



National Fire Protection Association

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NEC Code-Making Panel 2

Second Draft Meeting Agenda

November 9-14, 2015

San Diego, CA

<u>Item No.</u>	<u>Subject</u>
15-11 -1	Call to Order
15-11-2	Introduction of Members and Guests
15-11-3	Approval of A2016 First Draft Meeting Minutes
15-11-4	Review of Meeting Procedures and Revision Schedule
15-11-5	Task Group Reports
15-11-6	Process Public Comments and Develop Second Revisions
15-11-7	Fire Protection Research Foundation Requests
15-11-8	Old Business
15-11-9	New Business
15-11-10	Adjournment

P2, P12, P1	Public Comment No. 120-NFPA 70-2015	Global Input	Aaron Adamczyk	0
p1, p2, p3,	Public Comment No. 1063-NFPA 70-2015	Global Input	Lawrence Ayer	
P2	Public Comment No. 162-NFPA 70-2015	Section No. 100, GFCI, Special P	Aaron Adamczyk	0
P2	Public Comment No. 574-NFPA 70-2015	Section No. 100, GFCI, Special P	Vincent Saporita	0
P2	Public Comment No. 617-NFPA 70-2015	Section No. 100, GFCI, Special P	NEHAD EL-SHERIF	0
P2	Public Comment No. 859-NFPA 70-2015	Section No. 100, GFCI, Special P	Ed Larsen	0
P2	Public Comment No. 414-NFPA 70-2015	Section No. 100, Show Window	GLENN CLAYDEN	0
P2	Public Comment No. 1176-NFPA 70-2015	Section No. 210.1	DAVID CLEMENTS	0
P2	Public Comment No. 1177-NFPA 70-2015	Section after 210.1		
P2	Public Comment No. 1368-NFPA 70-2015	Section No. 210.3	submitted	0
P2	Public Comment No. 1431-NFPA 70-2015	Section No. 210.3	submitted	0
P2	Public Comment No. 877-NFPA 70-2015	Section No. 210.5(C)(1)	DAVID CLEMENTS	0
P2	Public Comment No. 1653-NFPA 70-2015	Sections 210.5(C)(1), 210.5(C)(2)	submitted	0
P2	Public Comment No. 1234-NFPA 70-2015	Section after 210.5(C)(1)	Jim Muir	C1443120700131.xml
P2	Public Comment No. 1376-NFPA 70-2015	Section No. 210.5(C)(2)	submitted	0
P2	Public Comment No. 1453-NFPA 70-2015	Section No. 210.5(C)(2)	submitted	0
P2	Public Comment No. 882-NFPA 70-2015	Section No. 210.7	DAVID CLEMENTS	0
P2	Public Comment No. 1750-NFPA 70-2015	Section No. 210.7	submitted	0
P2	Public Comment No. 1814-NFPA 70-2015	Section No. 210.8	submitted	0
P2	Public Comment No. 856-NFPA 70-2015	Section No. 210.8	Ed Larsen	0
P2	Public Comment No. 883-NFPA 70-2015	Section No. 210.8	DAVID CLEMENTS	0
P2	Public Comment No. 544-NFPA 70-2015	Section No. 210.8	ALFIO TORRISI	4
P2	Public Comment No. 1060-NFPA 70-2015	Section No. 210.8(A)	L. Keith Lofland	0
P2	Public Comment No. 1236-NFPA 70-2015	Section No. 210.8(A)	submitted	0
P2	Public Comment No. 545-NFPA 70-2015	Section No. 210.8(A)	ALFIO TORRISI	0
P2	Public Comment No. 598-NFPA 70-2015	Section No. 210.8(A)	ALFIO TORRISI	5
P2	Public Comment No. 623-NFPA 70-2015	Section No. 210.8(A)	JOHN MASARICK	0
P2	Public Comment No. 884-NFPA 70-2015	Section No. 210.8(A)	DAVID CLEMENTS	0
P2	Public Comment No. 613-NFPA 70-2015	Section after 210.8(A)	ALFIO TORRISI	0
P2	Public Comment No. 1436-NFPA 70-2015	Section No. 210.8(B)	submitted	0
P2	Public Comment No. 1751-NFPA 70-2015	Section No. 210.8(B)	submitted	0
P2	Public Comment No. 35-NFPA 70-2015	Section No. 210.8(B)	J GRANT HAMMETT	0
P2	Public Comment No. 599-NFPA 70-2015	Section No. 210.8(B)	ALFIO TORRISI	1
P2	Public Comment No. 616-NFPA 70-2015	Section No. 210.8(B)	NEHAD EL-SHERIF	0

P2	Public Comment No. 642-NFPA 70-2015	Section No. 210.8(B)	Robert Huddleston	0
P2	Public Comment No. 819-NFPA 70-2015	Section No. 210.8(B)	Edwin Kramer	0
P2	Public Comment No. 853-NFPA 70-2015	Section No. 210.8(B)	Ed Larsen	0
P2	Public Comment No. 988-NFPA 70-2015	Section No. 210.8(B)	DAVID CLEMENTS	0
P2	Public Comment No. 1020-NFPA 70-2015	Section No. 210.8(B)	Kenneth Vannice	0
P2	Public Comment No. 357-NFPA 70-2015	Section No. 210.8(B)	MIKE HOLT	0
P2	Public Comment No. 425-NFPA 70-2015	Sections 210.8(B)(1), 210.8(B)(2)	STEVEN ORLOWSKI	0
P2	Public Comment No. 1069-NFPA 70-2015	Section No. 210.8(B)(2)	Christopher Walker	0
P2	Public Comment No. 1023-NFPA 70-2015	Section No. 210.8(B)(3)	Kenneth Vannice	0
P2	Public Comment No. 1173-NFPA 70-2015	Section No. 210.8(B)(3)	Brian Rock	2
P2	Public Comment No. 1463-NFPA 70-2015	Section No. 210.8(B)(3)	submitted	0
P2	Public Comment No. 1523-NFPA 70-2015	Section No. 210.8(B)(3)	submitted	0
P2	Public Comment No. 358-NFPA 70-2015	Section No. 210.8(B)(3)	MIKE HOLT	0
P2	Public Comment No. 267-NFPA 70-2015	Section No. 210.11(C)(4)	DON GANIERE	0
P2	Public Comment No. 952-NFPA 70-2015	Section No. 210.11(C)(4)	L. Keith Lofland	0
P2	Public Comment No. 269-NFPA 70-2015	Section No. 210.12	mike kline	0
P2	Public Comment No. 439-NFPA 70-2015	Section No. 210.12(A)	KENNETH REMPE	0
P2	Public Comment No. 655-NFPA 70-2015	Section No. 210.12(A)	ALFIO TORRISI	0
P2	Public Comment No. 822-NFPA 70-2015	Section No. 210.12(A)	VINCE BACLAWSKI	1
P2	Public Comment No. 855-NFPA 70-2015	Section No. 210.12(A)	Ed Larsen	0
P2	Public Comment No. 93-NFPA 70-2015	Section No. 210.12(A)	Aaron Adamczyk	0
P2	Public Comment No. 36-NFPA 70-2015	Section No. 210.12(B)	J GRANT HAMMETT	0
P2	Public Comment No. 676-NFPA 70-2015	Section No. 210.12(B)	Paul Dunphy	0
P2	Public Comment No. 815-NFPA 70-2015	Section No. 210.12(B)	VINCE BACLAWSKI	0
P2	Public Comment No. 1752-NFPA 70-2015	Section No. 210.12(C)	submitted	0
P2	Public Comment No. 682-NFPA 70-2015	Section No. 210.12(C)	ALFIO TORRISI	0
P2	Public Comment No. 816-NFPA 70-2015	Section No. 210.12(C)	VINCE BACLAWSKI	0
P2	Public Comment No. 1573-NFPA 70-2015	Section No. 210.12(D)	submitted	0
P2	Public Comment No. 683-NFPA 70-2015	Section No. 210.12(D)	ALFIO TORRISI	0
P2	Public Comment No. 818-NFPA 70-2015	Section No. 210.12(D)	VINCE BACLAWSKI	0
P2	Public Comment No. 684-NFPA 70-2015	Section No. 210.17	ALFIO TORRISI	0
P2	Public Comment No. 373-NFPA 70-2015	Section No. 210.19	DERRICK ATKINS	0
P2	Public Comment No. 54-NFPA 70-2015	Section No. 210.52(A)(2)	BRIAN ROCK	0
P2	Public Comment No. 928-NFPA 70-2015	Section No. 210.52(A)(2)	DAVID CLEMENTS	0

P2	Public Comment No. 55-NFPA 70-2015	Section No. 210.52(A)(4)	BRIAN ROCK	0
P2	Public Comment No. 1031-NFPA 70-2015	Section No. 210.52(B)(1)	Ron Chilton	0
P2	Public Comment No. 56-NFPA 70-2015	Section No. 210.52(C)	BRIAN ROCK	0
P2	Public Comment No. 525-NFPA 70-2015	Section No. 210.52(C)(3)	J. Grant Hammett	0
P2	Public Comment No. 572-NFPA 70-2015	Section No. 210.52(C)(3)	L. Keith Lofland	1
P2	Public Comment No. 58-NFPA 70-2015	Section No. 210.52(C)(5)	BRIAN ROCK	0
P2	Public Comment No. 820-NFPA 70-2015	Section No. 210.52(C)(5)	VINCE BACLAWSKI	0
P2	Public Comment No. 59-NFPA 70-2015	Section No. 210.52(D)	BRIAN ROCK	0
P2	Public Comment No. 821-NFPA 70-2015	Section No. 210.52(D)	VINCE BACLAWSKI	0
P2	Public Comment No. 1237-NFPA 70-2015	Section No. 210.52(E) [Excluding]	submitted	0
P2	Public Comment No. 550-NFPA 70-2015	Section after 210.52(E)(3)	ALFIO TORRISI	1
P2	Public Comment No. 1549-NFPA 70-2015	Section No. 210.52(G)(1)	submitted	0
P2	Public Comment No. 330-NFPA 70-2015	Section No. 210.52(G)(1)	DON GANIERE	0
P2	Public Comment No. 929-NFPA 70-2015	Section No. 210.52(G)(1)	DAVID CLEMENTS	0
P2	Public Comment No. 954-NFPA 70-2015	Section No. 210.52(G)(1)	L. Keith Lofland	0
P2	Public Comment No. 685-NFPA 70-2015	Section No. 210.60(A)	ALFIO TORRISI	0
P2	Public Comment No. 1681-NFPA 70-2015	Section No. 210.64	submitted	0
P2	Public Comment No. 33-NFPA 70-2015	Section No. 210.64	J GRANT HAMMETT	1
P2	Public Comment No. 1034-NFPA 70-2015	Section No. 210.70(A)(3)	Ron Chilton	0
P2	Public Comment No. 985-NFPA 70-2015	Section No. 210.70(C)	DAVID CLEMENTS	0
P2	Public Comment No. 1594-NFPA 70-2015	Section No. 210.71	submitted	0
P2	Public Comment No. 1695-NFPA 70-2015	Section No. 210.71	submitted	0
P2	Public Comment No. 441-NFPA 70-2015	Section No. 210.71	STEVEN ORLOWSKI	0
P2	Public Comment No. 790-NFPA 70-2015	Section No. 210.71	JOHN MASARICK	0
P2	Public Comment No. 828-NFPA 70-2015	Section No. 210.71	VINCE BACLAWSKI	0
P2	Public Comment No. 1188-NFPA 70-2015	Section No. 210.71(D)	L. Keith Lofland	0
P2	Public Comment No. 762-NFPA 70-2015	Section No. 210.71(D)	Charles Palmieri	0
P2	Public Comment No. 1761-NFPA 70-2015	Section No. 210.71(E)	submitted	0
P2	Public Comment No. 393-NFPA 70-2015	Section No. 215.2(A)(1)	DERRICK ATKINS	0
P2	Public Comment No. 80-NFPA 70-2015	Section No. 215.2(A)(1)	JOSEPH HREN	0
P2	Public Comment No. 103-NFPA 70-2015	Section No. 215.2(A)(2)	david kelman	0
P2	Public Comment No. 633-NFPA 70-2015	Section No. 215.9	NEHAD EL-SHERIF	0
P2	Public Comment No. 1071-NFPA 70-2015	Section No. 220.12	Lawrence Ayer	0
P2	Public Comment No. 1048-NFPA 70-2015	Section No. 215.12(C)(2)	MARVIN HAMON	0

P2	Public Comment No. 1372-NFPA 70-2015	Section No. 215.12(C)(2)	submitted	1
P2	Public Comment No. 1378-NFPA 70-2015	Section No. 215.12(C)(2)	submitted	0
P2	Public Comment No. 1454-NFPA 70-2015	Section No. 215.12(C)(2)	submitted	0
P2	Public Comment No. 1678-NFPA 70-2015	Section No. 215.12(C)(2)	submitted	0
P2	Public Comment No. 1442-NFPA 70-2015	Section No. 220.3	submitted	0



Public Comment No. 120-NFPA 70-2015 [Global Input]

Change ANSI/NEMA WD6, Standard for Dimesions of Attachment Plugs and Receptacles and replace with ANSI/NEMA WD6, Wiring Devices - Dimensional Specifications, 2012, throughout Articles 210, 406, 555, and 626.

Statement of Problem and Substantiation for Public Comment

Same standard with new title.

Related Item

[Public Input No. 3956-NFPA 70-2014 \[Section No. 626.24\(B\)\]](#)

[First Revision No. 5110-NFPA 70-2015 \[Section No. 406.9\(B\)\(1\)\]](#)

[First Revision No. 5439-NFPA 70-2015 \[Section No. 555.19\(A\)\(4\)\]](#)

[First Revision No. 7517-NFPA 70-2015 \[New Section after 210.70\(B\)\]](#)

Submitter Information Verification

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Submittal Date: Mon Jul 06 09:10:33 EDT 2015



Public Comment No. 1063-NFPA 70-2015 [Global Input]

Article 100 Definitions

Voltage, Nominal.....

Informational Note No. 3: Certain 48-volt DC battery units have a charging float voltage up to 58 volts. In DC applications 60 volts is used to cover the entire range of float voltages.

Article 110**110.27 Guarding of Live Part**

(A) Live Parts Guarded Against Accidental Contact. Except as elsewhere required or permitted by this Code, live parts of electrical equipment operating at 50 volts **AC/60 volts DC** or more shall be guarded against accidental contact by approved enclosures or by any of the following means:

Article 200 Use and Identification of Grounded Conductors**200.7**

(B) **Circuits of Less Than 50 Volts AC.** A conductor with white or gray color insulation or three continuous white stripes or having a marking of white or gray at the termination for circuits of less than 50 volts **AC** shall be required to be grounded only as required by 250.20(A).

(C) **Circuits of 50 Volts AC or More.** The use of insulation that is white or gray or that has three continuous white or gray stripes for other than a grounded conductor for circuits of 50 volts **AC** or more shall be permitted only as in (1) and (2).

Article 215 Feeders**215.12(C)(2) Feeders Supplied from Direct-Current Systems.**

Where a feeder is supplied from a dc system operating at more than ~~50~~ **60 volts**, each ungrounded conductor of 4 AWG or larger shall be identified by polarity at all termination, connection, and splice points by marking tape, tagging, or other approved means; each ungrounded conductor of 6 AWG or smaller shall be identified by polarity at all termination, connection, and splice points in compliance with 215.12(C)(2)(a) and (b). The identification methods utilized for conductors originating within each feeder panelboard or similar feeder distribution equipment shall be documented in a manner that is readily available or shall be permanently posted at each feeder panelboard or similar feeder distribution equipment.

Article 430 Motors, Motor Circuits, and Controllers

430.232 Where Required. Exposed live parts of motors and controllers operating at 50 volts **DC** or more between terminals shall be guarded against accidental contact by enclosure or by location as follows:

430.233 Guards for Attendants. Where live parts of motors or controllers operating at over 50 volts **AC** to ground are guarded against accidental contact only by location as specified in 430.232, and where adjustment or other attendance may be necessary during the operation of the apparatus, suitable insulating mats or platforms shall be provided so that the attendant cannot readily touch live parts unless standing on the mats or platforms.

Article 445 Generators

445.14 Protection of Live Parts. Live parts of generators operated at more than 50 volts **AC/60 volts DC** to ground shall not be exposed to accidental contact where accessible to unqualified persons.

Article 460 Capacitors

460.6 (A) Time of Discharge. The residual voltage of a capacitor shall be reduced to 50 volts **DC**, nominal, or less within 1 minute after the capacitor is disconnected from the source of supply.

460.28(A) Means for Discharge. A means shall be provided to reduce the residual voltage of a capacitor to 50 volts **DC** or less within 5 minutes after the capacitor is disconnected from the source of supply.

Article 480 Storage Batteries

480.5 Overcurrent Protection for Prime Movers. Overcurrent protection shall not be required for conductors from a battery with a nominal voltage of 60 volts DC or less if the battery provides power for starting, ignition, or control of prime movers. Section 300.3 shall not apply to these conductors.

480.6 DC Disconnect Methods. (A) Disconnecting Means. A disconnecting means shall be provided for all ungrounded conductors derived from a stationary battery system with a nominal voltage over 60 volts DC. A disconnecting means shall be readily accessible and located within sight of the battery system.

Article 522 Control Systems for Permanent Amusement Attractions

522.25 Ungrounded Control Circuits. Separately derived ac and 2-wire dc circuits and systems 50 volts **AC/60 volts DC** or greater shall be permitted to be ungrounded, provided that all the following conditions are met:

Article 625

625.18 Interlock. Electric vehicle supply equipment shall be provided with an interlock that de-energizes the electric vehicle connector whenever the electrical connector is uncoupled from the electric vehicle. An interlock shall not be required for portable cord-and-plug-connected electric vehicle supply equipment intended for connection to

receptacle outlets rated at 125 volts, single phase, 15 and 20 amperes. An interlock shall not be required for dc supplies less than **50 60** volts dc.

625.19 Automatic De-Energization of Cable. The electric vehicle supply equipment or the cable-connector combination of the equipment shall be provided with an automatic means to de-energize the cable conductors and electric vehicle connector upon exposure to strain that could result in either cable rupture or separation of the cable from the electric connector and exposure of live parts. Automatic means to de-energize the cable conductors and electric vehicle connector shall not be required for portable cord-and-plug-connected electric vehicle supply equipment intended for connection to receptacle outlets rated at 125 volts, single phase, 15 and 20 amperes. An interlock shall not be required for dc supplies less than **50 60** volts dc.

625.44 Electric Vehicle Supply Equipment Connection.

Electric vehicle supply equipment shall be permitted to be cord and plug-connected to the premises wiring system in accordance with one of the following:

(A) Connections to 125-Volt, Single-Phase, 15 and 20-Ampere Receptacle Outlets. Electric vehicle supply equipment intended for connection to non-locking, 2-pole, 3-wire grounding-type receptacle outlets rated at 125 V, single phase, 15 and 20 amperes or from a supply of less than **50 60** volts dc.

(4) Supply Circuits. The supply circuit to the mechanical ventilation equipment shall be electrically interlocked with the electric vehicle supply equipment and shall remain energized during the entire electric vehicle charging cycle. Electric vehicle supply equipment shall be marked in accordance with 625.15. Electric vehicle supply equipment receptacles rated at 125 volts, single phase, 15 and 20 amperes shall be marked in accordance with 625.15 and shall be switched, and the mechanical ventilation system shall be electrically interlocked through the switch supply power to the receptacle. Electric vehicle supply equipment supplied from less than **50 60** volts dc shall be marked in accordance with 625.15(C) and shall be switched, and the mechanical ventilation system shall be electrically interlocked through the switch supply power to the electric vehicle supply equipment.

Article 669 Electroplating

669.6 Wiring Methods. Conductors connecting the electrolyte tank equipment to the conversion equipment shall be in accordance with 669.6(A) and (B).

(A) Systems Not Exceeding **50 60** Volts Direct Current. Insulated conductors shall be permitted to be run without insulated support, provided they are protected from physical damage. Bare copper or aluminum conductors shall be permitted where supported on insulators.

(B) Systems Exceeding ~~50-60~~ **Volts Direct Current. Insulated conductors shall be permitted to be run on insulated supports, provided they are protected from physical damage. Bare copper or aluminum conductors shall be permitted where supported on insulators and guarded against accidental contact up to the point of termination in accordance with 110.27.**

Article 720 Circuits and Equipment Operating at Less than 50 Volts

Circuits and Equipment Operating at Less Than 50 Volts AC/60 Volts DC.

720.1 Scope. This article covers installations operating at less than 50 volts, alternating current, or 60 volts direct current of alternating current.

720.11 Mechanical Execution of Work. Circuits operating at less than 50 volts AC or 60 volts DC shall be installed in a neat and workmanlike manner. Cables shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Type your content here ...

Statement of Problem and Substantiation for Public Comment

Over the past decade numerous code articles have been placed into the NEC as a result of the increased resurgence of DC systems. These systems, similar to their AC counterpart, have mandated code requirements that must be met when the system voltage exceeds a certain threshold. For years the system threshold for many of the requirements has been kept at the 50 volt level. While this is appropriate for AC systems, it can create confusion to the user of the document when applied to a 48 DC batteries during charging where a "float voltage" is common at 58 volts. The float voltage can vary significantly depending on battery chemistry, battery construction, and the actual ambient temperature. This voltage may be constant for the entire duration of the charge or can fluctuate. Some 48 volt DC systems stay above the 50 volt threshold for 99% of the time for applications such as telecommunications, UPS systems and emergency lighting.

This elevated voltage may create confusion since various AHJ's might see 58 volts and mandate that a code rule must be followed since the 50 volt threshold has been increased. To resolve these issues a DC task group was formed to research the DC systems found in the NEC and to correlate the various DC topics that were being added to the NEC. The task group recommended the use of 60 volt DC throughout the code to eliminate the confusion that could arise from the elevated float voltage. The intent of the task group was to provide a consistent use of the voltage threshold within the NEC document.

For the 2017 NEC Revision Cycle, a task group was formed to correlate the use of the 50/60V threshold and provide public comments for the second draft. The task group members Larry Ayer (Chair), Bill Cantor, Donny Cook, Jim Dollard (Co-Chair), John Kovacic (DC Task Group Chair), Ernie Gallo, Vince Saporita, and Jim White provided input and guidance for these recommendations.

To correlate the use of 50 volts for AC systems and 60 volts for DC systems, the recommended NEC changes are based on the following:

1. Where a code section refers to AC systems only and indicates 50 volts the acronym "AC" was added to provide clarity.
2. Where a code section refers to a requirement used only in a DC system at a 50 volt threshold, the voltage is revised to 60 volts and the term "DC" is added
3. Where a code section indicates a 50 volt threshold, and the section is a requirement for both AC and DC systems, the text is revised as "50 volts AC/60 volts DC".
4. When a code section refers to DC systems, and the term "nominal" is used, it will be deleted since the voltage threshold is increased to 60 volts.
5. A fine print note is being recommended in Article 100 below the definition for "Nominal Voltage" to provide additional information on float voltage.

NEC changes are being recommended for the following code sections:

1. *Add informational note after "Voltage, Nominal". Informational note to read as follows:*

Informational Note No. 3: Certain 48-volt DC battery units use a charging float voltage up to 58 volts. In DC applications 60 volts is used to cover the entire range of float voltages.

2. For section 110.27, "50 volts" is being changed to "50 volts AC/60 volts DC". This will clarify the voltage threshold for AC and DC systems.

3. Section 200.7 (B) and (C) applies to conductor marking for AC systems only. "AC" is added after 50 volts to clarify that this requirement is only for AC systems.

4. Section 210.5(C)(2) was revised in the First draft that changed "50 volts" to "60 volts" to correlate with the new microgrid article. Revise section 215.12(C) from "50 volts" to "60 volts" to correlate with section 210.5(C)(2).

5. In section 445.14, revise "50 volts" to "50 volts AC/60 volts DC" to clarify that this requirement pertains to both AC and DC systems.

6. In sections 480.5 and 480.6 "50 volts" was changed to "60 volts" since these pertain to DC batteries and DC systems.

7. In section 522.25, "50 volts" is being changed to "50 volts AC / 60 volts DC" to clarify that this section pertains to both AC and DC systems and distinguishes between the two voltage systems and thresholds.

8. Article 625, Electrical Vehicle Charging System. Revise the text from "50 volts" to "60 volts" since these are DC systems.

9. Section 669.6(A) and (B) are DC systems. Revise the text from "50 volts" to "60 volts"

10. Section 690.71 (B) is a DC system with a threshold of 50 volts. Revise the text from "50 volts" to "60 volts DC".

11. Article 720 Circuits and Equipment Operating at Less Than 50 Volts covers both AC and DC systems. To correlate the Title has been changed to "50 Volts AC/60 Volts DC". The Scope 720.1 and section 720.11 have been modified to clarify that this Article applies to both systems with the corresponding voltage.

Related Item

[Public Input No. 3681-NFPA 70-2014 \[Global Input\]](#)

Submitter Information Verification

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Submittal Date: Wed Sep 23 14:39:50 EDT 2015

**Public Comment No. 162-NFPA 70-2015 [Definition: Ground-Fault Circuit Interrupter, Special Purpo...]****Ground-Fault Circuit Interrupter, Special Purpose (SPGFCI).**

A device intended for the protection of personnel that functions to de-energize a circuit or portion of a circuit within an established period of time when a current to ground exceeds the values established for Class C, D, and E devices.

Informational Note: Classes C, D, and E ground-fault circuit interrupters trip when the current to ground is 20 mA or higher and do not trip when the current to ground is less than 15 mA. For further information, see UL 943C **Outline**, *Outline of Investigation for Special Purpose Ground-Fault Circuit Interrupters*.

Statement of Problem and Substantiation for Public Comment

Reference update.

Related Item

First Revision No. 339-NFPA 70-2015 [New Definition after Definition: Ground-Fault Circuit Inter...]

Submitter Information Verification

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Submittal Date: Mon Jul 06 19:25:52 EDT 2015

**Public Comment No. 574-NFPA 70-2015 [Definition: Ground-Fault Circuit Interrupter, Special Purpo...]****Ground-Fault Circuit Interrupter, Special Purpose (SPGFCI).**

A device intended for the protection of personnel that functions to de-energize a circuit or portion of a circuit within an established period of time when a current to ground exceeds the values established for Class C, D, and E devices.

Informational Note: Classes C, D, and E ground-fault circuit interrupters ~~trip~~ open when the current to ground is 20 mA or higher and do not ~~trip~~ open when the current to ground is less than 15 mA. For further information, see UL 943C, *Outline of Investigation for Special Purpose Ground-Fault Circuit Interrupters*.

Statement of Problem and Substantiation for Public Comment

The word "trip" is changed to "open" in two places to more clearly identify the action. Not all of these devices "trip", but all of these devices do "open".

Related Item

First Revision No. 339-NFPA 70-2015 [New Definition after Definition: Ground-Fault Circuit Inter...]

Submitter Information Verification

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Submittal Date: Tue Sep 08 14:22:11 EDT 2015

**Public Comment No. 617-NFPA 70-2015 [Definition: Ground-Fault Circuit Interrupter, Special Purpo...]****Ground-Fault Circuit Interrupter, Special_ Purpose (SPGFCI).**

A device intended for the protection of personnel that functions to de-energize a circuit or portion of a circuit within an established period of time when a current to ground exceeds the values established for Class C, D, and E devices.

Informational Note: Classes C, D, and E ground-fault circuit interrupters trip when the current to ground is 20 mA or higher and do not trip when the current to ground is less than 15 mA. For further information, see UL 943C, *Outline of Investigation for Special Purpose Ground-Fault Circuit Interrupters*.

Statement of Problem and Substantiation for Public Comment

This change is to add a hyphen to "special purpose" to be consistent with how SPGFCIs were referenced in FR-347

Related Item

[First Revision No. 339-NFPA 70-2015 \[New Definition after Definition: Ground-Fault Circuit Inter...\]](#)

[First Revision No. 347-NFPA 70-2015 \[Section No. 210.8\(B\)\]](#)

Submitter Information Verification

Submitter Full Name: NEHAD EL-SHERIF

Organization: Littelfuse Startco

Street Address:

City:

State:

Zip:

Submission Date: Sat Sep 12 16:16:44 EDT 2015

**Public Comment No. 859-NFPA 70-2015 [Definition: Ground-Fault Circuit Interrupter, Special Purpo...]****Ground-Fault Circuit Interrupter, Special Purpose (SPGFCI).**

A device intended for the protection of personnel that functions to de-energize a circuit or portion of a circuit within an established period of time when a current to ground exceeds the values established for Class C, D, and E devices.

Informational Note: Classes C, D, and E ground-fault circuit interrupters trip when the current to ground is 20 mA or higher and do not trip when the current to ground is less than 15 mA. For further information, see UL 943C, *Outline of Investigation for Special Purpose Ground-Fault Circuit Interrupters*.

Statement of Problem and Substantiation for Public Comment

Due to the unacceptable language proposed in FR 347, the addition of this definition is not appropriate for the installation of Special Purpose Ground-Fault Circuit Interrupters in 210.8(B) [FR 347].

Related Item

First Revision No. 339-NFPA 70-2015 [New Definition after Definition: Ground-Fault Circuit Inter...]

Submitter Information Verification

Submitter Full Name: Ed Larsen

Organization: Schneider Electric USA

Affiliation: Schneider Electric USA

Street Address:

City:

State:

Zip:

Submittal Date: Mon Sep 21 14:37:56 EDT 2015

**Public Comment No. 414-NFPA 70-2015 [Definition: Show Window.]****Show Window.**

Any window or window above a glass door that will likely be used or designed to be used for the display of goods or advertising material, whether it is fully or partly enclosed or entirely open at the rear and whether or not it has a platform raised higher than the street floor level.

Statement of Problem and Substantiation for Public Comment

Windows above glass doors may be electrified and should be required to meet the power receptacle requirement for show windows.

Related Item

[First Revision No. 1-NFPA 70-2015 \[Section No. 90.2\(A\)\]](#)

Submitter Information Verification

Submitter Full Name: GLENN CLAYDEN

Organization: CLAYDEN AND ASSOC

Street Address:

City:

State:

Zip:

Submittal Date: Mon Aug 17 18:05:31 EDT 2015

**Public Comment No. 1176-NFPA 70-2015 [Section No. 210.1]**210.1 _ Scope.

This article provides the general requirements for branch circuits.

Note since there is no 210.2 in terraview add the following definition.210.2 Definitions

Laundry Area. Any space within 1.8 m (6 ft) of the nearest edge of a washing machine or dryer.

Statement of Problem and Substantiation for Public Comment

CMP 2 rejected PI No. 3458, which sought to create a definition of a laundry area, stating "Sufficient information or substantiation has not been provided for the panel to conclude that all laundry areas are limited to only six feet from the edge of the laundry equipment. Based on all the various design layouts that the panel discussed it would not be possible to determine where the laundry area begins and ends." The last sentence of the Panel's statement is exactly why defining the term is necessary.

Currently there is no way for an electrical inspector to provide uniform enforcement of the boundaries for GFCI requirements for receptacle outlets in laundry areas. For example; if there was a studio apartment with a washing machine in one corner of the common area would GFCI protection be required for all the 125 volt, 15 and 20 ampere receptacles? What if a basement has been finished as one large open room but there is a washing machine or dryer in the room, do all the 125 volt, 15 and 20 ampere receptacles in the room require GFCI protection?

The substantiation that brought the GFCI requirements for laundry areas in the 2014 NEC was directly related to appliance failures not receptacle outlets in adjacent areas. IAEI panel members did not vote against the addition of the requirement as there was merit to requiring GFCI protection for receptacle outlets adjacent to a washer or dryer which introduce grounded surfaces to the environment. With those thoughts in mind, the 1.8 m (6 ft) measurement makes perfect sense and it should be in any direction. Any receptacle outlets located beyond the traditional reach measurement of 1.8 m (6 ft) should be judged by the specific environment they are located in as contact with the appliance is not likely. If the GFCI protection requirements are really for the appliance and not the environment the receptacle outlet is located in they do not belong in 210.8 and should be moved to 422.5 in the next cycle. Section 210.2 was vacated at the First Draft stage so it was chosen as the location for the new definition. The term "laundry area" is used in other locations in 210 and therefore should be defined for the purpose of the article.

Related Item

Public Input No. 3458-NFPA 70-2014 [New Definition after Definition: Labeled.]

Submitter Information Verification

Submitter Full Name: DAVID CLEMENTS

Organization: INTL ASSOC ELEC INSP

Street Address:

City:

State:

Zip:

Submittal Date: Thu Sep 24 09:42:40 EDT 2015

**Public Comment No. 1177-NFPA 70-2015 [New Section after 210.1]****TITLE OF NEW CONTENT**210.2 DefinitionsUnfinished Basements. Portions or areas of a basement not intended as habitable rooms or spaces**Statement of Problem and Substantiation for Public Comment**

Including unfinished basements in 210.8(B) has identified sufficient substantiation to define the term “unfinished basement” for the purposes of the 210. This can be accomplished by locating the definition in 210.2 vacated during the First Draft actions. By removing the text “storage areas, work areas, and the like” from 210.8(A)(5) in the First Draft the reference to open areas in basements was lost. This presents enforcement challenges for the inspector. For example; how would a habitable space within a basement that has not been finished as a “room” be treated? The words “or spaces” was added to the end of the proposed definition for clarity and uniform understanding. Companion comments have been submitted to delete the text in 210.8(A) & (B).

Related ItemFirst Revision No. 346-NFPA 70-2015 [Section No. 210.8(A)]First Revision No. 347-NFPA 70-2015 [Section No. 210.8(B)]**Submitter Information Verification****Submitter Full Name:** DAVID CLEMENTS**Organization:** INTL ASSOC ELEC INSP**Street Address:****City:****State:****Zip:****Submittal Date:** Thu Sep 24 09:52:09 EDT 2015



Public Comment No. 1368-NFPA 70-2015 [Section No. 210.3]

210.3 Other Articles for Specific-Purpose Branch Circuits.

Table 210.3 lists branch circuit requirements for specific equipment and applications 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, 440.32
Audio signal processing, amplification, and reproduction equipment		640.8
Busways		368.17
Circuits and equipment operating at less than 50 volts	720	
Central heating equipment other than fixed electric space-heating equipment		422.12
Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits	725	
Cranes and hoists		610.42
<u>Direct Current Microgrid</u>	<u>712</u>	<u>712.25, 712.40, 712.70</u>
Electric signs and outline lighting		600.6
Electric welders	630	
Electrified truck parking space	626	
Elevators, dumbwaiters, escalators, moving walks, wheelchair lifts, and stairway chair lifts		620.61
Fire alarm systems	760	
Fixed electric heating equipment for pipelines and vessels		427.4
Fixed electric space-heating equipment		424.3
Fixed outdoor electrical deicing and snow-melting equipment		426.4
Information technology equipment		645.5
Infrared lamp industrial heating equipment		422.48, 424.3
Induction and dielectric heating equipment	665	
Marinas and boatyards		555.19
Mobile homes, manufactured homes, and mobile home parks	550	
Motion picture and television studios and similar locations	530	
Motors, motor circuits, and controllers	430	
Pipe organs		650.7
Recreational vehicles and recreational vehicle parks	551	
Switchboards and panelboards		408.52
Theaters, audience areas of motion picture and television studios, and similar locations		520.41, 520.52, 520.62
X-ray equipment		660.2, 517.73

Statement of Problem and Substantiation for Public Comment

Robert Bosch LLC proposes to add a reference in the table to the new article 712 addressing Direct Current (DC) Microgrids. There are specific branch circuit requirements for DC Microgrids in article 712 that amends or supplements the requirements of this article.

Robert Bosch LLC is actively involved in DC Microgrid pilot installations with the Department of Defense, the California Energy Commission, as well as with building-scale demonstration projects in North Carolina and Michigan. Through this experience, it has become clear that code clarifications are necessary with respect to branch circuits for DC Microgrids and Article 712 is being included to address those issues as well as other issues related to DC use within buildings.

Related Item

First Revision No. 3663-NFPA 70-2015 [New Section after 708.64]

Submitter Information Verification

Submitter Full Name: Andrew Yip

Organization: Robert Bosch LLC

Street Address:



Public Comment No. 1431-NFPA 70-2015 [Section No. 210.3]

210.3 _ Other Articles for Specific-Purpose Branch Circuits.

Table 210.3 lists branch circuit requirements- 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, 440.32
Audio signal processing, amplification, and reproduction equipment	640.8	
Busways	368.17	
Circuits and equipment operating at less than 50 volts	720	
Central heating equipment other than fixed electric space-heating equipment		422.12
Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits	725	
Cranes and hoists	610.42	
Electric signs and outline lighting	600.6	
Electric welders	630	
Electrified truck parking space	626	
Elevators, dumbwaiters, escalators, moving walks, wheelchair lifts, and stairway chair lifts	620.61	
Fire alarm systems	760	
Fixed electric heating equipment for pipelines and vessels		427.4
Fixed electric space-heating equipment		424.3
Fixed outdoor electrical deicing and snow-melting equipment		426.4
Information technology equipment	645.5	
Infrared lamp industrial heating equipment		422.48, 424.3
Induction and dielectric heating equipment	665	
Marinas and boatyards	555.19	
Mobile homes, manufactured homes, and mobile home parks	550	
Motion picture and television studios and similar locations	530	
Recreational vehicles and recreational vehicle parks	551	
Motors, motor circuits, and controllers		430
Pipe organs	650.7	
Switchboards and panelboards		408.52
Theaters, audience areas of motion picture and television studios, and similar locations	520.41, 520.52, 520.62	
X-ray equipment	660.2, 517.73	

Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
210.3_Comment-MH.docx	This file is provided in case the changes being recommended are not clear in Terra View.	

Statement of Problem and Substantiation for Public Comment

Section 210.3 was revised to clarify the application of the table. Other than for listing specific purpose requirements in Chapters 2, 3 & 4, Table 210.3 is not necessary nor is it all inclusive as it exists. Section 90.3 already provides the guidance that specific equipment and applications in Chapters 5, 6 & 7 can amend or supplement the branch circuit requirements in 210 so the sections referencing branch circuit requirements in those Chapters can be removed.

Tables are helpful and benefit readers when they remain all inclusive. However, it would be a challenging task to provide readers with a continually updated list of all the sections that include branch circuit requirements that amend or supplement those in 210 so only the references that do not amend or supplement those in Article 210 via 90.3 were kept.

Related Item

First Revision No. 7524-NFPA 70-2015 [Section No. 210.2]

Submitter Information Verification

Submitter Full Name: Mark Hilbert

**Public Comment No. 877-NFPA 70-2015 [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 system at all termination, connection, and splice points in compliance with 210.5(C)(1)(a) and (b).

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

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

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

Statement of Problem and Substantiation for Public Comment

The First Draft language is not clear and therefore presents installation and enforcement challenges. The proposed text will clarify the existing unidentified installations must have been made prior to the adoption of the 2005 NEC, when 210.5(C) first appeared, to be excluded from new system identifications and where that identification is required. Providing the specific minimum specific wording will preserve the intent of the change while promoting consistency in installations and inspections.

Related Item

First Revision No. 302-NFPA 70-2015 [Section No. 210.5(C)(1)]

Submitter Information Verification

Submitter Full Name: DAVID CLEMENTS

Organization: INTL ASSOC ELEC INSP

Street Address:

City:

State:

Zip:

Submittal Date: Mon Sep 21 15:59:50 EDT 2015



Public Comment No. 1653-NFPA 70-2015 [Sections 210.5(C)(1), 210.5(C)(2)]

Sections 210.5(C)(1), 210.5(C)(2)

(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 system at all termination, connection, and splice points in compliance with [210.5\(C\)\(1\)\(a\)](#) and (b).

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

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

Exception: In existing installations where a voltage system(s) already exists and a different voltage system is being added, it is permissible to mark only the new system voltage at each termination, connection, and splice point in compliance with [210.5\(C\)\(1\)\(a\)](#) and (b). Labeling is required at each voltage system distribution equipment to identify that only one voltage system has been marked.

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

Where a branch circuit is supplied from a dc system operating at more than 60 volts, each ungrounded conductor of 4 AWG or larger shall be identified by polarity at all termination, connection, and splice points by marking tape, tagging, or other approved means; each ungrounded conductor of 6 AWG or smaller shall be identified by polarity at all termination, connection, and splice points in compliance with [210.5\(C\)\(2\)\(a\)](#) and (b). The identification methods utilized for conductors originating within each branch-circuit panelboard or similar branch-circuit distribution equipment shall be documented in a manner that is readily available or shall be permanently posted at each branch-circuit panelboard or similar branch-circuit distribution equipment.

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

- (2) A continuous red outer finish
- (3) A continuous red stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or black
- (4) Imprinted plus signs (

±

- (1)) or the word POSITIVE or POS durably marked on insulation of a color other than green, white, gray, or black and repeated at intervals not exceeding 610 mm (24 in.) in accordance with [310.120\(B\)](#)

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

- (1) A continuous black outer finish
- (2) A continuous black stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or red
- (3) Imprinted minus signs (–) or the word NEGATIVE or NEG durably marked on insulation of a color other than green, white, gray, or red and repeated at intervals not exceeding 610 mm (24 in.) in accordance with [310.120\(B\)](#)

Exception: In retrofit installations where existing conductors are to be converted to dc, it is permissible to mark only the new system dc voltage, "dc," and polarity at each termination, connection, and splice point in compliance with [210.5\(C\)\(1\)\(a\)](#) and (b).

Statement of Problem and Substantiation for Public Comment

The Code requires continuous identification of ungrounded dc conductors via markings every 24". This puts undue financial burden on retrofit installations.

The EMerge Alliance proposes to allow the re-use of existing conductors in retrofit situations through suitable marking means as accepted elsewhere in the Code.

We do not believe there will be any adverse safety risk caused by this change.

The previously accepted exception to 210.5(C)1 in FR 302 above should apply to 210.5(C)2, with suitable contextual wording changes.

Related Item

[First Revision No. 302-NFPA 70-2015 \[Section No. 210.5\(C\)\(1\)\]](#)

[First Revision No. 303-NFPA 70-2015 \[Section No. 210.5\(C\)\(2\)\]](#)

Submitter Information Verification

Submitter Full Name: BEN HARTMAN

Organization: NEXTEK POWER SYSTEMS

Affiliation: EMerge Alliance

Street Address:

City:

State:

Zip:

Submittal Date: Fri Sep 25 15:53:05 EDT 2015

**Public Comment No. 1234-NFPA 70-2015 [New Section after 210.5(C)(1)]**

(c) For 277/480 volt systems, the wire colors shall be brown, orange and yellow. For 120/208 volt systems, the wire colors shall be black, red and blue.

Statement of Problem and Substantiation for Public Comment

This is used elsewhere in the NEC. This also adds consistency to the installation. The CMP pointed out it was not in mandatory language, so this has been changed to reflect mandatory language.

Related Item

Public Input No. 2896-NFPA 70-2014 [Section No. 210.5(C)(1)]

Submitter Information Verification

Submitter Full Name: Jim Muir

Organization: Building Safety Division, Clark County, WA

Affiliation: NFPA's Building Code Development Committee (BCDC)

Street Address:

City:

State:

Zip:

Submittal Date: Thu Sep 24 14:51:40 EDT 2015



Public Comment No. 1376-NFPA 70-2015 [Section No. 210.5(C)(2)]

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

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

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

- (2) A continuous red outer finish
- (3) A continuous red stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or black
- (4) Imprinted plus signs ()

±

- (1) () or the word POSITIVE or POS durably marked on insulation of a color other than green, white, gray, or black and repeated at intervals not exceeding 610 mm (24 in.) in accordance with 310.120(B)
- (2) A permanent listed marking means such as sleeving or shrink-tubing that is suitable for the conductor size, at all termination, connection, and splice points, with imprinted plus signs () or the word POSITIVE or POS durably marked on insulation of a color other than green, white, gray, or black. Marking tape shall not be permitted.

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

- (1) A continuous black outer finish
- (2) A continuous black stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or red
- (3) Imprinted minus signs (-) or the word NEGATIVE or NEG durably marked on insulation of a color other than green, white, gray, or red and repeated at intervals not exceeding 610 mm (24 in.) in accordance with 310.120(B)
- (4) A permanent listed marking means such as sleeving or shrink-tubing that is suitable for the conductor size, at all termination, connection, and splice points, with imprinted minus signs (-) or the word NEGATIVE or NEG durably marked on insulation of a color other than green, white, gray, or red. Marking tape shall not be permitted.

Statement of Problem and Substantiation for Public Comment

210.5(C)(2) was a new requirement in the 2014 NEC. It was a positive step forward in requiring clear identification of dc wiring and its polarity. Looking forward, a large part of the application of dc microgrids (see Article 712) and the LED retrofit business will involve dc power distribution through existing branch circuits. The 2014 Code did not consider this re-use case for marking, and essentially requires new cable to be pulled when a modern permanent marking method such as printed heat shrink sleeves would be quite adequate. This change is proposed in order to support this emerging, environmentally important LED retrofit industry. It allows marking by up to date, permanent means (e.g. heat shrink sleeve), and re-use of branch conductors for dc lighting and dc microgrid applications.

Note Terraview is wrongly changing numbering - in both cases this becomes a part (4). It also takes the (+) sign out from between the parens in the first addition.

Regarding the safety of re-use of 277 Vac branch circuits for dc applications, building wire is typically rated for 600V ac and dc. The nominal voltage to ground of most dc microgrids is 190 Vdc (380 V center-resistively grounded). This imparts significantly less stress on insulation than 277 Vac which impresses $277 \times \sqrt{2} = 390$ Vpeak to ground. Ungrounded dc microgrid systems are also required to have ground fault protection by both articles 250 and 712.

Related Item

Public Input No. 4607-NFPA 70-2014 [Section No. 210.5(C)(2)]

Submitter Information Verification

Submitter Full Name: Robert Wills



Public Comment No. 1453-NFPA 70-2015 [Section No. 210.5(C)(2)]

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

Where a branch circuit is supplied from a dc system operating at more than 60 volts, each ungrounded conductor of 4 AWG or larger shall be identified by polarity at all termination, connection, and splice points by marking tape, tagging, or other approved means; each ungrounded conductor of 6 AWG or smaller shall be identified by polarity at all termination, connection, and splice points in compliance with [210.5\(C\)\(2\)\(a\)](#) and (b). The identification methods utilized for conductors originating within each branch-circuit panelboard or similar branch-circuit distribution equipment shall be documented in a manner that is readily available or shall be permanently posted at each branch-circuit panelboard or similar branch-circuit distribution equipment.

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

- (2) A continuous red outer finish
- (3) A continuous red stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or black
- (4) Imprinted plus signs (

±

- (1)) or the word POSITIVE or POS durably marked on insulation of a color other than green, white, gray, or black and repeated at intervals not exceeding 610 mm (24 in.) in accordance with [310.120\(B\)](#)
- (2) In retrofit work, a permanent sleeve or tube marked /POSITIVE/POS at all splices and terminations shall be permitted

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

- (1) A continuous black outer finish
- (2) A continuous black stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or red
- (3) Imprinted minus signs (–) or the word NEGATIVE or NEG durably marked on insulation of a color other than green, white, gray, or red and repeated at intervals not exceeding 610 mm (24 in.) in accordance with [310.120\(B\)](#)
- (4) In retrofit work, a permanent sleeve or tube marked -NEGATIVE/NEG at all splices and terminations shall be permitted

Statement of Problem and Substantiation for Public Comment

There is increasing interest in retrofitting DC microgrids into buildings for improved energy efficiency, reliability, and self-generation of power from e.g. solar. The proposed change will provide a safe, permanent means of marking DC circuits without pulling new wire.

Related Item

[Public Input No. 4607-NFPA 70-2014 \[Section No. 210.5\(C\)\(2\)\]](#)

Submitter Information Verification

Submitter Full Name: Ben Polito

Organization: Pika Energy Inc

Street Address:

City:

State:

Zip:

Submission Date: Fri Sep 25 12:10:48 EDT 2015

**Public Comment No. 882-NFPA 70-2015 [Section No. 210.7]**210.7 _ Multiple Branch Circuits.

Where two or more branch circuits supply devices or equipment on the same yoke or mounting strap, a means to simultaneously disconnect the ungrounded supply conductors ~~supplying these devices or equipment~~ shall be provided at the point at which the branch circuits originate.

Statement of Problem and Substantiation for Public Comment

The opening part of the paragraph already identifies the requirement is to simultaneously disconnect the ungrounded conductors for devices or equipment. The proposed editorial revision removes the redundant reference to "devices and equipment."

Related Item

[First Revision No. 319-NFPA 70-2015 \[Section No. 210.7\]](#)

Submitter Information Verification

Submitter Full Name: DAVID CLEMENTS

Organization: INTL ASSOC ELEC INSP

Street Address:

City:

State:

Zip:

Submittal Date: Mon Sep 21 16:39:12 EDT 2015



Public Comment No. 1750-NFPA 70-2015 [Section No. 210.7]

210.7 Multiple Branch Circuits.

Where two or more branch circuits supply devices or equipment on the same yoke or mounting strap, a means to simultaneously disconnect the ungrounded conductors supplying those devices or equipment shall be provided at the point at which the branch circuits originate.

Statement of Problem and Substantiation for Public Comment

The Correlating Committee directs that further consideration be given to the comments expressed in voting on FR 319.

Related Item

[First Revision No. 319-NFPA 70-2015 \[Section No. 210.7\]](#)

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NFPA

Street Address:

City:

State:

Zip:

Submittal Date: Mon Sep 28 14:49:55 EDT 2015

**Public Comment No. 1814-NFPA 70-2015 [Section No. 210.8]****210.8 Ground-Fault Circuit-Interrupter Protection for Personnel.**

Ground-fault circuit-interrupter protection for personnel shall be provided as required in [210.8\(A\)](#) and [210.8\(B\)](#). The ground-fault circuit interrupter shall be installed in a readily accessible location.

Informational Note No. 1: See [215.9](#) for ground-fault circuit-interrupter protection for personnel on feeders.

Informational Note No. 2: See [422.5\(A\)](#) for GFCI requirements for appliances.

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

(A) Dwelling Units.

All 125- and 250- volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in [210.8\(A\)\(1\)](#) through (10) shall have ground-fault circuit-interrupter protection for personnel.

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

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

- (4) Crawl spaces — at or below grade level
- (5) Unfinished basements — for purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms

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

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

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

- (6) Kitchens — where the receptacles are installed to serve the countertop surfaces
- (7) Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink
- (8) Boathouses
- (9) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall
- (10) Laundry areas

(B) Other Than Dwelling Units.

All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in [210.8\(B\)\(1\)](#) through (8) shall have ground-fault circuit-interrupter protection for personnel.

(1) Class A Ground-Fault Circuit-Interrupter Protection (GFCI).

(a) All single-phase receptacles rated 150 volts to ground or less, 50 amperes or less, shall have GFCI protection for personnel,

(b) All three-phase receptacles rated 150 volts to ground or less, 100 amperes or less, shall have GFCI protection for personnel.

(2) Classes C, D, or E Special-Purpose Ground-Fault Circuit-Interrupter Protection (SPGFCI).

(a) All single-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.

(b) All three-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.

(3) Locations.

(a) Bathrooms (b) Kitchens (c) Rooftops

(d) Outdoors

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

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

(e) Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink

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

Exception No. 2 to (e): For receptacles located in patient bed locations of general care or critical care areas of health care facilities other than those covered under 210.8(B)(1), GFCI protection shall not be required.

(f) Indoor wet locations (g) Locker rooms with associated showering facilities

(h) Garages, service bays, and similar areas other than vehicle exhibition halls and showrooms

(i) Crawl spaces — GFCI protection shall be provided for lighting outlets in crawl spaces at or below grade level.

(j) Unfinished basements — for the purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms.

Statement of Problem and Substantiation for Public Comment

The Correlating Committee additionally directs that FR 4247 be sent to Code-Making Panel 2 for additional action with regard to the use of “general” and “critical care areas” in 210.8.

Related Item

[First Revision No. 4247-NFPA 70-2015 \[Definition: Patient Care Space.\]](#)

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NFPA

Street Address:

City:

State:

Zip:

Submittal Date: Tue Sep 29 09:44:35 EDT 2015

**Public Comment No. 856-NFPA 70-2015 [Section No. 210.8]****210.8** _ Ground-Fault Circuit-Interrupter Protection for Personnel.

Ground-fault circuit-interrupter protection for personnel shall be provided as required in [210.8\(A\)](#) and [210.8\(B\)](#). The ground-fault circuit interrupter shall be installed in a readily accessible location.

Informational Note No. 1: See [215.9](#) for ground-fault circuit-interrupter protection for personnel on feeders.

Informational Note No. 2: See [422.5\(A\)](#) for GFCI requirements for appliances.

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

(A) _ Dwelling Units.

All 125- and 250- volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in [210.8\(A\)](#) (1) through (10) shall have ground-fault circuit-interrupter protection for personnel.

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

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

- (4) Crawl spaces — at or below grade level
- (5) Unfinished basements — for purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms

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

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

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

- (6) Kitchens — where the receptacles are installed to serve the countertop surfaces
- (7) Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink
- (8) Boathouses
- (9) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall
- (10) Laundry areas

(B) _ Other Than Dwelling Units.

All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in [210.8\(B\)\(1\)](#) through (8) shall have ground-fault circuit-interrupter protection for personnel.

(1) _ Class A Ground-Fault Circuit-Interrupter Protection (GFCI).

(a) All single-phase receptacles rated 150 volts to ground or less, 50 amperes or less, shall have GFCI protection for personnel,

(b) All three-phase receptacles rated 150 volts to ground or less, 100 amperes or less, shall have GFCI protection for personnel.

(2) _ Classes C, D, or E Special-Purpose Ground-Fault Circuit-Interrupter Protection (SPGFCI).

(a) All single-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.

(b) All three-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.

(3) Locations.

- (a) Bathrooms (b) Kitchens (c) Rooftops
(d) Outdoors

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

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

- (e) Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink

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

Exception No. 2 to (e): For receptacles located in patient bed locations of general care or critical care areas of health care facilities other than those covered under 210.8(B) (1), GFCI protection shall not be required.

- (f) Indoor wet locations (g) Locker rooms with associated showering facilities

- (h) Garages, service bays, and similar areas other than vehicle exhibition halls and showrooms

- (i) Crawl spaces — GFCI protection shall be provided for lighting outlets in crawl spaces at or below grade level.

- (j) Unfinished basements — for the purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms.

- (k) **(C) Boat Hoists.** GFCI protection shall be provided for outlets not exceeding 240 volts that supply boat hoists installed in dwelling unit locations.

Statement of Problem and Substantiation for Public Comment

The 2014 NEC addresses the hazard associate with boat hoists beginning with the outlet serving the boat hoist up to 240V. Protection is not limited to just protecting the “appliance.” There can be cord and plug connected boat hoists. A hazard may exist when inserting or removing the plug from the receptacle, therefore the protection needs to be in the branch circuit. Since the protection needs to remain in the branch circuit the requirement in the NEC must remain in 210.8. 210.8(C) should not be moved to Article 422.

Related Item

First Revision No. 348-NFPA 70-2015 [Section No. 210.8(C)]

Submitter Information Verification

Submitter Full Name: Ed Larsen

Organization: Schneider Electric USA

Affiliation: Schneider Electric USA

Street Address:

City:

State:

Zip:

Submission Date: Mon Sep 21 14:33:24 EDT 2015

**Public Comment No. 883-NFPA 70-2015 [Section No. 210.8]****210.8** _ Ground-Fault Circuit-Interrupter Protection for Personnel.

Ground-fault circuit-interrupter protection for personnel shall be provided as required in [210.8\(A\)](#) and [210.8\(B\)](#). The ground-fault circuit interrupter shall be installed in a readily accessible location.

Informational Note No. 1: See [215.9](#) for ground-fault circuit-interrupter protection for personnel on feeders.

Informational Note No. 2: See [422.5\(A\)](#) for GFCI requirements for appliances.

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

(A) _ Dwelling Units.

All 125- and 250- volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in [210.8\(A\)](#) (1) through (10) shall have ground-fault circuit-interrupter protection for personnel.

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

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

- (4) Crawl spaces — at or below grade level
- (5) Unfinished basements — for purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms

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

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

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

- (6) Kitchens — where the receptacles are installed to serve the countertop surfaces
- (7) Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink
- (8) Boathouses
- (9) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall
- (10) Laundry areas

(B) _ Other Than Dwelling Units.

All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in [210.8\(B\)\(1\)](#) through (8) shall have ground-fault circuit-interrupter protection for personnel.

(1) _ Class A Ground-Fault Circuit-Interrupter Protection (GFCI).

(a) All single-phase receptacles rated 150 volts to ground or less, 50 amperes or less, shall have GFCI protection for personnel,

(b) All three-phase receptacles rated 150 volts to ground or less, 100 amperes or less, shall have GFCI protection for personnel.

(2) _ Classes C, D, or E Special-Purpose Ground-Fault Circuit-Interrupter Protection (SPGFCI).

(a) All single-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.

(b) All three-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.

(3) Locations.

- (a) Bathrooms (b) Kitchens (c) Rooftops
(d) Outdoors

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

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

- (e) Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink

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

Exception No. 2 to (e): For receptacles located in patient bed locations of general care or critical care areas of health care facilities other than those covered under 210.8(B) (1), GFCI protection shall not be required.

- (f) Indoor wet locations (g) Locker rooms with associated showering facilities
(h) Garages, service bays, and similar areas other than vehicle exhibition halls and showrooms
(i) Crawl spaces — GFCI protection shall be provided for lighting outlets in crawl spaces at or below grade level.
(j) Unfinished basements — for the purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms.

Statement of Problem and Substantiation for Public Comment

The term "cabinet opening" was added to the new second paragraph to clarify measurements are not made through cabinet openings. This clarification is in response to several questions as to whether cabinet openings were included during the IAEI Section meeting presentations

Related Item

First Revision No. 333-NFPA 70-2015 [Section No. 210.8 [Excluding any Sub-Sections]]

Submitter Information Verification

Submitter Full Name: DAVID CLEMENTS

Organization: INTL ASSOC ELEC INSP

Street Address:

City:

State:

Zip:

Submittal Date: Mon Sep 21 16:55:46 EDT 2015

**Public Comment No. 544-NFPA 70-2015 [Section No. 210.8 [Excluding any Sub-Sections]]**

Ground-fault circuit-interrupter protection for personnel shall be provided as required in [210.8\(A\)](#) and [210.8\(B\)](#). The ground-fault circuit interrupter shall be installed in a readily accessible location.

Informational Note No. 1: See [215.9](#) for ground-fault circuit-interrupter protection for personnel on feeders.

Informational Note No. 2: See [422.5\(A\)](#) for GFCI requirements for appliances.

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

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
shadowbox.jpg	
shadowbox_2.jpg	
opening.jpg	
case.jpg	

Statement of Problem and Substantiation for Public Comment

there are other openings used in the field such as a "cased" and "shadowbox" openings. if these openings are not included, the measurement could extent into other rooms, of course if this is the panels intent this language should not be included.

Related Item

[Public Input No. 2991-NFPA 70-2014 \[Section No. 210.8\(A\)\]](#)

Submitter Information Verification

Submitter Full Name: ALFIO TORRISI

Organization: Master

Street Address:

City:

State:

Zip:

Submittal Date: Fri Sep 04 10:49:42 EDT 2015











Public Comment No. 1060-NFPA 70-2015 [Section No. 210.8(A)]

(A) Dwelling Units.

All 125- and 250- volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in 210.8(A) (1) through (10) shall have ground-fault circuit-interrupter protection for personnel.

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

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

- (4) Crawl spaces — at or below grade level
- (5) Unfinished basements — for purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms

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

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

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

- (6) Kitchens — where the receptacles are installed to serve the countertop surfaces
- (7) Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink
- (8) Boathouses
- (9) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall
- (10) Laundry areas

Statement of Problem and Substantiation for Public Comment

This comment would seek to return the parent text of 210.8(A) to the original text at 210.8(A) of the 2014 NEC. Where is the substantiation for including 250-volt receptacles in required GFCI protection? No one is more supportive and committed to GFCI protection than the submitter of this comment, but I don't see the required substantiation for this increase. In the Public Input that spurred this proposed change (PI 516), the submitter made a statement about 250 volt air compressors, chop saws, table saws etc. that are widely used in residential areas that see potential hazards from ground faults. This is a statement, not substantiated evidence of these alleged ground faults. Speaking as an experienced woodworker, the 250 volt air compressors chop saws, and table saws that I encounter (especially at dwelling units) are also rated at 30-amperes or greater. If these tools addressed in the public input are rated at 250-volts, they typically would not be covered by these GFCI requirements as they are typically plugged into a 30-ampere rated receptacle (not requiring GFCI protection). Even as currently proposed by FR 346, 210.8(A) would only apply to 15- and 20-ampere rated receptacles. The proposed change would increase the voltage rating, not the ampere rating of the receptacle.

A quick fix to this would be for CMP-2 to simply raise both the voltage rating (to 250 volts) and the ampere rating (to 30 ampere) for the receptacle involved, but once again I ask, where is the substantiation? If the ampere rating were to be increased for GFCI protection, this would encompass such things as the clothes dryer receptacle. Where is the substantiation for a 250-volt, 30-ampere rated clothes dryer to be GFCI protected?

If this section remains as proposed, it will be very difficult for an AHJ to explain why a 250-volt, 20-ampere rated receptacle does required GFCI protection and a 250-volt, 30-ampere rated receptacle does not require GFCI protection.

Related Item

Public Input No. 516-NFPA 70-2014 [Section No. 210.8(A)]

First Revision No. 346-NFPA 70-2015 [Section No. 210.8(A)]

Submitter Information Verification

Submitter Full Name: L. Keith Lofland

Organization: International Association of Electrical Inspectors (IAEI)

Affiliation: None
Street Address:
City:
State:
Zip:
Submittal Date: Wed Sep 23 14:31:17 EDT 2015



Public Comment No. 1236-NFPA 70-2015 [Section No. 210.8(A)]

(A) Dwelling Units.

All 125- and 250- volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in 210.8(A) (1) through (10) shall have ground-fault circuit-interrupter protection for personnel.

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

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

- (4) Crawl spaces — at or below grade level
- (5) Unfinished basements — for purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms

Exception to

Exceptions to (5):

-

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

2. Ground-fault circuit-interrupter protection shall not be required for a single receptacle providing power for sump or sewage pumps where an accessible ground-fault circuit-interrupter protected receptacle is located within 900 mm (3 ft) of the non-GFCI protected receptacle.

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

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

- (6) Kitchens — where the receptacles are installed to serve the countertop surfaces
- (7) Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink
- (8) Boathouses
- (9) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall
- (10) Laundry areas

Statement of Problem and Substantiation for Public Comment

This adds a second exception to item (5). The CMP indicated that no technical substantiation was provided. It is common sense that if a wet condition operates the GFCI and shunts the power to a sump pump, the sump pump will not do its job to remove the water. This will provide a reliable power source for an emergency sump operation while still providing GFI protected convenience outlet for the occupant.

Here is an example of the problem. This is an excerpt from the Louisiana State Uniform Construction Code Councils' sub committee reviewing the 2014 NEC for possible adoption This excerpt is from their March 3, 2015 public hearing:

"Committee member Mr. John Stephens from Stephens Contracting Company Inc. testified his company receives numerous calls, concerning nuisance trips, on private sewage treatment plants with sump pumps. They keep sending men out at a cost of \$85 per trip to reset the GFCI circuit and they can never determine the cause. Committee member Mr. Ronnie Joundot with Joundot Electric testified his company had also experienced numerous calls concerning nuisance trips on these same type of installations. Discussion followed with several individuals from both the inspection and private sector testifying they had experienced the same issues in the past. The discussion lasted for approximately 1 hour before the issue was tabled for a later meeting to allow the committee to proceed with other sections of the code." The issue was tabled and the review committee sent it forward with the request for the entire LSUCCC to consider some type of amendment addressing the GFCI issues on private sewage treatment plants, refrigerators and dishwashers.

Consideration should be given to amending the NEC to add this exception.

Related Item

[Public Input No. 2897-NFPA 70-2014 \[Section No. 210.8\(A\)\]](#)

Submitter Information Verification

Submitter Full Name: Jim Muir

Organization: Building Safety Division, Clark County, WA

Affiliation: NFPAs Building Code Development Committee (BCDC)

Street Address:

City:

State:

Zip:

Submittal Date: Thu Sep 24 14:56:34 EDT 2015

**Public Comment No. 545-NFPA 70-2015 [Section No. 210.8(A)]****(A) Dwelling Units.**

All 125- ~~and through~~ 250- volt, single-phase, ~~15- and 20-ampere~~ receptacles installed in the locations specified in 210.8(A) (1) through (10) shall have ground-fault circuit-interrupter protection for personnel.

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

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

- (4) Crawl spaces — at or below grade level
- (5) Unfinished basements — for purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms

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

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

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

- (6) Kitchens — where the receptacles are installed to serve the countertop surfaces
- (7) Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink
- (8) Boathouses
- (9) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall
- (10) Laundry areas

Statement of Problem and Substantiation for Public Comment

Contrary to the panel statement this section was amended by other PI's to include 250v circuits, however it neglected to act on the ampacity of the circuit as addressed in PI 2803. The notion that a 25 ampere circuit is less dangerous than a 20 ampere circuit have been dismissed, pool pump motors are a good example of this. when deciding to require 250v GFCI protection for the pool pumps the panel recognized ampere capacity whether 20 amps or 25 amps had no bearing. Please reconsider the ampacity limitation as a 220v 20 amp compressor next to a sink is no different than a 220v 25 amp compressor. The panel recognized this hazard in the 2017 NEC section 210.8 (B). I would hope the same safety concerns are given to homeowner. As far as the voltage is concerned the Panel should consider larger home that have 208/120 three phase services and amend the language to 120 through 250volts.

Related Item

Public Input No. 2803-NFPA 70-2014 [Section No. 210.8(A)]

First Revision No. 346-NFPA 70-2015 [Section No. 210.8(A)]

Submitter Information Verification

Submitter Full Name: ALFIO TORRISI

Organization: Master

Street Address:

City:

State:

Zip:

Submission Date: Fri Sep 04 11:30:49 EDT 2015



Public Comment No. 598-NFPA 70-2015 [Section No. 210.8(A)]

(A) Dwelling Units.

All 125- and 250- volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in [210.8\(A\)](#) (1) through (10) shall have ground-fault circuit-interrupter protection for personnel.

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

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

- (4) Crawl spaces — at or below grade level
- (5) Unfinished basements — for purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms

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

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

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

- (6) Kitchens — where the receptacles are installed to serve the countertop surfaces
- (7) Sinks — where receptacles are installed within 1.8 m (6 ft) of from the outside-top inside edge of the sink sinks bowl
- (8) Boathouses
- (9) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall
- (10) Laundry areas

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
sink.jpg	
sink3.jpg	
sink2.jpg	
sink4.jpg	
sink5.jpg	

Statement of Problem and Substantiation for Public Comment

This is a three dimensional product INSIDE, OUTSIDE TOP AND BOTTOM, it should be clear the measurement is taken from the top of the sink. some stone sinks and free standing sinks are completely exposed and in the case of a drop in sink the outside edge could mean the bottom. If the top inside is reference it would be clearer, the measurement starts on the top of the sink along the inside edge of the bowl.

Related Item

[Public Input No. 2991-NFPA 70-2014 \[Section No. 210.8\(A\)\]](#)

Submitter Information Verification

Submitter Full Name: ALFIO TORRISI

Organization: Master

Street Address:

City:











**Public Comment No. 623-NFPA 70-2015 [Section No. 210.8(A)]****(A) Dwelling Units.**

All 125- and 250- volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in 210.8(A) (1) through (10) shall have ground-fault circuit-interrupter protection for personnel.

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

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

- (4) Crawl spaces — at or below grade level
- (5) Unfinished basements — for purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms

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

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

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

- (6) Kitchens — where the receptacles are installed to serve the countertop surfaces
- (7) Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink
- (8) Boathouses
- (9) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall
- (10) Laundry areas

Statement of Problem and Substantiation for Public Comment

IEC's position is to delete the requirement for 250 volt GFCI protection in 210.8(A) - (FR 346)

The submitter of PI 516 was concerned about portable power tools and identified tools such as air compressors, chop saws, and table saws. For residential applications these tools are typically 120 volt and already covered by current Code requirements. If 250 volt tools are utilized in a dwelling unit then the GFCI protection should be located in the article covering the specific equipment.

There is no significant substantiation to expand GFCI protection to 250-volt, single phase, 15- and 20-ampere receptacles in dwelling units.

Related Item

First Revision No. 346-NFPA 70-2015 [Section No. 210.8(A)]

Submitter Information Verification

Submitter Full Name: JOHN MASARICK

Organization: Independent Electrical Contractors, Inc.

Affiliation: Independent Electrical Contractors, Inc.

Street Address:

City:

State:

Zip:

Submission Date: Sat Sep 12 17:31:16 EDT 2015



Public Comment No. 884-NFPA 70-2015 [Section No. 210.8(A)]

(A) Dwelling Units.

All 125- volt and 250- volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in 210.8(A) (1) through (10) shall have ground-fault circuit-interrupter protection for personnel.

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

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

- (4) Crawl spaces — at or below grade level
- (5) Unfinished basements — for purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms

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

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

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

- (6) Kitchens — where the receptacles are installed to serve the countertop surfaces
- (7) Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink
- (8) Boathouses
- (9) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall
- (10) Laundry areas

Statement of Problem and Substantiation for Public Comment

The text defining unfinished basements in 210.8(A)(5) was relocated to a new 210.2 for consistency within 210 and the NEC in general. Removing the text “storage areas, work areas, and the like” from 210.8(A)(5) and expanding the GFCI requirements in 210.8(B) to include unfinished basements identifies sufficient substantiation to define the term for the purposes of the article. This can be accomplished by locating the definition in the now available 210.2. A companion comment has been submitted to include the definition in a new 210.2.

The words “or spaces” will be added to the new definition in 210.2 for clarification. As worded in 201.8(A)(5) in First Draft, the reference to open areas in basements has been lost. This will present enforcement challenges for example; how would a habitable space within a basement that has not been finished as a “room” be treated? If the defining the term in a new 210.2 is not accepted the words “or spaces” should be added to 210.8(A)(5) so it reads; habitable rooms or spaces.

Related Item

First Revision No. 346-NFPA 70-2015 [Section No. 210.8(A)]

Submitter Information Verification

Submitter Full Name: DAVID CLEMENTS
Organization: INTL ASSOC ELEC INSP
Street Address:
City:
State:
Zip:
Submittal Date: Mon Sep 21 16:58:04 EDT 2015



Public Comment No. 613-NFPA 70-2015 [New Section after 210.8(A)]

TITLE OF NEW CONTENT 210.8 (A) exception

Type your content here ...

exception: receptacles install under the provisions of 406.15 shall not require GFCI protection

Statement of Problem and Substantiation for Public Comment

we normally see this type of installation in under counter lights. the requirement in 406.15 list a non standard configuration type receptacles. Relief should be given to the type of receptacle

Related Item

[Public Input No. 2803-NFPA 70-2014 \[Section No. 210.8\(A\)\]](#)

[Public Input No. 1436-NFPA 70-2014 \[New Section after 210.8\]](#)

[Public Input No. 4387-NFPA 70-2014 \[Section No. 210.8 \[Excluding any Sub-Sections\]\]](#)

[Public Input No. 2897-NFPA 70-2014 \[Section No. 210.8\(A\)\]](#)

Submitter Information Verification

Submitter Full Name: ALFIO TORRISI

Organization: master

Street Address:

City:

State:

Zip:

Submittal Date: Fri Sep 11 16:19:51 EDT 2015


Public Comment No. 1436-NFPA 70-2015 [Section No. 210.8(B)]
(B) Other Than Dwelling Units.

All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in [210.8\(B\)\(1\)](#) through (8) shall have ground-fault circuit-interrupter protection for personnel.

~~(3) – Locations.~~

- Bathrooms
- Kitchens
- Rooftops

~~Outdoors Exception No. 1 to (c) and (d)~~

~~(1) – Class A Ground-Fault Circuit-Interrupter Protection (GFCI).~~

~~(a) – All single-phase receptacles rated 150 volts to ground or less, 50 amperes or less, shall have GFCI protection for personnel.~~

~~(b) – All three-phase receptacles rated 150 volts to ground or less, 100 amperes or less, shall have GFCI protection for personnel.~~

~~(2) – Classes C, D, or E Special-Purpose Ground-Fault Circuit-Interrupter Protection (SPGFCI).~~

~~(a) – All single-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.~~

~~(b) – All three-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.~~

~~– Bathrooms~~

~~(2) Kitchens~~

~~(3) Rooftops~~

~~(4) Outdoors~~

~~Exception No. 1 to (3): Receptacles on rooftops shall not be required to be readily accessible other than from the rooftop.~~

~~Exception No. 2 to (3) and (4): Receptacles that are not readily accessible and are supplied by a branch circuit dedicated to electric snow-melting, deicing, or pipeline and vessel heating equipment shall be permitted to be installed in accordance with [426.28](#) or [427.22](#), as applicable.~~

~~Exception No.~~

~~2~~

~~3 to (~~

~~d~~

~~4): In industrial establishments only, where the conditions of maintenance and supervision ensure that only qualified personnel are involved, an assured equipment grounding conductor program as specified in [590.6\(B\)\(2\)](#) shall be permitted for only those receptacle outlets used to supply equipment that would create a greater hazard if power is interrupted or having a design that is not compatible with GFCI protection.~~

~~(5) Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink~~

~~Exception No. 1 to (~~

~~e~~

~~5): In industrial laboratories, receptacles used to supply equipment where removal of power would introduce a greater hazard shall be permitted to be installed without GFCI protection.~~

~~Exception No. 2 to (~~

~~e~~

~~5): For receptacles located in patient bed locations of general care or critical care areas of health care facilities other than those covered under [210.8\(B\)](#) (1), GFCI protection shall not be required.~~

~~(6) Indoor wet locations~~

~~(7) Locker rooms with associated showering facilities~~

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

- Crawl spaces — GFCI protection shall be provided for lighting outlets in crawl spaces at or below grade level.
- Unfinished basements — for the purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms.

Statement of Problem and Substantiation for Public Comment

IEC's position is to Delete FR 347

The code does not prohibit use of these devices and there was not enough technical substantiation to expand on GFCI protection beyond 125-volt, single phase, 15- and 20-ampere receptacles in "other than dwelling units." FR-347 is too broad. SPGCFI protection needs to be equipment specific and located in the applicable article.

Related Item

First Revision No. 347-NFPA 70-2015 [Section No. 210.8(B)]

Submitter Information Verification

Submitter Full Name: JOHN MASARICK

Organization: Independent Electrical Contractors, Inc.

Affiliation: Independent Electrical Contractors, Inc.

Street Address:

City:

State:

Zip:

Submittal Date: Fri Sep 25 11:17:18 EDT 2015

**Public Comment No. 1751-NFPA 70-2015 [Section No. 210.8(B)]****(B) Other Than Dwelling Units.**

All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in 210.8(B)(1) through (8) shall have ground-fault circuit-interrupter protection for personnel.

(1) Class A Ground-Fault Circuit-Interrupter Protection (GFCI).

(a) All single-phase receptacles rated 150 volts to ground or less, 50 amperes or less, shall have GFCI protection for personnel,

(b) All three-phase receptacles rated 150 volts to ground or less, 100 amperes or less, shall have GFCI protection for personnel.

(2) Classes C, D, or E Special-Purpose Ground-Fault Circuit-Interrupter Protection (SPGFCI).

(a) All single-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.

(b) All three-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.

(3) Locations.

(a) Bathrooms (b) Kitchens (c) Rooftops

(d) Outdoors

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

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

(e) Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink

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

Exception No. 2 to (e): For receptacles located in patient bed locations of general care or critical care areas of health care facilities other than those covered under 210.8(B)(1), GFCI protection shall not be required.

(f) Indoor wet locations (g) Locker rooms with associated showering facilities

(h) Garages, service bays, and similar areas other than vehicle exhibition halls and showrooms

(i) Crawl spaces — GFCI protection shall be provided for lighting outlets in crawl spaces at or below grade level.

(j) Unfinished basements — for the purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms.

Statement of Problem and Substantiation for Public Comment

The Correlating Committee directs that further consideration be given to the comments expressed in voting on First Revision #347, 210.8(B), in regard to clarity and numbering/order.

Related Item

First Revision No. 347-NFPA 70-2015 [Section No. 210.8(B)]

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NFPA

Street Address:

City:



Public Comment No. 35-NFPA 70-2015 [Section No. 210.8(B)]

(B) Other Than Dwelling Units.

All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in [210.8\(B\)\(1\)](#) through (8) shall have ground-fault circuit-interrupter protection for personnel.

(1) - Class A Ground-Fault Circuit-Interrupter Protection (GFCI).

(a) - All single-phase receptacles rated 150 volts to ground or less, 50 amperes or less, shall have GFCI protection for personnel.

(b) - All three-phase receptacles rated 150 volts to ground or less, 100 amperes or less, shall have GFCI protection for personnel.

(2) - Classes C, D, or E Special-Purpose Ground-Fault Circuit-Interrupter Protection (SPGFCI).

(a) - All single-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.

(b) - All three-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.

(3) - Locations.

(a) - Bathrooms (b) - Kitchens (c) - Rooftops

(d) - Outdoors

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

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

(e) - Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink

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

Exception No. 2 to (e): For receptacles located in patient bed locations of general care or critical care areas of health care facilities other than those covered under [210.8\(B\)\(1\)](#), GFCI protection shall not be required.

(f) - Indoor wet locations (g) - Locker rooms with associated showering facilities

(h) - Garages, service bays, and similar areas other than vehicle exhibition halls and showrooms

(i) - Crawl spaces — GFCI protection shall be provided for lighting outlets in crawl spaces at or below grade level.

(j) - Unfinished basements — for the purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms.

Statement of Problem and Substantiation for Public Comment

Revert to 2014 text and try again. FR 347 fails in several ways, 2 of which are: 1. Removing Exception (1) to (3) is a mistake in that now we must have a readily-accessible GFCI breaker in the panel supplying the rooftop receptacle, which if tripped while in use, necessitates a trip down from the roof, rather than simply pressing a reset button on the receptacle at hand; 2. Insufficient guidance is provided to enable the code user to select the appropriate SPGFCI Class. The vote on this FR was close and negative comments should have been heeded. This FR is not ready for prime time.

Related Item

[First Revision No. 347-NFPA 70-2015 \[Section No. 210.8\(B\)\]](#)

Submitter Information Verification

Submitter Full Name: J GRANT HAMMETT
Organization: COLORADO STATE ELECTRICAL BOARD
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 13:27:29 EDT 2015



Public Comment No. 599-NFPA 70-2015 [Section No. 210.8(B)]

(B) Other Than Dwelling Units.

All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in [210.8\(B\) \(4-3\)](#) through (8) shall have ground-fault circuit-interrupter protection for personnel.

(1) Class A Ground-Fault Circuit-Interrupter Protection (GFCI).

(a) All single-phase receptacles rated 150 volts to ground or less, 50 amperes or less, shall have GFCI protection for personnel,

(b) All three-phase receptacles rated 150 volts to ground or less, 100 amperes or less, shall have GFCI protection for personnel.

(2) Classes C, D, or E Special-Purpose Ground-Fault Circuit-Interrupter Protection (SPGFCI).

(a) All single-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.

(b) All three-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.

(3) Locations.

(a) Bathrooms (b) Kitchens (c) Rooftops

(d) Outdoors

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

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

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

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

Exception No. 2 to (e): For receptacles located in patient bed locations of general care or critical care areas of health care facilities other than those covered under [210.8\(B\) \(1\)](#), GFCI protection shall not be required.

(f) Indoor wet locations (g) Locker rooms with associated showering facilities

(h) Garages, service bays, and similar areas other than vehicle exhibition halls and showrooms

(i) Crawl spaces — GFCI protection shall be provided for lighting outlets in crawl spaces at or below grade level.

(j) Unfinished basements — for the purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms.

Additional Proposed Changes

File Name Description Approved

sink3.jpg

Statement of Problem and Substantiation for Public Comment

locations 1 -8 is a typo should say 210.8 (B) (3), the measurement from the sink is a companion of PC 598

Related Item

[First Revision No. 347-NFPA 70-2015 \[Section No. 210.8\(B\)\]](#)

Submitter Information Verification

Submitter Full Name: ALFIO TORRISI

Organization: Master

Street Address:

City:

State:

Zip:

Submittal Date: Thu Sep 10 17:56:27 EDT 2015



Public Comment No. 616-NFPA 70-2015 [Section No. 210.8(B)]

(B) Other Than Dwelling Units.

All

~~125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in 210.8(~~

~~B)(1) through (8)~~

3) shall have ground-fault circuit-interrupter (GFCI) or special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.

(1) Class A Ground-Fault Circuit-Interrupter Protection (GFCI).

(a) All single-phase receptacles rated 150 volts to ground or less, 50 amperes or less, shall have GFCI protection for personnel,

(b) All three-phase receptacles rated 150 volts to ground or less, 100 amperes or less, shall have GFCI protection for personnel.

(2) Classes C, D, or E Special-Purpose Ground-Fault Circuit-Interrupter Protection (SPGFCI).

(a) All single-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.

(b) All three-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.

(3) Locations.

(a) Bathrooms (b) Kitchens (c) Rooftops

(d) Outdoors

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

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

(e) Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink

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

Exception No. 2 to (e): For receptacles located in patient bed locations of general care or critical care areas of health care facilities other than those covered under 210.8(B) (1), GFCI protection shall not be required.

(f) Indoor wet locations (g) Locker rooms with associated showering facilities

(h) Garages, service bays, and similar areas other than vehicle exhibition halls and showrooms

(i) Crawl spaces — GFCI protection shall be provided for lighting outlets in crawl spaces at or below grade level.

(j) Unfinished basements — for the purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms.

Statement of Problem and Substantiation for Public Comment

The proposed change is to revise the opening paragraph to correctly reference the installation locations in 210.8(3).

Related Item

First Revision No. 347-NFPA 70-2015 [Section No. 210.8(B)]

Submitter Information Verification

Submitter Full Name: NEHAD EL-SHERIF

Organization: Littelfuse Startco
Street Address:
City:
State:
Zip:
Submittal Date: Sat Sep 12 15:52:25 EDT 2015



Public Comment No. 642-NFPA 70-2015 [Section No. 210.8(B)]

(B) Other Than Dwelling Units.

All single-phase receptacles rated

All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in 210.8(B)(1) through (8) shall have ground-fault-circuit-interrupter protection for personnel.

(1) - Class A Ground-Fault-Circuit-Interrupter Protection (GFCI).

operating at 150 volts to ground or less

, 50 amperes or less, shall have GFCI protection for personnel. All three-phase receptacles rated 150 volts to ground or less, 100

and rated at 60 amperes or less

shall have

GFCI protection for personnel.

(2) - Classes C, D, or E Special-Purpose Ground-Fault-Circuit-Interrupter Protection (SPGFCI).

(a) - All single-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault-circuit-interrupter (SPGFCI) protection for personnel.

(b) - All three-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault-circuit-interrupter (SPGFCI) protection for personnel.

(3) - Locations.

Class A Ground Fault Circuit Interrupter (GFCI) protection for personnel.

(1) - Class A GFCI required locations

(a) Bathrooms (b) Kitchens (c) Rooftops

(d) Outdoors

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

Exception No. 2 to (c) and (d): Receptacles that are not readily accessible and are supplied by a branch circuit dedicated to electric snow-melting, deicing, or pipeline and vessel heating equipment shall be permitted to be installed in accordance with 426.28 or 427.22, as applicable.

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

(e) Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink

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

Exception No. 2 to (e): For receptacles located in patient bed locations of general care or critical care areas of health care facilities other than those covered under 210.8(B) (1), GFCI protection shall not be required.

(f) Indoor wet locations (g) Locker rooms with associated showering facilities

(h) Garages, service bays, and similar areas other than vehicle exhibition halls and showrooms

(i) Crawl spaces — GFCI protection shall be provided for lighting outlets in crawl spaces at or below grade level.

(j) Unfinished basements — for the purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms.

Informational Note No. 1: Three-phase GFCI protection is available for voltages up to and including 150 volts to ground. The Assured Equipment Grounding Conductor Program is sometimes used to provide personnel protection where GFCIs are not otherwise required (see 590.6(B)(2)).

Informational Note No. 2: Special Purpose Ground Fault Circuit Interrupters (SPGFCIs) are available to provide ground fault protection for receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors. These devices are available in both single-phase and three-phase versions, and typically have adjustable ground fault trip settings.

Statement of Problem and Substantiation for Public Comment

The added GFCI requirements for single-phase and three-phase lower voltages and also higher voltages were not substantiated by any technical data. Special Purpose GFCIs have not been proven to add any layer of safety above and beyond an "Assured Equipment Grounding Conductor Program". Introducing them to the electrical public by way of an informational note rather than a mandated requirement allows electrical professionals the opportunity to prove their worth as a valid safety device. This revision removes the requirement for SPGFCIs and also three-phase lower voltage GFCI devices, and adds them as an option in the form of informational notes.

The improper numbering of the first revision has been corrected (210.8(B)(1) through (8), which does not exist). This has been replaced by proper numbering of the locations where Class A GFCIs are required ((1) (a) through (j)).

An exception was added back from the 2014 NEC allowing receptacles on rooftops to not be readily accessible other than from the rooftop. This exception was new text in 2014 and should remain. It only makes sense to clarify what is meant by ready access on a rooftop.

Related Item

[First Revision No. 347-NFPA 70-2015 \[Section No. 210.8\(B\)\]](#)

Submitter Information Verification

Submitter Full Name: Robert Huddleston

Organization: Eastman Chemical Company

Affiliation: American Chemistry Council

Street Address:

City:

State:

Zip:

Submittal Date: Mon Sep 14 15:01:30 EDT 2015



Public Comment No. 819-NFPA 70-2015 [Section No. 210.8(B)]

(B) Other Than Dwelling Units.

All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in 210.8(B)(1) through (8) shall 3) shall be permitted to have ground-fault circuit-interrupter protection for personnel.

(1) Class A Ground-Fault Circuit-Interrupter Protection (GFCI) shall be used when 210.8(B)(1)(a) or (b) apply.

(a) All single-phase receptacles rated 150 volts to ground or less, 50 amperes or less, shall be permitted to have GFCI protection for personnel.

(b) All three-phase receptacles rated 150 volts to ground or less, 100 amperes or less, shall have be permitted to have GFCI protection for personnel.

(2) Classes C, D, or E Special-Purpose Ground-Fault Circuit-Interrupter Protection (SPGFCI) shall be used when 210.8(B)(2)(a) or (b) apply.

(a) All single-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall be permitted to have special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.

(b) All three-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have be permitted to have special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.

(3) Locations.

- (a) Bathrooms
- (b) Kitchens
- (c) Rooftops
- (d) Outdoors

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

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

- (e) Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink

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

Exception No. 2 to (e): For receptacles located in patient bed locations of general care or critical care areas of health care facilities other than those covered under 210.8(B)(1), GFCI protection shall not be required.

- (f) Indoor wet locations
- (g) Locker rooms with associated showering facilities
- (h) Garages, service bays, and similar areas other than vehicle exhibition halls and showrooms
- (i) Crawl spaces — GFCI protection shall be provided for lighting outlets in crawl spaces at or below grade level.
- (j) Unfinished basements — for the purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms.

Statement of Problem and Substantiation for Public Comment

The first draft of 201.8 (B) is need of a clean-up.

Related Item

Public Input No. 2192-NFPA 70-2014 [Section No. 210.8(B)]

Submitter Information Verification

Submitter Full Name: Edwin Kramer

Organization:

Street Address:



Public Comment No. 853-NFPA 70-2015 [Section No. 210.8(B)]

(B) Other Than Dwelling Units.

All ~~125-volt, single-phase, 15- and 20-ampere~~ receptacles installed in the locations specified in [210.8\(B\)\(1\)](#) through (8) shall have ground-fault circuit-interrupter protection for personnel.

(1) Class A Ground-Fault Circuit-Interrupter Protection (GFCI).

(a) All single-phase receptacles rated 150 volts to ground or less, 50 amperes or less, shall have GFCI protection for personnel,

(b) All three-phase receptacles rated 150 volts to ground or less, 100 amperes or less, shall have GFCI protection for personnel.

(a)

{

2) Classes C, D, or E Special Purpose Ground-Fault Circuit-Interrupter Protection (SPGFCI).

(a) ~~All single-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.~~

(b) ~~All three-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.~~

{ 3) Locations.

(a) Bathrooms (b) Kitchens (c) Rooftops

(d) Outdoors

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

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

(e) Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink

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

Exception No. 2 to (e): For receptacles located in patient bed locations of general care or critical care areas of health care facilities other than those covered under [210.8\(B\) \(1\)](#), GFCI protection shall not be required.

(f) Indoor wet locations (g) Locker rooms with associated showering facilities

(h) Garages, service bays, and similar areas other than vehicle exhibition halls and showrooms

(i) Crawl spaces — GFCI protection shall be provided for lighting outlets in crawl spaces at or below grade level.

(j) Unfinished basements — for the purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms.

Statement of Problem and Substantiation for Public Comment

The words "125-volt, single-phase, 15- and 20-ampere" need to be deleted because the requirement now includes three-phase receptacles and receptacles rated up to 100 A.

FR 347 adds a requirement for the use of Classes C, D or E Special Purpose Ground-Fault Circuit Interrupters (SPGFCI) in specified locations where the voltage is more than 150 volts to ground. These devices are listed to UL 943C. According to UL 943C, in applications where the voltage to ground exceeds 150 volts but does not exceed 300 volts, a Class C SPGFCI is to be used. In applications where the voltage to ground exceeds 300 volts, a Class D SPGFCI may be used if an oversized equipment grounding conductor is installed. If an oversized equipment grounding conductor is not installed, a Class E SPGFCI must be used. No mention of these requirements is made in the proposed Code text, thus there is the possibility of these devices being misapplied, endangering persons who should be protected from shock. The text in (B)(2) should be deleted.

Related Item

[First Revision No. 347-NFPA 70-2015 \[Section No. 210.8\(B\)\]](#)

Submitter Information Verification

Submitter Full Name: Ed Larsen

Organization: Schneider Electric USA

Affiliation: Schneider Electric USA

Street Address:

City:

State:

Zip:

Submittal Date: Mon Sep 21 14:05:59 EDT 2015



Public Comment No. 988-NFPA 70-2015 [Section No. 210.8(B)]

(B) Other Than Dwelling Units.

All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in [210.8\(B\)\(1\)](#) through [\(8 10\)](#) shall have ground-fault circuit-interrupter protection for personnel.

(1)

— Class A Ground-Fault Circuit-Interrupter Protection (GFCI).

(a) - All single-phase receptacles rated 150 volts to ground or less, 50 amperes or less, shall have GFCI protection for personnel.

(b) - All three-phase receptacles rated 150 volts to ground or less, 100 amperes or less, shall have GFCI protection for personnel.

(2) - Classes C, D, or E Special-Purpose Ground-Fault Circuit-Interrupter Protection (SPGFCI).

(a) - All single-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.

(b) - All three-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.

(3) - Locations:

- Bathrooms
- Kitchens
- Rooftops

Outdoors Exception No. 1 to (c) and (d)

Bathrooms

(2) Kitchens

(3) Rooftops

(4) Outdoors

Exception No. 1 to (3): Receptacles on rooftops shall not be required to be readily accessible other than from the rooftop.

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

Exception No. 2 to (

d

4): In industrial establishments only, where the conditions of maintenance and supervision ensure that only qualified personnel are involved, an assured equipment grounding conductor program as specified in [590.6\(B\)\(2\)](#) shall be permitted for only those receptacle outlets used to supply equipment that would create a greater hazard if power is interrupted or having a design that is not compatible with GFCI protection.

(5) Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink

Exception No. 1 to (

e

5): In industrial laboratories, receptacles used to supply equipment where removal of power would introduce a greater hazard shall be permitted to be installed without GFCI protection.

Exception No. 2 to (e): For receptacles located in patient bed locations of general care or critical care areas of health care facilities other than those covered under [210.8\(B\)](#) (1), GFCI protection shall not be required.

(6) Indoor wet locations

(7) Locker rooms with associated showering facilities

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

(9) Crawl spaces — GFCI protection shall be provided for lighting outlets in crawl spaces at or below grade level.

(10) Unfinished basements —

for the purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms.

Statement of Problem and Substantiation for Public Comment

This comment essentially returns the numbering structure of 210.8(B) to that of 2014 NEC and removes the text expanding the requirements to include single and three phase receptacles up to 600 volts and 100 amperes. There were several issues with wording of 210.8(B) in the First Draft (FR No. 347). For example; the text in the First Draft opening paragraph only references single phase, 125 volt, 15 and 20 ampere receptacles when the requirements were expanded to include receptacles to up to 600 volts, 100 amperes and three phase types, the exception numbering is not consistent and Exception No. 1 to (3), regarding rooftop GFCI receptacle devices, was removed by FR 347 but remains in the First Draft. Removing the expanded requirements solves other wording issues.

The substantiation provided for expanding the current Class A GFCI ampacity, voltage and phase requirements and to mandate special-purpose ground-fault protection circuit-interrupter, Class C, D or E (SPGFCI), protection for higher voltages as general branch circuit requirements was extremely insufficient. At these expanded levels the receptacle outlets will likely be used for specific purpose portable or other cord and plug connected equipment. Specific-purpose ground-fault protection requirements should be located in the applicable article for the equipment or the conditions such as 422 or 590 as opposed to a general branch circuit requirement in 210. Locating special purpose requirements in the appropriate article is consistent with the First Draft actions to move appliance GFCI requirements from 210 to 422.

The text defining unfinished basements in 210.8(B)(3)(j) in the First Draft was relocated to a new 210.2 for consistency within 210. Including unfinished basements in 210.8(B) and expanding the AFCI requirements in 210.12 has identified sufficient substantiation to define the term for the purposes of the article. This can be accomplished by locating the definition in the now available 210.2. A companion comment has been submitted to include the definition in a new 210.2.

Related Item

[First Revision No. 347-NFPA 70-2015 \[Section No. 210.8\(B\)\]](#)

Submitter Information Verification

Submitter Full Name: DAVID CLEMENTS
Organization: INTL ASSOC ELEC INSP
Street Address:
City:
State:
Zip:
Submittal Date: Tue Sep 22 19:51:31 EDT 2015



Public Comment No. 1020-NFPA 70-2015 [Section No. 210.8(B) [Excluding any Sub-Sections]]

All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the Class A ground-fault circuit-interrupter protection for personnel and Classes C, D, or E special purpose ground-fault circuit-interrupter protection for personnel shall be provided in locations specified in 210.8(B)(

1) through (8) shall have ground-fault circuit-interrupter protection for personnel
3).

Statement of Problem and Substantiation for Public Comment

When the body of the section was extensively revised the lead-in sentence was not adjusted to go with the revisions. There are no longer locations 210.8(B)(1) through (8).

Related Public Comments for This Document

<u>Related Comment</u>	<u>Relationship</u>
<u>Public Comment No. 1023-NFPA 70-2015 [Section No. 210.8(B)(3)]</u>	

<u>Related Item</u>
<u>First Revision No. 347-NFPA 70-2015 [Section No. 210.8(B)]</u>

Submitter Information Verification

Submitter Full Name: Kenneth Vannice
Organization: [Not Specified]
Affiliation: USITT Engineering Commission
Street Address:
City:
State:
Zip:
Submittal Date: Wed Sep 23 00:50:50 EDT 2015

**Public Comment No. 357-NFPA 70-2015 [Section No. 210.8(B) [Excluding any Sub-Sections]]**

All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in [210.8\(B\)\(4 3 \)](#) through ~~(8)~~ shall have ground-fault circuit-interrupter protection for personnel.

Statement of Problem and Substantiation for Public Comment

Reference should be (B)(3), not (B)(1) through (8).

Related Item

[First Revision No. 347-NFPA 70-2015 \[Section No. 210.8\(B\)\]](#)

Submitter Information Verification

Submitter Full Name: MIKE HOLT

Organization: MIKE HOLT ENTERPRISES INC

Street Address:

City:

State:

Zip:

Submittal Date: Tue Aug 04 14:37:52 EDT 2015

**Public Comment No. 425-NFPA 70-2015 [Sections 210.8(B)(1), 210.8(B)(2)]****Sections 210.8(B)(1), 210.8(B)(2)**

(1) - Class A Ground-Fault Circuit-Interrupter Protection (GFCI).

(a) - All single-phase receptacles rated 150 volts to ground or less, 50 amperes or less, shall have GFCI protection for personnel.

(b) - All three-phase receptacles rated 150 volts to ground or less, 100 amperes or less, shall have GFCI protection for personnel.

(2) - Classes C, D, or E Special-Purpose Ground-Fault Circuit-Interrupter Protection (SPGFCI).

(a) - All single-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.

(b) - All three-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault circuit-interrupter (SPGFCI) protection for personnel.

Statement of Problem and Substantiation for Public Comment

BOMA, International is requesting the committee reverse its action on mandating the use of Special Purpose GFCI's in all occupancies, where there use will have no impact in improving the safety of occupants where there is no evidence that the hazard currently exists. According to the US Bureau of Labor Statistics, a majority of the shocks (outside of residential occupancies) occur from individuals coming into contact with overhead power lines (44%) followed by workers who come into contact with wiring, transformers and other electrical components (27%) as part of their daily work routine. These statistics were reported in the ESFI report available at <http://www.esfi.org/resource/electrical-safety-then-and-now-281>. Currently, the code does not prohibit their use to protect personal in industrial settings and the proponent should continue to promote better engineering practices to encourage their use. BOMA agrees that improvements for electrical safety and reducing electrical shocks should be the goal, but as it was so appropriately stated in the negative comment from Mr. McGovern.. "Sufficient substantiation has not been provided to expand GFCI protection beyond 125 volt receptacles in the areas specified other than the fact that new products have been developed for sale in the market place."

Related Item

[First Revision No. 347-NFPA 70-2015 \[Section No. 210.8\(B\)\]](#)

Submitter Information Verification

Submitter Full Name: STEVEN ORLOWSKI

Organization: BOMA, International

Street Address:

City:

State:

Zip:

Submittal Date: Fri Aug 21 11:05:00 EDT 2015

**Public Comment No. 1069-NFPA 70-2015 [Section No. 210.8(B)(2)]**

~~(2) - Classes C, D, or E Special-Purpose Ground-Fault Circuit-Interrupter Protection (SPGFCI).~~

~~(a) - All single-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault-circuit-interrupter (SPGFCI) protection for personnel.~~

~~(b) - All three-phase receptacles rated more than 150 volts to ground and up to 600 volts between ungrounded conductors, 100 amperes or less, shall have special-purpose ground-fault-circuit-interrupter (SPGFCI) protection for personnel.~~

Statement of Problem and Substantiation for Public Comment

The PI for "210.8(B)(2) Classes C,D, or E Special-Purpose Ground Fault Circuit-Interrupter Protection (SPGFCI)" should be DELETED.. While Class C, D, and E GFCI devices may increase safety for workers, it would be premature to mandate their usage at this time until sufficient field experience shows that they will reduce fatalities, and will not cause nuisance tripping in industrial type settings, in addition to all the 'Other Than Dwelling Units' locations that would be impacted. There is presently nothing that would prohibit installing these devices in facilities today

Related Item

[First Revision No. 347-NFPA 70-2015 \[Section No. 210.8\(B\)\]](#)

Submitter Information Verification

Submitter Full Name: Christopher Walker

Organization: Eaton Corporation

Street Address:

City:

State:

Zip:

Submission Date: Wed Sep 23 15:15:31 EDT 2015



Public Comment No. 1023-NFPA 70-2015 [Section No. 210.8(B)(3)]

(3) Locations.

- (a) Bathrooms (b) Kitchens (c) Rooftops
- (d) Outdoors

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

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

Exception No. 3 to (d): For receptacles in outdoor locations in Articles 520, 525 and 530 occupancies GFCI and SPGFCI protection shall be permitted but not required.

- (e) Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink

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

Exception No. 2 to (e): For receptacles located in patient bed locations of general care or critical care areas of health care facilities other than those covered under 210.8(B) (1), GFCI protection shall not be required.

- (f) Indoor wet locations (g) Locker rooms with associated showering facilities
- (h) Garages, service bays, and similar areas other than vehicle exhibition halls and showrooms
- (i) Crawl spaces — GFCI protection shall be provided for lighting outlets in crawl spaces at or below grade level.
- (j) Unfinished basements — for the purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms.

Statement of Problem and Substantiation for Public Comment

In many cases GFCI and SPGFCI protection is not reliably functional in these supervised occupancies with the equipment involved. In a previous cycle a similar proposal was made. UL determined that the equipment had not been evaluated for this use and would have to be considered on a case by case basis. There are applications where this equipment can be applied and applications where it doesn't function properly. This is partially due to very long runs of sets of single-conductor cables, phase-cut single-phase dimming controls on three-phase circuits, arc lamp ballasts with high harmonic content, and portable generators bonded only to their frame. The proposed Exception allows the use of this equipment where it can be applied and does not require its use where it does not function properly. The last time a similar proposal was made proposals in Articles 520, 525 and 530 were made to negate the requirements. When the proposal was withdrawn the counter proposals in Article 520 and 530 were withdrawn and the requirements in Section 525.23 were revised to coordinate with the requirements of 210. If Exception 3 is not granted, Section 525.23 will need to be revised to re-coordinate with 210 and similar sections re-inserted into Article 520 and 530.

Entertainment electrical equipment is mostly portable moving from show to show. Each time it is moved it becomes a new installation involving a new electrical permit and a new inspection. Large stocks of rental electrical equipment that is compliant one day is un-rentable the next day if the requirements change.

The requirements for GFCI's, as stated in the NEC, appear to be frequency neutral. Consequently it applies to all the ungrounded DC systems found in Article 530. The UL standard for GFCI's indicates that they are for use on AC circuits.

Related Public Comments for This Document

Related Comment
Public Comment No. 1020-NFPA 70-2015 [Section No. 210.8(B)
[Excluding any Sub-Sections]]

Relationship
The related comment must be processed before the comment is valid.

Related Item
First Revision No. 347-NFPA 70-2015 [Section No. 210.8(B)]

Submitter Information Verification

Submitter Full Name: Kenneth Vannice
Organization: [Not Specified]



Public Comment No. 1173-NFPA 70-2015 [Section No. 210.8(B)(3)]

(3) Locations.

- (a) Bathrooms (b) Kitchens (c) Rooftops
- (d) Outdoors

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

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

- (e) Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink

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

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

- (f) Indoor wet locations (g) Locker rooms with associated showering facilities
- (h) Garages, service bays, and similar areas other than vehicle exhibition halls and showrooms
- (i) Crawl spaces — GFCI protection shall be provided for lighting outlets in crawl spaces at or below grade level.
- (j) Unfinished basements — for the purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms.

Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
Klein01_Hart01_HEA-FUN_Agenda_item_NEC2017_CN155_FR4247_FR347.pdf	Request and details to NFPA HEA-FUN Committee for use of parenthetic transition of NFPA 99-extracted terms	
reply_Klein01_Hart01_HEA-FUN_Agenda_item_NEC2017_CN155_FR4247_FR347.pdf	Consent of NFPA HEA-FUN Committee for use of parenthetic transition of NFPA 99-extracted terms	
99_HEA-FUN_A2017_FDMinutes_8-15_annotated.pdf	Minutes of NFPA 99 HEA-FUN Committee: Item 7 consideration and acceptance of extract transition approach in NFPA 70	

Statement of Problem and Substantiation for Public Comment

This Public Comment is responsive to NEC® Correlating Committee Note CN155 regarding 2017 NEC® First Revision FR4247 for Article 517 [and First Revision FR347 for Section 210.8(B)].

In accordance with 4.3.3 of the National Electrical Code® Style Manual and 2.3.2.11 of the Manual of Style for NFPA Technical Committee Documents regarding extracted materials, NFPA 99 Fundamentals Technical Committee, as the committee responsible for the source document, HAS CONSENTED to use parenthetic references between specific older and current NFPA 99 terminology during a transition to current NFPA 99 terminology in the National Electrical Code®.

This transitioning approach causes no change whatsoever in published NFPA 99-2015 or in NFPA 99-2018 in-development and assures correlation of NEC®/NFPA 70-2017 with NFPA 99-2015 and NFPA 99-2018 in-development.

Please see the attached PDF file for details and for the requested action.

Related Public Comments for This Document

<u>Related Comment</u>	<u>Relationship</u>
Public Comment No. 1175-NFPA 70-2015 [Definition: Patient Care Space.]	revised terms in 517.2 Definitions used in 210.8(B)(3)(e) Exception

[Public Comment No. 1175-NFPA 70-2015 \[Definition: Patient Care Space.\]](#)

Related Item

[Correlating Committee Note No. 155-NFPA 70-2015 \[Definition: Patient Care Space.\]](#)

[First Revision No. 347-NFPA 70-2015 \[Section No. 210.8\(B\)\]](#)

[Public Input No. 3239-NFPA 70-2014 \[Section No. 210.8\(B\)\]](#)

[First Revision No. 4217-NFPA 70-2015 \[Section No. 520.48\]](#)

[Public Input No. 2838-NFPA 70-2014 \[Definition: Patient Care Space.\]](#)

[Public Input No. 4488-NFPA 70-2014 \[Definition: Patient Care Space.\]](#)

Submitter Information Verification

Submitter Full Name: Brian Rock

Organization: Hubbell Incorporated

Street Address:

City:

State:

Zip:

Submittal Date: Thu Sep 24 07:22:11 EDT 2015

Committee Correspondence

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July 9, 2015

Mr. David P. Klein,
Chair, *NFPA 99* Fundamentals Technical Committee
U.S. Department of Veterans Affairs
810 Vermont Avenue, NW, Suite 800
Mail Code: (10NA8)
Washington, DC 20420

Mr. Jonathan R. Hart,
Staff Liaison, *NFPA 99* Fundamentals Technical Committee
National Fire Protection Association (NFPA)
Post Office Box 9101
Quincy, Massachusetts 02269-9101

SUBJECT: Additional Agenda item for August 13 – 14, 2015 meeting of HEA-FUN: NEC® Correlating Committee Note CC155 regarding 2017 NEC® First Revisions FR4247 and FR347 transitioning to Category-numbered Patient Care Spaces in the NEC®

Dear Messrs. Klein and Hart,

Please add an Agenda item to the August 13th – 14th meeting of HEA-FUN to consider a transitioning approach to incorporating *NFPA 99-2015* Category-numbered Patient Care Spaces in the *National Electrical Code*®. This matter is responsive to *NEC*® Correlating Committee Note CC155 regarding 2017 *NEC*® First Revision FR4247 (and First Revision FR347). In accordance with 4.3.3 of the *National Electrical Code*® *Style Manual* and 2.3.2.11 of the *Manual of Style for NFPA Technical Committee Documents* regarding extracted materials, this letter seeks consent of the Fundamentals Technical Committee as the committee responsible for the source document to use parenthetical references between specific older and current *NFPA 99* terminology during a transition to current *NFPA 99* terminology in the *National Electrical Code*®.

I write this letter as the Task Group Chair for *NEC*® Code-Making Panel CMP-15 that addressed the Public Inputs involved.

Background Information

NFPA 99-2015 in its definition of “Patient Care Space” [3.1.127] defines the subdivisions of that space as “Category 1 Space” [3.1.127.1], “Category 2 Space” [3.1.127.2], “Category 3 Space” [3.1.127.3], and “Category 4 Space” [3.1.127.4] that had previously been designated in earlier editions as “Critical Care Space (Room)”, “General Care Space (Room)”, “Basic Care Space (Room)”, and “Support Space (Room)”, respectively.

Public Inputs to the 2017 *NEC*® PI4488, PI4507, and PI2838 sought to correlate the older terms still used in *NEC*® Article 517 with the revised terms employed in *NFPA 99-2015*. It should be noted that the older terms are also used in the *NEC*® outside of Article 517.

NEC® Code-Making Panel CMP-15 accepted these Public Inputs by incorporation as First Revision FR4247. As such, the definition correlations are represented as and bracketed as extractions from *NFPA 99-2015*. *NEC*® Code-Making Panel CMP-2 met and acted upon FR347 prior to CMP-15's acting upon those Public Inputs, so the revised terms were premature to be reflected in FR347 for *NEC*® 210.8(B)(3) Exception No. 2.

HEA-FUN Consent for *NEC*® Transition Sought

Unlike routine users of *NFPA 99*, many users of the *National Electrical Code*® are not versant with requirements of *NFPA 99* and, consequently, are unfamiliar with the new categorization numbering of patient care space in *NFPA 99*. Requirements in the *NEC*® use these patient care space definitions not only to establish where requirements DO apply but also by exception where some requirements outside of *NEC*® Article 517 are NOT applicable. Furthermore, local jurisdictions adopt editions of the *National Electrical Code*® on very different schedules.

As a matter of readability and usability of the *National Electrical Code*® expressed in the Committee Statement Note to the *NEC*® Correlating Committee and *NFPA* Staff in First Revision FR4266 (intended to have been also included in the FR 4247 Committee Statement), *NEC*® Code-Making Panel CMP-15 wishes to implement the transition over several Code cycles. It was felt that such a transition is needed for *NEC*® users with infrequent usage of *NFPA 99* to avoid confusion and misinterpretation. This proposed terminology transition is similar to the terminology transition that had previously occurred within the *NEC*® in going from "fixture" to "luminaire":

- Prior to revision: "fixture"
- Code cycle 1: "fixture (luminaire)"
- Code cycle 2: "luminaire (fixture)"
- Code cycle 3: "luminaire"

Accordingly, with HEA-FUN's consent, what is sought is the following transition in the *NEC*®:

2014 <i>NEC</i> ® (pre-revision)	2017 <i>NEC</i> ®	2020 <i>NEC</i> ®	2023 <i>NEC</i> ® and after
"Critical Care Space"	"Critical Care Space (Category 1 Space)"	"Category 1 Space (Critical Care Space)"	"Category 1 Space"
"General Care Space"	"General Care Space (Category 2 Space)"	"Category 2 Space (General Care Space)"	"Category 2 Space"
"Basic Care Space"	"Basic Care Space (Category 3 Space)"	"Category 3 Space (Basic Care Space)"	"Category 3 Space"
"Support Space"	"Support Space (Category 4 Space)"	"Category 4 Space (Support Space)"	"Category 4 Space"

Please advise if the above transition in the *NEC*® has the consent of the HEA-FUN Technical Committee.

Best regards,

A handwritten signature in black ink that reads "Brian E. Rock". The signature is written in a cursive, flowing style with a large initial "B" and "R".

Brian E. Rock
Hubbell Incorporated

Principal Member — *NFPA 99* Electrical Systems
Principal Member — *NEC®* Code Panel 15
Alternate Member — *NEC®* Code Panel 2

cc: Michael J. Johnston, NECA [Chair, *NEC®* Correlating Committee]
Mark W. Earley, NFPA [Staff Liaison, *NEC®*]
Kimberly L. Shea, NFPA [Recording Secretary, *NEC®* Correlating Committee]
Lawrence E. Todd, Intertek [Chair, *NEC®* Code-Making Panel 15]
Mark R. Hilbert, MR Hilbert Electrical Inspections & Training [Chair, *NEC®* Code-Making Panel 2]
Jason D'Antona, Thompson Consultants [Submitter, *NEC®* Public Inputs PI4488 and PI4507]
Gary A. Beckstrand, UEJATC [Submitter, *NEC®* Public Input PI2838]



Brian Rock <brian.rock.electrotechnical@gmail.com>

Additional Agenda item for August 13 – 14, 2015 meeting of HEA-FUN: transitioning to NFPA 99's Category-numbered Patient Care Spaces in the NEC

Hart, Jonathan <JHart@nfpa.org>

Tue, Sep 22, 2015 at 9:48 AM

To: Brian Rock <brian.rock.electrotechnical@gmail.com>

Cc: David Klein <david.p.klein@va.gov>, "Johnston, Michael" <MJ@necanet.org>, "Earley, Mark" <mwearley@nfpa.org>, "Shea, Kimberly" <kshea@nfpa.org>, Larry Todd <larry.todd@intertek.com>, Mark Hilbert <mhilbert@mrhilbert.net>, Jason D'Antona <jdantona@thompson-consultants.com>, Gary Beckstrand <gbeck@uejatc.org>, "Crowley, Michael" <mcrowley@jensenhughes.com>

Hi Brian,

HEA-FUN did address the issue. I inadvertently left this topic out of the HEA-FUN meeting minutes. They will be revised and reposted.

There we no objections from the committee.

Thank you for discovering this and bringing it to my attention.

Jon

Jonathan R. Hart, P.E.

Senior Fire Protection Engineer

National Fire Protection Association

1 Batterymarch Park, Quincy, MA 02169-7471

Phone: 617-984-7470 Email: jhart@nfpa.org

From: Brian Rock [mailto:brian.rock.electrotechnical@gmail.com]

Sent: Sunday, September 20, 2015 12:59 PM

To: Hart, Jonathan <JHart@nfpa.org>

Cc: David Klein <david.p.klein@va.gov>; Johnston, Michael <MJ@necanet.org>; Earley, Mark <mwearley@nfpa.org>; Shea, Kimberly <kshea@NFPA.org>; Larry Todd <larry.todd@intertek.com>; Mark Hilbert <mhilbert@mrhilbert.net>; Jason D'Antona <jdantona@thompson-consultants.com>; Gary Beckstrand <gbeck@uejatc.org>; Crowley, Michael <mcrowley@jensenhughes.com>

Subject: Re: Additional Agenda item for August 13 – 14, 2015 meeting of HEA-FUN: transitioning to NFPA 99's Category-numbered Patient Care Spaces in the NEC

Hi Jon

I just downloaded the Meeting Minutes for HEA-FUN and I did not see it covered under New Business. Was this matter considered? This affects the Second Draft of 2017 NFPA 70 for CMP-15 and CMP-2, so it is essential that it be addressed.

Thanks,

Brian

Brian E. Rock
Engineering Manager - Standards & Certification
Hubbell Incorporated

Principal Member - NEC® Code Panel 15 (NEMA)
Alternate Member - NEC® Code Panel 2 (NEMA)
Principal Member - NFPA99 Health Care Electrical Systems
Member - UL Standard Technical Panels
Member - CSA Technical Subcommittees

e-mail: Brian.Rock.electrotechnical@gmail.com [standards & codes development]

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mobile: +1 203 494 7258 (personal)

post:

Hubbell Incorporated
40 Waterview Drive
Shelton, Connecticut 06484

"Electricity is really just organized lightning." -- George Carlin

Please do NOT omit ".electrotechnical" in my G-Mail address;
that e-mail address without ".electrotechnical" is NOT me but
someone else (unknown) having the SAME name as me.

On Thu, Jul 9, 2015 at 2:18 PM, Hart, Jonathan <JHart@nfpa.org> wrote:

Thank you, Mr. Rock.

I am copying Michael Crowley, Chairman of the NFPA 99 Correlating Committee (HEA-AAC) on this response, so that he is aware of the request as well.

From: Brian Rock [mailto:brian.rock.electrotechnical@gmail.com]

Sent: Thursday, July 09, 2015 12:33 PM

To: David Klein; Hart, Jonathan

Cc: Johnston, Michael; Earley, Mark; Shea, Kimberly; Larry Todd; Mark Hilbert; Jason D'Antona; Gary Beckstrand

Subject: Additional Agenda item for August 13 – 14, 2015 meeting of HEA-FUN: transitioning to NFPA 99's Category-numbered Patient Care Spaces in the NEC

Dear Messrs. Klein and Hart,

Please add an Agenda item to the August 13th – 14th meeting of HEA-FUN to consider a transitioning approach to incorporating *NFPA 99-2015* Category-numbered Patient Care Spaces in the *National Electrical Code®*. This matter is responsive to **NEC® Correlating Committee Note CC155** regarding 2017 **NEC® First Revision FR4247** (and **First Revision FR347**). In accordance with 4.3.3 of the *National Electrical Code® Style Manual* and 2.3.2.11 of the *Manual of Style for NFPA Technical Committee Documents* regarding extracted materials, this letter **seeks consent of the Fundamentals Technical Committee** as the committee responsible for the source document to use parenthetical references between specific older and current *NFPA 99* terminology during a transition to current *NFPA 99* terminology in the *National Electrical Code®*. This transitioning approach causes no change whatsoever in published *NFPA 99-2015* or in *NFPA 99-2018* in-development.

Please see the attached PDF file for details and for the requested action.

I write this letter as the Task Group Chair for *NEC®* Code-Making Panel CMP-15 that addressed the *NEC®* Public Inputs involved.

I am out of the office on business travel off the North American continent this week, on business travel back on the North American continent early next week, and returning to my office on Thursday PM, July 16th.

Best regards,

Brian E. Rock
Engineering Manager - Standards & Certification
Hubbell Incorporated

Principal Member - NFPA99 Health Care Electrical Systems
Principal Member - NEC® Code Panel 15 (NEMA)
Alternate Member - NEC® Code Panel 2 (NEMA)
Member - UL Standard Technical Panels
Member - CSA Technical Subcommittees

e-mail: Brian.Rock.electrotechnical@gmail.com [standards & codes development]

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Hubbell Incorporated
40 Waterview Drive
Shelton, Connecticut 06484

MINUTES
NFPA Technical Committee on Fundamentals (HEA-FUN)
August 13, 2015
First Draft Meeting
Sheraton Inner Harbor Hotel – Baltimore, MD

1. **Call to Order.** Committee Chair, David Klein, called the meeting to order at 8:00 am on Thursday August 13, 2015.

2. **Attendance and Introductions:** Attendance was taken and those present at the meeting introduced themselves and stated who they represent on the committee. Those who were present at the meeting are listed below:

Name	Representing
Klein, David – Chair	US Department of Veterans Affairs
Abell, Bruce – Principal	U.S. Army Corps of Engineers
Beebe, Chad – Principal	ASHE
Besel, Jeff – Principal	Automatic Fire Alarm Association, Inc.
Burrill, Gordon – Principal	Canadian Healthcare Engineering Society
Crowley, Michael – Principal	Jensen Hughes
Fertlitch, Carl – Principal	Chubb Group of Insurance Companies
Kowalenko, Henry – Principal	Illinois Department of Public Health
Lathrop, James – Principal	Koffel Associates, Inc.
Lipster, Stephen – Principal	International Brotherhood of Electrical Workers
Martin, Bret – Principal	Carolinas Healthcare Systems
McNamara, Thomas – Principal	North Shore LIJ Health System-Southside
Peterkin, James – Principal	Heery International
Van Overmeiren, Frank – Principal	FP&C Consultants, Inc.
Dahozy, Roger – Alternate	US Dept. of Health and Human Services/IHS
Mansfield, Michael – Alternate	CNA Insurance Company
Scarlett, Kevin – Alternate	Washington State Department of Health
Hart, Jonathan – Staff Liaison	NFPA

3. **Chairman Comments:** David Klein spoke to the agenda for the meeting and provided opening comments.
4. **Minutes Approval:** The minutes of the HEA-FUN June 3, 2013 Second Draft Meeting were approved as distributed in the Agenda Package.
5. **Staff Liaison Presentation:** Jon Hart give a staff presentation which included general meeting procedures and a review of the Annual 2017 revision cycle.
6. **Development of First Draft:** The committee reviewed all 33 public inputs (PI) and resolved them by either providing a committee statement or by creating a first revision (FR) based on the PI. Other First Revisions were also created. See the First Draft and First Draft Report for the official committee actions.
7. **New Business:** The committee discussed a request from a task group of NEC Code-Making Panel CMP-15 to consider a transitioning approach to incorporating *NFPA 99-2015* Category-numbered Patient Care Spaces in the *National Electrical Code*®. The matter was in response to *NEC* Correlating Committee Note CC155 regarding 2017 *NEC*® First Revision FR4247 (and First Revision FR347). There were no objections made to this approach from the HEA-FUN committee.
8. **Next Meeting:** The next meeting will be held in the June/July 2016 timeframe.
9. **Meeting Adjourned:** The meeting was adjourned at 12:00 pm on August 13, 2015.



Public Comment No. 1463-NFPA 70-2015 [Section No. 210.8(B)(3)]

(3) Locations.

- (a) Bathrooms (b) Kitchens (c) Rooftops
(d) Outdoors

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

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

- (e) Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink

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

Exception No. 2 to (e): For receptacles located in patient bed locations of general care or critical care areas of health care facilities other than those covered under 210.8(B) (1), GFCI protection shall not be required.

- (f) Indoor wet locations (g) Locker rooms with associated showering facilities

- (h) Garages, service bays, and similar areas other than vehicle exhibition halls and showrooms

- (i) Crawl spaces — GFCI protection shall be provided for lighting outlets in crawl spaces at or below grade level.

(j) Unfinished basements — for the purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms.

(C) Boat Hoists.

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

(D) Kitchen Dishwasher Branch Circuit.

GFCI protection shall be provided for outlets that supply dishwashers installed in dwelling unit locations.

Statement of Problem and Substantiation for Public Comment

IEC's position is to reject FR-348 and FR-349.

GFCI protection for boat hoists and dishwashers needs to remain in the branch circuit or outlet. The proposed text in FR-4801 (422.5) allows the option of providing GFCI protection for boat hoists and dishwashers in the attachment plug, the supply cord or installed within the appliance. There is no UL standard that requires GFCI protection integral with appliances or their cords. Moving this requirement to Article 422, providing the option for appliances equipped with GFCI protection to meet this requirement, would reduce the existing protection afforded by the NEC. For new construction, GFCI protection afforded in the outlet or in the circuit breaker is the best solution for safety as this solution pays no regards to whether or not GFCI protection is provided for in the cord of the appliance.

Related Item

First Revision No. 348-NFPA 70-2015 [Section No. 210.8(C)]

First Revision No. 349-NFPA 70-2015 [Section No. 210.8(D)]

Submitter Information Verification

Submitter Full Name: JOHN MASARICK

Organization: Independent Electrical Contractors, Inc.

Affiliation: Independent Electrical Contractors, Inc.

Street Address:

City:

State:

Zip:

Submission Date: Fri Sep 25 12:36:02 EDT 2015

**Public Comment No. 1523-NFPA 70-2015 [Section No. 210.8(B)(3)]**

(3) Locations.

- (a) Bathrooms (b) Kitchens (c) Rooftops
(d) Outdoors

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

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

- (e) Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink

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

Exception No. 2 to (e): For receptacles located in patient bed locations of general care or critical care areas of health care facilities other than those covered under 210.8(B) (1), GFCI protection shall not be required.

- (f) Indoor wet locations (g) Locker rooms with associated showering facilities

- (h) Garages, service bays, and similar areas other than vehicle exhibition halls and showrooms

- (i) Crawl spaces — GFCI protection shall be provided for lighting outlets in crawl spaces at or below grade level.

(j) Unfinished basements — for the purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms.

Exception No. 3 to (d): Recepticals on rooftops shall not be required to be readily accessible other than from the rooftop

Statement of Problem and Substantiation for Public Comment

This exception was added in the 2014 NEC to add clarity (see ROP 2-52). The exception should remain for clarification purposes.

Related Item

First Revision No. 347-NFPA 70-2015 [Section No. 210.8(B)]

Submitter Information Verification

Submitter Full Name: Michael Weaver

Organization: M&W Electric

Affiliation: NECA

Street Address:

City:

State:

Zip:

Submittal Date: Fri Sep 25 13:34:39 EDT 2015

**Public Comment No. 358-NFPA 70-2015 [Section No. 210.8(B)(3)]**

(3) Locations.

- (a) Bathrooms (b) Kitchens (c) Rooftops
- (d) Outdoors

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

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

- (e) Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink

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

Exception No. 2 to (e): For receptacles located in patient bed locations of general care or critical care areas of health care facilities other than those covered under 210.8(B) (1), GFCI protection shall not be required.

- (f) Indoor wet locations (g) Locker rooms with associated showering facilities
- (h) Garages, service bays, and similar areas other than vehicle exhibition halls and showrooms
- (i) Crawl spaces — GFCI protection shall be provided for lighting outlets in crawl spaces at or below grade level.
- (j) Unfinished basements — ~~for the purposes of this section, unfinished basements are defined as~~ portions or areas of the basement not intended as habitable rooms.

Statement of Problem and Substantiation for Public Comment

Delete the text so that the rule is a rule and not a definition.

Related Item

First Revision No. 347-NFPA 70-2015 [Section No. 210.8(B)]

Submitter Information Verification

Submitter Full Name: MIKE HOLT
Organization: MIKE HOLT ENTERPRISES INC
Affiliation: Self
Street Address:
City:
State:
Zip:
Submission Date: Tue Aug 04 14:43:56 EDT 2015

**Public Comment No. 267-NFPA 70-2015 [Section No. 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 20-ampere branch circuit shall be provided to ~~supply garage-~~ supply receptacle outlet(s) in attached garages and in detached garages with electric power .

Statement of Problem and Substantiation for Public Comment

The first draft wording requires that electric power be provided to a detached garage at a dwelling unit. The decision to provide electric power to a detached garage is a design issue and not a code issue. Electric power to a detached garage is not required by the 2014 NEC. There is nothing in the substantiation for the PI that suggests a need for this new requirement to provide electric power to a detached garage

Related Item

Public Input No. 1010-NFPA 70-2014 [New Section after 210.11(C)]

Submitter Information Verification

Submitter Full Name: DON GANIERE

Organization: [Not Specified]

Street Address:

City:

State:

Zip:

Submittal Date: Sat Jul 18 13:43:04 EDT 2015

**Public Comment No. 952-NFPA 70-2015 [Section No. 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 20-ampere branch circuit shall be provided to supply garage receptacle outlet(s) required by 210.52(G)(1) and other outlets and devices in that particular garage. Such circuit(s) shall have no other outlets.

Exception: This branch circuit shall be permitted to supply a receptacle outlet(s) located immediately adjacent on the outside of the garage.

Statement of Problem and Substantiation for Public Comment

As originally proposed by PI 1010, this proposed language is similar in structure to the existing text at 210.11(C). This proposed text (added by this comment) is also being proposed at 210.52(G)(1). Section 210.52 is requirements for dwelling unit receptacle outlets. A more appropriate location for this text that deals with the branch circuit supplying these receptacle outlets is 210.11(C), which deals with required branch circuits for dwelling units.

This proposed text and the proposed exception will allow the garage lighting outlet(s) and related switches, along with an outdoor receptacle outlet(s) located on the outside of the garage to also be supplied from the garage branch circuit without the installer having to install a separate branch circuit to supply these lighting outlets and outside receptacle outlet as currently required by the 2014 NEC text at 210.52(G)(1).

Related Item

Public Input No. 1010-NFPA 70-2014 [New Section after 210.11(C)]

First Revision No. 330-NFPA 70-2015 [Section No. 210.11(C)(3)]

Submitter Information Verification

Submitter Full Name: L. Keith Lofland

Organization: International Association of Electrical Inspectors (IAEI)

Affiliation: None

Street Address:

City:

State:

Zip:

Submittal Date: Tue Sep 22 14:51:29 EDT 2015

**Public Comment No. 269-NFPA 70-2015 [Section No. 210.12]**210.12 Arc-Fault Circuit-Interrupter Protection.

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

(A) Dwelling- Dormitory Units.

All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets or devices installed ~~in dwelling units in~~ dormitory units 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:
 - (4) The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
 - (5) The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
 - (6) The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
- (7) 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:
 - (8) The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
 - (9) The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
 - (10) The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
- (11) If RMC, IMC, EMT, Type MC, or steel-armored Type AC cables meeting the requirements of [250.118](#), metal wireways, metal auxiliary gutters, and metal outlet and junction boxes 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.
- (12) Where a listed 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: Where an individual branch circuit to a fire alarm system installed in accordance with [760.41\(B\)](#) or [760.121\(B\)](#) is installed in RMC, IMC, EMT, or metal wireways or auxiliary gutters or steel-sheathed cable, Type AC or Type MC, meeting the requirements of [250.118](#), with metal outlet and junction boxes, AFCI protection shall be permitted to be omitted.

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 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 a listed arc-fault circuit interrupter meeting the requirements of 210.12(A)(1) through (6) as appropriate.

(C) - Branch Circuit Extensions or Modifications — Dwelling Units and Dormitory Units.

In any of the areas specified in 210.12(A) or 210.12(C), where branch-circuit wiring is modified, replaced, or extended, the branch circuit shall be protected by one of the following:

- (1) A listed combination-type AFCI located at the origin of the branch circuit
- (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 conductors is not more than 1.8 m (6 ft) and does not include any additional outlets or devices.

(D C) - Guest Rooms and Guest Suites.

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 shall be protected by a listed arc-fault circuit interrupter meeting the requirements of 210.12(A)(1) through (6) as appropriate.

Statement of Problem and Substantiation for Public Comment

The current afci breakers on the market are prone to tripping for reasons not related to arcs or anything remotely dangerous. On every electrical contractor forum in every supply house and talking to countless EC's there are talks of contractors having to "chase ghosts", breakers tripping at random and not on demand (cant replicate trip). Many of these contractors, me included have spent countless dollars trying to find what is causing these trips. The findings of these Licensed Electrical Contractors in the field dealing with these breakers every day are that they ghost trip at random due to things such as ie: LED bulbs, electronic equipment of all kinds including but not limited to dvd players, TV's, computers etc, electronic noise, line side connections (power company conns) dimmers, electronic switching devices, vacuums, hair dryers, power tools, fluorescent light ballasts and even ham radios in the neighborhood. Nothing is wrong with any of this equipment it is just interfering with the electronics of the afcis. I have personally also had homeowners refrigerators tripping afci when it cycled into energy saving mode causing hundreds of dollars of spoiled food each time. I agree that the idea of afci technology is relevant but the current variation on the market is defective costing electrical contractors countless dollars trying to troubleshoot a circuit where there is nothing wrong. These devices should not be required in dwellings until such a time that these nuisance ghost trip issues can be resolved.. By not doing so you are costing the very people (electrical contractors) who support and for who this code is written enough money to put us out of business. Contractors cannot bear this cost. Why do we have to bear the responsibility, cost and loss of respect and customers due to something which is obviously a manufacturer defect. If you doubt what I say please use your database of electrical contractors and do a poll of how many of these nuisance trips each are having, this is a serious enough issue. There are polls out there already which show over 80% of trade professional respondents who want to eliminate 210-12 altogether(mikeholt.com) I have yet to hear from a contractor who has not wasted thousands of dollars chasing these non existent afci ghosts. PLEASE TAKE THIS ISSUE SERIOUSLY, as I know the manufactures will deny any problems. Just because a product is mass produced does not mean that it has to be forced to market and definitely not forced into code until that product is 100% effective and free of nuisance issues which have proven to cost contractors countless dollars. It will also set off a firestorm when millions of homeowners lose there refrigerator and freezer contents because of a defective breaker. By leaving dormitories and guest rooms manufacturers still have places which are not permanent residences to BETA test and work out these issues. Another option is removing 210-12 altogether until afci technology is 100%. I personally think afci technology should be removed from premises wiring and integrated into all manufactured plug in or hard wired EQUIPMENT. This would eliminate all false circuit trips and would be a simple to troubleshoot problem as only faulty equipment would trip, not entire circuit.

Related Item

[Public Input No. 4218-NFPA 70-2014 \[Section No. 210.12\]](#)

Submitter Information Verification

Submitter Full Name: mike kline

Organization: Kline Electric inc

Street Address:

City:

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Zip:

Submission Date: Sat Jul 18 20:35:11 EDT 2015



Public Comment No. 439-NFPA 70-2015 [Section No. 210.12(A)]

(A) Dwelling Units.

All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets or devices installed in dwelling units 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:
 - (4) The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
 - (5) The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
 - (6) The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
- (7) 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:
 - (8) The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
 - (9) The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
 - (10) The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
 - (11) The combination of the branch-circuit overcurrent device and outlet branch-circuit AFCI shall be identified as meeting the requirements for a system combination-type AFCI and shall be listed as such.
- (12) If RMC, IMC, EMT, Type MC, or steel-armored Type AC cables meeting the requirements of 250.118, metal wireways, metal auxiliary gutters, and metal outlet and junction boxes 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.
- (13) Where a listed 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: Where an individual branch circuit to a fire alarm system installed in accordance with 760.41(B) or 760.121(B) is installed in RMC, IMC, EMT, or metal wireways or auxiliary gutters or steel-sheathed cable, Type AC or Type MC, meeting the requirements of 250.118, with metal outlet and junction boxes, AFCI protection shall be permitted to be omitted.

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.

Statement of Problem and Substantiation for Public Comment

The Committee Statement of FR329 which supported the elimination of 210.12 (A) (4) used excerpts from the UL research report titled "Effectiveness of Circuit Breakers in Mitigating Parallel Arcing Faults in the HomeRun". It should be noted that this was updated by a later report titled "Evaluation of Run Length and Available Current on Breaker Ability to Mitigate Parallel Arcing Faults – Part II: Effect of run Length with 500A Available at the Panelboard". The following statement is extracted from its summary on pages 3-4.

"The initial study on this topic attempted to evaluate the magnetic trip level of residential 15- and 20-amp circuit breakers to determine whether a generalized magnetic trip distribution could be found. The initial set of circuit breakers, which were sampled from four North

American manufacturers and included circuit breakers of different designs for each manufacturer, suggested that 99% of all circuit breakers would magnetically trip at or below 300A for 15A breakers and 350A for 20A breakers. However, follow-up testing one year later negated this findings, with circuit breakers of the same model number but of a different batch had significantly different magnetic trip levels, varying by 50A or more for some manufacturers, yet unvarying for others. These results showed that magnetic trip levels could conceivably be controlled, but were not in all cases. The revised data showed that panelboard current and run length would need to be set assuming magnetic trip thresholds as high as 400-450A would be needed, which makes arc mitigating using magnetic trip levels not specifically calibrated for this application impractical as well as potentially unreliable. Therefore, the results of Part I of this work showed that circuit breakers with magnetic trip levels calibrated for the purpose of mitigating parallel arcing faults would be necessary."

This updated UL report clearly indicates that further investigation confirms that ordinary residential breakers used for arc mitigation are "impractical" and "potentially unreliable" from an arc fault protection perspective.

Additionally, many members of CMP 2 have witnessed testing which demonstrates that ordinary thermal magnetic circuit breakers will NOT provide arcing protection. This clearly refutes the misleading conclusions which some have drawn from previously submitted reports.

There is no technical reason to reduce the level of safety provided by the other five options by deleting the requirement for a listed system combination AFCI in option 4. Standard thermal magnetic circuit breakers are not designed, tested or listed to detect and interrupt low level arcing faults. The American Circuit Breaker Manufacturers Association (whose members consist of Eaton, General Electric, Schneider Electric and Siemens) does not support the claims that the magnetic trip characteristics will protect the home run circuit from parallel arcing faults.

The American Circuit Breaker Manufacturers Association (ACBMA) recommends that NFPA breakout the proposed deletion of 210.12(A)(4)(d) as a ballotable detail.

Related Item

[First Revision No. 329-NFPA 70-2015 \[Section No. 210.12\(A\)\]](#)

Submitter Information Verification

Submitter Full Name: KENNETH REMPE

Organization: Siemens Industry, Inc.

Affiliation: American Circuit Breaker Manufacturers Association (ACBMA)

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Submittal Date: Wed Aug 26 11:25:26 EDT 2015



Public Comment No. 655-NFPA 70-2015 [Section No. 210.12(A)]

A large, empty rectangular box with a thin black border, intended for the user to enter their public comment.

(A) Dwelling Units.

All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets or devices installed in dwelling units 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:
 - (4) The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
 - (5) The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
 - (6) The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
- (7) 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:
 - (8) The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
 - (9) The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
 - (10) The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
- (11) If RMC, IMC, EMT, Type MC, or steel-armored Type AC cables meeting the requirements of 250.118, metal wireways, metal auxiliary gutters, and metal outlet and junction boxes 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.
- (12) Where a listed 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:

~~Where~~

~~AFCI protection shall not be required for an individual branch circuit~~

~~to~~

~~supplying a fire alarm system installed in accordance with 760.41(B) or 760.121(B)~~

~~is~~

~~The branch circuit shall be installed in~~

~~RMC, IMC, EMT, or metal wireways or auxiliary gutters or steel-sheathed a metallic raceway, metallic auxiliary gutter, steel-armored cable, Type~~

~~AC~~

~~MC or Type~~

~~MC,~~

~~AC systems meeting the requirements of 250.118~~

~~or~~

~~with~~

~~metal outlet and junction boxes, AFCI protection shall be permitted to be omitted metallic 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.

Statement of Problem and Substantiation for Public Comment

The only thing not allowed is LTFMC and FMC both are made with steel and have the same strength as the armored cable and should be allowed. It would be valuable to have some flexibility in the field for an outdoor or indoor installations. You would only need to reference a metallic raceway and eliminate the laundry list. Metal outlet boxes and junction boxes is too narrow of an allowance, a more general statement covering most installation would be Metal boxes, conduit fittings and enclosures. The current language is confusing, "permitted to be omitted" and appears at the end of the paragraph. Say what this is for (no AFCI) and give the requirements (Steel everything).

Related Item

[First Revision No. 329-NFPA 70-2015 \[Section No. 210.12\(A\)\]](#)

[Public Input No. 3596-NFPA 70-2014 \[Section No. 210.12\(A\)\]](#)

Submitter Information Verification

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Submittal Date: Mon Sep 14 19:31:48 EDT 2015



Public Comment No. 822-NFPA 70-2015 [Section No. 210.12(A)]

(A) Dwelling Units.

All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets or devices installed in dwelling units 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:
 - (4) The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
 - (5) The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
 - (6) The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
- (7) 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:
 - (8) The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
 - (9) The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
 - (10) The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
 - (11) The combination of the branch-circuit overcurrent device and outlet branch-circuit AFCI shall be identified as meeting the requirements for a system combination-type AFCI and shall be listed as such.
- (1) If RMC, IMC, EMT, Type MC, or steel-armored Type AC cables meeting the requirements of 250.118, metal wireways, metal auxiliary gutters, and metal outlet and junction boxes 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.
- (2) Where a listed 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: Where an individual branch circuit to a fire alarm system installed in accordance with 760.41(B) or 760.121(B) is installed in RMC, IMC, EMT, or metal wireways or auxiliary gutters or steel-sheathed cable, Type AC or Type MC, meeting the requirements of 250.118, with metal outlet and junction boxes, AFCI protection shall be permitted to be omitted.

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.

Additional Proposed Changes

File Name	Description	Approved
210.12_A_4_FR329-5lvde1.pdf	210.12(A)(4) document	

Statement of Problem and Substantiation for Public Comment

Revision only adds new item (4)(d). Remaining text is existing.

There is no technical reason to reduce the level of safety afforded by the listed solutions in the other five installation options by deleting the requirement for a listed system combination AFCI in option 4. There is a need to verify that the circuit breaker and OBC AFCI can together provide arc fault protection for the entire branch circuit. NEMA proposed the existing text in 210.12(A)(4) as part of ROC-2-44 in the 2014 revision cycle. Standard thermal-magnetic circuit breakers are not designed, tested or listed to detect and interrupt low level arcing faults. There is no NEMA circuit breaker manufacturer that supports these claims being made about their products.

Related Item

[First Revision No. 329-NFPA 70-2015 \[Section No. 210.12\(A\)\]](#)

Submitter Information Verification

Submitter Full Name: VINCE BACLAWSKI

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Submittal Date: Mon Sep 21 09:45:44 EDT 2015

NFPA Public Comment Form

(For Proposing Revisions to the First Draft)

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Date Rec'd: _____

Date _____ Name Vince Baclawski Tel. No. 703-841-3236

Company National Electrical Manufacturers Association (NEMA) Email vin_baclawski@nema.org

Street Address 1300 North 17th Street, Suite 900 City Rosslyn State VA Zip 22209

Please indicate organization represented (if any) NEMA

1. (a) NFPA Document Title National Electrical Code NFPA No. Year 2017

(b) Section/Paragraph 210.12(A)(4)

2. Identify First Revision and/or Input to which Comment relates: FR 329

No(s).

2. Public Comment Recommends (check one): new text revised text deleted text

3. Proposed Text of Public Comment (include proposed new or revised wording, or identification of wording to be deleted):

[Note: Proposed text should be in legislative format showing proposed changes to the First Draft; i.e., use underscore to denote wording to be inserted (inserted wording) and strike-through to denote wording to be deleted (~~deleted wording~~).]

210.12 (A) (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:

- The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
- 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.
- The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
- 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.

4. Statement of Problem and Substantiation for Public Comment: (Note: State the problem that would be resolved by your recommendation; give the specific reason for your Public Comment, including copies of tests, research papers, fire experience, etc. If more than 200 words, it may be abstracted for publication.)

There is no technical reason to reduce the level of safety afforded by the listed solutions in the other five installation options by deleting the requirement for a listed system combination AFCI in option 4. There is a need to verify that the circuit breaker and OBC AFCI can together provide arc fault protection for the entire branch circuit. NEMA proposed the existing text in 210.12(A)(4) as part of ROC-2-44 in the 2014 revision cycle. Standard thermal-magnetic circuit breakers are not designed, tested or listed to detect and interrupt low level arcing faults. There is no NEMA circuit breaker manufacturer that supports these claims being made about their products.

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(a) I am the author of the text or other material (such as illustrations, graphs) proposed in the Public Comment.

(b) Some or all of the text or other material proposed in this Public Comment was not authored by me. Its source is as follows: (please identify which material and provide complete information on its source)

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Signature (Required)

PLEASE USE SEPARATE FORM FOR EACH PUBLIC COMMENT

To: Secretary, Standards Council National Fire Protection Association
1 Batterymarch Park · Quincy, MA 02169 OR

Fax to: (617) 770-3500 OR Email to: publicinput_comments@nfpa.org

8/21/2015



Public Comment No. 855-NFPA 70-2015 [Section No. 210.12(A)]

(A) Dwelling Units.

All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets or devices installed in dwelling units 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:
 - (4) The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
 - (5) The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
 - (6) The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
- (7) 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:
 - (8) The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
 - (9) The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
 - (10) The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
 - (11) The combination of the branch-circuit overcurrent device and outlet branch-circuit AFCI shall be identified as meeting the requirements for a system combination-type AFCI and shall be listed as such.
- (12) If RMC, IMC, EMT, Type MC, or steel-armored Type AC cables meeting the requirements of 250.118, metal wireways, metal auxiliary gutters, and metal outlet and junction boxes 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.
- (13) Where a listed 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: Where an individual branch circuit to a fire alarm system installed in accordance with 760.41(B) or 760.121(B) is installed in RMC, IMC, EMT, or metal wireways or auxiliary gutters or steel-sheathed cable, Type AC or Type MC, meeting the requirements of 250.118, with metal outlet and junction boxes, AFCI protection shall be permitted to be omitted.

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.

Statement of Problem and Substantiation for Public Comment

The deletion of 210.12(A)(4)(d) is not acceptable due to the reduction in safety created by eliminating the listing requirement. The listing requirement for demonstrating arc fault protection of the entire branch circuit and the cords connected to it is currently found in all four permitted protection methods. In order to remove a listing requirement from any of the four protection methods and not reduce or compromise safety, you must be convinced the protection method will operate within the UL 1699 parameters without any verification.

The acceptance of this FR ignores the Panel's acceptance of Comment 2-52 that was introduced by UL and others during the development of the 2014 NEC. The Panel statement cites the UL research report titled, "Effectiveness of Circuit Breakers in Mitigating

Parallel Arcing Faults in the Home Run" as providing significant statistical assurance that the "home run" portion of the branch circuit will be protected from parallel arcing faults by standard circuit breakers. This report was revised three months after it was issued, as documented in UL Comment 2-52, and then followed up by two additional reports based on further research. The second report, "Evaluation of Run Length and Available Current on Breaker Ability to Mitigate Parallel Arcing Faults - Part I: Effect of Panelboard Current for 50 Foot Run Lengths" refutes critical findings in the first report, which includes the following:

- a) "Evaluation of the magnetic trip level of circuit breakers...show that breaker magnetic trip levels are not sufficiently reliable and consistent to allow for a generalized assumption of an upper bound, as was proposed before", and
- b) "...more controlled verification of the magnetic trip level of a circuit breaker intended for mitigating parallel arcing faults may be needed", and
- c) "...the magnetic trip level of circuit breakers is not as well controlled as was previously found in a previous study.", and
- d) "Circuit breakers with magnetic trip levels 200A or greater failed to mitigate a large fraction of the arcing events in eight half-cycles."

All of the UL research reports on this topic must be considered, unfortunately the only one cited in the PI and the Panel statement was the initial unrevised UL report. It is important for the public record to reflect accurate information for Panel consideration and comment. The Panel statement also cites the UL research report titled "Influence of Damage and Degradation on Breakdown Voltage of NM Cables", however, the conclusion cited in the Committee statement focuses on only two important but very narrow damage events; voltage surges and hammer damage. There are many other ways and documented occurrences about how NM cable can be damaged.

Since the submission of UL Comment 2-52 test data has been presented to the UL 1699 Standards Technical Panel showing that standard thermal-magnetic circuit breakers cannot pass the UL 1699 performance requirements relating to branch circuit arc fault protection, leaving a protection gap for the home run of the branch circuit. No data has been presented to justify removing the listing requirement in 210.12(A)(4). Standard thermal-magnetic circuit breakers are not designed and tested to detect and interrupt low level arcing faults. No manufacturer claims that they can, which is why AFCI protection was identified as a need to provide such protection.

Related Item

[First Revision No. 329-NFPA 70-2015 \[Section No. 210.12\(A\)\]](#)

Submitter Information Verification

Submitter Full Name: Ed Larsen

Organization: Schneider Electric USA

Affiliation: Schneider Electric USA

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City:

State:

Zip:

Submission Date: Mon Sep 21 14:22:21 EDT 2015



Public Comment No. 93-NFPA 70-2015 [Section No. 210.12(A)]

(A) Dwelling Units.

All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets or devices installed in dwelling units 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:
 - (4) The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
 - (5) The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
 - (6) The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
- (7) 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:
 - (8) The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
 - (9) The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
 - (10) The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
- (11) If RMC, IMC, EMT, Type MC, or steel-armored Type AC cables meeting the requirements of 250.118, metal wireways, metal auxiliary gutters, and metal outlet and junction boxes 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.
- (12) Where a listed 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: Where an individual branch circuit to a fire alarm system installed in accordance with 760.41(B) or 760.121(B) is installed in RMC, IMC, EMT, or metal wireways or auxiliary gutters or steel-sheathed cable, Type AC or Type MC, meeting the requirements of 250.118, with metal outlet and junction boxes, AFCI protection shall be permitted to be omitted.

Informational Note No. 1: For information on combination-type and branch-feeder-type arc-fault circuit interrupters, see UL 1699-2014 **2013**, *Standard for Arc-Fault Circuit Interrupters*. For information on outlet branch-circuit type arc-fault circuit interrupters, see UL Subject 1699A **Outline**, *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 **2016**, *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.

Statement of Problem and Substantiation for Public Comment

In informational note 1 corrected reference to UL 1699A Outline, removed reference to UL Subject 1699C which is now part of UL 1699A Outline.

In informational note 2 updated reference to NFPA 72 to 2016.

Related Public Comments for This Document

Related Comment	Relationship
Public Comment No. 39-NFPA 70-2015 [Section No. 110.31]	Referenced correct SDO name, standard name, number, and edition.

[Public Comment No. 41-NFPA 70-2015 \[Section No. 399.10\]](#)

Referenced correct SDO name, standard name, number, and edition.

[Public Comment No. 42-NFPA 70-2015 \[Section No. Table\]](#)

Referenced correct SDO name, standard name, number, and edition.

[Public Comment No. 43-NFPA 70-2015 \[Section No. B.310.15\(B\)\(2\)\]](#)

Referenced correct SDO name, standard name, number, and edition.

[Public Comment No. 47-NFPA 70-2015 \[Section No. 770.44\(B\)\]](#)

Referenced correct SDO name, standard name, number, and edition.

[Public Comment No. 49-NFPA 70-2015 \[Section No. 800.44\(B\)\]](#)

Referenced correct SDO name, standard name, number, and edition.

[Public Comment No. 50-NFPA 70-2015 \[Section No. 800.90\(A\)\]](#)

Referenced correct SDO name, standard name, number, and edition.

[Public Comment No. 51-NFPA 70-2015 \[Section No. 800.182\(A\)\]](#)

Referenced correct SDO name, standard name, number, and edition.

[Public Comment No. 52-NFPA 70-2015 \[Section No. 830.44\(C\)\]](#)

Referenced correct SDO name, standard name, number, and edition.

[Public Comment No. 53-NFPA 70-2015 \[Section No. 840.44\(B\)\]](#)

Referenced correct SDO name, standard name, number, and edition.

[Public Comment No. 66-NFPA 70-2015 \[Section No. 620.23\(C\)\]](#)

Referenced correct SDO name, standard name, number, and edition.

[Public Comment No. 67-NFPA 70-2015 \[Section No. 620.24\(C\)\]](#)

Referenced correct SDO name, standard name, number, and edition.

[Public Comment No. 68-NFPA 70-2015 \[Section No. 620.51\(A\)\]](#)

Referenced correct SDO name, standard name, number, and edition.

[Public Comment No. 69-NFPA 70-2015 \[Section No. 620.91 \[Excluding any Sub-Sections\]\]](#)

Referenced correct SDO name, standard name, number, and edition.

[Public Comment No. 70-NFPA 70-2015 \[Section No. 645.5\(E\)\(2\)\]](#)

Referenced correct SDO name, standard name, number, and edition.

[Public Comment No. 71-NFPA 70-2015 \[Section No. 646.7\(C\)\]](#)

Referenced correct SDO name, standard name, number, and edition.

[Public Comment No. 85-NFPA 70-2015 \[Section No. 110.24\(A\)\]](#)

Referenced correct SDO name, standard name, number, and edition.

[Public Comment No. 86-NFPA 70-2015 \[Section No. 110.16\(B\)\]](#)

Referenced correct SDO name, standard name, number, and edition.

[Public Comment No. 92-NFPA 70-2015 \[Section No. 110.28\]](#)

Referenced correct SDO name, standard name, number, and edition.

[Public Comment No. 107-NFPA 70-2015 \[Section No. 500.5\(A\)\]](#)

Referenced correct SDO name, standard name, number, and edition.

[Public Comment No. 95-NFPA 70-2015 \[Section No. 620.1\]](#)

[Public Comment No. 96-NFPA 70-2015 \[Definition: Equipment Rack.\]](#)

[Public Comment No. 101-NFPA 70-2015 \[Section No. 690.7\]](#)

[Public Comment No. 110-NFPA 70-2015 \[Section No. 500.6\(A\)\(4\)\]](#)

[Public Comment No. 111-NFPA 70-2015 \[Section No. 505.2\]](#)

[Public Comment No. 112-NFPA 70-2015 \[Section No. 505.5\]](#)

[Public Comment No. 114-NFPA 70-2015 \[Section No. 505.6 \[Excluding any Sub-Sections\]\]](#)

Related Item

[First Revision No. 329-NFPA 70-2015 \[Section No. 210.12\(A\)\]](#)

Submitter Information Verification

Submitter Full Name: Aaron Adamczyk

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Submission Date: Mon Jun 29 23:57:15 EDT 2015

**Public Comment No. 36-NFPA 70-2015 [Section No. 210.12(B)]****(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- units shall be protected by a listed arc-fault circuit interrupter meeting the requirements of [210.12\(A\)\(1\)](#) through (6) as appropriate.

Statement of Problem and Substantiation for Public Comment

Whereas the need for AFCI protection has been satisfactorily demonstrated, expanding its application throughout the dormitory unit is consistent with the companion change proposed in 210.12(A).

Related Item

[First Revision No. 351-NFPA 70-2015 \[Section No. 210.12\(C\)\]](#)

Submitter Information Verification

Submitter Full Name: J GRANT HAMMETT

Organization: COLORADO STATE ELECTRICAL BOARD

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Submittal Date: Wed Jun 24 14:27:59 EDT 2015

**Public Comment No. 676-NFPA 70-2015 [Section No. 210.12(B)]****(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, kitchens, and similar rooms shall be protected by a listed arc-fault circuit interrupter meeting the requirements of [210.12\(A\)\(1\)](#) through (6) as appropriate.

Statement of Problem and Substantiation for Public Comment

We recently experienced a costly fire event in a college dormitory kitchen walk-in refrigerator. A section of heat tracing cable starting arcing but did not trip the circuit breaker. The fault escalated into sparks and fire igniting stored items.

A dry sprinkler fused and discharged inside the walk-in refrigerator. The incident caused a significant damage to a central college dormitory, closing the facility.

I believe an AFCI may have prevented the incident. Code section 210.12 (A) Dwelling Units includes kitchen circuits. Code section 210.12 (C) should include kitchens as well.

Related Item

[First Revision No. 351-NFPA 70-2015 \[Section No. 210.12\(C\)\]](#)

Submitter Information Verification

Submitter Full Name: Paul Dunphy

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Affiliation: Campus Services, Engineering and Utilities

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City:

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Submittal Date: Wed Sep 16 14:14:52 EDT 2015

**Public Comment No. 815-NFPA 70-2015 [Section No. 210.12(B)]**

(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 a ~~listed arc-fault circuit interrupter meeting the requirements of any of the means described in~~ 210.12(A)(1) through (6) ~~as appropriate~~ .

Statement of Problem and Substantiation for Public Comment

"As appropriate" is a vague and unenforceable term. Delete in accordance with NEC® Style Manual 3.2.1.

As worded, the arc-fault circuit-interrupter could be required to meet ALL of the requirements of 210.12(A)(1) through 210.12(A)(6).

Revise wording to match how 210.12(A) expresses the same. All means in 210.12(A)(1) through 210.12(A)(6) are already specified as being listed; redundant to repeat here.

Related Item

First Revision No. 351-NFPA 70-2015 [Section No. 210.12(C)]

Submitter Information Verification

Submitter Full Name: VINCE BACLAWSKI

Organization: NEMA

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Submittal Date: Mon Sep 21 09:18:49 EDT 2015

**Public Comment No. 1752-NFPA 70-2015 [Section No. 210.12(C)]**

(C) Branch Circuit Extensions or Modifications — Dwelling Units and Dormitory Units.

In any of the areas specified in [210.12\(A\)](#) or [210.12\(C\)](#), where branch-circuit wiring is modified, replaced, or extended, the branch circuit shall be protected by one of the following:

- (1) A listed combination-type AFCI located at the origin of the branch circuit
- (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 conductors is not more than 1.8 m (6 ft) and does not include any additional outlets or devices.

Statement of Problem and Substantiation for Public Comment

The Correlating Committee directs that section 210.12(D) be rewritten with respect to "as appropriate" to comply with the NEC Style Manual.

Related Item

[First Revision No. 350-NFPA 70-2015 \[Section No. 210.12\(B\)\]](#)

Submitter Information Verification

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Submittal Date: Mon Sep 28 14:52:30 EDT 2015

**Public Comment No. 682-NFPA 70-2015 [Section No. 210.12(C)]****(C D) Branch Circuit Extensions or Modifications — Dwelling Units and Dormitory Units.**

In any of the areas specified in [210.12\(A\)](#) or [210.12\(C\)](#), where branch-circuit wiring is modified, replaced, or extended, the branch circuit shall be protected by one of the following:

- (1) A listed combination-type AFCI located at the origin of the branch circuit
- (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 conductors is not more than 1.8 m (6 ft) and does not include any additional outlets or devices.

Statement of Problem and Substantiation for Public Comment

This section should be moved down to the bottom and the reference dwelling unit and dormitory units should be removed. This way the section will now apply to A- Dwelling's, B -dormitory's and and C- guest suites. a companion PC will be submitted to change 210.12 (D) to (C)

Related Item

[Public Input No. 3009-NFPA 70-2014 \[Section No. 210.12\(B\)\]](#)

[First Revision No. 350-NFPA 70-2015 \[Section No. 210.12\(B\)\]](#)

Submitter Information Verification

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Submittal Date: Wed Sep 16 18:22:09 EDT 2015

**Public Comment No. 816-NFPA 70-2015 [Section No. 210.12(C)]**

(C) Branch Circuit Extensions or Modifications — Dwelling Units and Dormitory Units.

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

- (1) A listed combination-type AFCI located at the origin of the branch circuit
- (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 conductors is not more than 1.8 m (6 ft) and does not include any additional outlets or devices.

Statement of Problem and Substantiation for Public Comment

Correlation issue. First Revisions FR 350 and FR 351 revised the subdivision of 210.12, redesignating 210.12(B) as 210.12(C) and 210.12(C) as 210.12(B). The addition in FR 350 in redesignated 210.12(C) of "or 210.12(C)" results in a circular reference to itself.

Related Item

[First Revision No. 350-NFPA 70-2015 \[Section No. 210.12\(B\)\]](#)

Submitter Information Verification

Submitter Full Name: VINCE BACLAWSKI

Organization: NEMA

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City:

State:

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Submittal Date: Mon Sep 21 09:23:14 EDT 2015

**Public Comment No. 1573-NFPA 70-2015 [Section No. 210.12(D)]**

(D) – ~~Guest Rooms and Guest Suites.~~

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 shall be protected by a listed arc-fault circuit interrupter meeting the requirements of [210.12\(A\)\(1\)](#) through (6) as appropriate.

[delete section](#)

Statement of Problem and Substantiation for Public Comment

There was no technical data or sufficient substantiation indicating problems or hazards relating directly to guest rooms to add this section to the code. Hotel and motel rooms are wired and managed differently than dwelling units and should not be subject to the same requirements without data to support it.

Related Item

[First Revision No. 352-NFPA 70-2015 \[New Section after 210.12\(C\)\]](#)

Submitter Information Verification

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Submittal Date: Fri Sep 25 14:34:58 EDT 2015



Public Comment No. 683-NFPA 70-2015 [Section No. 210.12(D)]

(D C) Guest Rooms and Guest Suites.

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 shall be protected by a listed arc-fault circuit interrupter meeting the requirements of [210.12\(A\)\(1\)](#) through (6) as appropriate.

Statement of Problem and Substantiation for Public Comment

see companion PC 682. this change would make the modification allowance apply to all sections

Related Item

[First Revision No. 350-NFPA 70-2015 \[Section No. 210.12\(B\)\]](#)

[First Revision No. 352-NFPA 70-2015 \[New Section after 210.12\(C\)\]](#)

Submitter Information Verification

Submitter Full Name: ALFIO TORRISI

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Submittal Date: Wed Sep 16 18:34:24 EDT 2015

**Public Comment No. 818-NFPA 70-2015 [Section No. 210.12(D)]**

(D) _ Guest Rooms and Guest Suites.

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 shall be protected by ~~a listed arc-fault circuit interrupter meeting the requirements of~~ any of the means described in 210.12(A)(1) through (6) as appropriate .

Statement of Problem and Substantiation for Public Comment

NEMA supports the First Revision going forward but essential revisions are necessary to avoid misinterpretation and enforceability issues.

“As appropriate” is a vague and unenforceable term. Delete in accordance with NEC® Style Manual 3.2.1.

As worded, the arc-fault circuit-interrupter could be required to meet ALL of the requirements of 210.12(A)(1) through 210.12(A)(6). Revise wording to match how 210.12(A) expresses the same. All means in 210.12(A)(1) through 210.12(A)(6) are already specified as being listed; redundant to repeat here.

Related Item

First Revision No. 352-NFPA 70-2015 [New Section after 210.12(C)]

Submitter Information Verification

Submitter Full Name: VINCE BACLAWSKI

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Submittal Date: Mon Sep 21 09:26:15 EDT 2015

**Public Comment No. 684-NFPA 70-2015 [Section No. 210.17]**

~~210.17 - Guest Rooms and Guest Suites.~~

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

Statement of Problem and Substantiation for Public Comment

This is already in section 210.60 and should be removed

Related Item

[First Revision No. 357-NFPA 70-2015 \[Section No. 210.3\]](#)

Submitter Information Verification

Submitter Full Name: ALFIO TORRISI

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Submittal Date: Wed Sep 16 18:44:07 EDT 2015

**Public Comment No. 373-NFPA 70-2015 [Section No. 210.19]**210.19 Conductors — Minimum Ampacity and Size.(A) Branch Circuits Not More Than 600 Volts.

Informational Note No. 1: See [310.15](#) for ampacity ratings of conductors.

Informational Note No. 2: See Part II of Article [430](#) for minimum rating of motor branch-circuit conductors.

Informational Note No. 3: See [310.15\(A\)\(3\)](#) for temperature limitation of conductors.

Informational Note No. 4: 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.

(1) General.

~~Branch-circuit conductors shall have an ampacity not less than the maximum load to be served.~~ Conductors shall be sized to carry not less than the larger of [210.19\(A\)\(1\)\(a\)](#) or (b).

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

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

Exception: If the assembly, including the overcurrent devices protecting the branch circuit(s), is listed for operation at 100 percent of its rating, the allowable ampacity of the branch-circuit conductors shall be permitted to be not less than the sum of the continuous load plus the noncontinuous load.

(2) 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.

(3) 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 8 ¾ kW or more rating, the minimum branch-circuit rating shall be 40 amperes.

Exception No. 1: Conductors tapped from a 50-ampere branch circuit 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 8 ¾ -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.

(4) 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\(A\)\(3\)](#) 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:

(a) Individual lampholders or luminaires with taps extending not longer than 450 mm (18 in.) beyond any portion of the lampholder or luminaire

(b) A luminaire having tap conductors as provided in [410.117](#)

(c) Individual outlets, other than receptacle outlets, with taps not over 450 mm (18 in.) long

(d) Infrared lamp industrial heating appliances (e) 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 Over 600 Volts.

The ampacity of conductors shall be in accordance with [310.15](#) and [310.60](#), 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:

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

Statement of Problem and Substantiation for Public Comment

I agree with the Panel's statement for PI 1268, that two separate comparisons are required to size the conductor properly. I still maintain that the current text is confusing. I would first ask the Panel if there is a difference between ampacity, which is defined in Article 100, and allowable ampacity which is not. I have asked numerous users of the Code to read the current text of [210.19\(A\)](#) and describe the difference between allowable ampacity and ampacity. The majority respond that an ampacity is read from a table in [310.15](#) such as Table [310.15\(B\)\(16\)](#), and an allowable ampacity results from considering conditions of use and applying adjustment and correction factors. Although this is incorrect and actually backwards, the language in the text of [210.19\(A\)\(1\)\(b\)](#) of "an allowable ampacity not less than the maximum load to be served after the application of any adjustment or correction factors." leads users of the Code to believe an allowable ampacity results from considering conditions of use. Again, this is incorrect. If ampacity is defined in Article 100 as considering the conditions of use, and an allowable ampacity is from an allowable ampacity table in [310.15](#) such as Table [310.15\(B\)\(16\)](#), how can there be an allowable ampacity after conditions of use? After conditions of use and adjustment and correction factors have been applied, is not the result an ampacity, not an allowable ampacity? The current charging text of [210.19\(A\)\(1\)](#) requires the conductor to have an ampacity not less than the maximum load to be served. How is the intent of that statement any different than the intent of [210.19\(A\)\(1\)\(b\)](#)? I have proposed removing text in the charging language of [210.19\(A\)\(1\)](#), only as it seems to be redundant with [210.19\(A\)\(1\)\(b\)](#), it would be fine if it remained. In [210.19\(A\)\(1\)\(b\)](#), I have removed the word allowable as the current text is technically incorrect and inconsistent with the definition of ampacity and allowable ampacity tables of [310.15](#) and it is causing confusion. If the panel disagrees, then I ask for the Panel to clarify the two separate comparisons by defining the difference between ampacity and allowable ampacity as used in this section since both terms are used.

Related Public Comments for This Document

Related Comment

[Public Comment No. 393-NFPA 70-2015 \[Section No. 215.2\(A\)\(1\)\]](#)

[Public Comment No. 1555-NFPA 70-2015 \[Section No. 230.42\(A\)\]](#)

Related Item

[Public Input No. 1268-NFPA 70-2014 \[Section No. 210.19\(A\)\(1\)\]](#)

Relationship

Submitter Information Verification

Submitter Full Name: DERRICK ATKINS

Organization: Minneapolis Electrical JATC

Street Address:

City:

State:

Zip:

Submission Date: Tue Aug 04 17:56:42 EDT 2015

**Public Comment No. 54-NFPA 70-2015 [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, and fixed cabinets that do not have countertops or 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

Statement of Problem and Substantiation for Public Comment

To correlate with 210.52(C)(5). First Revision FR 308 to 210.52(C)(5) raised the issue of installation of receptacles in work surfaces by revising the Information Note to additionally include work surfaces. The Committee Statement for First Revision FR324 nonetheless makes it clear that the intent is not to address kitchen countertops alone.

Consequently, 210.52(C)(5), 210.52(A)(2), 210.52(A)(4), and 210.52(C) need to include requirements for receptacles outlets in work surfaces.

Related Item

[First Revision No. 324-NFPA 70-2015 \[Section No. 210.52\(A\)\(2\)\]](#)

[First Revision No. 308-NFPA 70-2015 \[Section No. 210.52\(C\)\(5\)\]](#)

Submitter Information Verification

Submitter Full Name: BRIAN ROCK

Organization: HUBBELL INCORPORATED

Street Address:

City:

State:

Zip:

Submittal Date: Thu Jun 25 10:51:51 EDT 2015

**Public Comment No. 928-NFPA 70-2015 [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, and fixed cabinets that do not have countertops and fireplaces.~~
- (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

Statement of Problem and Substantiation for Public Comment

All the CMP 2 discussion that resulted in the term “fixed cabinets” being added in 2011 was directly related to the receptacle outlets provided for the wall spaces above the countertops in kitchens, pantries, breakfast rooms and dining rooms. This was not to say the receptacle outlet could not be used for an appliance that was not located on the countertop, say a vacuum cleaner, but that the receptacle outlet would not qualify as the required receptacle outlet for an adjacent wall space. There is no doubt the 2011 action created the unintended consequence of eliminating the requirement for a receptacle outlet in rooms such as libraries which had fixed cabinets around the entire floor line of the room.

CMP 2 attempted to address the situation in the First Draft by adding the words “without countertops” to 210.52(A)(2)(1) which does not correct the unintended consequences of 2011 and will add additional confusion. What qualifies as a “countertop” in a library or a den?

Section 210.52(A)(4) already restricts receptacle outlets above countertops in kitchens, pantries, breakfast rooms and dining rooms from qualifying for adjacent wall spaces so the 2011 action was unnecessary. Removing “and fixed cabinets without countertops” from 210.52(A)(2)(1) will address the unintended consequences of the 2011 action without compromising the intent of the First Draft revision.

Related Item

[First Revision No. 324-NFPA 70-2015 \[Section No. 210.52\(A\)\(2\)\]](#)

Submitter Information Verification

Submitter Full Name: DAVID CLEMENTS

Organization: INTL ASSOC ELEC INSP

Street Address:

City:

State:

Zip:

Submission Date: Tue Sep 22 12:41:04 EDT 2015



Public Comment No. 55-NFPA 70-2015 [Section No. 210.52(A)(4)]

(4) Countertop ~~Receptacles~~ and Work Surface Receptacle Outlets .

Receptacles installed for ~~countertop~~ ~~countertops~~ and ~~work~~ surfaces as specified in 210.52(C) shall not be considered as the ~~receptacles~~ ~~receptacle outlets~~ required by 210.52(A).

Statement of Problem and Substantiation for Public Comment

To avoid confusion and misinterpretations, and improve readability of the Code.

First Revision FR 308 to 210.52(C)(5) raised the issue of installation of receptacles in work surfaces by revising the Information Note to additionally include work surfaces. The Committee Statement for First Revision FR324 nonetheless makes it clear that the intent is not to address kitchen countertops alone.

Consequently, 210.52(C)(5), 210.52(A)(2), 210.52(A)(4), and 210.52(C) need to include requirements for receptacles outlets in work surfaces.

Related Item

[First Revision No. 308-NFPA 70-2015 \[Section No. 210.52\(C\)\(5\)\]](#)

[First Revision No. 324-NFPA 70-2015 \[Section No. 210.52\(A\)\(2\)\]](#)

Submitter Information Verification

Submitter Full Name: BRIAN ROCK

Organization: HUBBELL INCORPORATED

Street Address:

City:

State:

Zip:

Submittal Date: Thu Jun 25 11:13:39 EDT 2015

**Public Comment No. 1031-NFPA 70-2015 [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 branch circuit as defined in 210.70(A)(1), Exception No. 1, shall be permitted.

Exception No. 2: The receptacle outlet for refrigeration equipment shall be permitted to be supplied from an individual branch circuit rated 15 amperes or greater.

____ Exception No. 3: A single receptacle dedicated to a specific appliance supplied by an individual branch circuit.

Statement of Problem and Substantiation for Public Comment

Apparently the Panel failed in the substantiation to notice their response was contradicted by Exception No. 3 in this same Section. The Exception for refrigerators was added to allow the 15-ampere outlet and not to be bound by the small appliance circuit receptacle rule. Certain appliances are installed on dedicated circuits by cord and plug connections in the kitchen area regularly. The refrigerator Exception is the only permitted non-small appliance circuit supplied now for other appliances. There is no link stating that the individual branch circuit may be permitted as an Exception, as they have indicated.

Related Item

Public Input No. 3807-NFPA 70-2014 [Section No. 210.52(B)(1)]

Submitter Information Verification

Submitter Full Name: Ron Chilton
Organization: North Carolina Code Clearing Committee
Street Address:
City:
State:
Zip:
Submission Date: Wed Sep 23 10:01:19 EDT 2015


Public Comment No. 56-NFPA 70-2015 [Section No. 210.52(C)]
(C) Countertops and Work Surfaces .

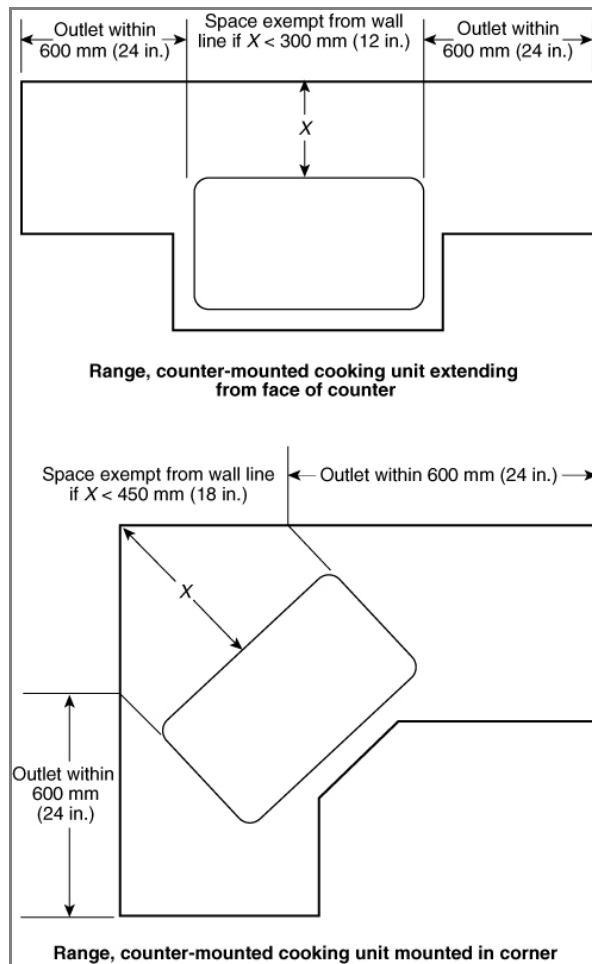
In kitchens, pantries, breakfast rooms, dining rooms, and similar areas of dwelling units, receptacle outlets for countertop and work surface spaces shall be installed in accordance with 210.52(C)(1) through (C)(5).

(1) Wall Countertop and Work Surface Spaces.

A receptacle outlet shall be installed at each wall countertop and work surface space that is 300 mm (12 in.) or wider. 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 on a wall directly behind a range, counter-mounted cooking unit, or sink in the installation described in Figure 210.52(C)(1).

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


(2) Island Countertop Spaces.

At least one receptacle shall be installed at each island countertop space with a long dimension of 600 mm (24 in.) or greater and a short dimension of 300 mm (12 in.) or greater.

(3) Peninsular Countertop Spaces.

At least one receptacle outlet shall be installed at each peninsular countertop long dimension space with a long dimension of 600 mm (24 in.) or greater and a short dimension of 300 mm (12 in.) or greater. A peninsular countertop is measured from the connected perpendicular wall.

A receptacle in a wall countertop space shall be permitted to serve as the receptacle for a peninsular countertop space where the spaces are contiguous and the receptacle is located within 1.8 m (6 ft) of the outside edge of the peninsular countertop.

(4) Separate Spaces.

Countertop spaces separated by rangetops, refrigerators, or sinks shall be considered as separate countertop spaces in applying the requirements of 210.52(C)(1). If a range, counter-mounted cooking unit, or sink is installed in an island or peninsular countertop and the depth of the countertop behind the range, counter-mounted cooking unit, or sink is less than 300 mm (12 in.), the range, counter-mounted cooking unit, or sink shall be considered to divide the countertop space into two separate countertop spaces. Each separate countertop space shall comply with the applicable requirements in 210.52(C).

(5) Receptacle Outlet Location.

Receptacle outlets shall be located on or above, but not more than 500 mm (20 in.) above, the countertop. Receptacle outlet assemblies listed for use in countertops shall be permitted to be installed in countertops. Receptacle outlets rendered not readily accessible by appliances fastened in place, appliance garages, sinks, or rangetops as covered in 210.52(C)(1), Exception, or appliances occupying dedicated space shall not be considered as these required outlets.

Informational Note: See 406.5(E) for requirements for installation of receptacles in countertops and 406.5(F) for requirements for installation in work surfaces.

Exception to (5): To comply with the conditions specified in (1) or (2), receptacle outlets shall be permitted to be mounted not more than 300 mm (12 in.) below the countertop. Receptacles mounted below a countertop in accordance with this exception shall not be located where the countertop extends more than 150 mm (6 in.) beyond its support base.

(1) Construction for the physically impaired

(2) On island and peninsular countertops where the countertop is flat across its entire surface (no backsplashes, dividers, etc.) and there are no means to mount a receptacle within 500 mm (20 in.) above the countertop, such as an overhead cabinet

Statement of Problem and Substantiation for Public Comment

To avoid confusion and misinterpretations, and improve readability of the Code.

First Revision FR 308 to 210.52(C)(5) raised the issue of installation of receptacles in work surfaces by revising the Information Note to additionally include work surfaces. The Committee Statement for First Revision FR324 nonetheless makes it clear that the intent is not to address kitchen countertops alone.

Consequently, 210.52(C)(5), 210.52(A)(2), 210.52(A)(4), and 210.52(C) need to include requirements for receptacles outlets in work surfaces.

Related Item

[First Revision No. 308-NFPA 70-2015 \[Section No. 210.52\(C\)\(5\)\]](#)

[First Revision No. 324-NFPA 70-2015 \[Section No. 210.52\(A\)\(2\)\]](#)

Submitter Information Verification

Submitter Full Name: BRIAN ROCK

Organization: HUBBELL INCORPORATED

Street Address:

City:

State:

Zip:

Submission Date: Thu Jun 25 11:44:54 EDT 2015

**Public Comment No. 525-NFPA 70-2015 [Section No. 210.52(C)(3)]****(3) Peninsular Countertop Spaces.**

At least one receptacle outlet shall be installed at each peninsular countertop ~~long dimension~~ space with a long dimension of 600 mm (24 in.) or greater and a short dimension of 300 mm (12 in.) or greater. A peninsular countertop is measured from the ~~connected perpendicular wall~~ outer end to the connection to the perpendicular countertop surface.

A receptacle in a wall countertop space shall be permitted to serve as the receptacle for a peninsular countertop space where the spaces are contiguous and the receptacle is located within 1.8 m (6 ft) of the outside ~~edge~~ end of the peninsular countertop.

Statement of Problem and Substantiation for Public Comment

The original wording was unclear. A peninsular counter does not always connect to a wall but sometimes connects to another counter. The comment hopefully suggests clearer wording.

Related Item

First Revision No. 356-NFPA 70-2015 [Section No. 210.52(C)(3)]

Submitter Information Verification

Submitter Full Name: J. Grant Hammett

Organization: Colorado State Electrical Board

Street Address:

City:

State:

Zip:

Submittal Date: Thu Sep 03 15:51:52 EDT 2015



Public Comment No. 572-NFPA 70-2015 [Section No. 210.52(C)(3)]

(3) Peninsular Countertop Spaces.

At least one receptacle outlet shall be installed at each peninsular countertop long dimension space with a long dimension of 600 mm (24 in.) or greater and a short dimension of 300 mm (12 in.) or greater. A peninsular countertop is measured from the connected perpendicular wall. A receptacle in a wall countertop space shall be permitted to serve as the receptacle for a peninsular countertop space where the spaces are contiguous and the receptacle is located within 1.8 m (6 ft) of the outside edge of the peninsular countertop connecting edge .

Additional Proposed Changes

<u>File Name</u>	<u>Description</u> <u>Approved</u>
210.52_C_3_.docx	210.52(C)(3)

Statement of Problem and Substantiation for Public Comment

I urge CMP-2 to accept this Public Comment and return this Code language to its previous text in the 2014 NEC. By accepting the Public Input and First Revision at 210.52(C)(3), safety for the user (typically the homeowner) is lessened from the previous requirements for a receptacle at a peninsular countertop. The language accepted at the First Draft stage would allow a receptacle outlet at the connecting wall (which serves the base countertop) to also serve the peninsular countertop. The end of the peninsular countertop could be as far away from the wall receptacle as 1.8 m (6 ft). Under the 2014 NEC, a peninsular countertop that measures 600 mm (24 in.) by 900 mm (36 in.) (measured from the connecting edge) would require at least one receptacle outlet (located at the peninsular countertop) to serve that peninsular countertop. Under the proposed text of the 2017 NEC, this same peninsular countertop would require ZERO receptacles at the peninsular countertop as the countertop could be served by the wall receptacle [that could be up to 1.8 m (6 ft) away from the end of said countertop].

Related Item

[First Revision No. 356-NFPA 70-2015 \[Section No. 210.52\(C\)\(3\)\]](#)

[Public Input No. 3605-NFPA 70-2014 \[Section No. 210.52\(C\)\(3\)\]](#)

Submitter Information Verification

Submitter Full Name: L. Keith Lofland
Organization: International Association of Electrical Inspectors (IAEI)
Affiliation: None
Street Address:
City:
State:
Zip:
Submittal Date: Tue Sep 08 11:12:38 EDT 2015

**Public Comment No. 58-NFPA 70-2015 [Section No. 210.52(C)(5)]****(5) Countertop and Work Surface Receptacle Outlet Location.**

Receptacle outlets shall be located on or above, but not more than 500 mm (20 in.) above, the countertop or work surface .
~~Receptacle outlet assemblies listed for use in countertops shall be permitted to be installed in countertops. Receptacle outlets rendered not readily accessible by appliances fastened in place, appliance garages, sinks, or rangetops as covered in 210.52(C)(1), Exception, or appliances occupying dedicated space shall not be considered as these required outlets.~~

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

Exception to (5): To comply with the conditions specified in (1) or (2), receptacle outlets shall be permitted to be mounted not more than 300 mm (12 in.) below the countertop or work surface . Receptacles mounted below a countertop or work surface in accordance with this exception shall not be located where the countertop or work surface extends more than 150 mm (6 in.) beyond its support base.

- (1) *Construction for the physically impaired*
- (2) *On island and peninsular countertops where the countertop is flat across its entire surface (no backsplashes, dividers, etc.) and there are no means to mount a receptacle within 500 mm (20 in.) above the countertop, such as an overhead cabinet*

Statement of Problem and Substantiation for Public Comment

First Revision FR 308 to 210.52(C)(5) as written will add confusion, and reduce readability of the Code, and result in misinterpretations.

210.52(C)(5) by its title is intended to specify the LOCATION of REQUIRED countertop receptacle outlets, not the TYPE of eligible receptacles or receptacle assemblies already covered in 406.5(E) in 2014 NEC® [First Revision FR5108 divides that 406.5(E) into 406.5(E), (F) and (G) and rennumbers the remainder for the 2017 NEC®]. The Informational Note already directs the reader to 406.5(E); that Information Note, however, DOES need to be correlated with FR 5108 for the requirements now separated off into NEW 406.5(G). The second sentence of the mandatory requirement is nonetheless redundant to the mandatory requirement of referenced 406.5(E) and should therefore be deleted.

First Revision FR 308 to 210.52(C)(5) raised the issue of installation of receptacles in work surfaces by revising the Information Note to additionally include work surfaces. Nothing in the MANDATORY requirements of 210.52(C)(5) however addresses WORK SURFACE receptacle outlets as being REQUIRED outlets or imposes any location requirements upon WORK SURFACE receptacle outlets. The Committee Statement for First Revision FR324 nonetheless makes it clear that the intent is not to address kitchen countertops alone.

Consequently, 210.52(C)(5), 210.52(A)(2), 210.52(A)(4), and 210.52(C) need to include requirements for receptacles outlets in work surfaces.

Related Item

First Revision No. 308-NFPA 70-2015 [Section No. 210.52(C)(5)]

First Revision No. 5108-NFPA 70-2015 [Sections 406.5(E), 406.5(F), 406.5(G), 406.5(H)]

First Revision No. 324-NFPA 70-2015 [Section No. 210.52(A)(2)]

Submitter Information Verification

Submitter Full Name: BRIAN ROCK

Organization: HUBBELL INCORPORATED

Street Address:

City:

State:

Zip:

Submission Date: Thu Jun 25 12:06:47 EDT 2015

**Public Comment No. 820-NFPA 70-2015 [Section No. 210.52(C)(5)]****(5) _ Receptacle Outlet Location.**

Receptacle outlets shall be located on or above, but not more than 500 mm (20 in.) above, the countertop. Receptacle outlet assemblies listed for use in countertops shall be permitted to be installed in countertops. Receptacle outlet assemblies listed for use in countertops or work surfaces shall be permitted to be installed in work surfaces. Receptacle outlets rendered not readily accessible by appliances fastened in place, appliance garages, sinks, or rangetops as covered in [210.52\(C\)\(1\)](#), Exception, or appliances occupying dedicated space shall not be considered as these required outlets.

Informational Note: See [406.5\(E\)](#) and [406.5\(G\)](#) for requirements for installation of receptacles in countertops and [406.5\(F\)](#) and [406.5\(G\)](#) for requirements for installation of receptacles in work surfaces.

Exception to (5): To comply with the conditions specified in (1) or (2), receptacle outlets shall be permitted to be mounted not more than 300 mm (12 in.) below the countertop. Receptacles mounted below a countertop in accordance with this exception shall not be located where the countertop extends more than 150 mm (6 in.) beyond its support base.

- (1) *Construction for the physically impaired*
- (2) *On island and peninsular countertops where the countertop is flat across its entire surface (no backsplashes, dividers, etc.) and there are no means to mount a receptacle within 500 mm (20 in.) above the countertop, such as an overhead cabinet*

Statement of Problem and Substantiation for Public Comment

The First Revision FR 308 to 210.52(C)(5) raised the issue of installation of receptacles in work surfaces by revising the Information Note to additionally include work surfaces. Consequently, 210.52(C)(5) need to correlate to First Revision FR5108 that divides 406.5(E) into 406.5(E), (F) and (G) and renumbers the remainder for the 2017 NEC®, to include requirements for receptacles in work surfaces.

Related Item

[First Revision No. 308-NFPA 70-2015 \[Section No. 210.52\(C\)\(5\)\]](#)

Submitter Information Verification

Submitter Full Name: VINCE BACLAWSKI

Organization: NEMA

Street Address:

City:

State:

Zip:

Submission Date: Mon Sep 21 09:29:57 EDT 2015

**Public Comment No. 59-NFPA 70-2015 [Section No. 210.52(D)]****(D) Bathrooms.**

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

Informational Note: See [406.5\(E\)](#) and [406.5\(G\)](#) for requirements for installation of receptacles in countertops.

Statement of Problem and Substantiation for Public Comment

“Listed for the application” is considered to be a vague and unenforceable term per the NEC® Style Manual Clause 3.2.1. The First Revision FR 308 to 210.52(C)(5) revised “Receptacle outlet assemblies listed for the application ...” to “Receptacle outlet assemblies listed for use in countertops ...”. FR 309 should similarly revise 210.52(D), for consistency. BUT ...

210.52(D) is intended to specify the LOCATION of REQUIRED countertop receptacle outlets, not the TYPE of eligible receptacles or receptacle assemblies ALREADY covered in 406.5(E) in 2014 NEC® [First Revision FR5108 divides that 406.5(E) into 406.5(E), (F) and (G) and renumbers the remainder for the 2017 NEC®]. The Informational Note already directs the reader to 406.5(E); that Information Note, however, DOES need to be correlated with FR 5108 for the requirements now separated off into NEW 406.5(G). The third sentence of the mandatory requirement is nonetheless redundant to the mandatory requirement of referenced 406.5(E) and should therefore be deleted.

Additionally, FR 309 shows a sentence-case “At” being added to the start of this requirement but did not delete the lowercase “at”, resulting in “At at ...”.

Related Item

[First Revision No. 309-NFPA 70-2015 \[Section No. 210.52\(D\)\]](#)

[First Revision No. 5108-NFPA 70-2015 \[Sections 406.5\(E\), 406.5\(F\), 406.5\(G\), 406.5\(H\)\]](#)

Submitter Information Verification

Submitter Full Name: BRIAN ROCK

Organization: HUBBELL INCORPORATED

Street Address:

City:

State:

Zip:

Submittal Date: Thu Jun 25 12:44:06 EDT 2015

**Public Comment No. 821-NFPA 70-2015 [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. The receptacle outlet shall be located on a wall or partition that is adjacent to the basin or basin countertop, located on the countertop, or installed on the side or face of the basin cabinet. In no case shall the receptacle be located more than 300 mm (12 in.) below the top of the basin or basin countertop. Receptacle outlet assemblies listed for ~~the application-~~ use in countertops shall be permitted to be installed in the countertop.

Informational Note: See [406.5\(E\)](#) for requirements for installation of receptacles in countertops.

Statement of Problem and Substantiation for Public Comment

The First Revision FR 308 to 210.52(C)(5) revised "Receptacle outlet assemblies listed for the application ..." to "Receptacle outlet assemblies listed for use in countertops ...". Similarly, FR 309 to 210.52(D) should make the same revision for consistency.

Related Item

[First Revision No. 309-NFPA 70-2015 \[Section No. 210.52\(D\)\]](#)

Submitter Information Verification

Submitter Full Name: VINCE BACLAWSKI

Organization: NEMA

Street Address:

City:

State:

Zip:

Submittal Date: Mon Sep 21 09:34:21 EDT 2015

**Public Comment No. 1237-NFPA 70-2015 [Section No. 210.52(E) [Excluding any Sub-Sections]]**

Outdoor receptacle outlets shall be installed in accordance with [210.52\(E\)\(1\)](#) through (E)(3). When an addition is made to an existing dwelling which includes the addition of receptacle outlets required in accordance with [210.52\(A\)](#), at least one exterior GFCI receptacle outlet shall be provided.

Informational Note: See [210.8\(A\)\(3\)](#).

Statement of Problem and Substantiation for Public Comment

The intent is to require that when an addition is being made including electrical work for the addition, the finished building shall be provided with an exterior protected (GFCI) outlet. This could be an existing exterior receptacle outlet that is changed to include GFCI, or it could be a whole new exterior receptacle outlet with GFCI.

Related Item

[Public Input No. 2904-NFPA 70-2014 \[Section No. 210.52\(E\)\]](#)

Submitter Information Verification

Submitter Full Name: Jim Muir

Organization: Building Safety Division, Clark County, WA

Affiliation: NFPAs Building Code Development Committee (BCDC)

Street Address:

City:

State:

Zip:

Submittal Date: Thu Sep 24 15:10:45 EDT 2015

**Public Comment No. 550-NFPA 70-2015 [New Section after 210.52(E)(3)]****TITLE OF NEW CONTENT**

Exception.

A receptacle outlet shall not be required if no walking surface is available and the receptacle outlet cannot be installed accessible from the opening leading to the balcony, deck or porch

Additional Proposed Changes

File Name **Description Approved**

deck.jpg

Statement of Problem and Substantiation for Public Comment

the receptacle cannot be reached in this type of installation Please see photo attached, an exception should be provide for this situation.

Related Item

Public Input No. 4235-NFPA 70-2014 [Section No. 210.52(3)]

Submitter Information Verification

Submitter Full Name: ALFIO TORRISI

Organization: master

Street Address:

City:

State:

Zip:

Submittal Date: Fri Sep 04 14:14:36 EDT 2015

**Public Comment No. 1549-NFPA 70-2015 [Section No. 210.52(G)(1)]**

(1) _ Garages.

In each attached garage and in each detached garage with electric power, the branch circuit supplying this receptacle(s) shall not supply outlets outside of the garage. At least one receptacle outlet shall be installed in each vehicle bay and not more than 1.7 m (5 ½ ft) above the floor.

Exception: Recepticals required by 210.52 (E) shall be permitted to be supplied by this branch circuit.

Statement of Problem and Substantiation for Public Comment

There is no adequate substantiation to support that other receptacles should not be allowed on this circuit. Article 210.11(C)(3) will now require this circuit to be a 20 amp circuit. A power tool that draws 16 amps was used as substantiation in the FR. Power tools are seldom used in the average home owners garage. Hair dryers that draw 16 amps are more likely to be used in bathrooms and at times more than one at the same because of multiple bathrooms. The NEC does not require individual branch circuits to bathrooms.

Related Item

First Revision No. 317-NFPA 70-2015 [Section No. 210.52(G)(1)]

Submitter Information Verification

Submitter Full Name: Michael Weaver

Organization: M&W Electric

Affiliation: NECA

Street Address:

City:

State:

Zip:

Submittal Date: Fri Sep 25 14:03:03 EDT 2015

**Public Comment No. 330-NFPA 70-2015 [Section No. 210.52(G)(1)]****(1) Garages.**

In each attached garage and in each detached garage with electric power, ~~the branch circuit supplying this receptacle(s) shall not supply outlets outside of the garage. At least one receptacle outlet shall be installed in each vehicle bay and not more than 1.7 m (5 - ¹/₂ - ft) above the floor.~~

Statement of Problem and Substantiation for Public Comment

This is a design issue and not an electrical safety issue and does not belong in the code. Also it is an attempt to provide power for electrical vehicle charging, but many such charging systems will require more power than required by the rule. Also vehicle bay is an undefined term. It is often considered the area where a vehicle would be parked and/or stored, but may not be defined by a wall where a receptacle could be installed.

Related Item

[First Revision No. 317-NFPA 70-2015 \[Section No. 210.52\(G\)\(1\)\]](#)

Submitter Information Verification

Submitter Full Name: DON GANIERE

Organization: [Not Specified]

Street Address:

City:

State:

Zip:

Submittal Date: Fri Jul 31 16:53:55 EDT 2015

**Public Comment No. 929-NFPA 70-2015 [Section No. 210.52(G)(1)]**

(1) _ Garages.

In each attached garage and in each detached garage with electric power, the branch circuit supplying this receptacle(s) shall not ~~supply outlets~~ supply outlets outside of the garage. At least one receptacle outlet shall be installed in each vehicle bay and not more than 1.7 m (5 ½ ft) above the floor.

Exception: The branch circuit shall be permitted to supply a receptacle outlet(s) on the outside of the garage.

Statement of Problem and Substantiation for Public Comment

Although the exception will restore the option to supply outdoor receptacle outlets on the garage from the required branch circuit inside of the garage, the revised wording will restrict lighting or other receptacle outlets from being supplied. The revised text "shall not supply other outlets" is consistent with other language in 210 restricting the use of branch circuits. Additionally, CMP 2 created a minimum requirement of 20 amperes for the garage branch circuit as a means of recognizing the increased use of the circuit for the First Draft. The requirements for the EV charging circuit are not considered by this section as the last sentence of 210.52(G) specifies the required receptacle(s) is in addition to those installed for specific equipment. The type of circuit required for EV charging will be addressed in 625 and/or the manufactures installation instructions for the equipment.

Related Item

Public Input No. 4303-NFPA 70-2014 [Section No. 210.52(G)(1)]

Submitter Information Verification

Submitter Full Name: DAVID CLEMENTS

Organization: INTL ASSOC ELEC INSP

Street Address:

City:

State:

Zip:

Submission Date: Tue Sep 22 12:45:56 EDT 2015

**Public Comment No. 954-NFPA 70-2015 [Section No. 210.52(G)(1)]**

(1) _ Garages.

In each attached garage and in each detached garage with electric power, ~~the branch circuit supplying this receptacle(s) shall not supply outlets outside of the garage~~ . At least one receptacle outlet shall be installed in each vehicle bay and not more than 1.7 m (5 ½ ft) above the floor.

Statement of Problem and Substantiation for Public Comment

A similar requirement for "no other outlets" is being proposed at 210.11(C)(4). Section 210.52 is requirements for dwelling unit receptacle outlets. A more appropriate location for this text that deals with the branch circuit supplying these receptacle outlets is 210.11(C), which deals with required branch circuits for dwelling units. The proposed deleted text deals with the branch circuit supplying the garage, not the receptacle outlet(s) itself.

Related Item

[First Revision No. 317-NFPA 70-2015 \[Section No. 210.52\(G\)\(1\)\]](#)

Submitter Information Verification

Submitter Full Name: L. Keith Lofland

Organization: International Association of Electrical Inspectors (IAEI)

Affiliation: None

Street Address:

City:

State:

Zip:

Submission Date: Tue Sep 22 15:17:32 EDT 2015

**Public Comment No. 685-NFPA 70-2015 [Section No. 210.60(A)]****(A) General.**

Guest rooms or guest suites in hotels, motels, sleeping rooms in dormitories, and similar occupancies shall have receptacle outlets installed in accordance with [210.52\(A\)](#) and (D). Guest rooms or guest suites provided with permanent provisions for cooking shall have receptacle outlets and branch circuits installed in accordance with all of the applicable rules in [210.52](#) -- for dwelling units.

Statement of Problem and Substantiation for Public Comment

eliminating 201.17 and bring all the requirements in one section making it easier to understand and enforce

Related Item

[Public Input No. 2728-NFPA 70-2014 \[Section No. 210.60\(A\)\]](#)

Submitter Information Verification

Submitter Full Name: ALFIO TORRISI

Organization: master

Street Address:

City:

State:

Zip:

Submittal Date: Wed Sep 16 18:58:57 EDT 2015

**Public Comment No. 1681-NFPA 70-2015 [Section No. 210.64]****210.64 – Electrical Service Areas.**

At least one 125-volt, single-phase, 15- or 20-ampere-rated receptacle outlet shall be installed in an accessible location within 7.5 m (25 ft) of the indoor electrical service equipment. The required receptacle outlet shall be located within the same room or area as the service equipment.

Exception No. 1: The receptacle outlet shall not be required to be installed in one- and two-family dwellings.

Exception No. 2: Where the service voltage is greater than 120 volts to ground, a receptacle outlet shall not be required for services dedicated to equipment covered in Articles 675 and 682.

Statement of Problem and Substantiation for Public Comment

This rule mandates that the customer owned substations that I've dealt with would need a 120V receptacle. This wasn't substantiated, and is absurd.

Related Item

[Public Input No. 1937-NFPA 70-2014 \[Section No. 210.64\]](#)

Submitter Information Verification

Submitter Full Name: RYAN JACKSON

Organization: RYAN JACKSON

Street Address:

City:

State:

Zip:

Submittal Date: Fri Sep 25 16:23:09 EDT 2015



Public Comment No. 33-NFPA 70-2015 [Section No. 210.64]

210.64 Electrical Service Areas.

At least one 125-volt, single-phase, 15- or 20-ampere-rated receptacle outlet shall be installed in an accessible location within 7.5 m (25 ft) of the indoor electrical service equipment. The required receptacle outlet shall be located within the same room or area as the service equipment.

Exception No. 1: The receptacle outlet shall not be required to be installed in one- and two-family dwellings.

Exception No. 2: Where the service voltage is greater than ~~120~~ 150 volts to ground, a receptacle outlet shall not be required for services dedicated to equipment covered in Articles ~~675~~ and ~~682~~ . .

Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
210_64.jpg	Oil Well Service	

Statement of Problem and Substantiation for Public Comment

For the sake of consistency with other NEC references, the voltage threshold should be 150 volts, not 120, as 150 is generally used throughout the NEC to refer to wye-connected systems with a line to neutral voltage greater than 120 volts. See 210.13, 215.10, 225.18, 230.24, 230.95, to name a few of many such references.

As proposed, the exception applies to only two categories of many. Removing the references to specific articles permits the exception to be used in any case where there is no 120 volt, nominal system available. Please see attached photo of a recent oil well service I inspected where the electrical contractor had attempted to comply with 210.64, adding over \$700. to the project cost, for a receptacle which might never be used.

Related Item

First Revision No. 323-NFPA 70-2015 [Section No. 210.64]

Submitter Information Verification

Submitter Full Name: J GRANT HAMMETT
Organization: COLORADO STATE ELECTRICAL BOARD
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 24 11:16:09 EDT 2015

3200051N23
S
PIN
#3BTR



**Public Comment No. 1034-NFPA 70-2015 [Section No. 210.70(A)(3)]**

(3) Storage or Equipment Spaces.

For attics, underfloor spaces, utility rooms, and basements, at least one lighting outlet containing a switch or controlled by a wall switch shall be installed where these spaces are used for storage or contain equipment requiring servicing. At least one point of control shall be at the usual point of entry to these spaces. The lighting outlet shall be provided at or near the equipment requiring servicing. Lamps installed in lighting outlets in these spaces, such as in lamp sockets, shall be protected from physical damage.

Statement of Problem and Substantiation for Public Comment

The protection warranted to prevent electric shock caused by contact from broken lamps would eliminate needs for other forms of required protections such as GFCI or AFCI to be extended in this area. The referenced 2014 death in North Carolina caused by a worker in a crawl space accidentally breaking a lamp bulb exposing the worker to contact with 120 volts could have been prevented by a small device such as those accepted in other areas for the same protection being placed over the lamp or bulb.

Code Making Panel 2 had stated that this protection was not under their purview however in other Code Sections the consideration that Luminaires subject to damage are specifically referenced to require protection from damage. The intent of the Public Input was to assure protection from the broken lamp exposing the energized filament.

Related Item

Public Input No. 2734-NFPA 70-2014 [Section No. 250.94]

Submitter Information Verification

Submitter Full Name: Ron Chilton
Organization: North Carolina Code Clearing Committee
Street Address:
City:
State:
Zip:
Submittal Date: Wed Sep 23 10:22:31 EDT 2015

**Public Comment No. 985-NFPA 70-2015 [Section No. 210.70(C)]**

(C) _ All Occupancies.

For attics and underfloor spaces, utility rooms, and basements, at least one lighting outlet containing a switch or controlled by a wall switch shall be installed where these spaces are used for storage or contain equipment requiring servicing. At least one point of control shall be at the usual point of entry to these spaces. The lighting outlet shall be provided at or near the equipment requiring servicing.

~~A lighting outlet installed in a crawl space shall be protected from physical damage or be provided with GFCI protection.~~

Statement of Problem and Substantiation for Public Comment

Although this requirement has merit, it is related to the type of lampholder or luminaire and should not be located in 210. It should be located in 410 where protection of lampholders, luminaires and their associated lamps are covered. Further, 210.70 is for required lighting outlets and therefore does address lampholders or luminaires. Other than enclosing the conductors, how do you protect a lighting outlet from physical damage? Additionally, providing GFCI protection for the lighting outlet in instead of guarding the lamp from contact by an individual does not address the true hazards of inadvertently contacting a hot lamp or from broken glass.

Related Item

[First Revision No. 315-NFPA 70-2015 \[Section No. 210.70\(C\)\]](#)

[Public Input No. 2702-NFPA 70-2014 \[Section No. 210.70\(A\)\(3\)\]](#)

Submitter Information Verification

Submitter Full Name: DAVID CLEMENTS

Organization: INTL ASSOC ELEC INSP

Street Address:

City:

State:

Zip:

Submittal Date: Tue Sep 22 18:24:53 EDT 2015



Public Comment No. 1594-NFPA 70-2015 [Section No. 210.71]

210.71 - Meeting Rooms.

(A) - General.

Each meeting room in other than dwelling units shall have nonlocking-type, 125-volt, 15- and 20-ampere receptacles installed in accordance with 210.71(B) through (E). Where a room or space is provided with movable partition(s), the room size shall be determined with the partition in the position that results in the smallest size meeting room.

Informational Note No. 1: For the purposes of this section, meeting rooms are typically designed or intended for the gathering of seated occupants for such purposes as conferences, deliberations, or similar purposes, where portable electronic equipment such as computers, projectors, or similar equipment is likely to be used.

Informational Note No. 2: The types of receptacles covered by this requirement are identified as 5-15 and 5-20 in ANSI/NEMA WD-6-2002, National Electrical Manufacturers Association - *Standard for Dimensions of Attachment Plugs and Receptacles*.

(B) - Receptacle Outlets in Fixed Walls.

In meeting rooms having a floor area of 70 m^2 (760 ft^2) or less, receptacle outlets shall be installed in accordance with 210.52(A) (A)(1) through (A)(4). These receptacle outlets shall be in addition to any receptacle outlets that are located within cabinets or cupboards, or located more than 1.7 m ($5 \frac{1}{2} \text{ ft}$) above the floor.

(C) - Floor Receptacle Outlets.

A meeting room that is at least 3.6 m (12ft) wide and that has a floor area of at least 21 m^2 (225 ft^2) and not more than 70 m^2 (760 ft^2) shall have at least one duplex- or quadruplex-type receptacle located in the floor at a distance not less than 1.8 m (6 ft) from any fixed wall.

(D) - Receptacle Outlets at Moveable Room Partitions.

At least one floor receptacle outlet shall be installed for each 3.7 linear m (12 linear ft) or major fraction thereof of movable wall measured horizontally along the floor line. These receptacle outlets shall be located within 450 mm (18 in.) of the partition.

(E) - Receptacle Outlet Placement.

In applying the provisions of this section, the total number of receptacle outlets shall not be less than as determined in (B), (C), and (D). The receptacle outlets required by this section shall be permitted to be located in accordance with municipal, state, federal, or other codes and regulations, or as determined by the designer/building owner.

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

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

[delete section](#)

Statement of Problem and Substantiation for Public Comment

No data or sufficient substantiation was provided that there have been problems or hazards with insufficient receptacles installed in meeting rooms to warrant adding this section. The committee statement was "the new section addresses the inherent life safety concerns relating to inadequate access to electrical power in meeting rooms" If data or substantiation were to be provided it is likely the same issues would still exist as this section is written.

Related Item

[First Revision No. 7517-NFPA 70-2015 \[New Section after 210.70\(B\)\]](#)

Submitter Information Verification

Submitter Full Name: Michael Weaver

Organization: M&W Electric

Affiliation: NECA

Street Address:

City:

State:

Zip:

Submission Date: Fri Sep 25 14:58:35 EDT 2015



Public Comment No. 1695-NFPA 70-2015 [Section No. 210.71]

210.71 - Meeting Rooms.

(A) - General.

Each meeting room in other than dwelling units shall have nonlocking-type, 125-volt, 15- and 20-ampere receptacles installed in accordance with 210.71(B) through (E). Where a room or space is provided with movable partition(s), the room size shall be determined with the partition in the position that results in the smallest size meeting room.

Informational Note No. 1: For the purposes of this section, meeting rooms are typically designed or intended for the gathering of seated occupants for such purposes as conferences, deliberations, or similar purposes, where portable electronic equipment such as computers, projectors, or similar equipment is likely to be used.

Informational Note No. 2: The types of receptacles covered by this requirement are identified as 5-15 and 5-20 in ANSI/NEMA WD-6-2002, National Electrical Manufacturers Association - *Standard for Dimensions of Attachment Plugs and Receptacles*.

(B) - Receptacle Outlets in Fixed Walls.

In meeting rooms having a floor area of 70 m^2 (760 ft^2) or less, receptacle outlets shall be installed in accordance with 210.52(A) (A)(1) through (A)(4). These receptacle outlets shall be in addition to any receptacle outlets that are located within cabinets or cupboards, or located more than 1.7 m ($5 \frac{1}{2} \text{ ft}$) above the floor.

(C) - Floor Receptacle Outlets.

A meeting room that is at least 3.6 m (12 ft) wide and that has a floor area of at least 21 m^2 (225 ft^2) and not more than 70 m^2 (760 ft^2) shall have at least one duplex- or quadruplex-type receptacle located in the floor at a distance not less than 1.8 m (6 ft) from any fixed wall.

(D) - Receptacle Outlets at Moveable Room Partitions.

At least one floor receptacle outlet shall be installed for each 3.7 linear m (12 linear ft) or major fraction thereof of movable wall measured horizontally along the floor line. These receptacle outlets shall be located within 450 mm (18 in.) of the partition.

(E) - Receptacle Outlet Placement.

In applying the provisions of this section, the total number of receptacle outlets shall not be less than as determined in (B), (C), and (D). The receptacle outlets required by this section shall be permitted to be located in accordance with municipal, state, federal, or other codes and regulations, or as determined by the designer/building owner.

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

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

Statement of Problem and Substantiation for Public Comment

This is a design issue and is outside of the purpose of the NEC, as described in 90.1(A). Furthermore, the substantiation provided by the submitter (CMP 2) would never have been adequate from anyone other than CMP2. The requirement for providing technical substantiation is proving to be a requirement for everyone but the panel. How many dead bodies are there? How many fires? What were the results of the cost benefit study that was performed? These are questions that panel two asks others, what are panel two's answers here?

Related Item

First Revision No. 7517-NFPA 70-2015 [New Section after 210.70(B)]

Submitter Information Verification

Submitter Full Name: RYAN JACKSON

Organization: RYAN JACKSON

Street Address:

City:

State:

Zip:

Submission Date: Fri Sep 25 16:33:47 EDT 2015



Public Comment No. 441-NFPA 70-2015 [Section No. 210.71]

210.71 - Meeting Rooms.

(A) - General.

Each meeting room in other than dwelling units shall have nonlocking-type, 125-volt, 15- and 20-ampere receptacles installed in accordance with 210.71(B) through (E). Where a room or space is provided with movable partition(s), the room size shall be determined with the partition in the position that results in the smallest size meeting room.

Informational Note No. 1: For the purposes of this section, meeting rooms are typically designed or intended for the gathering of seated occupants for such purposes as conferences, deliberations, or similar purposes, where portable electronic equipment such as computers, projectors, or similar equipment is likely to be used.

Informational Note No. 2: The types of receptacles covered by this requirement are identified as 5-15 and 5-20 in ANSI/NEMA WD 6-2002, National Electrical Manufacturers Association - *Standard for Dimensions of Attachment Plugs and Receptacles*.

(B) - Receptacle Outlets in Fixed Walls.

In meeting rooms having a floor area of 70 m^2 (760 ft^2) or less, receptacle outlets shall be installed in accordance with 210.52(A) (A)(1) through (A)(4). These receptacle outlets shall be in addition to any receptacle outlets that are located within cabinets or cupboards, or located more than 1.7 m ($5 \frac{1}{2} \text{ ft}$) above the floor.

(C) - Floor Receptacle Outlets.

A meeting room that is at least 3.6 m (12ft) wide and that has a floor area of at least 21 m^2 (225 ft^2) and not more than 70 m^2 (760 ft^2) shall have at least one duplex- or quadruplex-type receptacle located in the floor at a distance not less than 1.8 m (6 ft) from any fixed wall.

(D) - Receptacle Outlets at Moveable Room Partitions.

At least one floor receptacle outlet shall be installed for each 3.7 linear m (12 linear ft) or major fraction thereof of movable wall measured horizontally along the floor line. These receptacle outlets shall be located within 450 mm (18 in.) of the partition.

(E) - Receptacle Outlet Placement.

In applying the provisions of this section, the total number of receptacle outlets shall not be less than as determined in (B), (C), and (D). The receptacle outlets required by this section shall be permitted to be located in accordance with municipal, state, federal, or other codes and regulations, or as determined by the designer/building owner.

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

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

Statement of Problem and Substantiation for Public Comment

Three concerns were raised during the balloting, that BOMA agrees should be revisited by the committee during the second draft meeting. First and foremost is the fact that there was no substantiation or data presented to the committee or to the public to justify this design requirement being incorporated into the National Electrical Code, nor does the proposed language cure the perceived problem on meeting rooms not being provided with properly located receptacles to eliminate the use of extension cords. By design, conference and meeting rooms serve the function of providing work space to conduct business. To assume that a building owner or designer is not going to provide receptacles in these locations is ludicrous, businesses and tenants need electricity to function and power will be provided.

The new code language also does not address the concern about eliminating the reliance on extension cords. Depending on the function of the space and furniture configurations, the receptacles may still be in a location where the use of extension cords will be needed and based on the number of occupants needing power may require additional power strips. In addition, based on the 210.71(E) the designer can take the total number of receptacles required by (B), (C) & (D) and lump them all in one single location and extensions cords will still be used. Along with creating confusion referring the designer to go to the dwelling unit receptacle outlets for meeting room receptacles, the requirements for the installing these receptacles in accordance with 210.52 (A) (1)- (4), was not justified, analyzed or supported by any data to support the need for meeting rooms to follow the same installation requirements for residential dwellings. BOMA encourages the committee to remove this language and continue to allow designers and architects the ability to design these rooms without these arbitrary restraints.

Related Item

[First Revision No. 7517-NFPA 70-2015 \[New Section after 210.70\(B\)\]](#)

Submitter Information Verification

Submitter Full Name: STEVEN ORLOWSKI

Organization: BOMA, Internatinal
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 27 10:33:14 EDT 2015



Public Comment No. 790-NFPA 70-2015 [Section No. 210.71]

210.71 - Meeting Rooms.

(A) - General.

Each meeting room in other than dwelling units shall have nonlocking-type, 125-volt, 15- and 20-ampere receptacles installed in accordance with 210.71(B) through (E). Where a room or space is provided with movable partition(s), the room size shall be determined with the partition in the position that results in the smallest size meeting room.

Informational Note No. 1: For the purposes of this section, meeting rooms are typically designed or intended for the gathering of seated occupants for such purposes as conferences, deliberations, or similar purposes, where portable electronic equipment such as computers, projectors, or similar equipment is likely to be used.

Informational Note No. 2: The types of receptacles covered by this requirement are identified as 5-15 and 5-20 in ANSI/NEMA WD 6-2002, National Electrical Manufacturers Association - *Standard for Dimensions of Attachment Plugs and Receptacles*.

(B) - Receptacle Outlets in Fixed Walls.

In meeting rooms having a floor area of 70 m^2 (760 ft^2) or less, receptacle outlets shall be installed in accordance with 210.52(A) (A)(1) through (A)(4). These receptacle outlets shall be in addition to any receptacle outlets that are located within cabinets or cupboards, or located more than 1.7 m ($5 \frac{1}{2} \text{ ft}$) above the floor.

(C) - Floor Receptacle Outlets.

A meeting room that is at least 3.6 m (12ft) wide and that has a floor area of at least 21 m^2 (225 ft^2) and not more than 70 m^2 (760 ft^2) shall have at least one duplex- or quadruplex-type receptacle located in the floor at a distance not less than 1.8 m (6 ft) from any fixed wall.

(D) - Receptacle Outlets at Moveable Room Partitions.

At least one floor receptacle outlet shall be installed for each 3.7 linear m (12 linear ft) or major fraction thereof of movable wall measured horizontally along the floor line. These receptacle outlets shall be located within 450 mm (18 in.) of the partition.

(E) - Receptacle Outlet Placement.

In applying the provisions of this section, the total number of receptacle outlets shall not be less than as determined in (B), (C), and (D). The receptacle outlets required by this section shall be permitted to be located in accordance with municipal, state, federal, or other codes and regulations, or as determined by the designer/building owner.

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

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

Statement of Problem and Substantiation for Public Comment

IEC's position is to delete 210.71 – (FR 7517)

This is a design issue and there are a variety of ways to provide power in meeting rooms. The NEC cannot make mandatory requirements for receptacle placement in meeting rooms because the configuration of the room can change depending on the needs of a particular meeting.

When applying the mandatory rules for receptacle placement in (B), (C) or (D) it is possible to have a meeting room, with a moveable partition, of 1296 square feet to require 16 receptacles. It is also possible to have a meeting room, with a moveable partition, of 2934 square feet to require only 3 receptacles.

The mandatory language is unenforceable because of Item (E) and a designer may determine only one receptacle is needed or no receptacles are needed.

IEC agrees with the negative ballot comment of Thomas Wood that "this is a design issue that Architects and owners are currently addressing to meet consumer needs".

Related Item

First Revision No. 7517-NFPA 70-2015 [New Section after 210.70(B)]

Submitter Information Verification

Submitter Full Name: JOHN MASARICK

Organization: Independent Electrical Contractors, Inc.

Affiliation: Independent Electrical Contractors, Inc

Street Address:

City:

State:

Zip:

Submittal Date: Sun Sep 20 17:12:24 EDT 2015



Public Comment No. 828-NFPA 70-2015 [Section No. 210.71]

210.71 Meeting Rooms.

(A) General.

Each meeting room in other than dwelling units shall have ~~nonlocking-type, 125-volt, 15- and 20-ampere receptacles installed~~ be provided with receptacle outlets. The number and type of receptacle outlets shall be determined in accordance with 210.71(B) through (E). Placement of receptacles shall be in accordance with 210.71(E). Where a room or space is provided with movable partition(s), the room size shall be determined with the partition(s) in the position that results in the smallest size meeting room.

Informational Note No. 1: For the purposes of this section, meeting rooms are typically designed or intended for the gathering of seated occupants for such purposes as conferences, deliberations, or similar purposes, where portable electronic equipment such as computers, projectors, or similar equipment is likely to be used.

~~Informational Note No. 2: The types of receptacles covered by this requirement are identified as 5-15 and 5-20 in ANSI/NEMA WD-6-2002, National Electrical Manufacturers Association Standard for Dimensions of Attachment Plugs and Receptacles.~~

(B) Receptacle Outlets in Fixed Walls.

In meeting rooms having a floor area of ~~70-93 m² (760-1000 ft²)~~ or less, receptacle outlets shall be installed in accordance with 210.52(A) (A)(1) through (A)(4). ~~These receptacle outlets shall be in addition to any receptacle outlets that are located within cabinets or cupboards, or located more than 1.7 m (5 - 4/2 - ft) above the floor.~~

(C) Floor Receptacle Outlets.

A meeting room that is at least 3.6-7 m (12ft) wide and that has a floor area of at least 24-20 m² (225-215 ft²) and not more than ~~70-93 m² (760-1000 ft²)~~ shall have at least one duplex ~~or quadruplex-type~~ receptacle located in the floor at a distance not less than 1.8 m (6 ft) from any fixed wall for each 20m² (215 ft²) or major portion of floor space.

(D) Receptacle Outlets at Moveable Room Partitions.

At least one floor receptacle outlet shall be installed for each 3.7 linear m (12 linear ft) or major fraction thereof of movable wall measured horizontally along the floor line to serve each meeting room created by the partition. These receptacle outlets shall be located within 450 mm (18 in.) of the partition.

(E) Receptacle Outlet Placement.

In applying the provisions of this section, the total number of receptacle outlets shall not be less than as determined in (B), (C), and (D). ~~The receptacle outlets required by this section shall.~~ These receptacle outlets shall be permitted to be located in accordance with municipal, state, federal, or other codes and regulations, or as located as determined by the designer/building owner.

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

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

Statement of Problem and Substantiation for Public Comment

The suggested modifications are intended to address the logical negative comments from Mr. Buuck. The proposed changes clarify that Parts (B), (C), and (D) are intended to establish the number and type of receptacle outlets to be installed, and (E) allows the designer/owner to locate those receptacle outlets to best suit the anticipated use of the meeting room. Contrary to some of the comments, there are not an unworkable number of configurations for meeting rooms; they are set up in classroom style, closed "O" or "D", open ended or horse shoe. In all but the classroom style, electrical power needs are similar for each set-up. This Code addition gives the same design flexibility as found in 210.60.

As was stated by Mr. Woods, designers have recognized the need and are already specifying receptacle outlets in meeting rooms in order to meet the needs of the room users. Most hotel/motel chains and office building owners already have specifications for receptacle outlets, so this requirement will have little impact to those businesses. What it will accomplish is to give the inspection community a means of making sure that there is a minimum number of access points for electrical power in the event that a "value engineered" design might result in an inadequate number of receptacle outlets.

The safety concerns are the same as those in all other locations where a minimum number and type of receptacle outlets are specified in the National Electrical Code®: to minimize the use of extension cords and multi-outlet strips that would violate other sections of the Code and the product standards.

Conversions from metric to imperial have been revised where needed, to be consistent with NEC Style Manual Annex C.

NEMA stands on the balance of its substantiation to PI 2872 and urges the Panel to continue to support this revision as modified by this comment.

Related Item

First Revision No. 7517-NFPA 70-2015 [New Section after 210.70(B)]

Submitter Information Verification

Submitter Full Name: VINCE BACLAWSKI

Organization: NEMA

Street Address:

City:

State:

Zip:

Submittal Date: Mon Sep 21 10:09:20 EDT 2015

**Public Comment No. 1188-NFPA 70-2015 [Section No. 210.71(D)]**

(D) _ Receptacle Outlets at Moveable Room Partitions.

At least one floor receptacle outlet shall be installed on each side of the moveable room partition for each 3.7 linear m (12 linear ft) or major fraction thereof of movable wall measured horizontally along the floor line. These receptacle outlets shall be located within 450 mm (18 in.) of the partition.

Statement of Problem and Substantiation for Public Comment

As currently proposed for floor receptacle outlets serving movable room partitions, an installer could install all the required floor receptacles on one side of the partition and meet this proposed Code requirement. This would result in serviceable floor receptacles on one side of a closed room partition and no floor receptacles on the other side, therefore leaving one side of the meeting room space no better off than what we currently have now. If the scenario described above was the intent of the submitter and CMP-2, then ignore this comment. Otherwise, take this public comment as a starting point to address this seemingly inefficiency in this proposed meeting room receptacle outlet requirement, which has merit.

Related Item

Public Input No. 2872-NFPA 70-2014 [New Section after 210.70]

First Revision No. 7517-NFPA 70-2015 [New Section after 210.70(B)]

Submitter Information Verification

Submitter Full Name: L. Keith Lofland

Organization: International Association of Electrical Inspectors (IAEI)

Affiliation: None

Street Address:

City:

State:

Zip:

Submittal Date: Thu Sep 24 11:24:35 EDT 2015

**Public Comment No. 762-NFPA 70-2015 [Section No. 210.71(D)]**

(D) _ Receptacle Outlets at Moveable Room Partitions.

At least one floor receptacle outlet shall be installed for each 3.7 linear m (12 linear ft) or major fraction thereof of movable wall measured horizontally along the floor line. Where the moveable partition forms two meeting spaces at least one receptacle outlet, meeting the spacing requirements above shall be accessible from both sides of the partition when it is closed. These receptacle outlets shall be located within 450 mm (18 in.) of the partition.

Statement of Problem and Substantiation for Public Comment

Many partitions when closed will form two meeting spaces. If CMP 2 has determined a need to mitigate the use of extension cords (and I agree with such an initiative) it should make sense that this new section should be clear and enforceable in addressing occupancy use on either side of a close partition.

Related Item

Public Input No. 2872-NFPA 70-2014 [New Section after 210.70]

Submitter Information Verification

Submitter Full Name: Charles Palmieri

Organization: Town of Norwell

Affiliation: self

Street Address:

City:

State:

Zip:

Submittal Date: Sat Sep 19 10:17:21 EDT 2015

**Public Comment No. 1761-NFPA 70-2015 [Section No. 210.71(E)]****(E) Receptacle Outlet Placement.**

In applying the provisions of this section, the total number of receptacle outlets shall not be less than as determined in (B), (C), and (D). The receptacle outlets required by this section shall be permitted to be located in accordance with municipal, state, federal, or other codes and regulations, or as determined by the designer/building owner.

Informational Note No. 1: See Section [314.27\(B\)](#) for floor boxes used for receptacles located in the floor.

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

Statement of Problem and Substantiation for Public Comment

The Correlating Committee directs that the panel reconsider the text of (E) to remove the slash combining two terms and Informational Note No. 2 to remove language that references an entire Article to comply with the NEC Style Manual.

Related Item

[First Revision No. 7517-NFPA 70-2015 \[New Section after 210.70\(B\)\]](#)

Submitter Information Verification

Submitter Full Name: CC on NEC-AAC

Organization: NFPA

Street Address:

City:

State:

Zip:

Submittal Date: Mon Sep 28 15:12:06 EDT 2015



Public Comment No. 393-NFPA 70-2015 [Section No. 215.2(A)(1)]

(1) General.

Feeder conductors shall have an ampacity not less than required to supply the load as calculated in Parts III, IV, and V of Article 220. Conductors shall be sized to carry not less than the larger of 215.2(A)(1)(a) or (b).

(a) Where a feeder supplies continuous loads or any combination of continuous and noncontinuous loads, the minimum feeder conductor size shall have an allowable ampacity not less than the noncontinuous load plus 125 percent of the continuous load.

Exception No. 1: If the assembly, including the overcurrent devices protecting the feeder(s), is listed for operation at 100 percent of its rating, the allowable ampacity of the feeder conductors shall be permitted to be not less than the sum of the continuous load plus the noncontinuous load.

Exception No. 2: Where a portion of a feeder 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 not less than the sum of the continuous load plus the noncontinuous load. No portion of a feeder installed under the provisions of this exception shall extend into an enclosure containing either the feeder supply or the feeder load terminations, as covered in 110.14(C)(1).

Exception No. 3: Grounded conductors that are not connected to an overcurrent device shall be permitted to be sized at 100 percent of the continuous and noncontinuous load.

(b) The minimum feeder conductor size shall have an allowable ampacity ~~an ampacity~~ not less than the maximum load to be served after the application of any adjustment or correction factors.

Informational Note No. 1: See Examples D1 through D11 in Informative Annex D.

Informational Note No. 2: Conductors for feeders, 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, will provide reasonable efficiency of operation.

Informational Note No. 3: See 210.19(A), Informational Note No. 4, for voltage drop for branch circuits.

Statement of Problem and Substantiation for Public Comment

I agree with the Panel's statement for PI 1269, that two separate comparisons are required to size the conductor properly. I still maintain that the current text is confusing. I would first ask the Panel if there is a difference between ampacity, which is defined in Article 100, and allowable ampacity which is not. I have asked numerous users of the Code to read the current text of 215.2(A)(1) and describe the difference between allowable ampacity and ampacity. The majority respond that an ampacity is read from a table in 310.15 such as Table 310.15(B)(16), and an allowable ampacity results from considering conditions of use and applying adjustment and correction factors. Although this is incorrect and actually backwards, the language in the text of 215.2(A)(1)(b) of "an allowable ampacity not less than the maximum load to be served after the application of any adjustment or correction factors." leads users of the Code to believe an allowable ampacity results from considering conditions of use. Again, this is incorrect. If ampacity is defined in Article 100 as considering the conditions of use, and an allowable ampacity is from an allowable ampacity table in 310.15 such as Table 310.15(B)(16), how can there be an allowable ampacity after conditions of use? After conditions of use and adjustment and correction factors have been applied, is not the result an ampacity, not an allowable ampacity? The current charging text of 215.2(A)(1) requires the conductor to have an ampacity not less than the maximum load to be served. How is the intent of that statement any different than the intent of 215.2(A)(1)(b)? In 215.2(A)(1)(b), I have removed the word allowable as the current text is technically incorrect and inconsistent with the definition of ampacity and allowable ampacity tables of 310.15 and it is causing confusion. If the panel disagrees, then I ask for the Panel to clarify the two separate comparisons by defining the difference between ampacity and allowable ampacity as used in this section since both terms are used.

Related Public Comments for This Document

Related Comment

[Public Comment No. 373-NFPA 70-2015 \[Section No. 210.19\]](#)

[Public Comment No. 1555-NFPA 70-2015 \[Section No. 230.42\(A\)\]](#)

Related Item

[Public Input No. 1269-NFPA 70-2014 \[Section No. 215.2\(A\)\(1\)\]](#)

Relationship

Submitter Information Verification

Submitter Full Name: DERRICK ATKINS

Organization: Minneapolis Electrical JATC

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Submittal Date: Tue Aug 11 14:31:49 EDT 2015

**Public Comment No. 80-NFPA 70-2015 [Section No. 215.2(A)(1)]****(1) _ General.**

Feeder conductors shall have an allowable ampacity, after the application of any adjustment or correction factors, not less than required to supply the load as calculated in Parts III, IV, and V of Article 220. ~~Conductors shall be sized to carry not less than the larger of 215.2(A)(1)(a) or (b). Where a feeder supplies continuous loads or any combination of continuous and noncontinuous loads, the minimum feeder conductor size shall have an allowable ampacity, and coordinated with 240.4 for overcurrent protection. Additionally, conductor size shall be coordinated with 110.14(C) temperature limitation under same temperature column of Table 310.15(B)(16) to have an allowable ampacity, without adjustment and correction, not less than the noncontinuous load plus 125 percent of the continuous load.~~

Exception No. 1: If the assembly, including the overcurrent devices protecting the feeder(s), is listed for operation at 100 percent of its rating, the allowable ampacity of the feeder conductors shall be permitted to be not less than the sum of the continuous load plus the noncontinuous load.

Exception No. 2: Where a portion of a feeder 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 not less than the sum of the continuous load plus the noncontinuous load. No portion of a feeder installed under the provisions of this exception shall extend into an enclosure containing either the feeder supply or the feeder load terminations, as covered in 110.14(C)(1).

Exception No. 3: Grounded conductors that are not connected to an overcurrent device shall be permitted to be sized at 100 percent of the continuous and noncontinuous load.

- The minimum feeder conductor size shall have an allowable ampacity not less than the maximum load to be served after the application of any adjustment or correction factors.

Informational Note No. 1: See Examples D1 through D11 in Informative Annex D.

Informational Note No. 2: Conductors for feeders, 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, will provide reasonable efficiency of operation.

Informational Note No. 3: See 210.19(A), Informational Note No. 4, for voltage drop for branch circuits.

Statement of Problem and Substantiation for Public Comment

Through previous editions apprentices and indirectly-related tradespersons have had difficulty understanding how to properly determine the minimum rating and size feeder conductor which meets all the requirements. Such determination requires taking not just this section, but others sections into consideration as well. Proposed wording indicates the other sections which influence this determination and eliminates redundant or excessive wording.

If accepted, wording similar to this should be correlated to other sections using similar wording, e.g. 210.19(A) and 230.42(A).

Related Item

First Revision No. 337-NFPA 70-2015 [Section No. 215.2(A)(1)]

Submitter Information Verification

Submitter Full Name: JOSEPH HREN

Organization:

Street Address:

City:

State:

Zip:

Submittal Date: Fri Jun 26 17:12:49 EDT 2015

**Public Comment No. 103-NFPA 70-2015 [Section No. 215.2(A)(2)]****(2) Grounded Conductor.**

The size of the feeder circuit grounded conductor shall not be

a. Not smaller than the ungrounded conductors, or

b. Not smaller than that required by 250.122, except that 250.122(F) shall not apply where grounded conductors are run in parallel. If a grounded conductor is sized smaller than the ungrounded conductors, it shall be protected by an Overcurrent Protection Device so that its ampacity is not exceeded under fault conditions of the ungrounded conductors. The Overcurrent Protection device shall open all the ungrounded conductors.

c. Additional minimum sizes shall be as specified in 215.2(A)(3) under the conditions stipulated.

Statement of Problem and Substantiation for Public Comment

As 215.2A@ currently reads, Fault conditions on the ungrounded conductors (for example, single phasing of a 3-phase motor or transformer) can cause a grounded conductor which is downsized (smaller than the ungrounded conductors) to exceed its ampacity, and carry a load equal to that of the remaining ungrounded conductors, possibly causing a fire. This proposed change would prevent that, by sensing the over-current on the grounded conductor, and opening up all the ungrounded conductors.

This brings the NEC into conformity with British Standard BS7671 of 2008, 17th edition, where section 524.3 permits downsizing of neutral if (among other conditions) the neutral is protected against overcurrents appropriate to its crosssection area.

British Standard BS7671, 17th edition of 2008, Section 431.2.1 says the overcurrent detection on the neutral shall cause the line conductors to be disconnected.

Related Item

First Revision No. 336-NFPA 70-2015 [Section No. 215.2(A)(2)]

Submitter Information Verification

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Submission Date: Thu Jul 02 09:24:21 EDT 2015

**Public Comment No. 633-NFPA 70-2015 [Section No. 215.9]****215.9** ~~Ground-Fault-Circuit-Interrupter~~ Protection for Personnel.

Feeders supplying ~~15- and 20-ampere~~ receptacle branch circuits shall be permitted to be protected by a ground-fault circuit interrupter or a special-purpose ground-fault circuit interrupter installed in a readily accessible location in lieu of the provisions for such interrupters as specified in [210.8](#) and [590.6\(A\)](#).

Statement of Problem and Substantiation for Public Comment

Fatality Statistics continue to show electrocutions as a significant cause of death at the work place. The 2015 NFPA 70E Standard, Annex K states that electrocutions are the fourth leading cause of industrial fatalities. It also stated that the National Safety Council estimates that about 1000 fatalities every year are due to electrocution, where more that 50% of them take place on system voltage less than 600 V. Moreover, approximately 30,000 non-fatal electrical shock accidents occur every year.

UL 943C identifies protective devices designated as special purpose GFCI (SPGFCI) and thus designed to meet the both NEC and NFPA 70E definition of devices intended for personnel protection. Updating the NFPA 70E code to include SPGFCIs designed and approved for industrial applications per UL 943C holds the promise of significantly reducing loss of life at the work place.

References:

1. Underwriters Laboratories Inc. (UL), "Outline of Investigation for Special Purpose Ground-Fault Circuit-Interrupters", UL 943C Edition 2, 2012.
2. Online UL directory, "Guide Information for Special Purpose Ground-Fault Circuit-Interrupters". [Online]: http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/showpage.html?name=KCYC.GuideInfo&ccnshorttitle=Special-purpose+Ground-fault+Circuit+Interrupters&objid=1074849623&cfgid=1073741824&version=versionless&parent_id=1074849622&sequence=1
3. IAEI Magazine, "Now that industrial GFCIs are here, inspectors have a proactive option for shock protection", International Association of Electrical Inspectors (IAEI), pp. 30-35, Jan/Feb 2014. [Online]: <http://www.iaei.org/blogpost/890108/178015/Now-that-industrial-GFCIs-are-here-inspectors-have-a-proactive-option-for-shock-protection>
4. NFPA, "2015 NFPA 70E Standard." [Online]: <http://www.nfpa.org/codes-and-standards/document-information-pages?mode=code&code=70e&tab=editions>
5. Fire Protection Research Foundation report, "Occupational Injuries from Electrical Shock and Arc Flash Events", NFPA, March 2015. [Online]: <http://www.nfpa.org/research/fire-protection-research-foundation/reports-and-proceedings/electrical-safety/other/occupational-injuries-from-electrical-shock-and-arc-flash-events>

Related Item

[Public Input No. 2194-NFPA 70-2014 \[Section No. 215.9\]](#)

[First Revision No. 339-NFPA 70-2015 \[New Definition after Definition: Ground-Fault Circuit Inter...\]](#)

[First Revision No. 347-NFPA 70-2015 \[Section No. 210.8\(B\)\]](#)

Submitter Information Verification

Submitter Full Name: NEHAD EL-SHERIF

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Submittal Date: Sun Sep 13 22:50:25 EDT 2015


Public Comment No. 1071-NFPA 70-2015 [Section No. 220.12]
220.12 Lighting Load for Specified Occupancies.

A unit load of not less than that specified in [Table 220.12](#) for occupancies specified shall constitute the minimum lighting load. 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.

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

Exception No. 1 : 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 at the 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.
- (3) The demand factors specified in [220.42](#) are not applied to the general lighting load.

Exception No. 2: . Where an building is entirely an office or a bank type occupancy and the lighting is designed and constructed to comply with an energy code adopted by the local authority with a lighting density of less than 13.5 Volt-Amperes/Square Meter (1.2 Volt-Amperes/Square Foot), the unit lighting load for those type occupancies in [Table 220.12](#) shall be permitted to be reduced by 11 Volt-Amperes/Square Meter (1 Volt-Amperes/Square Foot).:

Table 220.12 General Lighting Loads by Occupancy

<u>Type of Occupancy</u>	<u>Unit Load</u>	
	<u>Volt-Amperes/ Square Meter</u>	<u>Volt-Amperes/ Square Foot</u>
Armories and auditoriums	11	1
Banks	39 ^b	3 ½ ^b
Barber shops and beauty parlors	33	3
Churches	11	1
Clubs	22	2
Court rooms	22	2
Dwelling units ^a	33	3
Garages — commercial (storage)	6	½
Hospitals	22	2
Hotels and motels, including apartment houses without provision for cooking by tenants ^a	22	2
Industrial commercial (loft) buildings	22	2
Lodge rooms	17	1 ½
Office buildings	39 ^b	3 ½ ^b
Restaurants	22	2
Schools	33	3
Stores	33	3
Warehouses (storage)	3	¼
In any of the preceding occupancies except one-family dwellings and individual dwelling units of two-family and multifamily dwellings:		
Assembly halls and auditoriums	11	1
Halls, corridors, closets, stairways	6	½
Storage spaces	3	¼

^aSee 220.14(J).

^bSee 220.14(K).

Additional Proposed Changes

<u>File Name</u>	<u>Description Approved</u>
14154_-_E2M_Comcheck.pdf	
15126_-_Comcheck_-_E2M.pdf	
Lighting_Allowances_PDF_file.pdf	

Statement of Problem and Substantiation for Public Comment

The typical light fixture of choice to provide illumination for office buildings, banks, and most other occupancies is the 2'x4' Lay-in Troffer. In the late 1980's this fixture provide illumination with 4 fluorescent lamps using an electromagnetic ballast. The wattage for this fixture was approximately 180 watts. This fixture was normally installed on 8' by 10' centers or 1 fixture for every 80 square feet of office space. This equated out to a lighting power density of 2.2 watts per square foot. If you move ahead into the mid to late 1990's the original T-12 lamps of the 1980's were being replaced with T-8' and electronic ballasts. The same 2x4 Fluorescent fixture with T-8 lamps now required only 110 watts of power. Using the same standard fluorescent light fixture placement of 1 fixture for every 80 square feet the lighting power density was reduced to 1.375 watts per square foot.

Fast forwarding to the last few years two things have happened. First, the original 1980's illumination standards of 70 footcandles has been reduced downward to 40 to 50 footcandles. Studies have been shown that with the advent of the computer screen and for other reasons the original illumination level was outdated. Second the invention of LED's has driven wattage down again. An equivalent 2'x4' LED fixture that would produce the same lumen output as a 4 lamp T-8 Troffer now draws 71 watts. With the same 80 square foot per fixture we are now down to .8875 watts per square foot. If you take into account the reduced lighting levels of 40 to 50 footcandles lighting designers are no longer installing 4 lamps fluorescents but are moving to 2 or 3 lamps fixture to achieve the lower light levels. LED 2'x4 fixtures with equivalent lumen output of 2 to 3 lamps are around 38 watts per fixture or .475 watts per square foot.

The reduction in lighting power is also a result of Nationally Recognized Energy standards such as ASHRAE and IECC. These documents, where adopted, have steadily mandated lower and lower lighting power densities in various occupancy types across the country. While the adoption of these standards was sparse 10 to 15 years ago, in today's world they are commonplace. In the 2013 version of ASHRAE, the lighting power densities for office type buildings is mandated to be less than .82 watts per square foot.

I have attached excerpts from both the ASHRAE and IECC lighting power allowance standards to show the required allowances if a building department or AHJ requires these standards to be adopted. We are seeking relief on the decades old lighting power allowance of 3.5 watts per square foot allowance for offices and banks. We are asking that this value be reduced to 2.5 watts per square foot for office or bank type occupancies where it can be shown that the building is designed based on a Nationally recognized lighting power density of 1.2 watts per square foot or less. We think this is a safe value based upon the standards in place and are providing a 200% safety factor.

We also think that this is a safety issue. By reducing the lighting allowance we are allowing services to be reduced in size which will in turn reduce the size of the main overcurrent device. Utilities, when calculating their demand for their system, already take into account the reduced lighting load and size their system accordingly. Installing smaller transformer provides a lower fault current level but installing large breakers that are mandated by NEC sizing rules facilitates the possibility for larger incident energy values.

We have attached portions of Table 9.6.1 from a ASHRAE 2013 Energy standard that shows a lighting power density for banking areas at 1.01 watts per square foot and also attached Table 9.5.1 which shows a lighting power density for offices at .82 watts per square foot.

Related Item

[Public Input No. 3685-NFPA 70-2014 \[Section No. 220.14\(K\)\]](#)

Submitter Information Verification

Submitter Full Name: Lawrence Ayer
Organization: Biz Com Electric, Inc.
Affiliation: IEC
Street Address:
City:
State:
Zip:
Submission Date: Wed Sep 23 15:26:47 EDT 2015

**Public Comment No. 1048-NFPA 70-2015 [Section No. 215.12(C)(2)]****(2) Feeders Supplied from Direct-Current Systems.**

Where a feeder is supplied from a dc system operating at more than 50- 60 volts, each ungrounded conductor of 4 AWG or larger shall be identified by polarity at all termination, connection, and splice points by marking tape, tagging, or other approved means; each ungrounded conductor of 6 AWG or smaller shall be identified by polarity at all termination, connection, and splice points in compliance with 215.12(C)(2)(a) and (b). The identification methods utilized for conductors originating within each feeder panelboard or similar feeder distribution equipment shall be documented in a manner that is readily available or shall be permanently posted at each feeder panelboard or similar feeder distribution equipment.

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

- (2) A continuous red outer finish
- (3) A continuous red stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or black
- (4) Imprinted plus signs (

±

- (1)) or the word POSITIVE or POS durably marked on insulation of a color other than green, white, gray, or black, and repeated at intervals not exceeding 610 mm (24 in.) in accordance with 310.120(B)

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

- (6) A continuous black outer finish
- (7) A continuous black stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or red
- (8) Imprinted minus signs (-) or the word NEGATIVE or NEG durably marked on insulation of a color other than green, white, gray, or red, and repeated at intervals not exceeding 610 mm (24 in.) in accordance with 310.120(B)

Statement of Problem and Substantiation for Public Comment

The CMP accepted the proposal, PI-4607, to change the DC voltage from 50V to 60V to align with new Art 712 in 210.5.(C)(2) for branch circuits. It follows that for the same reason 50V should be changed to 60V in 215.12(C)(2) for feeders. Both the feeder and branch voltages should use the same break point voltage and having two different voltages would be a major discrepancy in the NEC.

Related Item

Public Input No. 4616-NFPA 70-2014 [Section No. 215.12(C)(2)]

Public Input No. 4607-NFPA 70-2014 [Section No. 210.5(C)(2)]

First Revision No. 303-NFPA 70-2015 [Section No. 210.5(C)(2)]

Submitter Information Verification

Submitter Full Name: MARVIN HAMON

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Submission Date: Wed Sep 23 11:36:13 EDT 2015


Public Comment No. 1372-NFPA 70-2015 [Section No. 215.12(C)(2)]
(2) Feeders Supplied from Direct-Current Systems.

Where a feeder is supplied from a dc system operating at more than 50- 60 volts, each ungrounded conductor of 4 AWG or larger shall be identified by polarity at all termination, connection, and splice points by marking tape, tagging, or other approved means; each ungrounded conductor of 6 AWG or smaller shall be identified by polarity at all termination, connection, and splice points by marking tape, tagging, or other approved means for existing wiring circuits in buildings which are being converted to a dc system; for new construction buildings where new wiring circuits are being installed **each ungrounded conductor of 6 AWG or smaller shall be identified by polarity at all termination, connection, and splice points in compliance with 215.12(C)(2)(a) and (b).** The identification methods utilized for conductors originating within each feeder panelboard or similar feeder distribution equipment shall be documented in a manner that is readily available or shall be permanently posted at each feeder panelboard or similar feeder distribution equipment.

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

- (2) A continuous red outer finish
- (3) A continuous red stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or black
- (4) Imprinted plus signs (

+

- (1)) or the word POSITIVE or POS durably marked on insulation of a color other than green, white, gray, or black, and repeated at intervals not exceeding 610 mm (24 in.) in accordance with 310.120(B)

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

- (6) A continuous black outer finish
- (7) A continuous black stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or red
- (8) Imprinted minus signs (-) or the word NEGATIVE or NEG durably marked on insulation of a color other than green, white, gray, or red, and repeated at intervals not exceeding 610 mm (24 in.) in accordance with 310.120(B)

Statement of Problem and Substantiation for Public Comment

Robert Bosch LLC (Bosch) proposes two amendments to Article 215.12(C)(2).

The first amendment changes the 50 volts requirement to 60 volts to align with articles 210.5(C)(2) and 712.

The second amendment clarifies how existing wiring circuits in buildings being converted to a dc system will be identified. The reason for this amendment is that existing ungrounded conductors of 6 AWG or smaller in buildings being converted to a dc system can also be safely reused and identified per the same requirements as ungrounded conductors of 4 AWG or larger without any safety or reliability concerns. It is reasonable for the present requirements for 6 AWG or smaller in Article 215.12(C)(2)(a) and (b) to apply to new building construction, however for existing buildings it would in essence require perfectly usable existing wiring to be removed/disposed of and new wiring to be installed. This adds extra unnecessary waste/cost with the potential to create a less reliable and safe wiring environment through the extensive rework necessary, for zero benefit as the existing wiring does not need replacement and can be properly identified. The retrofit of specific existing wiring circuits to operate on a dc system, such as lighting circuits in commercial buildings, rather than having to install new wiring represents a tremendous improvement in utilization of renewable energy, overall system reliability, and resiliency to power outages with long-term cost effective savings and no impact to safety and reliability. Conversion to DC circuits also offers the opportunity to utilize high-resistance midpoint grounding schemes, which substantially reduces the chances of electric shock, since both current-carrying conductors have a high-resistance path to ground in this configuration.

Related Public Comments for This Document

Related Comment

Relationship

[Public Comment No. 720-NFPA 70-2015 \[Section No. 210.5\(C\)\(2\)\]](#)

[Public Comment No. 839-NFPA 70-2015 \[Section No. 712.25\(B\)\]](#)

[Public Comment No. 841-NFPA 70-2015 \[Section No. 712.40\(B\)\]](#)

Related Item

[Public Input No. 4616-NFPA 70-2014 \[Section No. 215.12\(C\)\(2\)\]](#)

[First Revision No. 3663-NFPA 70-2015 \[New Section after 708.64\]](#)

Submitter Information Verification

Submitter Full Name: Andrew Yip

Organization: Robert Bosch LLC

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Submittal Date: Fri Sep 25 01:43:47 EDT 2015



Public Comment No. 1378-NFPA 70-2015 [Section No. 215.12(C)(2)]

(2) Feeders Supplied from Direct-Current Systems.

Where a feeder is supplied from a dc system operating at more than 50 volts, each ungrounded conductor of 4 AWG or larger shall be identified by polarity at all termination, connection, and splice points by marking tape, tagging, or other approved means; each ungrounded conductor of 6 AWG or smaller shall be identified by polarity at all termination, connection, and splice points in compliance with [215.12\(C\)\(2\)\(a\)](#) and (b). The identification methods utilized for conductors originating within each feeder panelboard or similar feeder distribution equipment shall be documented in a manner that is readily available or shall be permanently posted at each feeder panelboard or similar feeder distribution equipment.

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

- (2) A continuous red outer finish
- (3) A continuous red stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or black
- (4) Imprinted plus signs ()

±

- (1) () or the word POSITIVE or POS durably marked on insulation of a color other than green, white, gray, or black, and repeated at intervals not exceeding 610 mm (24 in.) in accordance with [310.120\(B\)](#)
- (2) A permanent listed marking means such as sleeving or shrink-tubing that is suitable for the conductor size, at all termination, connection, and splice points, with imprinted plus signs () or the word POSITIVE or POS durably marked on insulation of a color other than green, white, gray, or black. Marking tape shall not be permitted.

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

- (6) A continuous black outer finish
- (7) A continuous black stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or red
- (8) Imprinted minus signs (-) or the word NEGATIVE or NEG durably marked on insulation of a color other than green, white, gray, or red, and repeated at intervals not exceeding 610 mm (24 in.) in accordance with [310.120\(B\)](#)
- (9) A permanent listed marking means such as sleeving or shrink-tubing that is suitable for the conductor size, at all termination, connection, and splice points, with imprinted minus signs (-) or the word NEGATIVE or NEG durably marked on insulation of a color other than green, white, gray, or red. Marking tape shall not be permitted.

Statement of Problem and Substantiation for Public Comment

215.12(C)(2) was a new requirement in the 2014 NEC. It was a positive step forward in requiring clear identification of dc wiring and its polarity. Looking forward, a large part of the application of dc microgrids (see Article 712) and the LED retrofit business will involve dc power distribution through existing branch circuits. The 2014 Code did not consider this re-use case for marking, and essentially requires new cable to be pulled when a modern permanent marking method such as printed heat shrink sleeves would be quite adequate. This change is proposed in order to support this emerging, environmentally important LED retrofit industry. It allows marking by up to date, permanent means (e.g. heat shrink sleeve), and re-use of branch conductors for dc lighting and dc microgrid applications.

Regarding the safety of re-use of 277 Vac branch circuits and feeders for dc applications, building wire is typically rated for 600V ac and dc. The nominal voltage to ground of most dc microgrids is 190 Vdc (380 V center-resistively grounded). This imparts significantly less stress on insulation than 277 Vac which impresses $277 \times \text{root}(2) = 390 \text{ V}_{\text{peak}}$ to ground. Ungrounded dc microgrid systems are also required to have ground fault protection by both articles 250 and 712.

Related Item

[Public Input No. 4616-NFPA 70-2014 \[Section No. 215.12\(C\)\(2\)\]](#)

Submitter Information Verification

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Street Address:
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Submittal Date: Fri Sep 25 02:50:01 EDT 2015



Public Comment No. 1454-NFPA 70-2015 [Section No. 215.12(C)(2)]

(2) Feeders Supplied from Direct-Current Systems.

Where a feeder is supplied from a dc system operating at more than 50 volts, each ungrounded conductor of 4 AWG or larger shall be identified by polarity at all termination, connection, and splice points by marking tape, tagging, or other approved means; each ungrounded conductor of 6 AWG or smaller shall be identified by polarity at all termination, connection, and splice points in compliance with [215.12\(C\)\(2\)\(a\)](#) and (b). The identification methods utilized for conductors originating within each feeder panelboard or similar feeder distribution equipment shall be documented in a manner that is readily available or shall be permanently posted at each feeder panelboard or similar feeder distribution equipment.

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

- (2) A continuous red outer finish
- (3) A continuous red stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or black
- (4) Imprinted plus signs (

±

- (1)) or the word POSITIVE or POS durably marked on insulation of a color other than green, white, gray, or black, and repeated at intervals not exceeding 610 mm (24 in.) in accordance with [310.120\(B\)](#)
- (2) In retrofit work, a permanent sleeve or tube marked /POSITIVE/POS at all splices and terminations shall be permitted

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

- (6) A continuous black outer finish
- (7) A continuous black stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or red
- (8) Imprinted minus signs (–) or the word NEGATIVE or NEG durably marked on insulation of a color other than green, white, gray, or red, and repeated at intervals not exceeding 610 mm (24 in.) in accordance with [310.120\(B\)](#)
- (9) In retrofit work, a permanent sleeve or tube marked -/NEGATIVE/NEG at all splices and terminations shall be permitted

Statement of Problem and Substantiation for Public Comment

There is increasing interest in retrofitting DC microgrids into buildings for improved energy efficiency, reliability, and self-generation of power from e.g. solar. The proposed change will provide a safe, permanent means of marking DC circuits without pulling new wire.

Related Item

Public Input No. 4607-NFPA 70-2014 [Section No. 210.5(C)(2)]

Submitter Information Verification

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Submittal Date: Fri Sep 25 12:22:07 EDT 2015



Public Comment No. 1678-NFPA 70-2015 [Section No. 215.12(C)(2)]

(2) Feeders Supplied from Direct-Current Systems.

Where a feeder is supplied from a dc system operating at more than 50 volts, each ungrounded conductor of 4 AWG or larger shall be identified by polarity at all termination, connection, and splice points by marking tape, tagging, or other approved means; each ungrounded conductor of 6 AWG or smaller shall be identified by polarity at all termination, connection, and splice points in compliance with [215.12\(C\)\(2\)\(a\)](#) and (b). The identification methods utilized for conductors originating within each feeder panelboard or similar feeder distribution equipment shall be documented in a manner that is readily available or shall be permanently posted at each feeder panelboard or similar feeder distribution equipment.

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

- (2) A continuous red outer finish
- (3) A continuous red stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or black
- (4) Imprinted plus signs (

±

- (1)) or the word POSITIVE or POS durably marked on insulation of a color other than green, white, gray, or black, and repeated at intervals not exceeding 610 mm (24 in.) in accordance with [310.120\(B\)](#)

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

- (6) A continuous black outer finish
- (7) A continuous black stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or red
- (8) Imprinted minus signs (–) or the word NEGATIVE or NEG durably marked on insulation of a color other than green, white, gray, or red, and repeated at intervals not exceeding 610 mm (24 in.) in accordance with [310.120\(B\)](#)

Exception: In retrofit installations where existing conductors are to be converted to dc, it is permissible to mark only the dc voltage, "dc," and polarity at each termination, connection, and splice point in compliance with [215.12\(C\)\(1\)\(a\)](#) and (b).

Statement of Problem and Substantiation for Public Comment

The Code requires continuous identification of ungrounded dc feeders via markings every 24". This puts undue financial burden on retrofit installations.

The EMerge Alliance proposes to allow the re-use of existing conductors in retrofit situations through suitable marking means as accepted elsewhere in the Code.

We do not believe there will be any adverse safety risk caused by this change.

The previously accepted exception to 210.5(C)1 in FR 302 above should apply to 215.12(C)2, with suitable contextual wording changes.

Related Item

First Revision No. 303-NFPA 70-2015 [Section No. 210.5(C)(2)]

Submitter Information Verification

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Public Comment No. 1442-NFPA 70-2015 [Section No. 220.3]
220.3 Application of Other Articles for Specific-Purpose Calculations .

In other articles applying to the calculation of loads in specialized applications, there are requirements provided in Table 220.3

that are in addition to, or modifications of, those within lists 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-Additional Load- 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
Cranes and hoists, rating and size of conductors 610 610.14 Electric vehicle charging system branch-circuit and feeder calculations 625 625.41 Electric welders, ampacity calculations 630 630.11, 630.31 Electrically driven or controlled irrigation machines 675 675.7(A), 675.22(A) Electrified truck parking space 626 Electrolytic cell lines 668 668.3(C) Electroplating, branch-circuit conductor sizing 669 669.5 Elevator feeder demand factors 620 620.14		
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
Industrial machinery, supply conductor sizing 670 670.4(A) Marinas and boatyards, feeder and service load calculations 555 555.12 Mobile homes, manufactured homes, and mobile home parks, total load for determining power supply 550 550.18(B) Mobile homes, manufactured homes, and mobile home parks, allowable demand factors for park electrical wiring systems 550 550.34 Motion picture and television studios and similar locations — sizing of feeder conductors for television studio sets 530 530.19		
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
Recreational vehicle parks, basis of calculations 551 551.73(A)		
Storage-type water heaters	422	422.11(E)
Theaters, stage switchboard feeders 520 520.27		

Additional Proposed Changes

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
220.3_Comment-MH.docx	The Word File is provided in case the changes are not clear in Terra View.	

Statement of Problem and Substantiation for Public Comment

Section 220.3 was revised to clarify the application of the table and for consistency with the title of Table 210.3.

Other than for listing requirements not amended by Chapters 5, 6 & 7, Table 220.3 is not necessary nor is it all inclusive as it exists. Section 90.3 already provides the guidance that specific equipment and applications in Chapters 5, 6 & 7 can amend or supplement the calculations in Article 220 so the sections referencing calculations in those Chapters can be removed.

Tables such as this are helpful and benefit readers when they remain all inclusive. However, it would be a challenging task to provide readers with a continually updated list of all the sections that include calculations that amend or supplement those in Article 220 so only the references that do not amend or supplement those in Article 220 via 90.3 were kept.

Related Item

First Revision No. 340-NFPA 70-2015 [Section No. 220.3]

Submitter Information Verification

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