

Arc-Fault Circuit-Interrupter Protection in Dwellings

ELECTRICAL REQUIREMENTS

2014 National Electrical Code

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With the adoption of the 2014 National Electrical Code (14NEC), Arc-Fault Circuit-Interrupter (AFCI) protection is now required in more locations throughout the home. The following explains the types of AFCI protection allowed and required locations.

Section 210.12 (A) in the 14NEC states that all 120-volt, single-phase, 15- and 20-ampere branch circuits supplying all outlets (which includes: receptacles, lighting circuits, switches, smoke alarms, dishwashers, refrigerators, etc.) must be AFCI protected in the following dwelling unit locations:

Kitchens, Family Rooms, Dining Rooms, Living Rooms, Parlors, Libraries, Dens, Bedrooms, Sunrooms, Recreation Rooms, Closets, Hallways, Laundry Areas, or Similar Rooms or Areas (Including finished basements). AFCI protected shall be by any of following the six (6) ways:

- 1) Combination AFCI breaker protecting the entire circuit at the panel
- 2) Branch Feeder AFCI breaker protecting the entire circuit at the panel with a listed outlet branch-circuit (OBC) type AFCI receptacle at the first outlet and marked at the first outlet
- 3) Supplemental AFCI breaker (currently nonexistent) protecting the entire circuit at the panel with an AFCI receptacle at the first outlet. Wiring must be continuous from the panel to the first AFCI receptacle and marked at the first outlet box that it is the first outlet of the circuit. The maximum length of the branch circuit wiring must not exceed 50ft for #14 AWG conductors and 70ft for #12 AWG conductors.
- 4) System Combination Type AFCI (currently nonexistent) Combination AFCI receptacle located at the first outlet. Wiring must be continuous from the panel to the first AFCI receptacle and marked at the first outlet box that it is the first outlet of the circuit. The maximum length of the branch circuit wiring must not exceed 50ft for #14 AWG conductors and 70ft for #12 AWG conductors.
- 5) Metal conduit or Armored cable to the first AFCI receptacle
- 6) Conduit incased in concrete with an AFCI receptacle

Section 406.4 (D)(4) in the 14NEC states that where a receptacle outlet is supplied by a branch circuit that requires AFCI protection as specified elsewhere in this Code (areas of the house listed above) a replacement receptacle at this outlet shall be protected by one of the following:

- (1) A listed outlet branch-circuit (OBC) type AFCI receptacle
- (2) A receptacle protected by a listed OBC type AFCI type receptacle
- (3) A receptacle protected by a listed combination type AFCI type circuit breaker

~ CLARIFICATION ~

Branch/Feeder AFCI Protection – Only protects against parallel arcing conditions
Combination AFCI Protection – Protects against Parallel Arcs and Series Arcs

The first generation AFCI breakers were only able to detect Parallel Arcing conditions and not both Series Arcs and Parallel Arcs which a combination style AFCI breaker can detect. The differences between Parallel Arcs and Series Arcs are as followed:

Parallel Arc - Detects arcing between the hot and neutral or ground, or the neutral and ground on a circuit. This type of arc is most commonly associated with damage to a wire were a staple has been driven in too tight causing an arc between the hot and neutral wires.

Series Arc - Detects arcing across a break in the hot or neutral conductor most commonly associated with loose connections or damage to a single wire.

PLEASE CONTACT YOUR LOCAL INSPECTOR IF YOU HAVE ANY QUESTIONS

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