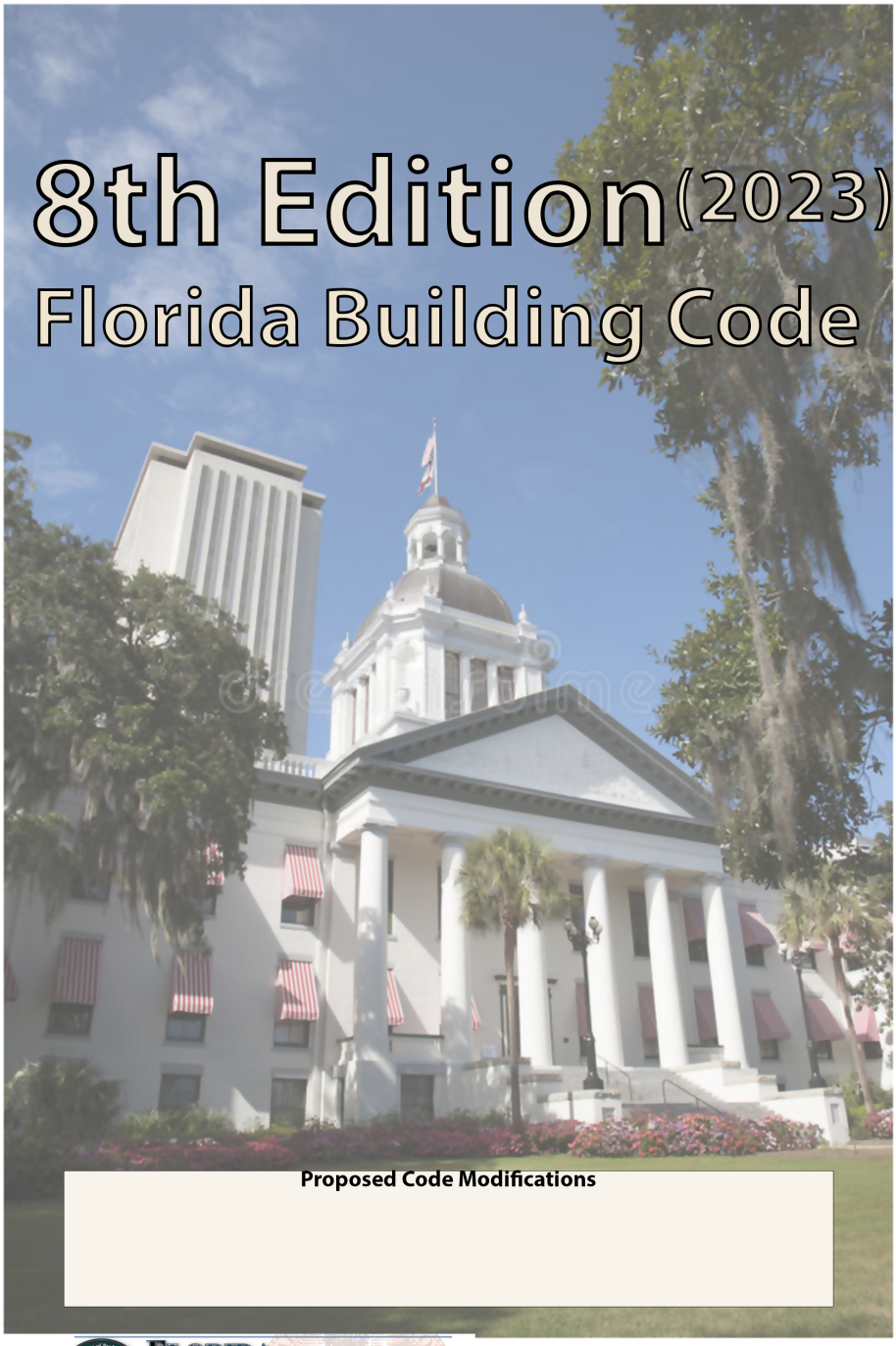

FLORIDA BUILDING COMMISSION
"Stronger Codes Through Science and Consensus"

dbpr Department of Business & Professional Regulation

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850-487-1824

TAC: Electrical

Total Mods for **Electrical** in **Denied : 6**

Total Mods for report: 6

Sub Code: Building

1

E10316

Date Submitted	02/12/2022	**Section**	454.1.8.15	**Proponent**	Dallas Thiesen
Chapter	4	**Affects HVHZ**	No	**Attachments**	**Yes**
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments Yes **Alternate Language No**

Related Modifications

Summary of Modification

Exempts spas with gravity flow drains from NEC emergency cut off switch requirements.

Rationale

Spas with gravity flow drain systems are at extremely low risk for suction entrapment incidents. The inclusion of an unnecessary cutoff switch can lead to unsanitary spa conditions when the switch is accidentally or intentionally erroneously activated. The Florida Department of Health argued for the adoption of gravity flow systems due to their inherent safety.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None, simplifies code requirements.

Impact to building and property owners relative to cost of compliance with code

None, simplifies code requirements.

Impact to industry relative to the cost of compliance with code

None, simplifies code requirements.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

How a swimming pool system is designed and construction impact the health and safety of bathers.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Improves effectiveness of the code by simplifying and clarifying requirements.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not specify particular materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

Improves effectiveness of the code by simplifying and clarifying requirements.

2nd Comment Period

10316-G1

Proponent Dallas Thiesen Submitted 8/26/2022 10:12:13 AM Attachments Yes

Comment:

Comment in support of adopting this proposal attached as a file.

454.1.8.15 Emergency cutoff switches

Spas equipped with gravity flow drain systems, regardless of when constructed, are exempted from Section 680.41 of NFPA-70.

However, ~~I~~if a spa is equipped with an emergency cutoff or kill switch, it shall include provisions for a minimum 80 decibel audible alarm near the spa to sound continuously until deactivated when such device is triggered. The following additional rule sign shall be installed to be visible by the spa which reads "ALARM INDICATES SPA PUMPS OFF. DO NOT USE SPA WHEN ALARM SOUNDS UNTIL ADVISED OTHERWISE."

Drowning Prevention (/posts/category/Drowning+Prevention)

One of life's greatest experiences is a long cool dip in the pool. Children choose swimming over any other recreational activity and it is one of the healthiest forms of aerobic exercise. i It is an activity that many families enjoy in the comfort of their own backyard.

Now imagine one of life's worst experiences, having to bury your own child and worse yet, being there as they drown, helpless to save them. Try as you might, their bodies held on the bottom by an unseen force.

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Unfortunately one of life's greatest experiences can lead to this horrible scenario. According to the Consumer Product Safety Commission, between 1999 and 2010, twelve people drowned as a result of suction entrapment. Of those twelve, eleven were children ages six to seventeen. ii

Suction entrapment is an unseen force created by the suction of a pump connected directly to the suction outlet in a pool. Generally speaking it occurs when a person comes in contact with an improperly protected suction outlet and part of their body, jewelry, clothing or hair is entrapped, entangled or held down by the force of the pump. iii The amount of this force can be staggering; with as much as eighteen hundred pounds of hold down force, literally vaporizing the water in the pipe and sometimes disemboweling small children who have sat down on the suction outlet in a wading pool.

In a 2002 suction entrapment incident, a seven year old girl named Virginia Graeme Baker was trapped underwater by a direct suction main drain. Despite the desperate attempts by her mother to free her she would not budge. Two men finally pulled Virginia out, using enough force to shatter the 8" grate that had suctioned her to the bottom of the pool. Though she was quickly transported to the hospital it was too late to save the little girl's life.

The Virginia Graeme Baker story has a twist though. Virginia was the granddaughter of Secretary of State James Baker III and as a result powerful forces were set in motion and on December 19, 2007 the Virginia Graeme Baker Pool and Spa Safety Act became Law. The Virginia Graeme Baker Act requires that after December 19, 2008 every swimming pool or spa drain cover manufactured, distributed or entered into commerce in the United States conform to the entrapment protection standards of the ASME/ANSI A112.19.8 performance standard or any successor standard regulating such swimming pool or drain cover. These drain covers are specially designed to prevent suction entrapment and were required on all public pools by that date.

But because suction entrapment often occurs when there is a missing or broken grate the law requires pools with a single main drain other than an unblockable drain to have a secondary layer of protection. The second layer can be one of the following five options:

I. Safety Vacuum Release System – A safety vacuum release system which ceases operation of the pump, reverses the circulation flow or otherwise provides a vacuum release at a suction outlet when a blockage is detected, that has been tested by an independent third party and found to conform to ASME/ANSI standard A112.19.17 or ASTM standard F2287.

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II. Suction Limiting Vent System – A suction limiting vent system with a tamper resistant opening.

III. Gravity Drainage System – A gravity drainage system that utilizes a collector tank.

IV. Automatic Pump Shut-off System – An Automatic Pump Shut-off System.

V. Drain Disablement – A device or system that disables the drain.

VI. Other Systems – Any other system determined by the Commission to be equally as effective as, or better than, the systems described in subclauses (I) through (V) of this clause at preventing or eliminating the risk of injury or death associated with pool drainage systems. iv

Only two of these options remove Direct Suction from the swimming pool or spa, Gravity Drainage Systems and Drain Disablement. Many Health Departments still require main drains for proper filtration and chemical dispersion so if you have a main drain in the pool there is only one, Gravity Drainage.

Recognizing the danger posed by direct suction outlets in swimming pools and spas, the Florida State Department of Health has required gravity drainage on pools since 1977 and all spas since 1993. Of the approximately 31,000 pools in Florida on gravity flow there have been no entrapment injuries or deaths. Of the approximately 6,000 pools and spas on direct suction there have been 6 deaths. Statistically speaking the State of Florida has saved approximately 31 lives by requiring gravity drainage on its pools and spas. v The CPSC also has no record of an entrapment incident on a gravity drainage system. Florida is the only state to have such a requirement.

Citing their perfect safety record the Florida Department of Health sought to require all pools and spas that were still on direct suction be retrofitted to gravity flow. “Florida regulations have required gravity drainage for public pools since 1977 and for public spas since 1993 to prevent entrapment” according to Patti Anderson, Bureau Chief for Water Programs with the Florida Department of Health (DOH). “Gravity Drainage is the failsafe anti-entrapment system because there is no direct suction entrapment possibility, and it requires no maintenance or testing to ensure proper function of the anti-entrapment feature.” vi The DOH gave a graduated timeline over 3 years to have the work completed targeting the most dangerous pools first, wading pools, then spas and then pools. Most of these older pools were in some sort of disrepair and many were retrofitted and brought up to code in other areas as well.

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Unfortunately as the deadline approached, in a move designed to circumvent the Health Department an amendment was added to a very popular construction bill to allow the other four options. The Department of Health, the United Pool and Spa Association and the Florida Swimming Pool Association opposed the legislation but were unsuccessful and the amendment became law.

When presented with these options none of the 18 engineers at the DOH would sign off on a method for the Department to approve plans for the installation of these other options. This left the Department with no alternative but to place all liability for any incidents involving the other options with the owner. Responsibility for proper installation, testing and operation lie squarely with the owner of the property. Many owners, being properly informed of the performance of the 5 options, the liability incurred and the ongoing maintenance and cost of testing, have chosen the Gravity Drainage Option. Many, unfortunately, lured by the promise of a savings of money have not.

Now a Gravity Drainage Standard is being written by the ASTM. Many on the original committee were SVRS manufacturers. The preliminary requirements coming from this committee would render many gravity systems deemed unsafe. With a perfect safety record how could this be possible? The UPSA and FSPA have since had members join the committee and have enlisted the University of North Florida to do comparison testing between Gravity Drainage and Direct Suction. As you will see in their report and in subsequent testing, the damage done by direct suction in an entrapment incident happens in the blink of an eye and the forces applied are staggering. When you couple this with the need for ongoing maintenance and the ease with which the other options can be disabled, there is only one option that makes sense when a main drain is present in a pool — a Gravity Drainage System.

A Gravity Drainage System works on the principle that a properly sized and located collector tank installed between the pool or spa and the pump can limit the amount of suction created when the main drain is blocked. The suction line to the pump is connected to the collector tank, not the main drain. Water flows from the main drain in the pool to the collector tank by gravity, and from the collector tank to the pump by pump-caused suction. With this recirculation system, the main drain is not a source of pump-caused suction.

In Florida the basic design requirements for a gravity system are as follows…

The main drain grate must meet ASME/ANSI A112.19.8-2007 for drain covers/grates.

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In Florida the basic design requirements for a gravity system are as follows…

The main drain grate must meet ASME/ANSI A112.19.8-2007 for drain covers/grates.

The main drain outlet shall be connected to a collector tank.

The main drain sump and grate must be sized such that the maximum velocity of the water flow through the grate does not exceed 1.5 feet per second.

The piping connecting the main drain outlet to the collector tank must be sized so that the maximum velocity of the water flow from the main drain to the collector tank does not exceed 3 feet per second.

The capacity of the collector tank shall be at least one minute of the recirculated flow unless justified by an engineer. Vacuum filter tanks are considered collector tanks.

Collector tanks must have a minimum 2.25 square feet of water surface area.

Because of Florida's perfect record these design requirements were followed and a test tank was built by Vak Pak, Inc. in Jacksonville, Fla. The 1000 gallon test tank is designed to simulate the hydraulics of both a 100 gallon per minute pool and a 60 gallon a minute spa with a 120 gallon a minute therapy pump. They are set up to run both on direct suction and gravity flow. The University of North Florida then built an apparatus which would measure the hold down force created when the main drain was covered.

The results were dramatic to say the least. The direct suction system tests resulted in 1505 lbs. of hold down force normalized to 6.8 lbs. per square inch almost immediately after starting the pumps. Conversely the gravity flow system only resulted in 183 lbs. of hold down force normalized to approximately .8 lbs. per square inch and took approximately a minute to accomplish. The normalized psi is due to the 16"x16" open area under the device. vii

While this is certainly a striking difference it still did not definitively explain why no one has ever been entrapped on a gravity flow system. The apparatus built by the University of North Florida only lifted straight up and is not a good representation of how a body would act in the water. A body actually could not lift straight up but would either lift up from the front like a push up or roll from one side or the other in an effort to free itself. It was hypothesized that because there has never been an entrapment incident on a gravity system for two reasons:

There was no immediate force to entrap a person and a seal had to be created and even the smallest break in the seal relieved any suction force. Contrast this to direct suction where even when the main drain wasn't sealed there was an incredible amount of force.

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Because of the small amount of hold down force per square inch, even at maximum drawdown a body could easily break the seal.

Members of the United Pool and Spa Association decided to take the test a step further and designed a blocking element that could be lifted from one corner to test this theory. The 16”x16”x1/2” 11 lb. rubber mat was attached by the corner to a digital scale on a chain hoist and tested on both the gravity flow and direct suction main drains with an old flat style grate in place. This test yielded 7 lbs of force to lift the mat off the gravity flow system by the corner and 17 lbs of force from the direct suction system. Because most entrapment situations occur when there is a missing or broken grate the grates were removed and the tests run again. The gravity flow test resulted in the same 7 lbs of force. The test on the direct suction system was unsuccessful though because when the mat was placed over the drain without a grate the entire mat was sucked down into the drain. Even though the drain was not sealed the mat could not be removed until the pumps were shut off.

Again, there was a dramatic difference but not enough to conclusively say that you cannot be trapped on a gravity drainage main drain. There was only one thing left to do…conduct a live test with a human being on a gravity drainage main drain.

The first test was done on a wade pool with a 12”x12” main drain and a flow of 50 gallons per minute. It was run with the VGB approved grate in place and the subject was unable to seal the drain. Next the grate was removed and the tests run again. The subject, a 6’ 240 lbs. man was unable to seal the 12”x12” frame. A gasket was then made reducing the open area to 10”x10” and the test run again. This time the drain was sealed and the collector tank began to draw down. Afterwards, the subject reported that there was a definite pull at first from the kinetic energy of the water in motion but once that stopped it leveled off and did not increase appreciably as the collector tank drew down. Once the collector tank had drawn down as far as it could the subject was notified and easily removed himself from the drain. The test was run a number of times with the subject on his stomach and on his back with similar results each time. At no point could the subject not easily remove himself from the main drain.

A test was also run using the mat that was used in the test tank. It was placed over the main drain and once the collector tank had reached maximum draw down the subject tried to remove it by hand from an eyebolt in the middle. He could not remove it consistent with the

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183 lbs of force required to lift it straight up as documented by UNF. He then grabbed it by the corner with just his thumb and forefinger and easily removed it also consistent with the tests run in the tank.

Next the same tests were run in a pool in 2'8" of water. This was a 75 gallon per minute system again with a 12"x12" main drain. The first difference became apparent when the subject could not hold himself on the main drain due to his buoyancy. A 23 lb. weight belt was employed and the subject was able to seal the drain. However, as soon as he took the belt off his back his buoyancy lifted him off the drain as there is virtually no force to hold you there in the beginning. The belt was used again and not removed and the collector tank lowered to the maximum draw down. The results were identical to that of the wade pool. At no point was the subject unable to remove himself from the main drain. Whether on his stomach or his back, whether he rolled off or did a push up, each time he easily removed himself even with the weight belt still on his back.

In a subsequent test in 4'6" of water the subject could not seal the 12"x12" main drain frame even with the aid of the gasket and the weight belt.

Because of the hydraulic requirements of 1.5' per second through the main drain grate in Florida that necessitate a 12"x12" main drain frame and grate even a man of above average size could not seal the main drain with the grate missing.

There is no immediate force drawing you to the drain and a seal must be created even with the 10"x10" "gasket" in place.

Buoyancy is a large factor not included in any testing done up until the time. The subjects buoyancy allowed him to float above the main drain in the wade pool with no effects even in only 11" of water and the subject was unable to even create a seal in 2' 8" of water without the aid of a weight belt. In 4'6" of water the subject could not create a seal even with the aid of the gasket and a weight belt.

While the overall number of the removal force seems large at 183 lbs it is only because of the large area of the drain and actually only results in approximately .8 lbs per square inch.

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Because a collector tank requires no power and has no moving parts there is no maintenance or ongoing testing required to ensure it is operating properly. Also, because of its design it would be very difficult to disable. This is not the case with the other options. SVRS's and Automatic Pump Shut off Systems require power and ongoing testing to ensure they are operating properly. Suction Limiting Vent Systems can easily be disabled. Even Drain Disablement adversely affects the pool as it alters the proper dispersion of chemicals and creates "dead spots" in the pool. Clearly, the only sure-fire failsafe option to prevent suction entrapment when a main drain is present is a Gravity Drainage System.

If you are still not convinced compare the experience of our test subject with the following account taken from the website of the Law Firm handling estate of John Van-Joy Jr. who drowned in a hot tub at the Sandals' Royal Bahamian Resort.

"While enjoying a once in a lifetime trip with his fiancée, Nicole Cleveland, John Van-Hoy Jr., drowned when he became entrapped in a spa at the Sandals' Royal Bahamian Resort in Nassau, Bahamas. On December 28, 2010, at the end of the day, John was in approximately 3.5 feet of water in a small circular hot tub / spa at the resort, while Nicole relaxed nearby. John submerged his body under the warm waters, but never came up. As it turned out, his body had been "sucked" onto the single suction outlet drain at the bottom of the hot tub."

"Although he was 33 years old, a former all-state baseball player, in excellent shape, and could bench press over 300 pounds, John could not free himself. Nicole, realizing something was horribly wrong when John did not re-surface, tried unsuccessfully to free John from the suction forces generated by the spa's pump and water circulation systems. In response to Nicole's screams for help, five more heroic guests jumped into the hot tub but collectively also could not free John from the suction outlet drain at the bottom of the spa. Complicating matters, experts who have visited the resort concluded, amongst other things, that there was no nearby emergency shut-off switch to turn off the spa's suction pump in time to save John's life. Ultimately, Nicole watched her fiancée die before her eyes. John left behind two boys, ages 15 and 5, his fiancée, two sisters, a brother and his parents."

By Keith Brias and Richard Husk on May 24, 2011 [viii]

If a former athlete, aided by five guests could not get free from a direct suction main drain, what chance would a child have? It is not necessary to have direct suction in a swimming pool or spa. There is a vastly better option…Gravity Drainage.

Because a collector tank requires no power and has no moving parts there is no maintenance or ongoing testing required to ensure it is operating properly. Also, because of its design it would be very difficult to disable. This is not the case with the other options. SVRS's and Automatic Pump Shut off Systems require power and ongoing testing to ensure they are operating properly. Suction Limiting Vent Systems can easily be disabled. Even Drain Disablement adversely affects the pool as it alters the proper dispersion of chemicals and creates "dead spots" in the pool. Clearly, the only sure-fire failsafe option to prevent suction entrapment when a main drain is present is a Gravity Drainage System.

If you are still not convinced compare the experience of our test subject with the following account taken from the website of the Law Firm handling estate of John Van-Joy Jr. who drowned in a hot tub at the Sandals' Royal Bahamian Resort.

"While enjoying a once in a lifetime trip with his fiancée, Nicole Cleveland, John Van-Hoy Jr., drowned when he became entrapped in a spa at the Sandals' Royal Bahamian Resort in Nassau, Bahamas. On December 28, 2010, at the end of the day, John was in approximately 3.5 feet of water in a small circular hot tub / spa at the resort, while Nicole relaxed nearby. John submerged his body under the warm waters, but never came up. As it turned out, his body had been "sucked" onto the single suction outlet drain at the bottom of the hot tub."

"Although he was 33 years old, a former all-state baseball player, in excellent shape, and could bench press over 300 pounds, John could not free himself. Nicole, realizing something was horribly wrong when John did not re-surface, tried unsuccessfully to free John from the suction forces generated by the spa's pump and water circulation systems. In response to Nicole's screams for help, five more heroic guests jumped into the hot tub but collectively also could not free John from the suction outlet drain at the bottom of the spa. Complicating matters, experts who have visited the resort concluded, amongst other things, that there was no nearby emergency shut-off switch to turn off the spa's suction pump in time to save John's life. Ultimately, Nicole watched her fiancée die before her eyes. John left behind two boys, ages 15 and 5, his fiancée, two sisters, a brother and his parents."

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Warning!

The testing performed in this report should not be attempted.

The participants in this test are certified divers and industry professionals.

Attempting these tests on a direct suction main drain sump may be harmful or even fatal.

i Business Lexington, "Kentucky Needs to Update its Pool Code" by Tracynda Davis

ii Consumer Product Safety Commission 1999-2010 Reported Circulation/Suction Entrapments Associated with Pools, Spas and Whirlpool Bathtubs, 2011 Report

iii Pool and Spa News, "The Five Types of Entrapment" by Rebecca Robledo 11/26/2010

iv "Virginia Graeme Baker Pool and Spa Safety Act"

v Robert Pryor, Florida State Department of Health

vi Florida Community Association Journal, "State Law to Join Federal Law" by Kathy Danforth July 2011

vii "Characterization of Swimming Pool and Spa Main Drain Technologies" James H. Fletcher, PHD Principal Investigator, University of North Florida 8/17/ 2012

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Blog: The Gravity Drain Advantage

AQUA Editors
Aug 28, 2014

For both kids and adults, few things are as attractive as a swimming pool when the weather's hot. Whether it's public or private, a pool is often the center of summertime fun and swimming is usually a healthy, safe activity. Although every adult and most children are aware of the danger of drowning for those who can't swim, few may know of the danger that can affect swimmer and non-swimmers alike: becoming trapped by the suction of a drain. Suction entrapment, also referred to as drain entrapment, can result in drowning for even the strongest swimmer

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What is suction entrapment?

Entrapment is when a swimmer (most often a child) becomes trapped by the powerful suction forces created by water rushing into the drains at the bottom of pools. A person can be trapped by a part of his or her body, such as limb or hair, or by clothing or jewelry. The force produced at the drain by a pool pump is staggering, as high as 1,800 pounds of hold-down force. Depending upon body position, this can even result in evisceration (disembowelment).

Although considered rare, there have been more than 150 documented cases of suction entrapment since the 1980s.

Legal requirements for Pool and Spa professionals

In 2002, a seven-year-old girl, Virginia Graeme Baker, was trapped by a direct suction force. Despite the efforts to free her, the force was too powerful to prevent her drowning.

Virginia Graeme Baker was the granddaughter of then-Secretary of State James Baker.

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Virginia Graeme Baker was the granddaughter of then-Secretary of State James Baker.

With the power of his high profile, a law was set in motion that we as pool and spa professionals must follow to help ensure these types of accidents don't happen again. The law, enacted by Congress and signed by President George W. Bush in December 2007, requires that pool and spa drain covers on all public and commercial pools conform to entrapment standards.

Because suction entrapment drownings most often occur when a drain grate is broken or missing, the law requires pools with a single main drain to have secondary levels of protection. These can be one of the following:

?A safety vacuum release system, which causes the pump to stop operating, and reverses the circulation flow and releases the suction when a blockage occurs.

?A suction limiting vent system, which limits the suction forces and is present with a tamper resistant opening.

?A Gravity Feed Drainage System, which utilizes gravity feed and a collector tank to stop the suction forces at a main drain and eliminate potentially deadly suction forces.

?An automatic pump shutoff system, which uses an automatic system to shut off the pump when suction drain flow is obstructed.

?Drain disablement, which includes any system or device that disables the use of the drain.

While all of these options are valid solutions under the law, only two actually remove direct suction forces from the pool or spa: gravity feed draining systems and drain disablement.

Although drain disablement may be an option for residential installations, public and commercial pools and spas require drains to operate for proper filtration, circulation and dispersion of chemicals. For these reasons, we recommend Gravity Feed Draining systems as the most effective option for stopping main drain entrapment.

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Gravity Feed Draining System benefits

The most important benefit of these systems is in the numbers of saved lives. In Florida, we have been required by law to have gravity drainage systems on pools since 1977 and on spas since 1993. Today there are approximately 31,000 pools in Florida with gravity flow systems and there have been no reports of entrapment injuries or deaths with those systems. Conversely, there are approximately 6,000 pools and spas with direct suction systems; of those, there have been six documented deaths. Statistically, Florida's gravity drain system laws have saved about 31 lives. Florida is the only state to have this requirement.

To test the safety of gravity feed systems and direct suction systems, the United Pool and Spa Association (UPSA) enlisted the University of North Florida to conduct comparison testing.

The findings of the report unequivocally demonstrate the superior safety and efficacy of gravity feed draining systems over direct suction systems. In a direct suction incident, the damage is done in an instant because the forces applied to the trapped swimmer are at full strength immediately. Combined with the need for ongoing maintenance and monitoring that direct suction systems require, and the ease with which other options can be disabled, and only one choice is clear: Gravity Feed Drainage Systems.

How does a Gravity Feed Drainage System work?

These systems work by having a properly sized and located collector tank installed between the pool or spa and the pump. This limits the amount of suction force that can

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How does a Gravity Feed Drainage System work?

These systems work by having a properly sized and located collector tank installed between the pool or spa and the pump. This limits the amount of suction force that can

be created when the main drain becomes blocked.

The suction line is connected to a collector tank instead of the main drain. Water flows from the main drain of the pool to the collector tank by gravity force (not via pump). The water then flows from the collector tank to the pump via pump-caused action. This ingenious design allows recirculation of pool and spa water, but eliminates the main drain as the source of suction.

When we at Vak Pak engineer Gravity Feed Drainage Systems, we follow these basic design standards:

?Main drain grate meets ASME/ANSI A112.19.8-2007 standards for drain covers and grates.

?Main drain outlet is connected to a collector tank located between the pool or spa and the pump.

?Main drain sump and grate are sized so that the maximum velocity of the water flow through the grate does not exceed 1.5 feet per second.

?Piping that connects the main drain outlet to the collector tank is sized so the maximum velocity of water flow to the collector tank is not more than three feet per second.

?The capacity of the collector tank must have at least one minute of recirculated flow (a vacuum filter tank can be considered a collector tank).

?Collector tanks have a minimum of 2.25 square feet of water surface area.

To ensure that Gravity Feed Systems are the best and safest options for swimmers and pool professionals, we commissioned a test tank to be built at the University of North Florida to simulate the hydraulics of a pool and spa. We also had the pool and spa set up with both direct suction and gravity flow systems. We wanted to validate our view that

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gravity feed systems are a safer alternative to the direct suction systems allowed in other markets.

The UNF results showed that a direct suction system results in more than 1,500 lbs. of hold-down forces (which normalized to 6.8 lbs. per square inch) almost immediately upon starting the pumps. Our gravity flow system, however, resulted in only 183 lbs. (normalized to 0.8 lbs. per square inch) of hold-down force and took almost a minute to accomplish those forces.

While this alone is a very significant difference in forces, it doesn't adequately explain why no one has ever been trapped on a gravity flow system. We couldn't determine for certain the reasons, but we can hypothesize that there are two reasons this system works so well:

1.There is no immediate force to entrap a swimmer and a seal has to be created to cause entrapment. Even the smallest break in the seal relieves suction forces. This is in direct conflict with direct suction, where a seal isn't necessary to create incredible suction forces.

2.Because of the very low hold-down forces, even at maximum drawdown, swimmers (children included) can easily break the seal.

Testing the theories

We were aware that the theories for why gravity feed systems work so well are just that: theories. We decided to conduct live tests with a real swimmer on a gravity drainage system.

We ran multiple tests, in different water scenarios and with varying size main drains. Our test subject was an above-average size male (6 feet tall and 240 pounds) and he was unable to create a seal on a 12" x 12" main drain and unable to create an entrapment.

We then created a gasket that reduced the drain area to 10" x 10". This time, he was able to seal the drain. Once the collector tank system was drawn down, he was able to easily

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In another instance, we ran the test in a pool of almost three feet of water with a 75 gallon-per-minute drainage system and 12" x 12" main drain. The test subject was having trouble holding himself on the main drain due to his buoyancy. We added 20 pounds of weights so that he could create the main drain seal. As soon as the weights were removed his own buoyancy lifted him off the drain with virtually no forces holding him down.

The requirements in Florida necessitate the large 12" x 12" main drain frame and grate. Since the above-average sized man in our testing was unable to create a seal on the drain grate, it's almost impossible for a child or smaller adult to be able to create any sort of seal. At that, even if a seal is created, the holds down forces (of .8 pounds per square inch) are low enough that removal from the drain is easy and will not result in physical injury.

Because collector tanks have no power and are operating solely on gravity forces, there is no maintenance or ongoing testing necessary to ensure proper operation. Another benefit to the collector tank/gravity feed system is the design is difficult to tamper with or disable. This is certainly not the case with other mechanical and electric requiring systems. These suction-limiting systems require ongoing maintenance and testing, as well as power systems to ensure proper operation.

Disabling the main drain itself could be an option to prevent drownings, but this isn't an alternative in most public and commercial pool and spa settings as municipal standards require the ability to disperse chemicals and recirculate water. Drain disablement negatively affects the pool environment and creates dead spots. The only virtually fail

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David Sutherland has been involved in the aquatic equipment industry for over 15 years. He currently serves as the Vice President of Operations at Vak Pak, Inc. a Jacksonville, Florida based manufacturer providing aquatic filtration and recirculation systems and collector tanks worldwide.

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Jul 25th, 2019 7:54am

Very interesting, do you have schematics or graphic diagrams to illustrate example installations?

Gene Novak, CBO

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6 MANUFACTURER NEWS
Large Chlorine Plant to Open in August

SW10316-G1 Comment

Excluding Florida gravity flow spas from the NEC emergency shut off requirement is necessary to prevent erogenous engagement of the shut off which can and does lead to unsanitary water conditions in Florida Spas. When the switch is engaged all filtration and circulation of the spa water stops and creates a condition where algae and waterborne pathogens can grow.

Excepting gravity flow spas from this requirement will not affect bather safety negatively. Gravity flow spas are extremely effective at preventing suction entrapment. The NEC emergency shut off requirement is specially for use in the event that a bather becomes trapped by spa suction. To date there are no recorded entrapments on gravity flow spas in the State of Florida. The NEC emergency shutoff requirement is redundant on gravity flow spas adds no extra protection against suction entrapment and can create an unsanitary spa environment when erroneously tripped.

The emergency shut of is also not needed to create still water in the spa for non-entrapment medical or other emergencies. Proposed modification SW10528 (approved as modified by the Swimming Pool TAC) will require all heated spas to have a bather actuated timer that activates the water jets. This timer switch can be used to turn off spa jets in the event of a non-entrapment medical or other emergencies where the spa water is needed to be still.

Additionally, adoption of the NEC by the Florida Fire Prevention Code will not negate an exception to NEC 680.41 by the Florida Building Code. While both code adopt the NEC. Only the Florida Building Code speaks to swimming pool and spa standards, no specific swimming pool or spa standard are contained within the Fire Prevention code and no building official, swimming pool contractor, or member of the public would reasonably site the Fire Protection Code in the design, building, or inspection of a commercial spa. As such there is no proper place within the Fire Prevention Code to also include this proposed exception the proper place for this exception is the Florida Building Code.

Lastly, this exception is also being proposed NFPA as a Tentative Interim Amendment (TIA) for inclusion in the 2020 NEC which will become effective in Florida with the 2023 Florida Building Code.

SW10316-G1 Comment

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Lastly, this exception is also being proposed NFPA as a Tentative Interim Amendment (TIA) for inclusion in the 2020 NEC which will become effective in Florida with the 2023 Florida Building Code.

TAC: Electrical

Total Mods for **Electrical** in **Denied : 6**

Total Mods for report: 6

Sub Code: Building

2

E10220

Date Submitted	02/11/2022	**Section**	2703	**Proponent**	John Lovett
Chapter	27	**Affects HVHZ**	No	**Attachments**	**Yes**
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments Yes **Alternate Language Yes**

Related Modifications

Summary of Modification

This is a proposal to drop the arc fault requirement for the state of Florida.

Rationale

Majority of the trips are nuisance trips. Not constant. Only constant trips I've experienced with arc fault protection are either from an overcurrent or from a direct short. Same protection he would get with a standard trip breaker. No documented proof (that I know of) of arc fault protection actually preventing any fires, but there is very much proof of arc fault protection having nuisance trips. Actually causes a problem and doesn't prevent anything. Causes more problems than was meant to rectify. Documented proof of causing problems and no documented proof of solving problems. "Upgrading" (to AFCI protection), the NEC has downgraded the integrity of any circuit with arc fault protection. Arc fault protection is supposed to detect a spark. Once the spark is already happened it's too late. Like saying, "hello" to somebody after they've walked by you. Michigan and Indiana have completely dropped the requirement. Cost money. Every time nuisance trip being called by homeowner. Creates heat. Causes bus bars to burn over time. A first responder told me that when they cannot find a specific cause of a fire they fill in the blank with “electrical fire”. Have to fill in the blank. Reason there are so many documented electrical fires. Cost money. Every time nuisance trip being called by homeowner. Like taking a medication that causes more side effects than there are symptoms.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

would not impact entity either way.

Impact to building and property owners relative to cost of compliance with code

Material would cost less. This would eliminate "nuisance trips" which would save homeowners time, frustration, and money.

Impact to industry relative to the cost of compliance with code

Would eliminate "nuisance trips". Every time the ARC fault breaker trips, the homeowner will be calling the electrician. this could be totally eliminated by this proposal

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

no

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes. No more nuisance trips caused by arc fault breakers. This would save homeowners and contractors time, money and frustration.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

no

Does not degrade the effectiveness of the code

no

Alternate Language

2nd Comment Period

E10220-A1

Proponent Charles Fischer **Submitted** 8/24/2022 2:31:35 PM **Attachments** Yes

Rationale:

This modification will help alleviate the problem of nuisance tripping while at the same time preserving the majority of the safety aspects of arc-fault circuit interrupters.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Enforcement will be easier.

Impact to building and property owners relative to cost of compliance with code

Cost will be lowered in that there will not be as many arc-fault devices required, and nuisance trips and the costs associated with them will greatly be reduced.

Impact to industry relative to the cost of compliance with code

Cost will be substantially reduced.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Nuisance trips are a huge burden on the end user, by helping to reduce them, there will be less of a temptation to remove arc-fault protection and replace with standard protection after inspection.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Improves the code to address unintended circumstances associated with some of the arc-fault requirements.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This does not discriminate against any materials, products, methods, or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This does not degrade the overall effectiveness of the code.

1st Comment Period History

E10220-G1

Proponent Bryan Holland Submitted 3/28/2022 8:50:09 AM Attachments No

Comment:

NEMA strongly opposes this proposed modification. AFCI protection is a fundamental fire-safety component of a premises wiring system. Deletion of these sections will result in an increased risk of fire as a result of unmitigated arcing-faults in branch circuits, outlets, appliances, and other utilization equipment. The reports of unwanted tripping have not been substantiated by the proponent. Guidance and other AFCI protection related resources have been shared with the proponent to assist him with the proper installation and troubleshooting of AFCI protected branch circuits in new and existing dwellings. NEMA urges the Electrical TAC and Commission oppose this proposed modification.

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

210.12 **(A) Dwelling units.** All 120v, single phase, 15 and 20 ampere branch circuits supplying ~~outlets or devices~~ only general use receptacles installed in dwelling 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):

210.12 **(B) Dormitory Units.** All 120-volt, single phase, 15- and 20- ampere branch circuits supplying ~~outlets or devices~~ only general use receptacles 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).

210.12 **(C) Guest Rooms, Guest Suites, and Patient Sleeping Rooms in Nursing Homes and Limited-Care Facilities.** All 120-volt, single phase, 15- and 20- ampere branch circuits supplying ~~outlets or devices~~ only general use receptacles installed guest rooms and guest suites of hotels and motels, and patient sleeping rooms in nursing homes and limited-care facilities shall be protected by any of the means described in 210.12 (A) (1) through (6).

HOME BUILDERS ASSOCIATION OF MICHIGAN

TO: House Regulatory Reform Committee

FM: Lee Schwartz, Executive Vice President for Government Relations
Home Builders Association of Michigan

RE: Arc-Fault Circuit Interrupters and the Michigan Residential Code.

I'm writing to explain why the Home Builders Association of Michigan opposes the effort to overturn the reasoned decisions of both the Michigan Residential Code Review Committee and the Director of the Department of Licensing and Regulatory Reform to remove the requirement for arc-fault circuit interrupters from the 2015 Michigan Residential Code (the Code).

AFCIs were first required on all branch circuits serving bedrooms in the 2003 Michigan Residential Code. Since then **both** the Granholm and Snyder Administrations have rejected attempts to expand the mandated use of AFCIs in new homes as unnecessary and unsupported.

The Regulatory Impact Statement for the 2015 Michigan Residential Code states: "*The (2003) Michigan Residential Code requirement for arc-fault circuit interrupters (AFCIs) on all branch circuits serving bedroom outlets was justified solely on the basis of its inclusion in the NEC and the IRC.* ***No Michigan-specific fire data was ever provided for this code requirement. There has been a persistent and ongoing failure to provide an accurate fire analysis or cost benefit analysis to support requiring these devices in bedrooms of new homes.***"

Four separate Michigan-specific studies were conducted over a cumulative twelve-year period (2002-2013) using National Fire Incident Reporting system data. These studies, which used only structural fires involving electrical branch circuits or outlet receptacle fires in one- and two-family homes, the type of fires AFCIs are said to prevent, found:

- In the 12 years covered by the studies only one civilian death occurred in a fire caused by electrical arcing. This tragic death took place in Iron Mountain in 2013 where a 66-year-old man died from smoke inhalation. The house involved in the fire was built in the 1940s and it is not known if there were working smoke alarms in the house. (A 2008 National Fire Protection Association study found: "*The chances of surviving a reported home fire when working smoke alarms are present are 99.45%*)
- Michigan has over three and a half million one- and two-family dwellings. The average number of arcing fires in those homes over that 12 year period was 24.8 per year which equals 0.00071% of all homes.
- There were only two civilian injuries during that twelve-year period, an average of 0.16 injuries per year.
- The average annual total damage from this type of fire in both property and contents adjusted to 2013 dollars was $828,726.20.

The National Fire Protection Association has produced its own analysis of electrical fires from 2007 through 2011. This analysis suffers from several major flaws.

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- Rather than analyzing only fires involving electrical branch circuits or outlet receptacles, their analysis begins with an enumeration of **all** fires "*in which the factor contributing to ignition was **some type*** of electrical failure or malfunction.
- Their analysis also includes fires caused by "*electrical failures in all other types of equipment as well as unclassified wiring, cords, lighting and other electrical distribution or lighting.*"

Most tellingly, their analysis does not limit itself to one-and two-family homes built under the requirements of the Michigan Residential Code. Instead, to try to support their case, they have broadened their parameters to *include* "*incident types 110-129 excluding 113-118,*" many of which would not be regulated under the Michigan Residential Code.

- Incident type 112 is **a fire in structure other than a building**. This includes fires on or in piers, quays, or pilings; tunnels or underground connecting structures; bridges, trestles or overhead elevated structures; transformers, power or utility vaults or equipment; fences.
- Incident type 121 is **a fire in mobile home used as a fixed residence**. This includes mobile homes when not in transit and used as a structure for residential purposes and manufactured homes built on a permanent chassis.
- Incident 122 is **a fire in a motor home, camper or recreational vehicle when used as a structure**. This includes motor homes when not in transit and used as a structure for residential purposes.
- Incident 123 is **a fire in a portable building when used at a fixed location**. This includes portable buildings used for commerce, industry or education and trailers used for commercial purposes.
- Incident type 120 is **a fire in any other mobile property used as a fixed structure**.

Their analysis also made:

- "*Adjustments*" based on population to compensate for the fact some fire departments did not report a high number of fires.
- "*Adjustments*" to compensate for the fact some fire departments *did not report any fires in some or all years.*"
- "*Adjustments*" to compensate for fires in "*which the factor contributing to ignition was unknown.*"
- "*Adjustments*" to compensate for fires "*in which the heat source was unknown.*"
- "*Adjustments*" to compensate for fires "*in which the factor contributing to the ignition was coded as 'none.'*"

Their analysis not does specify what factors were used to make these "*adjustments.*" Their analysis does not explain how the factors used to make these "*adjustments*" were calculated. Even students in elementary schools are required to show their work.

This is not the first time proponents of mandatory AFCIs have provided erroneous data on residential fires in Michigan as rationalization for forcing these devices on the public. During the 2009 residential code promulgation process they inaccurately claimed: *"Per the National Fire Incident Reporting System (NFIRS), for calendar year 2009, Michigan has had 1,239 fires due to electrical arcing. This has resulted in 20 civilian deaths and 20 fire fighter injuries with total property and content loss of $122,274,894.*"

In 2009 there were only 23 fires due to electrical arcing in one- and two-family homes. There were no civilian deaths. The total property and content damage from these fires totaled $937,644.

Proponents of mandatory AFCIs seem to have a curious propensity for continuously "fuzzing the numbers" by citing national statistics which include all electrical fires, not just structural fires involving electrical branch circuits or outlet receptacle fires in one- and two-family homes.

While there may be one national model residential code, governmental units enforcing a residential code adopt thousands of amendments to fit the code to their needs including the use of significantly older codes. Many do not adopt a residential code at all. This patchwork of requirements allowing homes to be built to different standards make a comparison of fire data gathered outside Michigan irrelevant to our decisions in this state.

Perhaps the biggest deficiency surrounding fire data gathered through the National Fire Incident Reporting System is that it does not contain any information of the age of the home.

Volume 10, Issue 7 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. As of 2007, the median age of one- and two-family housing was over 35 years. With half of this housing stock older than 35 years, electrical issues become an increasing large player in residential fires.*"

According to a 1990 Consumer Product Safety Commission Epidemiological study, "*Residential Electrical Distribution System Fires*," 85% of all such fires involved housing over 20 years old.

A study by Harvard University's Center for Risk Analysis entitled "Residential Building Codes, Affordability, and Health Protection: A Risk-Tradeoff Approach" found "*The mortality risk from house fires is clearly higher in older homes.*" Another study in North Carolina reported on in the *New England Journal of Medicine* found the fatality rate per fire to be 100% greater in homes 20 years or older than in newer homes.

Seventy-one per cent of Michigan's housing units were built before 1990. Fully13.5 percent of Michigan's housing stock was built before 1939. The median age of Michigan's housing is 36 years. Only 15.3% percent of Michigan's housing has been built since 2000. Without knowing the approximate age of the home a fire occurred in, it is almost impossible to make a cogent determination on the need for commanding the inclusion of AFCIs in new home construction.

The NFPA analysis charges the National Association of Home Builders with focusing "*only on fires in which branch circuit wiring and outlet receptacles were the equipment involved in ignition. … (*excluding) *unclassified wiring, lighting, other electrical distribution or lighting equipment … electrical failures, arcing in appliances or other items plugged into the outlet"* and with *"making no adjustments for fires with unknown data."* Our studies analyze the effect of a specific code change and include *only* the fires that were relevant for that purpose, not piers, campers, tunnels, utility vaults or portable buildings.

Among the many deficiencies in the "*Fact Sheet*" prepared by AFCI proponents it that it contains the erroneous statement: "*The Home Builders Association of Michigan (HBAM) thinks AFCIs are too costly to add to new homes."* **The Home Builders Association of Michigan is opposed to the imposition of compulsory AFCI requirements because they are unnecessary and no accurate Michigan-specific data has ever been provided to substantiate a need** (see the Regulatory Impact Statement above). The cost of complying with a superfluous mandate is important but secondary to that consideration.

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

The Michigan Residential Code is intended to be a minimum code with affordability as one of its key purposes. State law prohibits the code from containing "*unnecessary construction regulations that tend to increase construction costs.*"

One million, one hundred seventy-nine thousand Michigan families cannot afford to buy a home costing more than $100,000. Another eight hundred and twenty thousand cannot afford a home priced above $175,000.

Attached you will find a breakdown by SMSA of the number of Michigan families who are priced out of a home by every $1,000 increase in cost.

The total annual cost to home buyers if the proposed ACFI requirement found in these rules had been in effect ranged between $9 million to $16.5 million, depending on the number of homes built and size 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 of 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.

These older homes, such as the one involved in the terrible Iron Mountain fatality in 2013, can have building materials, space heaters, faulty wiring, or other characteristics that might lead to a greater risk of a fire starting along with structural inadequacy, or lesser ease of exit which increase the chances of dying in that fire.

Even as homes built to today's Michigan Residential Code get older, they will continue to provide protection for families through their improved fire separation, fire blocking and draft stopping, emergency escape and rescue openings, electrical circuit breakers, capacity and outlet spacing, reduced need for space heating and enhanced means of egress.

Proponents of AFCIs often use the argument "*They'd only spend the money on a granite countertop anyway*," to justify including questionable requirements in the code. They often state the cost of these devices would only run $300. Based on actual estimates obtained for the inclusion of AFCIs we believe this severely understates the potential cost of this requirement.

Taking away a homebuyer's choice in how to spend their money means they lose the ability to use that money in other ways they have decided would better increase the quality of life for themselves and their families.

Dollars involuntarily spent on unjustified requirements won't be available for improved medical care, better insurance, a safer and more fuel-efficient car, education expenses, retirement accounts, charitable giving, physical fitness activities or even upgrades such as a higher efficiency furnace in the home.

On behalf of the Home Builders Association of Michigan, I want to thank you for your careful consideration of the information presented in this memo. If you have any questions about this issue, or if the Association can be of help to you in any other way, please do not hesitate to contact me. My direct line is 517-646-2565. My cell number is 517-582-4000. My email is lee@hbaofmichigan.com.

C.W. Fischer ELECTRIC, INC. since 1968

3121 N.W. 16th Terrace
Pompano Beach, FL 33064
954-566-5689

August 24th, 2022

Regarding: Electrical Code Modification E10220 and E10244; Proposal to drop the arc-fault requirement for the State of Florida.

To Whom It May Concern,

As an electrical contractor myself, I have experienced the aggravations, immense costs, customer conflicts, etc., that are associated with the constant nuisance tripping of arc-fault breakers. This has been an issue in the electrical trade for a long time now, and does not appear to be getting any better, only worse. I've had my share of lawsuits threatened against my company for installing faulty breakers, demands to replace arc-faults with different brands, or demands to remove them all together and install standard breakers.

Recently, I've had the chance to work with one of the major electrical arc-fault breaker manufacturers to determine what the issues were on one of my large custom home projects that we were experiencing constant nuisance tripping. After days of testing on site with factory reps and engineers, we were able to determine that the cause of the tripping was electrical noise that was being placed on the system by LED drivers and "Smart" appliances. The appliances were a dishwasher and warming drawer. The final resolution was that the manufacturer of the breaker said it was not their issue, and that the LED lighting and appliances didn't met FCC guidelines (See attached white sheet). I was forced to replace all of the panels and breakers with another brand, or risk having a lawsuit filed against me. We replaced everything, and after we were done, the owner still experienced nuisance tripping.

Each arc-fault breaker has a small chip in it designed with an algorithm to filter out "good" arcs, vs. "bad" arcs. These chips are often fooled into thinking that the excess noise placed on the electrical systems by these non-compliant items is a "bad" arc, and thus the chip tells the breaker to trip. The problem is, the breaker manufacturer's cannot keep up with re-programming, or "Rolling" their chips fast enough to accommodate all of these non-compliant items being sold in today's market. Even if they did, you'd have to replace your arc-fault breakers on a yearly basis to keep pace with the necessary changes to the algorithms to prevent nuisance tripping.

The issue with the arc-fault breakers and nuisance tripping is that there are products being sold and used all over the United States that do not meet FCC requirements for limiting excess "electrical noise" being placed on the electrical systems of the houses they are being used in. The problem gets worse as the house gets larger, more custom, and the lighting and

appliances get more exotic and intricate. General contractors and owners have no idea that the items they are buying do not meet FCC requirements and may cause nuisance tripping. Most of these products are being sold through legitimate distributors and stores. These "non-compliant" products lead to nuisance tripping, and the eventual conflicts that arise between homeowners, general contractors and electrical contractors, none of which are really at fault.

Thousands of dollars are spent each year by electrical contractors trying to figure out why the arc-fault breakers they have installed, as required, continue to trip, only to find out it's not their fault. There is no way to recover these losses, and often times this situation happens multiple times a year on multiple projects, especially for those contractors involved in custom homes. The most common way for some of my peers to correct the problem with nuisance tripping is to go back after inspection and replace the breakers with standard breakers. Obviously this defeats the whole purpose of arc-fault breakers and does no good to the contractor or consumer.

It is for these reasons that I suggest we amend the requirement for arc-fault breakers in Florida until something can be done to regulate the "Non-compliant" electrical lighting, devices, appliances, etc., that would alleviate the nuisance tripping issues. I completely understand that arc-fault breakers offer another level of safety against electrical fires, but the amount of safety they offer does not seem to justify the current situation with the nuisance tripping. I have briefly researched Mr. Lovett's statements about Michigan and Indiana, and it appears as if they have also dropped the requirements for arc-fault breakers (see attached).

If/when something is done to insure compliance with FCC requirements that would protect the consumer, the manufacturer, and the electrical contractor from all of the ramifications that come with nuisance tripping, I would be in favor of re-instating the full requirement.

In the meantime, I have proposed the following modification to original language of proposed code modifications E10220 and E10244. I believe this modification will greatly alleviate the nuisance tripping and still provide a high level of protection to the users satisfying all interested parties.

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

210.12 **(A) Dwelling units.** All 120v, single phase, 15 and 20 ampere branch circuits supplying ~~outlets or devices~~ only general use receptacles installed in dwelling 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):

210.12 **(B) Dormitory Units.** All 120-volt, single phase, 15- and 20- ampere branch circuits supplying ~~outlets or devices~~ only general use receptacles 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).

210.12 **(C) Guest Rooms, Guest Suites, and Patient Sleeping Rooms in Nursing Homes and Limited-Care Facilities.** All 120-volt, single phase, 15- and 20- ampere branch circuits supplying ~~outlets or devices~~ only general use receptacles installed guest rooms and guest suites of hotels and motels, and patient sleeping rooms in nursing homes and limited-care facilities shall be protected by any of the means described in 210.12 (A) (1) through (6).

Signed,

Charles W. Fischer

Charles W. Fischer, Jr.
EC0001578

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. *~~Dashed line through material to be deleted~~. Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received: 11/12/2018	Code: 2018 IRC	Proposal number: # 313

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3901.11 Foyers**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

__ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E3901.11 Foyers.
Foyers that are not part of a hallway in accordance with Section E3901.10 and that have an area that is greater than ~~60~~ 100 square feet ~~(5.57 m2)~~ shall have a receptacle(s) located in each useable wall space that is ~~3~~ 4 feet ~~(914 mm)~~ or more in width. The 4 foot measurement shall be taken in a straight line. Doorways, door-side windows that extend to the floor, and similar openings shall not be considered as wall space. [210.52(H)]

REASON STATEMENT AND FISCAL IMPACT

Reason:
The size of the foyer should be large enough that it would be more likely that an electrical device would be continuously plugged into a receptacle outlet. Also, the State of Indiana does not recognize metric dimensions.

Fiscal Impact: No fiscal impact

REVIEW RECOMMENDATION

Approve

Reject

Approve as amended

Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received: 10/29/2018	Code: 2018 IRC	Proposal number: # 314

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3901.12 HVAC outlet**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows _X_ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E3901.12 HVAC outlet.

A 125-volt, single-phase, 15- or 20-ampere-rated receptacle outlet shall be installed at an accessible location for the servicing of heating, air-conditioning and refrigeration equipment. The receptacle shall be located on the same level and within 25 feet (7620 mm) of the heating, air-conditioning and refrigeration equipment. The receptacle outlet shall not be connected to the load side of the HVAC equipment disconnecting means, and crawlspace receptacles shall be protected in accordance with Section E3902.4. (210.63)

Exception: A receptacle outlet shall not be required for the servicing of evaporative coolers. (210.63 Exception)

REASON STATEMENT AND FISCAL IMPACT

Reason:

Text extracted from the 2005 Indiana Residential Code

Fiscal impact: ***No fiscal impact***

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. *~~Dashed line through material to be deleted~~. Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received: 10/29/18	Code: 2018 IRC	Proposal number: # 315

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3902.4 Crawl space receptacles and lighting outlets**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows _X_ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E3902.4 Crawl space receptacles and lighting outlets.
Where a crawl space is at or below grade level, 125-volt, single-phase, 15- and 20-ampere receptacles installed in such spaces shall have ground-fault circuit-interrupter protection for personnel. Lighting outlets not exceeding 120 volts shall have ground-fault circuit-interrupter protection. [210.8(A)(4), 210.8(E)]
Exception Single receptacles that serve sump pumps.

REASON STATEMENT AND FISCAL IMPACT

Reason:
Text extracted from the 2005 Indiana Residential Code

Fiscal impact: ***No fiscal impact***

REVIEW RECOMMENDATION

Approve

Reject

Approve as amended

Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. *~~Dashed line through material to be deleted~~. Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 10/29/18	Code 2018 IRC	Proposal number # 316

Code title **International Residential Code**	Edition **2018**
Section number and title **E3902.11 Boathouse receptacles**	Page Number
Proponent Charlie Eldridge	Representing (if applicable) Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*) 551 Grassy Ln., Indianapolis, IN 46217	Telephone number (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

__ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E3902.11 Boathouse receptacles.
125-volt, single-phase, 15- or 20-ampere receptacles and outlets that supply boat hoists and ~~installed in~~ boathouses shall have ground-fault circuit-interrupter protection for personnel. [21 0.8(A)(8)]

REASON STATEMENT AND FISCAL IMPACT

Reason:
Text extracted from the 2005 Indiana Residential Code

Fiscal impact: ***No fiscal impact***

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:
1. Only a TYPED copy will be accepted.
2. ~~Dashed line through material to be deleted~~; underline or bold face material to be added.
3. Use a second sheet for any material requiring more space.
4. Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.

FOR OFFICE USE ONLY		
Received 11/12/2018	Code 2018 IRC	Proposal number # 317

Code title: International Residential Code for One and Two Family Dwellings	Edition: 2018
Section number and title: E3902.16 Arc Fault Circuit-Interupter Protection	Page number: 730
Proponent: David A. Soderquist	Representing (if applicable): IAEI, Indiana Chapter
Address (number and street, city, state, and ZIP code): 126 N. Michigan Ave. Hobart, IN 46342	Telephone number: (219) 942-8925

PROPOSED CODE CHANGE (check one)

☐ Change to read as follows ☐ Add to read as follows ☑ Delete and substitute as follows ☐ Delete without substitution

E3902.16 Arc Fault Circuit-Interupter Protection. All branch circuits that supply 120-volt, single phase, 15- and 20-ampere outlets installed in family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunroom, recreation room, closets, hallways and similar rooms or areas shall be protected by a combination type arc fault circuit-interupter installed to provide protection of the branch circuit.

Exception:
1. Where an outlet branch-circuit type AFCI is installed at the first outlet to provide protection for the branch circuit, the portion of the branch circuit between the branch circuit overcurrent device and the first outlet shall be installed with metal outlet boxes and RMC, IMC, EMT, type MC, or steel armored type AC cable meeting the requirements of Section E3908.8.
2. Where an outlet branch-circuit type AFCI is installed at the first outlet to provide protection for the branch circuit, the portion of the branch circuit between the branch circuit overcurrent device and the first outlet installed in metal or nonmetallic conduit or tubing that is incased in not less than 2 inches (51 mm) of concrete.
3. AFCI protection is not required for a branch circuit supplying only a fire alarm system where the branch circuit is wired with metal outlet and junction boxes and RMC, IMC, EMT, or steel armored Type AC or Type MC meeting the requirements of Section 3908.8.

REASON STATEMENT AND FISCAL IMPACT

Adoption of the 2012 IRC arc fault circuit-interupter protection language would return Indiana to production of residential construction on a par with the rest of the United States.

Fiscal impact: $200.00 per dwelling, approximate.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:
1. *Only a TYPED copy will be accepted.*
2. *~~Dashed line through material to be deleted~~; underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

Leadership for a Safe and Secure Indiana

FOR OFFICE USE ONLY		
Received 11/13/18	Code 2018 IRC	Proposal number # 318

Code title: 2018 International Residential Code for One- and Two-Family Dwellings	Edition: August 2017 First Printing
Section number and title: E3902.16 Arc-fault circuit-interrupter protection/E3902.17 Arc-fault circuit-interrupter protection for branch circuit extensions or modifications	Page number
Proponent: Tom Canon	Representing (*if applicable*): City of Richmond Electrical Inspector/Inspector Member International Association of Electrical Inspectors (Indiana Chapter)
Address (*number and street, city, state, and ZIP code*): 6512 U.S. Hwy 27 South, Richmond, Indiana 47374	Telephone number: (765) 993-3518

PROPOSED CODE CHANGE *(check one)*

☐ Change to read as follows ☐ Add to read as follows ☑ Delete and substitute as follows ☐ Delete without substitution

Delete: 2018 IRC E3902.16 and E3902.17

Substitute as follows from 2009 IRC/NEC2008

E3902.11 Arc-fault circuit-interrupter protection. All branch circuits that supply 120-volt, single- phase, 15- and 20-ampere outlets installed in family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreations rooms, closets, hallways and similar rooms or areas shall be protected by an combination type arc-fault circuit-interrupter installed to provide protection of the branch circuit.
Exception:
1. Where a combination AFCI is installed at the first outlet to provide protection for the remaining portion of the branch circuit, the portion of the branch circuit between the branch-circuit overcurrent device and such outlet shall be wired with metal outlet and junction boxes and RMC, IMC, EMT or steel armored cable Type AC meeting the requirements of Section E3908.8.
2. AFCI protection is not required for a branch circuit suppling only a fire alarm system where the branch circuit is wired with metal outlet and junction boxes and RMC, IMC, EMT, or steel armored cable Type AC meeting the requirements of Section E3908.8.

REASON STATEMENT AND FISCAL IMPACT

Approval of this proposal, while removing the most comprehensive requirements of the 2018 IRC /2017 NEC regarding the installation of arc-fault protective technology, would afford significant protection for the residents of Indiana against property and human loss due to fire events caused by electrical arcing. Indiana currently stands with no requirement for the installation and use of this proven technology.

Cost associated: ie, 1500 sq. ft. home, 3 volt-ampere per sq. ft. general lighting requirement equates to 3-20ampere 120volt circuits.
Approximate cost for 20 ampere AFCI circuit breakers $45 each = $135

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:
1. Only a TYPED copy will be accepted.
2. ~~Dashed line through material to be deleted~~; underline or bold face material to be added.
3. Use a second sheet for any material requiring more space.
4. Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.

FOR OFFICE USE ONLY		
Received 11/13/2018	Code 2018 IRC	Proposal number #319

Code title: International Residential Code	Edition: 2018
Section number and title: E3902.16 Arc-fault circuit-interrupter protection.	Page number: 730 & 731
Proponent: Randy Gulley	Representing (*if applicable*): Wayne Township Fire Department
Address (*number and street, city, state, and ZIP code*): 700 North High School Road, Indianapolis, IN. 46214	Telephone number: (317) 246-6216

PROPOSED CODE CHANGE *(check one)*

☑ Change to read as follows ☐ Add to read as follows ☐ Delete and substitute as follows ☐ Delete without substitution

Change only first paragraph to read as follows:

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

Subsections 1 thru 6 will remain unchanged.

REASON STATEMENT AND FISCAL IMPACT

Based on a average 3 bedroom 2,100 sqft home would require at least 4 or 5 15amp AFCI circuit breakers per model code.
By amending the model code to require only bedroom circuits to be protected with AFCI would require at least 1 or 2 15amp AFCI circuit breakers. Cost of a AFCI circuit breaker is estimated at approximately $36.00 each. Therefore, it would be a cost savings:
5 circuit breakers at $36 each is $180.00 per home x 14,600 homes = $2,628,000.00 cost vs
2 circuit breakers at $36 each is $ 72.00 per home x 14,600 homes = $1,051,200.00 cost. A savings of $1,576,800.00.

4 circuit breakers at $36 each is $144.00 per home x 14,600 homes = $2,102,400.00 cost vs
1 circuit breaker at $36 each is 36.00 per home x 14,600 homes = $525,600.00 cost. A savings of $1,576,800.00.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

RESEARCH

An Assessment of Indiana One- and two-Family Home Building Fires Preventable by AFCIs

Richard Campbell
October 2018

Acknowledgements

The National Fire Protection Association thanks all the fire departments and state fire authorities who participate in the National Fire Incident Reporting System (NFIRS) and the annual NFPA fire experience survey. These firefighters are the original sources of the detailed data that make this analysis possible. Their contributions allow us to estimate the size of the fire problem.

We are also grateful to the U.S. Fire Administration for its work in developing, coordinating, and maintaining NFIRS.

To learn more about research at NFPA visit www.nfpa.org/research.
E-mail: research@nfpa.org

NFPA Index No. 2877

An Assessment of Indiana One- or Two-Family Home Building Fires Preventable by AFCIs

This analysis quantifies fires and associated losses that should be wholly or partially prevented through the use of arc fault circuit interrupters (AFCIs). These estimates were obtained from the detailed information collected by the Indiana Fire Incident Reporting System and submitted to the U.S. Fire Administration's National Fire Incident Reporting System (NFIRS).

Which fires will be affected by AFCIs?
AFCIs should prevent all or nearly all fires originating between the panel board, switch board or circuit breaker board, and the outlet or switch where electricity interacts with electric-powered equipment in the home, including those end points. This list of equipment referred to here as the "Core Group" corresponds to NFIRS Equipment Involved in Ignition codes 210 and 215-219 specifically: the panel board, switch board, or circuit breaker board; electrical branch circuit wiring; outlet or receptacle; wall switch; and ground fault interrupters; and unclassified or other wiring.

It was also estimated that AFCIs might have a significant impact on the larger group of all electrical fires throughout a home, which was estimated in three ways:

- All electrical distribution or lighting equipment as Equipment Involved in Ignition, including the Core group and excluding NFIRS Equipment Involved in Ignition codes 211-214 (electrical power or utility line, electrical service supply wires from the utility, electric meter or meter box, and wiring from meter box to circuit breaker);
- All fires involving electrical failure or malfunction as a Factor Contributing to Ignition, excluding Equipment Involved in Ignition 211-214; and
- All fires involving electrical arcing as Heat Source, excluding Equipment Involved in Ignition 211-214.

In 2012-2016, Indiana fire departments responded to an estimated average of:

- 251 home building fires per year in one- or two-family homes in which the panel board, switch board, circuit breaker board, electrical branch circuit wiring; outlet or receptacle, wall switch, ground fault interrupter, or unclassified or other wiring was involved in ignition. Fires involving this core group of wiring and related equipment caused an average of 1 civilian fatality, 5 civilian injuries, and $6.8 million in direct property damage annually.
- 377 home building fires per year in one- or two-family homes in which any type of electrical distribution or lighting equipment was involved in ignition, including the core group above. Fires involving electrical distribution or lighting equipment caused an average of 1 civilian death, 10 civilian injuries, and $9.6 million in direct property damage annually.
- 455 home building fires per year in one- or two-family homes in which an electrical failure or malfunction was a contributing factor. Note than any equipment powered by electricity can have such a failure. These fires caused an average of 3 civilian deaths, 9 civilian injuries, and $16.5 million in direct property damage annually.
- 321 home building fires per year in one- or two-family homes in which the heat source was identified as arcing. Fires started by arcing caused an average of 1 civilian death, 5 civilian injuries, and $9.7 million in direct property damage annually.

Notes on Methodology

To compensate for Indiana departments that did not report any fires in a given year, the results were multiplied by

$$Total\ IN\ population \div Population\ protected\ by\ departments\ reporting\ at\ least\ one\ fire$$

Population data were obtained from NFPA's Fire Service Inventory.

The multipliers used are shown below:

Year	Multiplier
2012	1.18
2013	1.24
2014	1.96
2015	1.70
2016	1.70

Note that some departments did not submit reports every month. No adjustments were made for missing months of data.

Only building fires (NFIRS incident type 111) were analyzed.

This analysis is restricted to one- or two-family homes. Manufactured homes, other portable buildings, and fires involving structures were excluded from this this analysis, as were fires with the six NFIRS incident types indicating specific types of confined fires (confined cooking fires, confined chimney or flue fires, confined fuel burner or boiler fires, confined incinerator fires, confined compactor fires, and confined or contained trash fires that did not spread to other contents or the structure itself.

Reports of mutual aid given were excluded to avoid double-counting.

Estimates of fire and losses associated with the core group of wiring and related equipment and with all electrical distribution and lighting equipment include proportional shares of home fires with equipment involved with ignition shown as unknown or blank or as "no equipment" without a confirming heat source (codes 40-99 under heat source).

Estimates of fires and losses associated with electrical failures or malfunctions include a proportional share of fires in which the factor contributing to ignition was listed as unknown, unreported, none, or blank.

Estimates of fires involving arcing include proportional shares of fires in which the heat source was unknown or not reported.

For more information on how these estimates were calculated, see Appendix A.

Appendix A. Statistical Methodology

Section I: Summary of Basic NFIRS National Estimates Methods

The statistics in this analysis are estimates derived from Indiana data submitted to the U.S. Fire Administration's (USFA's) National Fire Incident Reporting System (NFIRS) (excluding mutual aid given) and population data from NFPA's Fire Service Inventory for Indiana fire departments. NFIRS is a voluntary system by which participating fire departments report detailed factors about the fires to which they respond. Fires reported to federal or state fire departments or industrial fire brigades are not included in these estimates unless the responding fire department has its own NFIRS Fire Department Identification Code, which is very rarely the case.

NFIRS provides the most detailed incident information of any national database not limited to large fires. NFIRS is the only database capable of addressing national patterns for fires of all sizes by specific property use and specific fire cause. NFIRS also captures information on the extent of flame spread, and automatic detection and suppression equipment. For more information about NFIRS visit http://www.nfirs.fema.gov/. Copies of the paper forms may be downloaded from http://www.nfirs.fema.gov/documentation/design/NFIRS_Paper_Forms_2012.pdf.

NFIRS has a wide variety of data elements and code choices. The NFIRS database contains coded information. Many code choices describe several conditions. These cannot be broken down further. For example, area of origin code 83 captures fires starting in vehicle engine areas, running gear areas or wheel areas. It is impossible to tell the portion of each from the coded data.

NFIRS 5.0 introduced six categories of confined structure fires, including:

- cooking fires confined to the cooking vessel,
- confined chimney or flue fires,
- confined incinerator fire,
- confined fuel burner or boiler fire or delayed ignition,
- confined commercial compactor fire, and
- trash or rubbish fires in a structure with no flame damage to the structure or its contents.

Because these confined fires are not generally associated with electrical fires, they were excluded from this analysis.

For most fields other than Property Use and Incident Type, NFPA allocates unknown data proportionally among known data. This approach assumes that if the missing data were known, it would be distributed in the same manner as the known data. NFPA makes additional adjustments to several fields. *Casualty and loss projections can be heavily influenced by the inclusion or exclusion of unusually serious fire.*

Reports of mutual aid given were excluded to avoid double-counting.

Creating state level estimates

The procedure to obtain estimates of home electrical fires reported to Indiana's fire departments involved four main steps:

1. Determine the populations protected each year by fire departments that had at least one fire in NFIRS of any type, and those that did not. Obtain a multiplier to compensate for departments that did not report by dividing the total population protected by the

population protected by fire departments that reported at least one fire. The same population was used for the entire period.
2. Run queries for each of the relevant types of electrical fires for each year, and allocate the unknown data proportionally.
3. Multiply the results from #2 by the multiplier obtained in #1.
4. Calculate the five-year annual averages by summing the results from #3 and dividing by five.

In the formulas that follow, the term "all fires" refers to all fires in NFIRS on the dimension studied. The percentages of fires with known or unknown data are provided for non-confined fires and associated losses, and for confined fires only.

Factor Contributing to Ignition (FCI): In this field, the code "none" is treated as an unknown and allocated proportionally as are fires coded as undetermined or with no entered values

To allocate unknown data for Factors Contributing to Ignition, the known data are multiplied by

$$\frac{\text{All fires}}{\text{(All fires – blank – undetermined – fires in which FCI =NN)}}$$

Entries in "electrical failure, malfunction" (factor contributing to ignition 30-39) were grouped together into one entry, "electrical failure or malfunction." This category includes:

31. Water-caused short circuit arc;
32. Short-circuit arc from mechanical damage;
33. Short-circuit arc from defective or worn insulation;
34. Unspecified short circuit arc;
35. Arc from faulty contact or broken connector, including broken power lines and loose connections;
36. Arc or spark from operating equipment, switch, or electric fence;
37. Fluorescent light ballast; and
30. Electrical failure or malfunction, other.

Equipment Involved in Ignition (EII). NFIRS 5.0 originally defined EII as the piece of equipment that provided the principal heat source to cause ignition if the equipment malfunctioned or was used improperly. In 2006, the definition was modified to "the piece of equipment that provided the principal heat source to cause ignition." However, much of the data predates the change. Individuals who have already been trained with the older definition may not change their practices. To compensate, NFPA treats fires in which EII = NNN and heat source is not in the range of 40-99 as an additional unknown.

To allocate unknown data for EII, the known data is multiplied by

$$\frac{\text{All fires}}{\text{(All fires – blank – undetermined – [fires in which EII =NNN and heat source <>40-99])}}$$

In addition, the partially unclassified codes for broad equipment groupings (i.e., code 100 - heating, ventilation, and air conditioning, other; code 200 - electrical distribution, lighting and power transfer, other; etc.) were allocated proportionally across the individual code choices in their respective broad groupings (heating, ventilation, and air conditioning; electrical distribution, lighting and power transfer, other; etc.). Equipment that is totally unclassified is not allocated further.

Ohio Electrical Ad Hoc Committee
Review of the 2008 National Electrical Code

INTRODUCTION

The Electrical Ad Hoc Committee met on May 22, 2008 at the Ohio Department of Commerce in Reynoldsburg, Ohio. The committee's objectives were to identify specific issues of concern relative to the new requirements included in the 2008 National Electrical Code. In addition, this committee's goal is to formulate a consensus and make a recommendation to the Ohio Board of Building Standards regarding the adoption thereof. Discussion revolved around the economic impact of the new requirements, as well as the important safety aspects included in the code.

The purpose of this paper is to provide factual data, statistics, and information that will demonstrate why adopting the 2008 National Electrical Code will ensure the safety and welfare of Ohio's citizens. It is important to recognize that the statistical data included with this report includes statistics for the entire United States. Ohio is ranked #7 in population in the U.S., consequently it stands to reason that these statistics would include Ohio as being at a higher risk than a lower populated state. Included after each response, is the applicable NFPA 70 Report on Proposals (ROP) & Report on Comments (ROC) which copies are attached and included as part of this report. The National Electrical Code is a consensus based code process and changes are not made to the NEC unless it is substantiated by logical reasoning, research, data, and statistics to promote the practical safeguarding of persons and property from hazards arising from the use of electricity.

REVIEW OF CONCERNS

The following items have been identified through the work of the committee:

Background and review of NEC Section 210.8, GFCI Requirements.

1. Concern was expressed regarding the compatibility of GFCI's with refrigeration equipment and motor loads associated with garage door openers and sump pumps.

Response:
Section 210.8 is the main rule for application of ground-fault circuit interrupters (GFCIs). Since the introduction of the GFCI in the 1971 Code, these devices have proved to their users and to the electrical community that they are worth the added cost during construction or remodeling. Published data[1] from the U.S. Consumer Product Safety Commission show a decreasing trend in the number of electrocutions in the United States since the introduction of GFCI devices.

Deleting the two exceptions brings consistency with expansion in the 2005 NEC of GFCI receptacle requirements in Section 210.8(A)(7) for laundry, utility, and wet bar sinks. There are no exceptions for these locations and the exceptions deleted in the 2008 NEC for 210.8(A)(2) (garages & accessory buildings) & 210.8(A)(5) (unfinished basements) are now consistent with 210.8(A)(7).

In addition, the product safety standards for appliances covered by this exception require appliances to be manufactured with insulation dielectric leakage levels that do not exceed 0.5 mA. This level of leakage current is far below the 4-6 mA leakage thresholds of Class A ground fault circuit interrupters manufactured to UL Standard 943.

NFPA 70 2008 Proposal 2-40, 2-41, 2-51
NFPA 70 2008 Comment 2-34

Background and review of NEC Section 210.12, AFCI Requirements.

2. Discussion regarding the expansion of AFCI requirements included the following:
   a. Cost Impact from the 2005 NEC to the 2008 NEC; including minimum circuits required by code versus numbers that may be installed.
   b. Reliability; concern over the requirement for combination AFCI and whether the technology has been perfected. In addition, concern regarding the compatibility with sweepers and similar motor operated appliances.

Response:
The 2008 *National Electrical Code*□ *(NEC)* requirement for AFCI protection considerably expands fire prevention technology to the majority of circuits installed in new and renovated homes. The type of AFCI currently available commercially is a next-generation circuit breaker that not only provides the conventional safety functions which includes short circuit, ground fault and overcurrent protection, its advanced design also rapidly detects potentially dangerous arcs and disconnects power in the circuit before a fire can start. Fire and electrical safety officials throughout the U.S. endorse AFCIs as a significant step forward in electrical fire safety.

AFCIs will save lives and make homes safer. According to the U.S. Fire Administration March 2008 Report[2], each year home electrical problems cause about 28,500 fires, resulting in 360 deaths, 1,000 injuries and $995 million in property loss.

The cost of the enhanced protection is directly related to the size of the dwelling and the number of circuits installed. Current retail prices of AFCI-type circuit breakers at several national building supply chains are in the range of $35 to $40 per unit. Even for larger homes with more circuits, the cost increase is insignificant compared to the total cost of the home, particularly when the increased level of safety is taken into consideration.

AFCI technology was first introduced in the early 1990's[3] and has been included in the code development process in the 1999, 2002, 2005, and 2008 editions[4]. In order to gain a complete understanding of the evolution of AFCI technology, it is important to recognize that the AFCI requirements have been a progressive process, as well as substantiated over the past four NEC Code cycles. Earlier proposals included whole house protection, however the code making panel recognized the need to ensure the technology will work.

Concerns have been raised regarding reliability and compatibility, with various electrical appliances and equipment. U.L. Standard 1699 requires AFCI devices to undergo a rigorous evaluation process that includes compatibility with a variety of electrical appliances and equipment. As mentioned above, AFCI technology has been around for many years and the technology has a proven track record.

NFPA 70 1999 Proposals 2-128, 2-129, 2-130
NFPA 70 1999 Comments 2-56, 2-65, 2-66, 2-67, 2-68, 2-69, 2-70, 2-85

NFPA 70 2002 Proposals 2-102, 2-103, 2-110, 2-112, 2-113, 2-115, 2-116
NFPA 70 2002 Comments 2-71, 2-78, 2-79, 2-80, 2-81, 2-82

NFPA 70 2005 Proposals 2-123, 2-133, 2-134, 2-142, 2-146, 2-149, 2-150, 2-134a, 2-161, 2-167
NFPA 70 2005 Comments 2-87a, 2-93, 2-105, 2-108, 2-110

NFPA 70 2008 Proposals 2-142, 2-126
NFPA 70 2008 Comments 2-95, 2-129, 2-137

Background and review of NEC Section 406.11, Tamper Resistant Receptacles.

3. Discussion of Tamper Resistant Receptacles included the following:
   a. Durability/Reliability: What is the mechanical life expectancy of the devices.
   b. Usability: concern regarding compliance with ADA requirements and/or elderly regarding insertion and removal difficulty.
   c. Safety: CPSC study shows significant number of electrical receptacle related accidents with young children.

Response:
According to a 10-year study[5] conducted by the Consumer Product Safety Commission, (1991 – 2001) of National Electronic Injury Surveillance Systems (NEISS) data 24,000+ children under 10 years old were treated in emergency rooms for incidents related to electrical receptacles. On average, this translates to about 7 children per day.

These statistics clearly represent a need to protect our children from the inherent hazards associated with electrical receptacle outlets. When we look at the overall cost, the projected cost of a TR receptacle adds about $0.50 to the cost of an unprotected receptacle. Based on current statistics, the average home has about 75 receptacles resulting in an overall added cost of under $40. This amount may vary slightly based on the type and style of TR receptacle used. This minimal increase in cost buys a significant increase in electrical safety for children.

In regard to reliability, tamper resistant receptacles are evaluated UL Standard 498, which requires insertion of an attachment plug 5,000 times to ensure durability. Recent testing by several device manufacturers found no appreciable difference for insertion and removal forces between tamper-resistant and non-tamper-resistant receptacles. In addition, these standards require both tamper resistant and non-tamper resistant receptacles to not exceed a minimum retention force to retain a plug in a receptacle (3 lbf) and the maximum permitted force to withdraw an attachment plug out of a receptacle (15 lbf).

NFPA 70 2008 Proposal 18-40

Background and review of NEC Section 406.8, WR/TR Requirements.

4. Discussion of Weather Resistant/Tamper Resistant receptacles included availability and cost

Response:
The requirement for listed weather-resistant type 15- and 20-ampere receptacles for both damp and wet locations was added to the 2008 Code. Studies indicated that normal receptacles were inadequate because covers were either broken off or not closed properly. The major differences between WR and non-WR receptacles are that the WR has additional corrosion protection, UV resistance, and cold impact resistance.

A joint NEMA/UL Field study revealed that the greatest number of inoperable GFCI receptacles were located outdoors. The rate of failure was more than double the next highest known location.

NFPA 70 2008 Proposal 18-28, 18-33
NFPA 70 2008 Comment 18-16, 18-18

Background and review of NEC Section 310.15(B)(6), Service/Feeder Conductor Sizing Requirements.

5. Discussion regarding the change to Section 310.15(B)(6) and how it affects feeder conductor sizes, relative to service conductor size.

Response:
There are no significant changes to the requirements of this section. The change was to clarify for users that the provisions apply to a single-service feeder, where previous code language could have permitted the ampacities in 310.15(B)(6) to be used for multiple feeders. Section 310.15(B)(6) allows smaller service conductor sizes and main feeders, based on load diversity and demand factors, whereas a specific feeder (other than service conductors and/or main feeder) conductor would need to be sized per Table 310.16. Therefore, this change does not provide an impact that would affect cost.

SUMMARY

In summary, the State of Ohio has always remained at the forefront of safety by adopting the most current up-to-date construction codes. The "Ohioized" version of construction codes historically involves modifying the administrative sections of the code to avoid conflict with Ohio law. Modifying the technical provisions of a code without sound statistical data and facts will only lessen the safety and welfare of Ohio's citizens. The information included in this document provides the statistics, data, and information that will help the committee gain an in depth understanding and reach a consensus to recommend to the Ohio Board of Building Standards, adoption of the 2008 National Electrical Code.

Finally, in regard to the cost impact of issues raised by the committee, included with this paper is a copy of the cost impact analysis prepared by the Ohio Chapter International Association of Electrical Inspectors, which reflects minimum requirements prescribed by code.

Tim McClintock, Chief Building Official/Electrical Inspector
Wayne County Building Department

Thomas E Moore, Electrical /Building Inspector
City of Beachwood

REFERENCES

[1]Consumer Product Safety Commission-*2000 Electrocutions Associated With Consumer Products*
[2] US Fire Administration- (March 2008) *Residential Building Electrical Fires*
[3] NEMA *AFCI Evolution*
[4] NFPA ROP & ROC-Several Editions
[5]Consumer Product Safety Commission Study

ADDITIONAL REFERENCES

NEMA-*Real Cost of an Electrical Fire*
NFPA-*Tamper Resistant Fact Sheet*
NFPA-*AFCI Fact Sheet*
Consumer Product Safety Commission Letter
Ohio Fire Marshal-*Electrical Data 06/07*
NEMA-*Upgrading the Home: Luxury vs. Safety*
Richard J. Kagan, M.D., FACS, Cincinnati Burn Center Letter
NFPA-*What are NFPA Codes and Standards*
Ohio Chapter IAEI-*Cost Impact Analysis*

"Let the Code Decide"

OHIO CHAPTER
International Association of Electrical Inspectors

Understanding the Cost Impact of the 2008 NEC

The impact of additional Arc-Fault Circuit Interrupters and the new Tamper Resistant Receptacles in the 2008 NEC has prompted controversy driven by the misunderstood cost impact of moving from the 2005 NEC to the 2008 NEC. The NEC provides for the safe use of electricity from fire and shock. Technology over the years has enhanced that protection with minimal cost impact. Circuit breakers protect the home from overloaded circuits to prevent fires and GFCIs are well recognized in the safe use of electricity to protect us and our children from shock hazards. The GFCI entered the home in the 1970s, AFCIs became part of the NEC in the 1999 NEC and the tamper resistant receptacle in the 2008 NEC.

We will show that the impact of adding AFCI protection and Tamper Resistant Receptacles will have minimal impact on affordable housing. Keep in mind the NEC establishes the requirements for the safe electrical operation of a home. Additional circuits that include extra lighting, specific known loads, or a desire to separate circuits for isolation purposes is an additional cost that may be incurred that is once again not driven by the NEC. The additional lighting loads or appliances are not code driven, they are upgrades similar to windows, roofing configuration, or brick vs siding.

This report has been prepared by the following Ohio Chapter Board of Director Members; Oran P. Post, Electrical Inspector for the City of Tallmadge, Ohio and Thomas E. Moore, Electrical Inspector for the City of Beachwood, Ohio and Tim McClintock, Building Official/Electrical Inspector for Wayne County, Ohio. All three Board Members have extensive experience with the code development process.

This report provides an impact statement based entirely on the 2008 NEC requirements for three different homes. The first is a 900 sq ft home to help understand the impact to affordable housing. The other two homes are typical size homes and will include a 1700 sq ft home and a 2100 sq ft home.

The findings are based on prices obtained at a local electrical distributor and other verifiable resources as follows:

Combination AFCI	$36.34
Standard Receptacle	$.50
Tamper Resistant Receptacle	$1.25
Standards GFCI Receptacle	$8.00
Tamper Resistant Receptacle with GFCI	$14.85

Results

900 sqft Home	$160.18 for 900 sq. ft. dwelling unit or $.18/sq. ft.
1700 sqft Home	$205.27 for 1700 sq. ft. dwelling unit or $.12/sq. ft.
2100 sqft Home	$241.36 for 2100 sq. ft. dwelling unit or $.11/sq. ft

The 2008 NEC impact is minimal at less than a 20 cents per sq ft.

Respectfully,

Jack Jamison, President

*Cost Analysis for a new dwelling based on the minimum 2008 NEC requirements (900 Sq ft)					
2008 NEC Code Section	**Description of Code Requirement**	**Total Required Branch Circuit/Devices**	**Cost per 2005 NEC**	**Cost per 2008 NEC**	**Cost Difference**
	GENERAL LIGHTING LOADS				
220.12, Table 220.12 & 220.14(J)	900 sq. ft. X 3VA = 2700 VA/120 Volts = 22.5 Amps = 1.5 or 2 circuits. 2 general purpose 15 Ampere circuits which includes family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, or similar rooms or areas is required.	2	$3.25	$36.34	$33.09
			$25.00[1]	$36.34	$11.34
	DINING ROOM				
210.52(A), 220.12, 220.14(J)	210.12(B) requires the dining room outlets to be protected by an arc fault circuit interrupter. 210.52(B)(1) requires this circuit to be on a 20 ampere circuit.	1	$3.25	$36.34	$33.09
	KITCHEN				
210.52(C), 210.11(C)(1), 220.14(J), & 406.11	2 Kitchen small appliance branch circuits supplying 2 Tamper Resistant GFCI Receptacles serving the kitchen countertop.	2	$8.00	$14.85	$13.70
210.52(C), 210.11(C)(1), 220.14(J), & 406.11	2 Kitchen small appliance branch circuits supplying 6 Tamper Resistant receptacles located as required by 210.52(B)(1)	6	$.50	$1.25	$4.50
	BATHROOM				
210.52(D), 210.11(C)(3), 220.14(J), & 406.11	1 Tamper Resistant GFCI receptacle required for bathroom	1	$8.00	$14.85	$6.85
	GARAGES				
210.52(G), 220.14(J), & 406.11	1 Tamper Resistant GFCI receptacles required for attached garages & unattached garages with power.	1	$8.00	$14.85	$6.85
	OUTDOOR & BASEMENT RECEPTACLES				
210.52(E), 220.14(J), & 406.11	2 Tamper Resistant/Weather Resistant receptacles (front & rear of Dwelling)	2	$.50	$7.03	$13.06[2]
210.52(G), 220.14(J), & 406.11	1 Tamper Resistant GFCI required for unfinished basements	1	$8.00	$14.85	$6.85
	LAUNDRY				
210.52(F), 210.11(C)(2), 220.14(J), & 406.11	1 Tamper Resistant GFCI installed for the Laundry within 6 feet of laundry sink	1	$8.00	$14.85	$6.85
	GENERAL PROVISION RECEPTACLE OUTLETS				
210.52(A), 220.12, 220.14(J), & 406.11	which includes family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, or similar rooms or areas	32	$.50	$1.25	$24.00
				TOTAL	**$160.18**

Footnotes

1. Standard AFCI breakers as required by the 2005 NEC
2. Alternative method protecting outdoor receptacles fed from basement GFCI receptacle

This analysis is based on 2-wire home runs for branch circuits. The following consists of alternative wiring methods and their respective prices;
250ft NM-B-14/2/2-CU-WG.....$114.66
250ft NM-B-14/3-CU-WG.....$75.87
250ft NM-B-14/2-CU-WG.....$54.13

$160.18 for 900 sq. ft. dwelling unit is a cost of $.18/sq. ft.
Not a whole lot to pay for safety!
Any extra wiring or devices above and beyond this is the choice of the builder and not mandated by the NEC.
***Prices obtained from Leff Electric Supply (see attached quote), Lowes, & Home Depot**

*Cost Analysis for a new dwelling based on the minimum 2008 NEC requirements (1700 Sq ft)					
2008 NEC Code Section	**Description of Code Requirement**	**Total Required Branch Circuit/Devices**	**Cost per 2005 NEC**	**Cost per 2008 NEC**	**Cost Difference**
	GENERAL LIGHTING LOADS				
220.12, Table 220.12 & 220.14(J)	1700 sq. ft. X 3VA = 5100 VA/120 Volts = 42.5/15 Amps = 2.8 or 3 circuits. 2 general purpose 15 Ampere circuits which includes family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, or similar rooms or areas is required.	3	$3.25	$36.34	$66.18
			$25.00[1]	$36.34	$11.34
	DINING ROOM				
210.52(A), 220.12, 220.14(J)	210.12(B) requires the dining room outlets to be protected by an arc fault circuit interrupter. 210.52(B)(1) requires this circuit to be on a 20 ampere circuit.	1	$3.25	$36.34	$33.09
	KITCHEN				
210.52(C), 210.11(C)(1), 220.14(J), & 406.11	2 Kitchen small appliance branch circuits supplying 2 Tamper Resistant GFCI Receptacles serving the kitchen countertop.	2	$8.00	$14.85	$13.70
210.52(C), 210.11(C)(1), 220.14(J), & 406.11	2 Kitchen small appliance branch circuits supplying 8 Tamper Resistant receptacles located as required by 210.52(B)(1)	6	$.50	$1.25	$6.00
	BATHROOM				
210.52(D), 210.11(C)(3), 220.14(J), & 406.11	1 Tamper Resistant GFCI receptacle required for bathroom	1	$8.00	$14.85	$6.85
	GARAGES				
210.52(G), 220.14(J), & 406.11	1 Tamper Resistant GFCI receptacles required for attached garages & unattached garages with power.	1	$8.00	$14.85	$6.85
	OUTDOOR & BASEMENT RECEPTACLES				
210.52(E), 220.14(J), & 406.11	2 Tamper Resistant/Weather Resistant receptacles (front & rear of Dwelling)	2	$.50	$7.03	$13.06[2]
210.52(G), 220.14(J), & 406.11	1 Tamper Resistant GFCI required for unfinished basements	1	$8.00	$14.85	$6.85
	LAUNDRY				
210.52(F), 210.11(C)(2), 220.14(J), & 406.11	1 Tamper Resistant GFCI installed for the Laundry within 6 feet of laundry sink	1	$8.00	$14.85	$6.85
	GENERAL PROVISION RECEPTACLE OUTLETS				
210.52(A), 220.12, 220.14(J), & 406.11	which includes family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, or similar rooms or areas	46	$.50	$1.25	$34.50
				TOTAL	**$205.27**

Footnotes

1. Standard AFCI breakers as required by the 2005 NEC
2. Alternative method protecting outdoor receptacles fed from basement GFCI receptacle

This analysis is based on 2-wire home runs for branch circuits. The following consists of alternative wiring methods and their respective prices;
250ft NM-B-14/2/2-CU-WG.....$114.66
250ft NM-B-14/3-CU-WG.....$75.87
250ft NM-B-14/2-CU-WG.....$54.13

$205.27 for 1700 sq. ft. dwelling unit is a cost of $.12/sq. ft.
Not a whole lot to pay for safety!
Any extra wiring or devices above and beyond this is the choice of the builder and not mandated by the NEC.
***Prices obtained from Leff Electric Supply (see attached quote), Lowes, & Home Depot**

*Cost Analysis for a new dwelling based on the minimum 2008 NEC requirements (2100 Sq ft)					
2008 NEC Code Section	**Description of Code Requirement**	**Total Required Branch Circuit/Devices**	**Cost per 2005 NEC**	**Cost per 2008 NEC**	**Cost Difference**
	GENERAL LIGHTING LOADS				
220.12, Table 220.12 & 220.14(J)	2100 sq. ft. X 3VA = 6300 VA/120 Volts = 52.5/15 Amps = 3.5 or 4 circuits. 2 general purpose 15 Ampere circuits which includes family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, or similar rooms or areas is required.	4	$3.25 $25.00[1]	$36.34 $36.34	$99.27 $11.34
	DINING ROOM				
210.52(A), 220.12, 220.14(J)	210.12(B) requires the dining room outlets to be protected by an arc fault circuit interrupter. 210.52(B)(1) requires this circuit to be on a 20 ampere circuit.	1	$3.25	$36.34	$33.09
	KITCHEN				
210.52(C), 210.11(C)(1), 220.14(J), & 406.11	2 Kitchen small appliance branch circuits supplying 2 Tamper Resistant GFCI Receptacles serving the kitchen countertop.	2	$8.00	$14.85	$13.70
210.52(C), 210.11(C)(1), 220.14(J), & 406.11	2 Kitchen small appliance branch circuits supplying 8 Tamper Resistant receptacles located as required by 210.52(B)(1)	6	$.50	$1.25	$6.00
	BATHROOM				
210.52(D), 210.11(C)(3), 220.14(J), & 406.11	1 Tamper Resistant GFCI receptacle required for bathrooms	2	$8.00	$14.85	$6.85
	GARAGES				
210.52(G), 220.14(J), & 406.11	1 Tamper Resistant GFCI receptacles required for attached garages & unattached garages with power.	1	$8.00	$14.85	$6.85
	OUTDOOR & BASEMENT RECEPTACLES				
210.52(E), 220.14(J), & 406.11	2 Tamper Resistant/Weather Resistant receptacles (front & rear of Dwelling)	2	$.50	$7.03	$13.06[2]
210.52(G), 220.14(J), & 406.11	1 Tamper Resistant GFCI required for unfinished basements	1	$8.00	$14.85	$6.85
	LAUNDRY				
210.52(F), 210.11(C)(2), 220.14(J), & 406.11	1 Tamper Resistant GFCI installed for the Laundry within 6 feet of laundry sink	1	$8.00	$14.85	$6.85
	GENERAL PROVISION RECEPTACLE OUTLETS				
210.52(A), 220.12, 220.14(J), & 406.11	which includes family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, or similar rooms or areas	50	$.50	$1.25	$37.50
				TOTAL	**$241.36**

Footnotes

1. Standard AFCI breakers as required by the 2005 NEC
2. Alternative method protecting outdoor receptacles fed from basement GFCI receptacle

This analysis is based on 2-wire home runs for branch circuits. The following consists of alternative wiring methods and their respective prices;
250ft NM-B-14/2/2-CU-WG.....$114.66
250ft NM-B-14/3-CU-WG.....$75.87
250ft NM-B-14/2-CU-WG.....$54.13

$241.36 for 2100 sq. ft. dwelling unit is a cost of $.11/sq. ft.
Not a whole lot to pay for safety!
Any extra wiring or devices above and beyond this is the choice of the builder and not mandated by the NEC.
***Prices obtained from Leff Electric Supply (see attached quote), Lowes, & Home Depot**

LEFFELECTRIC
Leff/Akron Electric
711 Johnston St
AKRON OH 44306
Fax: 330-379-9865

Quotation

QUOTE DATE	QUOTE NUMBER
02/26/08	S1269245

ORDER TO:
Leff/Akron Electric
711 Johnston St
AKRON OH 44306
330-379-9800

PAGE NO: 1

QUOTE TO:
CASH ACCT TAXABLE (AKRON)
711 JOHNSTON STREET
AKRON, OH 44306

SHIP TO:
CASH ACCT TAXABLE (AKRON)
711 JOHNSTON STREET
AKRON, OH 44306

CUSTOMER NUMBER	CUSTOMER P/O NUMBER	RELEASE NUMBER	SALESPERSON
6056	post		House Account

WRITER	SHIP VIA	TERMS	SHIP DATE	FREIGHT ALLOWED
Pat Hinman		Cash On Delivery	03/22/08	No

ORDER QTY	DESCRIPTION	Net Prc	Ext Prc
1ea	LEV T5320-I IVY NEMA5-15R DPLX RCPT	125.00/c	1.25
1ea	LEV T7599-I IVY 15A-125V GFCI RCPT	1485.00/c	14.85
1ea	GE THQL1115AF 15A PLUG IN AFCI CB	36.34/ea	36.34
1ea	LEV TWR15-GY 15A WTR RST DLXRCPT	703.13/c	7.03

LEFFELECTRIC
Leff/Akron Electric
711 Johnston St
AKRON OH 44306
Fax: 330-379-9865

Quotation

QUOTE DATE	QUOTE NUMBER
02/26/08	S1269261

ORDER TO:
Leff/Akron Electric
711 Johnston St
AKRON OH 44306
330-379-9800

PAGE NO: 1

QUOTE TO:
CASH ACCT TAXABLE (AKRON)
711 JOHNSTON STREET
AKRON, OH 44306

SHIP TO:
CASH ACCT TAXABLE (AKRON)
711 JOHNSTON STREET
AKRON, OH 44306

CUSTOMER NUMBER	CUSTOMER P/O NUMBER	RELEASE NUMBER	SALESPERSON
6056	post		House Account

WRITER	SHIP VIA	TERMS	SHIP DATE	FREIGHT ALLOWED
Pat Hinman		Cash On Delivery	03/29/08	No

ORDER QTY	DESCRIPTION	Net Prc	Ext Prc
1ea	P&S 1595-TRWR 15A 125V RCPT	18.48/ea	18.48
1ea	P&S 3232-TRWR 15A 125V WR RCPT	2.32/ea	2.32

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. *~~Dashed line through material to be deleted~~. Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received: 11 / 16 / 2018	Code: 2018 IRC	Proposal number: # 320

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3902.16 Arc-fault circuit-interrupter protection**	Page Number
Proponent: **Phil Gettum**	Representing (if applicable): **Gettum Associates**
Address (*number and street, city, state, and ZIP code*)	Telephone number

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows ___ Add to read as follows ___ Delete and substitute as follows X Delete without substitution

~~**E3902.16 Arc-fault circuit-interrupter protection.**~~

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

~~1. A listed combination-type arc-fault circuit-interrupter, installed to provide protection of the entire branch circuit. [210.12(A)(1)]~~

~~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. [210.12(A)(2)]~~

~~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:~~

~~3.1. The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit-interrupter.~~

~~3.2. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 50 feet (15.2 m) for 14 AWG conductors and 70 feet (21.3 m) for 12 AWG conductors.~~

~~3.3. The first outlet box on the branch circuit shall be marked to indicate that it is the first outlet on the circuit. [210.12(A)(3)]~~

~~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:~~

~~4.1. The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit-interrupter.~~

~~4.2. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 50 feet (15.2 m) for 14 AWG conductors and 70 feet (21.3 m) for 12 AWG conductors.~~

~~4.3. The first outlet box on the branch circuit shall be marked to indicate that it is the first outlet on the circuit.~~

~~4.4. 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. [210.12(A)(4)]~~

~~5. Where metal outlet boxes and junction boxes and RMC, IMC, EMT, Type MC or steel-armored Type AC cables meeting the requirements of Section E3908.8, metal wireways or metal auxiliary gutters are installed for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, a listed outlet branch-circuit type AFCI installed at the first outlet shall be considered as providing protection for the remaining portion of the~~

~~branch circuit. [210.12(A)(5)]~~
~~6. Where a listed metal or nonmetallic conduit or tubing or Type MC cable is encased in not less than 2 inches (50.8 mm) of concrete for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, a listed outlet branch-circuit type AFCI installed at the first outlet shall be considered as providing protection for the remaining portion of the branch circuit. [210.12(A)(6)]~~

~~Exception: AFCI protection is not required for an individual branch circuit supplying only a fire alarm system where the branch circuit is wired with metal outlet and junction boxes and RMC, IMC, EMT or steel-sheathed armored cable Type AC or Type MC meeting the requirements of Section E3908.8.~~

REASON STATEMENT AND FISCAL IMPACT

Reason:

- Brought forward from the 2005 Indiana Residential Code.
- The Indiana Fire Prevention & Building Safety Commission removed the requirement for AFCIs in bedrooms in the 2005 Indiana Residential Code due to issues with nuisance tripping resulting in homeowner frustration, distrust of the product, and the added expense of calling an electrician to troubleshoot and resolve the issue.
- Based on a cost-benefit analysis, the state's Fire Prevention & Building Safety Commission removed the requirement for AFCI's from the 2014 Indiana Building Code.

Fiscal impact:

During Indiana's review of the 2009 IRC, Dr. Kish submitted a proposed code change to require AFCIs in bedrooms only and estimated the cost to be $250/house. Homewyse estimated the avg. cost to install one AFCI breaker in the 46204 area code to be $200. In previous years, cost estimates were found to be $400-$600/house.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:
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FOR OFFICE USE ONLY		
Received 11/13/2018	Code 2018 IRC	Proposal number # 321

Code title: International Residential Code	Edition: 2018
Section number and title: E3902.17 Arc-fault circuit-interrupter protection for branch circuit extensions or modifications	Page number: 731
Proponent: Randy Gulley	Representing (*if applicable*): Wayne Township Fire Department
Address (*number and street, city, state, and ZIP code*): 700 North High School Road, Indianapolis, IN. 46214	Telephone number: (317) 246-6216

PROPOSED CODE CHANGE *(check one)*

☐ Change to read as follows ☐ Add to read as follows ☐ Delete and substitute as follows ☑ Delete without substitution

REASON STATEMENT AND FISCAL IMPACT

Words of modified, replaced or extended are words that will not be accepted by the legal review of this code.
Difficult to determine an actual quantity of home remodels or home additions.
Estimate 2,190 (.15%) of 14,600 homes at a cost of $23.00 per outlet equals a cost savings of $ 50,370.00.
Estimate 2,190 (.15%) of 14,600 homes at a cost of $34.00 per circuit breaker equals a cost savings of $ 74,460.00.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received: 11/16/2018	Code: 2018 IRC	Proposal number: # 322

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3902.17 Arc-fault circuit-interrupter protection for branch circuit extensions or modifications**	Page Number
Proponent: **Phil Gettum**	Representing (if applicable): **Gettum Associates**
Address (*number and street, city, state, and ZIP code*)	Telephone number

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows __ Delete and substitute as follows _X_ Delete without substitution

~~**E3902.17 Arc-fault circuit-interrupter protection for branch circuit extensions or modifications.**~~
~~Where branch-circuit wiring is modified, replaced, or extended in any of the areas specified in Section E3902.16, the branch circuit shall be protected by one of the following:~~

~~1. A combination-type AFCI located at the origin of the branch circuit.~~
~~2. An outlet branch-circuit type AFCI located at the first receptacle outlet of the existing branch circuit. [21 0.12(B)]~~

~~Exception: AFCI protection shall not be required where the extension of the existing conductors is not more than 6 feet (1.8 m) in length and does not include any additional outlets or devices. [210.12(B) Exception]~~

REASON STATEMENT AND FISCAL IMPACT

Reason:
Brought forward from the 2005 Indiana Residential Code

Fiscal impact:

REVIEW RECOMMENDATION

Approve

Reject

Approve as amended

Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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FOR OFFICE USE ONLY		
Received: 10/29/2018	Code: 2018 IRC	Proposal number: #323

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3905.1 Box, conduit body or fitting—where required**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows X Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E3905.1 Box, conduit body or fitting—where required.
A box or conduit body shall be installed at each conductor splice point, outlet, switch point, junction point, termination point, and pull point except as otherwise permitted in Sections E3905.1.1 through E3905.1.6.

REASON STATEMENT AND FISCAL IMPACT

Reason:
This additional text was extracted from the 2005 Indiana Residential Code and the 2017 National Electrical Code Section 300.15.

Fiscal Impact: ***No fiscal impact***

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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FOR OFFICE USE ONLY		
Received: 10/29/2018	Code: 2018 IRC	Proposal number: # 324

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3905.3.2 Securing to box**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E3905.3.2 Securing to box.
Wiring methods shall be secured to the boxes. [314.17(C)]
Exception: Where nonmetallic-sheathed cable (Type MN) or underground feeder cable (Type UF) is used with boxes not larger than a nominal size of 2 ¼ inches by 4 inches (57 mm by 102 mm) mounted in walls or ceilings, and where the cable is fastened within 8 inches (203 mm) of the box measured along the sheath, and where the sheath extends through a cable knockout not less than ¼ inch (6.4 mm), securing the cable to the box shall not be required. Multiple cable entries shall be permitted in a single cable knockout opening. [314.17(C) Exception]

REASON STATEMENT AND FISCAL IMPACT

Reason:
Type UF cable is permitted to be used in place of Type NM cable as indicated in Table E3801.4. The additional last sentence was extracted from the 2018 NEC Section 314.17(C) Exception.

Fiscal impact: ***No fiscal impact***

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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FOR OFFICE USE ONLY		
Received: 10/29/2018	Code: 2018 IRC	Proposal number: # 325

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3905.12.2.1 Conductor fill**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

__ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E3905.12.2.1 Conductor fill.
Each conductor that originates outside the box and terminates or is spliced within the box shall be counted once, and each conductor that passes through the box without splice or termination shall be counted once. A looped, unbroken conductor not less than twice the minimum length required for free conductors in Section E3406.11.3 shall be counted twice. Each loop or coil of unbroken conductor having a length equal to or greater than twice that required for free conductors by Section E3406.11.3, shall be counted twice. The conductor fill, in cubic inches, shall be computed using Table E3905.12.2.1. A conductor, no part of which leaves the box, shall not be counted. [314.1 6(B)(1)]

Exception: An equipment grounding conductor or not more than four fixture wires smaller than No. 14, or both, shall be permitted to be omitted from the calculations where such conductors enter a box from a domed fixture or similar canopy and terminate within that box. [314.16(B)(1) Exception]

REASON STATEMENT AND FISCAL IMPACT

Reason:
Text extracted from the 2005 Indiana Electrical Code

Fiscal impact: ***No fiscal impact***

REVIEW RECOMMENDATION

Approve

Reject

Approve as amended

Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received: 10/29/2018	Code: 2018 IRC	Proposal number: # 326

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3905.12.2.2 Clamp fill**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows _X_ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E3905.12.2.2 Clamp fill.

Where one or more internal cable clamps, whether factory or field supplied, are present in the box, a single volume allowance in accordance with Table E3905.12.2.1 shall be made based on the largest conductor present in the box. An allowance shall not be required for a cable connector having its clamping mechanism outside of the box or for clamps that are an integral part of a nonmetallic box that does not protrude more than 1/8 in. into the box.

A clamp assembly that incorporates a cable termination for the cable conductors shall be listed and marked for use with specific nonmetallic boxes. Conductors that originate within the clamp assembly shall be included in conductor fill calculations provided in Section E3905.12.2.1 as though they entered from outside of the box. The clamp assembly shall not require a fill allowance, but, the volume of the portion of the assembly that remains within the box after installation shall be excluded from the box volume as marked in accordance with Section E3905.1 2.1.2. [314.1 6(B)(2)]

REASON STATEMENT AND FISCAL IMPACT

Reason:

Many nonmetallic boxes have a flapper style of clamp for Type NM cable that should not be counted when calculating box fill. I see this as a non-issue for a single home; however, this could be an issue with a volume builder.

Fiscal impact: ***No fiscal impact to a net savings depending on the AHJ***

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received 10/29/2018	Code 2018 IRC	Proposal number # 327

Code title **International Residential Code**	Edition **2018**
Section number and title **E3908.8.3 Nonmetallic sheathed cable (Type NM)**	Page Number
Proponent Charlie Eldridge	Representing (if applicable) Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*) 551 Grassy Ln., Indianapolis, IN 46217	Telephone number (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows __ Delete and substitute as follows _X_ Delete without substitution

E3908.8.3 Nonmetallic sheathed cable (Type NM).
In addition to the insulated conductors, the cable shall have an insulated, covered, or bare equipment grounding conductor. ~~Equipment grounding conductors shall be sized in accordance with Table E3908.12.~~ (334.108)

REASON STATEMENT AND FISCAL IMPACT

Reason:
Text extracted from the 2005 Residential Code

Fiscal impact: ***No fiscal impact***

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

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FOR OFFICE USE ONLY		
Received: 11/16/2018	Code: 2018 IRC	Proposal number: #328

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E4002.14 Tamper-resistant receptacles**	Page Number
Proponent: **Phil Gettum**	Representing (if applicable): **Gettum Associates**
Address (*number and street, city, state, and ZIP code*)	Telephone number

PROPOSED CODE CHANGE *(check one)*

__ Change to read as follows __ Add to read as follows __ Delete and substitute as follows _X_ Delete without substitution

~~**E4002.14 Tamper-resistant receptacles.**~~
~~In areas specified in Section E3901.1, 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles shall be listed tamper-resistant receptacles. [406.12(A)]~~
~~Exception: Receptacles in the following locations shall not be required to be tamper resistant:~~

~~1. Receptacles located more than 5.5 feet (1676 mm) above the floor.~~
~~2. Receptacles that are part of a luminaire or appliance.~~
~~3. A single receptacle for a single appliance or a duplex receptacle for two appliances where such receptacles are located in spaces dedicated for the appliances served and, under conditions of normal use, the appliances are not easily moved from one place to another. The appliances shall be cord-and-plug-connected to such receptacles in accordance with Section E3909.4. [406.12(A) Exception]~~

REASON STATEMENT AND FISCAL IMPACT

Reason:
Brought forward from the 2005 Indiana Residential Code

The state's Fire Prevention & Building Safety Commission removed the requirement for tamper-resistant receptacles (TRR) from the 2009 Indiana Electrical Code due to its fiscal impact.

There are cost-effective products on the market that families with children can utilize to limit access to the outlet that will not inhibit everyone else from using the outlet. The required force to insert cords into a TRR can be challenging for the elderly.

Fiscal impact:
In previous years, cost estimates were found to be $50-$75/house. The NFPA estimates a TR receptacle adds about $.50/receptacle and assumed a house has on average 75 receptacles for an added cost of $40/house. NFPA noted that the amount could vary based on the type and style of the TR receptacle used.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received: 11/11/2018	Code: 2018 IRC	Proposal number: # 329

Code title: **Indiana Residential Code**	Edition: **2020**
Section number and title: **Chapter 42, Swimming pools**	Page Number: **1 of 6 , codebook pages 765-777**
Proponent: **Craig Wagner**	Representing (if applicable): **IABO**
Address (*number and street, city, state, and ZIP code*): **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number: **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE ***(check one)***

___ Change to read as follows __ Add to read as follows _X_ Delete and substitute as follows __ Delete without substitution

Note: *The text and table are not underlined for this proposal, an entire chapter proposal, for clarity.*

Chapter 42
Spas, hot tubs and hydromassage tubs

E4201.1 Scope. The provisions of this chapter shall apply to the construction and installation of electric wiring and equipment associated with all hot tubs and spas, and hydromassage bathtubs, whether permanently installed or storable, and shall apply to metallic auxiliary equipment, such as pumps, filters and similar equipment. Electrical installations of in-ground, above ground and therapeutic pools, and ornamental fountains shall comply with the requirements of the Indiana Electric Code, 675 IAC 17.

E4201.2 Definitions. (680.2)

CORD-AND-PLUG-CONNECTED LIGHTING ASSEMBLY. A lighting assembly consisting of a cord-and-plug-connected transformer and a luminaire intended for installation in the wall of a spa or hot tub.

DRY-NICHE LUMINAIRE. A luminaire intended for installation in the floor or wall of a spa.

HYDROMASSAGE BATHTUB. A permanently installed bathtub equipped with a recirculating piping system, pump, and associated equipment designed so it can accept, circulate and discharge water upon each use.

LOW -VOLTAGE CONTACT LIMIT. A voltage not exceeding the following values:

1. 15 volts (RMS) for sinusoidal ac.
2. 21.2 volts peak for nonsinusoidal ac.
3. 30 volts for continuous dc.
4. 12.4 volts peak for dc that is interrupted at a rate of 10 to 200 Hz.

MAXIMUM WATER LEVEL. The highest level that water can reach before it spills out.

NO-NICHE LUMINAIRE. A luminaire intended for installation above or below the water without a niche.

PACKAGED SPA OR HOT TUB EQUIPMENT ASSEMBLY. A factory-fabricated unit consisting of water circulating heating and control equipment mounted on a common base intended to operate a spa or hot tub. Equipment may include pumps, air blowers, heaters, luminaires, controls and sanitizer generators.

SELF-CONTAINED SPA OR HOT TUB. A factory-fabricated unit consisting of a spa or hot tub vessel with all water circulating, heating and control equipment integral to the unit. Equipment may include pumps, air blowers, heaters, luminaires, controls and sanitizer generators.

SPA OR HOT TUB. A hydromassage pool, or tub for recreational or therapeutic use, not located in health care facilities, designed for immersion of users, and usually having a filter, heater, and motor-driven blower. They are installed indoors or outdoors, on the ground or supporting structure, or in the ground or supporting structure. Generally, a spa or hot tub is not designed, or intended, to have its contents drained or discharged after each use.

STORABLE/PORTABLE SPAS AND HOT TUBS. A spa or hot tub that is constructed on or above the ground with nonmetallic, molded polymeric walls or inflatable fabric walls regardless of dimension.

THROUGH-WALL LIGHTING ASSEMBLY. A lighting assembly intended for installation above grade, on or through the wall of a pool, consisting of two interconnected groups of components separated by the pool wall.

WET-NICHE LUMINAIRE. A luminaire intended for installation in a structure where the luminaire will be completely surrounded by water.

SECTION E4202
WIRING METHODS FOR POOLS, SPAS, HOT TUBS AND HYDROMASSAGE BATHTUBS

E4202.1 General. Wiring methods used in conjunction with permanently installed hot tubs that are installed in corrosive environments described in Section E4202.2.1 shall comply with Table E4202.1, Sections E4202.2 and E4205 and Chapter 38 except as otherwise stated in this section. Wiring methods used in conjunction with hot tubs that are not installed in noncorrosive environments shall comply with Chapter 38. Hydromassage bathtubs shall comply with Section E4209. [680.7; 680.14 (A) and (B); 680.23(B) and (F); 680.25(A); 680.42; 680.43; and 680.70]

E4202.2 Corrosive environment. Areas where sanitation chemicals are stored, areas with circulation pumps, automatic chlorinators or filters, open areas under decks adjacent to or abutting structures and similar locations shall be considered to be corrosive environments. The air in such areas shall be considered to be laden with acid, chlorine and bromine vapors or any combination of acid, chlorine or bromine vapors; and any liquids or condensation in those areas shall be considered to be laden with acids, chlorine and bromine vapors, or any combination of acid, chlorine or bromine vapors. [680.14 (A)]

E4202.2.1 Wiring Methods. Described in Section E4202.2 shall be listed and identified for use is such areas. Rigid metal conduit (RMC), intermediate metal conduit (IMC), rigid polyvinyl chloride conduit (RNC) and reinforced thermosetting resin conduit shall be considered to be resistant to the corrosive environment specified in Section E4202.2. [680.14 (B)]

TABLE E4202.1 [a]

PERMITTED WIRING METHODS IN CORROSIVE ENVIRONMENTS

WIRING LOCATION OR PURPOSE (Application allowed where marked with an "A")	IMC[b], RMC[b], RNC[e]	LFMC	FNMC	MC[g]	FLEX CORD
Panelboard(s) that supply equipment: from service equipment to panelboard	A[f]	—	A	—	—
Wet-niche and no-niche luminaires: from branch circuit OCPD to deck or junction box	A	—	A	—	—
Wet-niche and no-niche luminaires: from deck or junction box to forming shell	A[j]	—	A	—	A[d]
Dry niche: from branch circuit OCPD to luminaires	A	—	A	—	—
Motors: from branch circuit OCPD to motor	A	A[c]	A[c]	A	A[d]
Packaged or self-contained outdoor spas and hot tubs with underwater luminaire: from branch circuit OCPD to spa or hot tub	A	A	A	—	A[d]
Indoor spas and hot tubs, and other spa or hot tub associated equipment: from branch circuit OCPD to equipment	A	A	A	—	A[d]
Indoor spas and hot tubs, and other spa or hot tub associated equipment: from branch circuit OCPD to equipment	A	A	A	—	A[d]
Connection at lighting transformers or power supplies	A	A[i]	A	—	—

For SI: 1 foot = 304.8 mm.
a. For all wiring methods, see Section E4205 for equipment grounding conductor requirements.
b. See Section E4202.2.1 for use of metal conduits in corrosive environments.
c. Limited to where necessary to employ flexible connections at or adjacent to a pool motor.
d. Flexible cord shall be installed in accordance with Section E4202.2.
e. Nonmetallic conduit shall be rigid polyvinyl chloride conduit Type PVC or reinforced thermosetting resin conduit Type RTRC.
f. Aluminum conduits shall not be permitted in the pool area where subject to corrosion.
g. Where installed as direct burial cable or in wet locations, Type MC cable shall be listed and identified for the location.
h. See Section E4202.3 for listed, double-insulated pool pump motors.
i. Limited to use in individual lengths not to exceed 6 feet. The total length of all individual runs of LFMC shall not exceed 10 feet.
j. Metal conduit shall be constructed of brass or other approved corrosion-resistant metal.

E4202.3 Flexible cords. Flexible cords used in conjunction with a spa, hot tub or hydromassage bathtub shall be installed in accordance with the following:

1. For other than underwater luminaires, fixed or stationary equipment shall be permitted to be connected with a flexible cord to facilitate removal or disconnection for maintenance or repair. The flexible cord shall not exceed 3 feet (914 mm) in length.
2. Other than listed low-voltage lighting systems not requiring grounding, wet-niche luminaires that are supplied by a flexible cord or cable shall have all exposed noncurrent-carrying metal parts grounded by an insulated copper equipment grounding conductor that is an integral part of the cord or cable. Such grounding conductor shall be connected to a grounding terminal in the supply junction box, transformer enclosure, or other enclosure and shall be not smaller than the supply conductors and not smaller than 16 AWG. [680.23(B)(3)]

3. A listed packaged spa or hot tub installed indoors that is GCFI protected shall be permitted to be cord-and-plug connected provided that such cord does not exceed 15 feet (4572 mm) in length. [680.42(A)(2)]
4. A listed packaged spa or hot tub rated at 20 amperes or less and installed indoors shall be permitted to be cord-and-plug connected to facilitate maintenance and repair. (680.43 Exception No. 1)
5. For other than underwater lighting luminaires, the requirements of Item 1 shall apply to any cord-equipped luminaire that is located within 16 feet (4877 mm) radially from any point on the water surface. [680.22(B)(5)]

E4202.4 Ground-fault circuit-interrupters required. Electrical equipment, including power-supply cords, shall be protected by ground-fault circuit-interrupters. 125-volt, 15- and 20-ampere receptacles located within 20 feet (6096 mm) of the inside walls of a storable spa, or storable hot tub shall be protected by a ground-fault circuit -interrupter. In determining these dimensions, the distance to be measured shall be the shortest path that the supply cord of an appliance connected to the receptacle would follow without passing through a floor, wall, ceiling, and doorway with hinged or sliding door, window opening, or other effective permanent barrier. (680.32)

E4202.5 Luminaires. Luminaires for storable spas and storable hot tubs shall not have exposed metal parts and shall be listed for the purpose as an assembly.

E4202.5.1 Over the low-voltage contact limit but not over 150 volts. A lighting assembly without a transformer or power supply, and with the luminaire lamp(s) operating at over the low-voltage contact limit, but not over 150 volts, shall be permitted to be cord and plug-connected where the assembly is listed as an assembly for the purpose and complies with all of the following:

1. It has an impact-resistant polymeric lens and luminaire body.
2. A ground-fault circuit -interrupter with open neutral conductor protection is provided as an integral part of the assembly.
3. The luminaire lamp is permanently connected to the ground-fault circuit-interrupter with open-neutral protection.
4. The design of an underwater luminaire supplied from a branch circuit either directly or by way of a transformer or power supply shall be such that, where the fixture is properly installed without a ground-fault circuit-interrupter, there is no shock hazard with any likely combination of fault conditions during normal use (not relamping). In addition, a ground-fault circuit-interrupter protection for personnel shall be installed in the branch circuit supplying luminaires operating at voltages greater than the low-voltage contact limit, to protect personnel performing lamping, relamping or servicing. The installation of the ground-fault circuit-interrupter shall be such that there is no shock hazard with any likely fault-condition combination that involves a person in a conductive path from any ungrounded part of the branch circuit or the luminaire to ground. Compliance with this requirement shall be obtained by the use of a listed underwater luminaire and by installation of a listed ground-fault circuit-interrupter in the branch circuit or a listed transformer or power supply for luminaires operating at more than the low-voltage contact limit. Luminaires that depend on submersion for safe operation shall be inherently protected against the hazards of overheating when not submerged. [680.23(A)(1), (A)(3), (A)(7) and (A)(8)]
5. It has no exposed metal parts. [680.33(B)]

E4202.6 Receptacle locations. Receptacles shall be located not less than 6 feet (1829 mm) from the inside walls of a, storable spa or storable hot tub. In determining these dimensions, the distance to be measured shall be the shortest path that the supply cord of an appliance connected to the receptacle would follow without passing through a floor, wall, ceiling, and doorway with hinged or sliding door, window opening, or other effective permanent barrier. (680.34)

E4202.7 Disconnecting means. Disconnecting means for storable pools and storable/portable spas and hot tubs shall comply with Section E4202.3.

E4202.8 Ground-fault circuit -interrupters. The outlet(s) that supplies a self-contained spa or hot tub, or a packaged spa or hot tub equipment assembly, or a field-assembled spa or hot tub with a heater load of 50 amperes or less, shall be protected by a ground-fault circuit-interrupter. (680.44)

A listed self-contained unit or listed packaged equipment assembly marked to indicate that integral ground-fault circuit-interrupter protection is provided for all electrical parts within the unit or assembly, including pumps, air blowers, heaters, lights, controls, sanitizer generators and wiring, shall not require that the outlet supply be protected by a ground-fault circuit -interrupter. [680.44(A)]

E4202.9 Electric water heaters. Electric spa and hot tub water heaters shall be listed and shall have the heating elements subdivided into loads not exceeding 48 amperes and protected at not more than 60 amperes. The ampacity of the branch-circuit conductors, and the rating or setting of overcurrent protective devices, shall be not less than 125 percent of the total nameplate load rating. (680.9)

E4202.10 Underwater audio equipment. Underwater audio equipment shall be identified for the purpose. [680.27(A)]

E4202.10.1 Speakers. Each speaker shall be mounted in an approved metal forming shell, the front of which is enclosed by a captive metal screen, or equivalent, that is bonded to and secured to the forming shell by a positive locking device that ensures a low-resistance contact and requires a tool to open for installation or servicing of the speaker. The forming shell shall be installed in a recess in the wall or floor of the pool. [680.27(A)(1)]

E4202.10.2 Wiring methods. Rigid metal conduit of brass or other identified corrosion-resistant metal, rigid polyvinyl chloride conduit, rigid thermosetting resin conduit or liquid-tight flexible nonmetallic conduit (LFNC-B) shall extend from the forming shell to a suitable junction box or other enclosure. Where rigid nonmetallic conduit or liquid-tight flexible nonmetallic conduit is used, an 8 AWG solid or stranded insulated copper bonding jumper shall be installed in this conduit with provisions for terminating in the forming shell and the junction box. The termination of the 8 AWG bonding jumper in the forming shell shall be covered with, or encapsulated in, a suitable potting compound to protect such connection from the possible deteriorating effect of pool water. [680.27(A)(2)]

E4202.10.3 Forming shell and metal screen. The forming shell and metal screen shall be of brass or other approved corrosion-resistant metal. Forming shells shall include provisions for terminating an 8 AWG copper conductor. [680.27(A)(3)]

E4202.11 Emergency switch for spas and hot tubs. A clearly labeled emergency shutoff or control switch for the purpose of stopping the motor(s) that provides power to the recirculation system and jet system shall be installed at a point that is readily accessible to the users. This emergency shutoff or control switch shall be adjacent to, and within sight, of the spa or hot tub and not less than 5 feet (1524 mm) away from the spa or hot tub. This requirement shall not apply to one-family dwellings. (680.41)

SECTION E4203
HYDROMASSAGE BATHTUBS

E4203.1 General. Installations of hydromassage bathtubs shall be required to comply only with Section E4209. The branch circuit wiring method(s) supplying a hydromassage bathtub shall comply with Chapter 38.

E4203.2 Ground-fault circuit-interrupters. Hydromassage bathtubs and their associated electrical components shall be supplied by an individual branch circuit(s) and protected by a readily accessible ground-fault circuit-interrupter. All 125-volt, single-phase receptacles not exceeding 30 amperes and located within 6 feet (1829 mm) measured horizontally of the inside walls of a hydromassage tub shall be protected by a ground-fault circuit-interrupter(s). (680.71)

E4203.3 Other electric equipment. Luminaires, switches, receptacles, and other electrical equipment located in the same room, and not directly associated with a hydromassage bathtub, shall be installed in accordance with the requirements of this code relative to the installation of electrical equipment in bathrooms. (680.72)

E4203.4 Accessibility. Hydromassage bathtub electrical equipment shall be accessible without damaging the building structure or building finish. Where the hydromassage bathtub is cord- and plug-connected with the supply receptacle accessible only through a service access opening, the receptacle shall be installed so that its face is within direct view and not more than 12 inches (305 mm) from the plane of the opening (680.73)

E4203.5 Bonded parts.
The following parts shall be bonded together:

1. Metal fittings within or attached to the tub structure that are in contact with the circulating water.
2. Metal parts of electrical equipment associated with the tub water circulating system, including the pump and blower motors.
3. Metal-sheathed cables and raceways and metal piping that are within 5 feet (1524 mm) of the inside walls of the tub and that are not separated from the tub area by a permanent barrier.
4. Exposed metal surfaces that are within 5 feet (1524 mm) of the inside walls of the tub and not separated from the tub area by a permanent barrier.
5. Electrical devices and controls that are not associated with the hydromassage tubs and that are located within 5 feet (1524 mm) from such units.

Exceptions:

1. Double-insulated motors and blowers shall not be bonded.
2. Small conductive surfaces not likely to become energized, such as air and water jets, supply valve assemblies and drain fittings not connected to metal piping, and towel bars, mirror frames and similar nonelectric equipment not connected to metal framing shall not be required to be bonded.

E4203.6 Method of bonding. Metal parts required to be bonded by this section shall be bonded together using a solid copper bonding jumper, insulated, covered or bare, not smaller than 8 AWG. The bonding jumper(s) shall be required for equipotential bonding in the area of the hydromassage bathtub and shall not be required to be extended or attached to any remote panelboard, service equipment, or electrode. In all installations, a bonding jumper long enough to terminate on a replacement nondouble-insulated pump or blower motor shall be provided and shall be terminated to the equipment grounding conductor of the branch circuit of the motor where a double-insulated circulating pump or blower motor is used. (680.74)

REASON STATEMENT AND FISCAL IMPACT

This proposal removes language about pools from Chapter 42 since pools are required to be have their electrical systems installed according to the InEC.

Fiscal impact: No fiscal impact, editorial.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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FOR OFFICE USE ONLY		
Received 10/29/2018	Code 2018 IRC	Proposal number #330

Code title **International Residential Code**	Edition **2018**
Section number and title **E4207.4 Receptacle locations**	Page Number
Proponent Charlie Eldridge	Representing (if applicable) Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*) 551 Grassy Ln., Indianapolis, IN 46217	Telephone number (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

_X_ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E4207.4 Receptacle locations.
Receptacles shall be located not less than ~~6~~ 10 feet ~~(1829 mm)~~ from the inside walls of a storable pool, storable spa or storable hot tub. In determining these dimensions, the distance to be measured shall be the shortest path that the supply cord of an appliance connected to the receptacle would follow without passing through a floor, wall, ceiling, doorway with hinged or sliding door, window opening, or other effective permanent barrier. (680.34)

REASON STATEMENT AND FISCAL IMPACT

Reason:
Text extracted from the 2005 Indiana Residential Code

Fiscal impact: ***No fiscal impact***

REVIEW RECOMMENDATION

Approve

Reject

Approve as amended

Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received: 10/29/2018	Code: 2018 IRC	Proposal number: # 331

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E4301.2 Definitions**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

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E4301.2 Definitions.

ABANDONED CLASS 2 CABLE. Installed Class 2 cable that is not terminated at equipment and not identified for future use with a tag.

CLASS 2 CIRCUIT. That portion . . .

REASON STATEMENT AND FISCAL IMPACT

Reason:

Extracted text from the 2005 Indiana Residential Code

Fiscal impact: ***No fiscal impact***

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. ~~*Dashed line through material to be deleted.*~~ *Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received: 10/29/2018	Code: 2018 IRC	Proposal number: # 332

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E4301.3 Spread of fire or products of combustion**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows _X_ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E4301.3 Spread of fire or products of combustion.
The accessible portion of abandoned Class 2 cables shall not be permitted to remain.

REASON STATEMENT AND FISCAL IMPACT

Reason:
Added new section was extracted from the 2005 Indiana Residential Code

Fiscal impact: ***No fiscal impact***

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. *~~Dashed line through material to be deleted~~. Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number # 333

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **Chapter 44 Referenced standards.**	Page Number **1 of 1 , codebook page 783, 787**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address (*number and street, city, state, and ZIP code*) **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

_X_ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

Change two standards' designations as follows:

~~711-16~~ 711.13: **Voluntary Specification for Self-adhering Flashing Used for Installation of Exterior Wall Fenestration Products** R703.4

~~32-17~~ 32-01: **Design and Construction of Frost-protected Shallow Foundations** R403.1.4.1

REASON STATEMENT AND FISCAL IMPACT

This proposal is corrections from ICC.

Fiscal impact: No fiscal impact, editorial.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. *~~Dashed line through material to be deleted.~~ Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number # 334

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **Appendixes A through D**	Page Number **1 of 1, codebook pages 821-850**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address (*number and street, city, state, and ZIP code*) **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows __ Delete and substitute as follows _X_ Delete without substitution

Delete Appendixes A through D without substitution.

REASON STATEMENT AND FISCAL IMPACT

This proposal deletes informative appendixes not part of the prescriptive rule.

Fiscal impact: No fiscal impact

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. *~~Dashed line through material to be deleted~~. Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received: 11/11/2018	Code: 2018 IRC	Proposal number: # 335

Code title: **Indiana Residential Code**	Edition: **2020**
Section number and title: **AE101.1 General.**	Page Number: **1 of 1, codebook page 851**
Proponent: **Craig Wagner**	Representing (if applicable): **IABO**
Address (*number and street, city, state, and ZIP code*): **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number: **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

_X_ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

AE101.1 General.

These provisions shall be applicable only to a *manufactured home* or mobile homes used as a single *dwelling unit* installed on privately owned (nonrental) lots and shall apply to the following:

1. Construction, *alteration* and repair of any foundation system that is necessary to provide for the installation of a *manufactured home* unit.
2. Construction, installation, *addition*, *alteration*, repair or maintenance of the building service *equipment* that is necessary for connecting *manufactured homes* to water, fuel, or power supplies and sewage systems.
3. *Alterations*, *additions* or repairs to existing *manufactured homes*. The construction, *alteration*, moving, demolition, repair and use of accessory buildings and structures, and their building service *equipment*, shall comply with the requirements of the codes adopted by this *jurisdiction*.

These provisions shall not be applicable to the design and construction of *manufactured homes* and shall not be deemed to authorize either modifications or *additions* to *manufactured homes* where otherwise prohibited.

REASON STATEMENT AND FISCAL IMPACT

This proposal adds mobile homes to the text as some mobile homes are still in use in Indiana.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. ~~*Dashed line through material to be deleted.*~~ *Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number #336

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **AE102.1 General.**	Page Number **1 of 1, codebook page 851**
Proponent **Craig Wagner**	Representing (If applicable) **IABO**
Address (*number and street, city, state, and ZIP code*) **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

__ Change to read as follows __ Add to read as follows _X_ Delete and substitute as follows __ Delete without substitution

AE102.1 General. Manufactured homes and their building service equipment to which additions or alterations are made shall comply with all of the applicable requirements of the Indiana Residential Code (675 IAC 14) for new facilities.

REASON STATEMENT AND FISCAL IMPACT

This proposal explains the scope of the general requirements for installation.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. *~~Dashed line through material to be deleted~~. Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number # 337

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **AE102.2 Additions, alterations or repairs.**	Page Number **1 of 1, codebook page 851**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address *(number and street, city, state, and ZIP code)* **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows _X_ Delete and substitute as follows __ Delete without substitution

AE102.2 Additions. Additions made to a manufactured home shall conform to the requirements of this code and all other applicable Indiana codes. Additions shall be structurally independent from the manufactured home.

Exception: Structural independence need not be provided when:

(1) structural calculations are provided to the building official confirming that the addition will not adversely affect the structural integrity of the manufactured home, or

(2) the manufacturer of the home confirms, in writing, that the home will safely support the structural loads imposed by the proposed addition.

REASON STATEMENT AND FISCAL IMPACT

This proposal explains general requirements for additions as has been required by Indiana in the past.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve

Reject

Approve as amended

Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. *~~Dashed line through material to be deleted~~. Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number # 338

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **AE102.2.1 Alterations.**	Page Number **1 of 1, codebook page 851**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address *(number and street, city, state, and ZIP code)* **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows _X_ Add to read as follows ___ Delete and substitute as follows ___ Delete without substitution

AE102.2.1 Alterations. Alterations may be made to any manufactured home or to its building service equipment without requiring the existing manufactured home or its building service equipment to comply with all the requirements of these provisions, provided the alteration or additions conform to that required for new construction, and provided further that no hazard to life, health, or safety will be created by such additions or alterations.

REASON STATEMENT AND FISCAL IMPACT

This proposal explains general requirements for alterations as has been required by Indiana in the past.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. *~~Dashed line through material to be deleted~~. Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number # 339

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **AE102.3 Existing installations.**	Page Number **1 of 1, codebook page 852**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address (*number and street, city, state, and ZIP code*) **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows __ Delete and substitute as follows _X_ Delete without substitution

~~**AE102.3 Existing installations.** Building service *equipment* lawfully in existence at the time of the adoption of the applicable codes shall have their use, maintenance or repair continued if the use, maintenance or repair is in accordance with the original design and hazard to life, health or property has not been created by such building service *equipment*.~~

REASON STATEMENT AND FISCAL IMPACT

This proposal deletes requirements outside of the scope of this code.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. *~~Dashed line through material to be deleted~~. Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number # 340

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **AE102.4 Existing occupancy.**	Page Number **1 of 1, codebook page 852**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address *(number and street, city, state, and ZIP code)* **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows _X_ Delete and substitute as follows __ Delete without substitution

AE102.4 Existing Occupancy. The use or occupancy of any manufactured home shall not be changed unless evidence is provided to show compliance with the applicable rules of the Fire Prevention and Building Safety Commission for the new use or occupancy and be released for construction when required by the General Administrative Rules (675 IAC 12).

REASON STATEMENT AND FISCAL IMPACT

This proposal explains Indiana rules for proposed change to another occupancy type.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. ~~*Dashed line through material to be deleted.*~~ *Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number # 341

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **AE102.5 Maintenance.**	Page Number **1 of 1, codebook page 852**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address *(number and street, city, state, and ZIP code)* **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows __ Delete and substitute as follows _X_ Delete without substitution

~~**AE102.5 Maintenance.** All *manufactured homes* and their building service *equipment*, existing and new, and all parts thereof, shall be maintained in a safe and sanitary condition. All devices or safeguards that are required by applicable codes or by the *Manufactured Home* Standards shall be maintained in conformance to the code or standard under which it was installed. The owner or the owner's designated agent shall be responsible for the maintenance of *manufactured homes*, accessory buildings, structures and their building service *equipment*. To determine compliance with this section, the *building official* may has the authority to cause any *manufactured home*, accessory building or structure to be reinspected.~~

REASON STATEMENT AND FISCAL IMPACT

This proposal removes maintenance language that is outside of the scope of this code.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. *~~Dashed line through material to be deleted~~. Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number # 342

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **AE201.1 Definitions, Manufactured homes.**	Page Number **1 of 1, codebook page 852**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address *(number and street, city, state, and ZIP code)* **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

_X_ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

MANUFACTURED HOME. A structure transportable in one or more sections that, in the traveling mode, is 8 body feet (2438 body mm) or more in width or 40 body feet ~~(12 192 body mm)~~ (12192 body mm) or more in length or, where erected on site, is 320 or more square feet (30 m2), and which is built on a permanent chassis and designed to be used as a *dwelling* with ~~or without~~ a permanent foundation when connected to the required utilities, and includes the plumbing, heating, air-conditioning and electrical systems contained therein; except that such term shall include any structure that meets all of the requirements of this paragraph, except the size requirements and with respect to which the manufacturer voluntarily files a certification required by the Secretary of the U.S. Department of Housing and Urban Development (11UD) and complies with the standards established under this title.

For mobile homes built prior to June 15, 1976, a *label* certifying compliance with the *Standard for Mobile Homes*, NFPA 501, ANSI 119.1, in effect at the time of manufacture, is required. For the purpose of these provisions, a mobile home shall be considered to be a *manufactured home*.

REASON STATEMENT AND FISCAL IMPACT

This proposal corrects a number mistake, and clarifies that manufactured homes installed on a nonrental lots in Indiana require a permanent foundation.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. ~~*Dashed line through material to be deleted.*~~ *Underline or bold face material to be added.*
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4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number # 343

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **AE301.1 Initial installation.**	Page Number **1 of 1, codebook page 852**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address *(number and street, city, state, and ZIP code)* **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows _X_ Delete and substitute as follows ___ Delete without substitution

AE301.1 Permit. Where required by local ordinance, a manufactured home shall not be installed or altered without first obtaining a permit.

REASON STATEMENT AND FISCAL IMPACT

This proposal clarifies that permits shall be obtained when required by local ordinance.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. *~~Dashed line through material to be deleted~~. Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number #344

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **AE301.2 Additions and alterations to a manufactured home.**	Page Number **1 of 1, codebook page 852**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address (*number and street, city, state, and ZIP code*) **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows _X_ Delete and substitute as follows __ Delete without substitution

AE301.2 Additions and alterations to a manufactured home. Where required by local ordinance, a permit shall be obtained to alter, remodel, or add accessory buildings or structures to a manufactured home.

REASON STATEMENT AND FISCAL IMPACT

This proposal clarifies that permits for additions or alterations shall be obtained when required by local ordinance.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
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4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received: 11/11/2018	Code: 2018 IRC	Proposal number: #345

Code title: **Indiana Residential Code**	Edition: **2020**
Section number and title: **AE301.3, AE301.4, AE302, AE303, AE304 , AE305, AE306, AE307, AE401,**	Page Number: **1 of 1, codebook page 852-855**
Proponent: **Craig Wagner**	Representing (if applicable): **IABO**
Address *(number and street, city, state, and ZIP code)*: **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number: **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows __ Delete and substitute as follows _X_ Delete without substitution

Delete Sections AE301.3, AE301.4, AE302, AE303, AE304 , AE305, AE306, AE307, AE401

REASON STATEMENT AND FISCAL IMPACT

This proposal deletes sections from the code which are outside the scope of the rule or whose information are in other sections.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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2. *~~Dashed line through material to be deleted~~. Underline or bold face material to be added.*
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FOR OFFICE USE ONLY		
Received: 11/11/2018	Code: 2018 IRC	Proposal number: # 346

Code title: **Indiana Residential Code**	Edition: **2020**
Section number and title: **AE402.1 Location on property.**	Page Number: **1 of 1, codebook page 856**
Proponent: **Craig Wagner**	Representing (if applicable): **IABO**
Address (*number and street, city, state, and ZIP code*): **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number: **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

_X_ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

AE402.1 General. *Manufactured homes* and accessory buildings shall be located on the property in accordance with applicable ~~codes and ordinances of this *jurisdiction*~~ sections of the Indiana Residential Code (675 IAC 14) and the ordinances of the jurisdiction in which the home is sited.

REASON STATEMENT AND FISCAL IMPACT

This proposal defines how manufactured homes are to be located on nonrental lots.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve

Reject

Approve as amended

Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. *~~Dashed line through material to be deleted.~~ Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received: 11/11/2018	Code: 2018 IRC	Proposal number: #347

Code title: **Indiana Residential Code**	Edition: **2020**
Section number and title: **AE502.1 General.**	Page Number: **1 of 1, codebook page 856**
Proponent: **Craig Wagner**	Representing (if applicable): **IABO**
Address (*number and street, city, state, and ZIP code*): **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number: **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

_X_ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

AE502.1 General. Foundation systems designed and constructed in accordance with this section shall be considered a permanent installation. Where the manufacturer's installation instructions and foundation design details for the home are available, the foundation system shall be installed in accordance with those instructions.

REASON STATEMENT AND FISCAL IMPACT

This proposal clarifies that when the manufacturer's installation requirements are available those instructions are to be followed for the installation of the manufactured home.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. *~~Dashed line through material to be deleted~~. Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number #348

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **AE504.1 General.**	Page Number **1 of 1, codebook page 857**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address *(number and street, city, state, and ZIP code)* **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows _X_ Delete and substitute as follows __ Delete without substitution

AE504.1 General. Accessory structures shall not be structurally supported by a manufactured home.

Exception: Structural independence need not be provided when:

1. structural calculations are provided to the building official confirming that the addition will not a adversely affect the structural integrity of the manufactured home, or
2. the manufacturer of the home confirms, in writing, that the home will safely support the structural loads imposed by the proposed accessory structure.

REASON STATEMENT AND FISCAL IMPACT

This proposal gives guidance to adding accessory structures next to a manufactured home.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number # 349

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **AE505.1 General.**	Page Number **1 of 1, codebook page 857**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address (*number and street, city, state, and ZIP code*) **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __Add to read as follows _X_ Delete and substitute as follows __ Delete without substitution

AE505.1 General. The alteration, replacement, or addition to the building service equipment, other than that required for the initial installation of the manufactured home, shall conform to the regulations set forth in this code.

REASON STATEMENT AND FISCAL IMPACT

This proposal gives guidance to additional service equipment supplemental to the manufactured home.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number #350

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **AE507.1 General.**	Page Number **1 of 1, codebook page 857**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address (*number and street, city, state, and ZIP code*) **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

_X_ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

AE507.1 General. *Alterations* made to a *manufactured home* subsequent to its initial installation shall conform to the occupancy, fire safety and energy conservation requirements set forth in ~~the *Manufactured Home* Standards.~~ or referenced by, the applicable rules of the Fire Prevention and Building Safety Commission.

REASON STATEMENT AND FISCAL IMPACT

This proposal gives guidance to the rules for alterations to the manufactured home.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number #351

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **AE604.3 Resistance to weather deterioration.**	Page Number **1 of 1, codebook page 858**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address *(number and street, city, state, and ZIP code)* **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

X Change to read as follows ___ Add to read as follows ___ Delete and substitute as follows ___ Delete without substitution

AE604.3 Resistance to weather deterioration. All anchoring *equipment*, tension devices and ties shall have a resistance to deterioration as required by this code. All anchoring equipment surfaces exposed to weathering shall have a resistance to weather deterioration at least equivalent to that provided by a coating of zinc on steel of not less than 0.625 ounces per square foot.

REASON STATEMENT AND FISCAL IMPACT

This proposal details the minimum requirement for protection of anchoring devices exposed to weathering.

Fiscal impact: No fiscal impact since anchoring devices already meet this requirement, would apply to rarely used site built devices.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received: 11/11/2018	Code: 2018 IRC	Proposal number: #352

Code title: **Indiana Residential Code**	Edition: **2020**
Section number and title: **Appendixes F through T**	Page Number: **1 of 1, codebook pages 861-943**
Proponent: **Craig Wagner**	Representing (if applicable): **IABO**
Address (*number and street, city, state, and ZIP code*): **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number: **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows __ Delete and substitute as follows _X_ Delete without substitution

Delete Appendixes F through T without substitution.

REASON STATEMENT AND FISCAL IMPACT

This proposal deletes informative appendixes not part of the prescriptive rule.

Fiscal impact: No fiscal impact

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received 11/14/2018	Code 2018 IRC	Proposal number #353

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **R313.2 One- and Two-family dwellings automatic fire systems.**	Page Number **1 of 1**
Proponent **Bobby LaRue**	Representing (if applicable) **Monroe County Building Department**
Address *(number and street, city, state, and ZIP code)* **501 N. Morton Street, Bloomington, IN 47404**	Telephone number 812.349.2580

PROPOSED CODE CHANGE *(check one)*

Change to read as follows Add to read as follows Delete and substitute as follows x Delete without substitution

Delete the text of Section 310.1, Exception 2 in its entirety.

REASON STATEMENT AND FISCAL IMPACT

No cost.
Similar language to this was introduced by the sprinkler industry to the building code. It seems that this exception is the extension of that change. The change was passed in the committee by an 8 – 6 vote and was disapproved by a majority of ICC voting members on two separate occasions but did not receive a 2/3 majority in order to overturn the committee. Removing emergency escape and rescue openings from sleeping rooms represents a significate disadvantage in an emergency situation.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:
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FOR OFFICE USE ONLY		
Received 11/13/2018	Code 2018 IRC	Proposal number #354

Code title: Indiana Residential Code	Edition: 2020
Section number and title: R905.1.2 Ice barriers	Page number: 1 of 1
Proponent: John Cochran, Bose Public Affairs Group	Representing (*if applicable*): Amos Exteriors, Inc.
Address (*number and street, city, state, and ZIP code*): 111 Monument Circle, Suite 2700, Indianapolis, IN 46204	Telephone number: (317) 684-5408

PROPOSED CODE CHANGE *(check one)*

☑ Change to read as follows ☐ Add to read as follows ☐ Delete and substitute as follows ☐ Delete without substitution

R905.1.2 Ice barriers.

~~In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an~~ An ice barrier shall be installed for asphalt shingles, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, and wood shakes. The barrier shall consist of not fewer than two layers of underlayment cemented together, or a self-adhering polymer-modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point not less than 24 inches (610 mm) inside the exterior wall line of the building, measured horizontally. On roofs with slope equal to or greater than eight units vertical in 12 units horizontal (67-percent slope), the ice barrier shall also be applied not less than 36 inches (914 mm) measured along the roof slope from eave edge of the building.

Exception: Detached accessory structures not contained conditioning floor area.

REASON STATEMENT AND FISCAL IMPACT

The proposal also clarifies that the 24" dimension is measured horizontally and not along the plane of the roof. This is not widely understood in the roofing trades. If the distance of ice barrier coverage were to be measured by the slope, the extent to which a roof is protected over the inside of the home would depend significantly on the length of the overhang as well as the slope of the roof.

The fiscal impact would be minimal, if any, depending on the home.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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FOR OFFICE USE ONLY		
Received: 11/16/2018	Code: 2018 IRC	Proposal number: #355

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **R905.1.2 Ice barriers**	Page Number
Proponent: **Bill Kaufholz**	Representing (if applicable): **Fischer Homes**
Address (*number and street, city, state, and ZIP code*)	Telephone number

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows _X_ Delete and substitute as follows ___ Delete without substitution

R905.1.2 Ice barriers

An ice barrier shall be installed for asphalt shingles, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles and wood shakes. The ice barrier shall consist of not fewer than two layers of underlayment cemented together, or a self-adhering polymer-modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point not less than 24 inches (610 mm) outside the exterior wall line of the building. The 24 inch measurement shall be along the slope of the roof from the point where the projected outside face of the wall intersects the roof deck. See Figure 905.1.2 (a). On roofs with slope equal to or greater than eight units vertical in 12 units horizontal (67-percent slope), the ice barrier shall also be applied not less than 36 inches (914 mm) measured along the roof slope from the eave edge of the building.

Exception 1: Detached accessory structures not containing conditioned floor area

Exception 2: If an attic/roof section is insulated to a minimum of R-38 uncompressed over the outside face of the exterior wall

See pg. 2 for Figure 905.1.2 Ice barriers

REASON STATEMENT AND FISCAL IMPACT

Reason:

Fiscal impact:

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

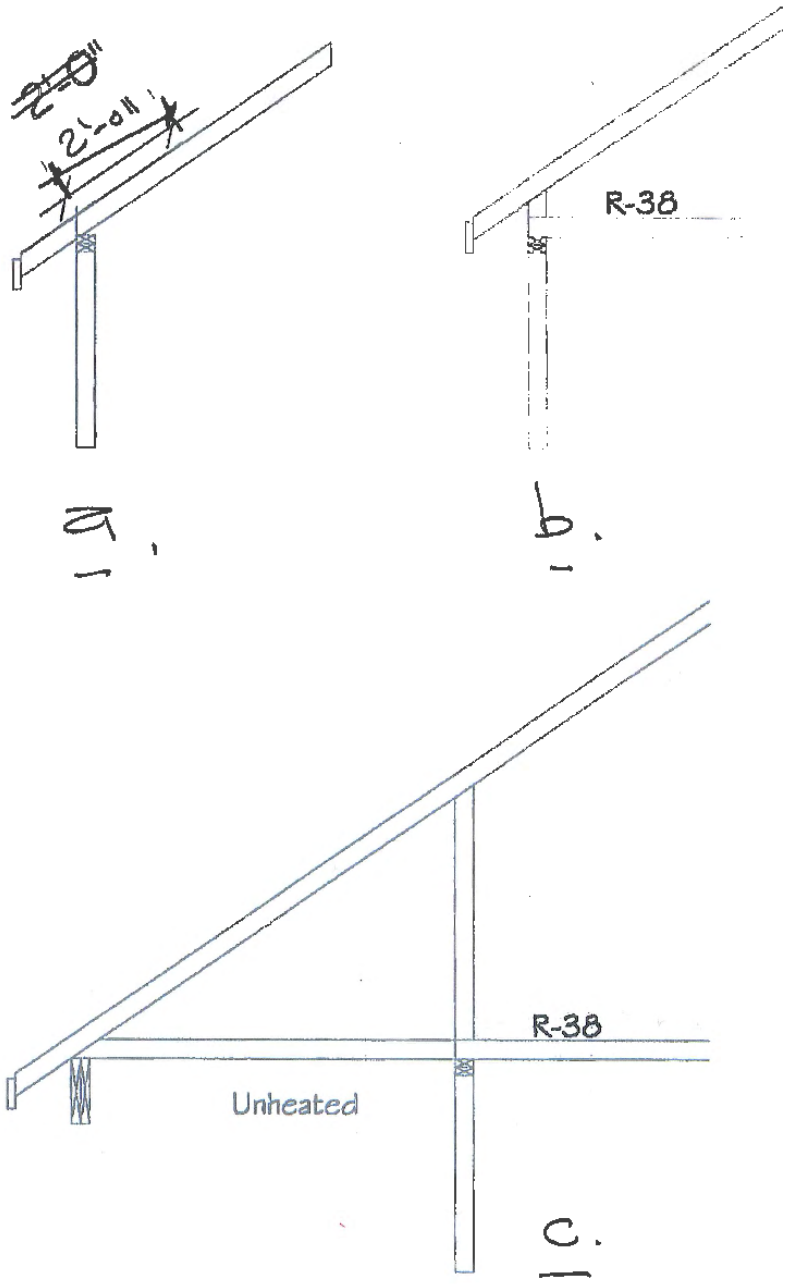

FIGURE 905.1.2 ICE BARRIERS

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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FOR OFFICE USE ONLY		
Received 11/16/2018	Code 2018 IRC	Proposal number #356

Code title **International Residential Code**	Edition **2018**
Section number and title **N1103.3.5 Building cavities**	Page Number
Proponent **Bill Kaufholz**	Representing (if applicable) **Fischer Homes**
Address (*number and street, city, state, and ZIP code*)	Telephone number

PROPOSED CODE CHANGE ***(check one)***

_X_ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

N1103.3.5 Building cavities (Mandatory).
Building framing cavities shall not be used as supply ducts or plenums.

REASON STATEMENT AND FISCAL IMPACT

Reason:
This maintains the current code language and allows building cavitles to be used for return ducts. Changing the testing from Total leakage to Leakage to Outside that we approved a few meetings ago allows this exception to be valid.

Fiscal impact: **Requiring all homes to have fully ducted return ducts will add $2,000-$5,000/new home.**

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received: 11/14/2018	Code: 2018 IRC	Proposal number: #357

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3501 Electrical definitions**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

_X_ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

Change Section E3501 Electrical definitions as follows:

(1) Delete the definition of APPROVED and substitute to read as follows: See the definition of APPROVED in Section R202.
(2) Delete the definition of BRANCH CIRCUIT, GENERAL PURPOSE and substitute: A branch circuit that supplies two or more receptacles or outlets for lighting and appliances.
(3) Change the definition of Grounding Conductor, Equipment to read as follows: The conductor used to connect the noncurrent-carrying metal parts of equipment, raceways, and other enclosures to the system grounded conductor or the grounding electrode conductor, or both, at the service equipment or at the source of a separately derived system.
(4) Change the definition of Grounding Electrode Conductor to read as follows: The conductor used to connect the grounding electrode(s) to the equipment grounding conductor or to the grounded conductor, or to both, at the service equipment, at each building or structure where supplied by a feeder(s) or branch circuit(s), or at the source of a separately derived system.
(5) Delete the definition of LABELED and substitute as follows: See the definition of LABELED in Section R202.
(6) Delete the definition of LISTED and substitute to read as follows: See the definition of LISTED AND LISTING in Section R202.

REASON STATEMENT AND FISCAL IMPACT

Reason:
The electrical definitions in E3501 above were extracted directly from the electrical definitions in the 2005 Indiana Residential Code

Fiscal impact: ***No fiscal impact***

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received: 11/14/2018	Code: 2018 IRC	Proposal number: # 358

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3601.2 Number of services**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows _X_ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E3601.2 Number of services.
One- and two-family dwellings shall be supplied by only one service. (230.2)
Exception: A building with more than one occupancy shall be permitted to have one set of service-entrance conductors for each service, run to each occupancy.

REASON STATEMENT AND FISCAL IMPACT

Reason:
To make clear that each occupancy (dwelling unit) is permitted to have their own service equipment.

From the NEC:
230.40 Number of Service-Entrance Conductor Sets.
Each service drop, set of overhead service conductors, set of underground service conductors, or service lateral shall supply only one set of service-entrance conductors.
Exception No. 1: A building with more than one occupancy shall be permitted to have one set of service-entrance conductors for each service, as defined in 230.2, run to each occupancy or group of occupancies.

Fiscal impact: ***No Fiscal Impact***

REVIEW RECOMMENDATION

Approve

Reject

Approve as amended

Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received: 11/14/2018	Code: 2018 IRC	Proposal number: # 359

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3606.3 Available short-circuit current**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows __ Delete and substitute as follows _X_ Delete without substitution

E3606.3 Available short-circuit current.
Service equipment shall be suitable for the maximum fault current available at its supply terminals~~, but not less than 10,000 amperes~~. (110.9)

REASON STATEMENT AND FISCAL IMPACT

Reason:
Brought forward from the 2005 IRC. There are many areas where more than 5000 amperes of fault current is simply not available. This is especially true of areas where overhead service drops are employed since electric utilities normally size their service drops for open air and not inside conduits or buildings. This is also true where service laterals have more length to smaller 100 ampere services especially with smaller transformers. There is no reason to not permit the use of 5 kAIC circuit breakers to be used in those areas.

From the NEC:
110.9 Interrupting Rating.
Equipment intended to interrupt current at fault levels shall have an interrupting rating at nominal circuit voltage at least equal to the current that is available at the line terminals of the equipment.
Equipment intended to interrupt current at other than fault levels shall have an interrupting rating at nominal circuit voltage at least equal to the current that must be interrupted.

Fiscal impact: ***No Fiscal Impact***

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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FOR OFFICE USE ONLY		
Received: 11/14/2018	Code: 2018 IRC	Proposal number: #360

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3608.1.2 Concrete-encased electrode**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows _X_ Add to read as follows ___ Delete and substitute as follows ___ Delete without substitution

E3608.1.2 Concrete-encased electrode.
A concrete-encased electrode consisting of not less than 20 feet (6096 mm) of either of the following shall be considered as a grounding electrode:
1. One or more bare or zinc-galvanized or other electrically conductive coated steel reinforcing bars or rods not less than 1/2 inch (13 mm) in diameter, installed in one continuous 20-foot (6096 mm) length, or if in multiple pieces connected together by the usual steel tie wires, exothermic welding, welding, or other effective means to create a 20-foot (6096 mm) or greater length. Where the steel reinforcing bars or rods are not less than ½ inch diameter, it shall be permitted to turn the reinforcing bars or rods up into the building cavity for connection to the grounding electrode conductor. The reinforcing bars or rods shall be isolated and protected from contact with the soil. The connection to the reinforcing bars or rods shall not be required to be accessible if listed clamps suitable for direct burial or exothermic welds are utilized.

REASON STATEMENT AND FISCAL IMPACT

Reason:
This has become a common and acceptable practice but is actually prohibited by R404.1.2.3.7.4.

Fiscal impact: ***No Fiscal Impact***

REVIEW RECOMMENDATION

Approve

Reject

Approve as amended

Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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FOR OFFICE USE ONLY		
Received: 11/16/2018	Code: 2018 IRC	Proposal number: # 361

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3702.13 Electric vehicle branch circuit**	Page Number
Proponent: **Lynn Madden**	Representing (if applicable): **Hallmark Homes**
Address (*number and street, city, state, and ZIP code*)	Telephone number

PROPOSED CODE CHANGE *(check one)*

_X_ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E3702.13 Electric vehicle branch circuit

When outlets are installed for the purpose of charging electric vehicles, such outlets shall be supplied by an individual branch circuit. Each circuit shall not supply other outlets

REASON STATEMENT AND FISCAL IMPACT

Reason:
To provide clarity that the outlets are not required, but also guidance for proper installation should someone choose to install them.

Fiscal impact:

REVIEW RECOMMENDATION

Approve

Reject

Approve as amended

Further study

210.12 Arc-Fault circuit-interrupter protection. ~~Arc-fault circuit-interrupter protection shall be provided as required in 210.12(A), (B), (C), and (D). Arc-fault circuit-interrupter shall be installed in a readily accessible location.~~

210.12(**A**) **Dwelling units**. ~~All 120 volt, single Phase, 15 and 20 ampere branch circuit supplying outlets or devices installed and dwelling 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)~~

406.4(4) Arc-Fault circuit interrupter protection. ~~If a receptacle outlet located in any area specified in 210.12 (A), (B) or (C) is replaced, a replacement receptacle at this outlet she'll 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~~

SILVER STRAND ELECTRIC, INC.
117 POINSETTIA ST.
ATLANTIC BEACH, FL.
32233
LIC.# EC13003769

RE: Arc Fault Protection

2020 NEC

210.12 Arc-Fault circuit-interrupter protection. ~~Arc-fault circuit-interrupter protection shall be provided as required in 210.12(A), (B), (C), and (D). Arc-fault circuit-interrupter shall be installed in a readily accessible location.~~

210.12(A) **Dwelling units.** ~~All 120 volt, single Phase, 15 and 20 ampere branch circuit supplying outlets or devices installed and dwelling 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)~~

406.4(4) Arc-Fault circuit interrupter protection. ~~If a receptacle outlet located in any area specified in 210.12 (A), (B) or (C) is replaced, a replacement receptacle at this outlet she'll 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~~

SILVER STRAND ELECTRIC, INC.

117 POINSETTIA ST.

ATLANTIC BEACH, FL.

32233

LIC.# EC13003769

Majority of the trips are nuisance trips. Not constant. Only constant trips I've experienced with arc fault protection are either from an overcurrent or from a direct short. Same protection he would get with a standard trip breaker.

No documented proof (that I know of) of arc fault protection actually preventing any fires, but there is very much proof of arc fault protection having nuisance trips. Actually **causes** a problem and doesn't prevent anything.

Causes more problems than was meant to rectify. **Documented proof of causing problems and no documented proof of solving problems.**

"Upgrading" (to AFCI protection), the NEC has **downgraded** the integrity of any circuit with arc fault protection.

Arc fault protection is supposed to detect a spark. Once the spark is already happened it's too late. Like saying, "hello" to somebody after they've walked by you.

Michigan and Indiana have completely dropped the requirement.

Cost money. Every time nuisance trip being called by homeowner.

Creates heat. Causes bus bars to burn over time.

A first responder told me that when they cannot find a specific cause of a fire they fill in the blank with “electrical fire”. Have to fill in the blank. Reason there are so many documented electrical fires.

Cost money. Every time nuisance trip being called by homeowner.

Like taking a medication that causes more side effects than there are symptoms.

TAC: Electrical

Total Mods for **Electrical** in **Denied : 6**

Total Mods for report: 6

Sub Code: Energy Conservation

3

E9974

Date Submitted	02/02/2022	**Section**	405.9	**Proponent**	John Hall
Chapter	4	**Affects HVHZ**	No	**Attachments**	**Yes**
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments Yes **Alternate Language Yes**

Related Modifications

None

Summary of Modification

This modification creates new section C405.9 to require electric vehicle charging equipment (EVSE) in all new commercial construction. The number of EV Ready and EV Capable parking spaces required would be determined by the attached chart that is part of the modification.

Rationale

Florida is ranked number two in the United States for the number of registered electric vehicle as of the latest ranking in June 2021. EVs provide significant economic benefits for consumers through fuel and maintenance cost savings, and have been identified as a key climate strategy to reduce GHG emissions from the U.S. transportation sector. The interest in EVs has grown alongside greater EV model availability and increased vehicle range. Every major auto manufacturer in the world has announced a plan to electrify a significant portion of their vehicle fleets over the next 3-5 years. Ford recently announced an $11 billion investment to reach their goal of 40 EV models by 2022. The goal for GM: 20 EV models by 2023; for VW: 27 EV models by 2022; for Toyota: 10 BEVs by the early 2020's; and similar goals for Volvo, Daimler, Nissan, BMW, and Fiat-Chrysler. However, the lack of access to EV charging stations continues to be a critical barrier to EV adoption. In particular, there are significant logistical barriers for commercial building tenants to upgrade existing electrical infrastructure and install new EV charging stations. A lack of pre-existing EV charging infrastructure, such as electrical panel capacity, raceways, and pre-wiring, can make the installation of a new charging station cost-prohibitive for a potential EV-owner. The installation of an EV charging station is made three to four times less expensive when the infrastructure is installed during the initial construction phase as opposed to retrofitting existing buildings to accommodate the new electrical equipment.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This modification will increase the number of inspections to be performed. The cost of enforcement will be offset by permit fees.

Impact to building and property owners relative to cost of compliance with code

The proposed modification increases the cost of construction. Costs for new EV Capable parking spaces i range from $300 to $850 per space. Costs for new EV Ready spaces range from $800 to $1300. The cost for EVSE retrofit in can be three or more times the cost of installations in new construction.

Impact to industry relative to the cost of compliance with code

Industry will likely benefit from this modification. Industry is adjusting by adopting a business model that involves installation, maintenance, and operation by an off site entity that then shares a portion of the revenue with the property or business owner.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This modification provides an additional resource to reduce greenhouse gas emissions from petroleum fueled vehicles, thus contributing to the reduction in the effects of climate change, which has been identified as a hazard too the health and welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification strengthens the code by providing guidance on the installation electric vehicle service equipment.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification does not discriminate against any materials, products, methods, or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code. To the contrary, this modification provides guidance on the installation of electric vehicle service equipment.

Alternate Language

2nd Comment Period

E9974-A4

Proponent John Hall **Submitted** 8/22/2022 3:37:13 PM **Attachments** Yes

Rationale:

This alternate language proposal seeks to create Appendix CC for EVSE provision in new commercial construction. construction

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There will be no impact unless adopted by the local jurisdiction.

Impact to building and property owners relative to cost of compliance with code

There will be no impact unless adopted by the local jurisdiction.

Impact to industry relative to the cost of compliance with code

There will be no impact unless adopted by the local jurisdiction.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

The proposed appendix will reduce carbon emissions and traffic noise.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

The proposed appendix improves the code code by providing an additional means for interested jurisdictions to address climate change and other factors affected by carbon emissions.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The proposed appendix does not discriminate against any materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

The proposed appendix does not degrade the effectiveness of the code. On the other hand it enhances the code by providing another avenue for jurisdictions to address issues that they face that may not be encountered state wide.

1st Comment Period History

E9974-A1

Proponent Bryan Holland **Submitted** 3/28/2022 5:20:22 PM **Attachments** Yes

Rationale:

This alternative proposed modification makes a few minor revisions to the original proposed modification. This includes editorial revisions to the definitions and the rules to provide technical clarity. Otherwise, NEMA fully supports the concept of EV-ready provisions in the FBC-EC as proposed and substantiated in the original proposed modification. NEMA urges the TAC(s) and Commission approve this proposed modification.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This alternative proposed modification provides clear and enforceable language for the AHJ.

Impact to building and property owners relative to cost of compliance with code

This alternative proposed modification will increase the cost of compliance for buildings/property owners at time of initial construction while reducing the cost of compliance for an existing building that does not have the capacity or infrastructure in-place for the installation of EVSE.

Impact to industry relative to the cost of compliance with code

This alternative proposed modification will increase the cost of compliance for industry.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This alternative proposed modification improves the general welfare of the public as the electrification of transportation becomes a fundamental of modern society.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This alternative proposed modification improves the code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This alternative proposed modification does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

This alternative proposed modification improves the code.

1st Comment Period History

E9974-G1

Proponent John Hall Submitted 3/31/2022 10:35:28 AM Attachments No

Comment:

I support the alternate language comment submitted by Bryan Holland and endorse it's submission to the TAC(s) for consideration of inclusion in the 2023 FBC.

1st Comment Period History

E9974-G2

Proponent Susannah Troner Submitted 4/12/2022 11:24:34 PM Attachments No

Comment:

Writing to express strong SUPPORT for proposed code modification EN 9974. The transportation sector, dominated by traditional internal combustion engine vehicles, currently generates 55% of our community’s carbon pollution. EVs greatly reduce this pollution. Therefore this code modification will help minimize future impacts such as sea level rise and intensification of storms that are associated with carbon pollution (GHGs). These pollution reductions resulting from the code change will lead to community health and safety benefits which are core objectives of the Florida Building Code. Our office is fielding more inquiries every day from stakeholders regarding the lack of EVSE and standardization and perceived costs. It is time to standardize the process and require EV Ready Spaces and EV Capable Spaces for new commercial construction. This will help prevent future EVSE scarcity and extreme costs associated with facility retrofits.

1st Comment Period History

E9974-G3

Proponent kamrath christian Submitted 4/13/2022 12:35:56 PM Attachments No

Comment:

I am writing to express strong SUPPORT for proposed code modification EN 9974. The transportation sector, dominated by traditional internal combustion engine vehicles, generates 55% of our community’s carbon pollution. EVs greatly reduce this pollution and help create healthier environments. And we need to be doing everything we can to reduce carbon pollution faster to stem the accelleration of rising water levels and climate disruption. Therefore this code modification will help minimize future impacts such as sea level rise and intensification of storms that are associated with carbon pollution (GHGs). Pollution reductions resulting from the code change will lead to community health and safety benefits which are core objectives of the Florida Building Code. Our County's office is fielding more inquiries every day from stakeholders regarding the lack of EVSE and standardization, and perceived costs. It is time to standardize the process and require EV Ready Spaces and EV Capable Spaces for new commercial construction. This will help prevent future EVSE scarcity and extreme costs associated with facility retrofits.

1st Comment Period History

E9974-G4

Proponent Matthew Chen Submitted 4/13/2022 4:44:23 PM Attachments No

Comment:

SemaConnect, a leading provider of EV charging solutions with many EVSE projects in Florida, supports proposed code modification EN 9974, which establishes modest but necessary EVSE commercial requirements for new construction. We also support the proposed alternative modification submitted by Bryan Holland. We respectfully recommend inclusion of the proposed alternative modification in the 2023 Florida Building Code.

1st Comment Period History

E9974-G5

Proponent Nicholas Gunia Submitted 4/14/2022 10:09:32 AM Attachments No

Comment:

As past Chair of the Miami Branch of the South Florida Chapter of the US Green Building Council, I am writing to voice my support for EN10370 for requiring new commercial to have EVSE. I believe the proposed changes will help future-proof our commercial buildings given the rise of EVs. As such, the proposed changes should be adopted.

1st Comment Period History

E9974-G6

Proponent Amanda Hickman Submitted 4/14/2022 11:16:08 AM Attachments No

Comment:

LBA does not support the modification, as it is not appropriate for Florida and/or is not cost justified.

1st Comment Period History

E9974-G7

Proponent Jared Walker Submitted 4/14/2022 2:25:00 PM Attachments No

Comment:

EN 9974 - Electric vehicle charging infrastructure (EVSE) commercial requirements The Electrification Coalition (EC) is a national, nonpartisan, not-for-profit organization committed to promoting policies and actions that facilitate the deployment of electric vehicles on a mass scale to combat the national security, economic, and public health impacts associated with our nation's dependence on oil. The EC SUPPORTS proposed code modification EN 9974, establishing modest but necessary EVSE commercial requirements for new construction. Mass adoption of EVs is key to addressing the U.S.'s reliance on oil, which currently powers 91% of our nation's transportation system. Not only will ongoing transportation electrification policies such as Miami Dade's code modification (EN 9974) accelerate EV adoption, but fostering investments in the future of electric transportation will be a boon to Miami-Dade's economy and job growth.

1st Comment Period History

E9974-G8

Proponent Estela Tost Submitted 4/14/2022 6:56:52 PM Attachments Yes

Comment:

I am in support of EN9974 Electrical Vehicle Charging Station infrastructure for new commercial construction

1st Comment Period History

E9974-G9

Proponent Richard Logan Submitted 4/15/2022 9:57:28 AM Attachments No

Comment:

AIA Florida supports this code modification with the alternate language

1st Comment Period History

E9974-G10

Proponent James Ellis Submitted 4/15/2022 2:34:08 PM Attachments No

Comment:

EV Connect, a leading electric vehicle infrastructure network and services provider with many EVSE projects in Florida, SUPPORTS proposed code modification EN 9974, which establishes modest but necessary commercial EVSE requirements for new construction. EV Connect encourages this body to consider diversity of electric supply for more than 10 parking spaces in accordance with 2017 NFPA 70. Please Note: An omission of the number “20” in Table C405.9.2.1 under Total Number of Parking Spaces requires revision for clarity.

1st Comment Period History

E9974-G11

Proponent Sandra St. Hilaire Submitted 4/15/2022 2:44:53 PM Attachments No

Comment:

Writing to express strong SUPPORT for proposed code modification EN 9974. The transportation sector, dominated by traditional internal combustion engine vehicles, generates 55% of our community’s carbon pollution. EVs greatly reduce this pollution. Therefore this code modification will help minimize future impacts such as sea level rise and intensification of storms that are associated with carbon pollution (GHGs). Pollution reductions resulting from the code change will lead to community health and safety benefits which are core objectives of the Florida Building Code. Our office is fielding more inquiries every day from stakeholders regarding the lack of EVSE and standardization, and perceived costs. It is time to standardize the process and require EV Ready Spaces and EV Capable Spaces for new commercial construction. This will help prevent future EVSE scarcity and extreme costs associated with facility retrofits.

1st Comment Period History

E9974-G12

Proponent Mike Gibaldi Submitted 4/15/2022 4:50:58 PM Attachments No

Comment:

No brainer here. Our firm with hundreds of EVSE charging ports installed throughout the State, fully SUPPORTS this proposed code modification which establishes modest but necessary EVSE commercial requirements for new construction. This will encourage more emission-free driving in Florida which will in turn greatly reduce CO2 pollution.

1st Comment Period History

E9974-G13

Proponent Chris Sanchez Submitted 4/15/2022 5:12:18 PM Attachments No

Comment:

I am strongly in favor of the proposed modifications to EN 9974. The transportation sector currently generates 55% of our community’s carbon pollution. EVs greatly reduce this pollution by shifting from tail-pipe to electricity grid. Therefore this code modification will help minimize future impacts such as sea level rise and intensification of storms that are associated with carbon pollution (GHGs). Pollution reductions resulting from the code change will lead to community health and safety benefits which are core objectives of the Florida Building Code. Our office is fielding more inquiries every day from stakeholders regarding the lack of EVSE and standardization, and

perceived costs. It is time to standardize the process and require EV Ready Spaces and EV Capable Spaces for new commercial construction. This will help prevent future EVSE scarcity and extreme costs associated with facility retrofits.

1st Comment Period History

E9974-G14

Proponent Marta Marello Submitted 4/17/2022 4:02:30 PM Attachments No

Comment:

I express strong SUPPORT for proposed code modification EN 9974. It is time to standardize the process and require EV Ready Spaces and EV Capable Spaces for new commercial construction. As more EV models are coming onto the market and the share of EVs increases, it is important to integrate EVSE in buildings in a cost-effective way and avoid very costly retrofits. The transportation sector is the number one cause of our region’s carbon pollution. EVs greatly reduce this pollution. Pollution reductions resulting from the code change will lead to community health and safety benefits which are core objectives of the Florida Building Code. Miami-Dade County's Office of Resilience has responded to an increasing number of inquiries from stakeholders regarding the lack of EVSE, EVSE standardization, and perceived costs.

APPENDIX CC

ELECTRIC VEHICLE CHARGING PROVISIONS FOR NEW COMMERCIAL CONSTRUCTION

(The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.)

SECTION CC 101

SCOPE

CC 101.1 General.

These provisions shall be applicable for new commercial construction where electric vehicle charging provisions are required.

SECTION CC 102

DEFINITIONS

ELECTRIC VEHICLE (EV). An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, electric motorcycles, and the like, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array, or other source of electric current. Plug-in hybrid electric vehicles (PHEV) are electric vehicles having a second source of motive power. Off-road, self-propelled electric mobile equipment, such as industrial trucks, hoists, lifts, transports, golf carts, airline ground support equipment, tractors, boats, and the like are not considered electric vehicles.

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE). The conductors, including the ungrounded, grounded, and equipment grounding conductors, and the *Electric Vehicle* connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the *Electric Vehicle.*

EV CAPABLE SPACE. Electrical distribution equipment capacity and space to support a minimum 40-ampere, 208/240-volt branch circuit for each EV parking space, and the installation of necessary wiring methods and materials to supply *EVSE.*

-

EV READY SPACE. A designated parking space which is provided with one 40-ampere, 208-volt or 240-volt branch circuit for *EVSE* supplying *Electric Vehicles*. The circuit shall terminate in a suitable termination point such as a receptacle, outlet box, enclosure, or an *EVSE*, and be located in close proximity to the proposed location of the EV parking spaces.

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SECTION CC 103

REQUIREMENTS FOR ELECTRIC VEHICLE CHARGING

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CC 103.1 Electric Vehicle (EV) power transfer for new construction. New construction shall facilitate future installation and use of *EVSE* in accordance with NFPA 70.

-

CC 103.2 New Commercial Buildings. *EV Ready Spaces* and *EV Capable Spaces* shall be provided in accordance with Table CE 103.2. Where the calculation of percent served results in a fractional parking space, it shall be rounded up to the next whole number. The electrical distribution equipment circuit directory shall identify the spaces reserved to support EV power transfer as "EV Capable" or "EV Ready". The box or enclosure provided for future *EVSE* shall be marked "FOR *EVSE* Use". The marking shall comply with NFPA 70, Section 110.21(B).

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TABLE CC 103.2

***EV READY SPACE* AND *EV CAPABLE SPACE* REQUIREMENTS**

Total Number of Parking Spaces	Minimum Number of *EV Ready Spaces*	Minimum Number of *EV Capable Spaces*
1	1	0

2-10	2	0
11-15	2	3
16-20	2	4
21-25	2	5
26+	2	20% of total Parking spaces

CC 103.3 Identification. Construction documents shall indicate the raceway or cable assembly termination point and the proposed location of future EV spaces and *EVSE.* Construction documents shall also provide information on the wiring methods, wiring schematics, and electrical load calculations to verify that the service capacity and premises wiring system have sufficient capacity to simultaneously charge all EVs at all required EV spaces at the full rating of the *EVSE.*

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C405.9. Electric Vehicle Service Equipment

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE). Equipment for plug-in power transfer including the ungrounded, grounded, and equipment grounding conductors, and the Electric Vehicle connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the Electric Vehicle.

EV CAPABLE SPACE. Electrical distribution equipment capacity and space to support a minimum 40-ampere, 208-volt or 240-volt branch circuit for each EV parking space, and the installation of necessary wiring methods and materials to supply *EVSE.*

EV READY SPACE. A designated parking space which is provided with one 40-ampere, 208-volt or 240-volt individual branch circuit for *EVSE* supplying *Electric Vehicles.* The circuit shall terminate in a suitable termination point such as a receptacle, outlet box, enclosure, or an *EVSE*, and be located in close proximity to the proposed location of the EV parking spaces.

C405.9.2. Electric Vehicle (EV) power transfer for new construction. New construction shall facilitate future installation and use of *EVSE* in accordance with the NFPA 70.

C405.9.2.1. New commercial buildings. *EV Ready Spaces* and *EV Capable Spaces* shall be provided in accordance with Table C405.9.1. Where the calculation of percent served results in a fractional parking space, it shall be shall rounded up to the next whole number. The electrical distribution equipment circuit directory shall identify the spaces reserved to support EV power transfer as "EV Capable" or "EV Ready". The box or enclosure provided for future EVSE shall be marked "FOR EVS USE." The marking shall comply with NFPA 70, Section 110.25

TABLE C405.9.2.1.

***EV READY SPACE* AND *EV CAPABLE SPACE* REQUIREMENTS**

Total Number of Parking Spaces	**Minimum number of *EV Ready Spaces***	**Minimum number of *EV Capable Spaces***
1	1	-
2 – 10	2	-
11 – 15	2	3
16 – 19	2	4
21 - 25	2	5
26+	2	20% of total parking spaces

C405.9.2.2. Identification. Construction documents shall indicate the raceway or cable assembly termination point and proposed location of future EV spaces and EVSE. Construction documents shall also provide information on the wiring methods, wiring schematics, and electrical load calculations to verify that the service capacity and premises wiring system have sufficient capacity to simultaneously charge all EVs at all required EV spaces at the full rating of the *EVSE.*

SECTION C405

ELECTRICAL POWER AND LIGHTING SYSTEMS

C405.1General (Mandatory).

This section covers lighting system controls, the maximum lighting power for interior and exterior applications and electrical energy consumption.

Dwelling units within multifamily buildings shall comply with Section R404.1. All other dwelling units shall comply with Section R404.1, or with Sections C405.2.4 and C405.3. Sleeping units shall comply with Section C405.2.4, and with Section R404.1 or C405.3. Lighting installed in walk-in coolers, walk-in freezers, refrigerated warehouse coolers and refrigerated warehouse freezers shall comply with the lighting requirements of Section C403.2.14.

C405.9. Electric Vehicle Service Equipment

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-

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE). The conductors, including the ungrounded, grounded, and equipment grounding conductors, and the Electric Vehicle connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the Electric Vehicle.

EV CAPABLE SPACE. Electrical panel capacity and space to support a minimum 40-ampere, 208/240-volt branch circuit for each EV parking space, and the installation of raceways, both underground and surface mounted, to support the *EVSE*.

EV READY SPACE. A designated parking space which is provided with one 40-ampere, 208/240-volt dedicated branch circuit for EVSE servicing *Electric Vehicles*. The circuit shall terminate in a suitable termination point such as a receptacle, junction box, or an *EVSE*, and be located in close proximity to the proposed location of the EV parking spaces.

C405.9.2. Electric Vehicle (EV) charging for new construction. New construction

shall facilitate future installation and use of *Electric Vehicle Supply Equipment (EVSE)* in accordance with the NFPA 70.

C405.9.2.1. New commercial buildings. *EV Ready Spaces* and *EV Capable Spaces* shall be provided in accordance with Table C405.9.1. Where the calculation of percent served results in a fractional parking space, it shall be shall rounded up to the next whole number. The service panel or sub panel circuit directory shall identify the spaces reserved to support EV charging as "EV Capable" or "EV Ready". The raceway location shall be permanently and visibly marked as "EV Capable".

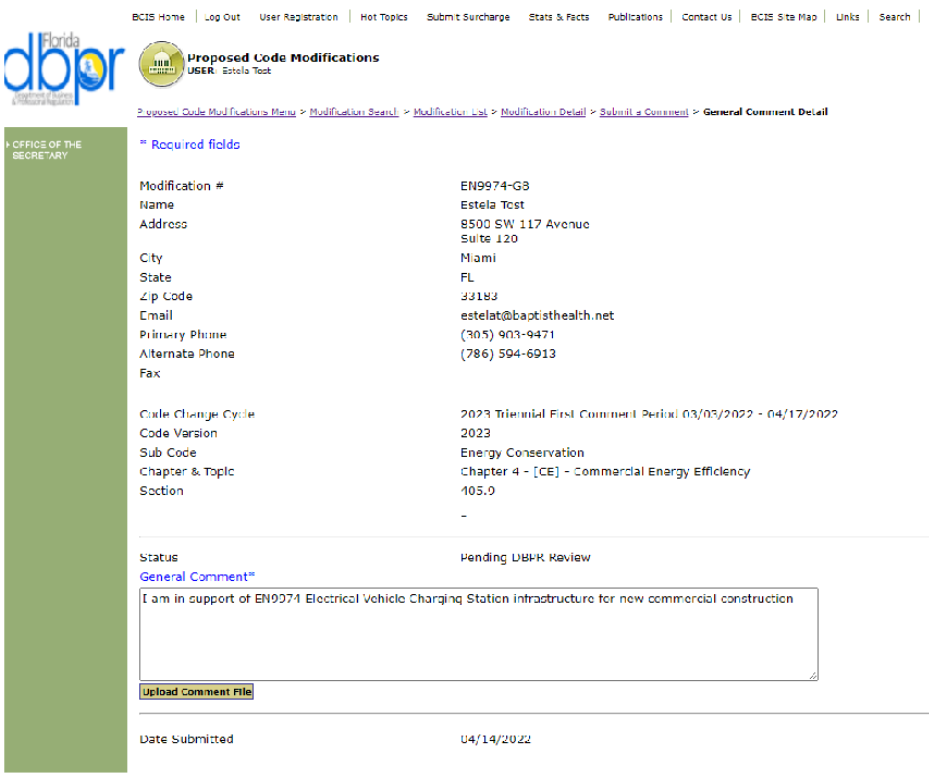
TABLE C405.9.2.1.

***EV READY SPACE* AND *EV CAPABLE SPACE* REQUIREMENTS**

Total Number of Parking Spaces	Minimum number of *EV Ready Spaces*	Minimum number of *EV Capable Spaces*
1	1	-
2 – 10	2	-
11 – 15	2	3
16 – 19	2	4
21 - 25	2	5
26+	2	20% of total parking spaces

-

C405.9.2.2. Identification. Construction documents shall indicate the raceway termination point and proposed location of future EV spaces and EV chargers. Construction documents shall also provide information on amperage of future *EVSE*, raceway methods, wiring schematics and electrical load calculations to verify that the electrical panel service capacity and electrical system, including any on-site distribution transformers, have sufficient capacity to simultaneously charge all EVs at all required EV spaces at the full rated amperage of the *EVSE*.



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Proposed Code Modifications
USER: Estela Test

Proposed Code Modifications Menu > Modification Search > Modification List > Modification Detail > Submit a Comment > **General Comment Detail**

OFFICE OF THE SECRETARY

* Required fields

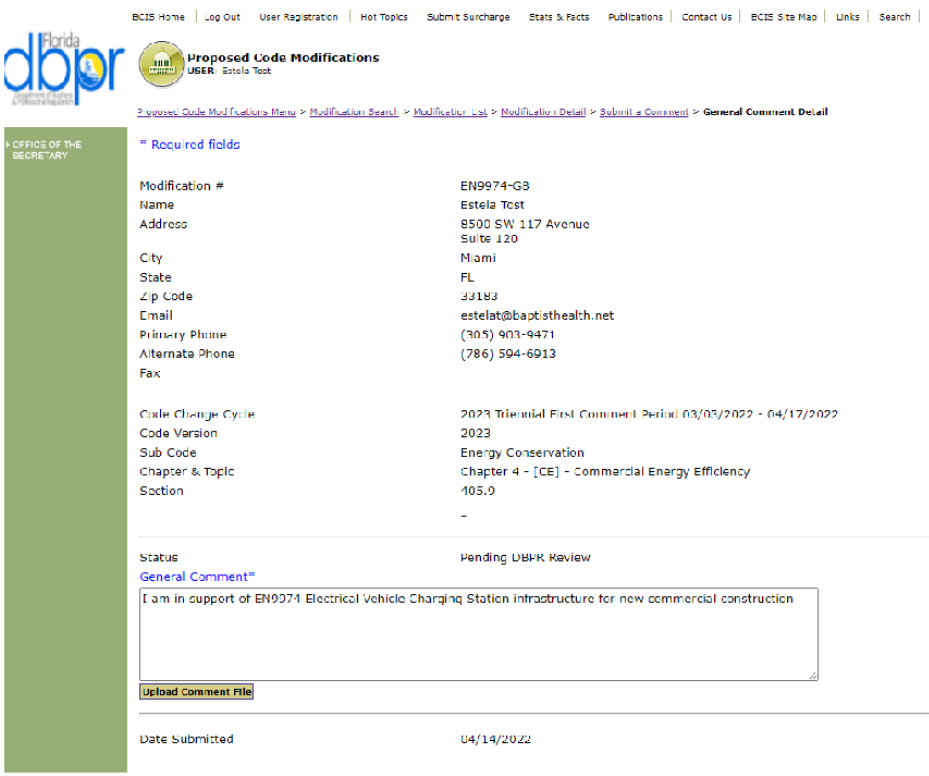
Modification #	EN9974-G8
Name	Estela Test
Address	8500 SW 117 Avenue Suite 120
City	Miami
State	FL
Zip Code	33183
Email	estelat@baptisthealth.net
Primary Phone	(305) 903-9471
Alternate Phone	(786) 594-6913
Fax	
Code Change Cycle	2023 Triennial First Comment Period 03/03/2022 - 04/17/2022
Code Version	2023
Sub Code	Energy Conservation
Chapter & Topic	Chapter 4 - [CE] - Commercial Energy Efficiency
Section	405.9
	-
Status	Pending DBPR Review

General Comment*

I am in support of EN9974 Electrical Vehicle Charging Station infrastructure for new commercial construction

Upload Comment File

Date Submitted 04/14/2022



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Chapter & Topic	Chapter 4 - [CE] - Commercial Energy Efficiency
Section	405.9
	-
Status	Pending DBPR Review

General Comment*

I am in support of EN9974 Electrical Vehicle Charging Station infrastructure for new commercial construction

Upload Comment File

Date Submitted 04/14/2022

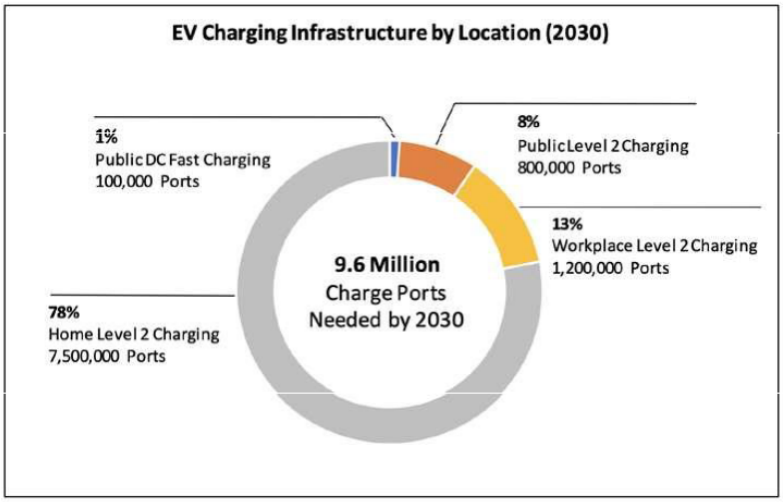

Figure 1. EV Charging Infrastructure in 2030 Based on EEI/IEI Forecast.

Electric Vehicle Registrations by State
Registration Count
450,000
75,000
0
Alabama
Alaska
Arizona
Arkansas
California
Colorado
Connecticut
Delaware
District of Columbia
Florida
Georgia
Hawaii
Idaho
Illinois
Indiana
Iowa
Kansas
Kentucky
Louisiana
Maine
Maryland
Massachusetts
Michigan
Minnesota
Mississippi
Missouri
Montana
Nebraska
Nevada
New Hampshire
New Jersey
New Mexico
New York
North Carolina
North Dakota
Ohio
Oklahoma
Oregon
Pennsylvania
Rhode Island
South Carolina
South Dakota
Tennessee
Texas
Utah
Vermont
Virginia
Washington
West Virginia
Wisconsin
Wyoming
Last updated: June 2021
Printed on: January 10

TAC: Electrical

Total Mods for **Electrical** in **Denied : 6**

Total Mods for report: 6

Sub Code: Residential

4

E10138

Date Submitted	02/15/2022	**Section**	3408	**Proponent**	Amanda Hickman
Chapter	34	**Affects HVHZ**	No	**Attachments**	**Yes**
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments Yes **Alternate Language Yes**

Related Modifications

10150

Summary of Modification

GFCI nuisance tripping

Rationale

This modification deletes the problematic new requirement for outdoor GFCI outlets in Section 210.8(F) of the 2020 NEC. AHRI requests that the Florida Building Commission to set this requirement aside until a resolution to nuisance tripping has been developed. This new requirement poses a much greater risk to Floridian's life and health than does the isolated, non-code compliant incident that was used to justify the addition of 210.8 (F) to the 2020 NEC. As of January 1, 2022, the twenty states that have either adopted or in the process of adopting the 2020 NEC have deleted, modified or delayed the implementation.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
Will improve enforcement of code by setting aside requirement until a resolution is developed.
Impact to building and property owners relative to cost of compliance with code
Reduction to cost of compliance because GFCI are not required.
Impact to industry relative to the cost of compliance with code
Reduction to cost of compliance because GFCI are not required.
Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
This modification will protect the health and safety of the general public by deleting this section from the NEC

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Improves the code by preventing nuisance tripping because the two technologies are not harmonized.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No, simply deletes section. As of January 1, 2022, the twenty states that have either adopted or in the process of adopting the 2020 NEC have deleted, modified or delayed the implementation.

Does not degrade the effectiveness of the code

Improves effectiveness of code by addressing nuisance tripping.

Alternate Language

1st Comment Period History

E10138-A1

Proponent Bryan Holland **Submitted** 3/28/2022 9:07:15 AM **Attachments** Yes

Rationale:

It appears the original proposed modification is referencing an older version of section 210.8(F) that has been updated by TIA 20-13, issued by the NFPA Standards Council on August 26, 2021 and that has addressed the concerns expressed by the proponent. However, the current section has a sunset date of January 1, 2023 that I am proposing be deleted to allow the HVAC equipment employing power conversion equipment to remain exempt under the duration of the 8th edition FBC-B. Approval of this alternative code modification assures GFCI protection remains for outlets where shock and electrocution hazards are present while exempting certain equipment that may not be compatible with GFCI protection, at this time.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposed alternative modification provides clarity to the AHJ on the enforcement of 210.8(F) with regard to HVAC equipment employing conversion equipment.

Impact to building and property owners relative to cost of compliance with code

This proposed alternative modification will reduce the cost of compliance by exempting certain equipment from the rule.

Impact to industry relative to the cost of compliance with code

This proposed alternative modification will reduce the cost of compliance by exempting certain equipment from the rule.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposed alternative modification will increase health, safety, and the welfare of the general public by maintaining GFCI protection where it will be most effective while exempting non-compatible equipment.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposed alternative modification improves the code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposed alternative modification does not discriminate against materials, products, methods, or systems.

Does not degrade the effectiveness of the code

This proposed alternative modification improves the effectiveness of the code.

2nd Comment Period

10138-G1

Proponent Amanda Hickman Submitted 8/23/2022 12:22:09 PM Attachments Yes

Comment:

Please see attachment.

210.8(F) Outdoor Outlets. All outdoor outlets for dwellings, other than those covered in 210.8(A)(3), Exception to (3) and heating/ventilating/air-conditioning (HVAC) equipment employing power conversion equipment as a means to control compressor speed, 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. ~~This requirement shall become effective on January 1, 2023 for mini-split-type heating/ventilating/air-conditioning (HVAC) equipment and other HVAC units employing power conversion equipment as a means to control compressor speed.~~

Informational Note: Power conversion equipment is the term used to describe the components used in HVAC equipment that is commonly referred to as a variable speed drive. The use of power conversion equipment to control compressor speed differs from multistage compressor speed control.

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

SECTION E3408
GFCI PROTECTION

E3408.1 NFPA 70-20: *National Electric Code*, Article 210 (Branch Circuits), Section 210.8, Ground-Fault Circuit-Interrupter Protection for Personnel, is amended to read as follows:

210.8 Ground-Fault Circuit-Interrupter Protection for Personnel. Ground-fault circuit-interrupter protection for personnel shall be provided as required in 210.8(A) through (F). The ground-fault circuit-interrupter shall be installed in a readily accessible location.

... remaining text unchanged

~~**(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).*~~

10138 General Comment

The Air-Conditioning, Heating and Refrigeration Institute (AHRI) appreciates the opportunity to provide information to the Florida Building Commission, its Technical Advisory Committee and Staff. AHRI represents more than 300 of the equipment, component, and refrigerant manufacturers in the Heating, Ventilation, Air Conditioning, and Refrigeration (HVACR). In America, the annual economic activity resulting from the HVACR industry is approximately $256 billion. In the United States alone, AHRI member companies, along with distributors, contractors, and technicians, employ more than 1.3 million people.

AHRI strongly recommends that the Florida Code either delete Section 210.8 (F) or exempt ALL listed and labeled HVAC equipment from GFCI outdoor outlet requirements from it. Until GFCI/HVAC equipment compatibility has been resolved for the following technical and emergency nature reasons detailed below Florida should NOT include it.

- Requiring GFCIs for HVAC equipment will put "at risk" populations, such as young children, the elderly, and individuals with underlying medical conditions, at a greater fatality risk due to loss of essential heating or cooling during a tripping event. Loss of AC put at-risk populations at dire risk. The US is currently undergoing record breaking heat waves.
- The historical safety of properly installed listed and labeled HVAC equipment (> 40 years for UL 1995 equipment) does not indicate the need for additional GFCI protection until the incompatibility issues are resolved. Listed labeled HVAC equipment installed per manufacturer's guidelines have been proved safe as evidenced by the more than 120 million units currently in service.
- GFIC standards are not consistent with regards to when the GFCI may trip or must trip. Furthermore, UL 943 has not been able to sufficiently address high frequencies GFCIs. UL 943, the standard that governs GFCI protection is not close to completion, therefore it is erroneous to imply that GFCIs are ready for installation with HVAC equipment. A representative from UL advised the TG that resolution of the standards issue is likely to take 5 years or more.
- AHRI is supportive of GFCIs, but understands that there is a compatibility issue between GFCIs/HVAC equipment. AHRI members are spending significant time, monies and in-kind resources working to understand the root causes for the incompatibility issue. AHRI and our members note that we would like to see the broader industry engaged in this process. AHRI members are not aware of any workstreams within the GFCI industry to investigate possible solutions.

Deleting Section 210.8(F) will provide the needed delay in the implementation of the GFCI requirement that will allow an appropriate resolution to be developed to harmonized from safety standard requirements governing impacted heating/ventilating/air-conditioning (HVAC).

Exempting only power conversion equipment has been suggested. However, it needs to be

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made very clear that nuisance tripping does not only occur with power conversion equipment but also single stage equipment as well. Below is data collected from three separate organizations clearing showing that nuisance tripping occurred across all equipment types. It would be irresponsible to only exempt power conversion equipment. Moreover, it would be unenforceable as there is virtually no way for a code official to know whether AC equipment is using power conversion equipment or not.

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Data Collected on GFCI Nuisance Tripping Related to 2020 NEC Requirement

This was preliminary data with a small sample size. We expected that as summer continued, there would be more data collected. However, some of the exemptions in southern states came into force, so we were not able to collect more data.

As of June 17th, 2021, AHRI collected the following information from their unitary manufacturers on the 210.8(F) GFCI issue.

Number of calls/issues attributed to GFCI nuisance tripping in jurisdictions adopting NEC 2020 without modification – June 17, 2021				
		System Type		
		Split System	Packaged Unit	Ductless Mini-Split
Compressor Technology	Single-Stage	100+	0	0
	Two-Stage	16	0	0
	Variable Speed	29	0	35

Additional information:

- AHRI Members reported that the GFCI performance interruption occurred in Colorado, Illinois, Minnesota, Nebraska, Texas, and Washington.
- GFCI manufacturer was not always know, but reports included different breaker sizes and several different brands.
- Most service calls and issues occurred in split system equipment (80 percent of reported cases) - mostly with single stage compressors. Ductless mini-split variable speed systems also reported this issue. No cases were reported for packaged equipment.

As of June 14th, 2021 Leading Builders of America (LBA) collected the following data, which was compiled by the National Association of Homebuilders (NAHB) and shared with AHRI.

Incidence Rate of GFCI Nuisance Tripping HVAC Circuit

Houston Market built under 2020 NEC

Builder	Homes Constructed	GFCI Homes with Nuisance Trip	Compressor Type	GFCI Brand	HVAC Brand	Date
Builder #1	26	73%	Single-speed	?	?	5/14/21
Builder #2	36	100%	?	?	?	5/14/21
Builder #3	280	32%	2- stage	A	X	5/14/21
Builder #4 vs	297	43% (127)	Variable speed	B	Y	6/11/21
Builder #5 ss	111	8% (9)	Single-speed	B	Y	6/11/21
Builder #6	302	3%	Single-speed	?	?	5/14/21
Builder #7	1669	31% (516)	Single-speed	B	X	6/11/21

Note: The coded GFCI and HVAC brand represent national brands that have been participating in resolving the field problems.

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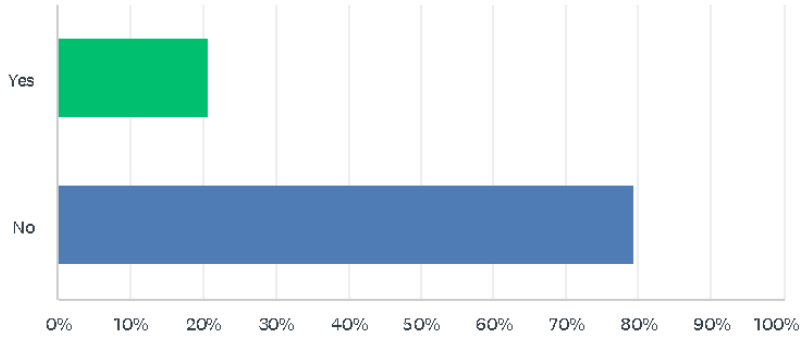
TACCA GFCI Quick Poll

Q1 Have you installed an outdoor unit (heat pump or air conditioner) with a GFCI?

Answered: 111 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	20.72%	23
No	79.28%	88
TOTAL		111

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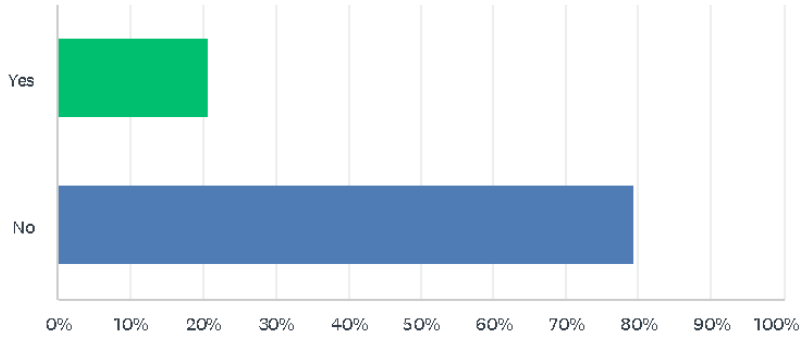

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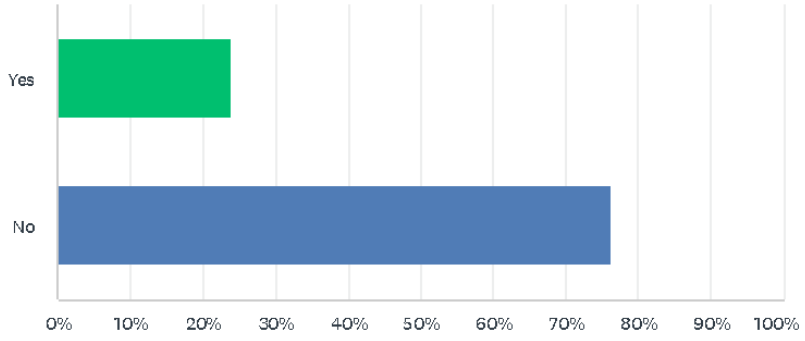
TACCA GFCI Quick Poll

Q2 Did you experience nuisance trips?

Answered: 92 Skipped: 19



ANSWER CHOICES	RESPONSES	
Yes	23.91%	22
No	76.09%	70
TOTAL		92

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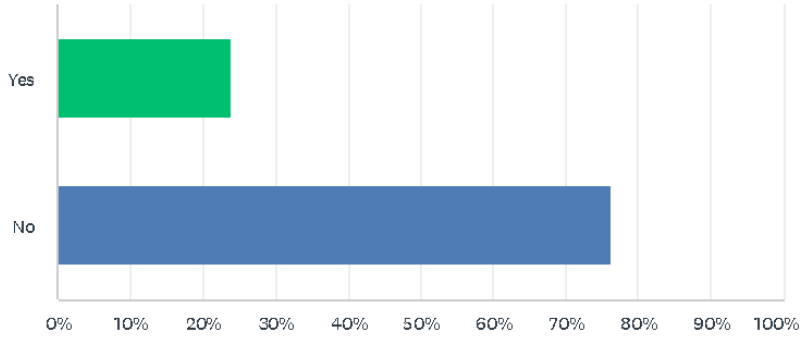
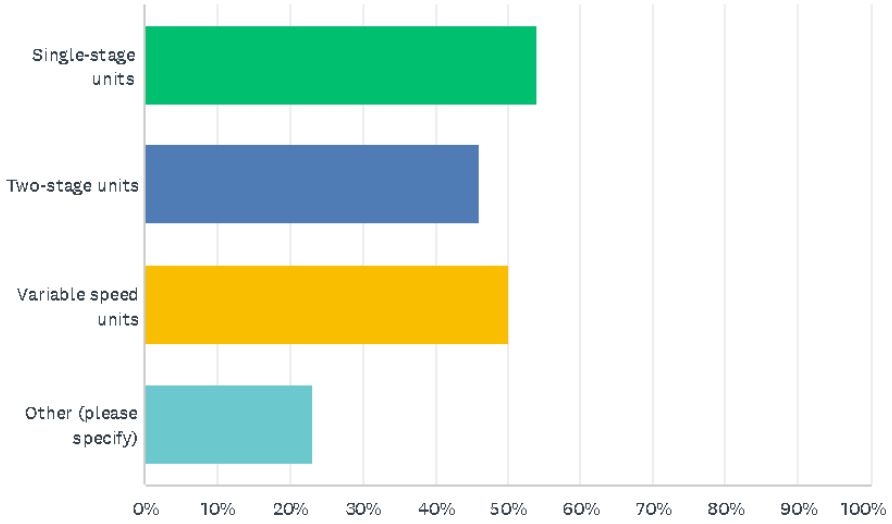


ANSWER CHOICES	RESPONSES	
Yes	23.91%	22
No	76.09%	70
TOTAL		92

Q3 If you answered yes to question #2, please indicate which type of unit(s) for which you experienced the nuisance trips. Choose as many as apply.

Answered: 26 Skipped: 85



ANSWER CHOICES	RESPONSES	
Single-stage units	53.85%	14
Two-stage units	46.15%	12
Variable speed units	50.00%	13
Other (please specify)	23.08%	6
Total Respondents: 26		

#	OTHER (PLEASE SPECIFY)	DATE
1	Not remember, single or two stage Furnace unit	2/10/2022 2:55 PM
2	Package unit	2/9/2022 6:33 AM
3	N/A	2/8/2022 11:27 PM
4	None	2/8/2022 10:05 PM
5	none	2/8/2022 3:25 PM
6	Units are Electronic communicating and very sensitive to voltages. any change causes fault codesd to appear, and sometimes shuts the system down.	2/3/2022 7:52 AM

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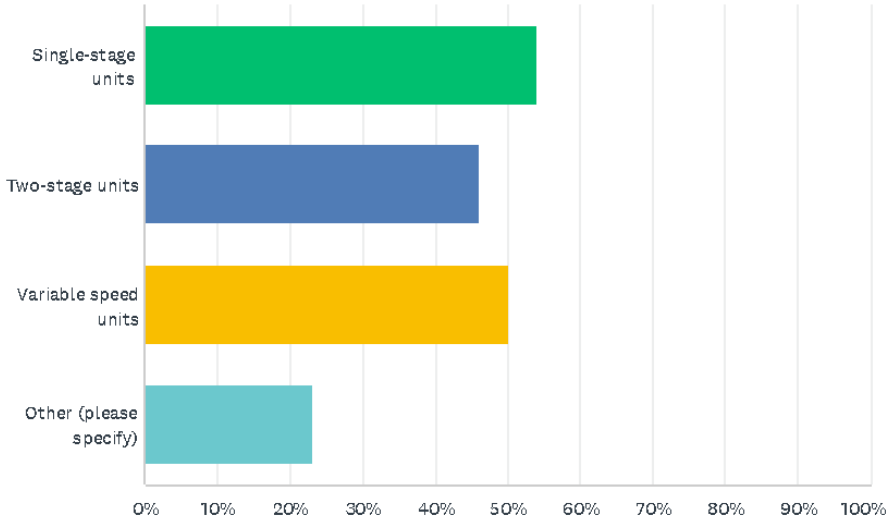

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Q4 If you answered yes to question #2, please share as much detail as you can about your experience.

Answered: 16 Skipped: 95

#	RESPONSES	DATE
1	Checked the AC was not working and found the GFCI breaker circuit was tripped. My house is only 6 years old and having GFCI breaker tripping issues on different breakers several time, if a rain or high humidity outside	2/10/2022 2:55 PM
2	the electrician switched to different type breaker.	2/10/2022 10:19 AM
3	Call back due to GFCI being connected to outdoor loads.	2/10/2022 1:41 AM
4	These nuisance trips are irritating and costly for both the contractor and the homeowner. The presence of the GFCI is completely unnecessary and if made a law will only add to the cost the homeowner must pay.	2/9/2022 4:26 PM
5	On hot days on almost like clock work when unit ran for several hours in lunch crowd unit would cycle down then when would cycle back on around 1 pm GFCI would be tripped. This happens Daly.	2/9/2022 6:33 AM
6	N/A	2/8/2022 11:27 PM
7	no problem	2/8/2022 3:25 PM
8	Electrical motors and GFCI do not work well together this is true for any electric motor. I have documented this for approximately 10 years.	2/8/2022 2:34 PM
9	I've actually seen 2 STG units do the exact same with zero issues other than breaker type.	2/8/2022 1:56 PM
10	we install Trane, Carrier and Lennox variable speed inverter driven outdoor units. when they are off they cause the nuisance trips and some homeowners are not able to reset them which creates a cost for them to have someone out to reset and also potentially severe discomfort if someone isnt able to get out there in a timely manner.	2/8/2022 1:50 PM
11	We haven't installed one with a gfci yet, but do not want to experience nuisance trips. Ac in the south during 105 degree temps cannot afford to go out for a mere nuisance. This rule needs to be delayed so that manufacturers can create equipment to withstand a gfci. We sell a lot of variable speed and 5 speed condensers.	2/8/2022 1:49 PM
12	we remove plug and replace	2/8/2022 9:38 AM
13	The GFCI trips without warning. We install everything with surge protectors, and as much lightning and electrical protection as possible. We experience this even with copper conducters and everything installed to code and manufacturer specifications. The GFCI is an absolute PEST and we lose out on our bottom line due to dispatching technicians on problem calls. The requirement of a GFCI will only hurt our industry.	2/7/2022 12:55 PM
14	Communicating equipment is very sensitive to voltages and voltage changes, creating fault codes in the system and often shuts the system down with a unnecessary trip to the job for a full system reset. the GFCI would just add to this electrical problem at this time frame.	2/3/2022 7:52 AM
15	Both units are variable speed compressors, since the voltage fluctuates the GFI thinks there is a voltage change and will trip.	2/3/2022 7:02 AM
16	I own an AC company that does high volume new construction homes. My company was running around 15 calls each day that are non-cooling calls due to tripped breakers. Since heating season 2021 we can account for 675+ calls that have been nuisance calls for this issue. With an expense of $75 per call that is a total waste to my company of $50,625. This is not accounting for the lost opportunities or the overworking of employees. For new home construction, some of these people who have purchased brand new homes do not understand why their homes do not cool and why we do not have a solution to the problem. Some homes	2/2/2022 2:00 PM

TACCA GFCI Quick Poll

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From: Ed Lehr
Sent: Wednesday, March 2, 2022 11:37 AM
To: Sargent, Jeffrey <jsargent@NFPA.org>; Weaver, Michael <mike@mwelectricinc.com>
Subject: Background re ECM fan motors in heat pump and air conditioning outdoor units

I am an HVAC contractor and ACCA Codes Committee representative on the Task Group. I am offering this for distribution to the TG in case they are not already familiar with the presence of electronically commutated (ECM) fan motors vs permanent split capacitor (PSC) fan motors.

At our February 28 meeting I mentioned that the TIA 1593 refers to power conversion equipment for compressors and questioned whether the ECM fan motors pose similar issues. John Hughes of Trane stated he had measured leakage currents from ECM fan motors that would be a problem for GFCI's. I think this is very important given how common ECM fan motors are in outdoor units but how difficult it is to identify the presence of ECM motors in the labeling/identification of the outdoor unit.

Normally a model line of outdoor units is either 100% inverter compressors or 0% inverter compressors. As a result, the model number and model name can be used to know if it has an inverter compressor. For instance, a Trane product that is 4TWV or 4TTV has an inverter compressor. It is readily known from the first few characters of the model number and model name. It is known to the installer and most buyers because it is the basis of the efficiency and comfort claims of this premium model line.

HVAC equipment manufacturers use ECM fan motors to improve energy efficiency ratings and to allow speed control. A certain model line may have some capacities that use ECM motors for certain periods of production of a certain capacity and did not at other production time spans. The model number may show a change from A to B or 1 to 2 in the 7^{th}, 8^{th}, 10^{th} digit. Not at all easy to know where to look and not a key feature of the unit or system. Not even used in all capacities of a certain model line. Not clear if the A was the ECM or the B when characters changed. Might need to check the parts list.

With the continuous progress to higher efficiencies, ECM fan motors are in a large share of split system outdoor units (and in many furnaces and air handlers as blower motors). The industry is converting many models this year to comply with new regional efficiency minimum, new test conditions for establishing the well-known SEER (soon to be SEER2) and a standard that requires narrower spacing in the grille (more pressure drop). All these factors will lead to more use of ECM motors as we approach the end of this year.

While inverter compressors may be in 10% of the outdoor units installed in the US. The number of outdoor units with ECM fan motors is much higher. They exist in units with inverter, single stage and two stage compressors. They exist as blower motors in furnaces and air handlers. They exist as draft inducer motors in furnaces also.

Sincerely

Edward Lehr
President

edlehr@jacklehr.com
610-797-5347

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Normally a model line of outdoor units is either 100% inverter compressors or 0% inverter compressors. As a result, the model number and model name can be used to know if it has an inverter compressor. For instance, a Trane product that is 4TWV or 4TTV has an inverter compressor. It is readily known from the first few characters of the model number and model name. It is known to the installer and most buyers because it is the basis of the efficiency and comfort claims of this premium model line.

HVAC equipment manufacturers use ECM fan motors to improve energy efficiency ratings and to allow speed control. A certain model line may have some capacities that use ECM motors for certain periods of production of a certain capacity and did not at other production time spans. The model number may show a change from A to B or 1 to 2 in the 7^{th}, 8^{th}, 10^{th} digit. Not at all easy to know where to look and not a key feature of the unit or system. Not even used in all capacities of a certain model line. Not clear if the A was the ECM or the B when characters changed. Might need to check the parts list.

With the continuous progress to higher efficiencies, ECM fan motors are in a large share of split system outdoor units (and in many furnaces and air handlers as blower motors). The industry is converting many models this year to comply with new regional efficiency minimum, new test conditions for establishing the well-known SEER (soon to be SEER2) and a standard that requires narrower spacing in the grille (more pressure drop). All these factors will lead to more use of ECM motors as we approach the end of this year.

While inverter compressors may be in 10% of the outdoor units installed in the US. The number of outdoor units with ECM fan motors is much higher. They exist in units with inverter, single stage and two stage compressors. They exist as blower motors in furnaces and air handlers. They exist as draft inducer motors in furnaces also.

Sincerely

Edward Lehr
President

edlehr@jacklehr.com
610-797-5347

Tentative Interim Amendment

NFPA® 70®

National Electrical Code®

2020 Edition

Reference: 210.8(F)
TIA 20-13
(SC 21-8-29 / TIA Log #1593)

Pursuant to Section 5 of the NFPA *Regulations Governing the Development of NFPA Standards*, the National Fire Protection Association has issued the following Tentative Interim Amendment to NFPA 70®, *National Electrical Code®*, 2020 edition. The TIA was processed by the National Electrical Code Panel 2, and the NEC Correlating Committee, and was issued by the Standards Council on August 26, 2021, with an effective date of September 15, 2021.

1. Revise Section 210.8(F) to read as follows:

210.8 Ground-Fault Circuit-Interrupter Protection for Personnel. …

(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. This requirement shall become effective on January 1, 2023 for mini-split-type heating/ventilating/air-conditioning (HVAC) equipment and other HVAC units employing power conversion equipment as a means to control compressor speed.

Informational Note: *Power conversion equipment* is the term used to describe the components used in HVAC equipment that is commonly referred to as a variable speed drive. The use of power conversion equipment to control compressor speed differs from multistage compressor speed control.

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

Issue Date: August 26, 2021

Effective Date: September 15, 2021

AIR-CONDITIONING, HEATING, & REFRIGERATION INSTITUTE
we make life better®

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February 9, 2022

Dear Florida Building Commission,

As of January 1, 2022, 18 of the 20 states that have adopted, or are in processing of adopting, the 2020 National Electrical Code (NEC) have deleted, modified, or delayed the implementation of section 210.8(F), which contains new requirements for ground-fault circuit interrupter (GFCI) protection on outdoor electrical circuits that are supplied by single-phase branch circuits rated 150 volts to ground or less. Specifically, the states that have refused to incorporate the new GFCI requirements in 210.8(F) are OR, WA, CO, TX, ND, SD, MA, IA, UT, GA, OK, SC, OH, MN, ME, NC, NJ and AL.

- Eight states (IA, NC, MA, SD, GA, SC, OK and UT) deleted 210.8(F) in its entirety.
- Four states (OH, ME, OR, and ND) modified 210.8(F).
- Six states (MN, TX, CO, WA, NJ, and AL) delayed the implementation of 210.8(F) until 1/1/2023.
- Two states (RI, DE) have adopted 2020 NEC without addressing 210.8(F).

As Florida considers how to address issues associated with this new 2020 NEC requirement, we refer you to the substantiation used by Massachusetts when they deleted 210.8(F):

> "This addition in the 2020 NEC has not been substantiated. The loss experience supporting this addition to the NEC was based on untrained and unqualified work on an air-conditioning condenser that ended up energized and a thereby caused a boy who jumped a fence and contacted the housing to become electrocuted. GFCI protection saves countless lives and certainly has its place. However, it is a fool's errand to imply to the public that improper work can be rendered essentially safe by waving the GFCI magic wand. For example, contact between two circuit conductors will never trip a GFCI. CMP-2 came within one vote of rejecting this; Massachusetts needs to set it aside and await proper support."

In addition to the above, Minnesota has encountered the same problem of nuisance tripping and issued a tentative interim amendment (TIA) request to the National Fire Protection Association (NFPA) on or about May 14, 2021 (TIA No. 1593). Minnesota's request provided the following rationale:

> "In the state of Minnesota, we began enforcing 210.8(F) on April 5, 2021, and we have already documented many cases of operational tripping occurrences which have been difficult for inspectors and electricians to resolve. The only solution at this time is for the AHJ [Authority Having Jurisdiction] to approve a temporary allowance for the installation of a circuit breaker without GFCI protection so that these HVAC units can operate."

This TIA was approved by the NFPA Code Making Panel 2 (CMP-2) and was issued by the NFPA Standards Council (TIA No. 20-13) in August 2021.

Yet another TIA request was submitted to NFPA on May 14, 2021 by the National Association of Home Builders (NAHB) (TIA No. 1589). The NAHB request notes:

> "The effects of this new requirement in the 2020 edition of the code has come to light over the past 1 to 2 weeks with the first hot/humid weather in Texas. Leading Builders of America (LBA) has collected the following data over the past couple days.
>
> - Builder A has indicated a 73% failure rate (GFCI breaker tripping) for non-mini-split, non-variable speed systems. In other words, 100% of Builder A's failures are on single-speed conventional cooling systems.
>
> - Builder B has 36 homes where the HVAC system is operational. 100% of those homes have experienced a circuit trip. All of Builder B's failures are on single-stage systems. They currently have 10 open warranty tickets for closed (occupied) units where the circuit is tripping consistently, leaving the homeowners with effectively no HVAC."

NAHB goes on to note "In jurisdictions that have adopted 2020 NEC with 210.8(F) intact, there have been numerous instances of field tripping of the GFCI breaker on ductless mini splits, units containing power conversion equipment, and on many single-stage units." This TIA was rejected by NFPA CMP-2 and an appeal to the NFPA Standards Council in August 2021 was rejected.

The Air-Conditioning, Heating, and Refrigeration Institute (AHRI) previously submitted a similar TIA to NFPA (TIA No. 1564) requesting a delay in the effective date of this requirement (as it relates to inverter-driven HVAC equipment) to allow the industry to (1) update certification requirements in UL 943 and UL/CSA 60335-2-40 to address leakage current testing requirements at higher frequencies and (2) to allow manufacturers to make revisions to their equipment (both GFCI breakers and HVAC equipment manufacturers) to comply with new requirements. This TIA request was rejected by NFPA CMP-2, and an appeal was rejected by the NFPA Standards Council in August 2021.

Yet another TIA (No. 1529) was submitted to NFPA in August 2020 by an electrical inspector in Shelby County, Alabama because of the same problem existing in the Birmingham area. This TIA request was approved by CMP-2, for both "Technical Merit" and "Emergency Nature" by a vote of 12-2. However, the Code Correlating Committee unanimously approved the TIA on "correlation" but failed the TIA by a vote of 8-3 (75% required) as to the "emergency nature."

The HVAC industry has experienced many nuisance trips of GFCI breakers operating with inverter-driven HVAC equipment, as well as non-inverter-driven HVAC equipment. 100 percent of all inverter-driven HVAC products that we are aware of, when paired with a GFCI breaker, experience nuisance tripping. As noted in TIA No. 1589, single-stage and two-stage HVAC products also have nuisance tripping when paired with GFCI breakers. The long history of TIA efforts, including three active TIAs, shows that section 210.8(F) is truly problematic.

The NFPA Standards Council (during the AHRI/NAHB Appeals) requested that CMP-2 create a Task Group (including HVAC industry experts, GFCI experts, and other interested parties) to look further into the HVAC/GFCI issue at the urgence of the HVAC industry. The Standards Council expects that the outcome of this Task Group's work will be a new TIA concerning both the 2020 NEC and the 2023 NEC (currently under development).

Technical Justification

HVAC equipment complies with safety standards that have been in use for over 40 years.
Over 90% of HVAC equipment in use today is labeled and listed per UL 1995.[1] Safety standards have ensured that products certified to them are safe. This safety is evidenced by the installation of more than 120 million HVAC units throughout the U.S. in the last twenty years without a documented fatality from equipment that was properly installed by qualified individuals per manufacturer's instructions. [2]

These existing HVAC safety standards focus on the touch current hazard instead of the leakage current in various operating modes and single fault conditions while also ensuring grounding resistance measurements under load.
Specifically:

- UL 1995 clauses 21, 22, 24, 54, 78 and 79 ensure grounding/earthing.
- UL 60335-2-40 (4th ed) sections 13 and 16 cover leakage/electrical strength, while section 27 covers earthing.

Furthermore, GFCI breakers are approved to product safety standard UL 943. This standard specifies leakage current trip requirements only at 60Hz, where a leakage current of 6 mA at 60 Hz must trip the breaker and a leakage current of 4 mA at 60 Hz must not trip the breaker. Leakage current at other frequencies is not addressed by UL 943. As such, there are no test requirements covering additional frequencies used by inverter-driven HVAC equipment.

Air conditioner/heat pumps (AC/HP) are approved to product safety standard UL 1995 which does not specify a maximum for this type of leakage current. UL 1995 is the standard to which all AC/HP have been certified since the early 1990s. There is a new version of standard UL 60335-2-40 (4th edition), earmarked to replace UL 1995, but mandatory compliance with this new standard is not required until January 1, 2024. This new version of the standard UL 60335-2-40 has leakage current requirements but allows up to 10 mA. UL 60335-2-40 4th edition will also contain alternative grounding provisions that continue to ensure safe use and installation without using GFCIs.

The UL Standards Technical Panels (STPs) for both UL 943 and UL 60335-2-40 are addressing the conflict between these two standards, but there is no fixed resolution on the immediate horizon. And

[1] UL 1995 Heating and Cooling Equipment.
[2] AHRI, Central Air Conditioners and Air-Source Heat Pumps, https://ahrinet.org/resources/statistics/historical-data/central-air-conditioners-and-air-source-heat-pumps (showing the number of central air conditioners installed from 2001 to 2020).

once the standards are modified to resolve the conflict, it will still take time for manufacturers to develop products and get them in the market.

As the committee from Massachusetts noted, the 210.8(F) requirement was added as a result of one incident as a result of "untrained and unqualified work." We note that a CDC report published in 2020 states, "During 2004–2018, an average of 702 heat-related deaths occurred in the United States annually."[3] This CDC report documents 10,527 heat-related deaths in a 15-year period (702/year), and an additional 6,220 deaths where heat was the primary factor (414/year). The CDC report, on pg. 732, further explains that "Past studies have demonstrated a relationship between ambient temperatures and mortality (8). In particular, extreme heat exposure can exacerbate certain chronic medical conditions, including hypertension and heart disease (4,5). In addition, medications that are typically used to treat these chronic medical conditions such as beta-blockers, diuretics, and calcium-channel blockers, can interfere with thermoregulation and result in a reduced ability to respond to heat stress (5)." (*NOTE: The numbers in parenthesis are reference numbers in the CDC document*). It is clear, therefore, that health related concerns associated with heat exposure (lack of cooling) can be significant based on items reported by the CDC.

Recommendation

As such, the HVAC industry recommends that Florida delete 210.8(F) concerning new requirements for ground-fault circuit interrupter (GFCI) protection on outdoor electrical circuits that are supplied by single-phase branch circuits rated 150 volts to ground or less, 50 amperes or less, and to delay incorporating 210.8(F) until a future code cycle when the industry is better prepared to meet these requirements.

Sincerely,

Mary E. Koban
Air-Conditioning, Heating, and Refrigeration Institute
Senior Director Regulatory Affairs
Cell: 484-220-3011
E-mail: mkoban@ahrinet.org

we make life better®

[3] *Heat-Related Deaths – United States, 2004-2018,* Centers For Disease Control and Prevention, Morbidity and Mortality Weekly Report, Vol. 69, No. 24, June 19, 2020, Page 732, available at https://www.cdc.gov/mmwr/volumes/69/wr/pdfs/mm6924a1-H.pdf.

Reference documents:
The following links/summaries document the actions taken by the noted 18 states to delete, modify or delay 210.8(F) in the 2020 NEC.

IA: Section 210.8(F) was deleted in an amendment after adoption
https://dps.iowa.gov/divisions/electrical-examining-board/electrical-code-updates

MA: GFCI protection was removed for outdoor, non-receptacle outlets during the adoption process.
https://www.mass.gov/doc/527-cmr-12-massachusetts-electrical-code-amendments/download

NC (Proposed): Section 210.8(F) is proposed to be deleted when the 2020 edition is adopted later this year.
https://www.ncosfm.gov/media/2068/open - Due to procedural issue – NC remaining on 2017 NEC

ND: An exception is provided for mini-split & A/C units with DC invertors. The installer is required to fill out a form including information describing what the contractor has done to the resolve the issue.
https://www.ndseb.com/

OR: Section 210.8(F) was modified to only apply to outdoor receptacles for other than dwelling units.
https://www.oregon.gov/bcd/codes-stand/Documents/21oesc-table1-E-2021April.pdf

SD: Section 210.8(F) was not adopted with the 2020 NEC.
https://dlr.sd.gov/electrical/documents/adopted_code_2020.pdf

TX: An emergency rule delayed the requirements of Section 210.8(F) effective May 20, 2021.
https://www.sos.state.tx.us/texreg/archive/November122021/Adopted%20Rules/16.ECONOMIC%20REGULATION.html#70
https://www.sos.state.tx.us/texreg/archive/November122021/Adopted%20Rules/16.ECONOMIC%20REGULATION.html#68

UT: Section 210.8(F) is deleted – effective 7/1/2021. Bill SB 0033 signed by Governor 3/16/2021 (see page 29 of link).
https://legiscan.com/UT/text/SB0033/id/2335968/Utah-2021-SB0033-Enrolled.pdf

WA: The state is delaying enforcement of Section 210.8(F) until January 1, 2023.
https://lni.wa.gov/licensing-permits/_docs/Elc2011.pdf

GA: State adopted 2020 NEC effective 1/1/2021. State deleted 210.8(F) due to nuisance tripping issues associated with the expanded GFCI requirements effective 9/1/2021.
https://www.dca.ga.gov/sites/default/files/2021_nec_amendments.pdf

CO: State issued a 1-year temporary Variance to the requirements in 210.8(F) on 6/29/2021.
https://content.govdelivery.com/accounts/CODORA/bulletins/2e613c2

MN: MN adopted TIA 20-13, adding the following statement to 210.8(F) – "This requirement shall become effective on January 1, 2023 for mini-split-type heating/ventilating/air-conditioning (HVAC) equipment and other HVAC units employing power conversion equipment as a means to control compressor speed."

https://www.dli.mn.gov/sites/default/files/pdf/review60fall21.pdf

ME: An exception from these requirements added for heat pumps.
https://up.codes/viewer/maine/nfpa-70-2020/chapter/2/wiring-and-protection#2

DE: Adopted the 2020 NEC at June 2021 meeting and it is effective 9/1/2021.

OK: Deleted 210.8(F) during OUBCC meeting 10/19/2021.
https://www.ok.gov/oubcc/documents/2021%2010%2019%20Meeting%20Minutes.pdf

SC: SC Building Code Council voted to delete 210.8(F) at 10/6/2021 meeting. Amendments to 2020 NEC will be effective 1/1/2023.

NJ: NJ UCC voted to delay the implementation of 210.8(F) until 1/1/2023 unless there is still uncertainty in the practicability of the requirement, in which case the Division can revisit the issue.
https://www.nj.gov/dca/divisions/codes/advisory/pdf_ucc/CAB_minutes_08_13_2021.pdf

OH: Proposal amending 210.8(F) to exempt HVAC units employing power conversion equipment (variable speed drive) as a means to control compressor speed. There is no delay in the proposed amendments so this exclusion would be permanent - not simply delayed until 1/1/2023 per e-mail from OH on 9/2/2021.

AL: Will adopt TIA 20-13 to address concerns over 210.8(F) when completing review/adoption process in 2022.

RI: Effective 2/1/2022, RI adopts the 2020 NEC as the Rhode Island Electrical Code with 210.8(F) intact.
https://rules.sos.ri.gov/Regulations/part/510-00-00-5?reg_id=11323&utm_source=Campaign%3a+Code+Alerts&utm_medium=newsletter&utm_campaign=11+January+2022

NAHB TIA No. 1589 and MN Dept. of Labor and Industry TIA No. 1593
https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=70

NFPA TIA No. 20-13:
https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=70

TAC: Electrical

Total Mods for **Electrical** in **Denied : 6**

Total Mods for report: 6

Sub Code: Residential

5

E10149

Date Submitted	02/15/2022	**Section**	3408	**Proponent**	Amanda Hickman
Chapter	34	**Affects HVHZ**	No	**Attachments**	**Yes**
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments Yes **Alternate Language Yes**

Related Modifications

10137

Summary of Modification

GFCI nuisance tripping

Rationale

This modification adds an exception to the current 2020 NEC language regarding the outdoor GFCI requirement [210.8(F)] for listed and labeled HVAC equipment.This proposed exception is urgently needed to prevent nuisance tripping that has and will continue to pose a serious health and safety risk. The sudden and unexpected loss of HVAC cooling in excessive heat due to a tripped GFCI breaker poses a danger to “at risk” populations. This ever-present risk presents a far greater threat to Floridians than does the isolated, non-code compliant incident that was used to justify the addition of 210.8 (F) to the 2020 NEC. The CDC statistics on heat-related deaths shows an annual average of 702 heat-related deaths in the U.S. from 2004 to 2018. LBA strongly encourages the Florida Building Commission to include the proposed HVAC exception or delete the requirement in its entirety to resolve the unintended safety issue caused by the current GFCI requirement.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Will improve enforcement of code by resolving the unintended safety issue caused by the current GFCI requirement.

Impact to building and property owners relative to cost of compliance with code

Will reduce cost because GFCI are not required for listed HVAC equipment.

Impact to industry relative to the cost of compliance with code

Will reduce cost because GFCI are not required for listed HVAC equipment.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

The proposed exception is urgently needed to prevent nuisance tripping that has and will continue to pose a serious health and safety risk.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Improves the code because the two technologies are not harmonized.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No, this modification will prevent nuisance tripping and not discriminate against systems of construction.

Does not degrade the effectiveness of the code

Will improve the effectiveness of the code by resolving the unintended safety issue caused by the current GFCI requirement.

Alternate Language

1st Comment Period History

E10149-A1

Proponent Bryan Holland **Submitted** 3/28/2022 9:10:00 AM **Attachments** Yes

Rationale:

It appears the original proposed modification is referencing an older version of section 210.8(F) that has been updated by TIA 20-13, issued by the NFPA Standards Council on August 26, 2021 and that has addressed the concerns expressed by the proponent. However, the current section has a sunset date of January 1, 2023 that I am proposing be deleted to allow the HVAC equipment employing power conversion equipment to remain exempt under the duration of the 8th edition FBC-B. Approval of this alternative code modification assures GFCI protection remains for outlets where shock and electrocution hazards are present while exempting certain equipment that may not be compatible with GFCI protection, at this time.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposed alternative modification provides clarity to the AHJ on the enforcement of 210.8(F) with regard to HVAC equipment employing conversion equipment.

Impact to building and property owners relative to cost of compliance with code

This proposed alternative modification will reduce the cost of compliance by exempting certain equipment from the rule.

Impact to industry relative to the cost of compliance with code

This proposed alternative modification will reduce the cost of compliance by exempting certain equipment from the rule.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposed alternative modification will increase health, safety, and the welfare of the general public by maintaining GFCI protection where it will be most effective while exempting non-compatible equipment.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposed alternative modification improves the code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposed alternative modification does not discriminate against materials, products, methods, or systems.

Does not degrade the effectiveness of the code

This proposed alternative modification improves the effectiveness of the code.

2nd Comment Period

E10149-G1

Proponent Amanda Hickman Submitted 8/23/2022 12:20:44 PM Attachments Yes

Comment:

Please see attachment.

210.8(F) Outdoor Outlets. All outdoor outlets for dwellings, other than those covered in 210.8(A)(3), Exception to (3) and heating/ventilating/air-conditioning (HVAC) equipment employing power conversion equipment as a means to control compressor speed, 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. ~~This requirement shall become effective on January 1, 2023 for mini-split-type heating/ventilating/air-conditioning (HVAC) equipment and other HVAC units employing power conversion equipment as a means to control compressor speed.~~

Informational Note: Power conversion equipment is the term used to describe the components used in HVAC equipment that is commonly referred to as a variable speed drive. The use of power conversion equipment to control compressor speed differs from multistage compressor speed control.

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

SECTION E3408
GFCI PROTECTION

E3408.1 NFPA 70-20: *National Electric Code*, Article 210 (Branch Circuits), Section 210.8, Ground-Fault Circuit-Interrupter Protection for Personnel, is amended to read as follows:

210.8 Ground-Fault Circuit-Interrupter Protection for Personnel. Ground-fault circuit-interrupter protection for personnel shall be provided as required in 210.8(A) through (F). The ground-fault circuit-interrupter shall be installed in a readily accessible location.

... remaining text unchanged

(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 No. 1: Ground-fault circuit-interrupter protection shall not be required on lighting outlets other than those covered in 210.8(C).

Exception No. 2: GFCI protection shall not be required for listed and labeled HVAC equipment.

Informational Note: See UL 60335-2-40, Household And Similar Electrical Appliances – Safety – Part 2-40:Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers or UL 1995, Heating and Cooling Equipment for product safety standards.(1)

10149 General Comment

Leading Builders of America (LBA) was founded in 2009 to provide the largest homebuilders in the United States with a direct voice in the policymaking process, combining their reach and expertise to address the key issues impacting the health of the industry.
Membership includes both public and privately-owned companies. The LBA Board of Directors is comprised of the CEOs of its member companies. Leading Builders of America members build in 35 states, including Florida.

It is important to know that the GFCI requirement was included in the NEC based upon a single fatality resulting from an HVAC unit that was improperly installed by an unlicensed contractor without a permit. It was suspected at its inclusion into the 2020 NEC that this GFCI requirement would, at the very least, cause an incompatibility issue between listed HVAC equipment and current GFCI protection devices. As the incompatibility issue became a significant source of nuisance tripping of GFCI's, most states that adopted the 2020 Edition either delayed the implementation date, modified the requirement, or deleted Section 210.8(F) in its entirety. It should be noted that these actions taken during the adoption process have impacted the ability to continue to collect data as to the nuisance tripping problem caused by the new requirement for GFCI protection for outdoor HVAC equipment.

The incompatibility issues have NOT been resolved and a solution will take several more years. During the meeting the Task Group appointed at the direction of the Council, the UL representative stated that it would take at least 5 years to achieve compatibility between the listing standards for GFCI and HVAC equipment. The Air Conditioning Heating and Refrigeration Institute (AHRI) members on that same Task Group indicated that the time period to deliver product to the marketplace would need to also account for issues such as designing and manufacturing new equipment to meet the new standards and time to reduce the inventory of equipment manufactured to existing standards.

We strongly encourage the Florida Building Commission to accept the proposed exemption for listed equipment or delete the requirement entirely.

It has been suggested that only power conversion equipment is prone to GFCI nuisance tripping, however, below is data collected from 3 separate organizations showing that nuisance tripping occurs across over all equipment types.

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The incompatibility issues have NOT been resolved and a solution will take several more years. During the meeting the Task Group appointed at the direction of the Council, the UL representative stated that it would take at least 5 years to achieve compatibility between the listing standards for GFCI and HVAC equipment. The Air Conditioning Heating and Refrigeration Institute (AHRI) members on that same Task Group indicated that the time period to deliver product to the marketplace would need to also account for issues such as designing and manufacturing new equipment to meet the new standards and time to reduce the inventory of equipment manufactured to existing standards.

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Data Collected on GFCI Nuisance Tripping Related to 2020 NEC Requirement

This was preliminary data with a small sample size. We expected that as summer continued, there would be more data collected. However, some of the exemptions in southern states came into force, so we were not able to collect more data.

As of June 17th, 2021, AHRI collected the following information from their unitary manufacturers on the 210.8(F) GFCI issue.

Number of calls/issues attributed to GFCI nuisance tripping in jurisdictions adopting NEC 2020 without modification – June 17, 2021				
		System Type		
Compressor Technology		Split System	Packaged Unit	Ductless Mini-Split
	Single-Stage	100+	0	0
	Two-Stage	16	0	0
	Variable Speed	29	0	35

Additional information:

- AHRI Members reported that the GFCI performance interruption occurred in Colorado, Illinois, Minnesota, Nebraska, Texas, and Washington.
- GFCI manufacturer was not always know, but reports included different breaker sizes and several different brands.
- Most service calls and issues occurred in split system equipment (80 percent of reported cases) - mostly with single stage compressors. Ductless mini-split variable speed systems also reported this issue. No cases were reported for packaged equipment.

As of June 14th, 2021 Leading Builders of America (LBA) collected the following data, which was compiled by the National Association of Homebuilders (NAHB) and shared with AHRI.

Incidence Rate of GFCI Nuisance Tripping HVAC Circuit

Houston Market built under 2020 NEC

Builder	Homes Constructed	GFCI Homes with Nuisance Trip	Compressor Type	GFCI Brand	HVAC Brand	Date
Builder #1	26	73%	Single-speed	?	?	5/14/21
Builder #2	36	100%	?	?	?	5/14/21
Builder #3	280	32%	2- stage	A	X	5/14/21
Builder #4 vs	297	43% (127)	Variable speed	B	Y	6/11/21
Builder #5 ss	111	8% (9)	Single-speed	B	Y	6/11/21
Builder #6	302	3%	Single-speed	?	?	5/14/21
Builder #7	1669	31% (516)	Single-speed	B	X	6/11/21

Note: The coded GFCI and HVAC brand represent national brands that have been participating in resolving the field problems.

Data Collected on GFCI Nuisance Tripping Related to 2020 NEC Requirement

This was preliminary data with a small sample size. We expected that as summer continued, there would be more data collected. However, some of the exemptions in southern states came into force, so we were not able to collect more data.

As of June 17th, 2021, AHRI collected the following information from their unitary manufacturers on the 210.8(F) GFCI issue.

Number of calls/issues attributed to GFCI nuisance tripping in jurisdictions adopting NEC 2020 without modification – June 17, 2021				
		System Type		
		Split System	Packaged Unit	Ductless Mini-Split
Compressor Technology	Single-Stage	100+	0	0
	Two-Stage	16	0	0
	Variable Speed	29	0	35

Additional information:

- AHRI Members reported that the GFCI performance interruption occurred in Colorado, Illinois, Minnesota, Nebraska, Texas, and Washington.
- GFCI manufacturer was not always know, but reports included different breaker sizes and several different brands.
- Most service calls and issues occurred in split system equipment (80 percent of reported cases) - mostly with single stage compressors. Ductless mini-split variable speed systems also reported this issue. No cases were reported for packaged equipment.

As of June 14th, 2021 Leading Builders of America (LBA) collected the following data, which was compiled by the National Association of Homebuilders (NAHB) and shared with AHRI.

Incidence Rate of GFCI Nuisance Tripping HVAC Circuit

Houston Market built under 2020 NEC

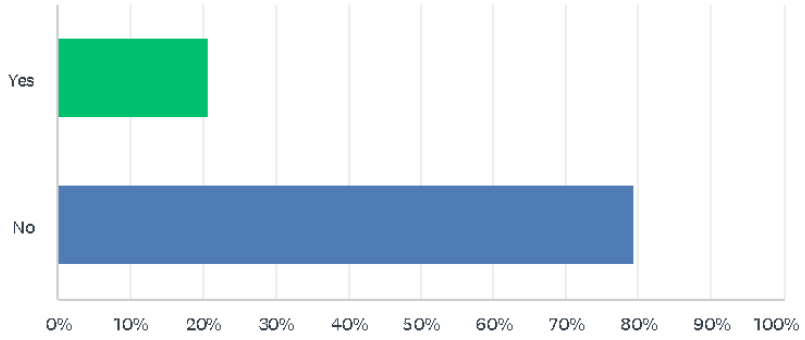
Builder	Homes Constructed	GFCI Homes with Nuisance Trip	Compressor Type	GFCI Brand	HVAC Brand	Date
Builder #1	26	73%	Single-speed	?	?	5/14/21
Builder #2	36	100%	?	?	?	5/14/21
Builder #3	280	32%	2- stage	A	X	5/14/21
Builder #4 vs	297	43% (127)	Variable speed	B	Y	6/11/21
Builder #5 ss	111	8% (9)	Single-speed	B	Y	6/11/21
Builder #6	302	3%	Single-speed	?	?	5/14/21
Builder #7	1669	31% (516)	Single-speed	B	X	6/11/21

Note: The coded GFCI and HVAC brand represent national brands that have been participating in resolving the field problems.

TACCA GFCI Quick Poll

Q1 Have you installed an outdoor unit (heat pump or air conditioner) with a GFCI?

Answered: 111 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	20.72%	23
No	79.28%	88
TOTAL		111

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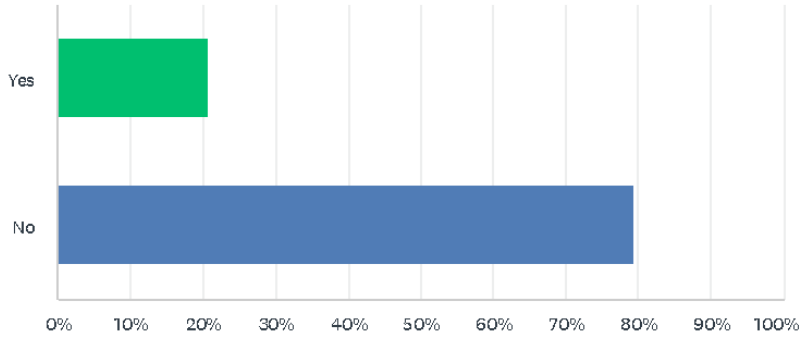

ANSWER CHOICES	RESPONSES	
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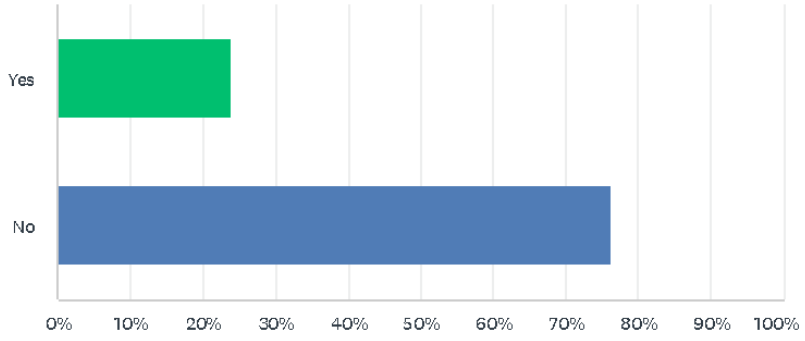
No	79.28%	88
TOTAL		111

TACCA GFCI Quick Poll

Q2 Did you experience nuisance trips?

Answered: 92 Skipped: 19



ANSWER CHOICES	RESPONSES	
Yes	23.91%	22
No	76.09%	70
TOTAL		92

TACCA GFCI Quick Poll

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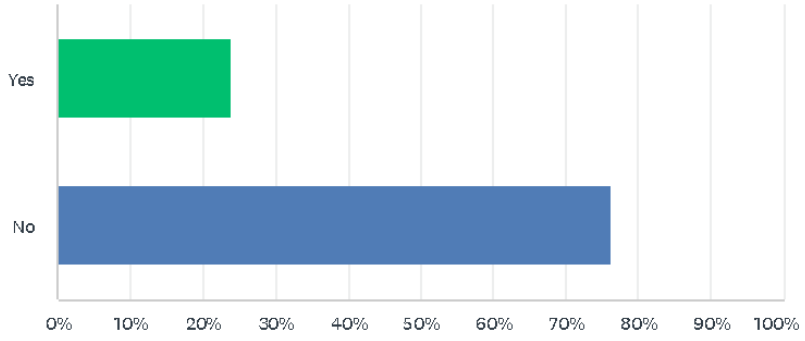
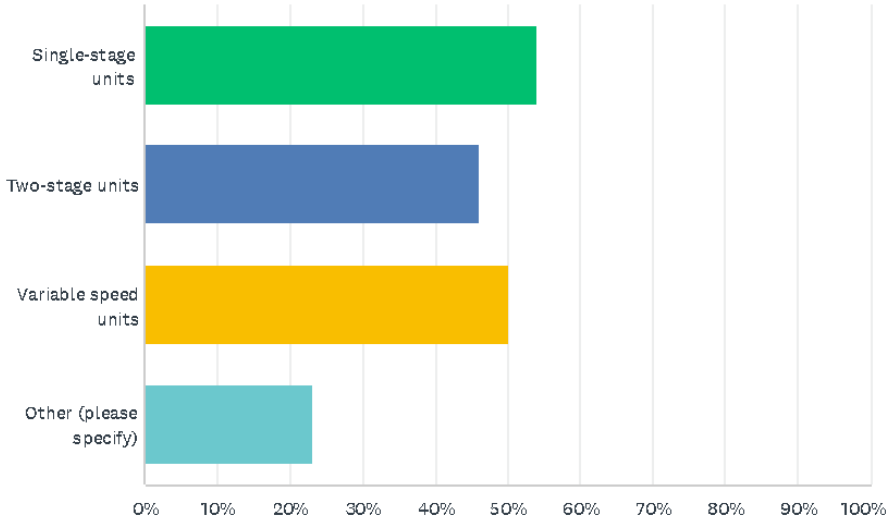
Answered: 92 Skipped: 19



ANSWER CHOICES	RESPONSES	
Yes	23.91%	22
No	76.09%	70
TOTAL		92

Q3 If you answered yes to question #2, please indicate which type of unit(s) for which you experienced the nuisance trips. Choose as many as apply.

Answered: 26 Skipped: 85



ANSWER CHOICES	RESPONSES	
Single-stage units	53.85%	14
Two-stage units	46.15%	12
Variable speed units	50.00%	13
Other (please specify)	23.08%	6
Total Respondents: 26		

#	OTHER (PLEASE SPECIFY)	DATE
1	Not remember, single or two stage Furnace unit	2/10/2022 2:55 PM
2	Package unit	2/9/2022 6:33 AM
3	N/A	2/8/2022 11:27 PM
4	None	2/8/2022 10:05 PM
5	none	2/8/2022 3:25 PM
6	Units are Electronic communicating and very sensitive to voltages. any change causes fault codesd to appear, and sometimes shuts the system down.	2/3/2022 7:52 AM

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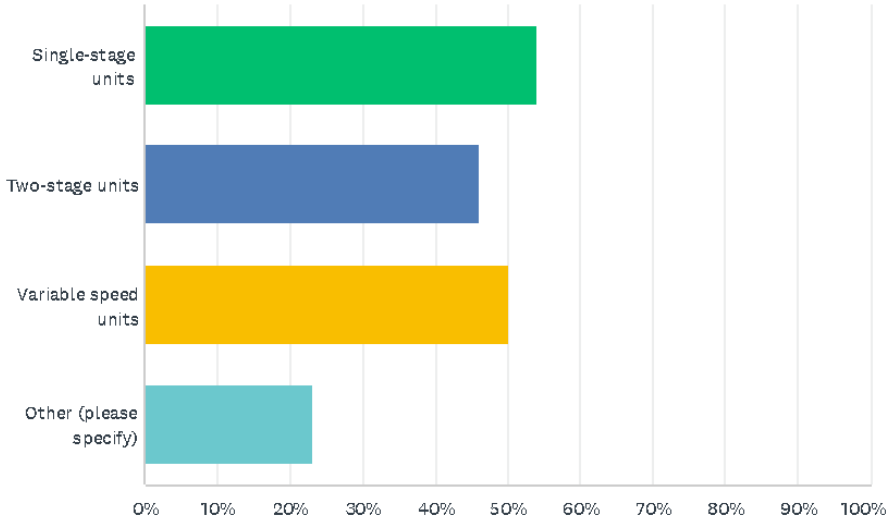

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TACCA GFCI Quick Poll

Q4 If you answered yes to question #2, please share as much detail as you can about your experience.

Answered: 16 Skipped: 95

#	RESPONSES	DATE
1	Checked the AC was not working and found the GFCI breaker circuit was tripped. My house is only 6 years old and having GFCI breaker tripping issues on different breakers several time, if a rain or high humidity outside	2/10/2022 2:55 PM
2	the electrician switched to different type breaker.	2/10/2022 10:19 AM
3	Call back due to GFCI being connected to outdoor loads.	2/10/2022 1:41 AM
4	These nuisance trips are irritating and costly for both the contractor and the homeowner. The presence of the GFCI is completely unnecessary and if made a law will only add to the cost the homeowner must pay.	2/9/2022 4:26 PM
5	On hot days on almost like clock work when unit ran for several hours in lunch crowd unit would cycle down then when would cycle back on around 1 pm GFCI would be tripped. This happens Daly.	2/9/2022 6:33 AM
6	N/A	2/8/2022 11:27 PM
7	no problem	2/8/2022 3:25 PM
8	Electrical motors and GFCI do not work well together this is true for any electric motor. I have documented this for approximately 10 years.	2/8/2022 2:34 PM
9	I've actually seen 2 STG units do the exact same with zero issues other than breaker type.	2/8/2022 1:56 PM
10	we install Trane, Carrier and Lennox variable speed inverter driven outdoor units. when they are off they cause the nuisance trips and some homeowners are not able to reset them which creates a cost for them to have someone out to reset and also potentially severe discomfort if someone isnt able to get out there in a timely manner.	2/8/2022 1:50 PM
11	We haven't installed one with a gfci yet, but do not want to experience nuisance trips. Ac in the south during 105 degree temps cannot afford to go out for a mere nuisance. This rule needs to be delayed so that manufacturers can create equipment to withstand a gfci. We sell a lot of variable speed and 5 speed condensers.	2/8/2022 1:49 PM
12	we remove plug and replace	2/8/2022 9:38 AM
13	The GFCI trips without warning. We install everything with surge protectors, and as much lightning and electrical protection as possible. We experience this even with copper conducters and everything installed to code and manufacturer specifications. The GFCI is an absolute PEST and we lose out on our bottom line due to dispatching technicians on problem calls. The requirement of a GFCI will only hurt our industry.	2/7/2022 12:55 PM
14	Communicating equipment is very sensitive to voltages and voltage changes, creating fault codes in the system and often shuts the system down with a unnecessary trip to the job for a full system reset. the GFCI would just add to this electrical problem at this time frame.	2/3/2022 7:52 AM
15	Both units are variable speed compressors, since the voltage fluctuates the GFI thinks there is a voltage change and will trip.	2/3/2022 7:02 AM
16	I own an AC company that does high volume new construction homes. My company was running around 15 calls each day that are non-cooling calls due to tripped breakers. Since heating season 2021 we can account for 675+ calls that have been nuisance calls for this issue. With an expense of $75 per call that is a total waste to my company of $50,625. This is not accounting for the lost opportunities or the overworking of employees. For new home construction, some of these people who have purchased brand new homes do not understand why their homes do not cool and why we do not have a solution to the problem. Some homes	2/2/2022 2:00 PM

Q4 If you answered yes to question #2, please share as much detail as you can about your experience.

Answered: 16 Skipped: 95

#	RESPONSES	DATE
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From: Ed Lehr
Sent: Wednesday, March 2, 2022 11:37 AM
To: Sargent, Jeffrey <jsargent@NFPA.org>; Weaver, Michael <mike@mwelectricinc.com>
Subject: Background re ECM fan motors in heat pump and air conditioning outdoor units

I am an HVAC contractor and ACCA Codes Committee representative on the Task Group. I am offering this for distribution to the TG in case they are not already familiar with the presence of electronically commutated (ECM) fan motors vs permanent split capacitor (PSC) fan motors.

At our February 28 meeting I mentioned that the TIA 1593 refers to power conversion equipment for compressors and questioned whether the ECM fan motors pose similar issues. John Hughes of Trane stated he had measured leakage currents from ECM fan motors that would be a problem for GFCI's. I think this is very important given how common ECM fan motors are in outdoor units but how difficult it is to identify the presence of ECM motors in the labeling/identification of the outdoor unit.

Normally a model line of outdoor units is either 100% inverter compressors or 0% inverter compressors. As a result, the model number and model name can be used to know if it has an inverter compressor. For instance, a Trane product that is 4TWV or 4TTV has an inverter compressor. It is readily known from the first few characters of the model number and model name. It is known to the installer and most buyers because it is the basis of the efficiency and comfort claims of this premium model line.

HVAC equipment manufacturers use ECM fan motors to improve energy efficiency ratings and to allow speed control. A certain model line may have some capacities that use ECM motors for certain periods of production of a certain capacity and did not at other production time spans. The model number may show a change from A to B or 1 to 2 in the 7^{th}, 8^{th}, 10^{th} digit. Not at all easy to know where to look and not a key feature of the unit or system. Not even used in all capacities of a certain model line. Not clear if the A was the ECM or the B when characters changed. Might need to check the parts list.

With the continuous progress to higher efficiencies, ECM fan motors are in a large share of split system outdoor units (and in many furnaces and air handlers as blower motors). The industry is converting many models this year to comply with new regional efficiency minimum, new test conditions for establishing the well-known SEER (soon to be SEER2) and a standard that requires narrower spacing in the grille (more pressure drop). All these factors will lead to more use of ECM motors as we approach the end of this year.

While inverter compressors may be in 10% of the outdoor units installed in the US. The number of outdoor units with ECM fan motors is much higher. They exist in units with inverter, single stage and two stage compressors. They exist as blower motors in furnaces and air handlers. They exist as draft inducer motors in furnaces also.

Sincerely

Edward Lehr
President

edlehr@jacklehr.com
610-797-5347

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610-797-5347

Tentative Interim Amendment

NFPA® 70®

National Electrical Code®

2020 Edition

Reference: 210.8(F)
TIA 20-13
(SC 21-8-29 / TIA Log #1593)

Pursuant to Section 5 of the NFPA *Regulations Governing the Development of NFPA Standards*, the National Fire Protection Association has issued the following Tentative Interim Amendment to NFPA 70®, *National Electrical Code®*, 2020 edition. The TIA was processed by the National Electrical Code Panel 2, and the NEC Correlating Committee, and was issued by the Standards Council on August 26, 2021, with an effective date of September 15, 2021.

1. Revise Section 210.8(F) to read as follows:

210.8 Ground-Fault Circuit-Interrupter Protection for Personnel. …

(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. This requirement shall become effective on January 1, 2023 for mini-split-type heating/ventilating/air-conditioning (HVAC) equipment and other HVAC units employing power conversion equipment as a means to control compressor speed.

Informational Note: *Power conversion equipment* is the term used to describe the components used in HVAC equipment that is commonly referred to as a variable speed drive. The use of power conversion equipment to control compressor speed differs from multistage compressor speed control.

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

Issue Date: August 26, 2021

Effective Date: September 15, 2021

TAC: Electrical

Total Mods for **Electrical** in **Denied : 6**

Total Mods for report: 6

Sub Code: Residential

6

E10244

Date Submitted	02/11/2022	**Section**	3401.5	**Proponent**	John Lovett
Chapter	34	**Affects HVHZ**	No	**Attachments**	**Yes**
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments Yes **Alternate Language Yes**

Related Modifications

Summary of Modification

drop arc fault (circuit breakers and receptacles) requirment

Rationale

Majority of the trips are nuisance trips. Not constant. Only constant trips I've experienced with arc fault protection are either from an overcurrent or from a direct short. Same protection he would get with a standard trip breaker. No documented proof (that I know of) of arc fault protection actually preventing any fires, but there is very much proof of arc fault protection having nuisance trips. Actually causes a problem and doesn't prevent anything. Causes more problems than was meant to rectify. Documented proof of causing problems and no documented proof of solving problems. "Upgrading" (to AFCI protection), the NEC has downgraded the integrity of any circuit with arc fault protection. Arc fault protection is supposed to detect a spark. Once the spark is already happened it's too late. Like saying, "hello" to somebody after they've walked by you. Michigan and Indiana have completely dropped the requirement. Cost money. Every time nuisance trip being called by homeowner. Creates heat. Causes bus bars to burn over time. A first responder told me that when they cannot find a specific cause of a fire they fill in the blank with “electrical fire”. Have to fill in the blank. Reason there are so many documented electrical fires. Cost money. Every time nuisance trip being called by homeowner. Like taking a medication that causes more side effects than there are symptoms.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

wouldn't effect either way.

Impact to building and property owners relative to cost of compliance with code

Material would cost less. This would eliminate "nuisance trips" which would save homeowners time, frustration, and money.

Impact to industry relative to the cost of compliance with code

Would eliminate "nuisance trips". Every time the ARC fault breaker trips, the homeowner will be calling the electrician. this could be totally eliminated by this proposal

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

no

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

eliminate "nuisance trips". Every time the ARC fault breaker trips, the homeowner will be calling the electrician. could be eliminated by this proposal. Material would cost less. would eliminate "nuisance trips" .would save homeowners time, frustration, and money.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

no

Does not degrade the effectiveness of the code

no

Alternate Language

2nd Comment Period

E10244-A3

Proponent Joseph Belcher **Submitted** 8/26/2022 4:09:27 PM **Attachments** Yes

Rationale:

A review of the NFPA data reveals that 92% of kitchen fires are caused by cooking, while 1% are caused by electrical sources. (NFPA Research Report Home Structure Fires, October 2021, Figure 16 uploaded) There is no definition of the term "electrical equipment" or the manner in which it provides the heat source for the fire. A review of the Florida annual fire reports reveals the percentage of fires in kitchens with electrical equipment as the heat source is 16% to 14% between 2015 to 2020. The percentage of fires in laundry rooms with electrical equipment as the heat source is 2% to 3% for the same period. (State Fire Marshal Florida Fires 2015-2020 Annual Reports, pages 82 and 84) The change removes overly broad language. The literature and educational material produced by Electrical Safety Foundation International recommends monthly testing of AFCIs. (See uploaded graphic.) The addition of AFCI to kitchens and laundry rooms is expensive, creates multiple nuisance trips requiring and electrical to reset, and has resulted in losses of freezers and refrigerators of food.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None.

Impact to building and property owners relative to cost of compliance with code

The change will result in savings ranging from $41 to hundreds of dollars for the equipment.

Impact to industry relative to the cost of compliance with code

The change will save hundreds of dollars on the cost of service calls.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

The change has a reasonable connection with the welfare of the general public by removing an overly restrictive requirement.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

The change improves the code by removing an overly restrictive requirement.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The change does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

The change improves the effectiveness of the code.

2nd Comment Period

E10244-A2

Proponent Charles Fischer **Submitted** 8/24/2022 4:27:14 PM **Attachments** Yes

Rationale:

To help limit nuisance tripping.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This will make enforcement easier as it lessens the areas that will be required to have arc-fault protection

Impact to building and property owners relative to cost of compliance with code

This will lower the costs associated with nuisance tripping such as, but not limited to, wasted service calls, wasted replacement of arc-fault breakers that will continue to trip after being replaced due to the connected

load, wasted time dealing with nuisance trips, etc.

Impact to industry relative to the cost of compliance with code

There will actually lower the cost of compliance since it will slightly reduce the number of arc-fault interrupting devices needed.

Impact to small business relative to the cost of compliance with code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This will not substantially affect the health, safety, and welfare of the general public. It still maintains the arc-fault requirements for general use receptacles, but eliminates the requirements where nuisance tripping occurs the most.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This improves the code by using "Real World" experience to modify an existing code requirement to better suit the needs of the general public and address an ongoing issue with nuisance tripping.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification does not discriminate against materials, methods, or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This will not degrade the effectiveness of the code.

1st Comment Period History

E10244-G1

Proponent Bryan Holland Submitted 3/28/2022 8:52:32 AM Attachments No

Comment:

NEMA strongly opposes this proposed modification. AFCI protection is a fundamental fire-safety component of a premises wiring system. Deletion of these sections will result in an increased risk of fire as a result of unmitigated arcing-faults in branch circuits, outlets, appliances, and other utilization equipment. The reports of unwanted tripping have not been substantiated by the proponent. Guidance and other AFCI protection related resources have been shared with the proponent to assist him with the proper installation and troubleshooting of AFCI protected branch circuits in new and existing dwellings. NEMA urges the Electrical TAC and Commission reject this proposed modification.

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

210.12 **(A) Dwelling units.** All 120v, single phase, 15 and 20-ampere branch circuits supplying outlets or devices installed in dwelling 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):

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

210.12 **(A) Dwelling units.** All 120v, single phase, 15 and 20 ampere branch circuits supplying ~~outlets or devices~~ only general use receptacles installed in dwelling 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):

210.12 Arc-Fault circuit-interrupter protection. ~~**Arc-fault circuit-interrupter protection shall be provided as required in 210.12(A), (B), (C), and (D). Arc-fault circuit-interrupter shall be installed in a readily accessible location.**~~

210.12(A) Dwelling units. ~~**All 120 volt, single Phase, 15 and 20 ampere branch circuit supplying outlets or devices installed and dwelling 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)**~~

406.4(4) Arc-Fault circuit interrupter protection. ~~**If a receptacle outlet located in any area specified in 210.12 (A), (B) or (C) is replaced, a replacement receptacle at this outlet she'll 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**~~

SILVER STRAND ELECTRIC, INC.
117 POINSETTIA ST.
ATLANTIC BEACH, FL.
32233
LIC.# EC13003769

RE: Arc Fault Protection

2020 NEC

210.12 Arc-Fault circuit-interrupter protection. ~~Arc-fault circuit-interrupter protection shall be provided as required in 210.12(A), (B), (C), and (D). Arc-fault circuit-interrupter shall be installed in a readily accessible location.~~

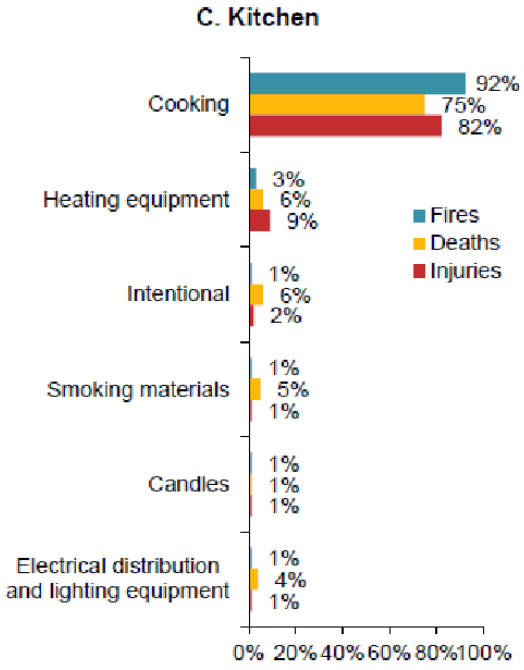
210.12(A) **Dwelling units.** ~~All 120 volt, single Phase, 15 and 20 ampere branch circuit supplying outlets or devices installed and dwelling unit kitchens, family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms,~~
~~Closets, hallways, laundry areas, or similar rooms or areas shall be protected by any of the means described in 210.12 (A)(1) through (6)~~

406.4(4) Arc-Fault circuit interrupter protection. ~~If a receptacle outlet located in any area specified in 210.12 (A), (B) or (C) is replaced, a replacement receptacle at this outlet she'll 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~~


C. Kitchen
Cooking
92%
75%
82%
Heating equipment
3%
6%
9%
Intentional
1%
6%
2%
Smoking materials
1%
5%
1%
Candles
1%
1%
1%
Electrical distribution and lighting equipment
1%
4%
1%
Fires
Deaths
Injuries
0% 20% 40% 60% 80% 100%

Arc-Fault Circuit Interrupters (AFCIs): Prevent Electrical Fires

esfi.org/arc-fault-circuit-interrupters-afcis-prevent-electrical-fires

May 1, 2016

What is an Arc-Fault?

An Arc-Fault is a dangerous electrical problem caused by damaged, overheated, or stressed electrical wiring or devices. Arc-faults can occur when older wires become frayed or cracked, when a nail or screw damages a wire behind a wall, or when outlets or circuits are compromised.

Why do I need Arc-Fault Protection?

The National Fire Protection Association reported 47,700 home fires involved some type of electrical failure or malfunction in 2011. The Consumer Product Safety Commission (CPSC) estimates that more than 50% of electrical fires that occur every year can be prevented by Arc-Fault Circuit Interrupters (AFCIs).

Arc-Fault Circuit Interrupters are available as:

Breakers

- Branch / Feeder AFCI Breaker
  - First generation AFCI breaker protection. AFCI protection originally required by the 1999 National Electrical Code (NEC)
  - Moderate fire prevention
  - Trips when a parallel arc between hot and neutral conductors is detected
- Combination Type AFCI Breaker
  - Branch / Feeder AFCI breaker were phased out as of January 2008 and replaced with Combination Type AFCI breakers
  - Enhanced fire protection
  - Provides the same protection as Branch / Feeder AFCIs and detects lower level series arcing in both branch circuits and power cords

Receptacle

AFCI Receptacle

- Provides protection from Arc-Faults beyond branch circuit wiring extending to appliances and cords plugged into the receptacle
- Enhanced fire protection
- Protects all downstream wire and appliances from both parallel and series arcs, and also protects from series arcs upstream in the wiring between the source of the circuit and the first outlet of the circuit

AFCI Breakers and receptacles should be tested monthly
All electrical systems should have an electrical inspection if the home is older than 40 years or has had a major addition, renovation, or large appliance added
AFCIs should be installed by a qualified electrician

Series Arc: Arc along the same conductor at connections
Parallel Arc: Arc between hot and neutral conductor or between the hot and ground conductor

SILVER STRAND ELECTRIC, INC.

117 POINSETTIA ST.

ATLANTIC BEACH, FL.

32233

LIC.# EC13003769

Majority of the trips are nuisance trips. Not constant. Only constant trips I've experienced with arc fault protection are either from an overcurrent or from a direct short. Same protection he would get with a standard trip breaker.

No documented proof (that I know of) of arc fault protection actually preventing any fires, but there is very much proof of arc fault protection having nuisance trips. Actually **causes** a problem and doesn't prevent anything.

Causes more problems than was meant to rectify. **Documented proof of causing problems and no documented proof of solving problems.**

"Upgrading" (to AFCI protection), the NEC has **downgraded** the integrity of any circuit with arc fault protection.

Arc fault protection is supposed to detect a spark. Once the spark is already happened it's too late. Like saying, "hello" to somebody after they've walked by you.

Michigan and Indiana have completely dropped the requirement.

Cost money. Every time nuisance trip being called by homeowner.

Creates heat. Causes bus bars to burn over time.

A first responder told me that when they cannot find a specific cause of a fire they fill in the blank with “electrical fire”. Have to fill in the blank. Reason there are so many documented electrical fires.

Cost money. Every time nuisance trip being called by homeowner.

Like taking a medication that causes more side effects than there are symptoms.

HOME BUILDERS ASSOCIATION OF MICHIGAN

TO: House Regulatory Reform Committee

FM: Lee Schwartz, Executive Vice President for Government Relations
Home Builders Association of Michigan

RE: Arc-Fault Circuit Interrupters and the Michigan Residential Code.

I'm writing to explain why the Home Builders Association of Michigan opposes the effort to overturn the reasoned decisions of both the Michigan Residential Code Review Committee and the Director of the Department of Licensing and Regulatory Reform to remove the requirement for arc-fault circuit interrupters from the 2015 Michigan Residential Code (the Code).

AFCIs were first required on all branch circuits serving bedrooms in the 2003 Michigan Residential Code. Since then **both** the Granholm and Snyder Administrations have rejected attempts to expand the mandated use of AFCIs in new homes as unnecessary and unsupported.

The Regulatory Impact Statement for the 2015 Michigan Residential Code states: "*The (2003) Michigan Residential Code requirement for arc-fault circuit interrupters (AFCIs) on all branch circuits serving bedroom outlets was justified solely on the basis of its inclusion in the NEC and the IRC.* ***No Michigan-specific fire data was ever provided for this code requirement. There has been a persistent and ongoing failure to provide an accurate fire analysis or cost benefit analysis to support requiring these devices in bedrooms of new homes.***"

Four separate Michigan-specific studies were conducted over a cumulative twelve-year period (2002-2013) using National Fire Incident Reporting system data. These studies, which used only structural fires involving electrical branch circuits or outlet receptacle fires in one- and two-family homes, the type of fires AFCIs are said to prevent, found:

- In the 12 years covered by the studies only one civilian death occurred in a fire caused by electrical arcing. This tragic death took place in Iron Mountain in 2013 where a 66-year-old man died from smoke inhalation. The house involved in the fire was built in the 1940s and it is not known if there were working smoke alarms in the house. (A 2008 National Fire Protection Association study found: "*The chances of surviving a reported home fire when working smoke alarms are present are 99.45%*)
- Michigan has over three and a half million one- and two-family dwellings. The average number of arcing fires in those homes over that 12 year period was 24.8 per year which equals 0.00071% of all homes.
- There were only two civilian injuries during that twelve-year period, an average of 0.16 injuries per year.
- The average annual total damage from this type of fire in both property and contents adjusted to 2013 dollars was $828,726.20.

The National Fire Protection Association has produced its own analysis of electrical fires from 2007 through 2011. This analysis suffers from several major flaws.

- Rather than analyzing only fires involving electrical branch circuits or outlet receptacles, their analysis begins with an enumeration of **all** fires "*in which the factor contributing to ignition was **some type*** of electrical failure or malfunction.
- Their analysis also includes fires caused by "*electrical failures in all other types of equipment as well as unclassified wiring, cords, lighting and other electrical distribution or lighting.*"

Most tellingly, their analysis does not limit itself to one-and two-family homes built under the requirements of the Michigan Residential Code. Instead, to try to support their case, they have broadened their parameters to *include* "*incident types 110-129 excluding 113-118,*" many of which would not be regulated under the Michigan Residential Code.

- Incident type 112 is **a fire in structure other than a building**. This includes fires on or in piers, quays, or pilings; tunnels or underground connecting structures; bridges, trestles or overhead elevated structures; transformers, power or utility vaults or equipment; fences.
- Incident type 121 is **a fire in mobile home used as a fixed residence**. This includes mobile homes when not in transit and used as a structure for residential purposes and manufactured homes built on a permanent chassis.
- Incident 122 is **a fire in a motor home, camper or recreational vehicle when used as a structure**. This includes motor homes when not in transit and used as a structure for residential purposes.
- Incident 123 is **a fire in a portable building when used at a fixed location**. This includes portable buildings used for commerce, industry or education and trailers used for commercial purposes.
- Incident type 120 is **a fire in any other mobile property used as a fixed structure**.

Their analysis also made:

- "*Adjustments*" based on population to compensate for the fact some fire departments did not report a high number of fires.
- "*Adjustments*" to compensate for the fact some fire departments *did not report any fires in some or all years.*"
- "*Adjustments*" to compensate for fires in "*which the factor contributing to ignition was unknown.*"
- "*Adjustments*" to compensate for fires "*in which the heat source was unknown.*"
- "*Adjustments*" to compensate for fires "*in which the factor contributing to the ignition was coded as 'none.'*"

Their analysis not does specify what factors were used to make these "*adjustments.*" Their analysis does not explain how the factors used to make these "*adjustments*" were calculated. Even students in elementary schools are required to show their work.

This is not the first time proponents of mandatory AFCIs have provided erroneous data on residential fires in Michigan as rationalization for forcing these devices on the public. During the 2009 residential code promulgation process they inaccurately claimed: *"Per the National Fire Incident Reporting System (NFIRS), for calendar year 2009, Michigan has had 1,239 fires due to electrical arcing. This has resulted in 20 civilian deaths and 20 fire fighter injuries with total property and content loss of $122,274,894.*"

In 2009 there were only 23 fires due to electrical arcing in one- and two-family homes. There were no civilian deaths. The total property and content damage from these fires totaled $937,644.

Proponents of mandatory AFCIs seem to have a curious propensity for continuously "fuzzing the numbers" by citing national statistics which include all electrical fires, not just structural fires involving electrical branch circuits or outlet receptacle fires in one- and two-family homes.

While there may be one national model residential code, governmental units enforcing a residential code adopt thousands of amendments to fit the code to their needs including the use of significantly older codes. Many do not adopt a residential code at all. This patchwork of requirements allowing homes to be built to different standards make a comparison of fire data gathered outside Michigan irrelevant to our decisions in this state.

Perhaps the biggest deficiency surrounding fire data gathered through the National Fire Incident Reporting System is that it does not contain any information of the age of the home.

Volume 10, Issue 7 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. As of 2007, the median age of one- and two-family housing was over 35 years. With half of this housing stock older than 35 years, electrical issues become an increasing large player in residential fires.*"

According to a 1990 Consumer Product Safety Commission Epidemiological study, "*Residential Electrical Distribution System Fires*," 85% of all such fires involved housing over 20 years old.

A study by Harvard University's Center for Risk Analysis entitled "Residential Building Codes, Affordability, and Health Protection: A Risk-Tradeoff Approach" found "*The mortality risk from house fires is clearly higher in older homes.*" Another study in North Carolina reported on in the *New England Journal of Medicine* found the fatality rate per fire to be 100% greater in homes 20 years or older than in newer homes.

Seventy-one per cent of Michigan's housing units were built before 1990. Fully13.5 percent of Michigan's housing stock was built before 1939. The median age of Michigan's housing is 36 years. Only 15.3% percent of Michigan's housing has been built since 2000. Without knowing the approximate age of the home a fire occurred in, it is almost impossible to make a cogent determination on the need for commanding the inclusion of AFCIs in new home construction.

The NFPA analysis charges the National Association of Home Builders with focusing "*only on fires in which branch circuit wiring and outlet receptacles were the equipment involved in ignition. … (*excluding) *unclassified wiring, lighting, other electrical distribution or lighting equipment … electrical failures, arcing in appliances or other items plugged into the outlet"* and with *"making no adjustments for fires with unknown data."* Our studies analyze the effect of a specific code change and include *only* the fires that were relevant for that purpose, not piers, campers, tunnels, utility vaults or portable buildings.

Among the many deficiencies in the "*Fact Sheet*" prepared by AFCI proponents it that it contains the erroneous statement: "*The Home Builders Association of Michigan (HBAM) thinks AFCIs are too costly to add to new homes."* **The Home Builders Association of Michigan is opposed to the imposition of compulsory AFCI requirements because they are unnecessary and no accurate Michigan-specific data has ever been provided to substantiate a need** (see the Regulatory Impact Statement above). The cost of complying with a superfluous mandate is important but secondary to that consideration.

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

The Michigan Residential Code is intended to be a minimum code with affordability as one of its key purposes. State law prohibits the code from containing "*unnecessary construction regulations that tend to increase construction costs.*"

One million, one hundred seventy-nine thousand Michigan families cannot afford to buy a home costing more than $100,000. Another eight hundred and twenty thousand cannot afford a home priced above $175,000.

Attached you will find a breakdown by SMSA of the number of Michigan families who are priced out of a home by every $1,000 increase in cost.

The total annual cost to home buyers if the proposed ACFI requirement found in these rules had been in effect ranged between $9 million to $16.5 million, depending on the number of homes built and size 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 of 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.

These older homes, such as the one involved in the terrible Iron Mountain fatality in 2013, can have building materials, space heaters, faulty wiring, or other characteristics that might lead to a greater risk of a fire starting along with structural inadequacy, or lesser ease of exit which increase the chances of dying in that fire.

Even as homes built to today's Michigan Residential Code get older, they will continue to provide protection for families through their improved fire separation, fire blocking and draft stopping, emergency escape and rescue openings, electrical circuit breakers, capacity and outlet spacing, reduced need for space heating and enhanced means of egress.

Proponents of AFCIs often use the argument "*They'd only spend the money on a granite countertop anyway*," to justify including questionable requirements in the code. They often state the cost of these devices would only run $300. Based on actual estimates obtained for the inclusion of AFCIs we believe this severely understates the potential cost of this requirement.

Taking away a homebuyer's choice in how to spend their money means they lose the ability to use that money in other ways they have decided would better increase the quality of life for themselves and their families.

Dollars involuntarily spent on unjustified requirements won't be available for improved medical care, better insurance, a safer and more fuel-efficient car, education expenses, retirement accounts, charitable giving, physical fitness activities or even upgrades such as a higher efficiency furnace in the home.

On behalf of the Home Builders Association of Michigan, I want to thank you for your careful consideration of the information presented in this memo. If you have any questions about this issue, or if the Association can be of help to you in any other way, please do not hesitate to contact me. My direct line is 517-646-2565. My cell number is 517-582-4000. My email is lee@hbaofmichigan.com.

6427 Centurion Drive #150B • Lansing, MI 48917 • (517) 322-0224 • www.hbaofmichigan.com

C.W. Fischer ELECTRIC, INC. since 1968

3121 N.W. 16th Terrace
Pompano Beach, FL 33064
954-566-5689

August 24th, 2022

Regarding: Electrical Code Modification E10220 and E10244; Proposal to drop the arc-fault requirement for the State of Florida.

To Whom It May Concern,

As an electrical contractor myself, I have experienced the aggravations, immense costs, customer conflicts, etc., that are associated with the constant nuisance tripping of arc-fault breakers. This has been an issue in the electrical trade for a long time now, and does not appear to be getting any better, only worse. I've had my share of lawsuits threatened against my company for installing faulty breakers, demands to replace arc-faults with different brands, or demands to remove them all together and install standard breakers.

Recently, I've had the chance to work with one of the major electrical arc-fault breaker manufacturers to determine what the issues were on one of my large custom home projects that we were experiencing constant nuisance tripping. After days of testing on site with factory reps and engineers, we were able to determine that the cause of the tripping was electrical noise that was being placed on the system by LED drivers and "Smart" appliances. The appliances were a dishwasher and warming drawer. The final resolution was that the manufacturer of the breaker said it was not their issue, and that the LED lighting and appliances didn't met FCC guidelines (See attached white sheet). I was forced to replace all of the panels and breakers with another brand, or risk having a lawsuit filed against me. We replaced everything, and after we were done, the owner still experienced nuisance tripping.

Each arc-fault breaker has a small chip in it designed with an algorithm to filter out "good" arcs, vs. "bad" arcs. These chips are often fooled into thinking that the excess noise placed on the electrical systems by these non-compliant items is a "bad" arc, and thus the chip tells the breaker to trip. The problem is, the breaker manufacturer's cannot keep up with re-programming, or "Rolling" their chips fast enough to accommodate all of these non-compliant items being sold in today's market. Even if they did, you'd have to replace your arc-fault breakers on a yearly basis to keep pace with the necessary changes to the algorithms to prevent nuisance tripping.

The issue with the arc-fault breakers and nuisance tripping is that there are products being sold and used all over the United States that do not meet FCC requirements for limiting excess "electrical noise" being placed on the electrical systems of the houses they are being used in. The problem gets worse as the house gets larger, more custom, and the lighting and

appliances get more exotic and intricate. General contractors and owners have no idea that the items they are buying do not meet FCC requirements and may cause nuisance tripping. Most of these products are being sold through legitimate distributors and stores. These "non-compliant" products lead to nuisance tripping, and the eventual conflicts that arise between homeowners, general contractors and electrical contractors, none of which are really at fault.

Thousands of dollars are spent each year by electrical contractors trying to figure out why the arc-fault breakers they have installed, as required, continue to trip, only to find out it's not their fault. There is no way to recover these losses, and often times this situation happens multiple times a year on multiple projects, especially for those contractors involved in custom homes. The most common way for some of my peers to correct the problem with nuisance tripping is to go back after inspection and replace the breakers with standard breakers. Obviously this defeats the whole purpose of arc-fault breakers and does no good to the contractor or consumer.

It is for these reasons that I suggest we amend the requirement for arc-fault breakers in Florida until something can be done to regulate the "Non-compliant" electrical lighting, devices, appliances, etc., that would alleviate the nuisance tripping issues. I completely understand that arc-fault breakers offer another level of safety against electrical fires, but the amount of safety they offer does not seem to justify the current situation with the nuisance tripping. I have briefly researched Mr. Lovett's statements about Michigan and Indiana, and it appears as if they have also dropped the requirements for arc-fault breakers (see attached).

If/when something is done to insure compliance with FCC requirements that would protect the consumer, the manufacturer, and the electrical contractor from all of the ramifications that come with nuisance tripping, I would be in favor of re-instating the full requirement.

In the meantime, I have proposed the following modification to original language of proposed code modifications E10220 and E10244. I believe this modification will greatly alleviate the nuisance tripping and still provide a high level of protection to the users satisfying all interested parties.

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

210.12 **(A) Dwelling units.** All 120v, single phase, 15 and 20 ampere branch circuits supplying ~~outlets or devices~~ only general use receptacles installed in dwelling 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):

210.12 **(B) Dormitory Units.** All 120-volt, single phase, 15- and 20- ampere branch circuits supplying ~~outlets or devices~~ only general use receptacles 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).

210.12 **(C) Guest Rooms, Guest Suites, and Patient Sleeping Rooms in Nursing Homes and Limited-Care Facilities.** All 120-volt, single phase, 15- and 20- ampere branch circuits supplying ~~outlets or devices~~ only general use receptacles installed guest rooms and guest suites of hotels and motels, and patient sleeping rooms in nursing homes and limited-care facilities shall be protected by any of the means described in 210.12 (A) (1) through (6).

Signed,

Charles W. Fischer

Charles W. Fischer, Jr.
EC0001578

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. *~~Dashed line through material to be deleted~~. Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received: 11/12/2018	Code: 2018 IRC	Proposal number: # 313

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3901.11 Foyers**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

__ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E3901.11 Foyers.
Foyers that are not part of a hallway in accordance with Section E3901.10 and that have an area that is greater than ~~60~~ 100 square feet ~~(5.57 m2)~~ shall have a receptacle(s) located in each useable wall space that is ~~3~~ 4 feet ~~(914 mm)~~ or more in width. The 4 foot measurement shall be taken in a straight line. Doorways, door-side windows that extend to the floor, and similar openings shall not be considered as wall space. [210.52(H)]

REASON STATEMENT AND FISCAL IMPACT

Reason:
The size of the foyer should be large enough that it would be more likely that an electrical device would be continuously plugged into a receptacle outlet. Also, the State of Indiana does not recognize metric dimensions.

Fiscal Impact: No fiscal impact

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
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4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received: 10/29/2018	Code: 2018 IRC	Proposal number: # 314

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3901.12 HVAC outlet**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows _X_ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E3901.12 HVAC outlet.

A 125-volt, single-phase, 15- or 20-ampere-rated receptacle outlet shall be installed at an accessible location for the servicing of heating, air-conditioning and refrigeration equipment. The receptacle shall be located on the same level and within 25 feet (7620 mm) of the heating, air-conditioning and refrigeration equipment. The receptacle outlet shall not be connected to the load side of the HVAC equipment disconnecting means, and crawlspace receptacles shall be protected in accordance with Section E3902.4. (210.63)

Exception: A receptacle outlet shall not be required for the servicing of evaporative coolers. (210.63 Exception)

REASON STATEMENT AND FISCAL IMPACT

Reason:

Text extracted from the 2005 Indiana Residential Code

Fiscal impact: ***No fiscal impact***

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. *~~Dashed line through material to be deleted~~. Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received: 10/29/18	Code: 2018 IRC	Proposal number: # 315

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3902.4 Crawl space receptacles and lighting outlets**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows _X_ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E3902.4 Crawl space receptacles and lighting outlets.
Where a crawl space is at or below grade level, 125-volt, single-phase, 15- and 20-ampere receptacles installed in such spaces shall have ground-fault circuit-interrupter protection for personnel. Lighting outlets not exceeding 120 volts shall have ground-fault circuit-interrupter protection. [210.8(A)(4), 210.8(E)]
Exception Single receptacles that serve sump pumps.

REASON STATEMENT AND FISCAL IMPACT

Reason:
Text extracted from the 2005 Indiana Residential Code

Fiscal impact: ***No fiscal impact***

REVIEW RECOMMENDATION

Approve

Reject

Approve as amended

Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. *~~Dashed line through material to be deleted~~. Underline or bold face material to be added.*
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4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 10/29/18	Code 2018 IRC	Proposal number # 316

Code title **International Residential Code**	Edition **2018**
Section number and title **E3902.11 Boathouse receptacles**	Page Number
Proponent Charlie Eldridge	Representing (if applicable) Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*) 551 Grassy Ln., Indianapolis, IN 46217	Telephone number (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

__ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E3902.11 Boathouse receptacles.
125-volt, single-phase, 15- or 20-ampere receptacles and outlets that supply boat hoists and ~~installed in~~ boathouses shall have ground-fault circuit-interrupter protection for personnel. [21 0.8(A)(8)]

REASON STATEMENT AND FISCAL IMPACT

Reason:
Text extracted from the 2005 Indiana Residential Code

Fiscal impact: ***No fiscal impact***

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:
1. Only a TYPED copy will be accepted.
2. ~~Dashed line through material to be deleted~~; underline or bold face material to be added.
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FOR OFFICE USE ONLY		
Received 11/12/2018	Code 2018 IRC	Proposal number # 317

Code title: International Residential Code for One and Two Family Dwellings	Edition: 2018
Section number and title: E3902.16 Arc Fault Circuit-Interupter Protection	Page number: 730
Proponent: David A. Soderquist	Representing (if applicable): IAEI, Indiana Chapter
Address (number and street, city, state, and ZIP code): 126 N. Michigan Ave. Hobart, IN 46342	Telephone number: (219) 942-8925

PROPOSED CODE CHANGE (check one)

☐ Change to read as follows ☐ Add to read as follows ☑ Delete and substitute as follows ☐ Delete without substitution

E3902.16 Arc Fault Circuit-Interupter Protection. All branch circuits that supply 120-volt, single phase, 15- and 20-ampere outlets installed in family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunroom, recreation room, closets, hallways and similar rooms or areas shall be protected by a combination type arc fault circuit-interupter installed to provide protection of the branch circuit.

Exception:
1. Where an outlet branch-circuit type AFCI is installed at the first outlet to provide protection for the branch circuit, the portion of the branch circuit between the branch circuit overcurrent device and the first outlet shall be installed with metal outlet boxes and RMC, IMC, EMT, type MC, or steel armored type AC cable meeting the requirements of Section E3908.8.
2. Where an outlet branch-circuit type AFCI is installed at the first outlet to provide protection for the branch circuit, the portion of the branch circuit between the branch circuit overcurrent device and the first outlet installed in metal or nonmetallic conduit or tubing that is incased in not less than 2 inches (51 mm) of concrete.
3. AFCI protection is not required for a branch circuit supplying only a fire alarm system where the branch circuit is wired with metal outlet and junction boxes and RMC, IMC, EMT, or steel armored Type AC or Type MC meeting the requirements of Section 3908.8.

REASON STATEMENT AND FISCAL IMPACT

Adoption of the 2012 IRC arc fault circuit-interupter protection language would return Indiana to production of residential construction on a par with the rest of the United States.

Fiscal impact: $200.00 per dwelling, approximate.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:
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IDHS INDIANA DEPARTMENT OF HOMELAND SECURITY
Leadership for a Safe and Secure Indiana

FOR OFFICE USE ONLY		
Received 11/13/18	Code 2018 IRC	Proposal number # 318

Code title: 2018 International Residential Code for One- and Two-Family Dwellings	Edition: August 2017 First Printing
Section number and title: E3902.16 Arc-fault circuit-interrupter protection/E3902.17 Arc-fault circuit-interrupter protection for branch circuit extensions or modifications	Page number
Proponent: Tom Canon	Representing (*if applicable*): City of Richmond Electrical Inspector/Inspector Member International Association of Electrical Inspectors (Indiana Chapter)
Address (*number and street, city, state, and ZIP code*): 6512 U.S. Hwy 27 South, Richmond, Indiana 47374	Telephone number: (765) 993-3518

PROPOSED CODE CHANGE *(check one)*

☐ Change to read as follows ☐ Add to read as follows ☑ Delete and substitute as follows ☐ Delete without substitution

Delete: 2018 IRC E3902.16 and E3902.17

Substitute as follows from 2009 IRC/NEC2008

E3902.11 Arc-fault circuit-interrupter protection. All branch circuits that supply 120-volt, single- phase, 15- and 20-ampere outlets installed in family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreations rooms, closets, hallways and similar rooms or areas shall be protected by an combination type arc-fault circuit-interrupter installed to provide protection of the branch circuit.
Exception:
1. Where a combination AFCI is installed at the first outlet to provide protection for the remaining portion of the branch circuit, the portion of the branch circuit between the branch-circuit overcurrent device and such outlet shall be wired with metal outlet and junction boxes and RMC, IMC, EMT or steel armored cable Type AC meeting the requirements of Section E3908.8.
2. AFCI protection is not required for a branch circuit suppling only a fire alarm system where the branch circuit is wired with metal outlet and junction boxes and RMC, IMC, EMT, or steel armored cable Type AC meeting the requirements of Section E3908.8.

REASON STATEMENT AND FISCAL IMPACT

Approval of this proposal, while removing the most comprehensive requirements of the 2018 IRC /2017 NEC regarding the installation of arc-fault protective technology, would afford significant protection for the residents of Indiana against property and human loss due to fire events caused by electrical arcing. Indiana currently stands with no requirement for the installation and use of this proven technology.

Cost associated: ie, 1500 sq. ft. home, 3 volt-ampere per sq. ft. general lighting requirement equates to 3-20ampere 120volt circuits.
Approximate cost for 20 ampere AFCI circuit breakers $45 each = $135

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:
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4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 11/13/2018	Code 2018 IRC	Proposal number #319

Code title: International Residential Code	Edition: 2018
Section number and title: E3902.16 Arc-fault circuit-interrupter protection.	Page number: 730 & 731
Proponent: Randy Gulley	Representing (*if applicable*): Wayne Township Fire Department
Address (*number and street, city, state, and ZIP code*): 700 North High School Road, Indianapolis, IN. 46214	Telephone number: (317) 246-6216

PROPOSED CODE CHANGE *(check one)*

☑ Change to read as follows ☐ Add to read as follows ☐ Delete and substitute as follows ☐ Delete without substitution

Change only first paragraph to read as follows:

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

Subsections 1 thru 6 will remain unchanged.

REASON STATEMENT AND FISCAL IMPACT

Based on a average 3 bedroom 2,100 sqft home would require at least 4 or 5 15amp AFCI circuit breakers per model code.
By amending the model code to require only bedroom circuits to be protected with AFCI would require at least 1 or 2 15amp AFCI circuit breakers. Cost of a AFCI circuit breaker is estimated at approximately $36.00 each. Therefore, it would be a cost savings:
5 circuit breakers at $36 each is $180.00 per home x 14,600 homes = $2,628,000.00 cost vs
2 circuit breakers at $36 each is $ 72.00 per home x 14,600 homes = $1,051,200.00 cost. A savings of $1,576,800.00.

4 circuit breakers at $36 each is $144.00 per home x 14,600 homes = $2,102,400.00 cost vs
1 circuit breaker at $36 each is 36.00 per home x 14,600 homes = $525,600.00 cost. A savings of $1,576,800.00.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

AN ASSESSMENT OF INDIANA ONE- AND TWO-FAMILY HOME BUILDING FIRES PREVENTABLE BY AFCIS

Richard Campbell
October 2018

Acknowledgements

The National Fire Protection Association thanks all the fire departments and state fire authorities who participate in the National Fire Incident Reporting System (NFIRS) and the annual NFPA fire experience survey. These firefighters are the original sources of the detailed data that make this analysis possible. Their contributions allow us to estimate the size of the fire problem.

We are also grateful to the U.S. Fire Administration for its work in developing, coordinating, and maintaining NFIRS.

To learn more about research at NFPA visit www.nfpa.org/research.
E-mail: research@nfpa.org

NFPA Index No. 2877

An Assessment of Indiana One- or Two-Family Home Building Fires Preventable by AFCIs

This analysis quantifies fires and associated losses that should be wholly or partially prevented through the use of arc fault circuit interrupters (AFCIs). These estimates were obtained from the detailed information collected by the Indiana Fire Incident Reporting System and submitted to the U.S. Fire Administration's National Fire Incident Reporting System (NFIRS).

Which fires will be affected by AFCIs?
AFCIs should prevent all or nearly all fires originating between the panel board, switch board or circuit breaker board, and the outlet or switch where electricity interacts with electric-powered equipment in the home, including those end points. This list of equipment referred to here as the "Core Group" corresponds to NFIRS Equipment Involved in Ignition codes 210 and 215-219 specifically: the panel board, switch board, or circuit breaker board; electrical branch circuit wiring; outlet or receptacle; wall switch; and ground fault interrupters; and unclassified or other wiring.

It was also estimated that AFCIs might have a significant impact on the larger group of all electrical fires throughout a home, which was estimated in three ways:

- All electrical distribution or lighting equipment as Equipment Involved in Ignition, including the Core group and excluding NFIRS Equipment Involved in Ignition codes 211-214 (electrical power or utility line, electrical service supply wires from the utility, electric meter or meter box, and wiring from meter box to circuit breaker);
- All fires involving electrical failure or malfunction as a Factor Contributing to Ignition, excluding Equipment Involved in Ignition 211-214; and
- All fires involving electrical arcing as Heat Source, excluding Equipment Involved in Ignition 211-214.

In 2012-2016, Indiana fire departments responded to an estimated average of:

- 251 home building fires per year in one- or two-family homes in which the panel board, switch board, circuit breaker board, electrical branch circuit wiring; outlet or receptacle, wall switch, ground fault interrupter, or unclassified or other wiring was involved in ignition. Fires involving this core group of wiring and related equipment caused an average of 1 civilian fatality, 5 civilian injuries, and $6.8 million in direct property damage annually.
- 377 home building fires per year in one- or two-family homes in which any type of electrical distribution or lighting equipment was involved in ignition, including the core group above. Fires involving electrical distribution or lighting equipment caused an average of 1 civilian death, 10 civilian injuries, and $9.6 million in direct property damage annually.
- 455 home building fires per year in one- or two-family homes in which an electrical failure or malfunction was a contributing factor. Note than any equipment powered by electricity can have such a failure. These fires caused an average of 3 civilian deaths, 9 civilian injuries, and $16.5 million in direct property damage annually.
- 321 home building fires per year in one- or two-family homes in which the heat source was identified as arcing. Fires started by arcing caused an average of 1 civilian death, 5 civilian injuries, and $9.7 million in direct property damage annually.

Notes on Methodology

To compensate for Indiana departments that did not report any fires in a given year, the results were multiplied by

$$Total\ IN\ population \div Population\ protected\ by\ departments\ reporting\ at\ least\ one\ fire$$

Population data were obtained from NFPA's Fire Service Inventory.

The multipliers used are shown below:

Year	Multiplier
2012	1.18
2013	1.24
2014	1.96
2015	1.70
2016	1.70

Note that some departments did not submit reports every month. No adjustments were made for missing months of data.

Only building fires (NFIRS incident type 111) were analyzed.

This analysis is restricted to one- or two-family homes. Manufactured homes, other portable buildings, and fires involving structures were excluded from this this analysis, as were fires with the six NFIRS incident types indicating specific types of confined fires (confined cooking fires, confined chimney or flue fires, confined fuel burner or boiler fires, confined incinerator fires, confined compactor fires, and confined or contained trash fires that did not spread to other contents or the structure itself.

Reports of mutual aid given were excluded to avoid double-counting.

Estimates of fire and losses associated with the core group of wiring and related equipment and with all electrical distribution and lighting equipment include proportional shares of home fires with equipment involved with ignition shown as unknown or blank or as "no equipment" without a confirming heat source (codes 40-99 under heat source).

Estimates of fires and losses associated with electrical failures or malfunctions include a proportional share of fires in which the factor contributing to ignition was listed as unknown, unreported, none, or blank.

Estimates of fires involving arcing include proportional shares of fires in which the heat source was unknown or not reported.

For more information on how these estimates were calculated, see Appendix A.

Appendix A. Statistical Methodology

Section I: Summary of Basic NFIRS National Estimates Methods

The statistics in this analysis are estimates derived from Indiana data submitted to the U.S. Fire Administration's (USFA's) National Fire Incident Reporting System (NFIRS) (excluding mutual aid given) and population data from NFPA's Fire Service Inventory for Indiana fire departments. NFIRS is a voluntary system by which participating fire departments report detailed factors about the fires to which they respond. Fires reported to federal or state fire departments or industrial fire brigades are not included in these estimates unless the responding fire department has its own NFIRS Fire Department Identification Code, which is very rarely the case.

NFIRS provides the most detailed incident information of any national database not limited to large fires. NFIRS is the only database capable of addressing national patterns for fires of all sizes by specific property use and specific fire cause. NFIRS also captures information on the extent of flame spread, and automatic detection and suppression equipment. For more information about NFIRS visit http://www.nfirs.fema.gov/. Copies of the paper forms may be downloaded from http://www.nfirs.fema.gov/documentation/design/NFIRS_Paper_Forms_2012.pdf.

NFIRS has a wide variety of data elements and code choices. The NFIRS database contains coded information. Many code choices describe several conditions. These cannot be broken down further. For example, area of origin code 83 captures fires starting in vehicle engine areas, running gear areas or wheel areas. It is impossible to tell the portion of each from the coded data.

NFIRS 5.0 introduced six categories of confined structure fires, including:

- cooking fires confined to the cooking vessel,
- confined chimney or flue fires,
- confined incinerator fire,
- confined fuel burner or boiler fire or delayed ignition,
- confined commercial compactor fire, and
- trash or rubbish fires in a structure with no flame damage to the structure or its contents.

Because these confined fires are not generally associated with electrical fires, they were excluded from this analysis.

For most fields other than Property Use and Incident Type, NFPA allocates unknown data proportionally among known data. This approach assumes that if the missing data were known, it would be distributed in the same manner as the known data. NFPA makes additional adjustments to several fields. *Casualty and loss projections can be heavily influenced by the inclusion or exclusion of unusually serious fire.*

Reports of mutual aid given were excluded to avoid double-counting.

Creating state level estimates

The procedure to obtain estimates of home electrical fires reported to Indiana's fire departments involved four main steps:

1. Determine the populations protected each year by fire departments that had at least one fire in NFIRS of any type, and those that did not. Obtain a multiplier to compensate for departments that did not report by dividing the total population protected by the

population protected by fire departments that reported at least one fire. The same population was used for the entire period.
2. Run queries for each of the relevant types of electrical fires for each year, and allocate the unknown data proportionally.
3. Multiply the results from #2 by the multiplier obtained in #1.
4. Calculate the five-year annual averages by summing the results from #3 and dividing by five.

In the formulas that follow, the term "all fires" refers to all fires in NFIRS on the dimension studied. The percentages of fires with known or unknown data are provided for non-confined fires and associated losses, and for confined fires only.

Factor Contributing to Ignition (FCI): In this field, the code "none" is treated as an unknown and allocated proportionally as are fires coded as undetermined or with no entered values

To allocate unknown data for Factors Contributing to Ignition, the known data are multiplied by

$$\frac{\text{All fires}}{\text{(All fires – blank – undetermined – fires in which FCI =NN)}}$$

Entries in "electrical failure, malfunction" (factor contributing to ignition 30-39) were grouped together into one entry, "electrical failure or malfunction." This category includes:

31. Water-caused short circuit arc;
32. Short-circuit arc from mechanical damage;
33. Short-circuit arc from defective or worn insulation;
34. Unspecified short circuit arc;
35. Arc from faulty contact or broken connector, including broken power lines and loose connections;
36. Arc or spark from operating equipment, switch, or electric fence;
37. Fluorescent light ballast; and
30. Electrical failure or malfunction, other.

Equipment Involved in Ignition (EII). NFIRS 5.0 originally defined EII as the piece of equipment that provided the principal heat source to cause ignition if the equipment malfunctioned or was used improperly. In 2006, the definition was modified to "the piece of equipment that provided the principal heat source to cause ignition." However, much of the data predates the change. Individuals who have already been trained with the older definition may not change their practices. To compensate, NFPA treats fires in which EII = NNN and heat source is not in the range of 40-99 as an additional unknown.

To allocate unknown data for EII, the known data is multiplied by

$$\frac{\text{All fires}}{\text{(All fires – blank – undetermined – [fires in which EII =NNN and heat source <>40-99])}}$$

In addition, the partially unclassified codes for broad equipment groupings (i.e., code 100 - heating, ventilation, and air conditioning, other; code 200 - electrical distribution, lighting and power transfer, other; etc.) were allocated proportionally across the individual code choices in their respective broad groupings (heating, ventilation, and air conditioning; electrical distribution, lighting and power transfer, other; etc.). Equipment that is totally unclassified is not allocated further.

Ohio Electrical Ad Hoc Committee
Review of the 2008 National Electrical Code

INTRODUCTION

The Electrical Ad Hoc Committee met on May 22, 2008 at the Ohio Department of Commerce in Reynoldsburg, Ohio. The committee's objectives were to identify specific issues of concern relative to the new requirements included in the 2008 National Electrical Code. In addition, this committee's goal is to formulate a consensus and make a recommendation to the Ohio Board of Building Standards regarding the adoption thereof. Discussion revolved around the economic impact of the new requirements, as well as the important safety aspects included in the code.

The purpose of this paper is to provide factual data, statistics, and information that will demonstrate why adopting the 2008 National Electrical Code will ensure the safety and welfare of Ohio's citizens. It is important to recognize that the statistical data included with this report includes statistics for the entire United States. Ohio is ranked #7 in population in the U.S., consequently it stands to reason that these statistics would include Ohio as being at a higher risk than a lower populated state. Included after each response, is the applicable NFPA 70 Report on Proposals (ROP) & Report on Comments (ROC) which copies are attached and included as part of this report. The National Electrical Code is a consensus based code process and changes are not made to the NEC unless it is substantiated by logical reasoning, research, data, and statistics to promote the practical safeguarding of persons and property from hazards arising from the use of electricity.

REVIEW OF CONCERNS

The following items have been identified through the work of the committee:

Background and review of NEC Section 210.8, GFCI Requirements.

1. Concern was expressed regarding the compatibility of GFCI's with refrigeration equipment and motor loads associated with garage door openers and sump pumps.

Response:
Section 210.8 is the main rule for application of ground-fault circuit interrupters (GFCIs). Since the introduction of the GFCI in the 1971 Code, these devices have proved to their users and to the electrical community that they are worth the added cost during construction or remodeling. Published data[1] from the U.S. Consumer Product Safety Commission show a decreasing trend in the number of electrocutions in the United States since the introduction of GFCI devices.

Deleting the two exceptions brings consistency with expansion in the 2005 NEC of GFCI receptacle requirements in Section 210.8(A)(7) for laundry, utility, and wet bar sinks. There are no exceptions for these locations and the exceptions deleted in the 2008 NEC for 210.8(A)(2) (garages & accessory buildings) & 210.8(A)(5) (unfinished basements) are now consistent with 210.8(A)(7).

In addition, the product safety standards for appliances covered by this exception require appliances to be manufactured with insulation dielectric leakage levels that do not exceed 0.5 mA. This level of leakage current is far below the 4-6 mA leakage thresholds of Class A ground fault circuit interrupters manufactured to UL Standard 943.

NFPA 70 2008 Proposal 2-40, 2-41, 2-51
NFPA 70 2008 Comment 2-34

Background and review of NEC Section 210.12, AFCI Requirements.

2. Discussion regarding the expansion of AFCI requirements included the following:
   a. Cost Impact from the 2005 NEC to the 2008 NEC; including minimum circuits required by code versus numbers that may be installed.
   b. Reliability; concern over the requirement for combination AFCI and whether the technology has been perfected. In addition, concern regarding the compatibility with sweepers and similar motor operated appliances.

Response:
The 2008 *National Electrical Code*□ *(NEC)* requirement for AFCI protection considerably expands fire prevention technology to the majority of circuits installed in new and renovated homes. The type of AFCI currently available commercially is a next-generation circuit breaker that not only provides the conventional safety functions which includes short circuit, ground fault and overcurrent protection, its advanced design also rapidly detects potentially dangerous arcs and disconnects power in the circuit before a fire can start. Fire and electrical safety officials throughout the U.S. endorse AFCIs as a significant step forward in electrical fire safety.

AFCIs will save lives and make homes safer. According to the U.S. Fire Administration March 2008 Report[2], each year home electrical problems cause about 28,500 fires, resulting in 360 deaths, 1,000 injuries and $995 million in property loss.

The cost of the enhanced protection is directly related to the size of the dwelling and the number of circuits installed. Current retail prices of AFCI-type circuit breakers at several national building supply chains are in the range of $35 to $40 per unit. Even for larger homes with more circuits, the cost increase is insignificant compared to the total cost of the home, particularly when the increased level of safety is taken into consideration.

AFCI technology was first introduced in the early 1990's[3] and has been included in the code development process in the 1999, 2002, 2005, and 2008 editions[4]. In order to gain a complete understanding of the evolution of AFCI technology, it is important to recognize that the AFCI requirements have been a progressive process, as well as substantiated over the past four NEC Code cycles. Earlier proposals included whole house protection, however the code making panel recognized the need to ensure the technology will work.

Concerns have been raised regarding reliability and compatibility, with various electrical appliances and equipment. U.L. Standard 1699 requires AFCI devices to undergo a rigorous evaluation process that includes compatibility with a variety of electrical appliances and equipment. As mentioned above, AFCI technology has been around for many years and the technology has a proven track record.

NFPA 70 1999 Proposals 2-128, 2-129, 2-130
NFPA 70 1999 Comments 2-56, 2-65, 2-66, 2-67, 2-68, 2-69, 2-70, 2-85

NFPA 70 2002 Proposals 2-102, 2-103, 2-110, 2-112, 2-113, 2-115, 2-116
NFPA 70 2002 Comments 2-71, 2-78, 2-79, 2-80, 2-81, 2-82

NFPA 70 2005 Proposals 2-123, 2-133, 2-134, 2-142, 2-146, 2-149, 2-150, 2-134a, 2-161, 2-167
NFPA 70 2005 Comments 2-87a, 2-93, 2-105, 2-108, 2-110

NFPA 70 2008 Proposals 2-142, 2-126
NFPA 70 2008 Comments 2-95, 2-129, 2-137

Background and review of NEC Section 406.11, Tamper Resistant Receptacles.

3. Discussion of Tamper Resistant Receptacles included the following:
   a. Durability/Reliability: What is the mechanical life expectancy of the devices.
   b. Usability: concern regarding compliance with ADA requirements and/or elderly regarding insertion and removal difficulty.
   c. Safety: CPSC study shows significant number of electrical receptacle related accidents with young children.

Response:
According to a 10-year study[5] conducted by the Consumer Product Safety Commission, (1991 – 2001) of National Electronic Injury Surveillance Systems (NEISS) data 24,000+ children under 10 years old were treated in emergency rooms for incidents related to electrical receptacles. On average, this translates to about 7 children per day.

These statistics clearly represent a need to protect our children from the inherent hazards associated with electrical receptacle outlets. When we look at the overall cost, the projected cost of a TR receptacle adds about $0.50 to the cost of an unprotected receptacle. Based on current statistics, the average home has about 75 receptacles resulting in an overall added cost of under $40. This amount may vary slightly based on the type and style of TR receptacle used. This minimal increase in cost buys a significant increase in electrical safety for children.

In regard to reliability, tamper resistant receptacles are evaluated UL Standard 498, which requires insertion of an attachment plug 5,000 times to ensure durability. Recent testing by several device manufacturers found no appreciable difference for insertion and removal forces between tamper-resistant and non-tamper-resistant receptacles. In addition, these standards require both tamper resistant and non-tamper resistant receptacles to not exceed a minimum retention force to retain a plug in a receptacle (3 lbf) and the maximum permitted force to withdraw an attachment plug out of a receptacle (15 lbf).

NFPA 70 2008 Proposal 18-40

Background and review of NEC Section 406.8, WR/TR Requirements.

4. Discussion of Weather Resistant/Tamper Resistant receptacles included availability and cost

Response:
The requirement for listed weather-resistant type 15- and 20-ampere receptacles for both damp and wet locations was added to the 2008 Code. Studies indicated that normal receptacles were inadequate because covers were either broken off or not closed properly. The major differences between WR and non-WR receptacles are that the WR has additional corrosion protection, UV resistance, and cold impact resistance.

A joint NEMA/UL Field study revealed that the greatest number of inoperable GFCI receptacles were located outdoors. The rate of failure was more than double the next highest known location.

NFPA 70 2008 Proposal 18-28, 18-33
NFPA 70 2008 Comment 18-16, 18-18

Background and review of NEC Section 310.15(B)(6), Service/Feeder Conductor Sizing Requirements.

5. Discussion regarding the change to Section 310.15(B)(6) and how it affects feeder conductor sizes, relative to service conductor size.

Response:
There are no significant changes to the requirements of this section. The change was to clarify for users that the provisions apply to a single-service feeder, where previous code language could have permitted the ampacities in 310.15(B)(6) to be used for multiple feeders. Section 310.15(B)(6) allows smaller service conductor sizes and main feeders, based on load diversity and demand factors, whereas a specific feeder (other than service conductors and/or main feeder) conductor would need to be sized per Table 310.16. Therefore, this change does not provide an impact that would affect cost.

SUMMARY

In summary, the State of Ohio has always remained at the forefront of safety by adopting the most current up-to-date construction codes. The "Ohioized" version of construction codes historically involves modifying the administrative sections of the code to avoid conflict with Ohio law. Modifying the technical provisions of a code without sound statistical data and facts will only lessen the safety and welfare of Ohio's citizens. The information included in this document provides the statistics, data, and information that will help the committee gain an in depth understanding and reach a consensus to recommend to the Ohio Board of Building Standards, adoption of the 2008 National Electrical Code.

Finally, in regard to the cost impact of issues raised by the committee, included with this paper is a copy of the cost impact analysis prepared by the Ohio Chapter International Association of Electrical Inspectors, which reflects minimum requirements prescribed by code.

Tim McClintock, Chief Building Official/Electrical Inspector
Wayne County Building Department

Thomas E Moore, Electrical /Building Inspector
City of Beachwood

REFERENCES

[1]Consumer Product Safety Commission-*2000 Electrocutions Associated With Consumer Products*
[2] US Fire Administration- (March 2008) *Residential Building Electrical Fires*
[3] NEMA *AFCI Evolution*
[4] NFPA ROP & ROC-Several Editions
[5]Consumer Product Safety Commission Study

ADDITIONAL REFERENCES

NEMA-*Real Cost of an Electrical Fire*
NFPA-*Tamper Resistant Fact Sheet*
NFPA-*AFCI Fact Sheet*
Consumer Product Safety Commission Letter
Ohio Fire Marshal-*Electrical Data 06/07*
NEMA-*Upgrading the Home: Luxury vs. Safety*
Richard J. Kagan, M.D., FACS, Cincinnati Burn Center Letter
NFPA-*What are NFPA Codes and Standards*
Ohio Chapter IAEI-*Cost Impact Analysis*

"Let the Code Decide"

OHIO CHAPTER
International Association of Electrical Inspectors

Understanding the Cost Impact of the 2008 NEC

The impact of additional Arc-Fault Circuit Interrupters and the new Tamper Resistant Receptacles in the 2008 NEC has prompted controversy driven by the misunderstood cost impact of moving from the 2005 NEC to the 2008 NEC. The NEC provides for the safe use of electricity from fire and shock. Technology over the years has enhanced that protection with minimal cost impact. Circuit breakers protect the home from overloaded circuits to prevent fires and GFCIs are well recognized in the safe use of electricity to protect us and our children from shock hazards. The GFCI entered the home in the 1970s, AFCIs became part of the NEC in the 1999 NEC and the tamper resistant receptacle in the 2008 NEC.

We will show that the impact of adding AFCI protection and Tamper Resistant Receptacles will have minimal impact on affordable housing. Keep in mind the NEC establishes the requirements for the safe electrical operation of a home. Additional circuits that include extra lighting, specific known loads, or a desire to separate circuits for isolation purposes is an additional cost that may be incurred that is once again not driven by the NEC. The additional lighting loads or appliances are not code driven, they are upgrades similar to windows, roofing configuration, or brick vs siding.

This report has been prepared by the following Ohio Chapter Board of Director Members; Oran P. Post, Electrical Inspector for the City of Tallmadge, Ohio and Thomas E. Moore, Electrical Inspector for the City of Beachwood, Ohio and Tim McClintock, Building Official/Electrical Inspector for Wayne County, Ohio. All three Board Members have extensive experience with the code development process.

This report provides an impact statement based entirely on the 2008 NEC requirements for three different homes. The first is a 900 sq ft home to help understand the impact to affordable housing. The other two homes are typical size homes and will include a 1700 sq ft home and a 2100 sq ft home.

The findings are based on prices obtained at a local electrical distributor and other verifiable resources as follows:

Combination AFCI	$36.34
Standard Receptacle	$.50
Tamper Resistant Receptacle	$1.25
Standards GFCI Receptacle	$8.00
Tamper Resistant Receptacle with GFCI	$14.85

Results

900 sqft Home	$160.18 for 900 sq. ft. dwelling unit or $.18/sq. ft.
1700 sqft Home	$205.27 for 1700 sq. ft. dwelling unit or $.12/sq. ft.
2100 sqft Home	$241.36 for 2100 sq. ft. dwelling unit or $.11/sq. ft

The 2008 NEC impact is minimal at less than a 20 cents per sq ft.

Respectfully,

Jack Jamison, President

*Cost Analysis for a new dwelling based on the minimum 2008 NEC requirements (900 Sq ft)					
2008 NEC Code Section	**Description of Code Requirement**	**Total Required Branch Circuit/Devices**	**Cost per 2005 NEC**	**Cost per 2008 NEC**	**Cost Difference**
	GENERAL LIGHTING LOADS				
220.12, Table 220.12 & 220.14(J)	900 sq. ft. X 3VA = 2700 VA/120 Volts = 22.5 Amps = 1.5 or 2 circuits. 2 general purpose 15 Ampere circuits which includes family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, or similar rooms or areas is required.	2	$3.25	$36.34	$33.09
			$25.00[1]	$36.34	$11.34
	DINING ROOM				
210.52(A), 220.12, 220.14(J)	210.12(B) requires the dining room outlets to be protected by an arc fault circuit interrupter. 210.52(B)(1) requires this circuit to be on a 20 ampere circuit.	1	$3.25	$36.34	$33.09
	KITCHEN				
210.52(C), 210.11(C)(1), 220.14(J), & 406.11	2 Kitchen small appliance branch circuits supplying 2 Tamper Resistant GFCI Receptacles serving the kitchen countertop.	2	$8.00	$14.85	$13.70
210.52(C), 210.11(C)(1), 220.14(J), & 406.11	2 Kitchen small appliance branch circuits supplying 6 Tamper Resistant receptacles located as required by 210.52(B)(1)	6	$.50	$1.25	$4.50
	BATHROOM				
210.52(D), 210.11(C)(3), 220.14(J), & 406.11	1 Tamper Resistant GFCI receptacle required for bathroom	1	$8.00	$14.85	$6.85
	GARAGES				
210.52(G), 220.14(J), & 406.11	1 Tamper Resistant GFCI receptacles required for attached garages & unattached garages with power.	1	$8.00	$14.85	$6.85
	OUTDOOR & BASEMENT RECEPTACLES				
210.52(E), 220.14(J), & 406.11	2 Tamper Resistant/Weather Resistant receptacles (front & rear of Dwelling)	2	$.50	$7.03	$13.06[2]
210.52(G), 220.14(J), & 406.11	1 Tamper Resistant GFCI required for unfinished basements	1	$8.00	$14.85	$6.85
	LAUNDRY				
210.52(F), 210.11(C)(2), 220.14(J), & 406.11	1 Tamper Resistant GFCI installed for the Laundry within 6 feet of laundry sink	1	$8.00	$14.85	$6.85
	GENERAL PROVISION RECEPTACLE OUTLETS				
210.52(A), 220.12, 220.14(J), & 406.11	which includes family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, or similar rooms or areas	32	$.50	$1.25	$24.00
				TOTAL	**$160.18**

Footnotes

1. Standard AFCI breakers as required by the 2005 NEC
2. Alternative method protecting outdoor receptacles fed from basement GFCI receptacle

This analysis is based on 2-wire home runs for branch circuits. The following consists of alternative wiring methods and their respective prices;
250ft NM-B-14/2/2-CU-WG.....$114.66
250ft NM-B-14/3-CU-WG.....$75.87
250ft NM-B-14/2-CU-WG.....$54.13

$160.18 for 900 sq. ft. dwelling unit is a cost of $.18/sq. ft.
Not a whole lot to pay for safety!
Any extra wiring or devices above and beyond this is the choice of the builder and not mandated by the NEC.
***Prices obtained from Leff Electric Supply (see attached quote), Lowes, & Home Depot**

*Cost Analysis for a new dwelling based on the minimum 2008 NEC requirements (1700 Sq ft)					
2008 NEC Code Section	**Description of Code Requirement**	**Total Required Branch Circuit/Devices**	**Cost per 2005 NEC**	**Cost per 2008 NEC**	**Cost Difference**
	GENERAL LIGHTING LOADS				
220.12, Table 220.12 & 220.14(J)	1700 sq. ft. X 3VA = 5100 VA/120 Volts = 42.5/15 Amps = 2.8 or 3 circuits. 2 general purpose 15 Ampere circuits which includes family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, or similar rooms or areas is required.	3	$3.25	$36.34	$66.18
			$25.00[1]	$36.34	$11.34
	DINING ROOM				
210.52(A), 220.12, 220.14(J)	210.12(B) requires the dining room outlets to be protected by an arc fault circuit interrupter. 210.52(B)(1) requires this circuit to be on a 20 ampere circuit.	1	$3.25	$36.34	$33.09
	KITCHEN				
210.52(C), 210.11(C)(1), 220.14(J), & 406.11	2 Kitchen small appliance branch circuits supplying 2 Tamper Resistant GFCI Receptacles serving the kitchen countertop.	2	$8.00	$14.85	$13.70
210.52(C), 210.11(C)(1), 220.14(J), & 406.11	2 Kitchen small appliance branch circuits supplying 8 Tamper Resistant receptacles located as required by 210.52(B)(1)	6	$.50	$1.25	$6.00
	BATHROOM				
210.52(D), 210.11(C)(3), 220.14(J), & 406.11	1 Tamper Resistant GFCI receptacle required for bathroom	1	$8.00	$14.85	$6.85
	GARAGES				
210.52(G), 220.14(J), & 406.11	1 Tamper Resistant GFCI receptacles required for attached garages & unattached garages with power.	1	$8.00	$14.85	$6.85
	OUTDOOR & BASEMENT RECEPTACLES				
210.52(E), 220.14(J), & 406.11	2 Tamper Resistant/Weather Resistant receptacles (front & rear of Dwelling)	2	$.50	$7.03	$13.06[2]
210.52(G), 220.14(J), & 406.11	1 Tamper Resistant GFCI required for unfinished basements	1	$8.00	$14.85	$6.85
	LAUNDRY				
210.52(F), 210.11(C)(2), 220.14(J), & 406.11	1 Tamper Resistant GFCI installed for the Laundry within 6 feet of laundry sink	1	$8.00	$14.85	$6.85
	GENERAL PROVISION RECEPTACLE OUTLETS				
210.52(A), 220.12, 220.14(J), & 406.11	which includes family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, or similar rooms or areas	46	$.50	$1.25	$34.50
				TOTAL	**$205.27**

Footnotes

1. Standard AFCI breakers as required by the 2005 NEC
2. Alternative method protecting outdoor receptacles fed from basement GFCI receptacle

This analysis is based on 2-wire home runs for branch circuits. The following consists of alternative wiring methods and their respective prices;
250ft NM-B-14/2/2-CU-WG.....$114.66
250ft NM-B-14/3-CU-WG.....$75.87
250ft NM-B-14/2-CU-WG.....$54.13

$205.27 for 1700 sq. ft. dwelling unit is a cost of $.12/sq. ft.
Not a whole lot to pay for safety!
Any extra wiring or devices above and beyond this is the choice of the builder and not mandated by the NEC.
***Prices obtained from Leff Electric Supply (see attached quote), Lowes, & Home Depot**

*Cost Analysis for a new dwelling based on the minimum 2008 NEC requirements (2100 Sq ft)

2008 NEC Code Section	Description of Code Requirement	Total Required Branch Circuit/Devices	Cost per 2005 NEC	Cost per 2008 NEC	Cost Difference
	GENERAL LIGHTING LOADS				
220.12, Table 220.12 & 220.14(J)	2100 sq. ft. X 3VA = 6300 VA/120 Volts = 52.5/15 Amps = 3.5 or 4 circuits. 2 general purpose 15 Ampere circuits which includes family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, or similar rooms or areas is required.	4	$3.25	$36.34	$99.27
			$25.00[1]	$36.34	$11.34
	DINING ROOM				
210.52(A), 220.12, 220.14(J)	210.12(B) requires the dining room outlets to be protected by an arc fault circuit interrupter. 210.52(B)(1) requires this circuit to be on a 20 ampere circuit.	1	$3.25	$36.34	$33.09
	KITCHEN				
210.52(C), 210.11(C)(1), 220.14(J), & 406.11	2 Kitchen small appliance branch circuits supplying 2 Tamper Resistant GFCI Receptacles serving the kitchen countertop.	2	$8.00	$14.85	$13.70
210.52(C), 210.11(C)(1), 220.14(J), & 406.11	2 Kitchen small appliance branch circuits supplying 8 Tamper Resistant receptacles located as required by 210.52(B)(1)	6	$.50	$1.25	$6.00
	BATHROOM				
210.52(D), 210.11(C)(3), 220.14(J), & 406.11	1 Tamper Resistant GFCI receptacle required for bathrooms	2	$8.00	$14.85	$6.85
	GARAGES				
210.52(G), 220.14(J), & 406.11	1 Tamper Resistant GFCI receptacles required for attached garages & unattached garages with power.	1	$8.00	$14.85	$6.85
	OUTDOOR & BASEMENT RECEPTACLES				
210.52(E), 220.14(J), & 406.11	2 Tamper Resistant/Weather Resistant receptacles (front & rear of Dwelling)	2	$.50	$7.03	$13.06[2]
210.52(G), 220.14(J), & 406.11	1 Tamper Resistant GFCI required for unfinished basements	1	$8.00	$14.85	$6.85
	LAUNDRY				
210.52(F), 210.11(C)(2), 220.14(J), & 406.11	1 Tamper Resistant GFCI installed for the Laundry within 6 feet of laundry sink	1	$8.00	$14.85	$6.85
	GENERAL PROVISION RECEPTACLE OUTLETS				
210.52(A), 220.12, 220.14(J), & 406.11	which includes family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, or similar rooms or areas	50	$.50	$1.25	$37.50
				TOTAL	**$241.36**

Footnotes

1. Standard AFCI breakers as required by the 2005 NEC
2. Alternative method protecting outdoor receptacles fed from basement GFCI receptacle

This analysis is based on 2-wire home runs for branch circuits. The following consists of alternative wiring methods and their respective prices;
250ft NM-B-14/2/2-CU-WG.....$114.66
250ft NM-B-14/3-CU-WG.....$75.87
250ft NM-B-14/2-CU-WG.....$54.13

$241.36 for 2100 sq. ft. dwelling unit is a cost of $.11/sq. ft.
Not a whole lot to pay for safety!
Any extra wiring or devices above and beyond this is the choice of the builder and not mandated by the NEC.
***Prices obtained from Leff Electric Supply (see attached quote), Lowes, & Home Depot**

LEFFELECTRIC
Leff/Akron Electric
711 Johnston St
AKRON OH 44306
Fax: 330-379-9865

Quotation

QUOTE DATE	QUOTE NUMBER
02/26/08	S1269245

ORDER TO:
Leff/Akron Electric
711 Johnston St
AKRON OH 44306
330-379-9800

PAGE NO: 1

QUOTE TO:
CASH ACCT TAXABLE (AKRON)
711 JOHNSTON STREET
AKRON, OH 44306

SHIP TO:
CASH ACCT TAXABLE (AKRON)
711 JOHNSTON STREET
AKRON, OH 44306

CUSTOMER NUMBER	CUSTOMER P/O NUMBER	RELEASE NUMBER	SALESPERSON
6056	post		House Account

WRITER	SHIP VIA	TERMS	SHIP DATE	FREIGHT ALLOWED
Pat Hinman		Cash On Delivery	03/22/08	No

ORDER QTY	DESCRIPTION	Net Prc	Ext Prc
1ea	LEV T5320-I IVY NEMA5-15R DPLX RCPT	125.00/c	1.25
1ea	LEV T7599-I IVY 15A-125V GFCI RCPT	1485.00/c	14.85
1ea	GE THQL1115AF 15A PLUG IN AFCI CB	36.34/ea	36.34
1ea	LEV TWR15-GY 15A WTR RST DLXRCPT	703.13/c	7.03

LEFFELECTRIC
Leff/Akron Electric
711 Johnston St
AKRON OH 44306
Fax: 330-379-9865

Quotation

QUOTE DATE	QUOTE NUMBER
02/26/08	S1269261

ORDER TO:
Leff/Akron Electric
711 Johnston St
AKRON OH 44306
330-379-9800

PAGE NO: 1

QUOTE TO:
CASH ACCT TAXABLE (AKRON)
711 JOHNSTON STREET
AKRON, OH 44306

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711 JOHNSTON STREET
AKRON, OH 44306

CUSTOMER NUMBER	CUSTOMER P/O NUMBER	RELEASE NUMBER	SALESPERSON
6056	post		House Account

WRITER	SHIP VIA	TERMS	SHIP DATE	FREIGHT ALLOWED
Pat Hinman		Cash On Delivery	03/29/08	No

ORDER QTY	DESCRIPTION	Net Prc	Ext Prc
1ea	P&S 1595-TRWR 15A 125V RCPT	18.48/ea	18.48
1ea	P&S 3232-TRWR 15A 125V WR RCPT	2.32/ea	2.32

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SERVICES

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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FOR OFFICE USE ONLY		
Received 11/16/2018	Code 2018 IRC	Proposal number # 320

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3902.16 Arc-fault circuit-interrupter protection**	Page Number
Proponent: **Phil Gettum**	Representing (if applicable): **Gettum Associates**
Address (*number and street, city, state, and ZIP code*)	Telephone number

PROPOSED CODE CHANGE ***(check one)***

___ Change to read as follows ___ Add to read as follows ___ Delete and substitute as follows X Delete without substitution

~~**E3902.16 Arc-fault circuit-interrupter protection.**~~

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

~~1. A listed combination-type arc-fault circuit-interrupter, installed to provide protection of the entire branch circuit. [210.12(A)(1)]~~

~~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. [210.12(A)(2)]~~

~~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:~~

~~3.1. The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit-interrupter.~~

~~3.2. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 50 feet (15.2 m) for 14 AWG conductors and 70 feet (21.3 m) for 12 AWG conductors.~~

~~3.3. The first outlet box on the branch circuit shall be marked to indicate that it is the first outlet on the circuit. [210.12(A)(3)]~~

~~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:~~

~~4.1. The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit-interrupter.~~

~~4.2. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 50 feet (15.2 m) for 14 AWG conductors and 70 feet (21.3 m) for 12 AWG conductors.~~

~~4.3. The first outlet box on the branch circuit shall be marked to indicate that it is the first outlet on the circuit.~~

~~4.4. 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. [210.12(A)(4)]~~

~~5. Where metal outlet boxes and junction boxes and RMC, IMC, EMT, Type MC or steel-armored Type AC cables meeting the requirements of Section E3908.8, metal wireways or metal auxiliary gutters are installed for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, a listed outlet branch-circuit type AFCI installed at the first outlet shall be considered as providing protection for the remaining portion of the~~

~~branch circuit. [210.12(A)(5)]~~
~~6. Where a listed metal or nonmetallic conduit or tubing or Type MC cable is encased in not less than 2 inches (50.8 mm) of concrete for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, a listed outlet branch-circuit type AFCI installed at the first outlet shall be considered as providing protection for the remaining portion of the branch circuit. [210.12(A)(6)]~~

~~Exception: AFCI protection is not required for an individual branch circuit supplying only a fire alarm system where the branch circuit is wired with metal outlet and junction boxes and RMC, IMC, EMT or steel-sheathed armored cable Type AC or Type MC meeting the requirements of Section E3908.8.~~

REASON STATEMENT AND FISCAL IMPACT

Reason:

- Brought forward from the 2005 Indiana Residential Code.
- The Indiana Fire Prevention & Building Safety Commission removed the requirement for AFCIs in bedrooms in the 2005 Indiana Residential Code due to issues with nuisance tripping resulting in homeowner frustration, distrust of the product, and the added expense of calling an electrician to troubleshoot and resolve the issue.
- Based on a cost-benefit analysis, the state's Fire Prevention & Building Safety Commission removed the requirement for AFCI's from the 2014 Indiana Building Code.

Fiscal impact:

During Indiana's review of the 2009 IRC, Dr. Kish submitted a proposed code change to require AFCIs in bedrooms only and estimated the cost to be $250/house. Homewyse estimated the avg. cost to install one AFCI breaker in the 46204 area code to be $200. In previous years, cost estimates were found to be $400-$600/house.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received: 11/13/2018	Code: 2018 IRC	Proposal number: # 321

Code title: International Residential Code	Edition: 2018
Section number and title: E3902.17 Arc-fault circuit-interrupter protection for branch circuit extensions or modifications	Page number: 731
Proponent: Randy Gulley	Representing (*if applicable*): Wayne Township Fire Department
Address (*number and street, city, state, and ZIP code*): 700 North High School Road, Indianapolis, IN. 46214	Telephone number: (317) 246-6216

PROPOSED CODE CHANGE *(check one)*

☐ Change to read as follows ☐ Add to read as follows ☐ Delete and substitute as follows ☑ Delete without substitution

REASON STATEMENT AND FISCAL IMPACT

Words of modified, replaced or extended are words that will not be accepted by the legal review of this code.
Difficult to determine an actual quantity of home remodels or home additions.
Estimate 2,190 (.15%) of 14,600 homes at a cost of $23.00 per outlet equals a cost savings of $ 50,370.00.
Estimate 2,190 (.15%) of 14,600 homes at a cost of $34.00 per circuit breaker equals a cost savings of $ 74,460.00.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received: 11/16/2018	Code: 2018 IRC	Proposal number: # 322

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3902.17 Arc-fault circuit-interrupter protection for branch circuit extensions or modifications**	Page Number
Proponent: **Phil Gettum**	Representing (if applicable): **Gettum Associates**
Address (*number and street, city, state, and ZIP code*)	Telephone number

PROPOSED CODE CHANGE *(check one)*

__ Change to read as follows __ Add to read as follows __ Delete and substitute as follows _X_ Delete without substitution

~~**E3902.17 Arc-fault circuit-interrupter protection for branch circuit extensions or modifications.**~~
~~Where branch-circuit wiring is modified, replaced, or extended in any of the areas specified in Section E3902.16, the branch circuit shall be protected by one of the following:~~

~~1. A combination-type AFCI located at the origin of the branch circuit.~~
~~2. An outlet branch-circuit type AFCI located at the first receptacle outlet of the existing branch circuit. [21 0.12(B)]~~

~~Exception: AFCI protection shall not be required where the extension of the existing conductors is not more than 6 feet (1.8 m) in length and does not include any additional outlets or devices. [210.12(B) Exception]~~

REASON STATEMENT AND FISCAL IMPACT

Reason:
Brought forward from the 2005 Indiana Residential Code

Fiscal impact:

REVIEW RECOMMENDATION

Approve

Reject

Approve as amended

Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received: 10/29/2018	Code: 2018 IRC	Proposal number: #323

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3905.1 Box, conduit body or fitting—where required**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows X Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E3905.1 Box, conduit body or fitting—where required.

A box or conduit body shall be installed at each conductor splice point, outlet, switch point, junction point, termination point, and pull point except as otherwise permitted in Sections E3905.1.1 through E3905.1.6.

REASON STATEMENT AND FISCAL IMPACT

Reason:

This additional text was extracted from the 2005 Indiana Residential Code and the 2017 National Electrical Code Section 300.15.

Fiscal Impact: ***No fiscal impact***

REVIEW RECOMMENDATION

Approve

Reject

Approve as amended

Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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FOR OFFICE USE ONLY		
Received: 10/29/2018	Code: 2018 IRC	Proposal number: # 324

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3905.3.2 Securing to box**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E3905.3.2 Securing to box.

Wiring methods shall be secured to the boxes. [314.17(C)]

Exception: Where nonmetallic-sheathed cable (Type MN) or underground feeder cable (Type UF) is used with boxes not larger than a nominal size of 2 ¼ inches by 4 inches (57 mm by 102 mm) mounted in walls or ceilings, and where the cable is fastened within 8 inches (203 mm) of the box measured along the sheath, and where the sheath extends through a cable knockout not less than ¼ inch (6.4 mm), securing the cable to the box shall not be required. Multiple cable entries shall be permitted in a single cable knockout opening. [314.17(C) Exception]

REASON STATEMENT AND FISCAL IMPACT

Reason:

Type UF cable is permitted to be used in place of Type NM cable as indicated in Table E3801.4. The additional last sentence was extracted from the 2018 NEC Section 314.17(C) Exception.

Fiscal impact: ***No fiscal impact***

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
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FOR OFFICE USE ONLY		
Received: 10/29/2018	Code: 2018 IRC	Proposal number: # 325

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3905.12.2.1 Conductor fill**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

__ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E3905.12.2.1 Conductor fill.
Each conductor that originates outside the box and terminates or is spliced within the box shall be counted once, and each conductor that passes through the box without splice or termination shall be counted once. A looped, unbroken conductor not less than twice the minimum length required for free conductors in Section E3406.11.3 shall be counted twice. Each loop or coil of unbroken conductor having a length equal to or greater than twice that required for free conductors by Section E3406.11.3, shall be counted twice. The conductor fill, in cubic inches, shall be computed using Table E3905.12.2.1. A conductor, no part of which leaves the box, shall not be counted. [314.1 6(B)(1)]

Exception: An equipment grounding conductor or not more than four fixture wires smaller than No. 14, or both, shall be permitted to be omitted from the calculations where such conductors enter a box from a domed fixture or similar canopy and terminate within that box. [314.16(B)(1) Exception]

REASON STATEMENT AND FISCAL IMPACT

Reason:
Text extracted from the 2005 Indiana Electrical Code

Fiscal impact: ***No fiscal impact***

REVIEW RECOMMENDATION

Approve

Reject

Approve as amended

Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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FOR OFFICE USE ONLY		
Received: 10/29/2018	Code: 2018 IRC	Proposal number: # 326

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3905.12.2.2 Clamp fill**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows _X_ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E3905.12.2.2 Clamp fill.

Where one or more internal cable clamps, whether factory or field supplied, are present in the box, a single volume allowance in accordance with Table E3905.12.2.1 shall be made based on the largest conductor present in the box. An allowance shall not be required for a cable connector having its clamping mechanism outside of the box or for clamps that are an integral part of a nonmetallic box that does not protrude more than 1/8 in. into the box.

A clamp assembly that incorporates a cable termination for the cable conductors shall be listed and marked for use with specific nonmetallic boxes. Conductors that originate within the clamp assembly shall be included in conductor fill calculations provided in Section E3905.12.2.1 as though they entered from outside of the box. The clamp assembly shall not require a fill allowance, but, the volume of the portion of the assembly that remains within the box after installation shall be excluded from the box volume as marked in accordance with Section E3905.1 2.1.2. [314.1 6(B)(2)]

REASON STATEMENT AND FISCAL IMPACT

Reason:

Many nonmetallic boxes have a flapper style of clamp for Type NM cable that should not be counted when calculating box fill. I see this as a non-issue for a single home; however, this could be an issue with a volume builder.

Fiscal impact: ***No fiscal impact to a net savings depending on the AHJ***

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received 10/29/2018	Code 2018 IRC	Proposal number # 327

Code title **International Residential Code**	Edition **2018**
Section number and title **E3908.8.3 Nonmetallic sheathed cable (Type NM)**	Page Number
Proponent Charlie Eldridge	Representing (if applicable) Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*) 551 Grassy Ln., Indianapolis, IN 46217	Telephone number (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows __ Delete and substitute as follows _X_ Delete without substitution

E3908.8.3 Nonmetallic sheathed cable (Type NM).
In addition to the insulated conductors, the cable shall have an insulated, covered, or bare equipment grounding conductor. ~~Equipment grounding conductors shall be sized in accordance with Table E3908.12.~~ (334.108)

REASON STATEMENT AND FISCAL IMPACT

Reason:
Text extracted from the 2005 Residential Code

Fiscal impact: ***No fiscal impact***

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received: 11/16/2018	Code: 2018 IRC	Proposal number: #328

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E4002.14 Tamper-resistant receptacles**	Page Number
Proponent: **Phil Gettum**	Representing (if applicable): **Gettum Associates**
Address (*number and street, city, state, and ZIP code*)	Telephone number

PROPOSED CODE CHANGE *(check one)*

__ Change to read as follows __ Add to read as follows __ Delete and substitute as follows _X_ Delete without substitution

~~**E4002.14 Tamper-resistant receptacles.**~~
~~In areas specified in Section E3901.1, 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles shall be listed tamper-resistant receptacles. [406.12(A)]~~
~~Exception: Receptacles in the following locations shall not be required to be tamper resistant:~~
~~1. Receptacles located more than 5.5 feet (1676 mm) above the floor.~~
~~2. Receptacles that are part of a luminaire or appliance.~~
~~3. A single receptacle for a single appliance or a duplex receptacle for two appliances where such receptacles are located in spaces dedicated for the appliances served and, under conditions of normal use, the appliances are not easily moved from one place to another. The appliances shall be cord-and-plug-connected to such receptacles in accordance with Section E3909.4. [406.12(A) Exception]~~

REASON STATEMENT AND FISCAL IMPACT

Reason:
Brought forward from the 2005 Indiana Residential Code

The state's Fire Prevention & Building Safety Commission removed the requirement for tamper-resistant receptacles (TRR) from the 2009 Indiana Electrical Code due to its fiscal impact.

There are cost-effective products on the market that families with children can utilize to limit access to the outlet that will not inhibit everyone else from using the outlet. The required force to insert cords into a TRR can be challenging for the elderly.

Fiscal impact:
In previous years, cost estimates were found to be $50-$75/house. The NFPA estimates a TR receptacle adds about $.50/receptacle and assumed a house has on average 75 receptacles for an added cost of $40/house. NFPA noted that the amount could vary based on the type and style of the TR receptacle used.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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FOR OFFICE USE ONLY		
Received: 11/11/2018	Code: 2018 IRC	Proposal number: # 329

Code title: **Indiana Residential Code**	Edition: **2020**
Section number and title: **Chapter 42, Swimming pools**	Page Number: **1 of 6 , codebook pages 765-777**
Proponent: **Craig Wagner**	Representing (if applicable): **IABO**
Address (*number and street, city, state, and ZIP code*): **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number: **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows _X_ Delete and substitute as follows __ Delete without substitution

Note: *The text and table are not underlined for this proposal, an entire chapter proposal, for clarity.*

Chapter 42
Spas, hot tubs and hydromassage tubs

E4201.1 Scope. The provisions of this chapter shall apply to the construction and installation of electric wiring and equipment associated with all hot tubs and spas, and hydromassage bathtubs, whether permanently installed or storable, and shall apply to metallic auxiliary equipment, such as pumps, filters and similar equipment. Electrical installations of in-ground, above ground and therapeutic pools, and ornamental fountains shall comply with the requirements of the Indiana Electric Code, 675 IAC 17.

E4201.2 Definitions. (680.2)

CORD-AND-PLUG-CONNECTED LIGHTING ASSEMBLY. A lighting assembly consisting of a cord-and-plug-connected transformer and a luminaire intended for installation in the wall of a spa or hot tub.

DRY-NICHE LUMINAIRE. A luminaire intended for installation in the floor or wall of a spa.

HYDROMASSAGE BATHTUB. A permanently installed bathtub equipped with a recirculating piping system, pump, and associated equipment designed so it can accept, circulate and discharge water upon each use.

LOW -VOLTAGE CONTACT LIMIT. A voltage not exceeding the following values:

1. 15 volts (RMS) for sinusoidal ac.
2. 21.2 volts peak for nonsinusoidal ac.
3. 30 volts for continuous dc.
4. 12.4 volts peak for dc that is interrupted at a rate of 10 to 200 Hz.

MAXIMUM WATER LEVEL. The highest level that water can reach before it spills out.

NO-NICHE LUMINAIRE. A luminaire intended for installation above or below the water without a niche.

PACKAGED SPA OR HOT TUB EQUIPMENT ASSEMBLY. A factory-fabricated unit consisting of water circulating heating and control equipment mounted on a common base intended to operate a spa or hot tub. Equipment may include pumps, air blowers, heaters, luminaires, controls and sanitizer generators.

SELF-CONTAINED SPA OR HOT TUB. A factory-fabricated unit consisting of a spa or hot tub vessel with all water circulating, heating and control equipment integral to the unit. Equipment may include pumps, air blowers, heaters, luminaires, controls and sanitizer generators.

SPA OR HOT TUB. A hydromassage pool, or tub for recreational or therapeutic use, not located in health care facilities, designed for immersion of users, and usually having a filter, heater, and motor-driven blower. They are installed indoors or outdoors, on the ground or supporting structure, or in the ground or supporting structure. Generally, a spa or hot tub is not designed, or intended, to have its contents drained or discharged after each use.

STORABLE/PORTABLE SPAS AND HOT TUBS. A spa or hot tub that is constructed on or above the ground with nonmetallic, molded polymeric walls or inflatable fabric walls regardless of dimension.

THROUGH-WALL LIGHTING ASSEMBLY. A lighting assembly intended for installation above grade, on or through the wall of a pool, consisting of two interconnected groups of components separated by the pool wall.

WET-NICHE LUMINAIRE. A luminaire intended for installation in a structure where the luminaire will be completely surrounded by water.

SECTION E4202
WIRING METHODS FOR POOLS, SPAS, HOT TUBS AND HYDROMASSAGE BATHTUBS

E4202.1 General. Wiring methods used in conjunction with permanently installed hot tubs that are installed in corrosive environments described in Section E4202.2.1 shall comply with Table E4202.1, Sections E4202.2 and E4205 and Chapter 38 except as otherwise stated in this section. Wiring methods used in conjunction with hot tubs that are not installed in noncorrosive environments shall comply with Chapter 38. Hydromassage bathtubs shall comply with Section E4209. [680.7; 680.14 (A) and (B); 680.23(B) and (F); 680.25(A); 680.42; 680.43; and 680.70]

E4202.2 Corrosive environment. Areas where sanitation chemicals are stored, areas with circulation pumps, automatic chlorinators or filters, open areas under decks adjacent to or abutting structures and similar locations shall be considered to be corrosive environments. The air in such areas shall be considered to be laden with acid, chlorine and bromine vapors or any combination of acid, chlorine or bromine vapors; and any liquids or condensation in those areas shall be considered to be laden with acids, chlorine and bromine vapors, or any combination of acid, chlorine or bromine vapors. [680.14 (A)]

E4202.2.1 Wiring Methods. Described in Section E4202.2 shall be listed and identified for use is such areas. Rigid metal conduit (RMC), intermediate metal conduit (IMC), rigid polyvinyl chloride conduit (RNC) and reinforced thermosetting resin conduit shall be considered to be resistant to the corrosive environment specified in Section E4202.2. [680.14 (B)]

TABLE E4202.1 [a]

PERMITTED WIRING METHODS IN CORROSIVE ENVIRONMENTS

WIRING LOCATION OR PURPOSE (Application allowed where marked with an "A")	IMC[b], RMC[b], RNC[e]	LFMC	FNMC	MC[g]	FLEX CORD
Panelboard(s) that supply equipment: from service equipment to panelboard	A[f]	—	A	—	—
Wet-niche and no-niche luminaires: from branch circuit OCPD to deck or junction box	A	—	A	—	—
Wet-niche and no-niche luminaires: from deck or junction box to forming shell	A[j]	—	A	—	A[d]
Dry niche: from branch circuit OCPD to luminaires	A	—	A	—	—
Motors: from branch circuit OCPD to motor	A	A[c]	A[c]	A	A[d]
Packaged or self-contained outdoor spas and hot tubs with underwater luminaire: from branch circuit OCPD to spa or hot tub	A	A	A	—	A[d]
Indoor spas and hot tubs, and other spa or hot tub associated equipment: from branch circuit OCPD to equipment	A	A	A	—	A[d]
Indoor spas and hot tubs, and other spa or hot tub associated equipment: from branch circuit OCPD to equipment	A	A	A	—	A[d]
Connection at lighting transformers or power supplies	A	A[i]	A	—	—

For SI: 1 foot = 304.8 mm.
a. For all wiring methods, see Section E4205 for equipment grounding conductor requirements.
b. See Section E4202.2.1 for use of metal conduits in corrosive environments.
c. Limited to where necessary to employ flexible connections at or adjacent to a pool motor.
d. Flexible cord shall be installed in accordance with Section E4202.2.
e. Nonmetallic conduit shall be rigid polyvinyl chloride conduit Type PVC or reinforced thermosetting resin conduit Type RTRC.
f. Aluminum conduits shall not be permitted in the pool area where subject to corrosion.
g. Where installed as direct burial cable or in wet locations, Type MC cable shall be listed and identified for the location.
h. See Section E4202.3 for listed, double-insulated pool pump motors.
i. Limited to use in individual lengths not to exceed 6 feet. The total length of all individual runs of LFMC shall not exceed 10 feet.
j. Metal conduit shall be constructed of brass or other approved corrosion-resistant metal.

E4202.3 Flexible cords. Flexible cords used in conjunction with a spa, hot tub or hydromassage bathtub shall be installed in accordance with the following:

1. For other than underwater luminaires, fixed or stationary equipment shall be permitted to be connected with a flexible cord to facilitate removal or disconnection for maintenance or repair. The flexible cord shall not exceed 3 feet (914 mm) in length.
2. Other than listed low-voltage lighting systems not requiring grounding, wet-niche luminaires that are supplied by a flexible cord or cable shall have all exposed noncurrent-carrying metal parts grounded by an insulated copper equipment grounding conductor that is an integral part of the cord or cable. Such grounding conductor shall be connected to a grounding terminal in the supply junction box, transformer enclosure, or other enclosure and shall be not smaller than the supply conductors and not smaller than 16 AWG. [680.23(B)(3)]

3. A listed packaged spa or hot tub installed indoors that is GCFI protected shall be permitted to be cord-and-plug connected provided that such cord does not exceed 15 feet (4572 mm) in length. [680.42(A)(2)]
4. A listed packaged spa or hot tub rated at 20 amperes or less and installed indoors shall be permitted to be cord-and-plug connected to facilitate maintenance and repair. (680.43 Exception No. 1)
5. For other than underwater lighting luminaires, the requirements of Item 1 shall apply to any cord-equipped luminaire that is located within 16 feet (4877 mm) radially from any point on the water surface. [680.22(B)(5)]

E4202.4 Ground-fault circuit-interrupters required. Electrical equipment, including power-supply cords, shall be protected by ground-fault circuit-interrupters. 125-volt, 15- and 20-ampere receptacles located within 20 feet (6096 mm) of the inside walls of a storable spa, or storable hot tub shall be protected by a ground-fault circuit -interrupter. In determining these dimensions, the distance to be measured shall be the shortest path that the supply cord of an appliance connected to the receptacle would follow without passing through a floor, wall, ceiling, and doorway with hinged or sliding door, window opening, or other effective permanent barrier. (680.32)

E4202.5 Luminaires. Luminaires for storable spas and storable hot tubs shall not have exposed metal parts and shall be listed for the purpose as an assembly.

E4202.5.1 Over the low-voltage contact limit but not over 150 volts. A lighting assembly without a transformer or power supply, and with the luminaire lamp(s) operating at over the low-voltage contact limit, but not over 150 volts, shall be permitted to be cord and plug-connected where the assembly is listed as an assembly for the purpose and complies with all of the following:

1. It has an impact-resistant polymeric lens and luminaire body.
2. A ground-fault circuit -interrupter with open neutral conductor protection is provided as an integral part of the assembly.
3. The luminaire lamp is permanently connected to the ground-fault circuit-interrupter with open-neutral protection.
4. The design of an underwater luminaire supplied from a branch circuit either directly or by way of a transformer or power supply shall be such that, where the fixture is properly installed without a ground-fault circuit-interrupter, there is no shock hazard with any likely combination of fault conditions during normal use (not relamping). In addition, a ground-fault circuit-interrupter protection for personnel shall be installed in the branch circuit supplying luminaires operating at voltages greater than the low-voltage contact limit, to protect personnel performing lamping, relamping or servicing. The installation of the ground-fault circuit-interrupter shall be such that there is no shock hazard with any likely fault-condition combination that involves a person in a conductive path from any ungrounded part of the branch circuit or the luminaire to ground. Compliance with this requirement shall be obtained by the use of a listed underwater luminaire and by installation of a listed ground-fault circuit-interrupter in the branch circuit or a listed transformer or power supply for luminaires operating at more than the low-voltage contact limit. Luminaires that depend on submersion for safe operation shall be inherently protected against the hazards of overheating when not submerged. [680.23(A)(1), (A)(3), (A)(7) and (A)(8)]
5. It has no exposed metal parts. [680.33(B)]

E4202.6 Receptacle locations. Receptacles shall be located not less than 6 feet (1829 mm) from the inside walls of a, storable spa or storable hot tub. In determining these dimensions, the distance to be measured shall be the shortest path that the supply cord of an appliance connected to the receptacle would follow without passing through a floor, wall, ceiling, and doorway with hinged or sliding door, window opening, or other effective permanent barrier. (680.34)

E4202.7 Disconnecting means. Disconnecting means for storable pools and storable/portable spas and hot tubs shall comply with Section E4202.3.

E4202.8 Ground-fault circuit -interrupters. The outlet(s) that supplies a self-contained spa or hot tub, or a packaged spa or hot tub equipment assembly, or a field-assembled spa or hot tub with a heater load of 50 amperes or less, shall be protected by a ground-fault circuit-interrupter. (680.44)

A listed self-contained unit or listed packaged equipment assembly marked to indicate that integral ground-fault circuit-interrupter protection is provided for all electrical parts within the unit or assembly, including pumps, air blowers, heaters, lights, controls, sanitizer generators and wiring, shall not require that the outlet supply be protected by a ground-fault circuit -interrupter. [680.44(A)]

E4202.9 Electric water heaters. Electric spa and hot tub water heaters shall be listed and shall have the heating elements subdivided into loads not exceeding 48 amperes and protected at not more than 60 amperes. The ampacity of the branch-circuit conductors, and the rating or setting of overcurrent protective devices, shall be not less than 125 percent of the total nameplate load rating. (680.9)

E4202.10 Underwater audio equipment. Underwater audio equipment shall be identified for the purpose. [680.27(A)]

E4202.10.1 Speakers. Each speaker shall be mounted in an approved metal forming shell, the front of which is enclosed by a captive metal screen, or equivalent, that is bonded to and secured to the forming shell by a positive locking device that ensures a low-resistance contact and requires a tool to open for installation or servicing of the speaker. The forming shell shall be installed in a recess in the wall or floor of the pool. [680.27(A)(1)]

E4202.10.2 Wiring methods. Rigid metal conduit of brass or other identified corrosion-resistant metal, rigid polyvinyl chloride conduit, rigid thermosetting resin conduit or liquid-tight flexible nonmetallic conduit (LFNC-B) shall extend from the forming shell to a suitable junction box or other enclosure. Where rigid nonmetallic conduit or liquid-tight flexible nonmetallic conduit is used, an 8 AWG solid or stranded insulated copper bonding jumper shall be installed in this conduit with provisions for terminating in the forming shell and the junction box. The termination of the 8 AWG bonding jumper in the forming shell shall be covered with, or encapsulated in, a suitable potting compound to protect such connection from the possible deteriorating effect of pool water. [680.27(A)(2)]

E4202.10.3 Forming shell and metal screen. The forming shell and metal screen shall be of brass or other approved corrosion-resistant metal. Forming shells shall include provisions for terminating an 8 AWG copper conductor. [680.27(A)(3)]

E4202.11 Emergency switch for spas and hot tubs. A clearly labeled emergency shutoff or control switch for the purpose of stopping the motor(s) that provides power to the recirculation system and jet system shall be installed at a point that is readily accessible to the users. This emergency shutoff or control switch shall be adjacent to, and within sight, of the spa or hot tub and not less than 5 feet (1524 mm) away from the spa or hot tub. This requirement shall not apply to one-family dwellings. (680.41)

SECTION E4203
HYDROMASSAGE BATHTUBS

E4203.1 General. Installations of hydromassage bathtubs shall be required to comply only with Section E4209. The branch circuit wiring method(s) supplying a hydromassage bathtub shall comply with Chapter 38.

E4203.2 Ground-fault circuit-interrupters. Hydromassage bathtubs and their associated electrical components shall be supplied by an individual branch circuit(s) and protected by a readily accessible ground-fault circuit-interrupter. All 125-volt, single-phase receptacles not exceeding 30 amperes and located within 6 feet (1829 mm) measured horizontally of the inside walls of a hydromassage tub shall be protected by a ground-fault circuit-interrupter(s). (680.71)

E4203.3 Other electric equipment. Luminaires, switches, receptacles, and other electrical equipment located in the same room, and not directly associated with a hydromassage bathtub, shall be installed in accordance with the requirements of this code relative to the installation of electrical equipment in bathrooms. (680.72)

E4203.4 Accessibility. Hydromassage bathtub electrical equipment shall be accessible without damaging the building structure or building finish. Where the hydromassage bathtub is cord- and plug-connected with the supply receptacle accessible only through a service access opening, the receptacle shall be installed so that its face is within direct view and not more than 12 inches (305 mm) from the plane of the opening (680.73)

E4203.5 Bonded parts.
The following parts shall be bonded together:

1. Metal fittings within or attached to the tub structure that are in contact with the circulating water.
2. Metal parts of electrical equipment associated with the tub water circulating system, including the pump and blower motors.
3. Metal-sheathed cables and raceways and metal piping that are within 5 feet (1524 mm) of the inside walls of the tub and that are not separated from the tub area by a permanent barrier.
4. Exposed metal surfaces that are within 5 feet (1524 mm) of the inside walls of the tub and not separated from the tub area by a permanent barrier.
5. Electrical devices and controls that are not associated with the hydromassage tubs and that are located within 5 feet (1524 mm) from such units.

Exceptions:

1. Double-insulated motors and blowers shall not be bonded.
2. Small conductive surfaces not likely to become energized, such as air and water jets, supply valve assemblies and drain fittings not connected to metal piping, and towel bars, mirror frames and similar nonelectric equipment not connected to metal framing shall not be required to be bonded.

E4203.6 Method of bonding. Metal parts required to be bonded by this section shall be bonded together using a solid copper bonding jumper, insulated, covered or bare, not smaller than 8 AWG. The bonding jumper(s) shall be required for equipotential bonding in the area of the hydromassage bathtub and shall not be required to be extended or attached to any remote panelboard, service equipment, or electrode. In all installations, a bonding jumper long enough to terminate on a replacement nondouble-insulated pump or blower motor shall be provided and shall be terminated to the equipment grounding conductor of the branch circuit of the motor where a double-insulated circulating pump or blower motor is used. (680.74)

REASON STATEMENT AND FISCAL IMPACT

This proposal removes language about pools from Chapter 42 since pools are required to be have their electrical systems installed according to the InEC.

Fiscal impact: No fiscal impact, editorial.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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FOR OFFICE USE ONLY		
Received: 10/29/2018	Code: 2018 IRC	Proposal number: # 330

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E4207.4 Receptacle locations**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

_X_ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E4207.4 Receptacle locations.
Receptacles shall be located not less than ~~6~~ 10 feet ~~(1829 mm)~~ from the inside walls of a storable pool, storable spa or storable hot tub. In determining these dimensions, the distance to be measured shall be the shortest path that the supply cord of an appliance connected to the receptacle would follow without passing through a floor, wall, ceiling, doorway with hinged or sliding door, window opening, or other effective permanent barrier. (680.34)

REASON STATEMENT AND FISCAL IMPACT

Reason:
Text extracted from the 2005 Indiana Residential Code

Fiscal impact: ***No fiscal impact***

REVIEW RECOMMENDATION

Approve

Reject

Approve as amended

Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received: 10/29/2018	Code: 2018 IRC	Proposal number: # 331

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E4301.2 Definitions**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

__ Change to read as follows _X_ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E4301.2 Definitions.

ABANDONED CLASS 2 CABLE. Installed Class 2 cable that is not terminated at equipment and not identified for future use with a tag.

CLASS 2 CIRCUIT. That portion . . .

REASON STATEMENT AND FISCAL IMPACT

Reason:

Extracted text from the 2005 Indiana Residential Code

Fiscal impact: ***No fiscal impact***

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. *~~Dashed line through material to be deleted~~. Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received: 10/29/2018	Code: 2018 IRC	Proposal number: # 332

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E4301.3 Spread of fire or products of combustion**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows _X_ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E4301.3 Spread of fire or products of combustion.
The accessible portion of abandoned Class 2 cables shall not be permitted to remain.

REASON STATEMENT AND FISCAL IMPACT

Reason:
Added new section was extracted from the 2005 Indiana Residential Code

Fiscal impact: ***No fiscal impact***

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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2. *~~Dashed line through material to be deleted~~. Underline or bold face material to be added.*
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4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number #333

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **Chapter 44 Referenced standards.**	Page Number **1 of 1 , codebook page 783, 787**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address (*number and street, city, state, and ZIP code*) **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

_X_ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

Change two standards' designations as follows:

~~711-16~~ 711.13: **Voluntary Specification for Self-adhering Flashing Used for Installation of Exterior Wall Fenestration Products** R703.4

~~32-17~~ 32-01: **Design and Construction of Frost-protected Shallow Foundations** R403.1.4.1

REASON STATEMENT AND FISCAL IMPACT

This proposal is corrections from ICC.

Fiscal impact: No fiscal impact, editorial.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number # 334

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **Appendixes A through D**	Page Number **1 of 1, codebook pages 821-850**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address (*number and street, city, state, and ZIP code*) **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows __ Delete and substitute as follows _X_ Delete without substitution

Delete Appendixes A through D without substitution.

REASON STATEMENT AND FISCAL IMPACT

This proposal deletes informative appendixes not part of the prescriptive rule.

Fiscal impact: No fiscal impact

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number # 335

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **AE101.1 General.**	Page Number **1 of 1, codebook page 851**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address *(number and street, city, state, and ZIP code)* **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

_X_ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

AE101.1 General.

These provisions shall be applicable only to a *manufactured home* or mobile homes used as a single *dwelling unit* installed on privately owned (nonrental) lots and shall apply to the following:

1. Construction, *alteration* and repair of any foundation system that is necessary to provide for the installation of a *manufactured home* unit.
2. Construction, installation, *addition*, *alteration*, repair or maintenance of the building service *equipment* that is necessary for connecting *manufactured homes* to water, fuel, or power supplies and sewage systems.
3. *Alterations*, *additions* or repairs to existing *manufactured homes*. The construction, *alteration*, moving, demolition, repair and use of accessory buildings and structures, and their building service *equipment*, shall comply with the requirements of the codes adopted by this *jurisdiction*.

These provisions shall not be applicable to the design and construction of *manufactured homes* and shall not be deemed to authorize either modifications or *additions* to *manufactured homes* where otherwise prohibited.

REASON STATEMENT AND FISCAL IMPACT

This proposal adds mobile homes to the text as some mobile homes are still in use in Indiana.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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2. *~~Dashed line through material to be deleted~~. Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number #336

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **AE102.1 General.**	Page Number **1 of 1, codebook page 851**
Proponent **Craig Wagner**	Representing (If applicable) **IABO**
Address (*number and street, city, state, and ZIP code*) **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

__ Change to read as follows __ Add to read as follows _X_ Delete and substitute as follows __ Delete without substitution

AE102.1 General. Manufactured homes and their building service equipment to which additions or alterations are made shall comply with all of the applicable requirements of the Indiana Residential Code (675 IAC 14) for new facilities.

REASON STATEMENT AND FISCAL IMPACT

This proposal explains the scope of the general requirements for installation.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
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3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received: 11/11/2018	Code: 2018 IRC	Proposal number: # 337

Code title: **Indiana Residential Code**	Edition: **2020**
Section number and title: **AE102.2 Additions, alterations or repairs.**	Page Number: **1 of 1, codebook page 851**
Proponent: **Craig Wagner**	Representing (if applicable): **IABO**
Address *(number and street, city, state, and ZIP code)*: **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number: **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows _X_ Delete and substitute as follows __ Delete without substitution

AE102.2 Additions. Additions made to a manufactured home shall conform to the requirements of this code and all other applicable Indiana codes. Additions shall be structurally independent from the manufactured home.

Exception: Structural independence need not be provided when:

(1) structural calculations are provided to the building official confirming that the addition will not adversely affect the structural integrity of the manufactured home, or

(2) the manufacturer of the home confirms, in writing, that the home will safely support the structural loads imposed by the proposed addition.

REASON STATEMENT AND FISCAL IMPACT

This proposal explains general requirements for additions as has been required by Indiana in the past.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve

Reject

Approve as amended

Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. *~~Dashed line through material to be deleted~~. Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number # 338

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **AE102.2.1 Alterations.**	Page Number **1 of 1, codebook page 851**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address *(number and street, city, state, and ZIP code)* **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows _X_ Add to read as follows ___ Delete and substitute as follows ___ Delete without substitution

AE102.2.1 Alterations. Alterations may be made to any manufactured home or to its building service equipment without requiring the existing manufactured home or its building service equipment to comply with all the requirements of these provisions, provided the alteration or additions conform to that required for new construction, and provided further that no hazard to life, health, or safety will be created by such additions or alterations.

REASON STATEMENT AND FISCAL IMPACT

This proposal explains general requirements for alterations as has been required by Indiana in the past.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. *~~Dashed line through material to be deleted~~. Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number # 339

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **AE102.3 Existing installations.**	Page Number **1 of 1, codebook page 852**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address (*number and street, city, state, and ZIP code*) **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows __ Delete and substitute as follows _X_ Delete without substitution

~~**AE102.3 Existing installations.** Building service *equipment* lawfully in existence at the time of the adoption of the applicable codes shall have their use, maintenance or repair continued if the use, maintenance or repair is in accordance with the original design and hazard to life, health or property has not been created by such building service *equipment*.~~

REASON STATEMENT AND FISCAL IMPACT

This proposal deletes requirements outside of the scope of this code.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. *~~Dashed line through material to be deleted~~. Underline or bold face material to be added.*
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FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number # 340

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **AE102.4 Existing occupancy.**	Page Number **1 of 1, codebook page 852**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address *(number and street, city, state, and ZIP code)* **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows _X_ Delete and substitute as follows __ Delete without substitution

AE102.4 Existing Occupancy. The use or occupancy of any manufactured home shall not be changed unless evidence is provided to show compliance with the applicable rules of the Fire Prevention and Building Safety Commission for the new use or occupancy and be released for construction when required by the General Administrative Rules (675 IAC 12).

REASON STATEMENT AND FISCAL IMPACT

This proposal explains Indiana rules for proposed change to another occupancy type.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. ~~*Dashed line through material to be deleted.*~~ *Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received: 11/11/2018	Code: 2018 IRC	Proposal number: # 341

Code title: **Indiana Residential Code**	Edition: **2020**
Section number and title: **AE102.5 Maintenance.**	Page Number: **1 of 1, codebook page 852**
Proponent: **Craig Wagner**	Representing (if applicable): **IABO**
Address *(number and street, city, state, and ZIP code)*: **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number: **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows __ Delete and substitute as follows _X_ Delete without substitution

~~**AE102.5 Maintenance.** All *manufactured homes* and their building service *equipment*, existing and new, and all parts thereof, shall be maintained in a safe and sanitary condition. All devices or safeguards that are required by applicable codes or by the *Manufactured Home* Standards shall be maintained in conformance to the code or standard under which it was installed. The owner or the owner's designated agent shall be responsible for the maintenance of *manufactured homes*, accessory buildings, structures and their building service *equipment*. To determine compliance with this section, the *building official* may has the authority to cause any *manufactured home*, accessory building or structure to be reinspected.~~

REASON STATEMENT AND FISCAL IMPACT

This proposal removes maintenance language that is outside of the scope of this code.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
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4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number # 342

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **AE201.1 Definitions, Manufactured homes.**	Page Number **1 of 1, codebook page 852**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address *(number and street, city, state, and ZIP code)* **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

_X_ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

MANUFACTURED HOME. A structure transportable in one or more sections that, in the traveling mode, is 8 body feet (2438 body mm) or more in width or 40 body feet ~~(12 192 body mm)~~ (12192 body mm) or more in length or, where erected on site, is 320 or more square feet (30 m2), and which is built on a permanent chassis and designed to be used as a *dwelling* with ~~or without~~ a permanent foundation when connected to the required utilities, and includes the plumbing, heating, air-conditioning and electrical systems contained therein; except that such term shall include any structure that meets all of the requirements of this paragraph, except the size requirements and with respect to which the manufacturer voluntarily files a certification required by the Secretary of the U.S. Department of Housing and Urban Development (11UD) and complies with the standards established under this title.

For mobile homes built prior to June 15, 1976, a *label* certifying compliance with the *Standard for Mobile Homes*, NFPA 501, ANSI 119.1, in effect at the time of manufacture, is required. For the purpose of these provisions, a mobile home shall be considered to be a *manufactured home*.

REASON STATEMENT AND FISCAL IMPACT

This proposal corrects a number mistake, and clarifies that manufactured homes installed on a nonrental lots in Indiana require a permanent foundation.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number # 343

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **AE301.1 Initial installation.**	Page Number **1 of 1, codebook page 852**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address *(number and street, city, state, and ZIP code)* **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows _X_ Delete and substitute as follows ___ Delete without substitution

AE301.1 Permit. Where required by local ordinance, a manufactured home shall not be installed or altered without first obtaining a permit.

REASON STATEMENT AND FISCAL IMPACT

This proposal clarifies that permits shall be obtained when required by local ordinance.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number #344

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **AE301.2 Additions and alterations to a manufactured home.**	Page Number **1 of 1, codebook page 852**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address (*number and street, city, state, and ZIP code*) **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows _X_ Delete and substitute as follows __ Delete without substitution

AE301.2 Additions and alterations to a manufactured home. Where required by local ordinance, a permit shall be obtained to alter, remodel, or add accessory buildings or structures to a manufactured home.

REASON STATEMENT AND FISCAL IMPACT

This proposal clarifies that permits for additions or alterations shall be obtained when required by local ordinance.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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FOR OFFICE USE ONLY		
Received: 11/11/2018	Code: 2018 IRC	Proposal number: #345

Code title: **Indiana Residential Code**	Edition: **2020**
Section number and title: **AE301.3, AE301.4, AE302, AE303, AE304 , AE305, AE306, AE307, AE401,**	Page Number: **1 of 1, codebook page 852-855**
Proponent: **Craig Wagner**	Representing (if applicable): **IABO**
Address *(number and street, city, state, and ZIP code)*: **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number: **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows __ Delete and substitute as follows _X_ Delete without substitution

Delete Sections AE301.3, AE301.4, AE302, AE303, AE304 , AE305, AE306, AE307, AE401

REASON STATEMENT AND FISCAL IMPACT

This proposal deletes sections from the code which are outside the scope of the rule or whose information are in other sections.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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FOR OFFICE USE ONLY		
Received: 11/11/2018	Code: 2018 IRC	Proposal number: # 346

Code title: **Indiana Residential Code**	Edition: **2020**
Section number and title: **AE402.1 Location on property.**	Page Number: **1 of 1, codebook page 856**
Proponent: **Craig Wagner**	Representing (if applicable): **IABO**
Address (*number and street, city, state, and ZIP code*): **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number: **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

_X_ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

AE402.1 General. *Manufactured homes* and accessory buildings shall be located on the property in accordance with applicable ~~codes and ordinances of this *jurisdiction*~~ sections of the Indiana Residential Code (675 IAC 14) and the ordinances of the jurisdiction in which the home is sited.

REASON STATEMENT AND FISCAL IMPACT

This proposal defines how manufactured homes are to be located on nonrental lots.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve

Reject

Approve as amended

Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received: 11/11/2018	Code: 2018 IRC	Proposal number: #347

Code title: **Indiana Residential Code**	Edition: **2020**
Section number and title: **AE502.1 General.**	Page Number: **1 of 1, codebook page 856**
Proponent: **Craig Wagner**	Representing (if applicable): **IABO**
Address (*number and street, city, state, and ZIP code*): **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number: **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

_X_ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

AE502.1 General. Foundation systems designed and constructed in accordance with this section shall be considered a permanent installation. Where the manufacturer's installation instructions and foundation design details for the home are available, the foundation system shall be installed in accordance with those instructions.

REASON STATEMENT AND FISCAL IMPACT

This proposal clarifies that when the manufacturer's installation requirements are available those instructions are to be followed for the installation of the manufactured home.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. *~~Dashed line through material to be deleted~~. Underline or bold face material to be added.*
3. *Use a second sheet for any material requiring more space.*
4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number #348

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **AE504.1 General.**	Page Number **1 of 1, codebook page 857**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address *(number and street, city, state, and ZIP code)* **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows _X_ Delete and substitute as follows __ Delete without substitution

AE504.1 General. Accessory structures shall not be structurally supported by a manufactured home.

Exception: Structural independence need not be provided when:

1. structural calculations are provided to the building official confirming that the addition will not a adversely affect the structural integrity of the manufactured home, or
2. the manufacturer of the home confirms, in writing, that the home will safely support the structural loads imposed by the proposed accessory structure.

REASON STATEMENT AND FISCAL IMPACT

This proposal gives guidance to adding accessory structures next to a manufactured home.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
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4. *Return this completed form to: Indiana Department of Homeland Security, Code Services, 402 West Washington Street, Room W246, Indianapolis, Indiana 46204.*

FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number # 349

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **AE505.1 General.**	Page Number **1 of 1, codebook page 857**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address (*number and street, city, state, and ZIP code*) **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows ___ Add to read as follows _X_ Delete and substitute as follows ___ Delete without substitution

AE505.1 General. The alteration, replacement, or addition to the building service equipment, other than that required for the initial installation of the manufactured home, shall conform to the regulations set forth in this code.

REASON STATEMENT AND FISCAL IMPACT

This proposal gives guidance to additional service equipment supplemental to the manufactured home.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

1. *Only a TYPED copy will be accepted.*
2. ~~*Dashed line through material to be deleted.*~~ *Underline or bold face material to be added.*
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FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number #350

Code title: **Indiana Residential Code**	Edition: **2020**
Section number and title: **AE507.1 General.**	Page Number: **1 of 1, codebook page 857**
Proponent: **Craig Wagner**	Representing (if applicable): **IABO**
Address (*number and street, city, state, and ZIP code*): **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number: **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE ***(check one)***

_X_ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

AE507.1 General. *Alterations* made to a *manufactured home* subsequent to its initial installation shall conform to the occupancy, fire safety and energy conservation requirements set forth in ~~the *Manufactured Home* Standards.~~ or referenced by, the applicable rules of the Fire Prevention and Building Safety Commission.

REASON STATEMENT AND FISCAL IMPACT

This proposal gives guidance to the rules for alterations to the manufactured home.

Fiscal impact: No fiscal impact, explanatory only.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number #351

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **AE604.3 Resistance to weather deterioration.**	Page Number **1 of 1, codebook page 858**
Proponent **Craig Wagner**	Representing (if applicable) **IABO**
Address *(number and street, city, state, and ZIP code)* **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

X Change to read as follows ___ Add to read as follows ___ Delete and substitute as follows ___ Delete without substitution

AE604.3 Resistance to weather deterioration. All anchoring *equipment*, tension devices and ties shall have a resistance to deterioration as required by this code. All anchoring equipment surfaces exposed to weathering shall have a resistance to weather deterioration at least equivalent to that provided by a coating of zinc on steel of not less than 0.625 ounces per square foot.

REASON STATEMENT AND FISCAL IMPACT

This proposal details the minimum requirement for protection of anchoring devices exposed to weathering.

Fiscal impact: No fiscal impact since anchoring devices already meet this requirement, would apply to rarely used site built devices.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received 11/11/2018	Code 2018 IRC	Proposal number #352

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **Appendixes F through T**	Page Number **1 of 1, codebook pages 861-943**
Proponent **Craig Wagner**	Representing (If applicable) **IABO**
Address (*number and street, city, state, and ZIP code*) **220 W Van Buren St, Ste 204, Columbia City, IN 46725**	Telephone number **260-248-3111, cell 260-212-2943**

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows __ Delete and substitute as follows _X_ Delete without substitution

Delete Appendixes F through T without substitution.

REASON STATEMENT AND FISCAL IMPACT

This proposal deletes informative appendixes not part of the prescriptive rule.

Fiscal impact: No fiscal impact

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received 11/14/2018	Code 2018 IRC	Proposal number #353

Code title **Indiana Residential Code**	Edition **2020**
Section number and title **R313.2 One- and Two-family dwellings automatic fire systems.**	Page Number **1 of 1**
Proponent **Bobby LaRue**	Representing (if applicable) **Monroe County Building Department**
Address *(number and street, city, state, and ZIP code)* **501 N. Morton Street, Bloomington, IN 47404**	Telephone number 812.349.2580

PROPOSED CODE CHANGE *(check one)*

Change to read as follows Add to read as follows Delete and substitute as follows x Delete without substitution

Delete the text of Section 310.1, Exception 2 in its entirety.

REASON STATEMENT AND FISCAL IMPACT

No cost.
Similar language to this was introduced by the sprinkler industry to the building code. It seems that this exception is the extension of that change. The change was passed in the committee by an 8 – 6 vote and was disapproved by a majority of ICC voting members on two separate occasions but did not receive a 2/3 majority in order to overturn the committee. Removing emergency escape and rescue openings from sleeping rooms represents a significate disadvantage in an emergency situation.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received 11/13/2018	Code 2018 IRC	Proposal number #354

Code title: Indiana Residential Code	Edition: 2020
Section number and title: R905.1.2 Ice barriers	Page number: 1 of 1
Proponent: John Cochran, Bose Public Affairs Group	Representing (*if applicable*): Amos Exteriors, Inc.
Address (*number and street, city, state, and ZIP code*): 111 Monument Circle, Suite 2700, Indianapolis, IN 46204	Telephone number: (317) 684-5408

PROPOSED CODE CHANGE *(check one)*

☑ Change to read as follows ☐ Add to read as follows ☐ Delete and substitute as follows ☐ Delete without substitution

R905.1.2 Ice barriers.

~~In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2(1), an~~ An ice barrier shall be installed for asphalt shingles, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, and wood shakes. The barrier shall consist of not fewer than two layers of underlayment cemented together, or a self-adhering polymer-modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point not less than 24 inches (610 mm) inside the exterior wall line of the building, measured horizontally. On roofs with slope equal to or greater than eight units vertical in 12 units horizontal (67-percent slope), the ice barrier shall also be applied not less than 36 inches (914 mm) measured along the roof slope from eave edge of the building.

Exception: Detached accessory structures not contained conditioning floor area.

REASON STATEMENT AND FISCAL IMPACT

The proposal also clarifies that the 24" dimension is measured horizontally and not along the plane of the roof. This is not widely understood in the roofing trades. If the distance of ice barrier coverage were to be measured by the slope, the extent to which a roof is protected over the inside of the home would depend significantly on the length of the overhang as well as the slope of the roof.

The fiscal impact would be minimal, if any, depending on the home.

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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FOR OFFICE USE ONLY		
Received: 11/16/2018	Code: 2018 IRC	Proposal number: #355

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **R905.1.2 Ice barriers**	Page Number
Proponent: **Bill Kaufholz**	Representing (if applicable): **Fischer Homes**
Address (*number and street, city, state, and ZIP code*)	Telephone number

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows _X_ Delete and substitute as follows ___ Delete without substitution

R905.1.2 Ice barriers

An ice barrier shall be installed for asphalt shingles, metal roof shingles, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles and wood shakes. The ice barrier shall consist of not fewer than two layers of underlayment cemented together, or a self-adhering polymer-modified bitumen sheet shall be used in place of normal underlayment and extend from the lowest edges of all roof surfaces to a point not less than 24 inches (610 mm) outside the exterior wall line of the building. The 24 inch measurement shall be along the slope of the roof from the point where the projected outside face of the wall intersects the roof deck. See Figure 905.1.2 (a). On roofs with slope equal to or greater than eight units vertical in 12 units horizontal (67-percent slope), the ice barrier shall also be applied not less than 36 inches (914 mm) measured along the roof slope from the eave edge of the building.

Exception 1: Detached accessory structures not containing conditioned floor area

Exception 2: If an attic/roof section is insulated to a minimum of R-38 uncompressed over the outside face of the exterior wall

See pg. 2 for Figure 905.1.2 Ice barriers

REASON STATEMENT AND FISCAL IMPACT

Reason:

Fiscal impact:

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

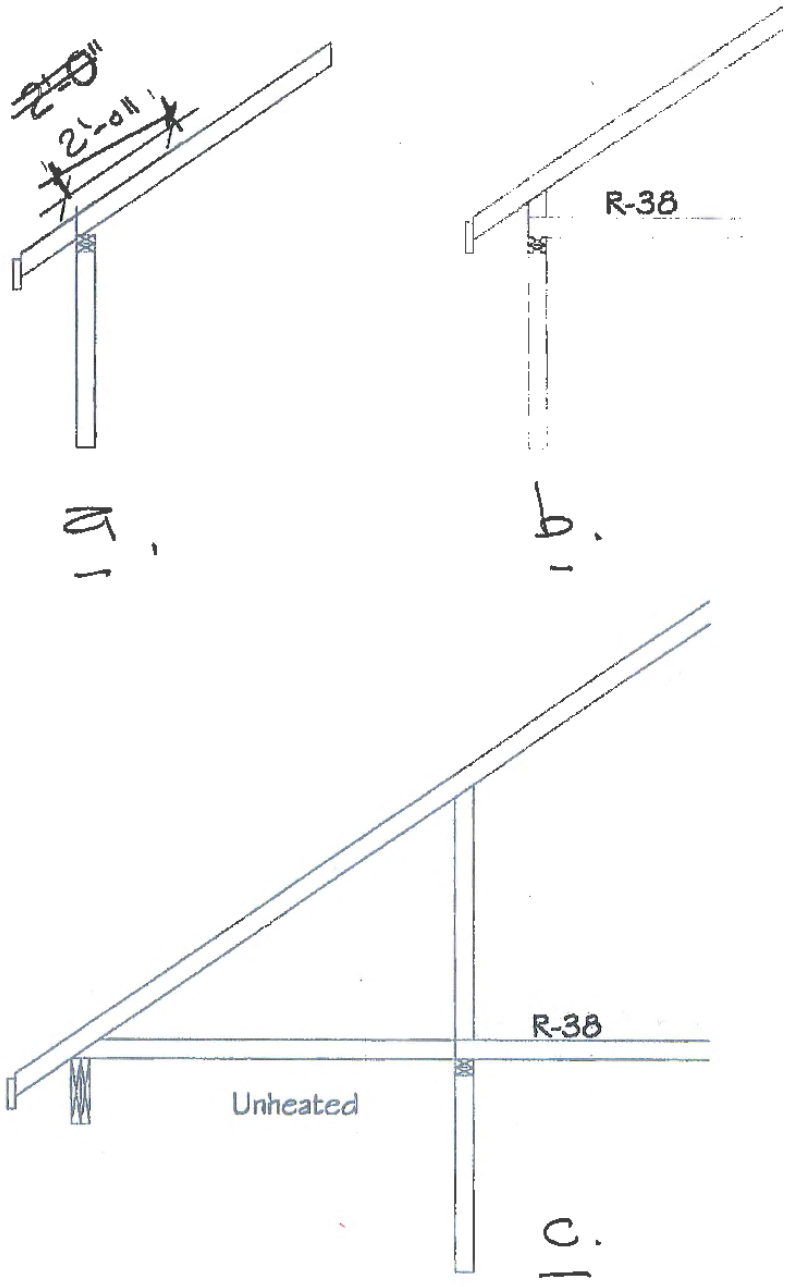

FIGURE 905.1.2 ICE BARRIERS

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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FOR OFFICE USE ONLY		
Received 11/16/2018	Code 2018 IRC	Proposal number #356

Code title **International Residential Code**	Edition **2018**
Section number and title **N1103.3.5 Building cavities**	Page Number
Proponent **Bill Kaufholz**	Representing (if applicable) **Fischer Homes**
Address (*number and street, city, state, and ZIP code*)	Telephone number

PROPOSED CODE CHANGE ***(check one)***

_X_ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

N1103.3.5 Building cavities (Mandatory).
Building framing cavities shall not be used as supply ducts or plenums.

REASON STATEMENT AND FISCAL IMPACT

Reason:
This maintains the current code language and allows building cavitles to be used for return ducts. Changing the testing from Total leakage to Leakage to Outside that we approved a few meetings ago allows this exception to be valid.

Fiscal impact: **Requiring all homes to have fully ducted return ducts will add $2,000-$5,000/new home.**

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received 11/14/2018	Code 2018 IRC	Proposal number #357

Code title **International Residential Code**	Edition **2018**
Section number and title **E3501 Electrical definitions**	Page Number
Proponent Charlie Eldridge	Representing (if applicable) Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*) 551 Grassy Ln., Indianapolis, IN 46217	Telephone number (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

_X_ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

Change Section E3501 Electrical definitions as follows:

(1) Delete the definition of APPROVED and substitute to read as follows: See the definition of APPROVED in Section R202.
(2) Delete the definition of BRANCH CIRCUIT, GENERAL PURPOSE and substitute: A branch circuit that supplies two or more receptacles or outlets for lighting and appliances.
(3) Change the definition of Grounding Conductor, Equipment to read as follows: The conductor used to connect the noncurrent-carrying metal parts of equipment, raceways, and other enclosures to the system grounded conductor or the grounding electrode conductor, or both, at the service equipment or at the source of a separately derived system.
(4) Change the definition of Grounding Electrode Conductor to read as follows: The conductor used to connect the grounding electrode(s) to the equipment grounding conductor or to the grounded conductor, or to both, at the service equipment, at each building or structure where supplied by a feeder(s) or branch circuit(s), or at the source of a separately derived system.
(5) Delete the definition of LABELED and substitute as follows: See the definition of LABELED in Section R202.
(6) Delete the definition of LISTED and substitute to read as follows: See the definition of LISTED AND LISTING in Section R202.

REASON STATEMENT AND FISCAL IMPACT

Reason:
The electrical definitions in E3501 above were extracted directly from the electrical definitions in the 2005 Indiana Residential Code

Fiscal impact: ***No fiscal impact***

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received: 11/14/2018	Code: 2018 IRC	Proposal number: # 358

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3601.2 Number of services**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows _X_ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E3601.2 Number of services.
One- and two-family dwellings shall be supplied by only one service. (230.2)
Exception: A building with more than one occupancy shall be permitted to have one set of service-entrance conductors for each service, run to each occupancy.

REASON STATEMENT AND FISCAL IMPACT

Reason:
To make clear that each occupancy (dwelling unit) is permitted to have their own service equipment.

From the NEC:
230.40 Number of Service-Entrance Conductor Sets.
Each service drop, set of overhead service conductors, set of underground service conductors, or service lateral shall supply only one set of service-entrance conductors.
Exception No. 1: A building with more than one occupancy shall be permitted to have one set of service-entrance conductors for each service, as defined in 230.2, run to each occupancy or group of occupancies.

Fiscal impact: ***No Fiscal Impact***

REVIEW RECOMMENDATION

Approve
Reject
Approve as amended
Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received: 11/14/2018	Code: 2018 IRC	Proposal number: # 359

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3606.3 Available short-circuit current**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows __ Add to read as follows __ Delete and substitute as follows _X_ Delete without substitution

E3606.3 Available short-circuit current.
Service equipment shall be suitable for the maximum fault current available at its supply terminals~~, but not less than 10,000 amperes~~. (110.9)

REASON STATEMENT AND FISCAL IMPACT

Reason:
Brought forward from the 2005 IRC. There are many areas where more than 5000 amperes of fault current is simply not available. This is especially true of areas where overhead service drops are employed since electric utilities normally size their service drops for open air and not inside conduits or buildings. This is also true where service laterals have more length to smaller 100 ampere services especially with smaller transformers. There is no reason to not permit the use of 5 kAIC circuit breakers to be used in those areas.

From the NEC:
110.9 Interrupting Rating.
Equipment intended to interrupt current at fault levels shall have an interrupting rating at nominal circuit voltage at least equal to the current that is available at the line terminals of the equipment.
Equipment intended to interrupt current at other than fault levels shall have an interrupting rating at nominal circuit voltage at least equal to the current that must be interrupted.

Fiscal impact: ***No Fiscal Impact***

REVIEW RECOMMENDATION

Approve

Reject

Approve as amended

Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

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FOR OFFICE USE ONLY		
Received: 11/14/2018	Code: 2018 IRC	Proposal number: #360

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3608.1.2 Concrete-encased electrode**	Page Number
Proponent: Charlie Eldridge	Representing (if applicable): Consultant for the Indianapolis Power & Light Company
Address (*number and street, city, state, and ZIP code*): 551 Grassy Ln., Indianapolis, IN 46217	Telephone number: (317) 370-3444

PROPOSED CODE CHANGE *(check one)*

___ Change to read as follows _X_ Add to read as follows ___ Delete and substitute as follows ___ Delete without substitution

E3608.1.2 Concrete-encased electrode.
A concrete-encased electrode consisting of not less than 20 feet (6096 mm) of either of the following shall be considered as a grounding electrode:
1. One or more bare or zinc-galvanized or other electrically conductive coated steel reinforcing bars or rods not less than 1/2 inch (13 mm) in diameter, installed in one continuous 20-foot (6096 mm) length, or if in multiple pieces connected together by the usual steel tie wires, exothermic welding, welding, or other effective means to create a 20-foot (6096 mm) or greater length. Where the steel reinforcing bars or rods are not less than ½ inch diameter, it shall be permitted to turn the reinforcing bars or rods up into the building cavity for connection to the grounding electrode conductor. The reinforcing bars or rods shall be isolated and protected from contact with the soil. The connection to the reinforcing bars or rods shall not be required to be accessible if listed clamps suitable for direct burial or exothermic welds are utilized.

REASON STATEMENT AND FISCAL IMPACT

Reason:
This has become a common and acceptable practice but is actually prohibited by R404.1.2.3.7.4.

Fiscal impact: ***No Fiscal Impact***

REVIEW RECOMMENDATION

Approve

Reject

Approve as amended

Further study

PROPOSAL FOR CODE CHANGE

State Form 41186 (R3 / 5-10)

INSTRUCTIONS:

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FOR OFFICE USE ONLY		
Received: 11/16/2018	Code: 2018 IRC	Proposal number: # 361

Code title: **International Residential Code**	Edition: **2018**
Section number and title: **E3702.13 Electric vehicle branch circuit**	Page Number
Proponent: **Lynn Madden**	Representing (if applicable): **Hallmark Homes**
Address (*number and street, city, state, and ZIP code*)	Telephone number

PROPOSED CODE CHANGE *(check one)*

_X_ Change to read as follows __ Add to read as follows __ Delete and substitute as follows __ Delete without substitution

E3702.13 Electric vehicle branch circuit

When outlets are installed for the purpose of charging electric vehicles, such outlets shall be supplied by an individual branch circuit. Each circuit shall not supply other outlets

REASON STATEMENT AND FISCAL IMPACT

Reason:
To provide clarity that the outlets are not required, but also guidance for proper installation should someone choose to install them.

Fiscal impact:

REVIEW RECOMMENDATION

Approve

Reject

Approve as amended

Further study