National Association of Home Builders

Construction,
Codes & Standards
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Suggested Amendments to the 2023 National Electrical Code

State and local HBAs should consider the amendments in this document to maintain cost-effective and affordable code provisions when discussing the adoption of the 2023 National Electrical Code. NAHB developed these amendments based on the outcome of the 2023 NFPA Code Development Cycle.

April 25, 2023

Contact codes@nahb.org for questions and visit the Code Adoption Kit page for more.

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How to Use This Document

NAHB has prepared recommendations for amending the 2023 National Electrical Code (NEC), other editions of the NEC, and ICC model codes. Each recommended amendment is provided in a draft form that includes the code section and text to be amended in legislative format (underline and ~~strikethrough~~) as well as a supporting reason statement explaining the substantiation for the technical amendments. Some of the suggested amendments have additional supporting documents and information on the NAHB website.

Each suggested amendment should be considered individually to ensure that it is an improvement for the jurisdiction. Users of this document must also decide between suggested amendments that provide alternative modifications for the same code section. These alternatives are denoted by letters, e.g. "5a." and "5b." **It is up to the user of this document to provide the adopting body with the preferred alternative.**

In addition, priorities can differ from region to region, and HBAs should not hesitate to consider alternative code text that may be more appropriate than the suggestions provided here. This document is available upon request in Microsoft Word format. You can copy and or change any portion of the Word document to fit your precise needs. If there are any questions on the change or an HBA is looking for assistance on modifying the amendment, please contact NAHB staff for assistance.

1. GFCIs for 250-Volt Receptacles – 210.8(A) & 210.8(D)

This amendment removes the requirement for receptacles serving 240-volt appliances to have GFCI protection when located in bathrooms, crawl spaces, basements, laundry areas, or within 6 feet of sinks, bathtubs, or showers. Prior to the 2020 NEC, this section only applied to receptacles up to 125 volts. This amendment also removes the requirement for GFCI coverage of specific 240-volt appliances which was added to the 2023 NEC.

Revise as follows:

210.8(A) Dwelling Units.

All 125-volt, single-phase, 15- and 20-ampere ~~through 250 volt~~ receptacles installed in the locations and supplied by single-phase branch circuits rated 150 volts or less to ground shall have ground-fault circuit-interrupter protection for personnel.

(1) Bathrooms
(2) Garages and also accessory buildings that have a floor located at or below grade level not intended as habitable rooms and limited to storage areas, work areas, and areas of similar use
(3) Outdoors
(4) Crawl spaces — at or below grade level
(5) Basements
(6) Kitchens
(7) Sinks — where receptacles are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink
(8) Boathouses
(9) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall
(10) Laundry areas
(11) Indoor damp and wet locations

[The exceptions remain unchanged.]

210.8(D) Specific Appliances.

GFCI protection shall be provided for the branch circuit or outlet supplying the following appliances rated 150 volts or less to ground and 60 amperes or less, single- or 3-phase:

(1) Automotive vacuum machines
(2) Drinking water coolers and bottle fill stations
(3) High-pressure spray washing machines
(4) Tire inflation machines
(5) Vending machines
(6) Sump pumps
(7) Dishwashers
~~(8) Electric ranges~~
~~(9) Wall-mounted ovens~~
~~(10) Counter-mounted cooking units~~
~~(11) Clothes dryers~~
(12) Microwave ovens

Reason:

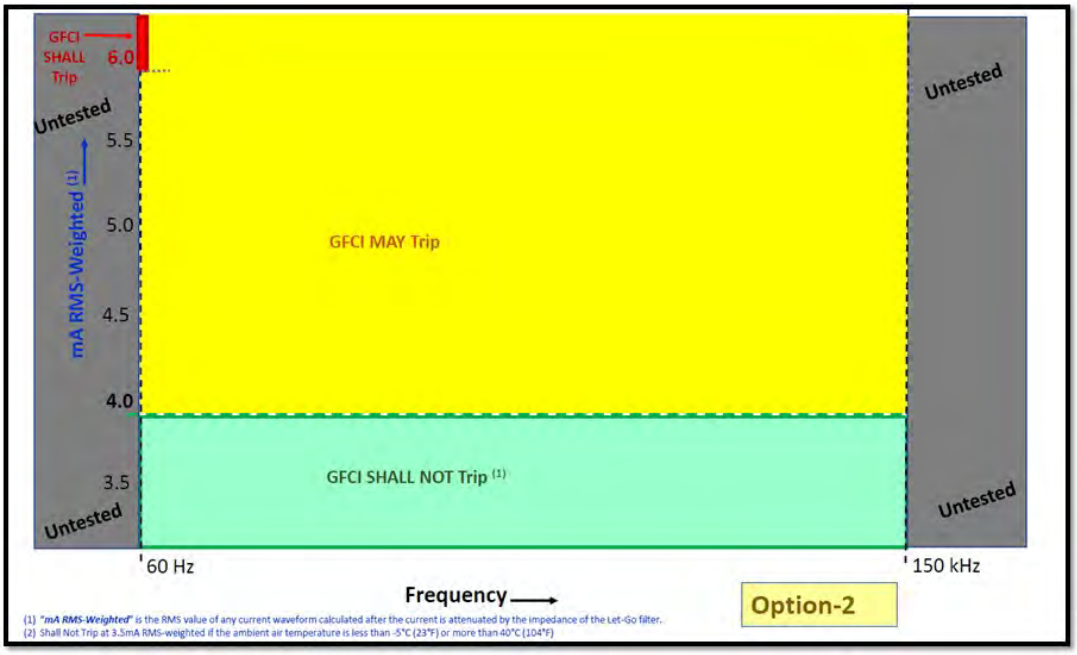
The two main reasons for this amendment are the (1) incompatibility issues caused by requiring 240-volt appliances to be on a GFCI device and (2) the inadequate substantiation given when it was adopted into the model code.

The change to this section now requires receptacles serving household ranges to be covered by a GFCI device. The Association of Home Appliance Manufacturers (AHAM) points out that when this code proposal was submitted to the NEC, it was not submitted to the relevant product safety standards for household appliances that plug into such outlets. As a result, no evaluation was conducted to evaluate issues of compatibility between these household appliances and GFCI devices, leading to nuisance tripping. For more information, see AHAM's white paper Nuisance Tripping of Ground-Fault Circuit Interrupters (GFCIs) for Appliances.

The GFCI was first introduced into the NEC when loads, such as appliances, in the home were operating on 60Hz electricity. Therefore, the GFCIs based their protection requirements on current measurements at 60Hz:

Virtually every modern AC electrical product has parts of the appliance that are operating at frequencies other than 60Hz. This is due to implementation of components like LED drivers, switched-mode power supplies, electrically commutated motors, and variable frequency drives. These components have been implemented to meet consumer demands but also to comply with mandatory energy efficiency regulations set by the U.S. Department of Energy and state regulators.

GFCIs need to be modernized. There are no existing requirements for how a GFCI shall react to frequencies above 60Hz. Even if appliances have minimal, safe levels of high frequency leakage current, GFCIs are tripping and disabling critical appliances. There is a UL 943 Task Group that is working to update the GFCI standard for modern electrical loads.



Until this update is published into UL 943 and made a compliance requirement, GFCI expansion in the NEC is premature.

Regarding the substantiation for this change in the model code, the unfortunate event used as the sole substantiation for the change involved an older stove with both an appliance manufacturing error as well as an installation error. This change goes beyond requiring belt and suspenders safety provisions, which were already in place.

The proposed requirement of GFCI protection for all 240-volt receptacles is too broad and not supported by the committee's substantiation. According to the NFPA article used to support the change, the appliance in question was "an older installation, one predating today's requirement to install an equipment grounding conductor in the branch circuit to the range". The tragedy was only possible with older wiring. This is another example that shows new construction and updated electrical systems do not constitute the same dangers as those in older homes, yet this requirement was not limited to homes with older wiring methods.

The committee contended that 240-volt receptacles presented similar hazards as 125-volt convenience receptacles and this is not true. 240-volt receptacles are installed behind the range or dryer without being readily accessible to the consumer. 240-volt appliances are plugged in and left for the operation of the appliance, but 125-volt receptacles are generally accessible to the consumer. If the consumer chose to, they could use a convenience receptacle for extension cords or other appliance use, whereas a 240-volt receptacle is specific to that appliance.

Similar amendments have been adopted in Iowa, Oregon, South Dakota, and Utah, and the requirement for GFCI coverage on 240-volt receptacles has been postponed in some jurisdictions, as well.

In 2019, the cost of this change was calculated to be $272 for homes with two 240-volt appliances, such as an electric range and an electric dryer. Many homes also have additional appliances that would be affected, such as electric water heaters. Since the cost for 240-volt GFCI breakers was calculated, the cost of electronic devices has increased greatly due to global supply chain challenges.

2. GFCIs for Kitchen Receptacles – 210.8(A)

This amendment limits the GFCI protection requirement to those that serve the countertop surfaces. It also removes the additional provision requiring GFCI protection in any area with a sink and permanent provisions for food preparation, beverage preparation, or cooking. Prior to the 2023 edition, this section only applied to kitchen receptacles serving the countertop surfaces but was expanded to include the entire kitchen. GFCI protection is still required for receptacles within six feet of a sink, whether or not provisions for food preparation are present.

Revise as follows:

210.8(A) Dwelling Units.

All 125-volt through 250-volt receptacles installed in the locations and supplied by single-phase branch circuits rated 150 volts or less to ground shall have ground-fault circuit-interrupter protection for personnel.

(1) Bathrooms
(2) Garages and also accessory buildings that have a floor located at or below grade level not intended as habitable rooms and limited to storage areas, work areas, and areas of similar use
(3) Outdoors
(4) Crawl spaces — at or below grade level
(5) Basements
(6) Kitchens <u>— where the receptacles are installed to serve the countertop surfaces</u>
~~(7) Areas with sinks and permanent provisions for food preparation, beverage preparation, or cooking~~
(8) Sinks — where receptacles are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink
(9) Boathouses
(10) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall
(11) Laundry areas
(12) Indoor damp and wet locations

[The exceptions remain unchanged.]

Reason:

GFCIs have been an unmitigated success, contributing significantly to reducing deaths due to electrical shock. In just 25 years after GFCIs were introduced, accidental electrocutions in the United States were cut by more than half, even though electricity use more than doubled[1]. There is a clear relationship between the reduction in electrocutions and the increased use of GFCIs over the last 45 years as indicated in Figure 1 below. However, this success has relied on requiring the devices in locations where dangers exist which they can protect against.

GFCIs are shown to be effective where a corded product is plugged into a standard “convenience” receptacle in a wet or damp location. However, the expanded requirement is for areas of the kitchen where handheld electric devices will never come near the sink. The extent of a “kitchen” is very open to

interpretation and may include any dining and living areas connected to it in today's popular open floor plans. Many additional receptacles are covered by this new requirement.

Over 80 percent of the incidents cited as reason for this change in the model code resulted from people attempting to repair, modify or install an appliance while plugged in and contact occurring with the energized elements within the particular appliance. The NEC should not mandate GFCI protection for all kitchen outlets due to the clearly unsafe practices of unqualified individuals.

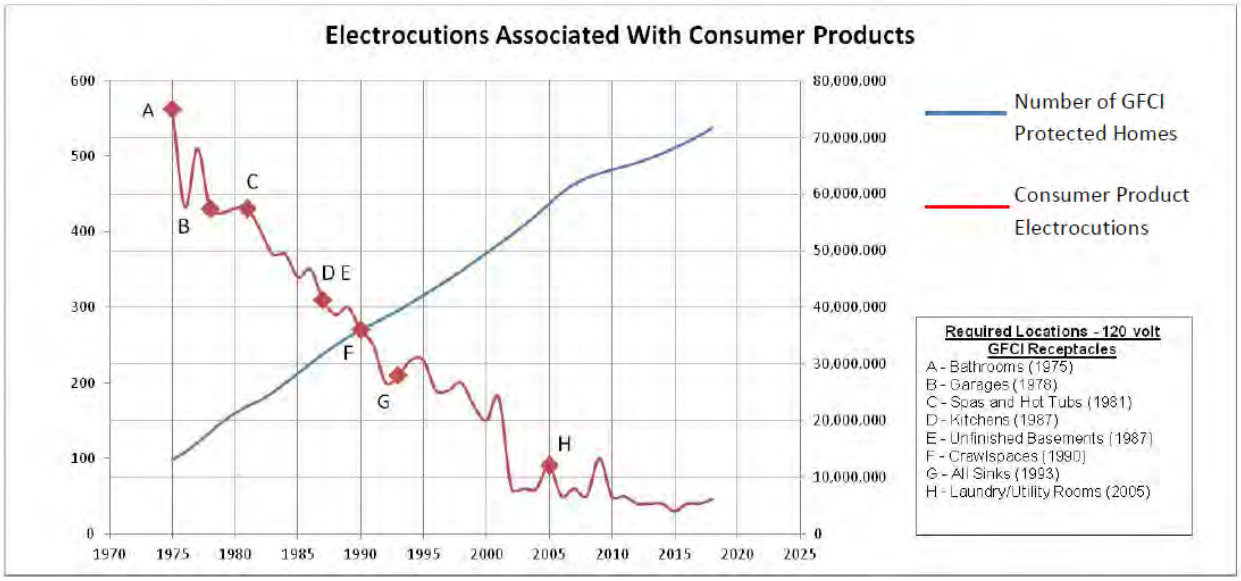


Figure 1: GFCI Protection in Homes Versus Electrocutions 1975 to 2018 (Source: A NEMA Ground Fault Personnel Protection Section Article entitled "GFCI Receptacles: Consumer Protection Personified" June 2020, Revision 2).

Footnotes:

[1] "Know the Dangers in Your Older Home", February 2015 (page 5), Electrical Safety Foundation International.

3. GFCIs for Basement Receptacles – 210.8(A)(5)

This amendment removes the all-encompassing requirement for basement receptacles to have GFCI protection. Prior to the 2020 edition, this section only applied to unfinished areas of basements.

Revise as follows:

210.8(A) Dwelling Units.

All 125-volt through 250-volt receptacles installed in the locations and supplied by single-phase branch circuits rated 150 volts or less to ground shall have ground-fault circuit-interrupter protection for personnel.

(1) Bathrooms
(2) Garages and also accessory buildings that have a floor located at or below grade level not intended as habitable rooms and limited to storage areas, work areas, and areas of similar use
(3) Outdoors
(4) Crawl spaces — at or below grade level
(5) ~~Basements~~ Unfinished portions or areas of the basement not intended as habitable rooms
(6) Kitchens
(7) Sinks — where receptacles are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink
(8) Boathouses
(9) Bathtubs or shower stalls — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the bathtub or shower stall
(10) Laundry areas
(11) Indoor damp and wet locations

[The exceptions remain unchanged.]

Reason:

When this change was adopted, substantiation of actual problems in finished basements was not provided to support expanding the requirement beyond unfinished basements during the code development cycle. Finished basements are not prone to damp conditions that may lead to the unintended grounding GFCIs protect against and should not be subject to the same rules as unfinished areas of basements.

Expanding GFCI coverage to all areas of finished basements, even where no water is to be expected, is not justified. Finished living areas of basements are not as hazardous as areas where GFCIs are otherwise required, such as bathrooms or kitchens where people use small appliances near sinks and tubs, and no data was presented to prove otherwise. GFCI receptacles were first required in the 1987 edition of the code and expanded to the entire unfinished area of basements in the following edition. For the past 30 years, this provision has been adequate which highlights the lack of any known benefit gained by expanding GFCIs to all areas of finished basements. (See Figure 1.)

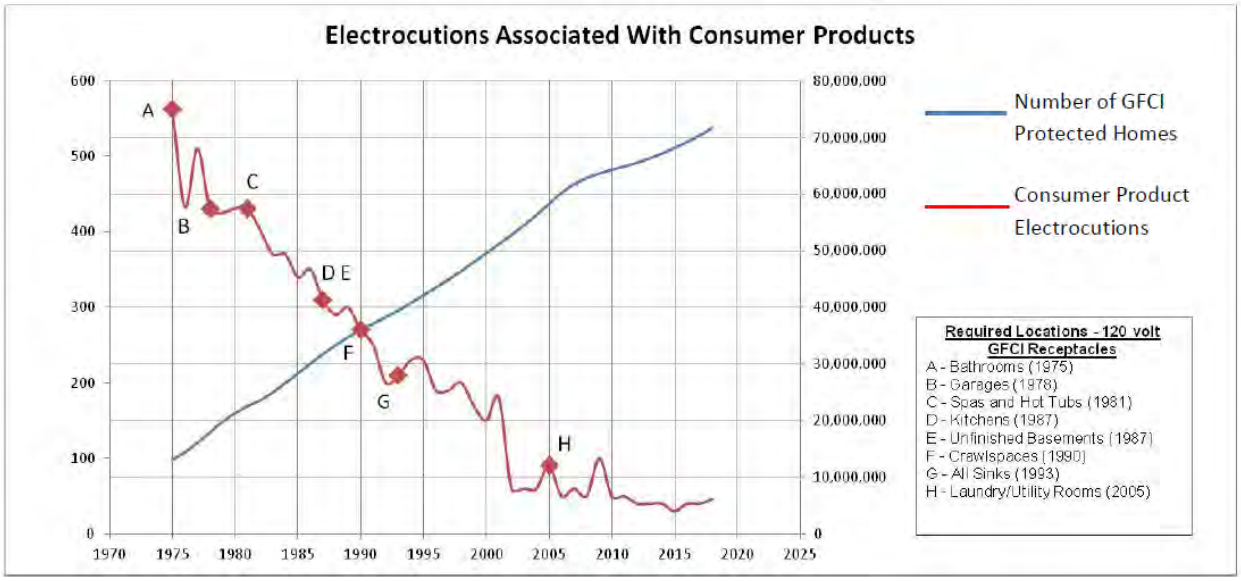


Figure 1: GFCI Protection in Homes Versus Electrocutions 1975 to 2018 (Source: A NEMA Ground Fault Personnel Protection Section Article entitled "GFCI Receptacles: Consumer Protection Personified" June 2020, Revision 2).

The committee statement claims that "basements whether finished or unfinished are prone to moisture including flooding," but that statement best reflects conditions in older existing homes. Government regulations and building codes have added requirements to address moisture in basements. One example is the National Flood Insurance Program (NFIP) under FEMA, which includes provisions for the construction of new homes. Under the program, basements are prohibited in new construction or in substantially improved/repaired existing buildings unless the floor of the basement is at or above the design flood elevation. The design flood elevation is the base flood elevation plus any additional "freeboard" required by the building code or local floodplain ordinance. The building code currently requires one foot of freeboard. In addition, basements are prohibited entirely in coastal high-hazard areas, where buildings need to be elevated on piles or piers.

Especially relevant is the requirement for electrical equipment and components to be above the design flood elevation unless "designed and installed to prevent water from entering or accumulating within the components."

Regarding the issue of moisture entering a basement from the soil, newer homes with basements require drain tile and water proofing materials which go beyond the traditional parging mortar of the past. As written, this provision affects all new houses, but only the expanded and updated circuits in older homes would need to comply.

Similar amendments have been adopted in Oregon and Utah, and the requirement for GFCI coverage throughout basements has been removed for finished portions of walk-out basements in South Carolina if not required by other provisions.

4. GFCIs for Outdoor Outlets – 210.8(F)

This amendment removes the requirement for outdoor outlets other than those receptacles covered by 210.8(A) to have GFCI protection.

Revise as follows:

~~**210.8(F) Outdoor Outlets.**~~

[Delete the entire section.]

Reason:

The requirements of this section have been very contentious since it was introduced in the 2020 NEC. When it was first implemented, multiple states experienced large numbers of GFCIs tripping which shut down air conditioning as well as heat pump units. Due to the problems experienced by the first states to adopt the 2020 NEC with the new section, almost every other state that adopted that edition modified or deleted Section 210.8(F).

The 2023 edition would have required this section to be enforced in full except for the intervention of the NFPA Standards Council following an appeal. In their decision from August 2022, the Council, which acts like a court of last resort in the NFPA code development process, commented that the section has been at the heart of multiple processed Tentative Interim Amendments (TIAs), as well as extensive Task Group work since it was introduced. According to the Council, the appeal does present a clear and substantial basis upon which to overturn the results yielded by the NPFA standards development process. It cannot be overemphasized how significant this statement is, and it shows that not all model code changes should be accepted at face value.

The Council's final decision #22-12 adds an exemption for "listed HVAC equipment" which expires September 1, 2026. Jurisdictions should be aware of this date because it is highly unlikely the compatibility issues explained below will be resolved by then. To fully address the issue, the standards that govern GFCI protection as well as HVAC equipment need to be updated in a coordinated manner, and that process is not close to completion.

If GFCI protection is required while the incompatibility issue remains, there is a higher risk of people being adversely impacted by exposure to extreme temperatures due to nuisance tripping than the risk of people being exposed to a leakage current that could cause injury or harm. The issue of GFCI protection not being compatible with listed HVAC equipment was known at the time it was approved for the model code. In fact, three of the four negative ballots during the code development cycle specifically mentioned the concern with incompatibility associated with requiring GFCI protection for listed HVAC equipment.

Technical Substantiation

UL 943 (*Standard for Ground-Fault Circuit-Interrupters*) requires that Class A ground-fault circuit-interrupters are capable of tripping at a minimum of 6 mA and could be as low as 4 mA. UL 60335-2 (*Standard for Household and Similar Electrical Appliances – Safety – Part 2-40: Particular Requirements for Electrical Heat Pumps, Air Conditioners and Dehumidifiers*) allows a maximum leakage current value of 10 mA for appliances accessible to the general public.

Data shows that HVAC equipment can have a leakage current higher than what would trip a Class A GFCI, but the touch current remains at safe levels. What is concerning are the number of fatalities (no cooling during a heat wave period) due to nuisance trips associated with GFCI protection of HVAC equipment.

Facts to Consider		**Sources**
No. of Homes with HVAC Units in US (Estimated)	100 million	https://www.eia.gov/consumption/residential/reports/2009/air-conditioning.php
US Population Age 65 and over	17%	https://censusreporter.org/profiles/01000US-united-states/
Temperature Where Heat Exhaustion or Stroke Can Occur	104° F	https://www.mayoclinic.org/diseases-conditions/heat-stroke/symptoms-causes/syc-20353581

Five conditions were identified that affect interoperability which have yet to be fully examined. This highlights the fact that a solution to the issue is unlikely to be found prior to the 2026 expiration date for the current exception as approved by the Standards Council.

Conclusion

Almost every state that has adopted the 2020 Edition of the NEC has modified or deleted Section 210.8(F). The equipment incompatibility issues identified above will not be resolved by September 1, 2026. If GFCI protection is required while the incompatibility issue remains, there is a higher risk of people being adversely impacted by exposure to extreme temperatures due to nuisance tripping than the risk of people being exposed to a leakage current that could cause injury or harm.

Similar amendments have been adopted in Georgia, Massachusetts, New Mexico, Oregon, South Dakota, Texas, and Utah. Many other states have dealt with Section 210.8(F) in ways other than code amendments. Additionally, five states added exemptions allowing certain pumps (sump pumps, sewage lift pumps or condensate pumps) to not be covered by a GFCI.

5a. Arc-Fault Circuit Interrupters (AFCI) – 210.12

This amendment removes the requirement for AFCI devices to be installed in one- and two-family dwellings and townhouses.

Revise as follows:

210.12(B) Dwelling Units.
All 120-volt, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A)(1) through (A)(6):

(1) Kitchens
(2) Family rooms
(3) Dining rooms
(4) Living rooms
(5) Parlors
(6) Libraries
(7) Dens
(8) Bedrooms
(9) Sunrooms
(10) Recreation rooms
(11) Closets
(12) Hallways
(13) Laundry areas
(14) Similar areas

Exception No. 1: AFCI protection shall not be required for an individual branch circuit supplying a fire alarm system installed in accordance with 760.41(B) or 760.121(B). The branch circuit shall be installed in a metal raceway, metal auxiliary gutter, steel-armored cable, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, conduit bodies, and enclosures.

Exception No. 2: AFCI protection shall not be required for the individual branch circuit supplying an outlet for arc welding equipment in a dwelling unit until January 1, 2025.

Exception No. 3: AFCI protection shall not be required for one- and two-family dwellings and townhouses.

Informational Note No. 1: See *NFPA 72*-2022, *National Fire Alarm and Signaling Code*, 29.9.4(5), for information on secondary power source requirements for smoke alarms installed in dwelling units.

Informational Note No. 2: See 760.41(B) and 760.121(B) for power source requirements for fire alarm systems.

Reason:

The list of locations within a dwelling requiring AFCIs was last expanded in the 2014 NEC. That change was substantiated by pointing to the decision to add them to the code in the 1990s. Since then, that original decision has not been revisited despite mounting evidence that these devices do not offer the benefits they were designed for.

AFCIs were first introduced in the 1999 edition of the National Electrical Code (NEC) with an effective date of Jan. 1, 2002. The approval of the code change was based on the U.S. Consumer Product Safety Commission (CPSC) report *Revised Residential Fire Loss Estimates: 1980 –1998.* **However, the number of incidents cited at the time was nearly five times higher than in the later CPSC report *2010–2012 Residential Fire Loss Estimates* (see Table 1).** This significant change is not due to any effect from the slow rollout of AFCIs after 2002 which was limited to bedroom circuits until the 2008 NEC and only where the latest edition was adopted.

Table 1: Change in Electrical Distribution Fire Estimates

	CPSC Report 1980-1998	2015 CPSC Report 2010-2012	**Percentage of Original Estimate**
Total Estimated Fires Attended by the Fire Service (Annual Average)	47,000	9,600[†]	**20%**

[†] The properties that were included in the analysis were single/multifamily dwellings, any type of boarding houses, dormitories, sorority/fraternity houses, hotels/motels, and mobile and motor homes not in transit.

It is important to note that the lower number from the later report includes mobile (manufactured) homes and motor homes (RVs) that are not in transit. It is unclear to what extent these particular property types contribute to the overall number of fires, and the proposed exception does not exempt them.

Where the data showed that AFCIs would have a minimal benefit, the results were ignored. The resulting expected benefits led to AFCI requirements being included in the NEC, but they were overblown. Today, the data bears this out. AFCIs have now been protecting electrical systems in homes for two decades and that protection has grown to cover an extensive area of the home. If they were effective, one should reasonably expect to see fire data showing a steady decline in fires involving electrical wiring and related equipment. However, that is not the case.

The Fire Protection Research Foundation (FPRF), an affiliate of NFPA, concluded there is no practical method to collect relevant data in their report *Residential Electrical Fire Problem: The Data Landscape*. The FPRF investigated the available data in 2018 and concluded the following: "Unfortunately, there are inherent challenges and barriers to the effective collection of the applicable data. Traditional data collection approaches have shortcomings that make their ultimate value questionable (e.g., lack of detail and quality on fire department collected residential fire events). Further, not all existing datasets are openly accessible, is lacking specific important details, or is insufficient in quality." There is no known data indicating that the expansion of AFCI requirements in the NEC has resulted in a quantifiable reduction of residential fires due to electrical malfunctions.

The problems with the original rationale were so evident that even electrical manufacturers spoke against the proposal at the time. During the 1998 code development cycle comment period, manufacturers' representatives stated that a large body of information was available to support **rejecting** an AFCI mandate. The main issue: the electrical problems AFCIs are designed to prevent occur overwhelmingly in older dwellings.

The July 2021 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]." This

finding is from the 1988 CPSC study, “Residential Electrical Distribution System Fires,” so it is comparing homes that are now 80 years old with those that were new at the time of the study. No similar study has been made to compare the previous findings with homes built in the last four decades.

When the home was built is important: The median age of one- and two-family housing in the U.S. is 40 years. The share of housing units built before 1970 is 38%, and those built before 1950 is 18%. 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.

No data is collected on the age of homes where fire occurs, and the vast majority of residential fires may occur in these older homes. **The CPSC study showed that 85% of fires of electrical origin occur in homes that are more than 20 years old at the time of the study.** This means that the bulk of these homes were wired in accordance with the 1965 or earlier editions of the NEC. Further, they were wired with products manufactured to product safety standards of a similar vintage. In the years since this study was produced, numerous changes have been made in both the NEC and product safety standards which mitigate against similar fires in newer homes—even as they age.

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 if one does start. **Even as homes built to today's residential code get older, they will continue to provide protection for families through their improved safety.**

It is clear that requiring AFCIs in new construction will not prevent all damage. This is due to the fact that AFCIs cannot prevent all fires and, more importantly, that electrical fires occur overwhelmingly in older houses. 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 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 American families. These regulations end up pushing the price of housing beyond the means of many teachers, police officers, firefighters and other middle-class workers. Nationally, for every $1,000 increase in the price of a home, about 140,500 households are priced out of the market for a median-priced new home. (These households would qualify for the mortgage before the price increase, but not afterward.) The added cost of $300-$400 for AFCIs may not sound like much when compared to the overall cost of a home, but this is only one of many regulations which adds cost for new homebuyers. Every $859 increase in construction costs adds an additional $1,000 to the final price of the home.

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.

From 1980 to 2015, data shows there has been a significant drop in the number of reported fires, injuries and fatalities in the United States. During that time period the number of fires has dropped by 50 percent and fatalities have dropped by about the same margin, even as the population increased.

The decline was sharpest during the 1980s before AFCIs were introduced. This further supports the importance of encouraging homeowners to move up to newer homes without the added burden of increased regulation.

Similar amendments have been adopted in Indiana, Michigan, and Utah. In all, nineteen states have amended the code to reduce AFCI requirements.

5b. Arc-Fault Circuit Interrupters (AFCI) – 210.12

This amendment removes the requirement for AFCI devices in residential kitchens and laundry areas only.

Revise as follows:

210.12(B) Dwelling Units.
All 120-volt, single-phase, 10-, 15-, and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A)(1) through (A)(6):

~~(1) Kitchens~~
(2) Family rooms
(3) Dining rooms
(4) Living rooms
(5) Parlors
(6) Libraries
(7) Dens
(8) Bedrooms
(9) Sunrooms
(10) Recreation rooms
(11) Closets
(12) Hallways
~~(13) Laundry areas~~
(14) Similar areas

Exception No. 1: AFCI protection shall not be required for an individual branch circuit supplying a fire alarm system installed in accordance with 760.41(B) or 760.121(B). The branch circuit shall be installed in a metal raceway, metal auxiliary gutter, steel-armored cable, or Type MC or Type AC cable meeting the applicable requirements of 250.118, with metal boxes, conduit bodies, and enclosures.

Exception No. 2: AFCI protection shall not be required for the individual branch circuit supplying an outlet for arc welding equipment in a dwelling unit until January 1, 2025.

Informational Note No. 1: See *NFPA 72*-2022, *National Fire Alarm and Signaling Code*, 29.9.4(5), for information on secondary power source requirements for smoke alarms installed in dwelling units.

Informational Note No. 2: See 760.41(B) and 760.121(B) for power source requirements for fire alarm systems.

Reason:

Kitchens and laundry areas were added to the list of locations within a dwelling requiring AFCIs in the 2014 NEC. It was the last time the list was changed, and it was substantiated by pointing to the decision to add them to the code in the 1990s. Since then, that original decision has not been revisited despite mounting evidence that these devices do not offer the benefits they were designed for.

There is an incompatibility problem between AFCI devices and home appliances, and the added areas include many home appliances. Despite this, no formal evaluation was conducted on issues of compatibility between household appliances and AFCI devices, some of which are overly sensitive. There are no industry-wide rules for the specific protection that an AFCI must provide, making it impossible for home appliance manufacturers to consistently design products that will not nuisance trip an AFCI. Nuisance tripping is especially concerning when it puts consumers at risk and without access to appliances essential for health and safety, like room air conditioners, dehumidifiers, refrigerators, freezers or room air cleaners. The Association of Home Appliance Manufacturers have created the white paper "Nuisance Tripping of Arc-Fault Circuit Interrupters (AFCIs) for Appliances" which explains the issue in greater detail.

AFCIs were first introduced in the 1999 edition of the National Electrical Code (NEC) with an effective date of Jan. 1, 2002. The approval of the code change was based on the U.S. Consumer Product Safety Commission (CPSC) report *Revised Residential Fire Loss Estimates: 1980 –1998.* **However, the number of incidents cited at the time was nearly five times higher than in the later CPSC report *2010–2012 Residential Fire Loss Estimates* (see Table 1).** This significant change is not due to any effect from the slow rollout of AFCIs after 2002 which was limited to bedroom circuits until the 2008 NEC and only where the latest edition was adopted.

Table 1: Change in Electrical Distribution Fire Estimates

	CPSC Report 1980-1998	2015 CPSC Report 2010-2012	**Percentage of Original Estimate**
Total Estimated Fires Attended by the Fire Service (Annual Average)	47,000	9,600[†]	**20%**

[†] The properties that were included in the analysis were single/multifamily dwellings, any type of boarding houses, dormitories, sorority/fraternity houses, hotels/motels, and mobile and motor homes not in transit.

It is important to note that the lower number from the later report includes mobile (manufactured) homes and motor homes (RVs) that are not in transit. It is unclear to what extent these particular property types contribute to the overall number of fires, and the proposed exception does not exempt them.

Where the data showed that AFCIs would have a minimal benefit, the results were ignored. The resulting expected benefits led to AFCI requirements being included in the NEC, but they were overblown. Today, the data bears this out. AFCIs have now been protecting electrical systems in homes for two decades and that protection has grown to cover an extensive area of the home. If they were effective, one should reasonably expect to see fire data showing a steady decline in fires involving electrical wiring and related equipment. However, that is not the case.

The Fire Protection Research Foundation (FPRF), an affiliate of NFPA, concluded there is no practical method to collect relevant data in their report *Residential Electrical Fire Problem: The Data Landscape*. The FPRF investigated the available data in 2018 and concluded the following: "Unfortunately, there are inherent challenges and barriers to the effective collection of the applicable data. Traditional data collection approaches have shortcomings that make their ultimate value questionable (e.g., lack of detail and quality on fire department collected residential fire events). Further, not all existing datasets are openly accessible, is lacking specific important details, or is

insufficient in quality." There is no known data indicating that the expansion of AFCI requirements in the NEC has resulted in a quantifiable reduction of residential fires due to electrical malfunctions.

The problems with the original rationale were so evident that even electrical manufacturers spoke against the proposal at the time. During the 1998 code development cycle comment period, manufacturers' representatives stated that a large body of information was available to support **rejecting** an AFCI mandate. The main issue: the electrical problems AFCIs are designed to prevent occur overwhelmingly in older dwellings.

The July 2021 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]." This finding is from the 1988 CPSC study, "Residential Electrical Distribution System Fires," so it is comparing homes that are now 80 years old with those that were new at that time of the time of the study. No similar study has been made to compare the previous findings with homes built in the last four decades.

When the home was built is important: The median age of one- and two-family housing in the U.S. is 40 years. The share of housing units built before 1970 is 38%, and those built before 1950 is 18%. 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.

No data is collected on the age of homes where fire occurs, and the vast majority of residential fires may occur in these older homes. **The CPSC study showed that 85% of fires of electrical origin occur in homes that are more than 20 years old at the time of the study.** This means that the bulk of these homes were wired in accordance with the 1965 or earlier editions of the NEC. Further, they were wired with products manufactured to product safety standards of a similar vintage. In the years since this study was produced, numerous changes have been made in both the NEC and product safety standards which mitigate against similar fires in newer homes—even as they age.

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 if one does start. **Even as homes built to today's residential code get older, they will continue to provide protection for families through their improved safety.**

It is clear that requiring AFCIs in new construction will not prevent all damage. This is due to the fact that AFCIs cannot prevent all fires and, more importantly, that electrical fires occur overwhelmingly in older houses. 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 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 American families. These regulations end up pushing the price of housing beyond the means of many teachers, police officers, firefighters and other middle-class workers. Nationally, for every $1,000 increase in the price of a home, about 140,500 households are priced out of the market for a median-priced new home. (These households would qualify for the mortgage before the price increase, but not afterward.) The added cost of $300-$400 for

AFCIs may not sound like much when compared to the overall cost of a home, but this is only one of many regulations which adds cost for new homebuyers. Every $859 increase in construction costs adds an additional $1,000 to the final price of the home.

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.

Similar amendments have been adopted in Arkansas, North Carolina, Oregon and Wisconsin. Three additional states have exempted kitchens or kitchen countertops from requiring AFCIs. Three more have completely removed the requirement for AFCIs for single-family homes. In all, nineteen states have amended the code to remove or reduce AFCI requirements.

6. Arc-Fault Circuit Interrupters (AFCI) Receptacle Replacement – 406.4(D)(4)

This amendment removes the requirement for AFCI devices for residential dwelling units to be installed when receptacles are replaced.

Revise as follows:

~~**406.4(D)(4) Arc-Fault Circuit-Interrupter Protection.**~~

[Delete the entire section.]

Reason:

The last time the list of locations within a dwelling requiring AFCIs was changed was in the 2014 NEC, and it was substantiated by pointing to the decision to add them to the code in the 1990s. Since then, that original decision has not been revisited despite mounting evidence that these devices do not offer the benefits they were intended for.

AFCIs were first introduced in the 1999 edition of the National Electrical Code (NEC) with an effective date of Jan. 1, 2002. The approval of the code change was based on the U.S. Consumer Product Safety Commission (CPSC) report *Revised Residential Fire Loss Estimates: 1980 –1998.* **However, the number of incidents cited at the time was nearly five times higher than in the later CPSC report *2010–2012 Residential Fire Loss Estimates* (see Table 1).** This significant change is not due to any effect from the slow rollout of AFCIs after 2002 which was limited to bedroom circuits until the 2008 NEC and only where the latest edition was adopted.

Table 1: Change in Electrical Distribution Fire Estimates

	CPSC Report 1980-1998	2015 CPSC Report 2010-2012	**Percentage of Original Estimate**
Total Estimated Fires Attended by the Fire Service (Annual Average)	47,000	9,600[†]	**20%**

[†] The properties that were included in the analysis were single/multifamily dwellings, any type of boarding houses, dormitories, sorority/fraternity houses, hotels/motels, and mobile and motor homes not in transit.

It is important to note that the lower number from the later report includes mobile (manufactured) homes and motor homes (RVs) that are not in transit. It is unclear to what extent these particular property types contribute to the overall number of fires, and the proposed exception does not exempt them.

Where the data showed that AFCIs would have a minimal benefit, the results were ignored. The resulting expected benefits led to AFCI requirements being included in the NEC, but they were overblown. Today, the data bears this out. AFCIs have now been protecting electrical systems in homes for two decades and that protection has grown to cover an extensive area of the home. If they were effective, one should reasonably expect to see fire data showing a steady decline in fires involving electrical wiring and related equipment. However, that is not the case.

The Fire Protection Research Foundation (FPRF), an affiliate of NFPA, concluded there is no practical method to collect relevant data in their report *Residential Electrical Fire Problem: The Data Landscape*. The FPRF investigated the available data in 2018 and concluded the following: "Unfortunately, there are inherent challenges and barriers to the effective collection of the applicable data. Traditional data collection approaches have shortcomings that make their ultimate value questionable (e.g., lack of detail and quality on fire department collected residential fire events). Further, not all existing datasets are openly accessible, is lacking specific important details, or is insufficient in quality." There is no known data indicating that the expansion of AFCI requirements in the NEC has resulted in a quantifiable reduction of residential fires due to electrical malfunctions.

The problems with the original rationale were so evident that even electrical manufacturers spoke against the proposal at the time. During the 1998 code development cycle comment period, manufacturers' representatives stated that a large body of information was available to support **rejecting** an AFCI mandate. The main issue: the electrical problems AFCIs are designed to prevent occur overwhelmingly in older dwellings.

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When the home was built is important: The median age of one- and two-family housing in the U.S. is 40 years. The share of housing units built before 1970 is 38%, and those built before 1950 is 18%. 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.

No data is collected on the age of a home when a fire occurs, and the vast majority of residential fires may occur in these older homes. **The CPSC study showed that 85% of fires of electrical origin occur in homes that are more than 20 years old at the time of the study.** This means that the bulk of these homes were wired in accordance with the 1965 or earlier editions of the NEC. Further, they were wired with products manufactured to product safety standards of a similar vintage. In the years since this study was produced, numerous changes have been made in both the NEC and product safety standards which mitigate against similar fires in newer homes—even as they age.

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 if one does start. **Even as homes built to today's residential code get older, they will continue to provide protection for families through their improved safety.**

From 1980 to 2015, data shows there has been a significant drop in the number of reported fires, injuries and fatalities in the United States. During that time period the number of fires has dropped by 50 percent and fatalities have dropped by about the same margin, even as the population increased. The decline was sharpest during the 1980s before AFCIs were introduced. This further supports the

importance of encouraging homeowners to move up to newer homes without the added burden of increased regulation.

It is clear that requiring AFCIs in new construction will not prevent all damage. This is due to the fact that AFCIs cannot prevent all fires and, more importantly, that electrical fires occur overwhelmingly in older houses. 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 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.

The lack of data to support AFCI expansion caused the leadership of the governing code-making panel to ask the NFPA Research Foundation (an affiliate of NFPA who publishes the NEC) to analyze existing fire data and make recommendations on next steps. Its report "Residential Electrical Fire Problem: The Data Landscape" acknowledged that "data and data analytics is lacking to guide the optimum approaches to minimize residential electrical fires and related hazards." The report also observes that "while proving the effectiveness of preventative measures (e.g., AFCIs) is a challenging task, the significant limitations associated with the existing traditional data sources presents serious concerns." It is clearly not the time to expand AFCI coverage in the home when the benefits cannot be verified.

Higher regulatory costs have real consequences for working American families. These regulations end up pushing the price of housing beyond the means of many teachers, police officers, firefighters and other middle-class workers. Nationally, for every $1,000 increase in the price of a home, about 140,500 households are priced out of the market for a median-priced new home. (These households would qualify for the mortgage before the price increase, but not afterward.) The added cost of $300-$400 for AFCIs may not sound like much when compared to the overall cost of a home, but this is only one of many regulations which adds cost for new homebuyers. Every $859 increase in construction costs adds an additional $1,000 to the final price of the home.

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.

Similar amendments have been adopted in New Jersey and North Carolina. Three additional states have completely removed the requirement for AFCIs for single-family homes. In all, nineteen states have amended the code to reduce AFCI requirements.

7. Kitchen Receptacles on Islands and Peninsulas – 210.52(C)(2)

This amendment removes the requirement for provisions for a future receptacle to be provided if no receptacle on the island or peninsula is installed and reinstates the requirement for at least one receptacle at each island or peninsula from the 2017 edition. It also reinstates the exception allowing receptacles to be installed below the countertop where installed on certain islands and peninsulas and where installed for accessibility for people with disabilities.

Revise as follows:

210.52(C)(2) Island and Peninsular Countertops and Work Surfaces.

~~Receptacle outlets, if installed to serve an island or peninsular countertop or work surface, shall be installed in accordance with 210.52(C)(3). If a receptacle outlet is not provided to serve an island or peninsular countertop or work surface, provisions shall be provided at the island or peninsula for future addition of a receptacle outlet to serve the island or peninsular countertop or work surface.~~

At least one receptacle shall be installed at each island and peninsular countertop space with a long dimension of 600 mm (24 in.) or greater and a short dimension of 300 mm (12 in.) or greater. A peninsular countertop is measured from the connected perpendicular wall.

210.52(C)(3) Receptacle Outlet Location.
Receptacle outlets shall be located in one or more of the following:

(1) On or above, but not more than 500 mm (20 in.) above, a countertop or work surface
(2) In a countertop using receptacle outlet assemblies listed for use in countertops
(3) In a work surface using receptacle outlet assemblies listed for use in work surfaces or listed for use in countertops

Receptacle outlets rendered not readily accessible by appliances fastened in place, appliance garages, sinks, or rangetops as covered in 210.52(C)(1), Exception No. 1, or appliances occupying assigned spaces shall not be considered as these required outlets.

Exception: To comply with the following conditions (1) and (2), receptacle outlets shall be permitted to be mounted not more than 300 mm (12 in.) below the countertop or work surface. Receptacles mounted below a countertop or work surface in accordance with this exception shall not be located where the countertop or work surface extends more than 150 mm (6 in.) beyond its support base.

(1) Construction for the physically impaired
(2) On island and peninsular countertops or work surface where the surface is flat across its entire surface (no backsplashes, dividers, etc.) and there are no means to mount a receptacle within 500 mm (20 in.) above the countertop or work surface, such as an overhead cabinet

Informational Note No. 1: See 406.5(E) for installation of receptacles in countertops and 406.5(F) for installation of receptacles in work surfaces. See 380.10 for installation of multioutlet assemblies.

Informational Note No. 2: See Informative Annex J and ANSI/ICC A117.1-2009, *Standard on Accessible and Usable Buildings and Facilities*, for additional information.

Reason:

There is inadequate justification to prohibit receptacles below the countertop or work surface. It is important to remember that the NEC is a minimum code, and its requirements should reflect that. Data from the U.S. Consumer Protection Safety Commission was presented as support for this change. However, the incidents recorded by the CPSC does not specifically indicate that receptacles below the countertops of islands and peninsulas were the cause. There is also no proof that the changes made to the 2023 NEC will be beneficial.

The ultimate responsibility during the use of electrical appliances falls upon the user. To that end, appliance manufacturers have taken measures to address the concern. Manufacturers of cooking appliances already include multiple warnings in their instruction manuals. Below are examples from a single instruction manual of one appliance.

- "Close supervision is necessary when any appliance is used by or near children."
- "Do not let cord hang over edge of table or counter or touch hot surfaces."
- "Use deep fryer only on a clean, dry, level, stable, and heat-resistant surface, away from countertop edge."
- "Close supervision is necessary when any appliance is used by or near children. Hot oil can cause serious and painful burns."

Most notably, manufacturers have already addressed the issue through innovations, such as magnetic cords that are designed to detach easily from the appliance if pulled. This design feature would prove effective in all circumstances, including all of the existing receptacles located below the countertop.

Surprisingly, the proposed change does not actually prohibit all receptacles from being installed below a countertop on an island or peninsula, and therefore, will have limited effect. There are two reasons for this. First, only receptacles installed "to serve" an island or peninsular countertop or work surface would need to be installed in the areas specified by 210.52(C)(4). Convenience receptacles (at the standard height of 18 inches above finished floor) installed in an island or peninsula do not serve the countertop or work surface, and therefore, would be allowed. Secondly, this provision is located under Part III. of article 210 titled Required Outlets (beginning at Section 210.50). Because this section only applies to required outlets, additional outlets would be allowed below the countertop as usual.

The reason given during the panel meeting for the new requirement under 210.52(C)(2) was that it would be too difficult to install a receptacle in an island or peninsula on a slab-on-grade floor after the home was completed. However, over a third of all new single-family homes are built over either a basement or a crawl space (source: https://eyeonhousing.org/2021/08/65-of-new-single-family-homes-used-slab-foundationin-2020/). In these cases, it would be possible to access the island or peninsula from below if a future receptacle were to be installed. Requiring all homes to meet the proposed text is too restrictive. There is also concern about how inspectors may enforce this provision differently. "Provisions shall be provided" is a very open requirement and can lead to differing guidance from no additional work needed (such as when there is access from below) to providing a powered circuit terminating in an electrical box. Requirements that are open to interpretation can be enforced much more strictly than those that clearly state what is intended—adding unnecessary costs to the homeowner.

This is yet another major change to the NEC with possible unintended consequences; adopting it can conceivably result in problems requiring future changes. These constant changes lead to confusion among all users of the code.

8. Load Calculations – 220.5(C)

This amendment removes garage floor areas from the calculation for the minimum lighting load in dwelling units.

Revise as follows:

220.5(C) Floor Area.

The floor area for each floor shall be calculated from the outside dimensions of the building, dwelling unit, or other area involved. For dwelling units, the calculated floor area shall not include open porches, garages, or unfinished areas not adaptable for future use as a habitable room or occupiable space.

Reason:

In the 2023 NEC development cycle, garages were removed from the list of exempted areas solely because "there are general lighting load requirements throughout the entire dwelling," including the garage. As written, this section requires the floor area of garages to be included in the branch-circuit load calculations. It does not add any additional electrical loading through receptacle outlets, lighting, etc. It simply requires more capacity in the electrical panel despite discussions happening that electrical loads are declining due to more efficient lighting and appliances.

This amendment restores the application of this section to the 2020 code by replacing the word "garages."

Consider that the code requires the following electrical loads which would fall under the calculation of Section 220.5(C).

- One 20-amp receptacle outlet in each vehicle bay
- One lighting outlet

Section 220.41 allows motors rated less than 1/8 hp to be considered part of the minimum lighting load when connected to a lighting circuit. However, garage door openers available today are typically ½ hp or larger. They would need to be calculated separately and would not be included in the floor area calculation.

9. Surge Protection – 230.67

This amendment removes the requirement for all services supplying dwelling units to be provided with a surge protective device.

Revise as follows:

~~**230.67 Surge Protection.**~~

[Delete the entire section.]

Reason:

Adequate substantiation was not provided to clearly identify a risk to equipment or safety concern to warrant this requirement being added to the 2020 NEC. Surge protection devices (SPDs) are currently permitted by the code and can provide a value to the end user, but it should remain up to the consumer as to whether the benefit is worth the investment. There are also potential issues with mandating currently available surge-protection products in all cases.

In addition to the overall problems of this provision, the 2023 NEC added the requirement that SPDs need to have a nominal discharge current rating of 10kA minimum. The National Electrical Manufacturers Association (NEMA) that represents the manufacturers of these devices submitted an amendment to remove the 10kA rating. In their testimony, they said the following: "The currently proposed revisions would confuse installers, specifiers, and inspectors who are familiar with interrupting ratings, and short circuit current ratings. It would inappropriately encourage them to require a nominal discharge current equal to or greater than the available short circuit current, under the mistaken belief that this would assure compliance with manufacturers' installation and use instructions, as required by NEC Section 110.3(B), or with short circuit current ratings - rating requirements of relevant 2023 NEC Sections."

Another company that manufacturers electrical devices claimed that the minimum rating of 10kA backed by certain members of the industry "represents an unwarranted exclusion of products offered by many other industry providers and stakeholders." These products that are now excluded have ratings permitted by their listing with UL Solutions (previously Underwriters Laboratories) and, until now, were compliant with the NEC. This requirement severely limits market choice by reducing the number of manufacturers offering compliant SPDs from about a dozen to just four. This is especially concerning in this time when supply chain difficulties already make it difficult to procure electronic devices and increase their cost substantially.

There is also no guarantee that SPDs remain in service, further negating any possible advantages of this new mandate. This becomes a costly requirement without a means to determine the benefit for the user. It is not necessary to mandate the protection just in case a consumer has a transient incident.

During the code development process for the 2020 NEC, several public comments were rejected to expand the surge-protection requirement to all occupancies and multiple levels of protection because they lacked substantiation. The same reason should be applied to remove this section as well.

Similar amendments have been adopted in Maine, North Dakota, Oregon, and South Carolina.

10. Emergency Disconnects – 230.85

This amendment removes the requirement for one and two-family dwelling units to have a labeled disconnecting means installed in a readily accessible outdoor location.

Revise as follows:

~~**230.85 Emergency Disconnects.**~~

[Delete the entire section.]

Reason:

The intent of this change is to allow firefighters to quickly shut off power from the electrical service before entering a house to fight a fire. In some states, especially in the southwest, this is already common practice. A likely means of complying with the requirement in other parts of the country would be installing a meter main housing, which includes the main circuit breaker along with the meter socket, on the exterior of the home where the service drop is located. A second main breaker would not be necessary in the electrical panel located inside the home.

This requirement is not necessary in jurisdictions where the fire service has made other arrangements for dealing with the electrical service in the case of fire. It is also important to note that activating the disconnect will not shut off all power in every case. Some systems, such as photovoltaic, backup generators and energy storage systems, will still provide power even after power from the electrical utility is disconnected.

The ongoing global supply chain challenges have limited the inventory of the meter mains used to comply with this section, greatly increasing their delivery wait times and cost.

A similar amendment has been adopted in Oregon.

11. Boxes at Ceiling-Suspended (Paddle) Fan Outlets – 314.27

This amendment limits the general requirement for ceiling-mounted outlet boxes to be listed for supporting a ceiling fan to the ceiling outlet in the center of a family room, living room, parlor, library, den, bedroom, sunroom, recreation room and similar areas.

Revise as follows:

314.27(A)(2) Ceiling Outlets.

At every outlet used exclusively for lighting, the box shall be designed or installed so that a luminaire or lampholder can be attached. Boxes shall be required to support a luminaire weighing a minimum of 23 kg (50 lb). A luminaire that weighs more than 23 kg (50 lb) shall be supported independently of the outlet box, unless the outlet box is listed for not less than the weight to be supported. The interior of the box shall be marked by the manufacturer to indicate the maximum weight the box shall be permitted to support.

Outlet boxes mounted in the ceilings of family rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms and similar areas of dwelling occupancies and located in an area of the ceiling typical for the installation of a ceiling-suspended (paddle) fan shall be installed to accommodate a ceiling-suspended (paddle) fan in accordance with 314.27(C).

314.27(C) Boxes at Ceiling-Suspended (Paddle) Fan Outlets.

Outlet boxes or outlet box systems used as the sole support of a ceiling-suspended (paddle) fan shall be listed, shall be marked by their manufacturer on the interior of the box as suitable for this purpose, and shall not support ceiling-suspended (paddle) fans that weigh more than 32 kg (70 lb). For outlet boxes or outlet box systems designed to support ceiling-suspended (paddle) fans that weigh more than 16 kg (35 lb), the required marking shall include the maximum weight to be supported.

~~Outlet boxes mounted in the ceilings of habitable rooms of dwelling occupancies in a location acceptable for the installation of a ceiling-suspended (paddle) fan shall comply with one of the following:~~

Where a ceiling-suspended (paddle) fan is not installed, the outlet box shall comply with one of the following:

(1) Listed for the sole support of ceiling-suspended (paddle) fans
(2) Installed so as to allow direct access through the box to structural framing capable of supporting a ceiling-suspended (paddle) fan without removing the box

Reason:

It has been reported that Section 314.27(C) has been cited to require multiple fan-rated boxes in one room, even in rooms which do not typically have a single ceiling fan installed, such as a kitchen or dining room. In some cases the lights were arranged in a rectangle around the ceiling with none near the middle of the ceiling. One problem with the language is using the vague phrasing “in a location acceptable for the installation of a ceiling-suspended (paddle) fan.” There are many locations where a

ceiling fan could conceivably be installed, but no one would ever put one there. Unfortunately, as written, this language allows such a broad interpretation that even those locations are being required to comply.

Electricians who do work in PA, NJ and DE have brought this to our attention. They are installing fan-rated boxes around the kitchen and in off-center lighting locations around various rooms based as a result of the electrical inspector's interpretation at a cost of $15-$20 per location. A home being built with 20 or so "acceptable" locations is now paying an additional $400 which is being passed along to the homeowner with no added benefit.

Generally, the light in the center of a bedroom, family room, living room and rooms with similar uses is a location where a fan could be installed, and fan-rated boxes are often provided. The list of areas added to Section 314.27(A)(2) by this amendment includes a large list of rooms where a fan may typically be installed and is taken from existing code language.

A second issue with the model code language is its location. The requirement for installing outlet boxes rated for ceiling fans applies to ceiling light locations, so there should be a pointer to the requirement provided under 314.27(A)(2) which provides the more general requirement for ceiling outlets. The heading of 314.27(C) implies that the section only applies to ceiling outlets where a fan is intended to be installed so it can be easily overlooked if there is no intent to install a ceiling fan. The result can be a surprise added cost to the homeowner through no fault of their own.

12. Receptacles Near Bathtub and Shower Spaces – 406.9(C)

This amendment reinstates the allowance for GFCI-protected receptacles to be located within 3-feet of a bathtub or shower stall.

Revise as follows:

406.9(C) Bathtub and Shower Space.

Receptacles shall not be installed ~~inside of the tub or shower or within a zone measured 900 mm (3 ft) horizontally from any outside edge of the~~ within or directly over a bathtub or shower stall~~, including the space outside the bathtub or shower stall space below the zone~~.

~~The zone also includes the space measured vertically from the floor to 2.5 m (8 ft) above the top of the bathtub rim or shower stall threshold. The identified zone is all-encompassing and shall include the space directly over the bathtub or shower stall and the space below this zone, but not the space separated by a floor, wall, ceiling, room door, window, or fixed barrier.~~

~~*Exception No. 1: Receptacles installed in accordance with 680.73 shall be permitted.*~~

~~*Exception No. 2: In bathrooms with less than the required zone, the receptacle(s) required by 210.52(D) shall be permitted to be installed opposite the bathtub rim or shower stall threshold on the farthest wall within the room.*~~

~~*Exception No. 3: Weight supporting ceiling receptacles (WSCR) shall be permitted to be installed for listed luminaires that employ a weight supporting attachment fitting (WSAF) in damp locations complying with 410.10(D).*~~

~~*Exception No. 4: In a dwelling unit, a single receptacle shall be permitted for an electronic toilet or personal hygiene device such as an electronic bidet seat. The receptacle shall be readily accessible and not located in the space between the toilet and the bathtub or shower.*~~

Informational Note No. 1: See 210.8(A)(1) for GFCI requirements in a bathroom.
Informational Note No. 2: See 210.11(C) for bathroom branch circuits.
Informational Note No. 3: See 210.21(B)(1) for single receptacle on an individual branch.

Reason:

The 2020 NEC prohibited receptacles to be installed near bathtub and shower spaces. This amendment reverts the language back to the 2017 edition of the NEC which prohibited receptacles from being located directly above a bathtub or in a shower stall. Receptacles in bathrooms are required to be GFCI protected, so further restrictions on their location are not needed.

The submitter of the code change claimed the original language was unclear, but it was easily understood in most cases. The new language adds complexity, which is made clear based on the addition of multiple exceptions, and complexity leads to non-uniform enforcement.

Corded, handheld devices, such as hairdryers, hair trimmers and shavers have cords longer than three feet, so the new requirement does not prevent them from entering a tub or shower. Additionally, the code requires a receptacle within three feet of a sink with no minimum. No substantiation was

presented when this change was adopted to suggest that a receptacle within three feet of a bathtub or shower poses a greater risk than that at a sink. Since receptacles in bathrooms are required to be GFCI protected these locations do not pose different levels of risk. Both should be acceptable.

Finally, receptacles in proximity to bathtub and shower spaces is addressed for manufactured and mobile homes in the code as well, but distance restrictions are not included. The requirements for site-built homes should not be more restrictive than for manufactured and mobile homes.

Similar amendments have been adopted in Maine, Oregon, and Utah.