



South Carolina Building Codes Council

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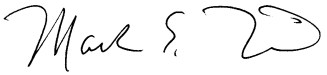
Request for Statewide Code Modification

Jurisdiction or Organization: Home Builders Association of South Carolina

Representative: Mark Nix **Title:** Executive Director

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Signature:  **Date:** May 21, 2018

Code: International Residential Code **Edition:** 2018 **Section:** E3902.16 – Arc-fault circuit-interrupter protection

Check One: Delete and substitute the following Delete without substitution Add the following Modify the following
Type or print proposed modification. Use additional pages if necessary. New language. ~~Line Through Deleted Language.~~

~~E3902.16 Arc fault circuit interrupter protection. Branch circuits that supply 120-volt, single-phase, 15- and 20-ampere outlets installed in kitchens, family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sun rooms, recreation rooms, closets, hallways, laundry areas and similar rooms or areas shall be protected by any of the following: [210.12(A)]...~~

Reason: Unusually Restrictive Impractical Threat to Human Injury or Life Safety
Type or print the reason for the proposed modification. Use additional pages if necessary.

(See attached)

Supporting background and reference information for E3902.16 – Arc-fault circuit-interrupter protection

The Home Builders Association of South Carolina is opposed to mandating the installation of AFCIs. No accurate South Carolina-specific data substantiates a need. Indeed, data collected over a 12-year period (2002-2013) shows the following:

- There were an estimated average of 0.6 civilian deaths per year in fires caused by electrical arcing in one- and two-family homes. South Carolina has a population of 4,774,839.
- There were an estimated total of 5 civilian injuries over the entire 12-year period. This is equal to an average of only 0.4 injuries per year.
- There was an average of 19 fires caused by electrical arcing annually over that time period. South Carolina has 1,502,989 one- and two-family dwellings. In other words, 0.000001% of all such homes were affected.
- The average annual total damage from fires caused by electrical arcing in both property and contents adjusted to 2013 dollars was \$438,349.

(The data set used included structural fires in all ages of one- and two-family homes involving electrical branch circuits or outlet receptacle fires, the type of fires AFCIs are said to prevent.)

AFCI requirements were introduced into the 1999 edition of the National Electrical Code (NEC) and the number of circuits where they are required greatly expanded in the following editions. An electrical manufacturer representative who served on the code-making panel at that time summed up the issue well: “The question of whether this [AFCI] mandate will have a meaningful impact in reducing the number of dwelling fires of electrical origin in new homes as they age (beyond the reduction already resulting from previous Code mandated improvements) is speculative at best.”

The June 2015 issue of the U.S. Fire Administration’s Topical Fire Report Series reported “A strong relationship between housing age and the rate of electrical fires has been observed, **with housing over 40 years old having the strongest association with electrical distribution fires** [emphasis added].” The median age of one- and two-family housing in South Carolina is 30 years. The share of housing units built before 1970 is 24%, and those built before 1950 is 8%. According to a study conducted by the U.S. Consumer Product Safety Commission, dwellings built before 1965 may still have fuses instead of circuit breakers, and those built before 1945 may still have knob and tube wiring.

These older homes were also wired with a very limited number of receptacle outlets, resulting in extensive use of extension cords or improper alterations and additions to the original electrical system, both recognized fire hazards. In addition, they are more likely to have outdated appliances, space heaters or other characteristics that might lead to a greater risk of a fire starting. Newer homes have fire blocking, hardwired smoke alarms and egress windows installed to today’s codes, all of which increase the chances of surviving a fire. **Even as homes built to today’s residential code get older, they will continue to provide protection for families through their improved safety.** To date, twenty-nine states have either removed or made amendments to AFCI and GFCI Provisions.

While questions regarding construction code requirements intended to increase the safety of homes cannot, and should not, be decided solely on the issue of cost, it is reasonable to ask if there is a

demonstrated South Carolina-specific need for the requirement or if an acceptable level of safety can be achieved through other, less expensive means. The cost of an incremental increase in the margin of safety can be quite high.

Higher regulatory costs have real consequences for working South Carolinian families. These regulations end up pushing the price of housing beyond the means of many teachers, police officers, firefighters and other middle-class workers. When all current and potential additional costs attributable to AFCI protection are accumulated, the resultant installation of AFCIs will likely add a minimum of \$1,000 to the cost of each new home constructed in South Carolina. Based upon the estimated 30,000 new single unit homes built in 2018, that's at least an additional \$30 million in costs passed on to the consumer every year. In South Carolina 662,016 families cannot afford to buy a home costing more than the median home price of 267,205. Every \$838 increase in construction costs adds an additional \$1,000 to the final price of the home, and in South Carolina, 3,311 households would no longer qualify for a mortgage based on a \$1,000 increase to a median-priced home.

These regulatory costs don't even take into account the added expense of nuisance trips.

As we know, AFCI devices are designed to prevent fires by detecting electrical arcs -- they differentiate normal electrical arcs from those that could cause a fire. Unfortunately, detecting arcs is far from an exact science, particularly when you are dealing with home electrical devices (HED). The fact is, some HEDs simply give AFCI devices problems. Many common household electrical devices, like large flat screen televisions, vacuum cleaners, microwaves, fluorescent lights, and medical devices can fool AFCI devices into thinking there is a dangerous arc even when there isn't, which leads to nuisance trips.

The National Electrical Manufacturers Association (NEMA) published a report in 2011 that discussed the false signals many common household electrical products (HEPs) send to AFCI devices, ultimately resulting in nuisance trips. The white paper, entitled "Recommendation on AFCI/Home Electrical Product Compatibility," was developed jointly by a team of electrical equipment manufacturers. One professional who offered commentary on the report (Douglas Onion, VP of Canby Electric) chronicled how AFCI nuisance trips affect his company's service to customers. "We have eaten countless hours, fuel and money going back out to warranty calls when AFCI breakers trip," Onion explained. While his company generally gets reimbursed for the replacement breakers, they are never reimbursed for the time and other expenses to make these service calls, he said. Onion went on to show records indicating lost revenue of over \$10,000 due to nuisance trip service over a five-year period. And, that's just the account of one contractor. Multiply this times the 628,000 certified electricians (as of 2014) working in the United States, and you can see the magnitude of nuisance trip service calls.

Due to these findings of fact twenty-nine states have either removed or made amendments to AFCI and GFCI Provisions. Mandating costly incremental increases in safety will only protect those who can afford them and will often decrease safety for those who cannot. Families who cannot qualify to purchase homes due to the increased costs from mandatory code requirements such as AFCIs will have to live in housing that is less safe, because that housing was built to less stringent code requirements. For these reasons, the HBASC request the removal of the mandate or a roll-back of the 2017 NEC regarding AFCI protection on kitchen and laundry room circuits and no further expansion of the NEC for AFCIs until more conclusive data on efficacy towards reduction of fires, and performance to solve nuisance tripping issues are made available.