

NFPA Technical Committee Document Proposal Form

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Date Oct. 1, 2002 Name William King Telephone 301-504-0508, ext. 1296

Company U.S. Consumer Product Safety Commission

Address 4330 East West Highway City Bethesda State MD Zip 20814-4408

Please indicate organization represented (if any) U.S. Consumer Product Safety Commission

1. a) NFPA Document Title National Electrical Code
b) NFPA No. & Edition 70-2002 c) Section/Paragraph 210.12
2. Proposal Recommends (check one): ☒ new text ☐ revised text ☐ deleted text
3. Proposal. (Include proposed new or revised wording, or identification of wording to be deleted.) Note: Proposed text should be in legislative format, that is, use underscore to denote wording to be inserted (inserted wording) and strike-through to denote wording to be deleted (~~deleted wording~~).
(See attachment for Proposal)

4. Statement of Problem and Substantiation for Proposal. Note: State the problem that will be resolved by your recommendation. Give the specific reason for your proposal including copies of tests, research papers, fire experience, etc. If more than 200 words, it may be abstracted for publication.
(See attachment for Statement of Problem and Substantiation for Proposal)

5. ☒ This Proposal Is Original Material. Note: Original material is considered to be the submitter's own idea based on or as a result of his/her own experience, thought, or research and, to the best of his/her knowledge, is not copied from another source.
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Signature (Required) William H King

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Mail to: Secretary, Standards Council • National Fire Protection Association
1 Batterymarch Park • PO Box 9101 • Quincy, MA 02269-9101

PROPOSAL.

Section/Paragraph: Art. 210, Part I. General, para. 210.12

Add a new 210.12 () section to paragraph 210.12 as follows:

() Lighting and Appliance Branch Circuits in Dwelling Units. When the service equipment at a dwelling is replaced, a listed arc-fault circuit interrupter, branch/feeder type, or a listed arc-fault circuit interrupter, outlet branch circuit type, shall protect each branch circuit that existed prior to the replacement and that supply 125-volt, single-phase, 15- and 20-ampere outlets for lighting and appliances. The arc-fault circuit interrupter, outlet branch circuit type, shall be the outlet closest to, and within 3.0 m (10 ft) of the overcurrent device as measured along the branch circuit conductors.

FPN: See 230.XX for complementary requirement for service equipment.

(Editorial note: 230.XX is a proposed new section, submitted to the CMP 4 for Article 230, to complement the proposed new paragraph (B) to 210.12. For information purposes, the proposed new 230.XX reads as follow: Replacement of Service Equipment at Dwelling Units. When the service equipment at a dwelling is replaced, a listed arc-fault circuit interrupter, branch/feeder type, or a listed arc-fault circuit interrupter, outlet branch circuit type, shall protect each branch circuit that existed prior to the replacement and that supply 125-volt, single-phase, 15- and 20-ampere outlets for lighting and appliances. The arc-fault circuit interrupter, outlet branch circuit type, shall be the outlet closest to, and located within 3.0 m (10 ft) of the overcurrent device as measured along the branch circuit conductors.)

STATEMENT OF PROBLEM AND SUBSTANTIATION FOR PROPOSAL.

The new requirement for lighting and appliance branch circuits within existing dwellings that undergo service equipment replacement addresses the condition of wiring systems identified in technical studies sponsored by the U.S. Consumer Product Safety Commission (CPSC). The 1987 CPSC report ("Residential Electrical Distribution System Fires", Smith & McCoskrie) provided evidence that fires originating in branch circuit wiring predominately occurred in dwellings over 20 years old, with the highest rates of fires occurring in dwellings over 40 years old. Older dwellings are frequently upgraded with replacement service equipment to increase the service rating to supply additional appliance and equipment loads. However, existing lighting and appliance branch circuits are not replaced when the service is upgraded in many cases due to the increased cost, and/or the inability to evaluate the extent of degradation in aged circuits. The branch circuit conductors are frequently located in concealed spaces surrounded with thermal insulation, and could be in a deteriorated condition at the time the service is upgraded. This proposal is intended to provide extra protection with the addition of arc-fault circuit interrupter (AFCI) technology to address the potential fire hazards in existing

branch circuits. This proposal is not intended to apply AFCI devices as a substitute for replacing unsafe wiring. Unsafe wiring should be replaced when it is identified, and the wiring methods should be done in accordance with the *NEC*.

In 1995 arc-fault detection was identified as a promising technology that could be applied to older homes to improve electrical safety by detecting symptoms that can cause fires (report "Technology for Detecting and Monitoring Conditions That Could Cause Electrical Wiring System Fires", sponsored by CPSC and prepared by Underwriters Laboratories Inc.). Shortly after this report was issued, the production of listed arc-fault circuit interrupter devices began. In 1999 the *NEC* introduced the first AFCI requirement for branch circuit protection, limited to branch circuits supplying outlets in bedrooms. When considering needs for additional AFCI protection, one of the priority locations is the older home that undergoes a service upgrade intended to extend the service life of the structure. This is the situation where the existing, older branch circuits in the dwelling will be expected to continue to supply power for appliance and lighting loads in the years ahead. These circuits need the benefit of the extra protection afforded by AFCI devices.

Other Considerations

- Cost of single-pole, 15 and 20 ampere AFCI circuit breakers currently on the market range from \$20-35 in retail stores and electrical supply stores. Contractors' cost and wholesale cost are estimated to be in the \$20-30 range. Costs will likely decrease with increasing volume.
- For 1998, CPSC estimates that there were 38,800 electrical distribution fires resulting in 280 civilian deaths, 1,230 injuries, and \$680.0 million in property loss. Engineering experience indicates that most of these involve arcing conditions that precede ignition. Engineering judgment, based on fire investigations sponsored in the past by CPSC, indicates that AFCI devices currently on the market might address 50% or more of these fires.
- Once installed, AFCI devices will likely remain in place throughout the life of the structure and, if found defective in the future, be replaced with an equivalent device. This has been the experience with GFCI devices.

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PROPOSAL.

Section/Paragraph: Art. 100, Part I. General

Add the following definitions to Part 1:

Arc-Fault Circuit Interrupter, Branch/Feeder Type. A device intended to protect the branch or feeder circuit from the effects of arc faults by recognizing characteristics unique to arcing and by functioning to de-energize the entire branch or feeder circuit when an arc fault is detected.

Arc-Fault Circuit Interrupter, Outlet Branch Circuit Type. A device intended to protect the branch circuit, outlet devices, and wires connected to outlet devices from the effects of arc faults by recognizing characteristics unique to arcing and by functioning to de-energize the circuit at the load side of the arc-fault circuit interrupter (including de-energizing receptacles provided on an arc-fault circuit interrupter outlet device).

STATEMENT OF PROBLEM AND SUBSTANTIATION FOR PROPOSAL.

Definitions for arc-fault circuit interrupters have been expanded from the definition that exists in Section 210.12 of the 2002 edition to coincide with the listing of new arc-fault circuit interrupter devices. It is recommended that the definitions be re-located from Article 210 to Article 100 because a proposal has been submitted to include new requirements in both Articles 210 and 230.

Although AFCI devices currently available are incorporated within circuit breakers, AFCI devices have been listed that are incorporated into outlet devices. While only AFCI/circuit breakers can de-energize the entire branch circuit, listed AFCI/outlet devices can be applied in applications where fuses are provided as the branch circuit overcurrent protection devices. In addition, listed AFCI/outlet devices have been investigated and listed as an outlet branch circuit type with expanded arc detection capabilities, including sensing certain arcing conditions upstream of the AFCI/outlet device location, and sensing broader arcing conditions downstream of the AFCI/device location. These safety devices will provide the broadest range of fire protection to the occupants of dwellings.