# NFPA Document Proposal Form

**NOTE: All Proposals must be received by 5:00 pm EST/EDST on the published Proposal Closing Date.**

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**Please indicate organization represented (if any)**

**1. (a) NFPA Document Title** National Electrical Code International Electrical Code Series **NFPA No. & Year** NFPA 70: NEC 2011

**(b) Section/Paragraph** 210.12 Arc-Fault Circuit-Interrupter Protection

**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; 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 Are-Fault Circuit-Interrupter Protection.*

*(A) Dwelling Units: All 125-volt, single-phase, 15- and 20- ampere branch circuits supplying outlets installed in dwelling unit family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, or similar rooms or areas shall be protected by a listed arc-fault circuit interrupter ~~combination-type~~, installed to provide protection of the branch circuit.*

**4. Statement of Problem and Substantiation for Proposal:** (Note: State the problem that would 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.)

The Problem:
A typical manufacturer's Combination AFCI claim from Square D's web site http://products.schneider-electric.us/products-services/products/circuit-breakers/miniature-circuit-breakers/combination-arcfault-circuit-interrupters/

"*A series arc is an arcing incident across a break in a conductor. A common example is a cut across one of the two wires in a lamp cord, with a dangerous arc forming in the gap. Combination AFCI circuit breakers detect the arcing condition and turn off the circuit, thus providing the enhanced protection.*"

This performance claim and others made by UL, NEMA manufacturers, and others concerning the Combination are unproven. There is no test for this condition in the UL1699, the AFCI standard. By mandating the Combination AFCI, the Branch/feeder AFCI that provides more protection at less cost is disallowed. This simple Code edit can save American home builders more than $200M a year, while also saving lives.

Substantiation:
Please refer to web site http://www.CombinationAFCI.com.
A paper titled "COMBINATION AFCIs: WHAT THEY WILL AND WILL NOT DO" is available on web site.

Additionally I would recommend that SquareD and other Combination AFCI manufacturers be asked to demonstrate their product performance claims. Two simple tests can be safely performed during the Panel's public deliberation.

Test 1:
Using a lamp cord with "*a cut across one of the two wires"* demonstrate that the "*dangerous arc forming in the gap"* can ignite a typical UL fire indicator like cotton.

Test 2:
Repeat Test 1 with lamp protected by a Combination AFCI. Demonstrate that "*Combination AFCI circuit breakers detect the arcing condition and turn off the circuit".* Manufacturers, other than Square D, could use a higher current load.

A Code Panel No. 2 member, the same one who was able to delay the Combination AFCI mandate from 2005 to 2008, asked two public questions concerning the Combination AFCI, during NEC2008 deliberations in Hilton Head.

- First he asked of UL if there is a test that involves tripping in response to arcing across a break in a cord's conductor. The UL Panel member answered yes. After the meeting I challenged him on his answer. He said that the UL engineer who developed the test considers his test to be equivalent to a series arcing test. That answer did not match the question, and again UL disappointed the author.
- The Panel member next asked a question of the Square D engineering manager, would his Combination AFCI respond and trip in response to arcing at a loose connection. Again the answer was yes, however he added that the arcing had to become continuous. The author thinks this answer may have been a simple, but serious, mistake. Arcing at a loose connection is not continuous, because of Paschen's Law (see web site).

This was one of the last discussions before the vote. The proposal to expand coverage with the Combination requirement, passed 8 "for" and 4 "against", the bare minimum required 2/3 majority. The Panel member who asked the questions of UL and Square D voted "for" the proposal. The author believes this Panel member would have voted "against", the proposal would have been defeated, if UL or Square D had answered differently.

Finally, UL should give each Panel No. 2 members a copy of UL1699, the arc fault standard, so members can decide for themselves if they feel test to be equivalent to a series arcing test.

**5. Copyright Assignment**

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

**(b) ☐ Some or all of the text or other material proposed in this Proposal 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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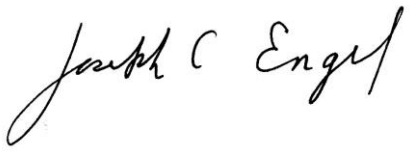

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