuits for general illumination.

Table 220.45 Lighting Load Demand Factors

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

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

220.463 Show-Window and Track Lighting.

(A) Show Windows.

For show-window lighting, a load of not less than 660 volt-amperes/linear meter or 200 volt-amperes/linear foot shall be included for a show window, measured horizontally along its base.

Informational Note: See 220.14(G) for branch circuits supplying show windows.

(B) Track Lighting.

For track lighting in other than dwelling units or guest rooms or guest suites of hotels or motels, an additional load of 150 volt-amperes shall be included for every 600 mm (2 ft) of lighting track or fraction thereof. Where multicircuit track is installed, the load shall be considered to be divided equally between the track circuits.

Exception: If the track lighting is supplied through a device that limits the current to the track, the load shall be permitted to be calculated based on the rating of the device used to limit the current.

220.474 Receptacle Loads — Other Than Dwelling Units.

Receptacle loads calculated in accordance with 220.14(H) and (I) shall be permitted to be made subject to the demand factors given in Table 220.452 or Table 220.474.

Table 220.474 Demand Factors for Non-Dwelling Receptacle Loads

Portion of Receptacle Load to Which Demand Factor Applies (Volt-Amperes)	Demand Factor (%)
First 10 kVA or less at	100
Remainder over 10 kVA at	50

220.50 Motors.

Motor loads shall be calculated in accordance with 430.24, 430.25, and 430.26 and with 440.6 for hermetic refrigerant motor-compressors.

220.51 Fixed Electric Space Heating.

Fixed electric space-heating loads shall be calculated at 100 percent of the total connected load. However, in no case shall a feeder or service load current rating be less than the rating of the largest branch circuit supplied.

Exception: Where reduced loading of the conductors results from units operating on duty-cycle, intermittently, or from all units not operating at the same time, the authority having jurisdiction ~~may~~ might grant permission for feeder and service conductors to have an ampacity less than 100 percent, provided the conductors have an ampacity for the load so determined.

220.52 Small-Appliance and Laundry Loads — Dwelling Unit.

(A) Small-Appliance Circuit Load.

In each dwelling unit, the load shall be calculated at 1500 volt-amperes for each 2-wire small-appliance branch circuit as covered by 210.11(C)(1). Where the load is subdivided through two or more feeders, the calculated load for each shall include not less than 1500 volt-amperes for each 2-wire small-appliance branch circuit. These loads shall be permitted to be included with the general lighting load and subjected to the demand factors provided in Table 220.42.

Exception: The individual branch circuit permitted by 210.52(B)(1), Exception No. 2, shall be permitted to be excluded from the calculation required by 220.52.

(B) Laundry Circuit Load.

A load of not less than 1500 volt-amperes shall be included for each 2-wire laundry branch circuit installed as covered by 210.11(C)(2). This load shall be permitted to be included with the general lighting load and shall be subjected to the demand factors provided in Table 220.42.

220.53 Appliance Load — Dwelling Unit(s).

It shall be permissible to apply a demand factor of 75 percent to the nameplate rating load of four or more appliances rated $\frac{1}{4}$ hp or greater, or 500 watts or greater, that are fastened in place, and that are served by the same feeder or service in a one-family, two-family, or multifamily dwelling. This demand factor shall not apply to:

- (1) Household electric cooking equipment that is fastened in place
- (2) Clothes dryers
- (3) Space heating equipment
- (4) Air-conditioning equipment

220.54 Electric Clothes Dryers — Dwelling Unit(s).

The load for household electric clothes dryers in a dwelling unit(s) shall be either 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		Demand Factor
Dryers		(%)
1–4	100	
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%	

220.55 Electric Cooking Appliances in Dwelling Units and Household Cooking Appliances Used in Instructional Programs.

The load for household electric ranges, wall-mounted ovens, counter-mounted cooking units, and other household cooking appliances individually rated in excess of $1\frac{3}{4}$ kW shall be permitted to be calculated in accordance with

Table 220.55. Kilovolt-amperes (kVA) shall be considered equivalent to kilowatts (kW) for loads calculated under this section.

Where two or more single-phase ranges 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.

Table 220.55 Demand Factors and Loads for Household Electric Ranges, Wall-Mounted Ovens, Counter-Mounted Cooking Units, and Other Household Cooking Appliances over 13/4 kW Rating (Column C to be used in all cases except as otherwise permitted in Note 3.)

Number of Appliances	Demand Factor (%) (See Notes)		Column C Maximum Demand (kW) (See Notes) (Not over 12 kW Rating)
	Column A (Less than 3 1/2 kW Rating)	Column B (3 1/2 kW through 8 3/4 kW Rating)	
1	80	80	8
2	75	65	11
3	70	55	14
4	66	50	17
5	62	45	20
6	59	43	21
7	56	40	22
8	53	36	23
9	51	35	24
10	49	34	25
11	47	32	26
12	45	32	27
13	43	32	28
14	41	32	29
15	40	32	30
16	39	28	31
17	38	28	32
18	37	28	33
19	36	28	34
20	35	28	35
21	34	26	36
22	33	26	37
23	32	26	38
24	31	26	39

Number of Appliances	Demand Factor (%) (See Notes)		Column C Maximum Demand (kW) (See Notes) (Not over 12 kW Rating)
	Column A (Less than 3 1/2 kW Rating)	Column B (3 1/2 kW through 8 3/4 kW Rating)	
25	30	26	40
26–30	30	24	15 kW + 1 kW for each range
31–40	30	22	
41–50	30	20	25 kW + 3/4 kW for each range
51–60	30	18	
61 and over	30	16	

Notes:

1. Over 12 kW through 27 kW ranges all of same rating. For ranges individually rated more than 12 kW but not more than 27 kW, the maximum demand in Column C shall be increased 5 percent for each additional kilowatt of rating or major fraction thereof by which the rating of individual ranges exceeds 12 kW.

2. Over 8 3/4 kW through 27 kW ranges of unequal ratings. For ranges individually rated more than 8 3/4 kW and of different ratings, but none exceeding 27 kW, an average value of rating shall be calculated by adding together the ratings of all ranges to obtain the total connected load (using 12 kW for any range rated less than 12 kW) and dividing by the total number of ranges. Then the maximum demand in Column C shall be increased 5 percent for each kilowatt or major fraction thereof by which this average value exceeds 12 kW.

3. Over 13/4 kW through 8 3/4 kW. In lieu of the method provided in Column C, it shall be permissible to add the nameplate ratings of all household cooking appliances rated more than 13/4 kW but not more than 8 3/4 kW and multiply the sum by the demand factors specified in Column A or Column B for the given number of appliances. Where the rating of cooking appliances falls under both Column A and Column B, the demand factors for each column shall be applied to the appliances for that column, and the results added together.

4. Branch-Circuit Load. It shall be permissible to calculate the branch-circuit load for one range in accordance with Table 220.55. The branch-circuit load for one wall-mounted oven or one counter-mounted cooking unit shall be the nameplate rating of the appliance. The branch-circuit load for a counter-mounted cooking unit and not more than two wall-mounted ovens, all supplied from a single branch circuit and located in the same room, shall be calculated by adding the nameplate rating of the individual appliances and treating this total as equivalent to one range.

5. This table shall also apply to household cooking appliances rated over 13/4 kW and used in instructional programs.

Informational Note No. 1: See the examples in Informative Annex D.

Informational Note No. 2: See Table 220.56 for commercial cooking equipment.

220.56 Kitchen Equipment — Other Than Dwelling Unit(s).

It shall be permissible to calculate the load for commercial electric cooking equipment, dishwasher booster heaters, water heaters, and other kitchen equipment in accordance with Table 220.56. These demand factors shall be applied to all 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 Kitchen Equipment — Other Than Dwelling Unit(s)

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

220.60 Noncoincident Loads.

Where it is unlikely that two or more noncoincident loads will be in use simultaneously, it shall be permissible to use only the largest load(s) that will be used at one time for calculating the total load of a feeder or service. Where a motor is part of the noncoincident load and is not the largest of the noncoincident loads, 125 percent of the motor load shall be used in the calculation if it is the largest motor.

220.61 Feeder or Service Neutral Load.

(A) Basic Calculation.

The feeder or service neutral load shall be the maximum unbalance of the load determined by this article. The maximum unbalanced load shall be the maximum net calculated load between the neutral conductor and any one ungrounded conductor.

Exception: For 3-wire, 2-phase or 5-wire, 2-phase systems, the maximum unbalanced load shall be the maximum net calculated load between the neutral conductor and any one ungrounded conductor multiplied by 140 percent.

(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 220.61(B)(1) or portion of the amount in 220.61(B)(2) determined by the following basic calculations:

- (1) A 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) That 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; or a 4-wire, 3-phase system; or a 3-wire, 2-phase system; or a 5-wire, 2-phase system

Informational Note: See Examples D1(a), D1(b), D2(b), D4(a), and D5(a) in Informative Annex D.

(C) Prohibited Reductions.

There shall be no reduction of the neutral or grounded conductor capacity applied to the amount in 220.61(C)(1), or portion of the amount in (C)(2), from that determined by the basic calculation:

- (1) Any portion of a 3-wire circuit consisting of 2 ungrounded conductors and the neutral conductor of a 4-wire, 3-phase, wye-connected system
- (2) That portion consisting of nonlinear loads supplied from a 4-wire, wye-connected, 3-phase system

Informational Note: A 3-phase, 4-wire, wye-connected power system used to supply power to nonlinear loads ~~may~~ might necessitate that the power system design allows for the possibility of high harmonic neutral conductor currents.

Part IV. Optional Feeder and Service Load Calculations

220.80 General.

Optional feeder and service load calculations shall be permitted in accordance with Part IV.

220.82 Dwelling Unit.

(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). 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.

(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 volt-amperes/m² or 3 volt-amperes/ft² 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.
- (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~~ 220.82(B)(2)
 - d. Water heaters
- (4) The nameplate ampere or kVA rating of all permanently connected motors not included in ~~item~~ 220.82(B)(3).

(C) Heating and Air-Conditioning Load.

The largest of the following six selections (load in kVA) shall be included:

- (1) 100 percent of the nameplate rating(s) of the air conditioning and cooling.
- (2) 100 percent of the nameplate rating(s) of the heat pump when the heat pump is used without any supplemental electric heating.
- (3) 100 percent of the nameplate rating(s) of the heat pump compressor and 65 percent of the supplemental electric heating for central electric space-heating systems. If the heat pump compressor is prevented from operating at the same time as the supplementary heat, it does not need to be added to the supplementary heat for the total central space heating load.
- (4) 65 percent of the nameplate rating(s) of electric space heating if less than four separately controlled units.
- (5) 40 percent of the nameplate rating(s) of electric space heating if four or more separately controlled units.
- (6) 100 percent of the nameplate ratings of electric thermal storage and other heating systems where the usual load is expected to be continuous at the full nameplate value. Systems qualifying under this selection shall not be calculated under any other selection in 220.82(C).

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 the dwelling unit is served by a 120/240-volt or 208Y/120-volt, 3-wire service, it shall be permissible to calculate the total load in accordance with 220.83(A) or (B).

(A) Where Additional Air-Conditioning Equipment or Electric Space-Heating Equipment Is Not to Be Installed.

The ~~following~~ 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/m² or 3 volt-amperes/ft² as determined by 220.12
- (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

(B) Where Additional Air-Conditioning Equipment or Electric Space-Heating Equipment Is to Be Installed.

The following 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	
.	100
controlled space-heating units	
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/m² or 3 volt-amperes/ft² as determined by 220.12
- (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

220.84 Multifamily Dwelling.

(A) Feeder or Service Load.

It shall be permissible to calculate the load of a feeder or service that supplies three or more dwelling units of a multifamily dwelling in accordance with Table 220.84 instead of Part III of this article if all the following conditions are met:

- (1) No dwelling unit is supplied by more than one feeder.
- (2) Each dwelling unit is equipped with electric cooking equipment.

Exception: When the calculated load for multifamily dwellings without electric cooking in Part III of this article exceeds that calculated under Part IV for the identical load plus electric cooking (based on 8 kW per unit), the lesser of the two loads shall be permitted to be used.

- (3) Each dwelling unit is equipped with either electric space heating or air conditioning, or both. Feeders and service conductors whose calculated load is determined by this optional calculation shall be permitted to have the neutral load determined by 220.61.

(B) House Loads.

House loads shall be calculated in accordance with Part III of this article and shall be in addition to the dwelling unit loads calculated in accordance with Table 220.84(B).

Table 220.84(B) Optional Calculations — Demand Factors for Three or More Multifamily Dwelling Units

Number of Dwelling Units	Demand Factor (%)
3–5	45
6–7	44
8–10	43
11	42
12–13	41
14–15	40
16–17	39
18–20	38
21	37
22–23	36
24–25	35
26–27	34
28–30	33
31	32
32–33	31
34–36	30
37–38	29
39–42	28
43–45	27
46–50	26
51–55	25
56–61	24
62 and over	23

(C) Calculated Loads.

The calculated load to which the demand factors of Table 220.84 apply shall include the following:

- (1) 33 volt-amperes/m² or 3 volt-amperes/ft² 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

220.85 Two Dwelling Units.

Where two dwelling units are supplied by a single feeder and the calculated load under Part III of this article exceeds that for three identical units calculated under 220.84, the lesser of the two loads shall be permitted to be used.

220.86 Schools.

The calculation of a feeder or service load for schools shall be permitted in accordance with Table 220.86 in lieu of Part III of this article where equipped with electric space heating, air conditioning, or both. The connected load to which the demand factors of Table 220.86 apply shall include all of the interior and exterior lighting, power, water heating, cooking, other loads, and the larger of the air-conditioning load or space-heating load within the building or structure.

Feeders and service conductors whose calculated load is determined by this optional calculation shall be permitted to have the neutral load determined by 220.61. Where the building or structure load is calculated by this optional method, feeders within the building or structure shall have ampacity as permitted in Part III of this article; however, the ampacity of an individual feeder shall not be required to be larger than the ampacity for the entire building.

This section shall not apply to portable classroom buildings.

Table 220.86 Optional Method — Demand Factors for Feeders and Service Conductors for Schools

		Demand
Connected Load		.
		Factor
		.
		(Percent)
First 33 VA/m ²	(3 VA/ft ²) at	100
.		

		Demand
		.
Connected Load		Factor
		.
		(Percent)
Plus,		
Over 33 through 220 VA/m ²		
.	(3 through 20 VA/ft ²) at	75
Plus,		
Remainder over 220 VA/m ²	(20 VA/ft ²) at	25

220.87 Determining Existing Loads.

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

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

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

- (2) The maximum demand at 125 percent plus the new load does not exceed the ampacity of the feeder or rating of the service.
- (3) The feeder has overcurrent protection in accordance with 240.4, and the service has overload protection in accordance with 230.90.

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

220.88 New Restaurants.

Calculation of a service or feeder load, where the feeder serves the total load, for a new restaurant shall be permitted in accordance with Table 220.88 in lieu of Part III of this article.

The overload protection of the service conductors shall be in accordance with 230.90 and 240.4.

Feeder conductors shall not be required to be of greater ampacity than the service conductors.

Service or feeder conductors whose calculated load is determined by this optional calculation shall be permitted to have the neutral load determined by 220.61.

Table 220.88 Optional Method — Permitted Load Calculations for Service and Feeder Conductors for New Restaurants

Total Connected	All Electric Restaurant	Not All Electric Restaurant
Load (kVA)	Calculated Loads (kVA)	Calculated Loads (kVA)
0–200	80%	100%
201–325	10% (amount over 200) + 160.0	50% (amount over 200) + 200.0
326–800	50% (amount over 325) + 172.5	45% (amount over 325) + 262.5
Over 800	50% (amount over 800) + 410.0	20% (amount over 800) + 476.3

Note: Add all electrical loads, including both heating and cooling loads, to calculate the total connected load. Select the one demand factor that applies from the table, then multiply the total connected load by this single demand factor.

Part V. Farm Load Calculations

220.100 General.

Farm loads shall be calculated in accordance with Part V.

220.102 Farm Loads — Buildings and Other Loads.

(A) Dwelling Unit.

The feeder or service load of a farm dwelling unit shall be calculated in accordance with the provisions for dwellings in Part III or IV of this article. Where the dwelling has electric heat and the farm has electric grain-drying systems, Part IV of this article shall not be used to calculate the dwelling load where the dwelling and farm loads are supplied by a common service.

(B) Other Than Dwelling Unit.

Where a feeder or service supplies a farm building or other load having two or more separate branch circuits, the load for feeders, service conductors, and service equipment shall be calculated in accordance with demand factors not less than indicated in Table 220.102(B).

Table 220.102(B) Method for Calculating Farm Loads for Other Than Dwelling Unit

Ampere Load at 240 Volts Maximum	Demand Factor
	(%)
The greater of the following:	
All loads that are expected to operate simultaneously, or	100
125 percent of the full load current of the largest motor, or	
First 60 amperes of the load	
Next 60 amperes of all other loads	50
Remainder of other loads	25

220.103 Farm Loads — Total.

Where supplied by a common service, the total load of the farm for service conductors and service equipment shall be calculated in accordance with the farm dwelling unit load and demand factors specified in Table 220.103. Where there is equipment in two or more farm equipment buildings or for loads having the same function, such loads shall be calculated in accordance with Table 220.102 and shall be permitted to be combined as a single load in Table 220.103 for calculating the total load.

Table 220.103 Method for Calculating Total Farm Load

	Demand Factor
Individual Loads Calculated in Accordance with Table 220.102	.
	(%)
Largest load	100
Second largest load	75
Third largest load	65
Remaining loads	50

Note: To this total load, add the load of the farm dwelling unit calculated in accordance with Part III or IV of this article. Where the dwelling has electric heat and the farm has electric grain-drying systems, Part IV of this article shall not be used to calculate the dwelling load.



First Revision No. 9628-NFPA 70-2021 [Global Input]

Add new exception to current 210.12(A). Existing exception will be numbered as Exception No. 1.

Exception No. 2: AFCI protection shall be required for the individual branch circuit supplying a receptacle for arc welding equipment in a dwelling unit effective January 1, 2025.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Wed Feb 10 20:04:48 EST 2021

Committee Statement

Committee Statement: This exception would provide a window of opportunity to continue the research currently underway between AFCI manufacturers and manufacturers of welding equipment. With the expansion of AFCIs, this equipment may need more time to address the possibility of unwanted tripping. CMP 2 is affording the manufacturers of these solutions time to address any compatibility concerns should any be identified.

Response Message: FR-9628-NFPA 70-2021

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

10 Affirmative All

3 Affirmative with Comments

2 Negative with Comments

0 Abstention

Affirmative All

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Boynton, Charles L.

I don't agree to expanding these devices to these areas. However, I support extending the time to allow manufacturers to determine how to prevent the Arc fault interrupter from tripping on a device designed to create an ARC.

Cook, Mark Daniel

agree

Neubauer, Fred

agree

Negative with Comment

Abbassi, Mathher

ARC welder is not subject to this provision since it requires larger size circuit breakers than 15 or 20 amp.

Campolo, Steve

How is an AHJ to know which individual circuit and receptacle will supply such an arc welder. This technology is not quite ready for prime time.

**First Revision No. 8970-NFPA 70-2021 [Detail]****210.11(C)(4)****(4) Garage Branch Circuits.**

In addition to the number of branch circuits required by other parts of this section, at least one 120-volt, 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 ~~readily accessible~~ outdoor receptacle outlets.

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

Supplemental Information

<u>File Name</u>	<u>Description</u> <u>Approved</u>
NEC_210.11_C_4_FR8970.docx	For staff use

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Wed Jan 13 12:02:11 EST 2021

Committee Statement

Committee Statement: The text is revised to clarify that the required receptacle outlets from 210.52(G)(1) must be served from at least one 120-volt, 20-ampere branch circuit, and that this 20-ampere branch circuit is also permitted to serve other receptacle outlets within the garage. Other kinds of outlets within the garage or in other space(s) not included by exception 1 are prohibited from being connected to the required 120-volt, 20-ampere branch circuit. Additional text provides clarification that receptacle outlets, other than those required by 210.52(G)(1), can be served by additional 120-volt branch circuit(s) rated either 15- or 20-amperes.

A new exception #2 was added to permit a single bay garage to have all outlets within that garage to be served by the required 120-volt, 20-ampere branch circuit in accordance with 210.23(A)(1) or (A)(2). The existing numbering of the exceptions is modified to account for these changes.

Response Message: FR-8970-NFPA 70-2021

[Public Input No. 2611-NFPA 70-2020 \[Section No. 210.11\(C\)\(4\)\]](#)

[Public Input No. 4283-NFPA 70-2020 \[Section No. 210.11\(C\)\(4\)\]](#)

[Public Input No. 4666-NFPA 70-2020 \[Section No. 210.11\(C\)\(4\)\]](#)

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

11 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Boynton, Charles L.

Agree

Cook, Mark Daniel

agree

Neubauer, Fred

agree



First Revision No. 9094-NFPA 70-2021 [Detail]

See attached Word file for changes throughout 210.12.

Supplemental Information

<u>File Name</u>	<u>Description</u> <u>Approved</u>
NEC_210.12_PI2970_PI2102_PI220_FR9094_CMP-2.docx	For staff use
NEC_Detail_FR-9094_210.12_for_ballot.docx	For ballot

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 14 19:23:38 EST 2021

Committee Statement

Committee Statement: The acronym AFCI is now used throughout section 210.12 after used the first time in section 210.12 (per 3.2.3 of the NEC Style Manual).

The occupancies in 210.12 (D) were removed from the title to make it clear that additions and modifications to any areas or occupancies in 210.12 must also be provided with AFCI protection.

Response Message: FR-9094-NFPA 70-2021

[Public Input No. 2970-NFPA 70-2020 \[Section No. 210.12\]](#)

[Public Input No. 220-NFPA 70-2019 \[Section No. 210.12\(D\)\]](#)

[Public Input No. 2102-NFPA 70-2020 \[Section No. 210.12\(D\)\]](#)

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

11 Affirmative All

3 Affirmative with Comments

1 Negative with Comments

0 Abstention

Affirmative All

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree with the acronym red edit.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree

Negative with Comment

Boynton, Charles L.

Agree with Acronym, but not changing to expand to all areas, as no data has substantiated this expansion.

210.12 Arc-Fault Circuit-Interrupter Protection.

Arc-fault circuit-interrupter protection shall be provided as required in 210.12(A), (B), (C), and (D). The arc-fault circuit interrupter shall be installed in a readily accessible location.

(A) Dwelling Units.

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

- (1) A listed combination-type ~~arc-fault circuit interrupter~~AFCI installed to provide protection of the entire branch circuit
- (2) A listed branch/feeder-type AFCI installed at the origin of the branch ~~-~~circuit in combination with a listed outlet branch-circuit-type ~~arc-fault circuit interrupter~~AFCI installed at the first outlet box on the branch circuit. The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
- (3) A listed supplemental arc protection circuit breaker installed at the origin of the branch circuit in combination with a listed outlet branch-circuit-type ~~arc-fault circuit interrupter~~AFCI installed at the first outlet box on the branch circuit where all of the following conditions are met:
 - a. The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit ~~arc-fault circuit interrupter~~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 in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
- (4) A listed outlet branch-circuit-type ~~arc-fault circuit interrupter~~AFCI installed at the first outlet on the branch circuit in combination with a listed branch-circuit overcurrent protective device where all of the following conditions are met:
 - a. The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit ~~arc-fault circuit interrupter~~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 in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
 - d. The combination of the branch-circuit overcurrent device and outlet branch-circuit AFCI shall be identified as meeting the requirements for a system combination-type AFCI and shall be listed as such.
- (5) If 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 at the first outlet to provide protection for the remaining portion of the branch circuit.

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

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

Informational Note No. 1: For information on combination-type and branch/feeder-type ~~are fault-circuit interrupters~~AFCI devices, see UL 1699-2011, *Standard for Arc-Fault Circuit Interrupters*. For information on outlet branch-circuit type ~~are fault-circuit interrupters~~AFCI devices, see UL Subject 1699A, *Outline of Investigation for Outlet Branch Circuit Arc-Fault Circuit-Interrupters*. For information on system combination AFCIs, see UL Subject 1699C, *Outline of Investigation for System Combination Arc-Fault Circuit Interrupters*.

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

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

(B) Dormitory Units.

All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets and devices installed in dormitory unit bedrooms, living rooms, hallways, closets, bathrooms, and similar rooms shall be protected by any of the means described in 210.12(A)(1) through (6).

(C) Guest Rooms, Guest Suites, and Patient Sleeping Rooms in Nursing Homes and Limited-Care Facilities.

All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets and devices installed in guest rooms and guest suites of hotels and motels and patient sleeping rooms in nursing homes and limited-care facilities shall be protected by any of the means described in 210.12(A)(1) through (6).

(D) Branch Circuit Extensions or Modifications —~~Dwelling Units, Dormitory Units, and Guest Rooms and Guest Suites.~~

Where branch circuit wiring for any of the areas specified in 210.12(A), (B), or (C) 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.



First Revision No. 9130-NFPA 70-2021 [Detail]

Revisions to current 210.52(C)(2).

AWhere a peninsular countertop is connected to a wall countertop, the peninsular countertop shall be measured from the connected perpendicular wall countertop. Where a peninsular countertop is connected to a wall, the peninsular countertop shall be measured from the wall.

Supplemental Information

<u>File Name</u>	<u>Description Approved</u>
NEC_210.52_C_2_FR9130.docx	Staff Use

Submitter Information Verification

Committee: NEC-P02

Submission Date: Fri Jan 15 12:15:57 EST 2021

Committee Statement

Committee Statement: The language removes the confusion with a perpendicular connection and clarifies where the measurement begins for peninsular counters.

Response Message: FR-9130-NFPA 70-2021

[Public Input No. 2027-NFPA 70-2020 \[Section No. 210.52\(C\)\(2\)\]](#)

[Public Input No. 2028-NFPA 70-2020 \[Section No. 210.52\(C\)\(2\)\]](#)

[Public Input No. 550-NFPA 70-2020 \[Section No. 210.52\(C\)\(2\)\]](#)

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve
Domitrovich, Thomas A.
El-Sherif, Nehad
Harman, Thomas L.
Humphrey, David G.
Johnson, David W.
Lujan, Cesar
Manche, Alan
McCamish, John
Pavese, Christopher J.
Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher
Agree
Cook, Mark Daniel
agree
Neubauer, Fred
Agree



First Revision No. 9131-NFPA 70-2021 [Detail]

Revisions to current 210.52(C)(2).

- (1) At least one receptacle outlet shall be provided for the first 0.84 m² (9 ft²), or fraction thereof, of the countertop or work surface. A receptacle outlet shall be provided for every additional 1.7 m² (18 ft²), or fraction thereof, of the countertop or work surface. Sinks, cooktops, or similar shall not be included in the measurement.

Supplemental Information

<u>File Name</u>	<u>Description Approved</u>
NEC_210.52_C_2_FR9131.docx	Staff Use

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 15 12:24:48 EST 2021

Committee Statement

Committee Statement: Language was added to clarify that sinks and cooktops, or similar, are not to be included in the calculation of the island, peninsula or work surface area. Sinks and cooktops or similar surfaces should not be used for cord or plug equipment.

Response Message: FR-9131-NFPA 70-2021

[Public Input No. 243-NFPA 70-2020 \[Section No. 210.52\(C\)\(2\)\]](#)

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve
Domitrovich, Thomas A.
El-Sherif, Nehad
Harman, Thomas L.
Humphrey, David G.
Johnson, David W.
Lujan, Cesar
Manche, Alan
McCamish, John
Pavese, Christopher J.
Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher
Agree. A space is required between the period and Sink.
Cook, Mark Daniel
Brings clarity to the calculation
Neubauer, Fred
Agree



First Revision No. 9138-NFPA 70-2021 [Detail]

Revisions to current 210.52(C)(3).

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

Supplemental Information

<u>File Name</u>	<u>Description Approved</u>
NEC_210.52_C_3_FR9138.docx	Staff use

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 15 13:07:45 EST 2021

Committee Statement

Committee Statement: The revised language to adds clarity and enables supports compliance with the added receptacle requirements for kitchen islands and peninsulas.

Response Message: FR-9138-NFPA 70-2021

[Public Input No. 2847-NFPA 70-2020 \[Section No. 210.52\(C\)\(3\)\]](#)

Ballot Results

✓ This item has passed ballot

15 Eligible Voters

0 Not Returned

11 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree

Cook, Mark Daniel

agree

Humphrey, David G.

The situation may occur where the enforcement authority is trying to locate a seam in a countertop in order to try to determine where the peninsular starts. This could also be misleading as the base may connect to the wall but the top turn without a seam onto the wall cabinets. This FR should be reworked for clarity.

Neubauer, Fred

Agree



First Revision No. 9144-NFPA 70-2021 [Detail]

Delete branch-circuit from 210.63(B)(2)

(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 branch-circuit disconnecting means.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 15 16:46:00 EST 2021

Committee Statement

Committee Statement: The term branch circuit has been deleted as the equipment in 110.26(E) is not fed by a branch circuit.

Response Message: FR-9144-NFPA 70-2021

[Public Input No. 620-NFPA 70-2020 \[Section No. 210.63\(B\)\(2\)\]](#)

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

11 Affirmative All

3 Affirmative with Comments

1 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree

McCamish, John

The elimination of the term branch circuit does not solve the safety issue at hand without creating a situation where additional feeders may have to be installed to accommodate this branch circuit. A building with only one feeder should be treated as a building with a service.

Neubauer, Fred

Agree

Negative with Comment

Cook, Mark Daniel

How can this be required in ALL applications? What about a MDP located within a building. The receptacle will have to be feed from another upstream source?

**First Revision No. 9147-NFPA 70-2021 [Detail]**

Revisions to 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 listed wall-mounted control device shall be installed in hallways, stairways, attached garages, and detached garages with electric power.
- (2) For dwelling units, attached garages, and detached garages with electric power, at least one exterior lighting outlet controlled by a 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, sloped 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 listed wall-mounted control device or by a unit switch of the interior luminaire or interior lampholder.

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

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

- (4) ~~Lighting Dimmer control of lighting outlets controlled installed in accordance with 210.70(A)(2)(3) shall not be controlled by use of listed wall-mounted control devices permitted unless they the listed control devices can provide the full range of dimming control at each location to maximum brightness at each control location for the interior stairway illumination.~~

Supplemental Information

<u>File Name</u>	<u>Description Approved</u>
NEC_210.70_A_2_FR9147.docx	Staff Use

Submitter Information Verification

Committee: NEC-P02

Submission Date: Fri Jan 15 18:18:31 EST 2021

Committee Statement

Committee Statement: The revised language clarifies that dimmer control for stair illumination must have the capability to provide maximum brightness at each control location for the stairway. CMP-2 did not add "required" because the term is used in the section title.

Response Message: FR-9147-NFPA 70-2021

[Public Input No. 4628-NFPA 70-2020 \[Section No. 210.70\(A\)\(2\)\]](#)

[Public Input No. 8-NFPA 70-2019 \[Section No. 210.70\(A\)\(2\)\]](#)

[Public Input No. 995-NFPA 70-2020 \[Section No. 210.70\(A\)\(2\)\]](#)

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9151-NFPA 70-2021 [Detail]

Revise 210.70(A) as follows by deleting the reference to (A)(3).

(A) Dwelling Units.

In dwelling units, lighting outlets shall be installed in accordance with 210.70(A)(1), and (A)(2), ~~and (A)(3)~~

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 15 19:51:25 EST 2021

Committee Statement

Committee Statement: To accurately reflect the reference section 210.70(A), an editorial revision was made to delete the reference to (A)(3).

Response Message: FR-9151-NFPA 70-2021

[Public Input No. 1784-NFPA 70-2020 \[Section No. 210.70\(A\)\]](#)

[Public Input No. 1762-NFPA 70-2020 \[Section No. 210.70\(A\) \[Excluding any Sub-Sections\]\]](#)

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree

**First Revision No. 9158-NFPA 70-2021 [Detail]**

See attached Word file for re-organization of 210.12.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_210.12_FR9158.docx	For staff use	
NEC_210.12_FR9158.1610770097218-1_FR9158.docx	Updated with questions for Jeff and Sarah. For staff use	
NEC_Detail_FR-9158_210.12_for_ballot.docx	For ballot	

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 15 21:40:34 EST 2021

Committee Statement

Committee Statement: This FR does not include any technical changes and is a straight rewrite of Section 210.12 to be similar to Section 210.8, while keeping the existing code language. The purpose is to add clarity to the code and improve its usability.

The changes made to Section 210.12 are as follows:

1. Changing the title of the existing Section 210.12(A) to "Means of Protection"
2. Moving the requirements for AFCI protection in dwelling units from the existing Section 210.12(A) to Section 210.12(B) and converting the protected areas in dwelling units from a paragraph to a numbered list (similar to Section 210.8)
3. Moving the requirements for AFCI protection in dormitory units from the existing Section 210.12(B) to Section 210.12(C) and converting the protected areas in dormitory units from a paragraph to a numbered list (similar to Section 210.8)
4. Moving the requirements for AFCI protection in guest rooms, guest suites, and patient sleeping rooms in nursing homes and limited-care facilities from existing Section 210.12(C) to Section 210.12(D) and changing the title to "Other Occupancies"
5. Converting the protected occupancies in the existing Section 210.12(C) from a paragraph to a numbered list (similar to Section 210.8)
6. Moving the requirements for AFCI protection for branch circuit Extensions or modifications from the existing Section 210.12(D) to Section 210.12(E) and deleting "Dwelling Units, Dormitory Units, Guest Rooms, and Guest Suites" from the title
7. Updating all the references within 210.12 to match this reorganization

Response Message: FR-9158-NFPA 70-2021

[Public Input No. 3264-NFPA 70-2020 \[Section No. 210.12\]](#)

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree

Cook, Mark Daniel

agree

Neubauer, Fred

Agree

210.12 Arc-Fault Circuit-Interrupter Protection.

Arc-fault circuit-interrupter protection shall be provided as required in 210.12(A), (B), (C), and (D) through (E) by any of the means described in 210.12(A)(1) through (A)(6). The arc-fault circuit interrupter shall be installed in a readily accessible location.

(A) ~~Dwelling Units~~ Means of Protection.

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

- (1) A listed combination-type arc-fault circuit interrupter installed to provide protection of the entire branch circuit
- (2) A listed branch/feeder-type AFCI installed at the origin of the branch-circuit in combination with a listed outlet branch-circuit-type arc-fault circuit interrupter installed at the first outlet box on the branch circuit. The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
- (3) A listed supplemental arc protection circuit breaker installed at the origin of the branch circuit in combination with a listed outlet branch-circuit-type arc-fault circuit interrupter installed at the first outlet box on the branch circuit where all of the following conditions are met:
 - a. The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
 - b. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
 - c. The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
- (4) A listed outlet branch-circuit-type arc-fault circuit interrupter installed at the first outlet on the branch circuit in combination with a listed branch-circuit overcurrent protective device where all of the following conditions are met:
 - a. The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
 - b. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.

- c. The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
 - d. The combination of the branch-circuit overcurrent device and outlet branch-circuit AFCI shall be identified as meeting the requirements for a system combination-type AFCI and shall be listed as such.
- (5) If 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 at the first outlet to provide protection for the remaining portion of the branch circuit.
- (6) Where a listed metal or nonmetallic conduit or tubing or Type MC cable is encased in not less than 50 mm (2 in.) of concrete for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, it shall be permitted to install a listed outlet branch-circuit-type AFCI at the first outlet to provide protection for the remaining portion of the branch circuit.

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

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

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

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

(B) Dormitory Dwelling Units.

All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets ~~and or~~ devices installed in dormitory unit bedrooms, living rooms, hallways, closets, bathrooms, and similar rooms shall be protected by any of the means described in 210.12(A)(1) through (A)(6).

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

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

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

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

~~(C) Guest Rooms, Guest Suites, and Patient Sleeping Rooms in Nursing Homes and Limited-Care Facilities~~Dormitory Units.

All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets and devices installed in ~~210.12(C)(1) through (C)(6) guest rooms and guest suites of hotels and motels and patient sleeping rooms in nursing homes and limited-care facilities~~ shall be protected by any of the means described in 210.12(A)(1) through (A)(6).

(D) Branch Circuit Extensions or Modifications — Dwelling Units, Dormitory Units, and Guest Rooms and Guest Suites.

All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets and devices installed in 210.12(D)(1) through (D)(4) shall be protected by any of the means described in 210.12(A)(1) through (A)(6).

(1) Guest rooms of hotels and motels

(2) Patient sleeping rooms in nursing homes

~~Where branch circuit wiring for any of the areas specified in 210.12(A), (B), or (C) 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.~~

(E) Branch Circuit Extensions or Modifications.

Where branch circuit wiring for any of the areas specified in 210.12(B) through (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.



First Revision No. 9170-NFPA 70-2021 [Detail]

New section after 220.56

220.57 Electric Vehicle Supply Equipment (EVSE) Load.

The EVSE load shall be calculated at either 7200 watts (volt-amperes) or the nameplate rating of the equipment, whichever is larger.

Informational Note: See 625.42 for sizing of an EVSE circuit.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Sat Jan 16 12:22:07 EST 2021

Committee Statement

Committee Statement: A new section is added to address EVSE, and an informational note to refer to the applicable requirements in Section 625.42. The 7200 watt (volt-amperes) minimum requirement is based on a 30 ampere, 240 volt, single-phase circuit.

CMP 2 is not adding demand factors as proposed, as the values proposed were not substantiated, and the requirements for sizing EVSE loads are in Section 625.42.

Response Message: FR-9170-NFPA 70-2021

Public Input No. 4661-NFPA 70-2020 [New Section after 220.56]

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9176-NFPA 70-2021 [Detail]

Revise current 210.12(C) as follows.

210.12 (C) Guest Rooms, Guest Suites, and Patient Sleeping Rooms in Nursing Homes and Limited-Care Facilities.

All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets and devices installed in guest rooms and guest suites of hotels and motels, and in areas used exclusively as patient sleeping rooms in nursing homes and limited-care facilities shall be protected by any of the means described in 210.12(A)(1) through (6).

Supplemental Information

<u>File Name</u>	<u>Description Approved</u>
NEC_210.12_C_PI26_FR9176.docx	Staff Use

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Sat Jan 16 15:39:33 EST 2021

Committee Statement

Committee Statement: "In areas used exclusively as" was added before "patient sleeping rooms" to correlate precisely with Section 517.10(B)(2) as to where Part II of Article 517 is specifically not applicable, thereby avoiding confusion and providing clearer differentiation in health care facilities from other patient rooms used for delivery of medical procedures and therefore not used exclusively for sleeping.

The term sleeping rooms in assisted living facilities was not added as the term sleeping room is unclear and does not define a specific area.

Response Message: FR-9176-NFPA 70-2021

Public Input No. 26-NFPA 70-2019 [Section No. 210.12(C)]

Ballot Results

✓ This item has passed ballot

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree. A space is required between "andin".

Cook, Mark Daniel

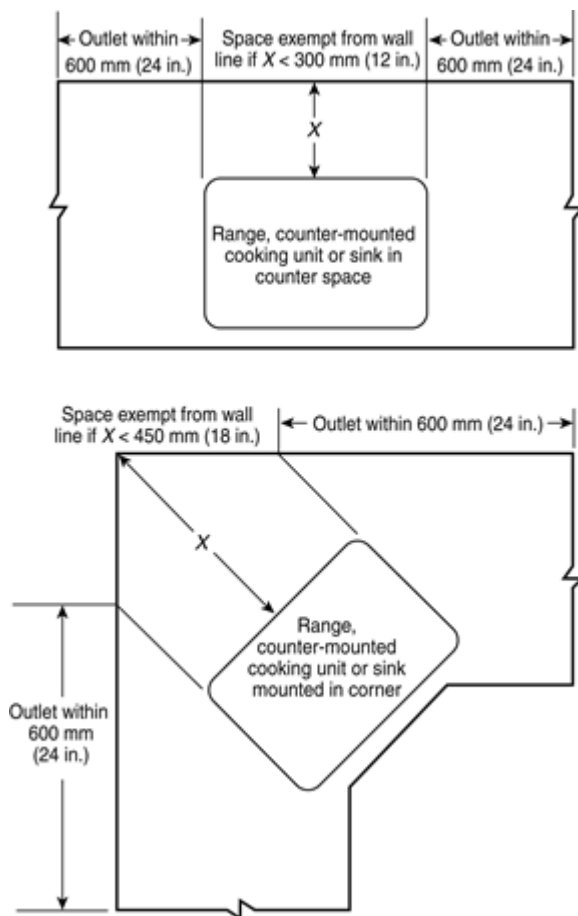
agree

Neubauer, Fred

Agree

**First Revision No. 9191-NFPA 70-2021 [Detail]**

The figures in 210.52(C)(1) are revised, see attached PDF, and the language “extending from the face of the counter” has been removed from the top figure.

**Supplemental Information**

<u>File Name</u>	<u>Description</u> <u>Approved</u>
NEC_210.52_C_1_Image_FR9191.pdf	For staff use

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Sat Jan 16 22:41:35 EST 2021

Committee Statement

Committee Statement: The figures are revised and the language “extending from the face of the counter” removed from the top figure. This clarifies the focus of the requirement is on the usable space behind the sink, range, or cooking unit.

Response FR-9191-NFPA 70-2021

Message:

[Public Input No. 1459-NFPA 70-2020 \[Section No. 210.52\(C\)\(1\)\]](#)

Ballot Results

✔ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9197-NFPA 70-2021 [Detail]

Changes to Informational Note No. 2 in 210.12(A):

Informational Note No. 2: See ~~29.6.3~~29.9.4(5) of ~~NFPA 72-2013~~2019, *National Fire Alarm and Signaling Code*, for information related to ~~on~~secondary power sources supply requirements for smoke alarms installed in dwelling units.

Supplemental Information

<u>File Name</u>	<u>Description</u> <u>Approved</u>
Detail_FR_9197_IN_2_210.12_A_.docx	For staff use

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Sun Jan 17 22:15:37 EST 2021

Committee Statement

Committee Statement: I.N. 2 and 3 were revised to align the language with NFPA 72 and Article 760 in the NEC.

Response Message: FR-9197-NFPA 70-2021

Public Input No. 2695-NFPA 70-2020 [Section No. 210.12(A)]

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree

**First Revision No. 9198-NFPA 70-2021 [Detail]****Change to text in current 210.12(A):**

All 120-volt, single-phase, ~~10-~~, 15- and 20-ampere branch circuits supplying outlets or devices installed in dwelling unit kitchensfamily rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, basements, closets, hallways, laundry areas, attics, garages, detached garages and other ancillary structures such as storage sheds, or similar rooms or areas shall be protected by any of the means described in 210.12(A)(1) through (6):

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
9198.docx	Adding "10-" ampere to 210.12(A). For staff use	

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Sun Jan 17 23:28:09 EST 2021

Committee Statement

Committee Statement: With the introduction and availability of 10-ampere branch circuits, 10-ampere branch circuits have been added to the list of circuits requiring AFCI protection.

Response Message: FR-9198-NFPA 70-2021

Ballot Results

✔ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

10 Affirmative All

3 Affirmative with Comments

2 Negative with Comments

0 Abstention

Affirmative All

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree. The addition of a reference or an informational Note to clarify that 10 ampere rated circuits are to serve light only.

Boynton, Charles L.

Agree it logically should be included but not with the expansion of these devices.

Neubauer, Fred

Agree

Negative with Comment

Campolo, Steve

NO- While I have no objection to AFCI protection on 10A branch circuits the current wording does not prohibit the circuits from powering 15 & 20A convenience receptacles. When one sees a 15 or 20A receptacle the expectation is to have that much power available; like when my daughter plugs in her 1850W hand-held hair dryers. If the plug fits..... turn it on! This will surely cause tripping of a 10A circuit breaker. The section says "...outlets or devices...". A wiring device appears to be permitted. Should the words change to specifically exclude receptacle outlets with 15 or 20A face configurations, I can support this. Conversely, should a 10A receptacle outlet be developed specifically for 10A branch circuits, that would also be acceptable.

Cook, Mark Daniel

I do not support the addition of a 10A branch circuit



First Revision No. 8774-NFPA 70-2021 [Definition: Bathroom.]

Bathroom.

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

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Jan 11 11:33:30 EST 2021

Committee Statement

Committee Statement: In the 2020 code cycle “basin” in the definition of bathroom was changed to “sink (basin)”. To be consistent with the use of the word sink in the definitions of kitchens, “(basin)” is removed from the definition for bathroom.

Response Message: FR-8774-NFPA 70-2021

[Public Input No. 522-NFPA 70-2020 \[Definition: Bathroom.\]](#)

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 8779-NFPA 70-2021 [Definition: Branch Circuit, Multiwire.]

Branch Circuit, Multiwire. (Multiwire Branch Circuit)

A branch circuit that consists of two or more ungrounded conductors that have a voltage between them, and a ~~grounded~~ neutral conductor that has equal voltage between it and each ungrounded conductor of the circuit and that is connected to the neutral ~~or grounded~~ conductor of the system. (CMP-2)

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Jan 11 12:19:54 EST 2021

Committee Statement

Committee Statement: The term “grounded conductor” is being removed and replaced with “neutral conductor”. This change aligns with the definitions of neutral point and neutral conductor and provides clarity to differentiate from a corner grounded delta system.

In accordance with 2.2.2.3 of the NEC Style manual “(Multiwire Branch Circuit)” was added. This change addresses global public input 3329.

Response Message: FR-8779-NFPA 70-2021

[Public Input No. 3880-NFPA 70-2020 \[Definition: Branch Circuit, Multiwire.\]](#)

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9180-NFPA 70-2021 [Section No. 210.1]

210.1 Scope.

This article provides the general requirements for branch circuits.

Informational Note: For requirements that supplement or modify this article for over 1000 Vac, 1500 Vdc installations, see Article 235.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Sat Jan 16 16:20:39 EST 2021

Committee Statement

Committee Statement: CMP 2 supports the concept of creating Articles dedicated to circuits rated over 1000 Volts. Regarding those requirements under the purview of CMP 2, this committee supports modifications to Article 210 to facilitate the creation of a new Article 235 to include the “over 1000 Volts” requirements for branch circuits. To facilitate the creation of this Article, CMP 2 revises 210.1 and 210.6(E).

For the change to 210.1, CMP 2 recognizes scope statements are under the purview of the Correlating Committee. CMP 2 also recommends that the purview for the new medium voltage articles be under a panel be comprised of subject matter experts on medium voltage wiring and equipment installations. Alternatively, existing panels could be expanded to include members with medium-voltage expertise.

Response Message: FR-9180-NFPA 70-2021

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

11 Affirmative All

1 Affirmative with Comments

3 Negative with Comments

0 Abstention

Affirmative All

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Cook, Mark Daniel

agree

Negative with Comment

Abbassi, Mathher

The reference doesn't exist.

Boynton, Charles L.

The proposed new article did not define the voltage at the high end. Would be problematic for utility, industrial and commercial industries without careful scrutiny and for probable correlation issues in the code due to greater than 1000V requirements that are embedded in various Articles of the code.

Neubauer, Fred

This First Revision should be resolved as proposed Article 235 (under the responsibility of CMP-10) was overwhelmingly resolved and therefore is nonexistent. The Correlating Committee will ultimately have to report these as resolved. The actions by CMP-2 on First Revisions 9208, 9202, and 9180 are totally presumptuous and perceived as an effort to steer the Code development process. Violating the NEC Style Manual requires immediate corrective action by the NEC Correlating Committee. To do otherwise is changing the rules the entire NEC Committee must abide by. The Correlating Committee has a responsibility to enforce the requirements of the 2020 NEC Style Manual (Section 2.1.3) which clearly indicates that articles must be on a "specific topic." Combining parts of Articles 210, 215, 225 and 230 is completely in violation of the NEC Style Manual as this would bring multiple topics into the same article. A voltage range does not warrant a "specific topic" for an article, it is a voltage range for a specific topic. This will also need to be addressed in the First Revisions creating new Articles 305 and 495. The NEC Style Manual is clearly being violated by these first revisions, in addition to introducing multiple scope and purview problems, very indicative of the very problems once fixed by the NEC Correlating Committee in the 1990s. You can't take parts out of multiple articles that cover "specific topics" and create a whole new article without violating Section 2.1.3 the NEC Style Manual, creating duplication, scope conflicts, and purview issues, is irresponsible, not to mention setting a dangerous and damaging precedent

**First Revision No. 8787-NFPA 70-2021 [Section No. 210.3]****210.3** Other Articles for Specific-Purpose Branch Circuits.

Table 210.3 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 210.3 Specific-Purpose Branch Circuits

<u>Equipment</u>	<u>Article</u>	<u>Section</u>
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		424.3 424.4
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	
Switchboards and panelboards		408.52

Submitter Information Verification**Committee:** NEC-P02**Submittal Date:** Mon Jan 11 13:11:22 EST 2021**Committee Statement**

Committee Statement: During the 2020 NEC revision cycle, Section 424.3 was renumbered to comply with the NEC style manual for paralleling numbering. The section containing branch circuit requirements for fixed electric space-heating equipment is now 424.4. This change will now ensure the proper section is referenced.

Response Message: FR-8787-NFPA 70-2021

Public Input No. 606-NFPA 70-2020 [Section No. 210.3]

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

11 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

McCamish, John

There is a reference in 210.3 that implies that the circuit in 408.52 is a branch circuit and that the Correlating Committee should review this as part of its work related to cleaning up 210.3 in First Revision No. 8787-NFPA 70-2021 [Section No. 210.3] to verify if indeed this circuit is a branch circuit or internal wiring not covered by the NEC.

Neubauer, Fred

Agree



First Revision No. 8788-NFPA 70-2021 [Section No. 210.4(A)]

(A) General.

Branch circuits recognized by this article shall be permitted as multiwire circuits. A multiwire circuit shall be permitted to be considered as multiple circuits. All conductors of a multiwire branch circuit shall originate from the ~~same panelboard or similar distribution equipment~~ equipment containing the branch-circuit overcurrent protective device .

Informational Note No. 1: A 3-phase, 4-wire, wye-connected power system used to supply power to nonlinear loads ~~may~~ might necessitate that the power system design allow for the possibility of high harmonic currents on the neutral conductor.

Informational Note No. 2: See 300.13(B) for continuity of grounded conductors on multiwire circuits.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Jan 11 13:12:54 EST 2021

Committee Statement

Committee Statement: New language adds clarity that all of the conductors of a multiwire branch circuit must originate from the equipment containing the branch-circuit OCPD. The intent of this section is not changing.

Response Message: FR-8788-NFPA 70-2021

Public Input No. 625-NFPA 70-2020 [Section No. 210.4(A)]

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 8789-NFPA 70-2021 [Section No. 210.4(C)]

(C) Line-to-Neutral Loads.

Multiwire branch circuits shall supply only line-to-neutral loads.

Exception No. 1: A multiwire branch circuit that supplies only one utilization equipment shall be permitted to supply line-to-line loads.

Exception No. 2: ~~Where~~ 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 overcurrent device.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Jan 11 13:16:04 EST 2021

Committee Statement

Committee Statement: The informational note was changed to a complete sentence to comply with NEC Style manual section 3.1.4.1. In addition, the word “where” was replaced to “if” in compliance with the style manual section 3.3.4.

Response Message: FR-8789-NFPA 70-2021

[Public Input No. 2661-NFPA 70-2020 \[Section No. 210.4\(C\)\]](#)

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree

**First Revision No. 8929-NFPA 70-2021 [Section No. 210.5(C)(1)]****(1) Branch Circuits Supplied from More Than One Nominal Voltage System.**

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

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

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

Exception: In existing installations where a voltage system(s) already exists and a different voltage system is being added, it shall be permissible to mark only the new system voltage. Existing unidentified systems shall not be required to be identified at each termination, connection, and splice point in compliance ~~accordance~~ with 210.5(C)(1)(a) and ~~(b) (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."

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Tue Jan 12 17:33:35 EST 2021

Committee Statement

Committee Statement: This section is modified to clearly convey the requirement that where a premises with more than one nominal system voltage is present, the ungrounded conductors must be identified by phase or line and by the nominal system voltage as specified here-in. The changes further clarify that where a premise may have different nominal system voltages present that are of the same nominal system voltage, they are permitted to have the same identification.

Response Message: FR-8929-NFPA 70-2021

[Public Input No. 697-NFPA 70-2020 \[Section No. 210.5\(C\)\(1\)\]](#)

[Public Input No. 2570-NFPA 70-2020 \[Section No. 210.5\(C\)\(1\)\]](#)

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned
11 Affirmative All
4 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Boynton, Charles L.
Campolo, Steve
Domitrovich, Thomas A.
El-Sherif, Nehad
Harman, Thomas L.
Humphrey, David G.
Johnson, David W.
Lujan, Cesar
Manche, Alan
Pavese, Christopher J.
Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher
Agree.
Cook, Mark Daniel
agree
McCamish, John

The term "enclosed panelboard" has been added to Article 100. See First Revision 8470-NFPA 70-2021. This language would apply here as well and should be added.

Neubauer, Fred
Agree

**First Revision No. 9208-NFPA 70-2021 [Section No. 210.6]****210.6 Branch-Circuit Voltage Limitations.**

The nominal voltage of branch circuits shall not exceed the values permitted by 210.6(A) through (E).

(A) Occupancy Limitation.

In dwelling units and guest rooms or guest suites of hotels, motels, and similar occupancies, the voltage shall not exceed 120 volts, nominal, between conductors that supply the terminals of the following:

- (1) Luminaires
- (2) Cord-and-plug-connected loads 1440 volt-amperes, nominal, or less or less than ¼ hp

(B) 120 Volts Between Conductors.

Circuits not exceeding 120 volts, nominal, between conductors shall be permitted to supply the following:

- (1) The terminals of lampholders applied within their voltage ratings
- (2) Auxiliary equipment of electric-discharge lamps

Informational Note: See 410.137 for auxiliary equipment limitations.

- (3) Cord-and-plug-connected or permanently connected utilization equipment

(C) 277 Volts to Ground.

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

- (1) Electric-discharge luminaires with integral ballasts
- (2) LED luminaires with LED drivers between the branch circuit and the lampholders
- (3) Incandescent or LED luminaires, equipped with medium-base or smaller screw shell lampholders, where the lampholders are supplied at 120 volts or less from the output of a stepdown autotransformer, LED driver, or other type of power supply that is an integral component of the luminaire

Informational Note No. 1: See 410.90 for requirements regarding the connection of screw shell lampholders to grounded conductors.

- (4) Luminaires equipped with mogul-base screw shell lampholders
- (5) Luminaires equipped with lampholders, other than the screw shell type, when used within ~~their~~ the voltage ratings of their lampholders
- (6) Luminaires without lampholders

Informational Note No. 2: Luminaires with nonserviceable LEDs are examples of luminaires without lampholders.

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

Informational Note No. 3: See 410.137 for auxiliary equipment limitations.

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

(D) ~~600~~ 1000 Volts Between Conductors.

Circuits exceeding 277 volts, nominal, to ground and not exceeding ~~600~~ 1000 volts, 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.

~~(E) Over 600 Volts Between Conductors.~~

~~Circuits exceeding 600 volts, nominal, between conductors shall be permitted to supply utilization equipment in installations where conditions of maintenance and supervision ensure that only qualified persons service the installation.~~

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Jan 18 11:16:51 EST 2021

Committee Statement

Committee Statement: CMP 2 supports the concept of creating articles dedicated to circuits rated over 1000 Volts. Regarding those requirements under the purview of CMP 2, this committee supports modifications to Article 210 to facilitate the creation of a new Article 235 to include the “over 1000 Volts” requirements for branch circuits. Creation of this new article recognizes the need to acknowledge the significant differences between circuits operating above 1000 volts from those operating below 1000 volts. This modification also exposes gaps in the requirements for over 1000 volts and creates the framework that could be used to identify and correct those gaps. Furthermore, CMP 2 acknowledges the need to have representation of medium voltage experts on the technical committees that have responsibility for the technical content of the Code®, expertise that is not in abundance with the current membership of CMP 2. While the creation of this new article does not immediately remedy these problems, it is a step in the right direction.

To facilitate the creation of this article, CMP 2 revises 210.1, 210.6, and 210.19. The public input (PI 3819) that is the basis for this first revision is the primary responsibility of CMP 10. Insomuch that CMP 2 supports the relocation of requirements for branch circuits rated over 1000 volts to a new article, due to the primary responsibility of creating that article residing with CMP 10, this first revision does not create that article. In creating this

first revision, CMP 2 recognizes that, during the 2014 and 2017 Code® cycles, other requirements in the NEC® were revised to reflect a transition from what has commonly been referred to as “Low Voltage” and “Medium Voltage” from 600 volts to 1000 volts. CMP 2 is taking this opportunity to correlate with the rest of the NEC® and revise Article 210 to recognize that same demarcation.

Response FR-9208-NFPA 70-2021

Message:

Ballot Results

✔ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

11 Affirmative All

1 Affirmative with Comments

3 Negative with Comments

0 Abstention

Affirmative All

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Cook, Mark Daniel

agree

Negative with Comment

Abbassi, Mathher

Retain (E) since proposed Article 235 resolved.

Boynton, Charles L.

The proposed new article did not define the voltage at the high end. Would be problematic for utility, industrial and commercial industries without careful scrutiny and for probable correlation issues in the code due to greater than 1000V requirements that are embedded in various Articles of the code.

Neubauer, Fred

This First Revision should be resolved as proposed Article 235 (under the responsibility of CMP-10) was overwhelmingly resolved and therefore is nonexistent. The Correlating Committee will ultimately have to report these as resolved. The actions by CMP-2 on First Revisions 9208, 9202, and 9180 are totally presumptuous and perceived as an effort to steer the Code development process. Violating the NEC Style Manual requires immediate corrective action by the NEC Correlating Committee. To do otherwise is changing the rules the entire NEC Committee must abide by. The Correlating Committee has a responsibility to enforce the requirements of the 2020 NEC Style Manual (Section 2.1.3) which clearly indicates that articles must be on a "specific topic." Combining parts of Articles 210, 215, 225 and 230 is completely in violation of the NEC Style Manual as this would bring multiple topics into the same article. A voltage range does not warrant a "specific topic" for an article, it is a voltage range for a specific topic. This will also need to be addressed in the First Revisions creating new Articles 305 and 495. The NEC Style Manual is clearly being violated by these first revisions, in addition to introducing multiple scope and purview problems, very indicative of the very problems once fixed by the NEC Correlating Committee in the 1990s. You can't take parts out of multiple articles that cover "specific topics" and create a whole new article without violating Section 2.1.3 the NEC Style Manual, creating duplication, scope conflicts, and purview issues, is irresponsible, not to mention setting a dangerous and damaging precedent



First Revision No. 8954-NFPA 70-2021 [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 specified in 210.8(B)(1) through (B)(12) shall have ground-fault-circuit-interrupter protection for personnel; shall be provided with GFCI protection:

(1) Bathrooms

(2) Kitchens

(3) ~~Kitchens or areas~~ Areas with ~~a~~ sinks and permanent provisions for ~~either~~ food preparation, beverage preparation, or cooking

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

(5) Rooftops

Exception to (5): Receptacles on rooftops shall not be required to be readily accessible other than from the rooftop.

(6) Outdoors

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

Exception No. 1 to (7): In industrial establishments only, where the conditions of maintenance and supervision ensure that only qualified personnel are involved, an assured equipment grounding conductor program ~~as specified in~~ 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 ~~having that has~~ a design that is not compatible with GFCI protection.

Exception No. 2 to (7): In industrial laboratories, receptacles used to supply equipment where removal of power would introduce a greater hazard shall be permitted to be installed without GFCI protection.

Exception No. 3 to (7): 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.

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

(9) Locker rooms with associated showering facilities

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

(11) Crawl spaces — at or below grade level

(12) Unfinished areas of basements

Exception to (1) through (7), (10), and (12): Listed locking support and mounting receptacles ~~utilized~~ used in combination with compatible attachment fittings installed for the purpose of serving a ceiling luminaire or ceiling fan shall not be required to be ~~ground-fault-circuit-interrupter~~ GFCI protected. If a general-purpose convenience receptacle is integral to the ceiling luminaire or ceiling fan, GFCI protection shall be provided.

(13) 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) Laundry areas

(15) 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 to (1) through (15): 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.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_210.8_B_FR8954.docx	For staff use	
FR-8954 - _need_to_put_this_in_Terra.docx	Updated file with tracked changes. For staff use	

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Tue Jan 12 19:57:29 EST 2021

Committee Statement

Committee Statement: All exceptions are moved to the end of the list items to align with the style manual.

Renumbered list items to account for changes.

List item (2) Kitchens: This list item is now dedicated for Kitchens to enhance clarity. The requirement did not change but was divided between two list items instead of including all in one list item.

List item (3) Areas with a sink . . . etc.: A new list item (3) includes what was previously found in list item (2). Creating this new list item will help in clarity and useability of the NEC. In addition, beverage preparation was added to distinguish and include these areas for GFCI protection as similar hazards exist.

List item (4): Added new list item (4) for buffet serving areas as these locations present similar hazards but do not meet any of those items listed in 210.8(B).

List item (7) Sinks: Added language to address fixed or stationary appliances and their proximity to sinks as the hazard exists for faulted appliances and the hazard is not necessarily driven by the location of the receptacle.

List item (8) Indoor damp or wet locations: The new language adds clarity. The indoor locations are either wet or damp not both.

List Item (13): New requirement has been added. A significant shock and electrocution hazard exist in other than dwelling occupancies where aquariums or live bait wells are located near receptacle outlets. This hazard is very similar to receptacles within 6 ft. of a sink, bathtubs or shower stalls which are all required to be GFCI protected.

Exception No. 2 for dedicated electric snow-melting, deicing, etc. removed the reference to items (3) and (4) to make this a general exception regardless of location of those items that are provided with GFPE as per 426.28 and 427.22.

Response Message: FR-8954-NFPA 70-2021

[Public Input No. 3826-NFPA 70-2020 \[Section No. 210.8\(B\)\]](#)

[Public Input No. 110-NFPA 70-2019 \[Section No. 210.8\(B\)\]](#)

[Public Input No. 3032-NFPA 70-2020 \[Section No. 210.8\(B\)\]](#)

[Public Input No. 392-NFPA 70-2020 \[Section No. 210.8\(B\)\]](#)

[Public Input No. 12-NFPA 70-2019 \[Section No. 210.8\(B\)\]](#)

[Public Input No. 3030-NFPA 70-2020 \[Section No. 210.8\(B\)\]](#)

[Public Input No. 349-NFPA 70-2020 \[Section No. 210.8\(B\)\]](#)

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 8865-NFPA 70-2021 [Section No. 210.8(D)]

(D) Specific Appliances.

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

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

- ~~(1) Automotive vacuum machines~~
- ~~(2) Drinking water coolers and bottle fill stations~~
- ~~(3) Cord-and-plug-connected high-pressure spray washing machines~~
- ~~(4) Tire inflation machines~~
- ~~(5) Vending machines~~
- ~~(6) Sump pumps~~
- ~~(7) Dishwashers~~

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Tue Jan 12 12:55:12 EST 2021

Committee Statement

Committee Statement: The proposed language will ensure GFCI protection is located in the branch circuit to provide protection of any outlets supplying the list of appliances regardless of vintage and whether or not GFCI protection is included in the appliance or in the cord. This change adds clarity to what specific appliances shall be required to have GFCI protection and the methods the installer can use to provide this GFCI protection.

Response Message: FR-8865-NFPA 70-2021

[Public Input No. 2871-NFPA 70-2020 \[Section No. 210.8\(D\)\]](#)

[Public Input No. 734-NFPA 70-2020 \[Section No. 210.8\(D\)\]](#)

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

11 Affirmative All

2 Affirmative with Comments

2 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Reyes, Frederick P.

Affirmative with Comment

Cook, Mark Daniel

agree

Neubauer, Fred

Agree

Negative with Comment

Abbassi, Mathher

Listing GFCI for appliances under two Articles causes confusion.

Pavese, Christopher J.

Lack substantiation



First Revision No. 8896-NFPA 70-2021 [Section No. 210.8(F)]

(F) Outdoor Outlets.

All ~~For dwellings, all~~ outdoor outlets ~~for dwellings, other than those covered in 210.8(A) (3), Exception to (3), that are~~ rated 125 volts through 250 volts, including outlets installed in the following locations, and supplied by single-phase branch circuits rated 150 volts or less to ground ~~or less~~ , 50 amperes or less, shall ~~have ground-fault circuit-interrupter protection for personnel.~~ be provided with GFCI protection:

- (1) Garages that have floors located at or below grade level
- (2) Accessory buildings
- (3) All outdoor outlets for dwellings other than those covered in 210.8(A), Exception No. 1
- (4) Boathouses

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

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

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_210.8_F_FR8896.docx	For staff use	
NEC_210.8_F_FR8896.1610488609079.docx	Updated after Sarah's attachment. This one has hyphens removed. For staff use	

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Tue Jan 12 15:36:24 EST 2021

Committee Statement

Committee Statement: The proposed language will require GFCI protection for dwelling outdoor outlets when they are replaced and will increase safety.

This section was modified to expand coverage of GFCI protection for dwelling outdoor outlets. The addition of these outlets address similar safety hazard exposures and should be afforded with the same level of protection as a receptacle outlet on the exterior of a dwelling unit.

An editorial revision was made to move "or less" directly after 150 volts to be consistent with the same language found in Section 210.8(A).

Response Message: FR-8896-NFPA 70-2021

Public Input No. 1964-NFPA 70-2020 [Section No. 210.8(F)]

[Public Input No. 2573-NFPA 70-2020 \[Section No. 210.8\(F\)\]](#)

[Public Input No. 2067-NFPA 70-2020 \[Section No. 210.8\(F\)\]](#)

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

10 Affirmative All

2 Affirmative with Comments

3 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Manche, Alan

McCamish, John

Reyes, Frederick P.

Affirmative with Comment

Cook, Mark Daniel

agree

Neubauer, Fred

Agree

Negative with Comment

Abbassi, Mathher

I can't identify the need for GFCI in garages in multifamily dwellings or in accessory buildings.
Boathouses already covered under 210.8(A).

Lujan, Cesar

No technical justification. TIA already needed for this section due to unintended consequences.

Pavese, Christopher J.

Lack substantiation



First Revision No. 8804-NFPA 70-2021 [Section No. 210.8 [Excluding any Sub-Sections]]

~~Ground-fault circuit-interrupter protection for personnel shall be provided A listed Class A GFCI shall provide protection as required in accordance with 210.8(A) through (F G). The ground-fault circuit interrupter GFCI shall be installed in a readily accessible location.~~

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

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

Informational Note No. 3: See 555.35(F) for GFCI requirements for boat hoists.

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

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

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Jan 11 15:43:56 EST 2021

Committee Statement

Committee Statement: Listing of GFCIs was added as this provides the ability of the inspector and other agencies including the end user to ensure this technology has had review by and performance tested by a third party agency focused on reviewing the solution for functionality and performance when installed as per the NEC and manufacturer instructions.

In order to add clarity to the requirements concerning measurement, the phrase “of an appliance” is being removed and adding of “power” to identify any power supply cord connected to the receptacle. This text is only used for measurement and does not impact a requirement. Removing appliance puts emphasis on the cord being the measurement method.

Removing the reference to windows adds clarity and provides language that would ensure receptacles within the measured distance as required here in, even through an interior pass through which could be perceived as a window, is afforded GFCI protection.

All references to Ground-Fault Circuit Interrupters are now using the acronym “GFCI”.

Response Message: FR-8804-NFPA 70-2021

[Public Input No. 2208-NFPA 70-2020 \[Section No. 210.8 \[Excluding any Sub-Sections\]\]](#)

[Public Input No. 3342-NFPA 70-2020 \[Section No. 210.8 \[Excluding any Sub-Sections\]\]](#)

[Public Input No. 7-NFPA 70-2019 \[Section No. 210.8 \[Excluding any Sub-Sections\]\]](#)

[Public Input No. 5-NFPA 70-2019 \[Section No. 210.8 \[Excluding any Sub-Sections\]\]](#)

Public Input No. 2159-NFPA 70-2020 [Section No. 210.8 [Excluding any Sub-Sections]]

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree

**First Revision No. 9093-NFPA 70-2021 [Sections 210.12(B), 210.12(C)]****(C) Dormitory Units.**

All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets ~~and or~~ devices installed in ~~dormitory unit bedrooms, living rooms, hallways, closets, bathrooms, and similar rooms~~ 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

[Detail FR-9176](#)**(D) ~~Guest Rooms, Guest Suites, and Patient Sleeping Rooms in Nursing Homes and Limited-Care Facilities~~ Other Occupancies.**

All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets ~~and or~~ devices installed in guest rooms and guest suites of hotels and motels ~~and, and in areas used exclusively as~~ patient sleeping rooms in nursing homes and limited-care facilities 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

Submitter Information Verification**Committee:** NEC-P02**Submittal Date:** Thu Jan 14 19:12:54 EST 2021**Committee Statement**

Committee Statement: The text was changed to add clarity and usability to the section and to align with the language in 210.12(A).

Response Message: FR-9093-NFPA 70-2021

[Public Input No. 3098-NFPA 70-2020 \[Sections 210.12\(B\), 210.12\(C\)\]](#)

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

11 Affirmative All
4 Affirmative with Comments
0 Negative with Comments
0 Abstention

Affirmative All

Boynton, Charles L.
Domitrovich, Thomas A.
El-Sherif, Nehad
Harman, Thomas L.
Humphrey, David G.
Johnson, David W.
Lujan, Cesar
Manche, Alan
McCamish, John
Pavese, Christopher J.
Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher
Agree.
Campolo, Steve
I agree with the concept but the list references do need to be clearer
Cook, Mark Daniel
agree
Neubauer, Fred
Agree



First Revision No. 9167-NFPA 70-2021 [New Section after 210.12(D)]

(F)_ Sleeping Quarters.

All 120-volt, single-phase, 15 and 20-ampere branch circuits supplying outlets or devices installed in rooms designed exclusively for sleeping in fire houses, rescue squads, police departments, and similar locations shall be protected by any of the means described in 210.12(A)(1) through (A)(6).

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Sat Jan 16 11:23:08 EST 2021

Committee Statement

Committee Statement: This new language addresses the ambiguity regarding these sleeping locations that are not fully defined as a dormitory unit but have the same electrical fire risk. These locations present similar hazards regarding electrical fires on these circuits.

Response Message: FR-9167-NFPA 70-2021

Public Input No. 3890-NFPA 70-2020 [New Section after 210.12]

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

9 Affirmative All

2 Affirmative with Comments

4 Negative with Comments

0 Abstention

Affirmative All

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Reyes, Frederick P.

Affirmative with Comment

Cook, Mark Daniel

agree

Neubauer, Fred

Agree

Negative with Comment

Abbassi, Mathher

Areas listed are in many cases are subject to COPS stringent requirements by agencies operating these facilities and they are equipped with additional life safety systems.

Boynton, Charles L.

No data to support expansion of AFCI's to sleeping quarters in fire houses, rescue squads, police departments or similar locations. This expands beyond the residential homes, as this moves to commercial areas that have completely different wiring methods.

Campolo, Steve

It is clear that expansion of AFCI protected circuits is very premature. Countless reports of false or unwanted tripping have been noted. So much so that three separate committees are looking into the issue. Why are three committees spending time on this if there was no false tripping problem? I personally serve on these committees and have seen reports of tripping. Variable speed motors have been high on the list of false tripping. Adding Sleeping Quarters of fire houses, rescue squad and police stations will surely duplicate the reports of false tripping that have been reported in other Sleeping Quarters. Also, the Electrical Safety Authority of Ontario, Canada has been allowing new installations to remove AFCI circuit breakers when repeated instances of false tripping cannot be rectified. They allow a receptacle AFCI and an ordinary thermo-magnetic breaker in its place for a period of one year to solve the problem. Let's not get a black stain on an important safety product by pushing widespread adoption before these issues are solved. This technology is still evolving. For those that remember, the same thing happened with GFCI's 50 years ago. And 50 years later we are still cautiously expanding those required areas. Let's be as cautious with AFCI's and let the technology mature and address these serious field issues.

Pavese, Christopher J.

Lack substantiation; protection provided under 210.12(A)



First Revision No. 9168-NFPA 70-2021 [Section No. 210.12 [Excluding any Sub-Sections]]

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

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Sat Jan 16 11:30:58 EST 2021

Committee Statement

Committee Statement: The revision clarifies that AFCI devices are required to be listed.

Response Message: FR-9168-NFPA 70-2021

Public Input No. 3344-NFPA 70-2020 [Section No. 210.12 [Excluding any Sub-Sections]]

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9202-NFPA 70-2021 [Section No. 210.13]

210.13 Ground-Fault Protection of Equipment.

Each branch-circuit disconnect rated 1000-A 1000 amperes or more and installed on solidly grounded wye electrical systems of more than 150 volts to ground, but not exceeding ~~600~~ 1000 volts phase-to-phase, shall be provided with ground-fault protection of equipment in accordance with 230.95.

Informational Note: ~~For See 517.17 for requirements on~~ buildings that contain health care occupancies, ~~see the requirements of 517.17.~~

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.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Mon Jan 18 11:07:40 EST 2021

Committee Statement

Committee Statement: CMP 2 supports the concept of creating articles dedicated to circuits rated over 1000 Volts. Regarding those requirements under the purview of CMP 2, this committee supports modifications to Article 210 to facilitate the creation of a new Article 235 to include the “over 1000 Volts” requirements for branch circuits. Creation of this new article recognizes the need to acknowledge the significant differences between circuits operating above 1000 volts from those operating below 1000 volts. This modification also exposes gaps in the requirements for over 1000 volts and creates the framework that could be used to identify and correct those gaps. Furthermore, CMP 2 acknowledges the need to have representation of medium voltage experts on the technical committees that have responsibility for the technical content of the Code®, expertise that is not in abundance with the current membership of CMP 2. While the creation of this new article does not immediately remedy these problems, it is a step in the right direction.

To facilitate the creation of this article, CMP 2 revises 210.1, 210.6, and 210.19. The public input (PI 3819) that is the basis for this first revision is the primary responsibility of CMP 10. Insomuch that CMP 2 supports the relocation of requirements for branch circuits rated over 1000 volts to a new article, due to the primary responsibility of creating that article residing with CMP 10, this first revision does not create that article. In creating this First Revision, CMP 2 recognizes that, during the 2014 and 2017 Code® cycles, other requirements in the NEC® were revised to reflect a transition from what has commonly been referred to as “Low Voltage” and “Medium Voltage” from 600 volts to 1000 volts. CMP 2 is taking this opportunity to correlate with the rest of the NEC® and revise Article 210 to recognize that same demarcation.

Response Message: FR-9202-NFPA 70-2021

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

11 Affirmative All

1 Affirmative with Comments

3 Negative with Comments

0 Abstention

Affirmative All

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Cook, Mark Daniel

agree

Negative with Comment

Abbassi, Mathher

The 1000v upper limit is not addressed in Article 235.

Boynton, Charles L.

The proposed new article did not define the voltage at the high end. Would be problematic for utility, industrial and commercial industries without careful scrutiny and for probable correlation issues in the code due to greater than 1000V requirements that are embedded in various Articles of the code.

Neubauer, Fred

This First Revision should be resolved as proposed Article 235 (under the responsibility of CMP-10) was overwhelmingly resolved and therefore is nonexistent. The Correlating Committee will ultimately have to report these as resolved. The actions by CMP-2 on First Revisions 9208, 9202, and 9180 are totally presumptuous and perceived as an effort to steer the Code development process. Violating the NEC Style Manual requires immediate corrective action by the NEC Correlating Committee. To do otherwise is changing the rules the entire NEC Committee must abide by. The Correlating Committee has a responsibility to enforce the requirements of the 2020 NEC Style Manual (Section 2.1.3) which clearly indicates that articles must be on a "specific topic." Combining parts of Articles 210, 215, 225 and 230 is completely in violation of the NEC Style Manual as this would bring multiple topics into the

same article. A voltage range does not warrant a “specific topic” for an article, it is a voltage range for a specific topic. This will also need to be addressed in the First Revisions creating new Articles 305 and 495. The NEC Style Manual is clearly being violated by these first revisions, in addition to introducing multiple scope and purview problems, very indicative of the very problems once fixed by the NEC Correlating Committee in the 1990s. You can’t take parts out of multiple articles that cover “specific topics” and create a whole new article without violating Section 2.1.3 the NEC Style Manual, creating duplication, scope conflicts, and purview issues, is irresponsible, not to mention setting a dangerous and damaging precedent



First Revision No. 9095-NFPA 70-2021 [Section No. 210.15]

210.15 Reconditioned Equipment.

Reconditioned equipment shall be listed as "reconditioned" and the original listing mark removed. The following shall not be reconditioned:

- (1) Equipment that provides ground-fault circuit-interrupter protection for personnel
- (2) Equipment that provides arc-fault circuit-interrupter protection
- (2) ~~Equipment that provides ground-fault protection of equipment~~

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 14 20:26:10 EST 2021

Committee Statement

Committee Statement: This First Revision complies with the direction of Standards Council Decision D#19-11. If equipment specified by Article 210 is permitted to be reconditioned, the reconditioned equipment is required then to be listed independent of the original manufacturer's listing and explicitly identified as being reconditioned, remanufactured, refurbished as specified in 110.21(A)(2). The original listing mark shall be removed as specified in 110.21(A)(2). Item 3 has been removed to align with the provisions of FR7829 adding a new 240.13(B).

Response Message: FR-9095-NFPA 70-2021

Public Input No. 3416-NFPA 70-2020 [Section No. 210.15]

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

11 Affirmative All

3 Affirmative with Comments

1 Negative with Comments

0 Abstention

Affirmative All

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree

Negative with Comment

Boynton, Charles L.

FR8577, added additional language to make it clear that "...The equipment nameplate shall not be required to be removed or made permanently illegible, only the part of the nameplate that include the listing mark, if applicable...". If FR9095 passes, it doesn't make reference to this second part, so is it over-riding the language in 110.21(A)(2). It repeats part of the general rule from 110.21(A)(2), but it also doesn't correlate as it doesn't address the second part of the general rule as modified by the First Draft.



First Revision No. 9096-NFPA 70-2021 [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

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 3.3.198.12 and A.3.3.198.12(5) of NFPA 101-2021, *Life Safety Code*, for the definition of assisted living facilities.

Submitter Information Verification

Committee: NEC-P02

Submission Date: Thu Jan 14 20:28:35 EST 2021

Committee Statement

Committee Statement: Assisted living facilities are now included in the list of occupancies where guest rooms and guest suites have the same branch circuit requirements as dwelling units. The section was reformatted to a list to add clarity. Informational Notes were added to provide appropriate guidance in the application of this section.

Response Message: FR-9096-NFPA 70-2021

[Public Input No. 2612-NFPA 70-2020 \[Section No. 210.17\]](#)

[Public Input No. 3405-NFPA 70-2020 \[Section No. 210.17\]](#)

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9097-NFPA 70-2021 [Section No. 210.18]

210.18 Rating.

Branch circuits recognized by this article shall be rated in accordance with the maximum permitted ampere rating or setting of the overcurrent device. 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 shall determine the circuit rating.

Exception No. 1: Multioutlet branch circuits greater than 50 amperes shall be permitted to supply nonlighting outlet loads ~~on industrial premises in locations~~ where conditions of maintenance and supervision ensure that only qualified persons service the equipment.

Exception No. 2: Branch circuits rated 10 amperes shall not be permitted to supply receptacle outlets.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 14 20:44:21 EST 2021

Committee Statement

Committee Statement: The application of adopted Energy Code(s) and energy efficiencies in general are bringing forward the possible applications of 10-ampere branch circuits for loads such as LED lighting and specific dedicated limited loads such as alarm system panels. The 10-ampere rating was added in the parent text of Section 210.18 along with the existing device ratings to be included for branch circuit protection. Receptacle outlets are not allowed to be supplied by a 10-ampere branch circuit because of utilization equipment that could be plugged into a 15-ampere receptacle.

Response Message: FR-9097-NFPA 70-2021

Public Input No. 2864-NFPA 70-2020 [Section No. 210.18]

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

12 Affirmative All

1 Affirmative with Comments

2 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve
Domitrovich, Thomas A.
El-Sherif, Nehad
Harman, Thomas L.
Humphrey, David G.
Johnson, David W.
Lujan, Cesar
Manche, Alan
McCamish, John
Pavese, Christopher J.
Reyes, Frederick P.

Affirmative with Comment

Neubauer, Fred
Agree

Negative with Comment

Abbassi, Mathher
Exception is not enforceable. The restriction shall be a part of the charging language.
Cook, Mark Daniel
I do not support the addition of a 10A branch circuit

**First Revision No. 9298-NFPA 70-2021 [Section No. 210.19]****210.19 Conductors — Minimum Ampacity and Size.**

Branch circuit conductors not more than 1000 volts 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 Informational Note No. 2 of 215.2(A)(1) for voltage drop on feeder conductors.

(A) General.

Branch-circuit conductors shall have an ampacity not less than the larger of ~~210.19(A)(1)(a) or (A)(1)(b)~~ 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 circuit(s) circuits, 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), it ~~shall be permitted to have 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.

(B) Branch Circuits with More than One Receptacle.

Conductors of branch circuits supplying more than one receptacle for cord-and-plug-connected portable loads shall have an ampacity of not less than the rating of the branch circuit.

(C) Household Ranges and Cooking Appliances.

Branch-circuit conductors supplying household ranges, wall-mounted ovens, counter-mounted cooking units, and other household cooking appliances shall have an ampacity not less than the rating of the branch circuit and not less than the maximum load to be served. For ranges of 8¾ kW or more rating, the minimum branch-circuit rating shall be 40 amperes.

Exception No. 1: Conductors tapped from a branch circuit not exceeding 50 amperes supplying electric ranges, wall-mounted electric ovens, and counter-mounted electric cooking units shall have an ampacity of not less than 20 amperes and shall be sufficient for the load to be served. These tap conductors include any conductors that are a part of the leads supplied with the appliance that are smaller than the branch-circuit conductors. The taps shall not be longer than necessary for servicing the appliance.

Exception No. 2: The neutral conductor of a 3-wire branch circuit supplying a household electric range, a wall-mounted oven, or a counter-mounted cooking unit shall be permitted to be smaller than the ungrounded conductors where the maximum demand of a range of 8¾ kW or more rating has been calculated according to Column C of Table 220.55, but such conductor shall have an ampacity of not less than 70 percent of the branch-circuit rating and shall not be smaller than 10 AWG.

(D) Other Loads.

Branch-circuit conductors that supply loads other than those specified in 210.3 and other than cooking appliances as covered in 210.19(C) shall have an ampacity sufficient for the loads served and shall not be smaller than 14 AWG.

Exception No. 1: Tap conductors shall have an ampacity sufficient for the load served. In addition, they shall have an ampacity of not less than 15 for circuits rated less than 40 amperes and not less than 20 for circuits rated at 40 or 50 amperes and only where these tap conductors supply any of the following loads:

- (1) Individual lampholders or luminaires with taps extending not longer than 450 mm (18 in.) beyond any portion of the lampholder or luminaire*
- (2) A luminaire having tap conductors as provided in in accordance with 410.117*
- (3) Individual outlets, other than receptacle outlets, with taps not over 450 mm (18 in.) long*
- (4) Infrared lamp industrial heating appliances*
- (5) Nonheating leads of deicing and snow-melting cables and mats*

Exception No. 2: Fixture wires and flexible cords shall be permitted to be smaller than 14 AWG as permitted by 240.5.

~~(B) Branch Circuits Not More Than 600 Volts.~~

~~Informational Note No. 1: See 310.14 for ampacity and temperature limitations of conductors.~~

~~Informational Note No. 2: See Part II of Article 430 for minimum rating of motor branch-circuit conductors.~~

(1)– General.

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

~~(0) 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 .~~

~~(0) 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 No. 1 to (1)(a): If the assembly, including the overcurrent devices protecting the branch circuit(s), is listed for operation at 100 percent of its rating, the ampacity of the branch-circuit conductors shall be permitted to be not less than the sum of the continuous load plus the noncontinuous load in accordance with 110.14(C) .~~

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

(E)– Branch Circuits Over 600 Volts.

~~The ampacity of conductors shall be in accordance with 310.14 and 311.60 , as applicable. Branch-circuit conductors over 600 volts shall be sized in accordance with 210.19(B)(1) or (B)(2).~~

(1)– General.

~~The ampacity of branch-circuit conductors shall not be less than 125 percent of the designed potential load of utilization equipment that will be operated simultaneously.~~

(2)– Supervised Installations.

~~For supervised installations, branch-circuit conductor sizing shall be permitted to be determined by qualified persons under engineering supervision. Supervised installations are defined as those portions of a facility where both of the following conditions are met:~~

- ~~(0) Conditions of design and installation are provided under engineering supervision.~~
- ~~(0) Qualified persons with documented training and experience in over 600-volt systems provide maintenance, monitoring, and servicing of the system.~~

Supplemental Information

<u>File Name</u>	<u>Description</u> <u>Approved</u>
FR_on_210.19_-_Formatting_revisions_JS1-19-21.docx	For staff use

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Tue Jan 19 15:30:13 EST 2021

Committee Statement

Committee CMP 2 supports the concept of creating articles dedicated to circuits rated over 1000
Statement: Volts. Regarding those requirements under the purview of CMP 2, this committee

supports modifications to Article 210 to facilitate the creation of a new Article 235 to include the “over 1000 Volts” requirements for branch circuits. Creation of this new article recognizes the need to acknowledge the significant differences between circuits operating above 1000 volts from those operating below 1000 volts. This modification also exposes gaps in the requirements for over 1000 volts and creates the framework that could be used to identify and correct those gaps. Furthermore, CMP 2 acknowledges the need to have representation of medium voltage experts on the Technical Committees that have responsibility for the technical content of the Code®, expertise that is not in abundance with the current membership of CMP 2. While the creation of this new article does not immediately remedy these problems, it is a step in the right direction.

To facilitate the creation of this article, CMP 2 revises 210.1, 210.6, and 210.19. The public input (PI 3819) that is the basis for this first revision is the primary responsibility of CMP 10. Insomuch that CMP 2 supports the relocation of requirements for branch circuits rated over 1000 volts to a new article, due to the primary responsibility of creating that Article residing with CMP 10, this first revision does not create that article. In creating these first revisions, CMP 2 recognizes that, during the 2014 and 2017 Code® cycles, other requirements in the NEC® were revised to reflect a transition from what has commonly been referred to as “Low Voltage” and “Medium Voltage” from 600 volts to 1000 volts. CMP 2 is taking this opportunity to correlate with the rest of the NEC® and revise Article 210 to recognize that same demarcation. Informational Notes Nos. 1 & 2 are no longer necessary. Language has been added to Section 210.19 so that the remaining informational note in its placement complies with Section 3.1.3 of the NEC Style Manual. Additionally, 600 volts was modified to 1000 volts to align with other sections of the NEC.

Response FR-9298-NFPA 70-2021
Message:

[Public Input No. 2135-NFPA 70-2020 \[Section No. 210.19\(A\)\]](#)

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

11 Affirmative All

2 Affirmative with Comments

2 Negative with Comments

0 Abstention

Affirmative All

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Cook, Mark Daniel

agree

Neubauer, Fred

Agree

Negative with Comment

Abbassi, Mathher

Since Article 235 was resolved, the over 600 volt must be retained.

Boynton, Charles L.

The proposed new article did not define the voltage at the high end. Would be problematic for utility, industrial and commercial industries without careful scrutiny and for probable correlation issues in the code due to greater than 1000V requirements that are embedded in various Articles of the code.

**First Revision No. 9099-NFPA 70-2021 [Section No. 210.21(B)(3)]****(3) Receptacle Ratings.**

Where connected to a branch circuit supplying two or more receptacles or outlets, receptacle ratings shall ~~conform to~~ not be less than the values listed in Table 210.21(B)(3), or, where rated higher than 50 amperes, the receptacle rating shall not be less than the branch-circuit rating.

Exception No. 1: Receptacles installed exclusively for the use of ~~one or more~~ cord-and-plug-connected arc welders shall be permitted to have ampere ratings not less than the minimum branch-circuit conductor ampacity determined by 630.11(A) or (B) for arc welders.

Exception No. 2: The ampere rating of a receptacle installed for electric discharge lighting shall be permitted to be based on 410.62(C).

Table 210.21(B)(3) Receptacle Ratings for ~~Various-Size~~ Circuits Serving More Than One Receptacle or Receptacle Outlet

<u>Circuit Rating</u> <u>(Amperes)</u>	<u>Receptacle Rating</u> <u>(Amperes)</u>
15	Not over 15
20	15 or 20
30	30
40	40 or 50
50	50

Supplemental Information

<u>File Name</u>	<u>Description Approved</u>
NEC_210.21_B_3_FR9099.docx	Staff Use

Submitter Information Verification

Committee: NEC-P02

Submission Date: Thu Jan 14 20:56:13 EST 2021

Committee Statement

Committee Statement: The text in the table has been modified to match existing receptacles that are available. The title of the table has been changed to make it clear that this table applies to circuits with more than one receptacle or receptacle outlet as the parent language of the table states .

Response Message: FR-9099-NFPA 70-2021

[Public Input No. 3746-NFPA 70-2020 \[Section No. 210.21\(B\)\(3\)\]](#)

[Public Input No. 438-NFPA 70-2020 \[Section No. 210.21\(B\)\(3\)\]](#)

[Public Input No. 437-NFPA 70-2020 \[Section No. 210.21\(B\)\(3\)\]](#)

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree

**First Revision No. 9100-NFPA 70-2021 [Section No. 210.23]****210.23** Permissible Loads, Multiple-Outlet Branch Circuits.

In no case shall the load exceed the branch-circuit ampere rating. A branch circuit supplying two or more outlets or receptacles shall supply only the loads specified according to its size ~~as specified in in accordance with 210.23(B) 210.23(A) through (D E)~~ and as summarized in 210.24, ~~and Table 210.24~~.

(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 of the following:

- (1) Lighting outlets
- (2) Dwelling unit exhaust fans on bathroom or laundry room lighting circuits
- (3) Gas fireplace igniter and fan where the gas fireplace is on an individual branch circuit

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

A 10-ampere branch circuit shall not be permitted for any of the following:

- (1) Supplying receptacle outlets
- (2) Supplying fixed appliances, except as permitted for individual branch circuits
- (3) Supplying garage door openers
- (4) Supplying laundry equipment

(B) 15- and 20-Ampere Branch Circuits.

A 15- or 20-ampere branch circuit shall be permitted to ~~supply lighting units~~ supply lighting outlets, lighting units, or other utilization equipment, or a any combination of ~~both them~~, and shall comply with 210.23(B)(1) and (A B)(2).

Exception: The small-appliance branch circuits, laundry branch circuits, and bathroom branch circuits required in a dwelling unit(s) by 210.11(C)(1), (C)(2), and (C)(3) shall supply only the receptacle outlets specified in that section.

(1) Cord-and-Plug-Connected Equipment Not Fastened in Place.

The rating of any one cord-and-plug-connected utilization equipment not fastened in place shall not exceed 80 percent of the branch-circuit ampere rating.

(2) Utilization Equipment Fastened in Place.

The total rating of utilization equipment fastened in place, other than luminaires, shall not exceed 50 percent of the branch-circuit ampere rating where lighting units, cord-and-plug-connected utilization equipment not fastened in place, or both, are also supplied.

(C) 30-Ampere Branch Circuits.

A 30-ampere branch circuit shall be permitted to supply fixed lighting units with heavy-duty lampholders in other than a dwelling unit(s) or utilization equipment in any occupancy. ~~A~~ The rating of any one cord-and-plug-connected utilization equipment shall not exceed 80 percent of the branch-circuit ampere rating.

(D) 40- and 50-Ampere Branch Circuits.

A 40- or 50-ampere branch circuit shall be permitted to supply cooking appliances that are fastened in place in any occupancy. In other than dwelling units, such circuits shall be permitted to supply fixed lighting units with heavy-duty lampholders, infrared heating units, or other utilization equipment.

(E) Branch Circuits Larger Than 50 Amperes.

Branch circuits larger than 50 amperes shall supply only nonlighting outlet loads.

Submitter Information Verification

Committee: NEC-P02

Submission Date: Thu Jan 14 21:02:09 EST 2021

Committee Statement

Committee Statement: The application of adopted Energy Code(s) and energy efficiencies in general are bringing forward the possible applications of 10-ampere branch circuits for loads such as LED lighting and specific equipment that are identified. A new 210.23(A) establishes the loads permitted and not permitted on a 10-ampere branch circuit. Revisions were made to the text for 15- and 20-ampere branch circuit loads to add "lighting outlets" and other editorial changes for clarity.

Response Message: FR-9100-NFPA 70-2021

[Public Input No. 3261-NFPA 70-2020 \[Section No. 210.23\]](#)

Ballot Results

✔ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

2 Affirmative with Comments

1 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Neubauer, Fred

Agree

Negative with Comment

Cook, Mark Daniel

disagree



First Revision No. 9190-NFPA 70-2021 [Section No. 210.24]

210.24 Branch-Circuit Requirements — Summary.

The requirements for circuits that have two or more outlets or receptacles, other than the receptacle circuits of 210.11(C)(1), (C)(2), and (C)(3), are summarized in Table 210.24(a). This table provides for copper conductors and Table 210.24(b) for aluminum and copper-clad aluminum conductors. Table 210.24(a) and Table 210.24(b) provide only a summary of minimum requirements. See 210.19, 210.20, and 210.21 for the specific requirements applying to branch circuits.

Table 210.24(a) Summary of Branch-Circuit Requirements — Copper Conductors

Circuit Rating	10 A	15 A	20 A	30 A	40 A	50 A
Conductors (min. size):				cc		
Circuit wires ¹	<u>14</u>	14	12	10	8	6
Taps	<u>14</u>	14	14	14	12	12
Fixture wires and cords			see See 240.5.			
Overcurrent Protection	10 A	15 A	20 A	30 A	40 A	50 A
Outlet devices:						
Lampholders permitted	<u>Any type</u>	Any type	Any type	Heavy duty	Heavy duty	Heavy duty
Receptacle rating ²	<u>See note 2.</u>	15 max. A	15 <u>A</u> or 20 A	30 A	40 <u>A</u> or 50 A	50 A
Maximum Load	10 A	15 A	20 A	30 A	40 A	50 A
Permissible load	<u>See 210.23(A).</u>	See 210.23(A <u>B</u>).	See 210.23(A <u>B</u>).	See 210.23(B <u>C</u>).	See 210.23(C <u>D</u>).	See 210.23(C <u>D</u>).

¹ These gauges are for copper conductors.

² ¹ For receptacle rating of cord-connected electric-discharge luminaires, see 410.62(C).

² Branch circuits rated 10-amperes shall not be permitted to supply receptacles.

Table 210.24(b) Summary of Branch-Circuit Requirements — Aluminum and Copper-Clad Aluminum Conductors

Circuit Rating	10 A ¹	15 A	20 A	30 A	40 A	50 A
Conductors (min. size):						
Circuit wires	<u>14 ¹</u>	<u>12</u>	<u>10</u>	<u>8</u>	<u>6</u>	<u>4</u>
Taps	<u>14 ¹</u>	<u>12</u>	<u>12</u>	<u>12</u>	<u>10</u>	<u>10</u>
Fixture wires and cords				See 240.5.		
Overcurrent Protection	10 A ¹	15 A	20 A	30 A	40 A	50 A
Outlet devices:						
Lampholders permitted	<u>Any type</u>	<u>Any type</u>	<u>Any type</u>	<u>Heavy duty</u>	<u>Heavy duty</u>	<u>Heavy duty</u>

Circuit Rating	<u>10 A</u>¹	<u>15 A</u>	<u>20 A</u>	<u>30 A</u>	<u>40 A</u>	<u>50 A</u>
Receptacle rating ²	See note 3.	15 max. A	15 A or 20 A	30 A	40 A or 50 A	50 A
Maximum Load	<u>10 A</u>¹	<u>15 A</u>	<u>20 A</u>	<u>30 A</u>	<u>40 A</u>	<u>50 A</u>
Permissible load	See 210.23(A).	See 210.23(B).	See 210.23(B).	See 210.23(C).	See 210.23(D).	See 210.23(D).

¹ Copper-clad aluminum conductors only.

² For receptacle rating of cord-connected electric-discharge luminaires, see 410.62(C).

³ Branch circuits rated 10-amperes shall not be permitted to supply receptacles.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_Table_210.24A_FR9190.docx	For staff use	
NEC_Table_210.24B_FR9190.docx	For staff use	

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Sat Jan 16 22:21:58 EST 2021

Committee Statement

Committee Statement: A note was added to make it clear that receptacle outlets are not permitted on 10-ampere branch circuits.

A new Table 210.24(B) was created that mirrors the structure of Table 210.24(A) to provide the same summary guidance for aluminum and copper-clad aluminum conductors for 10- to 50-ampere branch circuit loads allowed. A new Note 1 to Table 210.24(B) identifies that 14 AWG copper-clad aluminum is only for 10-ampere branch circuit.

The last row of both tables has been modified to accurately reflect the changes instituted in Section 210.23.

Response Message: FR-9190-NFPA 70-2021

Public Input No. 3940-NFPA 70-2020 [Section No. 210.24]

Ballot Results

✔ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

11 Affirmative All

3 Affirmative with Comments

1 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

McCamish, John

A few corrections need to be made to the table that were in the original PI. In the first column, by the words "Circuit wires" the reference to note 1 needs to be removed. The old note referred to the wires being copper, this information is now in the title of table (a) so the entire table is about copper. Further down in column 1 by the words "Receptacle rating", the reference to note 2 needs to be changed to a 1. This keeps it attached to the note that is intended to be referenced.

Neubauer, Fred

Agree

Negative with Comment

Cook, Mark Daniel

disagree



First Revision No. 9110-NFPA 70-2021 [Section No. 210.52(A)(2)]

(2) Wall Space.

As used in this section, a wall space shall include the following:

- (1) Any space 600 mm (2 ft) or more in width (including space measured around corners) and unbroken along the floor line by doorways and similar openings, fireplaces, stationary appliances, and fixed cabinets that do not have countertops or similar work surfaces
- (2) The space occupied by fixed panels in walls, excluding sliding panels
- (3) The space afforded by fixed room dividers, such as freestanding bar-type counters or railings

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 14 23:11:31 EST 2021

Committee Statement

Committee Statement: The language in 210.52(A)(2) has been revised to clarify receptacles along the wall space behind a stationary appliance is not included in the wall space.

Response Message: FR-9110-NFPA 70-2021

[Public Input No. 27-NFPA 70-2019 \[Section No. 210.52\(A\)\]](#)

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

11 Affirmative All

3 Affirmative with Comments

1 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree

Negative with Comment

Campolo, Steve

This change is unenforceable as how is an AHJ to know where a fixed appliance will be placed after the C.O. is issued. Also, when a kitchen or other room is remodeled or rearranged, how will the correct number of receptacles be assured.

**First Revision No. 9111-NFPA 70-2021 [Section No. 210.52(B)(1)]****(1) Receptacle Outlets Served.**

In the kitchen, pantry, breakfast room, dining room, or similar area of a dwelling unit, the two or more 20-ampere small-appliance branch circuits required by 210.11(C)(1) shall serve all wall and floor receptacle outlets covered by 210.52(A), all countertop outlets covered by 210.52(C), and receptacle outlets for refrigeration equipment.

Exception No. 1: In addition to the required receptacles specified by 210.52, switched receptacles supplied from a general-purpose 15- or 20-ampere branch circuit as required in shall be permitted in accordance with 210.70(A)(1), Exception No. 1, shall be permitted.

Exception No. 2: In addition to the required receptacles specified by 210.52, a receptacle outlet to serve a specific appliance shall be permitted to be supplied from an individual branch circuit rated 15 amperes or greater.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 14 23:15:36 EST 2021

Committee Statement

Committee Statement: The language is revised to clarify the permitted application instead of indicating that it is required

Response Message: FR-9111-NFPA 70-2021

Public Input No. 2974-NFPA 70-2020 [Section No. 210.52(B)(1)]

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9112-NFPA 70-2021 [Section No. 210.52(B)(2)]

(2) No Other Outlets.

The two or more small-appliance branch circuits specified in 210.52(B)(1) shall have no other outlets.

Exception No. 1: A receptacle installed solely for the electrical supply to and support of an electric clock in any of the rooms specified in 210.52(B)(1) shall be permitted to be served by a small-appliance branch circuit.

Exception No. 2: Receptacles installed to provide power for supplemental equipment and lighting on gas-fired ranges, ovens, or counter-mounted cooking units shall be permitted to be served by a small-appliance branch circuit.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 14 23:17:50 EST 2021

Committee Statement

Committee Statement: The language is revised to comply with the NEC Style Manual. There are no technical changes in this revision.

Response Message: FR-9112-NFPA 70-2021

[Public Input No. 3848-NFPA 70-2020 \[Section No. 210.52\(B\)\(2\)\]](#)

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree

**First Revision No. 9121-NFPA 70-2021 [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)(2)~~ 210.52(C)(1) through (C)(3 4) 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)

For the purposes of this section, receptacles installed in accordance with either of the following shall be considered as one receptacle outlet:

- (1) ~~For the purposes of this section, where using multioutlet assemblies, each~~ 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.~~
- (2) Each two receptacles installed in the same device box

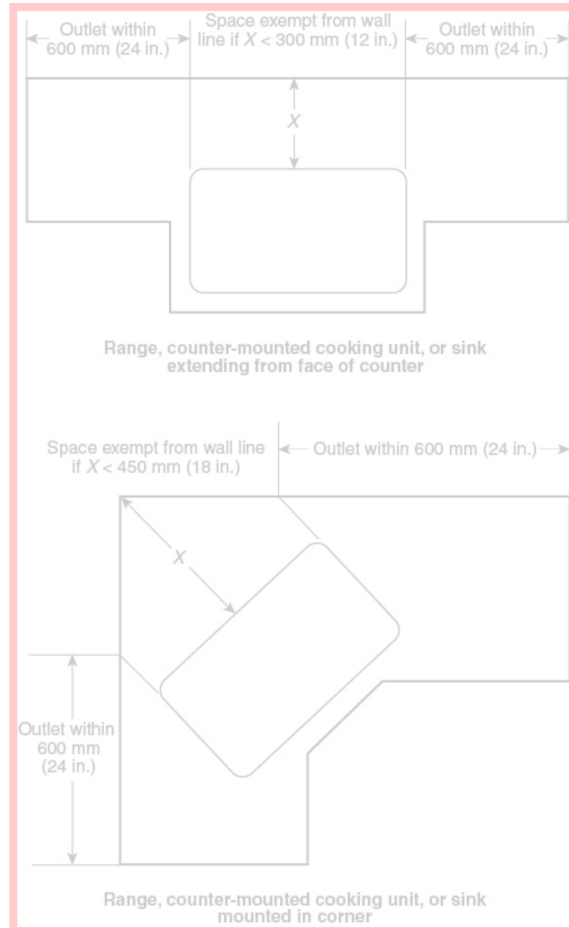
Detail FR-9191

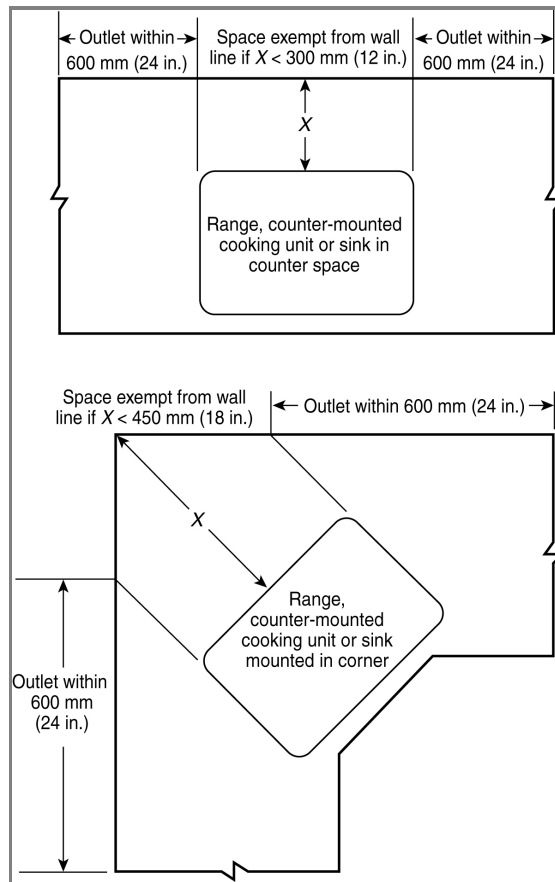
(2) Wall Spaces.

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.

Exception: Receptacle outlets shall not be required directly behind a range, counter-mounted cooking unit, or sink in the installation described in Figure 210.52(C)(2).

Figure 210.52(C)(2) Determination of Area Behind a Range, Counter-Mounted Cooking Unit, or Sink.





[Detail FR-9131](#)

[Detail FR-9130](#)

(3) Island and Peninsular Countertops and Work Surfaces.

Receptacle outlets shall be installed in accordance with ~~210.52(C)(2)(a)~~ 210.52(C)(3)(a) and ~~(C)(23)(b)~~.

~~(0) At least one receptacle outlet shall be provided for the first 0.84 m² (9 ft²), or fraction thereof, of the countertop or work surface. A receptacle outlet shall be provided for every additional 1.7 m² (18 ft²), or fraction thereof, of the countertop or work surface.~~

~~(0) At least one receptacle outlet shall be located within 600 mm (2 ft) of the outer end of a peninsular countertop or work surface. Additional required receptacle outlets shall be permitted to be located as determined by the installer, designer, or building owner. The location of the receptacle outlets shall be in accordance with 210.52(C)(3).~~

(a) Locations with Countertop or Work Surface Wall Spaces. At least one receptacle outlet shall be installed where the location is also provided with countertops or work surfaces totaling more than 1.2 linear m (4 linear ft).

(b) Locations without Countertop or Work Surface Wall Spaces. Receptacle outlets shall be installed in accordance with one of the following. Receptacle outlets shall be permitted to be located as determined by the installer, designer, or building owner.

- (1) At least one receptacle outlet shall be provided for the first 0.84 m² (9 ft²), or fraction thereof, of the countertop or work surface. A receptacle outlet shall be provided for every additional 1.7 m² (18 ft²), or fraction thereof, of the countertop or work surface. Sinks, cooktops, or similar shall not be included in the measurement.
- (2) At least one receptacle outlet shall be located within 600 mm (2 ft) of the outer end of a peninsular countertop or work surface.

Where a peninsular countertop is connected to a wall countertop, the peninsular countertop shall be measured from the connected perpendicular wall countertop. Where a peninsular countertop is connected to a wall, the peninsular countertop shall be measured from the wall.

Detail FR-9138

(4) Receptacle Outlet Location.

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

- (1) On or above countertop or work surfaces: On or above, but not more than 500 mm (20 in.) above, ~~the countertop or work surfaces.~~
- (2) In countertop or work surfaces: Receptacle outlet assemblies listed for use in countertops or work surfaces shall be permitted to be installed in countertops or work surfaces.
- (3) Below countertop or work surfaces: Not more than 300 mm (12 in.) below ~~the countertop or work surfaces.~~ Receptacles installed below a countertop or work surface shall not be located where the countertop or work surface extends more than 150 mm (6 in.) beyond its support base the face of such receptacles.

Receptacle outlets rendered not readily accessible by appliances fastened in place, appliance garages, sinks, or rangetops as covered in 210.52(C)(2), Exception, or appliances occupying assigned spaces shall not be considered as these required outlets.

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

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

Supplemental Information

<u>File Name</u>	<u>Description Approved</u>
NEC_210.52_C_FR9121.docx	Staff Use

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 15 11:04:49 EST 2021

Committee Statement

Committee Statement: The revised language enhances the clarity of the requirements in section 210.52(C).

Response Message: FR-9121-NFPA 70-2021

[Public Input No. 567-NFPA 70-2020 \[Section No. 210.52\(C\)\]](#)

Ballot Results

✔ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree

**First Revision No. 8924-NFPA 70-2021 [Section No. 210.52(D)]****(D) Bathrooms.**

At least one receptacle outlet shall be installed in bathrooms within 900 mm (3 ft) of the outside edge of each ~~basin sink~~ . The receptacle outlet shall be located on a wall or partition that is adjacent to the ~~basin sink~~ or ~~basin sink~~ countertop, located on the countertop, or installed on the side or face of the ~~basin sink~~ cabinet. In no case shall the receptacle be located more than 300 mm (12 in.) below the top of the ~~basin sink~~ or ~~basin 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 for on installation of receptacles in countertops.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Tue Jan 12 17:26:40 EST 2021

Committee Statement

Committee Statement: This change recognizes a change that was made to the definition of bathroom which removes the term “basin” and only using the term “sink”.

Response Message: FR-8924-NFPA 70-2021

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9143-NFPA 70-2021 [Section No. 210.62]

210.62 Show Windows.

At least one 125-volt, single-phase, 15- or 20-ampere-rated receptacle outlet shall be installed within 450 mm (18 in.) of the top of a show window for each 3.7 linear m (12 linear ft) or major fraction thereof of show window ~~area~~ width measured horizontally at its maximum width.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 15 15:43:19 EST 2021

Committee Statement

Committee Statement: This language was revised to appropriately reflect dimensional information.

Response Message: FR-9143-NFPA 70-2021

Public Input No. 1483-NFPA 70-2020 [Section No. 210.62]

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

We should add clarity if the required receptacle must be inside or outside in today's application

Neubauer, Fred

Agree



First Revision No. 9145-NFPA 70-2021 [Section No. 210.63 [Excluding any Sub-Sections]]

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

Informational Note: See 210.8(E) for requirements on GFCI protection.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 15 16:59:03 EST 2021

Committee Statement

Committee Statement: A new informational note is added to guide the user to the appropriate GFCI requirement for this section.

Response Message: FR-9145-NFPA 70-2021

Public Input No. 3898-NFPA 70-2020 [Section No. 210.63 [Excluding any Sub-Sections]]

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9146-NFPA 70-2021 [Section No. 210.65(B)(2)]

(2) Floor Outlets.

A meeting room with any floor dimension that is 3.7 m (12 ft) or greater in any direction and that has a floor area of at least 20 m² (215 ft²) shall have at least one floor receptacle outlet, or at least one floor outlet to serve a receptacle(s), located at a distance not less than 1.8 m (6 ft) from any fixed wall for each 20 m² (215 ft²) or major portion of floor space.

Informational Note No. 1: See 314.27(B) for requirements on floor boxes used for receptacles located in the floor.

Informational Note No. 2: See ~~Article 518~~ 518.1 for requirements on assembly occupancies designed for 100 or more persons.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 15 17:47:14 EST 2021

Committee Statement

Committee Statement: The language is revised to meet the requirements of 4.1.4 of the NEC Style Manual.

Response Message: FR-9146-NFPA 70-2021

Public Input No. 3712-NFPA 70-2020 [Section No. 210.65(B)(2)]

Ballot Results

✔ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9152-NFPA 70-2021 [Section No. 210.70(A)(1)]

(1) Habitable Rooms.

At least one lighting outlet controlled by a listed wall-mounted control device shall be installed in every habitable room, kitchen, laundry area, and bathroom. The 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 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 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: Fri Jan 15 19:54:33 EST 2021

Committee Statement

Committee Statement: It is important that laundry areas are illuminated as the use of these areas often result in the occupant carrying clothing and baskets. The area should also have a lighting means other than the options provided by a switched receptacle.

Response Message: FR-9152-NFPA 70-2021

[Public Input No. 2017-NFPA 70-2020 \[Section No. 210.70\(A\)\(1\)\]](#)

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9149-NFPA 70-2021 [Section No. 210.70(A)(2)]

[Detail FR-9147](#)

(2) Additional Locations.

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

- (1) At least one lighting outlet controlled by a listed wall-mounted control device shall be installed in hallways, stairways, attached garages, ~~and 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 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, sloped 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 listed wall-mounted control device or by a unit switch of the interior luminaire or interior lampholder.

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

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

- (4) ~~Lighting~~ Dimmer control of lighting outlets ~~controlled installed~~ in accordance with 210.70(A)(2)(3) shall not be controlled by use of listed wall-mounted control devices ~~permitted~~ unless ~~they~~ the listed control devices can provide the full range of dimming control at each location. to maximum brightness at each control location for the interior stairway illumination.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 15 19:46:43 EST 2021

Committee Statement

Committee Statement: Accessory structures are similar to attached and detached garages and have been added to the list in Section 210.70(A)(2). Requiring lighting in these areas enhances safety.

Response Message: FR-9149-NFPA 70-2021

[Public Input No. 2745-NFPA 70-2020 \[Section No. 210.70\]](#)

[Public Input No. 223-NFPA 70-2019 \[Section No. 210.70\(C\)\]](#)

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9148-NFPA 70-2021 [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: Fri Jan 15 19:03:48 EST 2021

Committee Statement

Committee Statement: The committee recognizing the need to support illumination upon failure of the control device powered exclusively by a battery that could impede safe egress. The failure mode of a battery powered device must ensure illumination. A sentence is included to permit battery powered control where the lighting outlets are automatically energized upon battery failure.

Response Message: FR-9148-NFPA 70-2021

Public Input No. 1489-NFPA 70-2020 [Section No. 210.70]

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9150-NFPA 70-2021 [Section No. 220.3]

220.3 Other Articles for Specific-Purpose Calculations.

Table 220.3 shall provide references for specific-purpose calculation requirements not located in Chapters 5, 6, or 7 that amend or supplement the requirements of this article.

Table 220.3 Specific-Purpose Calculation References

<u>Calculation</u>	<u>Article</u>	<u>Section (or Part)</u>
Air-conditioning and refrigerating equipment, branch-circuit conductor sizing	440	Part IV
<u>Capacitors</u>	<u>460</u>	<u>460.8</u>
Fixed electric heating equipment for pipelines and vessels, branch-circuit sizing	427	427.4
Fixed electric space-heating equipment, branch-circuit sizing	424	424.3
Fixed outdoor electric deicing and snow-melting equipment, branch-circuit sizing	426	426.4
<u>Fixed resistance and electrode industrial process heating equipment</u>	<u>425</u>	<u>425.4</u>
Motors, feeder demand factor	430	430.26
Motors, multimotor and combination-load equipment	430	430.25
Motors, several motors or a motor(s) and other load(s)	430	430.24
Over 600-volt branch-circuit calculations	210	210.19(B)
Over 600-volt feeder calculations	215	215.2(B)
Phase converters, conductors	455	455.6
Storage-type water heaters	422	422.11(E)

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
Revised_Table_220.3.docx	Revised Table 220.3. For staff use	

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 15 19:47:28 EST 2021

Committee Statement

Committee Statement: Table 220.3 was revised to add usability to the Code revised as follows:

- 1) Add "Fixed resistance and electrode industrial process heating equipment" reference Section 425.4.
- 2) Add "Capacitors" reference Section 460.8.

3) Change reference for “storage-type water heater” to refer to all of Section 422.11, as water heaters may be covered by either 422.11(E) or (F).

Response FR-9150-NFPA 70-2021
Message:

[Public Input No. 3842-NFPA 70-2020 \[Section No. 220.3\]](#)

[Public Input No. 3821-NFPA 70-2020 \[Section No. 220.3\]](#)

[Public Input No. 4010-NFPA 70-2020 \[Section No. 220.3\]](#)

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

11 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

McCamish, John

While I support addition of 425.4 and the clarification for storage type water heaters, I oppose the addition of 460.8. 460.9 does not allow the effect that capacitors have on a circuit to be considered with sizing motor branch circuit conductors.

Neubauer, Fred

Agree



First Revision No. 9153-NFPA 70-2021 [Section No. 220.11]

(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 open porches, garages, or unused or unfinished spaces not adaptable for future use.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 15 20:08:15 EST 2021

Committee Statement

Committee Statement: CMP 2 recognizes there are general lighting load requirements throughout the entire dwelling. The floor area calculation has been changed to encompass all areas of the dwelling.

Response Message: FR-9153-NFPA 70-2021

[Public Input No. 1632-NFPA 70-2020 \[Section No. 220.11\]](#)

[Public Input No. 2677-NFPA 70-2020 \[Section No. 220.11\]](#)

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

11 Affirmative All

3 Affirmative with Comments

1 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree

Negative with Comment

Lujan, Cesar

No technical justification. Arguments fail to recognize that the area is only for calculating a load.
Current load calculation methods are more than adequate.



First Revision No. 9154-NFPA 70-2021 [Section No. 220.12]

220.42 Lighting Load for Non-Dwelling Occupancies.

(A) General.

A unit load of not less than that specified in Table 220.42(A) for non-dwelling occupancies and the floor area determined in 220.44 220.5(C) shall be used to calculate the minimum lighting load. Motors rated less than $\frac{1}{8}$ HP and connected to a lighting circuit shall be considered general lighting load.

Informational Note: The unit values of Table 220.42(A) are based on minimum load conditions and 100 ~~80~~ percent power factor and ~~may~~ might not provide sufficient capacity for the installation contemplated.

Table 220.42(A) General Lighting Loads by Non-Dwelling Occupancy

<u>Type of Occupancy</u>	<u>Unit Load</u>	
	<u>Volt-amperes/ m²</u>	<u>Volt-amperes/ ft²</u>
Automotive facility	16	1.5
Convention center	15	1.4
Courthouse	15	1.4
Dormitory	16	1.5
Exercise center	15	1.4
Fire station	14	1.3
Gymnasium ^{a 1}	18	1.7
Health care clinic	17	1.6
Hospital	17	1.6
Hotels and <u>or</u> motels , including <u>or</u> apartment houses without provisions for cooking by tenants ^{b 2}	18	1.7
Library	16	1.5
Manufacturing facility ^{c 3}	24	2.2
Motion picture theater	17	1.6
Museum	17	1.6
Office ^{d 4}	14	1.3
Parking garage ^{e 5}	3	0.3
Penitentiary	13	1.2
Performing arts theater	16	1.5
Police station	14	1.3
Post office	17	1.6
Religious facility	24	2.2
Restaurant ^{f 6}	16	1.5
Retail ^{g, h 7, 8}	20	1.9
School/university	33 <u>16</u>	3 <u>1.5</u>
Sports arena	33 <u>16</u>	3 <u>1.5</u>
Town hall	15	1.4
Transportation	13	1.2
Warehouse	13	1.2
Workshop	18	1.7

Note: The 125 percent multiplier for a continuous load as specified in 210.20(A) is included,

therefore no additional multiplier shall be required when using the unit loads in this table for calculating the minimum lighting load for a specified occupancy.

a 1 Armories and auditoriums are considered gymnasium-type occupancies.

b 2 Lodge rooms are similar to hotels and motels.

c 3 Industrial commercial loft buildings are considered manufacturing-type occupancies.

d 4 Banks are office-type occupancies.

e 5 ~~Garages — commercial (storage)~~ Commercial (storage) garages are considered parking garage occupancies.

f 6 Clubs are considered restaurant occupancies.

g 7 Barber shops and beauty parlors are considered retail occupancies.

h 8 Stores are considered retail occupancies.

(B) Energy Code.

Where the building is designed and constructed to comply with an energy code adopted by the local authority, the lighting load shall be permitted to be calculated using the unit values specified in the energy code where the following conditions are met:

- (1) A power monitoring system is installed that will provide continuous information regarding the total general lighting load of the building.
- (2) The power monitoring system will be set with alarm values to alert the building owner or manager if the lighting load exceeds the values set by the energy code. Automatic means to take action to reduce the connected load shall be permitted.
- (3) The demand factors specified in 220.45 are not applied to the general lighting load.
- (4) The continuous load multiplier of 125 percent shall be applied.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 15 20:15:16 EST 2021

Committee Statement

Committee Statement: The original research and data that led to the changes in Table 220.12 assumed a 0.8 pf that was left out in the last revision (refer to 2020 Public Input 3282). This recognizes the fact that the new higher efficiency solutions are not unity power factor like incandescent light bulbs.

Multiple Revisions are made to Table 220.12:

1) The Note to Table 220.12, as written, is correct and inclusion of this information, along with the additional description (superscripts) for the occupancy types, is important and should be retained. To reduce confusion, additional clarity is added to the Note regarding the additional multiplier.

2) Values for Schools/Universities and Sports Arenas are corrected. The update in 2020 was intended to correspond with ASRHAE 90.1, and these 2 areas were not updated as they should have been. This was the intent of the Technical Committee, and CMP 2 requests NFPA to review the record to determine if an Errata can be issued (Refer to Word Doc. associated with FR 8075 of the 2020 Cycle, which appears to have been inadvertently modified during the Second Draft Meeting).

Response FR-9154-NFPA 70-2021

Message:

[Public Input No. 133-NFPA 70-2019 \[Section No. 220.12\(B\)\]](#)

[Public Input No. 453-NFPA 70-2020 \[Sections 220.12, 220.14, 220.16, 220.18, Part III., 220.40,...\]](#)

[Public Input No. 1008-NFPA 70-2020 \[Section No. 220.12\(A\)\]](#)

[Public Input No. 4459-NFPA 70-2020 \[Section No. 220.12\(B\)\]](#)

[Public Input No. 14-NFPA 70-2019 \[Section No. 220.12\(A\)\]](#)

Ballot Results

✔ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9155-NFPA 70-2021 [Section No. 220.14(C)]

(C) Motor Outlets.

Loads for motor outlets shall be calculated in accordance with the requirements in The conductor sizing requirements specified in 430.22, 430.24, and 440.6 shall be used to determine the loads for motor outlets .

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 15 20:26:22 EST 2021

Committee Statement

Committee Statement: Loads for motor outlets are to be calculated in the same manner as the supply conductor, in accordance with Sections 430.22, 430.24, and 440.6. The current references are correct; however, the text has been modified to improve clarity.

Response Message: FR-9155-NFPA 70-2021

Public Input No. 1936-NFPA 70-2020 [Section No. 220.14(C)]

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9156-NFPA 70-2021 [Section No. 220.14(H)]

(H) Fixed Multioutlet Assemblies.

Fixed multioutlet assemblies used in other than dwelling units or the guest rooms or guest suites of hotels or motels shall be calculated in accordance with (H)(1) or (H)(2). ~~For the purposes of this section, the calculation shall be permitted to be based on the portion that contains receptacle outlets. the following:~~

- (1) Where appliances are unlikely to be used simultaneously, each 1.5 m (5 ft) or fraction thereof of each separate and continuous length shall be considered as one outlet of not less than 180 volt-amperes.
- (2) Where appliances are likely to be used simultaneously, each 300 mm (1 ft) or fraction thereof shall be considered as an outlet of not less than 180 volt-amperes.

For the purposes of this section, the calculation shall be permitted to be based on the portion that contains receptacles ~~outlets~~.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 15 20:32:06 EST 2021

Committee Statement

Committee Statement: As written, the text refers to the wiring to which the multioutlet assembly is connected; however, the requirement applies to "receptacles", as the receptacles on a multioutlet assembly are not "receptacle outlets".

Response Message: FR-9156-NFPA 70-2021

Public Input No. 740-NFPA 70-2020 [Section No. 220.14(H)]

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad
Harman, Thomas L.
Humphrey, David G.
Johnson, David W.
Lujan, Cesar
Manche, Alan
McCamish, John
Pavese, Christopher J.
Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher
Agree.
Cook, Mark Daniel
agree
Neubauer, Fred
Agree



First Revision No. 9157-NFPA 70-2021 [Section No. 220.14(K)]

220.43 Office Buildings.

In office buildings, the receptacle loads shall be calculated to be the larger of ~~(1) or (2)~~ the following :

- (1) The calculated load from 220.14(I) after all Table 220.47 demand factors have been applied
- (2) 11 volt-amperes/m² or 1 volt-ampere/ft²

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Fri Jan 15 20:42:08 EST 2021

Committee Statement

Committee Statement: For ease of use the reference to Table 220.44 was added so the user can find the applicable demand factors.

Response Message: FR-9157-NFPA 70-2021

Public Input No. 1868-NFPA 70-2020 [Section No. 220.14(K)]

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

11 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

McCamish, John

"Table 220.14" needs to be changed to "Table 220.44" or 220.47 if FR 9188 (reorganization of Article220) is taken into account.

Neubauer, Fred

Agree

**First Revision No. 9161-NFPA 70-2021 [Section No. 220.18(A)]**[Global FR-9188](#)**(1) Motor-Operated and Combination Loads.**

Where a circuit supplies only motor-operated loads, ~~Article 430~~ the conductor sizing requirement specified in 430.22 shall apply. Where a circuit supplies only air-conditioning equipment, refrigerating equipment, or both, ~~Article 440~~ 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 $\frac{1}{8}$ hp in combination with other loads, the total calculated load shall be based on 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:** Sat Jan 16 10:14:36 EST 2021**Committee Statement**

Committee Statement: CMP 2 has revised the text for clarity to comply with Section 4.1.4 of the NEC Style Manual, identifying the specific sections in Articles 430 and 440 that apply.

Response Message: FR-9161-NFPA 70-2021

[Public Input No. 3719-NFPA 70-2020 \[Section No. 220.18\(A\)\]](#)

Ballot Results

✔ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9164-NFPA 70-2021 [Section No. 220.18(C)]

(3) Range Loads. Electric Cooking Appliances.

It shall be permissible to apply Applying demand factors for ranges, wall-mounted ovens, counter-mounted cooking units, and other household cooking appliance loads in excess of 1 3/4 kW shall be permitted in accordance with Table 220.55, including Note 4 Notes 4, 5, and 6 .

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Sat Jan 16 10:51:00 EST 2021

Committee Statement

Committee Statement: This revision is to align the language in this section with Table 220.55 which applies to ovens, cooktops, and other electric cooking appliances. This revision will help to clarify that a cooktop and up to two wall ovens could be installed on the same branch circuit and would be considered the same as a range for the purpose of a branch circuit load calculation. Reference to Note 4 of the Table has been updated to refer to Notes 4, 5, and 6 as modified by the First Revision in Table 220.55.

Response Message: FR-9164-NFPA 70-2021

Public Input No. 121-NFPA 70-2019 [Section No. 220.18(C)]

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree

**First Revision No. 9189-NFPA 70-2021 [New Section after 220.44]****220.48 Receptacle Loads — Health Care.**

Receptacle loads calculated in accordance with 220.14(H) and (I) shall be permitted to be subjected to the demand factors provided in Table 220.48 for health care facilities covered in Article 517.

Table 220.48 Demand Factors for Health Care Receptacle Loads

<u>Portion of Receptacle Load to Which Demand Factor Applies</u> <u>(Volt-Amperes)</u>	<u>Demand Factor</u> <u>(%)</u>
<u>First 7500 or less</u>	<u>125</u>
<u>From 7501 to 10,000</u>	<u>100</u>
<u>From 10,001 to 15,000</u>	<u>50</u>
<u>Remainder over 15,000</u>	<u>45</u>

Supplemental Information

<u>File Name</u>	<u>Description</u> <u>Approved</u>
NEC_Panel_2_FR-9189_220.46.docx	For staff use

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Sat Jan 16 19:20:10 EST 2021

Committee Statement

Committee Statement: Data has been provided to the CMP 2 as a result of Public Input-4219 assigned to and acted on by CMP 15, and CMP 2 has chosen to add a new section, 220.46, into Article 220 to provide separate demand factors for receptacles in health care type occupancies. The panel has modified the proposed code text and tables in this public input to address several concerns that were raised.

The concerns raised include the following:

1) The data provided in the PI combines general purpose receptacle loads calculated at 180VA with other data that would traditionally come from dedicated circuits of higher wattages. Combining this data makes it hard to interpret the data in its current form. The data that was submitted to Panel 2 has been normalized using 180VA for all loads. Any equipment that was counted as cord-and-plug connected type was estimated at 180VA to provide a consistent approach in analyzing the data and arriving at the proposed health care demand factors in the new 220.46.

2) We have identified a correlation issue with the Proposed table 517.22(B). This table is to be used only when determining the calculated load for cord-and-plug connected type loads. At the present time there is no definition for cord-and-plug connected loads and the user of the NEC may be confused on when it would be appropriate to use 517.22(A) or 517.22(B) since both tables involve these type connections.

CMP 2 accepts only Table 517.22(A)(which was accepted by CMP-15 for inclusion in Article 517) for relocation into 220.46 but has revised the demand factors based on a thorough review of the data. This table should satisfy the intent of the submitter.

Response FR-9189-NFPA 70-2021
Message:

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree

**First Revision No. 9177-NFPA 70-2021 [Section No. 220.50]****220.50 Motors and Air-Conditioning Equipment .**

~~Motor loads shall be calculated in accordance with 430.24 , 430.25 , and 430.26 and with 440.6 for hermetic refrigerant motor-compressors.~~

(A) Motors.

The conductor sizing requirements specified in 430.24 and 430.25 and the feeder demand factor calculation method specified in 430.26 shall be used to determine motor loads.

(B) Air-Conditioning Equipment.

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

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Sat Jan 16 15:47:57 EST 2021

Committee Statement

Committee Statement: This section addresses both motors and air-conditioning equipment; the phrase “air-conditioning equipment” is added to the title and the text is restructured into sub-sections to improve clarity. Reference to Section 440.6 is updated to refer to “Part IV of Article 440”, as this existing reference does not adequately address ampacity calculations for air-conditioning equipment.

References to requirements in Article 430 are correct, but are updated with additional information to improve clarity.

Response Message: FR-9177-NFPA 70-2021

[Public Input No. 1935-NFPA 70-2020 \[Section No. 220.50\]](#)

[Public Input No. 1749-NFPA 70-2020 \[Section No. 220.50\]](#)

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.
Campolo, Steve
Domitrovich, Thomas A.
El-Sherif, Nehad
Harman, Thomas L.
Humphrey, David G.
Johnson, David W.
Lujan, Cesar
Manche, Alan
McCamish, John
Pavese, Christopher J.
Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher
Agree.
Cook, Mark Daniel
agree brings clarity
Neubauer, Fred
Agree



First Revision No. 9182-NFPA 70-2021 [Section No. 220.53]

220.53 Appliance Load — Dwelling Unit(s).

~~It shall be permissible to apply~~ Applying a demand factor of 75 percent to the nameplate rating load of four or more appliances rated $\frac{1}{4}$ hp or greater, or 500 watts or greater, that are fastened in place, and that are served by the same feeder or service in a one-family, two-family, or multifamily dwelling shall be permitted. This demand factor shall not apply to the following :

- (1) Household electric cooking equipment that is fastened in place
- (2) Clothes dryers
- (3) Space heating equipment
- (4) Air-conditioning equipment
- (5) Electric vehicle supply equipment (EVSE).

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Sat Jan 16 16:56:11 EST 2021

Committee Statement

Committee Statement: CMP 2 recognizes that EVSE loads can be significant, even in dwelling units and any reduction in load would not be prudent. Article 625 requires that EVSE loads be considered as continuous.

Response Message: FR-9182-NFPA 70-2021

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9163-NFPA 70-2021 [Section No. 220.55]

220.55 Electric Cooking Appliances in Dwelling Units and Household Cooking Appliances
Used in Instructional Programs.

The load for household electric ranges, wall-mounted ovens, counter-mounted cooking units, and other household cooking appliances individually rated in excess of $1\frac{3}{4}$ kW shall be permitted to be calculated in accordance with Table 220.55. Kilovolt-amperes (kVA) shall be considered equivalent to kilowatts (kW) for loads calculated under this section.

Where two or more single-phase ranges 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.

Table 220.55 Demand Factors and Loads for Household Electric Ranges, Wall-Mounted Ovens, Counter-Mounted Cooking Units, and Other Household Cooking Appliances over $1\frac{3}{4}$ kW Rating (Column C to be used in all cases except as otherwise permitted in Note 3.)

<u>Number of Appliances</u>	<u>Demand Factor (%) (See Notes)</u>		<u>Column C Maximum Demand (kW) (See Notes) (Not over 12 kW Rating)</u>
	<u>Column A (Less than $3\frac{1}{2}$ kW Rating)</u>	<u>Column B ($3\frac{1}{2}$ kW through $8\frac{3}{4}$ kW Rating)</u>	
1	80	80	8
2	75	65	11
3	70	55	14
4	66	50	17
5	62	45	20
6	59	43	21
7	56	40	22
8	53	36	23
9	51	35	24
10	49	34	25
11	47	32	26
12	45	32	27
13	43	32	28
14	41	32	29
15	40	32	30
16	39	28	31
17	38	28	32
18	37	28	33
19	36	28	34
20	35	28	35
21	34	26	36
22	33	26	37
23	32	26	38
24	31	26	39
25	30	26	40
26–30	30	24	15 kW + 1 kW for each range
31–40	30	22	

<u>Number of Appliances</u>	<u>Demand Factor (%) (See Notes)</u>		<u>Column C Maximum Demand (kW) (See Notes) (Not over 12 kW Rating)</u>
	<u>Column A (Less than 3½ kW Rating)</u>	<u>Column B (3½ kW through 8¾ kW Rating)</u>	
41–50	30	20	25 kW + ¾ kW for each range
51–60	30	18	
61 and over	30	16	

Notes:

1. *Over 12 kW through 27 kW ranges all of same rating.* For ranges individually rated more than 12 kW but not more than 27 kW, the maximum demand in Column C shall be increased 5 percent for each additional kilowatt of rating or major fraction thereof by which the rating of individual ranges exceeds 12 kW.
2. *Over 8¾ kW through 27 kW ranges of unequal ratings.* For ranges individually rated more than 8¾ kW and of different ratings, but none exceeding 27 kW, an average value of rating shall be calculated by adding together the ratings of all ranges to obtain the total connected load (using 12 kW for any range rated less than 12 kW) and dividing by the total number of ranges. Then the maximum demand in Column C shall be increased 5 percent for each kilowatt or major fraction thereof by which this average value exceeds 12 kW.
3. *Over 1¾ kW through 8¾ kW.* In lieu of the method provided in Column C, ~~it shall be permissible to add~~ adding the nameplate ratings of all household cooking appliances rated more than 1¾ kW but not more than 8¾ kW and ~~multiply~~ multiplying the sum by the demand factors specified in Column A or Column B for the given number of appliances shall be permitted. Where the rating of cooking appliances falls under both Column A and Column B, the demand factors for each column shall be applied to the appliances for that column, and the results added together.
4. ~~Branch-Circuit Load. It shall be permissible to calculate~~ Calculating the branch-circuit load for one range in accordance with Table 220.55 ~~shall be permitted~~. ~~The branch-circuit load for one wall-mounted oven or one counter-mounted cooking unit shall be the nameplate rating of the appliance. The branch-circuit load for a counter-mounted cooking unit and not more than two wall-mounted ovens, all supplied from a single branch circuit and located in the same room, shall be calculated by adding the nameplate rating of the individual appliances and treating this total as equivalent to one range.~~
5. The branch-circuit load for one wall-mounted oven or one counter-mounted cooking unit shall be the nameplate rating of the appliance.
6. The branch-circuit load for a counter-mounted cooking unit and not more than two wall-mounted ovens, all supplied from a single branch circuit and located in the same room, shall be calculated by adding the nameplate rating of the individual appliances and treating this total as equivalent to one range.
- 5 7. This table shall also apply to household cooking appliances rated over 1¾ kW and used in instructional programs.

Informational Note No. 1: See the examples in Informative Annex D.

Informational Note No. 2: See Table 220.56 for demand factors for commercial cooking equipment.

Submitter Information Verification

Committee: NEC-P02

Submission Date: Sat Jan 16 10:48:12 EST 2021

Committee Statement

Committee Statement: For clarity and usability, each sentence in Note 4 is modified into an individual Note. The technical requirement of the notes to the Table have not changed.

Response Message: FR-9163-NFPA 70-2021

[Public Input No. 2404-NFPA 70-2020 \[Section No. 220.55\]](#)

Ballot Results

✔ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree

**First Revision No. 9169-NFPA 70-2021 [Section No. 220.56]****220.56 Kitchen Equipment — Other Than Dwelling Unit(s).**

~~It shall be permissible to calculate~~ Calculating the load for 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 $\frac{1}{4}$ hp or greater, or 500 watts or greater. These demand factors shall be applied to all 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 Kitchen Equipment — Other Than Dwelling Unit(s)

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

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Sat Jan 16 12:16:02 EST 2021

Committee Statement

Committee Statement: This requirement was revised to reflect the change of the language in Section 220.53, the requirement is revised to clarify what constitutes “other kitchen equipment”.

Response Message: FR-9169-NFPA 70-2021

Public Input No. 3858-NFPA 70-2020 [Section No. 220.56]

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9171-NFPA 70-2021 [Section No. 220.60]

220.60 Noncoincident Loads.

Where it is unlikely that two or more noncoincident loads will be in use simultaneously, ~~it shall be permissible to use~~ 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 . Where 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. ~~if it is the largest motor.~~

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Sat Jan 16 13:27:15 EST 2021

Committee Statement

Committee Statement: The text was modified to clarify wording and intent that an air-conditioning load can be considered as one of the noncoincident loads.

Response Message: FR-9171-NFPA 70-2021

[Public Input No. 28-NFPA 70-2019 \[Section No. 220.60\]](#)

[Public Input No. 388-NFPA 70-2020 \[Section No. 220.60\]](#)

[Public Input No. 1600-NFPA 70-2020 \[Section No. 220.60\]](#)

[Public Input No. 3632-NFPA 70-2020 \[Section No. 220.60\]](#)

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

2 Affirmative with Comments

0 Negative with Comments

1 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Neubauer, Fred

Agree

Abstention

Cook, Mark Daniel

This does not bring clarity to whether the smaller load must be included in the total calculation or not.
This is still very confusing to me.

**First Revision No. 9178-NFPA 70-2021 [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 220.61(B)(1) ~~or~~ and a portion of the amount in 220.61(B)(2) determined by the following basic calculations:

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

A 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 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; ~~or~~ a 4-wire, 3-phase system; ~~or~~ a 3-wire, 2-phase system; or a 5-wire, 2-phase system.

Informational Note: See Examples D1(a), D1(b), D2(b), D4(a), and D5(a) in Informative Annex D.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Sat Jan 16 16:02:53 EST 2021

Committee Statement

Committee Statement: The rewritten requirements are easier to read and apply. It will not change the technical requirements in any way.

Response Message: FR-9178-NFPA 70-2021

Public Input No. 1479-NFPA 70-2020 [Section No. 220.61(B)]

Ballot Results

✔ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve
Domitrovich, Thomas A.
El-Sherif, Nehad
Harman, Thomas L.
Humphrey, David G.
Johnson, David W.
Lujan, Cesar
Manche, Alan
McCamish, John
Pavese, Christopher J.
Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher
Agree.
Cook, Mark Daniel
agree
Neubauer, Fred
Agree



First Revision No. 9172-NFPA 70-2021 [New Section after 220.61(C)]

220.70 Energy Management Systems (EMSs).

If an energy management system (EMS) is used to limit the current to a feeder or service, 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 where designated loads are controlled by the EMS and all of the following conditions are met:

- (1) Only listed EMS shall be permitted use of the load calculation allowance of this section.
- (2) Upon system malfunction, the EMS shall use monitoring and controls to disconnect the loads associated with the current limiting feature.
- (3) Access to the settings of the EMS shall be restricted to qualified personnel in accordance with the requirements of 240.6(C).
- (4) The equipment that supplies the feeder or service shall be field marked with the following information:
 - a. Maximum current setting
 - b. Date of calculation and setting
 - c. Identification of loads associated with the current limiting feature
 - d. The following or equivalent wording: "The setting for the EMS current limiting feature shall not be bypassed"

The markings shall meet the requirements in 110.21(B) and shall be located such that they are clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment.

The setpoint value of the EMS shall be considered a continuous load for the purposes of load calculations. In addition, loads not controlled by the EMS, but connected to the same feeder or service, shall be included in load calculations for that feeder or service as approved by other sections.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Sat Jan 16 13:56:45 EST 2021

Committee Statement

Committee Statement: Homes and businesses continue to increase the number of loads that must be served from their power distribution systems. Widespread adoption of electric vehicles chargers, conversion of heating and cooling systems to electric heat pumps, and the adoption of onsite power sources such as solar and energy storage continue at a rapid pace. As these loads are added to electrical distribution systems, the distribution capacity becomes a barrier toward this electrification progress. Technologies in Energy Management Systems (EMS) are being developed, listed, and installed to address these challenges. Advanced systems from large microgrids serving multiple buildings to residential systems supplying a single home are being built today with advanced EMS functions to ensure that conductors and distribution equipment are applied within their ratings. Owners of these systems benefit from a more reliable and often more efficient supply of power when it is needed.

Increasingly, newer EMS are adding features to not only limit power flow in different system states (i.e. backup priority), but to also schedule loads (i.e. for time of use), or to configure loads to be non-coincident (i.e. optimize backup capacity). Additionally, EMS are increasingly being used for demand response programs in concert with utilities to support a smart grid. Historically, the Code has provided allowances for alternative equipment sizing where our buildings are built to energy codes (220.12(B)), or when sizing an optional standby system (702.4(B)(2)(b)), or when adding some types of EV chargers (625.42). There is also a recognized category of loads that are “unlikely” to be in use simultaneously (220.60), along with an allowance for power source control, where the output of multiple power sources connected in parallel are controlled to a specified total output limit (705.13).

This revision builds upon those specific allowances to provide a new option for any load connected to a feeder or service conductor where those loads are controlled to an effective maximum current limit that restricts the demand load operated at one time. Providing Code requirements can allow electric distribution systems to be utilized in a safe and effective manner, providing reasonable accommodation for property owners to further pursue system improvements without requiring extensive electrical system equipment upgrades which may be unnecessary. For those cases where loads do not need to be operated at the same time, addition of an EMS, rather than core equipment replacement, may enable cost-benefit upgrade, while mitigating downtime.

To ensure overcurrent during normal operation does not occur, this new provision requires that such a control system be listed and that loads be disconnected as a contingency or default during any malfunction. To ensure that the setpoints for the EMS are adequately protected against unauthorized adjustment, the same requirements as applies to adjustable-trip circuit breakers are included here. Markings are also required to identify the maximum current setting, date of setting calculations, the loads controlled, and a statement that the EMS shall not be incidentally by-passed for non-concurrent loads.

The current limit of the EMS is treated as continuous for the purposes of conductor sizing to recognize the connection of continuous and non-continuous duty loads is not restricted in this section. If other loads, not controlled by the EMS, are also connected to the same current-constrained feeder or service, this requirement ensures those loads are also included.

Response FR-9172-NFPA 70-2021
Message:

[Public Input No. 3454-NFPA 70-2020 \[New Part after IV.\]](#)

[Public Input No. 3448-NFPA 70-2020 \[New Section after 220.80\]](#)

Ballot Results

✔ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.
Campolo, Steve
Domitrovich, Thomas A.
El-Sherif, Nehad
Harman, Thomas L.
Humphrey, David G.
Johnson, David W.
Lujan, Cesar
Manche, Alan
McCamish, John
Pavese, Christopher J.
Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher
Agree.
Cook, Mark Daniel
agree
Neubauer, Fred
Agree



First Revision No. 9173-NFPA 70-2021 [Section No. 220.83 [Excluding any Sub-Sections]]

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 the dwelling unit is served by a 120/240-volt or 208Y/120-volt, 3-wire service, ~~it shall be permissible to calculate~~ or feeder, calculating the total load in accordance with 220.83(A) or (B) shall be permitted .

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Sat Jan 16 14:05:49 EST 2021

Committee Statement

Committee Statement: This requirement is used to determine whether an existing service or feeder is sufficient. The word “feeder” was left out of the second part of the text and is being added.

Response Message: FR-9173-NFPA 70-2021

[Public Input No. 3125-NFPA 70-2020 \[Section No. 220.83 \[Excluding any Sub-Sections\]\]](#)

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9174-NFPA 70-2021 [Section No. 220.85]

220.85 Two Dwelling Units.

Where two dwelling units are supplied by a single feeder or service and the calculated load under Part III of this article exceeds that for three identical units calculated under 220.84, the lesser of the two loads shall be permitted to be used.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Sat Jan 16 14:08:42 EST 2021

Committee Statement

Committee Statement: This requirement currently only addresses calculating a single feeder supplying two dwelling units, but the requirement should also apply to services. The text is revised to make this change.

Response Message: FR-9174-NFPA 70-2021

Public Input No. 1885-NFPA 70-2020 [Section No. 220.85]

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9175-NFPA 70-2021 [Section No. 220.86]

220.86 Schools.

The calculation of a feeder or service load for schools shall be permitted in accordance with Table 220.86 in lieu of Part III of this article where equipped with electric space heating, air conditioning, or both. The connected load to which the demand factors of Table 220.86 apply shall include all of the interior and exterior lighting, power, water heating, cooking, other loads, and the larger of the air-conditioning load or space-heating load within the building or structure.

Feeders and service conductors whose calculated load is determined by this optional calculation shall be permitted to have the neutral load determined by 220.61. Where the building or structure load is calculated by this optional method, feeders within the building or structure shall have ampacity as permitted in Part III of this article; however, the ampacity of an individual feeder shall not be required to be larger than the ampacity for the entire building.

This section shall not apply to portable classroom buildings.

Table 220.86(a) Optional Method — Demand Factors for Feeders and Service Conductors for Schools

<u>Connected Load</u>		<u>Demand Factor (Percent)</u>
First 33 VA/m ²	(3 VA/ft ²) at	100
Plus,		
Over 33 through 220 VA/m ²	(3 through 20 VA/ft ²) at	75
Plus,		
Remainder over 220 VA/m ²	(20 VA/ft ²) at	25

Table 220.86 Optional Method — Demand Factors for Feeders and Service Conductors for Schools

<u>Connected Load</u>		<u>Demand Factor (%)</u>	<u>Calculated Loads (VA)</u>
<u>Total VA/m²</u>	<u>Total VA/ft²</u>		
<u>0–33</u>	<u>0–3</u>	<u>100</u>	<u>Amount × 100%</u>
<u>Over 33–220</u>	<u>Over 3–20</u>	<u>75</u>	<u>(Amount × 75%) + 3</u>
<u>Remainder over 220</u>	<u>Remainder over 20</u>	<u>25</u>	<u>(Amount × 25%) + 15.75</u>

Supplemental Information

<u>File Name</u>	<u>Description Approved</u>
NEC_Table220.86_FR9175.docx	For staff use

Submitter Information Verification

Committee: NEC-P02
Submittal Date: Sat Jan 16 14:15:28 EST 2021

Committee Statement

Committee Statement: For ease of usability and accuracy, the table is revised to match the style of Table 220.88.

Response Message: FR-9175-NFPA 70-2021

Public Input No. 1196-NFPA 70-2020 [Section No. 220.86]

Ballot Results

✔ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9179-NFPA 70-2021 [Section No. 220.87]

220.87 Determining Existing Loads.

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

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

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

- (2) The maximum demand at 125 percent plus the new load does not exceed the ampacity of the feeder or rating of the service.
- (3) The feeder has overcurrent protection in accordance with 240.4, and the service has overload protection in accordance with 230.90.

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

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Sat Jan 16 16:07:39 EST 2021

Committee Statement

Committee Statement: A year of demand data would capture all of the weather variations at a building, including when the PV or wind system is not providing power because of weather variability. The likelihood of a renewable energy system consistently lowering peak demand day in and day out is low; however, with seasons impacting both the production and demand of electricity, a month's worth of data is an unreliable metric to demonstrate the impact of renewable energy over the course of a year. Rather than exclude renewable energy altogether, this revision relocates the exception such that it is only applied in cases where demand data is not available for a 1-year period.

It should be noted that not all renewable energy systems have functions that provide the level of energy management that is needed to entirely remove this exception from 220.87. Recognizing that such equipment can be used to reliably control loads, CMP 2 added a new Section (refer to new Section 220.70) that provides an option when using qualified equipment.

Response FR-9179-NFPA 70-2021

Message:

[Public Input No. 3151-NFPA 70-2020 \[Section No. 220.87\]](#)

[Public Input No. 4547-NFPA 70-2020 \[Section No. 220.87\]](#)

[Public Input No. 3610-NFPA 70-2020 \[Section No. 220.87\]](#)

Ballot Results

✔ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9186-NFPA 70-2021 [Definition: Example D5(a) Multifamily Dwelling Served at 20...]

Example D5(a) Multifamily Dwelling Served at 208Y/120 Volts, Three Phase

All conditions and calculations are the same as for the multifamily dwelling [Example D4(a)] served at 120/240 V, single phase except as follows:

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

Minimum Number of Branch Circuits Required for Each Dwelling Unit

(see 210.11)

Range Circuit: $8000 \text{ VA} \div 208 \text{ V} = 38 \text{ A}$ or a circuit of two 8 AWG conductors and one 10 AWG conductor in accordance with 210.19(C)

Minimum Size Feeder Required for Each Dwelling Unit

(see 215.2)

For 120/208-V, 3-wire system (without ranges),

Net calculated load of $3882 \text{ VA} \div 2 \text{ legs} \div 120 \text{ V/leg} = 16 \text{ A}$

For 120/208-V, 3-wire system (with ranges),

Net calculated load (range) of $8000 \text{ VA} \div 208 \text{ V} = 39 \text{ A}$

Total load (range + lighting) = $39 \text{ A} + 16 \text{ A} = 55 \text{ A}$

Reducing the neutral load on the feeder to each dwelling unit is not permitted [see 220.61(C)(1)].

Minimum Size Feeders Required from Service Equipment to Meter Bank (For 20 Dwelling Units — 10 with Ranges)

For 208Y/120-V, 3-phase, 4-wire system,

Ranges: Maximum number between any two phase legs = 4

$2 \times 4 = 8$.

Table 220.55 demand = 23,000 VA

Per phase demand = $23,000 \text{ VA} \div 2 = 11,500 \text{ VA}$

Equivalent 3-phase load = 34,500 VA

Net Calculated Load (total):

$40,590 \text{ VA} + 34,500 \text{ VA} = 75,090 \text{ VA}$

$75,090 \text{ VA} \div (208 \text{ V})(\times 1.732) = 208 \text{ A}$

Feeder Neutral Size

Net Calculated Lighting and Appliance Load & Equivalent Range Load:

$40,590 \text{ VA} + (34,500 \text{ VA at } 70\%) = 64,700 \text{ VA}$

Net Calculated Neutral Load:

$64,700 \text{ VA} \div (208 \text{ V})(\times 1.732) = 180 \text{ A}$

Minimum Size Main Feeder (Less House Load) (For 40 Dwelling Units — 20 with Ranges)

For 208Y/120-V, 3-phase, 4-wire system,

Ranges:

Maximum number between any two phase legs = 7

$$2 \times 7 = 14.$$

Table 220.55 demand = 29,000 VA

Per phase demand = 29,000 VA $\div$ 2 = 14,500 VA

Equivalent 3-phase load = 43,500 VA

Net Calculated Load (total):

$$69,150 \text{ VA} + 43,500 \text{ VA} = 112,650 \text{ VA}$$

$$112,650 \text{ VA} \div (208 \text{ V})(\times 1.732) = 313 \text{ A}$$

Main Feeder Neutral Size:

$$69,150 \text{ VA} + (43,500 \text{ VA at } 70\%) = 99,600 \text{ VA}$$

$$99,600 \text{ VA} \div (208 \text{ V})(\times 1.732) = 277 \text{ A}$$

Further Demand Factor

(see 220.61)

200 A at 100%	200.0 A
---------------	---------

277 A - 200 A = 77 A at 70%	54 A
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Net Calculated Load (neutral)	254 A
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Submitter Information Verification

Committee: NEC-P02

Submission Date: Sat Jan 16 18:40:11 EST 2021

Committee Statement

Committee Statement: Based on the Order of Operations in mathematics and depending on the scientific calculator used, the mathematical expression can yield different results as currently written. This revision ensures that the calculation is performed correctly by moving the parenthesis.

The panel notes that the multiplication symbol needs to be consistently expressed throughout the example.

Response Message: FR-9186-NFPA 70-2021

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9185-NFPA 70-2021 [Definition: Example D5(b) Optional Calculation for Multifam...]

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

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

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

Minimum Number of Branch Circuits Required for Each Dwelling Unit

(see 210.11)

Range Circuit (see Table 220.55, Column B): $8000 \text{ VA} \div 80\% \div 208 \text{ V} = 31 \text{ A}$ or a circuit of two 8 AWG conductors and one 10 AWG conductor in accordance with 210.19(C)

Space Heating: $6000 \text{ VA} \div 208 \text{ V} = 29 \text{ A}$

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

Minimum Size Feeder Required for Each Dwelling Unit

120/208-V, 3-wire circuit

Net calculated load of $18,782 \text{ VA} \div 208 \text{ V} = 90 \text{ A}$

Net calculated load (lighting line to neutral):

$3882 \text{ VA} \div 2 \text{ legs} \div 120 \text{ V per leg} = 16.2 \text{ A}$

Line to line = $14,900 \text{ VA} \div 208 \text{ V} = 71.6 \text{ A}$

Total load = $16.2 \text{ A} + 71.6 \text{ A} = 88 \text{ A}$

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

Net Calculated Load

$167,352 \text{ VA} \div (208 \text{ V}) \times 1.732 = 465 \text{ A}$

Feeder Neutral

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

Lighting and Small-Appliance Load

20 units $\times 5520 \text{ VA} = 110,400 \text{ VA}$ first 3000 VA at 100% = 3000 VA

$110,400 \text{ VA} - 3000 \text{ VA} = 107,400 \text{ VA}$ at 35% = 37,590 VA

Net Calculated Load: 40,590 VA

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

Ranges:

Maximum number between any two phase legs = 7

$$2 \times 7 = 14$$

Table 220.55 demand = 29,000 VA

Per phase demand = $29,000 \text{ VA} \div 2 = 14,500 \text{ VA}$

Equivalent 3-phase load = 43,500 VA

Net Calculated Neutral Load (total): $40,590 \text{ VA} + 43,500 \text{ VA} = 84,090 \text{ VA}$

$$84,090 \text{ VA} \div (208 \text{ V}) (\times 1.732) = 234 \text{ A}$$

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

Net Calculated Load:

$$246,624 \text{ VA} \div (208 \text{ V}) (\times 1.732) = 685 \text{ A}$$

Feeder Neutral Load for Feeder from Service Equipment to Meter Bank (for 40 Dwelling Units)**Lighting and Small-Appliance Load**

40 units $\times 5520 \text{ VA} = 220,800 \text{ VA}$

First 3000 VA at 100% = 3000 VA

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

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

Remainder $220,800 \text{ VA} - 120,000 \text{ VA} = 100,800 \text{ VA}$ at 25% = 25,200 VA

Net Calculated Load: 69,150 VA

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

Ranges:

Maximum number between any two phase legs = 14

$$2 \times 14 = 28$$

Table 220.55 demand = $15,000 \text{ VA} + (1000 \text{ VA} \times 28) = 43,000 \text{ VA}$ per phase

Demand = $43,000 \text{ VA} \div 2 = 21,500 \text{ VA}$

Equivalent 3-phase load = $21,500 \text{ VA} \times 3 = 64,500 \text{ VA}$

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

Net Calculated Neutral Load (total): $69,150 \text{ VA} + 45,150 \text{ VA} = 114,300 \text{ VA}$

$$114,300 \text{ VA} \div (208 \text{ V}) (\times 1.732) = 317 \text{ A}$$

Further Demand Factor

[see 220.61(B)]

200 A at 100%

200 A

$317 \text{ A} - 200 \text{ A} = 117 \text{ A}$ at 70%

82 A

Net Calculated Load (neutral)

282 A

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Sat Jan 16 18:34:08 EST 2021

Committee Statement

Committee Statement: Based on the Order of Operations in mathematics and depending on the scientific calculator used, the mathematical expression can yield different results as currently written.

Response Message: FR-9185-NFPA 70-2021

[Public Input No. 1937-NFPA 70-2020 \[Definition: Example D5\(b\) Optional Calculation for Multifam...\]](#)

Ballot Results

✔ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9187-NFPA 70-2021 [Definition: Receptacles]

Receptacles

Receptacle Load:

$14,400 \text{ VA} \div 240 \text{ V} = 60 \text{ A}$ for 3-wire, 120/240 V

$14,400 \text{ VA} \div 120 \text{ V} = 120 \text{ A}$ for ~~3~~ 2 -wire, ~~120/240 V~~ 120 V

The receptacle load would be permitted to be served by 2-wire or 3-wire circuits with a capacity equal to 60 A or greater for 3-wire circuits or 120 A or greater for 2-wire circuits.

Submitter Information Verification

Committee: NEC-P02

Submission Date: Sat Jan 16 18:52:17 EST 2021

Committee Statement

Committee Statement: The current 2020 NEC text resulting from the action on TIA 20-6 is amended by changing “3-wire, 120/240 V” to “2-wire, 120 V” under “receptacle load”.

Response Message: FR-9187-NFPA 70-2021

[Public Input No. 551-NFPA 70-2020 \[Definition: Example D3 Store Building\]](#)

Ballot Results

✔ This item has passed ballot

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 9184-NFPA 70-2021 [Definition: Example D1(b) One-Family Dwelling [Excluding an...]

Assume same conditions as Example No. D1(a), plus addition of one 6-A, 230-V, room air-conditioning unit and one 12-A, 115-V, room air-conditioning unit,* one 8-A, 115-V, rated waste disposer, and one 10-A, 120-V, rated dishwasher. See Article 430 for general motors and Article 440, Part VII, for air-conditioning equipment. Motors have nameplate ratings of 115 V and 230 V for use on 120-V and 240-V nominal voltage systems.

*(For feeder neutral, use larger of the two appliances for unbalance.)

From Example D1(a), feeder current is 78 A (3-wire, 240 V).

	<u>Line A</u>	<u>Neutral</u>	<u>Line B</u>
-			
Amperes from Example D1(a)	78	61	78
One 230-V air conditioner	6	—	6
One 115-V air conditioner and 120-V dishwasher	12	12	10
One 115-V disposer	—	8	8
25% of largest motor air-conditioner (see 430.24 440.33)	3	3	2
Total amperes per conductor	99	84	104

Submitter Information Verification

Committee: NEC-P02

Submission Date: Sat Jan 16 18:16:50 EST 2021

Committee Statement

Committee Statement: The first revision revises the load to indicate it is the largest air-conditioning or motor load as covered in 440.33.

Using nameplate voltages that would be encountered shows how to calculate these loads where their voltage differs from the nominal voltage of the system. The ratings of the equipment are correct as currently written and is noted they are allowed to operate on the 120-V and 240-V nominal voltage systems.

Response Message: FR-9184-NFPA 70-2021

Public Input No. 1416-NFPA 70-2020 [Definition: Example D1(b) One-Family Dwelling]

Ballot Results

✓ This item has passed ballot

15 Eligible Voters

0 Not Returned

11 Affirmative All

4 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Campolo, Steve

Even though 440.33 mentions the highest current in the group, leaving the word “largest” in the example makes for clearer text.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



First Revision No. 8956-NFPA 70-2021 [Part I.]

Part I. General Provisions

Submitter Information Verification

Committee: NEC-P02

Submission Date: Wed Jan 13 09:25:20 EST 2021

Committee Statement

Committee Statement: This change is being made in accordance with Section 2.4.2.1 of the NEC Style Manual which states that where an article has multiple parts, Part I shall be titled "General".

Response Message: FR-8956-NFPA 70-2021

[Public Input No. 4362-NFPA 70-2020 \[Part I.\]](#)

[Public Input No. 971-NFPA 70-2020 \[Part I.\]](#)

Ballot Results

✓ **This item has passed ballot**

15 Eligible Voters

0 Not Returned

12 Affirmative All

3 Affirmative with Comments

0 Negative with Comments

0 Abstention

Affirmative All

Boynton, Charles L.

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Lujan, Cesar

Manche, Alan

McCamish, John

Pavese, Christopher J.

Reyes, Frederick P.

Affirmative with Comment

Abbassi, Mathher

Agree.

Cook, Mark Daniel

agree

Neubauer, Fred

Agree



Committee Input No. 9003-NFPA 70-2021 [Detail]

This was a First Revision that failed ballot.

Change text to current 210.12(A) to read:

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

Supplemental Information

<u>File Name</u>	<u>Description</u> <u>Approved</u>
NEC_210.12_A_PI1191_PI3102_FR9003.docx	For staff use

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Wed Jan 13 15:27:35 EST 2021

Committee Statement

Committee Statement: Garages are being added to the list of locations in section 210.12(A) to address electrical fires arising from the circuits that are supplying power to these locations. The language for framing members is vague and unenforceable and not accepted.

Response Message: CI-9003-NFPA 70-2021

[Public Input No. 3102-NFPA 70-2020 \[Section No. 210.12\(A\)\]](#)

[Public Input No. 1191-NFPA 70-2020 \[Section No. 210.12\(A\)\]](#)

Ballot Results

✖ This item has failed ballot

- 15 Eligible Voters
- 0 Not Returned
- 8 Negative with Comments
- 5 Affirmative All
- 2 Affirmative with Comments
- 0 Abstention

Negative with Comment

Abbassi, Mathher

There is no data that support AFCI has reduced fire. The expansion of the garage will add another area with nuisance tripping.

Boynton, Charles L.

No data to support expansion to garages.

Campolo, Steve

It is clear that expansion of AFCI protected circuits is very premature. Countless reports of false or unwanted tripping have been noted. So much so that three separate committees are looking into the issue. Why are three committees spending time on this if there was no false tripping problem? I personally serve on these committees and have seen reports of tripping. Variable speed motors have been high on the list of false tripping. Adding garages where motors are prevalent will surely be another area of false tripping. Also, the Electrical Safety Authority of Ontario, Canada has been allowing new installations to remove AFCI circuit breakers when repeated instances of false tripping cannot be rectified. They allow a receptacle AFCI and an ordinary thermo-magnetic breaker in its place for a period of one year to solve the problem. Let's not get a black stain on an important safety product by pushing widespread adoption before these issues are solved. This technology is still evolving. For those that remember, the same thing happened with GFCI's 50 years ago. And 50 years later we are still cautiously expanding those required areas. Let's be as cautious with AFCI's and let the technology mature and address these serious field issues.

Harman, Thomas L.

No data to support AFCI in garages.

Johnson, David W.

IEC supports the application of Arc-Fault Circuit-Interrupter Protection in general, however there are numerous types of portable power tools, equipment and appliances available for use in the garage area of a dwelling that could possibly cause unwanted tripping of the AFCI device due to incompatibility issues.

Lujan, Cesar

No technical justification for unoccupied space.

Neubauer, Fred

Insufficient data and substantiation has been provided to warrant the expansion of AFCI's into additional areas of a dwelling. Nuisance tripping of AFCI's continues to be an issue. Contractors are not taking the time to report the nuisance trips and therefore the manufacturers have data of trips that is much lower than what is occurring in the field.

Pavese, Christopher J.

The submitter provided a lack of substantiation or statistics that an electrical arcing fault hazard likely exists in the location covered by this First Revision and that AFCIs were mandatory as the solution in these locations to enhance safety for all dwelling occupancies. The choice to install AFCIs in these locations should be at the discretion of the dwelling owner and not mandatory by the NEC.

Affirmative All

Domitrovich, Thomas A.

El-Sherif, Nehad

Humphrey, David G.

McCamish, John

Reyes, Frederick P.

Affirmative with Comment

Cook, Mark Daniel

agree

Manche, Alan

Each year over 6600 garage fires resulting in an average of 30 deaths, 400 injuries, and \$457M in property loss as noted in the U.S. Fire Administration report. Electrical malfunction is noted as a major contributor to these losses which constitutes approximately 1590 garage fires annually, resulting in 10 deaths per year according to the NFPA 2019 Home Electrical Fires report. Public input points to further substantiation in news articles resulting in electric fire sources resulting in deaths and significant property damage. AFCIs have now been protecting electrical systems in homes for two decades and that protection has grown to cover an extensive area of the home. AFCI protection is adopted in all 50 states to protect families in their home. The AFCI manufacturers have conducted extensive researching on garage loads as noted in the public input substantiation. That substantiation indicated that over 100,000 combination of loads have been study and verified to operate on AFCI circuits. Homes now have tens of millions of motors operating on AFCI protected circuits throughout the home. The state of Massachusetts now has AFCI protection being enforced on garage circuits for over a year, conservatively placing AFCI protection in over 7500 garages. We have an opportunity to enhance residential electrical safety by protecting lives and property.

**Committee Input No. 9006-NFPA 70-2021 [Detail]****This was a First Revision that failed ballot.**

Change text of current 210.12(A) to read:

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

Supplemental Information

<u>File Name</u>	<u>Description</u> <u>Approved</u>
NEC_210.12_A_PI1192_PI3473_FR9006.docx	For staff use

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Wed Jan 13 15:53:10 EST 2021

Committee Statement

Committee Statement: Basements are being added to the list of locations in section 210.12(A) to address electrical fires arising from the circuits that are supplying power to these locations.

Response Message: CI-9006-NFPA 70-2021

[Public Input No. 1192-NFPA 70-2020 \[Section No. 210.12\(A\)\]](#)

[Public Input No. 3473-NFPA 70-2020 \[Section No. 210.12\(A\)\]](#)

Ballot Results**✖ This item has failed ballot**

15 Eligible Voters
0 Not Returned
7 Negative with Comments
7 Affirmative All
1 Affirmative with Comments
0 Abstention

Negative with Comment

Abbassi, Mathher

There is no data that support AFCI has reduced fire. The expansion of the basement will add another area with nuisance tripping.

Boynton, Charles L.

No data to support expansion to basements.

Campolo, Steve

It is clear that expansion of AFCI protected circuits is very premature. Countless reports of false or unwanted tripping have been noted. So much so that three separate committees are looking into the issue. Why are three committees spending time on this if there was no false tripping problem? I personally serve on these committees and have seen reports of tripping. Variable speed motors have been high on the list of false tripping. Adding basements where power tool motors and washing machines are prevalent will surely be another area of false tripping. Also, the Electrical Safety Authority of Ontario, Canada has been allowing new installations to remove AFCI circuit breakers when repeated instances of false tripping cannot be rectified. They allow a receptacle AFCI and an ordinary thermo-magnetic breaker in its place for a period of one year to solve the problem. Let's not get a black stain on an important safety product by pushing widespread adoption before these issues are solved. This technology is still evolving. For those that remember, the same thing happened with GFCI's 50 years ago. And 50 years later we are still cautiously expanding those required areas. Let's be as cautious with AFCI's and let the technology mature and address these serious field issues.

Harman, Thomas L.

No data to support AFCI in basements.

Lujan, Cesar

No technical justification for spaces with limited use.

Neubauer, Fred

Insufficient data and substantiation has been provided to warrant the expansion of AFCI's into additional areas of a dwelling. Nuisance tripping of AFCI's continues to be an issue. Contractors are not taking the time to report the nuisance trips and therefore the manufacturers have data of trips that is much lower than what is occurring in the field.

Pavese, Christopher J.

The submitter provided a lack of substantiation or statistics that an electrical arcing fault hazard likely exists in the location covered by this First Revision and that AFCIs were mandatory as the solution in these locations to enhance safety for all dwelling occupancies. The choice to install AFCIs in these locations should be at the discretion of the dwelling owner and not mandatory by the NEC.

Affirmative All

Domitrovich, Thomas A.

El-Sherif, Nehad

Humphrey, David G.

Johnson, David W.

Manche, Alan

McCamish, John

Reyes, Frederick P.

Affirmative with Comment

Cook, Mark Daniel

agree



Committee Input No. 9015-NFPA 70-2021 [Detail]

This was a First Revision that failed ballot.

Change text for current 210.12(A) to read:

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

Supplemental Information

<u>File Name</u>	<u>Description Approved</u>
NEC_210.12_A_PI3100_FR9015.docx	For staff use

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Wed Jan 13 16:46:44 EST 2021

Committee Statement

Committee Statement: Attics are being added to the list of locations in section 210.12(A) to address electrical fires arising from the circuits that are supplying power to these locations.

Response Message: CI-9015-NFPA 70-2021

Public Input No. 3100-NFPA 70-2020 [Section No. 210.12(A)]

Ballot Results

✖ This item has failed ballot

15 Eligible Voters
0 Not Returned
6 Negative with Comments
6 Affirmative All
3 Affirmative with Comments
0 Abstention

Negative with Comment

Abbassi, Mathher

There is no data that support AFCI has reduced fire. The expansion of the attic will add another area with nuisance tripping.

Boynton, Charles L.

No data to support expansion to Attics.

Campolo, Steve

- It is clear that expansion of AFCI protected circuits is very premature. Countless reports of false or unwanted tripping have been noted. So much so that three separate committees are looking into the issue. Why are three committees spending time on this if there was no false tripping problem? I personally serve on these committees and have seen reports of tripping. Variable speed motors have been high on the list of false tripping. Adding attics where HVAC motorized equipment are installed will surely be another area of false tripping. Also, the Electrical Safety Authority of Ontario, Canada has been allowing new installations to remove AFCI circuit breakers when repeated instances of false tripping cannot be rectified. They allow a receptacle AFCI and an ordinary thermo-magnetic breaker in its place for a period of one year to solve the problem. Let's not get a black stain on an important safety product by pushing widespread adoption before these issues are solved. This technology is still evolving. For those that remember, the same thing happened with GFCI's 50 years ago. And 50 years later we are still cautiously expanding those required areas. Let's be as cautious with AFCI's and let the technology mature and address these serious field issues.

Harman, Thomas L.

No data to support AFCI in attics.

Lujan, Cesar

No technical justification. Not an issue in new construction.

Pavese, Christopher J.

The submitter provided a lack of substantiation or statistics that an electrical arcing fault hazard likely exists in the location covered by this First Revision and that AFCIs were mandatory as the solution in these locations to enhance safety for all dwelling occupancies. The choice to install AFCIs in these locations should be at the discretion of the dwelling owner and not mandatory by the NEC.

Affirmative All

Domitrovich, Thomas A.

El-Sherif, Nehad

Humphrey, David G.

Johnson, David W.

McCamish, John

Reyes, Frederick P.

Affirmative with Comment

Cook, Mark Daniel

agree

Manche, Alan

Let's first start with the nine deaths in Georgia, Maryland and Mississippi along with the property damage events that are well documented that resulted from electrical malfunction fires in the attic. AFCIs have now been protecting electrical systems in homes for two decades and that protection has grown to cover an extensive area of the home. AFCI protection is adopted in all 50 states to protect families in their home. The question that every homeowner should be asking is why are all of my circuits not AFCI protected. Let's discuss the attic. The attic is a transversal area where fire spreads quickly across the home. Wire damage often occurs in the attic when pulling it across sharp metal, typical gusset plates. There are no unique electrical outlets or loads that reside in an attic, typically lighting, possibly a receptacle outlet and potentially an attic fan. The fire hazard is well documented in news articles that substantiation the need to mitigate these fires with AFCI protection.

Neubauer, Fred

Agree



Committee Input No. 9091-NFPA 70-2021 [Detail]

This was a First Revision that failed ballot.

Change text for current 210.12(A) to read:

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

Supplemental Information

<u>File Name</u>	<u>Description</u> <u>Approved</u>
NEC_210.12_A_PI1190_PI3101_PI3265_FR9091.docx	For staff use

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 14 17:45:12 EST 2021

Committee Statement

Committee Statement: The circuits that serve the bathroom are subject to the same installation and conditions of use and warrant AFCI protection as other circuits in the dwelling unit. This location has been added due to electrical fires that are arising from the circuits that are supplying power to these locations.

Response Message: CI-9091-NFPA 70-2021

[Public Input No. 3101-NFPA 70-2020 \[Section No. 210.12\(A\)\]](#)

[Public Input No. 3265-NFPA 70-2020 \[Section No. 210.12\(A\)\]](#)

[Public Input No. 1190-NFPA 70-2020 \[Section No. 210.12\(A\)\]](#)

Ballot Results

✖ This item has failed ballot

15 Eligible Voters
0 Not Returned
7 Negative with Comments
6 Affirmative All
2 Affirmative with Comments
0 Abstention

Negative with Comment

Abbassi, Mathher

There is no data that support AFCI has reduced fire. The bathroom area has limited combustibles with tiled walls and occasional dampness. The expansion of the bathroom will add another area with nuisance tripping.

Boynton, Charles L.

No data to support expansion to bathrooms.

Campolo, Steve

It is clear that expansion of AFCI protected circuits is very premature. Countless reports of false or unwanted tripping have been noted. So much so that three separate committees are looking into the issue. Why are three committees spending time on this if there was no false tripping problem? I personally serve on these committees and have seen reports of tripping. Variable speed motors have been high on the list of false tripping. Adding bathrooms where motorized fans are installed as well as DC motor power (with arcing brushes and variable speed) hand-held hair dryers are used, as well as hydromassage tubs, will surely be another area of false tripping. Also, the Electrical Safety Authority of Ontario, Canada has been allowing new installations to remove AFCI circuit breakers when repeated instances of false tripping cannot be rectified. They allow a receptacle AFCI and an ordinary thermo-magnetic breaker in its place for a period of one year to solve the problem. Let's not get a black stain on an important safety product by pushing widespread adoption before these issues are solved. This technology is still evolving. For those that remember, the same thing happened with GFCI's 50 years ago.

And 50 years later we are still cautiously expanding those required areas. Let's be as cautious with AFCI's and let the technology mature and address these serious field issues.

Harman, Thomas L.

More data needed for AFCI/GFCI requirements in Bathrooms.

Lujan, Cesar

No technical justification. Not an issue in new construction.

Neubauer, Fred

Insufficient data and substantiation has been provided to warrant the expansion of AFCI's into additional areas of a dwelling. Nuisance tripping of AFCI's continues to be an issue. Contractors are not taking the time to report the nuisance trips and therefore the manufacturers have data of trips that is much lower than what is occurring in the field.

Pavese, Christopher J.

The submitter provided a lack of substantiation or statistics that an electrical arcing fault hazard likely exists in the location covered by this First Revision and that AFCIs were mandatory as the solution in these locations to enhance safety for all dwelling occupancies. The choice to install AFCIs in these locations should be at the discretion of the dwelling owner and not mandatory by the NEC.

Affirmative All

Domitrovich, Thomas A.

El-Sherif, Nehad

Humphrey, David G.

Johnson, David W.

McCamish, John

Reyes, Frederick P.

Affirmative with Comment

Cook, Mark Daniel

agree

Manche, Alan

Let's first start with the numerous property damage events that are well documented along with the 10 deaths noted in 2019 NFPA Home Electrical Fires Report that resulted from electrical malfunction fires, many originating from bathroom fans. AFCIs have now been protecting electrical systems in homes for two decades and that protection has grown to cover an extensive area of the home. AFCI protection is adopted in all 50 states to protect families in their home. The question that every homeowner should be asking is why are all of my circuits not AFCI protected. Let's discuss the bathroom. These rooms sit between your kids bedrooms in nearly every home. Wire running through the walls adjacent to bedrooms are at the same risk of establishing a fire ignition sources as those in the same wall powering the outlets in the bedrooms. Consider the mounting of towel racks, mirrors, and cabinets in bathrooms along with pictures and shelves in either the bedroom or the bathroom that can pierce the conductor and establish an ignition source. There are no unique electrical outlets or loads that reside in a bathroom. Homes now have tens of millions of motors operating on AFCI protected circuits throughout the home. The AFCI manufacturers have further conducted extensive researching on bathroom exhaust fans including within humidity chambers that has also been shared again. The fire hazard is well documented in NFPA Home Electrical Fires Report as well as numerous news articles that substantiation the need to mitigate these fires with AFCI protection.



Committee Input No. 8953-NFPA 70-2021 [Section No. 210.8(A)]

This was a First Revision that failed ballot.

(A) Dwelling Units.

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

(0) Bathrooms

(0) ~~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~~

(0) Outdoors

(0) ~~Crawl spaces — at or below grade level~~

(0) Basements

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

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

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

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

(0) Boathouses

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

(0) Laundry areas

(0) Indoor damp and 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 receptacle supplying only a permanently installed fire alarm or burglar-alarm security system shall not be required to have ground-fault-circuit-interrupter GFCI protection.

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

Exception No. 4: All factory-installed receptacle outlets mounted internal to bathroom exhaust fans shall not require GFCI protection unless required by the installation instructions or listing.

Supplemental Information

File Name	Description Approved
NEC_210.8_A_FR8953.docx	For staff use

Submitter Information Verification

Committee: NEC-P02

Submission Date: Tue Jan 12 19:20:12 EST 2021

Committee Statement

Committee Statement: This change recognizes the fact that the residential home provides many areas of vulnerability with regard to shock hazards.

There is a broad distribution of incidents over many products and product categories. National consumer product related electrocution estimates show that based on data collected by the CPSC for a 10-year period the US loses an average of 49 consumer lives every year. Lives are lost each year not just because of proximity to water but due to use of appliances, extension cords and other items that can be plugged into any receptacle outlet within a home. Outside of receptacle outlet examples, lighting examples of loss of life due to shock are also a statistic.

Exception No. 1 is modified to address the fact that the list of areas is no longer present.

Exception No. 2 for permanently installed fire alarm or security systems was expanded to any receptacle, regardless of

location as this equipment can be found in more locations than the basement. The informational note was deleted as it is not necessary. In addition "burglar alarm" was replaced with "security" as security system is the proper terminology currently used.

Exception No. 3 changes add terminology for weight supporting ceiling receptacles and weight supporting attachment fittings. In addition, damp and wet locations are now included in the list of those areas not requiring GFCI protection when these devices are used as per their listing. Note to the correlating committee: The addition of the WSAF and WSCR terms are contingent upon the success of these added new terms not under the purview of CMP 2. If these definitions are not accepted the discrepancy should be reconciled with this first revision.

A new exception No. 4 was added to provide clarity regarding factory installed receptacles internal to exhaust fans while directing the user to follow installation instructions. This receptacle located internal to the exhaust fan is not meant for public use as it is dedicated for the exhaust fan. In addition, this receptacle would not be required to have GFCI protection as per 90.7 due to the fact this is internal to the equipment.

Response Message: PI 1963: Please see CI for 210.8(B) (FR-8953) for accepted language suggested.

[Public Input No. 1963-NFPA 70-2020 \[Sections 210.8\(A\), 210.8\(B\)\]](#)

[Public Input No. 1396-NFPA 70-2020 \[Section No. 210.8\(A\)\]](#)

[Public Input No. 3375-NFPA 70-2020 \[Section No. 210.8\(A\)\]](#)

[Public Input No. 2454-NFPA 70-2020 \[Section No. 210.8\(A\)\]](#)

[Public Input No. 934-NFPA 70-2020 \[Section No. 210.8\(A\)\]](#)

[Public Input No. 1787-NFPA 70-2020 \[Section No. 210.8\(A\)\]](#)

[Public Input No. 845-NFPA 70-2020 \[Section No. 210.8\(A\)\]](#)

[Public Input No. 2693-NFPA 70-2020 \[Section No. 210.8\(A\)\]](#)

[Public Input No. 3376-NFPA 70-2020 \[Section No. 210.8\(A\)\]](#)

[Public Input No. 11-NFPA 70-2019 \[Section No. 210.8\(A\)\]](#)

[Public Input No. 3027-NFPA 70-2020 \[Section No. 210.8\(A\)\]](#)

[Public Input No. 3026-NFPA 70-2020 \[Section No. 210.8\(A\)\]](#)

[Public Input No. 3818-NFPA 70-2020 \[Section No. 210.8\(A\)\]](#)

[Public Input No. 2607-NFPA 70-2020 \[Section No. 210.8\(A\)\]](#)

[Public Input No. 2817-NFPA 70-2020 \[Section No. 210.8\(A\)\]](#)

Ballot Results

✖ This item has failed ballot

15 Eligible Voters
 0 Not Returned
 6 Negative with Comments
 8 Affirmative All
 1 Affirmative with Comments
 0 Abstention

Negative with Comment

Abbassi, Mathher

I can't identify the added safety in making all circuits in a dwelling GFCI protected. There is no substantiation for the unnecessary expense to try to address a hazard that doesn't exist.

Boynton, Charles L.

Insufficient technical data to support expansion of GFCI's to all areas of the home. Expansion in these areas without justification, may limit adoption of certain parts of NEC in some states.

Humphrey, David G.

The expansion of GFCI to the whole house deviates significantly from the incremental approach to expansion that has been in place for many years. Without additional substantiation this FR could face significant opposition at the local and state levels.

Lujan, Cesar

No technical justification. Incorrect cost statement.

Neubauer, Fred

Insufficient substantiation has been provided that would now require GFCI protection of receptacles in all locations of a dwelling. GFCI protection is generally required in wet and damp locations which is what should be the primary requirement of when GFCI protection should be required. Adding this excessive requirement will add to the list of States that are not adopting the NEC in its entirety or in part.

Pavese, Christopher J.

Lack substantiation

Affirmative All

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Johnson, David W.

Manche, Alan

McCamish, John

Reyes, Frederick P.

Affirmative with Comment

Cook, Mark Daniel

This will force installations of two circuits for dwellings. Lighting and receptacles. If both or on the same circuit and the GFCI trips it will leave the occupant potentially in the dark creating additional unseen hazards. Clarity should be given.



Committee Input No. 9165-NFPA 70-2021 [New Section after 210.8(E)]

This was a First Revision that failed ballot.

(G)_ Cord Reels.

All 125-volt through 250-volt electrical outlets supplying cord reels supplied by single-phase branch circuits rated 150 volts or less to ground, 30 amperes or less, shall be provided with GFCI protection.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Sat Jan 16 11:04:39 EST 2021

Committee Statement

Committee Statement: A new section is being added to address GFCI protection of cord reels which are used in many applications by electrical workers and others in a way whereby their nature they would benefit from GFCI protection. The statistics of shock help support this activity as CMP 2 seeks to reduce the number of lives lost due to the hazard of electrical shock.

Response Message: CI-9165-NFPA 70-2021

Public Input No. 3512-NFPA 70-2020 [New Section after 210.8(B)]

Ballot Results

✖ This item has failed ballot

15 Eligible Voters

0 Not Returned

6 Negative with Comments

8 Affirmative All

1 Affirmative with Comments

0 Abstention

Negative with Comment

Abbassi, Mathher

If an extension cord's application or environment requires GFCI protection, then the serving receptacle or circuit must be provided with such protection. In healthcare facilities (operation rooms) do use cord reel and GFCI protection is not permitted. This is an intrusive requirement, standard extension cords are not required to have GFCI built-in protection; why would it be required for cord reels.

Boynton, Charles L.

Cord reels are typically installed where GFCI protection is already required. It is not easy to identify Circuits for Cord reels as usually their location is not specified.

Domitrovich, Thomas A.

UL Standard UL 355 "Cord Reels" differentiates products as General Use Reels versus Commercial/Industrial Reels. General-Use Reels are already covered by 210.8(A) for circuits for dwelling units and garages and accessory buildings. NEMA opposes FR-9165 for Commercial/Industrial Reels due to: • no supporting incident history • permanent supply connections (hard-wired outlets or receptacle outlets) typically come from elevated locations, often on ceilings, rather than draped across any floor surfaces • the product standard already includes provisions for ACCESSIBLE GFCI, often inline or at reel output, to comply with OSHA 29 CFR 1910 requirements • OSHA 29 CFR 1926 may require egress lighting to have automatic-reset GFCI, but non-lighting equipment to have manual-reset GFCI. A number of NEMA Member company produce Commercial/Industrial Reels that already integrate GFCI protection at or to the reel outlets, as appropriate for the application.

Lujan, Cesar

GFCI protection is only necessary in damp and wet locations. Expanding the requirement to all locations where cord reels are used is too restrictive.

Neubauer, Fred

The requirement to install GFCI protection outlets for cord reels is far to broad of a requirement with insufficient substantiation to require it. Cord reels are used in many applications other than those used by electrical workers and others. there are several areas listed throughout the NEC that require the outlet to be GFCI protected based upon location which is the primase of where and when GFCI protection is required.

Pavese, Christopher J.

Good Practice but will be difficult to enforce and may introduce ladder access requirements to reset GFCI.

Affirmative All

Campolo, Steve

El-Sherif, Nehad

Harman, Thomas L.

Humphrey, David G.

Johnson, David W.

Manche, Alan

McCamish, John

Reyes, Frederick P.

Affirmative with Comment

Cook, Mark Daniel

agree



Committee Input No. 8963-NFPA 70-2021 [Section No. 210.11(C)]

This was a First Revision that failed ballot.

(C) Dwelling Units.

(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).

(2) Laundry Branch Circuits.

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

(3) Bathroom Branch Circuits.

In addition to the number of branch circuits required by other parts of this section, one or more 120-volt, 20-ampere branch circuit shall be installed 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 (A)(2).

[Detail FR-8970](#)

(4) Garage Branch Circuits.

In addition to the number of branch circuits required by other parts of this section, at least one 120-volt, 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 ~~readily accessible~~ outdoor receptacle outlets.

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

(5) Bedrooms.

In addition to the number of branch circuits required by other parts of this section, one or more 120-volt, 20-ampere branch circuit shall be provided to supply the receptacle outlet(s) in each bedroom required by 210.52(A). Such circuits shall have no other outlets.

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Wed Jan 13 11:11:20 EST 2021

Committee Statement

Committee Statement: Section 210.11(C)(5) is added to account for the increased demand of circuits in these locations. A 20-ampere circuit per bedroom is now required to serve the receptacle outlets within that bedroom.

Response Message: CI-8963-NFPA 70-2021

[Public Input No. 2972-NFPA 70-2020 \[Section No. 210.11\(C\)\]](#)

Ballot Results

✗ This item has failed ballot

15 Eligible Voters

0 Not Returned

7 Negative with Comments

7 Affirmative All

1 Affirmative with Comments

0 Abstention

Negative with Comment

Abbassi, Mathher

Unsubstantiated requirements. It is an added expense that will not be utilized. Fitting out bedrooms with provisions for future assisted living while the homeowner has to climb 10 risers to get to the bedroom!! Additionally, when power is lost, these receptacles are useless.

Boynton, Charles L.

There was no technical justification to require a 20 amp circuit to each bedroom.

Humphrey, David G.

The need for a 20 ampere branch circuit to supply bedrooms has not been substantiated. If additional circuit capacity is needed for medical equipment or the like a competent electrician should be able to provide such a circuit. This is a more prudent approach than requiring all bedrooms to upgrade to accommodate a small percentage that would actually benefit. Additionally language is uncertain as to whether a 20 ampere circuit would be required for each bedroom or one such circuit to serve all bedrooms.

Johnson, David W.

Insufficient technical substantiation was provided to support the addition of Section 210.11(C)(5) requiring a 20 ampere dedicated circuit to "each" bedroom of a dwelling.

Lujan, Cesar

Would change wiring methods of supplying bedrooms with multiple circuits.

Neubauer, Fred

Ballot Statement: The new requirement for a 20-A branch circuit in each bedroom of a dwelling unit is overly restrictive and unsubstantiated. There is no data to support such a significant change for every dwelling unit. Only the mention of Durable Medical Equipment (DME) loads could be substantiation, but not for every dwelling unit. Only a small percentage of dwelling units would every have to be used for patient care and required connection of DME loads. The NEC is a minimum Code. The individual branch circuit requirement should be triggered when the use requires it, not just in case. There are similar examples of this approach that were unsuccessful in gaining favorability of CMP-2. One that comes to mind is the effort to require an individual branch circuit or sleeving for future individual branch circuit wiring to supply electric vehicle supply equipment (EVSE). The end result was as it should be, no individual branch circuit required for every dwelling unit, only those that need it because of the choice to purchase an EV. Section 625.40 requires EVSE be supplied by an individual branch circuit that serve no other load. Section 210.11(C) should be handled the same for consistency and to not burden the industry with overly restrictive additional circuitry in every dwelling. Only those dwelling units that need it because of the actual DME and patient care requirements should be required to install the individual branch circuit for those loads. Here is a proposed solution: Add a new 517.10(C) as follows: (C) Durable Medical Equipment in Dwelling Units. Where durable medical equipment is required for patient care in a dwelling unit bedroom(s) or other space, an individual 20-ampere branch circuit shall be installed, and it shall not supply any other room(s). The requirements for branch circuit wiring and protection in Part II of Article 517 shall not apply to this circuit. Remove (5) from 210.11(C) and add an informational note as follows: Informational Note: See 517.10(C) for individual branch circuit requirements for bedrooms that install and use durable medical equipment (DME). Following the logic in Section 90.3, Chapter 5 can modify or amend the requirements in Chapter 2, in this case to require the additional circuit(s) as needed on a case-by-case basis, but not for every dwelling. NECA will be submitting this as a public comment, but this gets the information in the NEC First Draft public record so it could not be considered new material during the Second Draft stage of the process.

Pavese, Christopher J.

We do not support changes without technical substation. Users can add if needed.

Affirmative All

Campolo, Steve

Domitrovich, Thomas A.

El-Sherif, Nehad

Harman, Thomas L.

Manche, Alan

McCamish, John

Reyes, Frederick P.

Affirmative with Comment

Cook, Mark Daniel

agree

**Committee Input No. 9092-NFPA 70-2021 [New Section after 210.12(D)]**

This was a First Revision that failed ballot.

(G) Detached Garages and Other Accessory Buildings.

All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets or devices installed in the detached garages and other accessory buildings of one- and two-family dwellings shall be protected by any of the means described in 210.12(A)(1) through (A)(6).

Submitter Information Verification

Committee: NEC-P02

Submittal Date: Thu Jan 14 18:59:50 EST 2021

Committee Statement

Committee Statement: The electrical infrastructure wiring for these applications present the same hazards related to electrical fire as dwelling units.

Response Message: CI-9092-NFPA 70-2021

Public Input No. 1193-NFPA 70-2020 [Section No. 210.12(A)]

Ballot Results

✗ This item has failed ballot

15 Eligible Voters
0 Not Returned
8 Negative with Comments
6 Affirmative All
1 Affirmative with Comments
0 Abstention

Negative with Comment

Abbassi, Mathher

No substantiation.

Boynton, Charles L.

No data was given to support expansion to detached garages and accessory buildings.

Campolo, Steve

It is clear that expansion of AFCI protected circuits is very premature. Countless reports of false or unwanted tripping have been noted. So much so that three separate committees are looking into the issue. Why are three committees spending time on this if there was no false tripping problem? I personally serve on these committees and have seen reports of tripping. Variable speed motors have been high on the list of false tripping along with hobby welder and compressors. Adding Detached Garages and Other Accessory Buildings where this equipment is utilized will surely be another area of false tripping. Also, the Electrical Safety Authority of Ontario, Canada has been allowing new installations to remove AFCI circuit breakers when repeated instances of false tripping cannot be rectified. They allow a receptacle AFCI and an ordinary thermo-magnetic breaker in its place for a period of one year to solve the problem. Let's not get a black stain on an important safety product by pushing widespread adoption before these issues are solved. This technology is still evolving. For those that remember, the same thing happened with GFCI's 50 years ago. And 50 years later we are still cautiously expanding those required areas. Let's be as cautious with AFCI's and let the technology mature and address these serious field issues.

Harman, Thomas L.

No data to support AFCI in detached garages.

Johnson, David W.

IEC supports the application of Arc-Fault Circuit-Interrupter Protection in general, however there are numerous types of portable power tools, equipment and appliances available for use in the detached garage area and accessory buildings of a dwelling that could possibly cause unwanted tripping of the AFCI device due to incompatibility issues.

Lujan, Cesar

No technical justification. Not a life/safety issue.

Neubauer, Fred

Insufficient data and substantiation has been provided to warrant the expansion of AFCI's into additional areas of a dwelling. Nuisance

tripping of AFCI's continues to be an issue. Contractors are not taking the time to report the nuisance trips and therefore the manufacturers have data of trips that is much lower than what is occurring in the field.

Pavese, Christopher J.

Lack substantiation

Affirmative All

Domitrovich, Thomas A.

El-Sherif, Nehad

Humphrey, David G.

Manche, Alan

McCamish, John

Reyes, Frederick P.

Affirmative with Comment

Cook, Mark Daniel

agree