National Association of Home Builders

2020

National Electrical Code Suggested Amendments

6/9/2020

National Association of Home Builders

State and local HBAs should consider these amendments to maintain cost-effective and affordable code provisions when discussing the adoption of the 2020 National Electrical Code. NAHB developed these amendments based on the outcome of the 2020 NFPA Code Development Cycle.

Each amendment is shown in *legislative text* (underline and ~~strikethrough~~) and includes a supporting reason/s explaining why the jurisdiction should consider them. Some of the suggested amendments have additional supporting documents and information on the NAHB website.

Arc-Fault Circuit Interrupters (AFCIs) requirements have not expanded beyond the rooms and areas identified in the 2014 and 2017 NEC. The three suggested amendments to the AFCI provisions included have been retained from the 2017 NEC and are in the 2020 NEC Suggested Amendment package below.

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This document is also available in “Word” format upon request.

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2020 National Electrical Code

7. Arc-Fault Circuit Interrupters (AFCI)

This amendment removes the requirement for AFCI devices for residential dwelling units, including one and two-family homes, while leaving it in place for hotels, motels, and dormitories.

8. Arc-Fault Circuit Interrupters (AFCI) Receptacle Replacement

This amendment removes the requirement for AFCI devices to be installed in residential dwelling units, including one and two-family homes, when a receptacle is replaced, but does not remove it for dormitories.

Note: This is a comparison change to the first AFCI amendment. The reason statement is the same.

9. Tamper-Resistant Receptacles

This amendment removes the requirement for tamper-resistant receptacles in dwelling units, including one and two-family homes.

1. GFCI's for 250-Volt Receptacles

This change will require receptacles serving 250-volt appliances, such as stoves and clothes dryers, to have GFCI protection when located in bathrooms, crawl spaces, basements, laundry areas or within 6 feet of sinks, bathtubs or showers. This section previously applied to receptacles up to 125 volts only.

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 specified in 210.8(A)(1) through (A)(11) 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

   Exception to (3): Receptacles that are not readily accessible and are supplied by a branch circuit dedicated to electric snow-melting, deicing, or pipeline and vessel heating equipment shall be permitted to be installed in accordance with 426.28 or 427.22, as applicable.

4. Crawl spaces — at or below grade level
5. Basements

   Exception to (5): A receptacle supplying only a permanently installed fire alarm or burglar alarm system shall not be required to have ground-fault circuit-interrupter protection.

   Informational Note: See 760.41(B) and 760.121(B) for power supply requirements for fire alarm systems.

   Receptacles installed under the exception to 210.8(A)(5) shall not be considered as meeting the requirements of 210.52(G).

6. Kitchens — where the receptacles are installed to serve the countertop surfaces

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

    Exception to (1) through (3), (5) through (8), and (10): Listed locking support and mounting receptacles utilized in combination with compatible attachment fittings installed for the purpose of serving a ceiling luminaire or ceiling fan shall not be required to be ground-fault circuit-interrupter protected. If a general-purpose convenience receptacle is integral to the ceiling luminaire or ceiling fan, GFCI protection shall be provided.

11. Indoor damp and wet locations

Reason:

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. Those were already in place, and it took both to fail for the incident to occur.

The proposed requirement of GFCI protection for all 250-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". It sounds like 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.

The committee contends that 250-volt receptacles present similar hazards as 125-volt convenience receptacles and this is not true. 250-volt receptacles are installed behind the range or dryer without being readily accessible to the consumer. 250-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 250-volt receptacle is specific to that appliance.

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2. GFCI's for Basement Receptacles

This change requires all basement receptacles to have GFCI protection. This section previously applied to unfinished areas of basements only.

Revise as follows:

210.8(A)(5) Dwelling Units

(5) ~~Basements~~ Unfinished portions or areas of the basement not intended as habitable rooms

Exception to (5): A receptacle supplying only a permanently installed fire alarm or burglar alarm system shall not be required to have ground-fault circuit-interrupter protection.

Reason:

Substantiation of actual problems in finished basements was not provided to support expanding this requirement beyond unfinished basements. Not all basements are subject to damp or wet conditions and should not be subject to the same rules as ones that are.

Expanding GFCI coverage to all areas of finished basements even where no water is to be expected is not justified. Finished areas of basements are not as hazardous 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. There has been no reason to expand coverage to all basements for the past 30 years, which shows there is no known benefit to requiring finished basements to be covered by GFCIs.

The committee statement claims that "basements whether finished or unfinished are prone to moisture including flooding", but that statement best reflects conditions in older homes. As written, this would affect all new houses but only older homes which have their basement electrical systems updated or expanded. (Building codes have added requirements to address moisture in basements. Newer homes require drain tile and water proofing materials which go beyond the traditional parging mortar of the past.) If the concern is centered on the conditions of older homes, then an expansion of GFCI protection should focus on such homes and not include new construction.

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3. GFCI for Outdoor Outlets

This new section requires outdoor outlets up to 150 volts to ground and 50 amperes to have GFCI protection. It is meant to specifically apply to circuits serving A/C condenser units.

Revise as follows:

~~210.8(F) Outdoor Outlets.~~

~~All outdoor outlets for dwellings, other than those covered in 210.8(A)(3), Exception to (3), that are supplied by single-phase branch circuits rated 150 volts to ground or less, 50 amperes or less, shall have ground-fault circuit-interrupter protection for personnel.~~

~~Exception: Ground-fault circuit-interrupter protection shall not be required on lighting outlets other than those covered in 210.8(C).~~

Reason:

GFCIs are shown to be effective where a corded product is plugged into a standard "convenience" receptacle in a wet or damp location. However, this requirement is for condenser units, which are hardwired.

Data was not provided to supports expanding the use of GFCI protection on these circuits. The event used as substantiation was a result of an unqualified individual performing an electrical installation they never should have attempted. The NEC should not mandate GFCI protection for all outdoor outlets based on very specific unfortunate circumstances.

This requirement is extremely broad and will result in many unintended consequences. For example, it has not been determined if all A/C condenser units will operate on a GFCI protected circuit as sufficient testing has not been conducted. If the condenser unit is affected by high humidity and trips the GFCI, it could result in unhealthy conditions and property damage inside the home due to heat, humidity and mold growth, especially where the home is unoccupied for an extended period. There is also the potential for unwanted tripping and compatibility issues with heat pumps.

Branch circuit extensions or modifications would require the addition of GFCI protection for old condenser units, and it is not known whether the existing equipment is compatible with GFCI This requirement also applies to hardwired connections for effluent pumps and other types of lift station pumps with outdoor connections.

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4. Surge Protection

This new section requires all services supplying dwelling units to be provided with a surge- protective device.

Revise as follows:

~~230.67 Surge Protection.~~

~~230.67(A) Surge-Protective Device.~~
~~All services supplying dwelling units shall be provided with a surge-protective device (SPD).~~

~~230.67(B) Location.~~
~~The SPD shall be an integral part of the service equipment or shall be located immediately adjacent thereto.~~

~~Exception: The SPD shall not be required to be located in the service equipment as required in (B) if located at each next level distribution equipment downstream toward the load.~~

~~230.67(C) Type.~~
~~The SPD shall be a Type 1 or Type 2 SPD.~~

~~230.67(D) Replacement.~~
~~Where service equipment is replaced, all of the requirements of this section shall apply.~~

Reason:

The code-making panel did not provide adequate substantiation to clearly identify a risk to equipment or safety concern to warrant this new requirement. Surge protection is 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. The new language does not specify which conductors are to be protected or what the minimum short circuit current rating, the minimum nominal discharge current rating or the voltage protection rating should be. Market pressures will dictate that the lowest level of protection is installed in most cases, severely limiting the effectiveness of the devices. There is also no guarantee that the devices remain in service, further negating any possible advantages of this new mandate.

During the code development process, the code making panel rejected several public comments to expand the surge-protection requirement to all occupancies and multiple levels of protection because they lacked substantiation. Yet the committee did not provide technical data in their statement showing a problem existed that required this change.

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5. Emergency Disconnects

This new section requires one- and two-family dwelling units to have a labelled disconnecting means installed in a readily accessible outdoor location.

Revise as follows:

~~230.85 Emergency Disconnects.~~

~~For one- and two-family dwelling units, all service conductors shall terminate in disconnecting means having a short-circuit current rating equal to or greater than the available fault current, installed in a readily accessible outdoor location. If more than one disconnect is provided, they shall be grouped. Each disconnect shall be one of the following:~~

~~(1) Service disconnects marked as follows:~~
~~EMERGENCY DISCONNECT,~~
~~SERVICE DISCONNECT~~

~~(2) Meter disconnects installed per 230.82(3) and marked as follows:~~
~~EMERGENCY DISCONNECT,~~
~~METER DISCONNECT,~~
~~NOT SERVICE EQUIPMENT~~

~~(3) Other listed disconnect switches or circuit breakers on the supply side of each service disconnect that are suitable for use as service equipment and marked as follows:~~
~~EMERGENCY DISCONNECT,~~
~~NOT SERVICE EQUIPMENT~~

~~Markings shall comply with 110.21(B).~~

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 and backup generators, will still provide power even after power from the electrical utility is disconnected.

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6. Receptacles Near Bathtub and Shower Spaces

This change prohibits all receptacles from within 3 feet of any bathtub or shower stall unless the bathroom dimensions are too small to provide that clearance.

Revise as follows:

406.9(C) Bathtub and Shower Space.

Receptacles shall not be installed within ~~a zone measured 900 mm (3 ft) horizontally and 2.5 m (8 ft) vertically from the top of the bathtub rim or shower stall threshold. The identified zone is all-encompassing and shall include the space~~ or directly over ~~the~~ a bathtub or shower stall.

Exception: In bathrooms with less than the required zone the receptacle(s) shall be permitted to be installed opposite the bathtub rim or shower stall threshold on the farthest wall within the room.

Reason:

Current code prohibits receptacles from being located directly above a bathtub or in a shower stall. In addition, 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. And the new language will cause non-uniform enforcement, because it can be interpreted in different ways. Specifically, the zone where receptacles are prohibited extends 3 ft from the bathtub rim. The rim is located on all sides of a bathtub, so does the zone extend 3 ft horizontally in every direction? Note the zone is “all-encompassing” which is defined as “including everything”. This language seems to prohibit a receptacle from being installed within that zone even If there is a wall separating the end of the bathtub from the vanity. A receptacle is even more likely to be prohibited where a fixed glass panel separates the tub or shower from the area where a homeowner would like a receptacle.

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.

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7. Arc-Fault Circuit Interrupters (AFCI)

This amendment removes the requirement for AFCI devices for residential dwelling units, including one- and two-family homes, while leaving it in place for hotels, motels and dormitories. The requirement for AFCIs applies predominantly to new homes, although the strongest association with electrical distribution fires was observed in dwellings over 40 years old. The data did not show that AFCIs were necessary when they were first introduced into the electrical code, and it has not supported the devices' continued expansion in the code.

Revise as follows:

210.12 Arc-Fault Circuit-Interrupter Protection. Arc-fault circuit-interrupter protection shall be provided as required in 210.12(A), (B), and (C). The arc-fault circuit interrupter shall be installed in a readily accessible location.

(A) Means of Protection ~~**Dwelling Units.** All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets or devices installed indwelling unit kitchens, family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, laundry areas, or similar rooms or areas shall be protected by any of the means described in 210.12(A)(1) through (6):~~

1. A listed combination-type arc-fault circuit interrupter, installed to provide protection of the entire branch circuit.
2. A listed branch/feeder-type AFCI installed at the origin of the branch-circuit in combination with a listed outlet branch-circuit type arc-fault circuit interrupter installed at the first outlet box on the branch circuit. The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
3. A listed supplemental arc protection circuit breaker installed at the origin of the branch circuit in combination with a listed outlet branch-circuit type arc-fault circuit interrupter installed at the first outlet box on the branch circuit where all of the following conditions are met:
    a. The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
    b. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
    c. The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
4. A listed outlet branch-circuit type arc-fault circuit interrupter installed at the first outlet on the branch circuit in combination with a listed branch-circuit overcurrent protective device where all of the following conditions are met:
    a. The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
    b. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 15.2 m (50 ft) for a 14 AWG conductor or 21.3 m (70 ft) for a 12 AWG conductor.
    c. The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
    d. The combination of the branch-circuit overcurrent device and outlet branch-circuit AFCI shall be identified as meeting the requirements for a system combination– type AFCI and shall be listed as such.

5. If RMC, IMC, EMT, Type MC, or steel-armored Type AC cables meeting the requirements of 250.118, metal wire-ways, metal auxiliary gutters, and metal outlet and junction boxes are installed for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, it shall be

permitted to install a listed outlet branch-circuit type AFCI at the first outlet to provide protection for the remaining portion of the branch circuit.

6. Where a listed metal or nonmetallic conduit or tubing or Type MC cable is encased in not less than 50 mm (2 in.) of concrete for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, it shall be permitted to install a listed outlet branch-circuit type AFCI at the first outlet to provide protection for the remaining portion of the branch circuit.

Exception: Where an individual branch circuit to a fire alarm system installed in accordance with 760.41(B) or 760.121(B) is installed in RMC, IMC, EMT, or steel-sheathed cable, Type AC or Type MC, meeting the requirements of 250.118, with metal outlet and junction boxes, AFCI protection shall be permitted to be omitted.

(B) Dormitory Units. All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets and devices installed in dormitory unit bedrooms, living rooms, hallways, closets, bathrooms, and similar rooms shall be protected by any of the means described in 210.12(A)(1) through (6).

(C) Guest Rooms and Guest Suites. All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets and devices installed in guest rooms and guest suites of hotels and motels shall be protected by any of the means described in 210.12(A)(1) through (6).

(D) Branch Circuit Extensions or Modifications — ~~Dwelling Units and~~ Dormitory Units. In any of the areas specified in 210.12~~(A) or~~ (B), where branch-circuit wiring is modified, replaced, or extended, the branch circuit shall be protected by one of the following:

1. A listed combination-type AFCI located at the origin of the branch circuit
2. A listed outlet branch-circuit-type AFCI located at the first receptacle outlet of the existing branch circuit

Exception: AFCI protection shall not be required where the extension of the existing conductors is not more than 1.8 m (6 ft) and does not include any additional outlets or devices.

Reason:

This amendment retains the provisions of the 2017 NEC. AFCIs were first introduced in the 1999 edition of the National Electrical Code (NEC) with an effective date of Jan. 1, 2002. Code Making Panel 2, which had responsibility over branch circuits where AFCIs are addressed, largely based its approval of the code change on several U.S. Consumer Product Safety Commission (CPSC) reports. **However, the number of incidents cited at the time were several times higher than in later reports, and 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 were overblown.

The problems with the rationale were so evident that even electrical manufacturers spoke against the proposal. 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.

When the Home Was Built Is Important

A CPSC epidemiological study, "Residential Electrical Distribution System Fires," showed that 85% of fires of electrical origin occur in homes that are more than 20 years old. 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, 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.

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 the U.S. is 40 years. The share of housing units built before 1970 is 39%, 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.

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.**

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 150,000 households are priced out of the market for a median-priced new home. 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 $838 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.

The total cost to home buyers to install AFCIs is over $430,000,000—per year. **This is 24 times the cost of damage per year**, and 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.

From 1980 to 2015 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.

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8. Arc-Fault Circuit Interrupter (AFCI) Receptacle Replacement

This amendment removes the requirement for AFCI devices to be installed in residential dwelling units, including one- and two-family homes, when a receptacle is replaced, but does not remove it for dormitories.

Revise as follows:

406.4(D)(4) Arc-Fault Circuit-Interrupter Protection. Where a receptacle outlet is located in any areas specified in 210.12~~(A) or~~ (B), a replacement receptacle at this outlet shall be one of the following:

1. A listed outlet branch-circuit type arc-fault circuit-interrupter receptacle
2. A receptacle protected by a listed outlet branch-circuit type arc-fault circuit-interrupter type receptacle
3. A receptacle protected by a listed combination type arc-fault circuit-interrupter type circuit breaker

Exception No. 1: Arc-fault circuit-interrupter protection shall not be required where all of the following apply:

1. The replacement complies with 406.4(D)(2)(b).
2. It is impracticable to provide an equipment grounding conductor as provided by 250.130(C).
3. A listed combination type arc-fault circuit-interrupter circuit breaker is not commercially available.
4. GFCI/AFCI dual function receptacles are not commercially available.

Exception No. 2: Section 210.12(B), Exception shall not apply to replacement of receptacles.

Reason:

This amendment retains the provisions of the 2017 NEC. AFCIs were first introduced in the 1999 edition of the National Electrical Code (NEC) with an effective date of Jan. 1, 2002. Code Making Panel 2, which had responsibility over branch circuits where AFCIs are addressed, largely based its approval of the code change on several U.S. Consumer Product Safety Commission (CPSC) reports. **However, the number of incidents cited at the time were several times higher than in later reports, and 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 were overblown.

The problems with the rationale were so evident that even electrical manufacturers spoke against the proposal. 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.

When the Home Was Built Is Important

A CPSC epidemiological study, "Residential Electrical Distribution System Fires," showed that 85% of fires of electrical origin occur in homes that are more than 20 years old. 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, 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.

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 the U.S. is 40 years. The share of housing units built before

1970 is 39%, 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.

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.**

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 150,000 households are priced out of the market for a median-priced new home. 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 $838 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.

The total cost to home buyers to install AFCIs is over $430,000,000—per year. **This is 24 times the cost of damage per year**, and 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.

From 1980 to 2015 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.

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9. Tamper-Resistant Receptacles

This amendment removes the requirement for tamper-resistant receptacles in one- and two- family homes.

Revise as follows:

406.12 Tamper-Resistant Receptacles. All 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles in the areas specified in 406.12(1) through (7) shall be listed tamper-resistant receptacles.

~~(1) Dwelling units in all areas specified in 210.52 and 550.13.~~
~~(2)~~ (1) Guest rooms and guest suites of hotels and motels.
~~(3)~~ (2) Child care facilities.
~~(4)~~ (3) Preschools and elementary education facilities.
~~(5)~~ (4) Business offices, corridors, waiting rooms and the like in clinics, medical and dental offices, and outpatient facilities.
~~(6)~~ (5) Subset of assembly occupancies described in 518.2 to include places of waiting transportation, gymnasiums, skating rinks, and auditoriums.
~~(7)~~ (6) Dormitories

Exception to (1), (2), (3), (4), (5), and (6), ~~and (7):~~ Receptacles in the following locations shall not be required to be tamper resistant:

(1) Receptacles located more than 1.7m (5-1/2 ft) above the floor.
(2) Receptacles that are part of a luminaire of appliance.
(3) A single receptacle or a duplex receptacle for two appliances located within the dedicated space for each appliance that, in normal use, is not easily moved from one place to another and that is cord-and-plug connected in accordance with 400.10(A)(6), (A)(7), or (A)(8).
(4) Non-grounding receptacles used for replacements as permitted in 406.4(D)(2)(a).

Reason:

This amendment retains the provisions of the 2017 NEC. This requirement was added in the 2008 edition of the National Electrical Code (NEC) and is not based on sound technical information which adequately substantiates that it will result in protecting small children from burns or injury. During the revision cycle leading up to the 2008 edition the supporting documentation for the proposal was based on the summarization of several National Electronic Injury Surveillance System reports from 1991-2001. The NEISS system gathers its data by sampling a group of monitored hospitals for the total number of injuries treated. They then take these figures and calculate the estimated national average.

Public comment from electrical contractors criticized the conclusions drawn from the report. They stated that the report did not identify if the incidents were occurring in newer or older homes. Older homes generally have more electrical hazards which can lead to a higher incidence of shocks.

The NEISS reports also did not provide any supporting information of where the child was located at the time the injury occurred, much less that that all incidents occurred in dwelling units or if any child safety devices were present at the time the injury occurred. There is no scientific research available which has proven tamper-resistant (TR) receptacles are more effective than other safety devices that are currently available on the market. The fact sheet, produced by the National Fire Protection Association, states that TR receptacles are preferred over plastic safety caps for the reason that the caps **may** be lost and **may** be a choking hazard for some ages. However, the Consumer Product Safety Commission (CPSC) suggests the use of outlet safety covers on their website *Childproofing Your Home- 12 Safety Devices to Protect Your Children*, and safety

covers available in stores today are large enough not to constitute a choking hazard. It's fair to say CPSC would not advocate their use if there were safety concerns.

Another concern that was shared by many on the technical review committee was the amount of force that must be applied to insert plugs into the tamper-resistant device and how it will affect the elderly community. The devices are designed in a way that the springs will not open unless the prongs are properly aligned with the shutters and are receiving equal amounts of pressure. Many on the panel voiced concern that there was a lack of product testing showing whether there will be an impact to the aging community's ability to use the new devices.

Notes/additional background:

During the 2008 revision Cycle, the National Electrical Manufacturers Association submitted the proposal to require tamper-resistant receptacles in all areas of a dwelling as indicated in Article 210.52 of the NEC. Over 29 negative comments were submitted in response to the proposal and all 29 comments were rejected by the technical committee. The negative comments were submitted by electrical contractors, electrical inspectors, and some manufactures. Below is a list of concerns that were raised:

1. The required force to insert cords into the device may prove too much for the elderly or disabled.
2. There is no scientific data directly comparing current available safety devices to tamper- resistant receptacles to support the claim that TR are more effective and will reduce the number of accidents.
3. That the proponent should provide data listing the areas of the dwelling where injuries have occurred, thereby proving the need for tamper receptacle in areas such as attics, crawlspaces, mechanical rooms, countertops and other areas where the receptacles are normally out of reach of children.
4. At the time the proposal was approved, it was unknown whether any manufacturers were producing tamper-resistant devices that were compatible or integrated with arc-fault and ground-fault circuit interrupters.
5. The supporting documentation submitted by the proponent clearly stated "the results of these incidents are rarely fatal", and that further research should be conducted along with more product development before any such mandate should be implemented.
6. That the technical committee should remember, the code is not able to protect each person, in every situations, from every conceivable harm and should not be used as a tool to differ the responsibilities of the parent or caregiver who should be monitoring the children.
7. That the substantiation lacked any credible justification for disallowing the use of plastic safety caps other than claiming that they could be lost or become a choking hazard.
8. Why limit tamper-resistant receptacles to dwellings? There are several other occupancies that do not require these devices, yet children are present and the receptacles are accessible.
9. Tamper-resistant receptacles should be an option for dwellings that children occupy and not mandatory for dwellings where children are not present.

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