



Tom Pernal Electrical Seminars, LLC



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AFCI Requirements in New and Rehab Construction

Crackerbarrel Roundtable
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AFCI Requirements – New Construction 2017 NEC still adopted in NJ

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

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

(Laundry areas was proposed to be deleted as there is no definition of laundry areas in any currently adopted code in NJ – A CCC article gave guidance on what constitutes a laundry area. A 10' radius from the laundry plumbing hookup is no washer and dryer are present. A 6' radius from the laundry equipment if it is present. Therefore, laundry areas were not deleted)

Note: the NEC gives us (6) six options to achieve the required AFCI protection in the areas listed in 210.12(A). Nice to have options, but the first in the list is the simplest and most practical way to achieve code compliance.

(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.
(Branch-Circuit/Feeder type AFCI breakers only provide one of the two types of

required protection. That is what necessitates the need for the second outlet type AFCI device)

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

- a. The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
- b. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
- c. The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.

(Again: requires the installation of two protective devices. Difficult for installers and inspectors to determine the 50 ft and 70 ft. length requirements for maximum NM-type cable installation)

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

- a. The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
- b. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
- c. The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
- d. The combination of the branch-circuit overcurrent device and outlet branch-circuit AFCI shall be identified as meeting the requirements for a system combination–type AFCI and shall be listed as such.

(Requires a listed Combination AFCI receptacle. Same issue with determining the length of the branch circuit conductors from the overcurrent device to the first receptacle outlet on the circuit.)

(5) 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.

(Not too likely to see RMC or IMC in dwellings. MC possible. Steel-armored AC cable not likely. These wiring methods must be supplemented by a combination AFCI outlet device at the first receptacle outlet in the circuit)

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

(This option is a real stretch IMO)

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 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.

Dormitory Units, Guest Rooms and Guest Suites also require AFCI protection using any of the (6) six methods described above.



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5:23-3.16 AFCI in the 2017 Electrical Subcode

5:23-3.16 (3) ii. Section 210.12(D), entitled "Branch Circuit Extensions or Modifications - Dwelling Units," is deleted in its entirety.

5:23-3.16 (4) i. Section 406.4(D)(4), entitled "Arc-Fault Circuit-Interrupter Protection," is deleted in its entirety. (Replacements of receptacles in dwelling unit areas that would currently require AFCI protection)

5:23-3.16 AFCI in the 2020 Electrical Subcode (Proposed – No change from 2017)

5:23-3.16 (3) ii. Section 210.12(D), entitled "Branch Circuit Extensions or Modifications - Dwelling Units," is deleted in its entirety.

5:23-3.16 (4) i. Section 406.4(D)(4), entitled "Arc-Fault Circuit-Interrupter Protection," is deleted in its entirety. (Replacements of receptacles in dwelling unit areas that would currently require AFCI protection)



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Good info from the Spring 2022 CCC

Source: Tom Valeo

Electrical Subcode Official, Union City, North Arlington, and Wallington

As an Inspector and CEU instructor, I get many phone calls from contractors and other inspectors about what we can and cannot enforce in a rehabilitation project. Here are a few typical questions that come up.

1. Do I need to install AFCI breakers when replacing or upgrading an existing service?

Answer: No. It's not a new building element even if you are upgrading the service. The branch circuits are existing (see N.J.A.C. 5:23-6.9(a)26).

2. Do I need to use AFCI breakers for a kitchen renovation?

Answer: Maybe. Same as above, if you are just removing old branch circuits and installing the same amount of new branch circuits (replacing the old wiring with new), no AFCI is required. If you are adding new circuits which did not exist prior to the renovation, AFCI is required for the new branch circuits only (see N.J.A.C. 5:23-6.9(a)26).

3. Do I need a receptacle on an island or peninsula in a kitchen renovation?

Answer: No. An island, peninsula, or any other new counter space is not on the "New Building Element" list (see N.J.A.C. 5:23-6.9(a)1 through 34 for a list of new building elements. Electrical new building elements are #24, 25, and 26).

That brings us to Materials and Methods, N.J.A.C. 5:23-6.8(a) which tells us: The following requirements shall be met for materials and installation methods for all items that are part of the applicant's proposed project for all categories of work other than repair. N.J.A.C. 5:23-6.8(d) tells us: Electrical Materials and Methods. The following sections of the electrical subcode (N.J.A.C. 5:23-3.16) shall constitute the electrical materials and methods requirements for this subchapter: #3 goes on to say, "all of chapter 2 entitled "Wiring and Protection" except

Sections 210.11, Branch Circuits Required, 210.12, Arc-Fault Circuit-Interrupter Protection, 210.52, Dwelling Unit Receptacle Outlets, 210.60, Guest Rooms or Guest Suites, Dormitories and Other Similar Occupancies, 210.62, Show Windows, 210.63, Heating, Air Conditioning, and Refrigeration Equipment Outlet, and 210.70, Lighting Outlets Required.” Therefore, we cannot enforce Section 210.52, which is where the receptacle spacing requirements are found. Section 210.52(C) is where the receptacle requirements are found for counter tops, islands, and peninsulas. The only time we can enforce Section 210.52 in a rehabilitation project is if someone is creating finished space in previously unfinished spaces (N.J.A.C. 5:23-6.6(e)13 & 15), in additions.

The following paragraph was added by Scott Borsos - DCA

(N.J.A.C. 5:23-6.31(a)), and in reconstruction projects (N.J.A.C. 5:23-6.26(o), Basic Requirements R2 & R4, and N.J.A.C. 5:23-6.27(f), Basic Requirements R3 & R5). Receptacle and lighting outlets shall comply with Section 210.52 and 210.70, respectively, of the electrical subcode.



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New Building Elements - Electrical NJAC 5:23-6.9(a)(24), (25), & (26)

NJAC 5:23-6.9(a) When the rehabilitation of an existing building creates or includes any building element of a type listed in this section, then the new element shall comply with the requirements for such an element established by this section.

(a)(24) Newly installed (not replacing an existing device) electrical service equipment, switchboards, panelboards, motor control centers and other electrical equipment containing overcurrent, switching or control devices likely to require examination, adjustment, servicing, or maintenance while energized shall conform with the requirements specified at N.J.A.C. 5:23-6.8, Materials and methods, and, in addition, shall conform with Sections 110.26 (Space About Electrical Equipment--1,000 Volts, Nominal or Less), 110.32 (Work Space About Equipment--Over 1,000 Volts, Nominal), 110.33 (Entrance and Access to Work Space), 404.8 (Accessibility and Grouping) and 408.18 (Clearances), as applicable, of the electrical subcode. (Electrical)

- i. Where the requirements of Section 110.26(A)(3) (Height of Working Space) cannot be met due to existing height constraints, this section shall not apply.
- ii. In buildings required to comply with the barrier free subcode, newly installed panelboards (not replacement) shall comply with Sections 309.2 and 309.3 of the ICC/ANSI A117.1.

(a)(25) Newly installed (not replacing an existing device) heating, air conditioning or refrigeration equipment likely to require examination, adjustment, servicing or maintenance shall conform with the requirements of N.J.A.C. 5:23-6.8, Materials and methods, and, in addition, shall conform with Section 210.63 Heating, Air Conditioning, and Refrigeration Equipment Outlet and, if newly installed in an

attic, underfloor space, utility room or basement, 210.70 Lighting Outlets
Required, as applicable, of the electrical subcode.

(a)(26) As specified in Section 210.12 of the electrical subcode, Arc-Fault Circuit-Interrupter (AFCI) Protection shall be required for all newly installed (not replacement) branch circuits in dwelling units provided a listed combination type arc-fault circuit interrupter breaker is available.



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Additional AFCI info from the DCA

1. NJAC 5:23-3.16 only eliminates the need for AFCI requirements for branch circuit extensions in dwellings 210.12(D). AFCI protection is required in all new dwelling unit circuits (except: bathrooms, unfinished basements, garages and outdoors)
2. NJAC 5:23-6.8(d)3, eliminates this requirement when replacing a circuit.
3. NJAC 5:23-6.9(a)26, requires AFCI for all new circuits (i.e. circuits that never existed before. Again, not in bathrooms, unfinished basements, garages and outdoors).

So, in short, branch circuit replacements and extensions, AFCI NOT REQUIRED. All new circuits, new construction or rehab (excluding those areas mentioned above) require AFCI protection (if available-rehab).