



State of New Hampshire
OFFICE OF PROFESSIONAL LICENSURE AND CERTIFICATION
DIVISION OF LICENSING AND BOARD ADMINISTRATION
 7 Eagle Square, Concord, NH 03301
 Phone: 603-271-2152

FOR BOARD USE ONLY
Provider Number Assigned: _____

RECEIVED

SEP 26 2022

OPLC-FINANCE

Net

Request for Course Approval

Submitted By: RONALD J HENNESSEY	Date: SEPT 22, 2023
Location of Course: LYNN MA 01902	
Course Title: 2023 NATIONAL ELECTRICAL CODE CHANGES COURSE	
Instructors Name(s): RONALD J HENNESSEY	
Contact Name: RONALD J HENNESSEY	Contact Phone: 508-364-5305
Contact E-Mail: RONHEN@COMCAST.NET	
Education Hours Per Day: 8 hours	Number of Days: 2 Days
<u>Method of Presentation</u>	
Types of audio equipment utilized:	
Types of visual equipment utilized: IAEI POWER POINT / MIKE HOLT POWER POINT	
Virtual Classroom: No more than 25 per class	
<u>For all Submissions Please Include:</u>	
<p>The provider's resume(s). (This includes all providers' instructing the course). A copy of the provider's electrician license(s). (This includes all providers' instructing the course). If not licensed in NH, a certified letter from the licensing agency verifying that the provider has a valid license in good standing.</p> <p><input type="checkbox"/> A course outline with the significant changes made in the instruction for the current code cycle. <input type="checkbox"/> A course curriculum, which shall include the name of the program or the course material utilized. A sample course certificate that includes the following:</p> <ul style="list-style-type: none"> <input type="checkbox"/> ➤ Provider's name, business address and telephone number; <input type="checkbox"/> ➤ Year of the code change; ➤ Name and electrician number of the electrician completing the course; ➤ Date of code completion; ➤ Number of hours provided in course; and ➤ Provider's signature. 	
<p>I agree to cover the NH Laws, Rules, Common Deficiencies and an awareness of NFPA 70E as part of or in addition to the 15 hours required.</p>	
<p><input checked="" type="checkbox"/> I grant the Board permission to visit the program site for the purpose of assessing compliance with the Board's requirements for approval of licensing courses.</p>	
<p>Signature: <i>Ronald J Hennessey</i></p>	

$$1 + x_1 = 3_1$$

$$x_1 = 2$$

$$2 + 2 \times 2 = 6$$

TO: Providers of the 15 hours of continuing education on the 2020 NEC

The 2020 National Electrical Code is being published and will be distributed throughout the country. The NH Electricians' Board is accepting inquiries from prospective continuing education providers for approval by the Electricians' Licensing Board to teach the 2020 NEC code changes.

The Electricians' Board Education Committee has standardized guidelines for all providers to follow in developing their course outline and operation.

1. Providers shall submit, in writing, an outline of the course with their application.
2. Providers shall submit, in writing, to the Electricians' Licensing Board all scheduled 15-hour code courses with the time, date, and address where course will be held. (It's a possibility a Board member representative could attend to monitor the course.)
3. Attendance shall to be taken three times during the scheduled day ... at the beginning of the day, after lunch break, and at the end of the day. Picture ID and Electrician's license are required for proof at registration and for proof of course completion before certificate is issued.
4. Classes must start and end at the scheduled time. Breaks and lunchtime are not considered part of the 15 hour class time.
5. One of the fifteen hours must include changes to RSA 319, the Administrative Rules, and to the list of 'Commonly Found Licensing Concerns and Installation Deficiencies' provided by the Electricians' Licensing Board.

RSA 319-C, Administrative Rules and the list of 'Commonly Found Licensing Concerns and Installation Deficiencies' can be found on the NH Electricians' Board web site.

<https://www.oplc.nh.gov/electricians/forms.htm>

The Electricians' Board is going to continue the requirement for providers to submit the names of course attendees with New Hampshire licenses electronically. As in the 2014 cycle, we will not accept certificates as proof of continuing education for actual license renewal.

Once applications for new providers are approved the provider will receive a test packet and instructions for the electronic submittal. A provider number will be issued when the test submittal is received. Previously approved providers must acquire Board approval each code cycle.

The Electricians Board would like to thank all past continuing education providers for the service you have provided the electricians and citizens of our State. Your courses have kept New Hampshire on the cutting edge for highly trained electricians.

If you have any questions, please contact or write the Electricians' Licensing Board.



RONALD J HENNESSEY

2023 National Electrical Code 15 Hour Update Course

Syllabus

- Instructor:** RONALD J HENNESSEY
- Class Location:** (Polish American Hall, 12 Cheever St Danvers, Ma 01923)
(Lynn Vocational Technical, 80 Neptune Blvd Lynn Ma 01902)
- Telephone:** (C) 508-364-5305
- Email:** (RONHEN@COMCAST.NET)
- Class Hours:** (7:00am-4:00pm in Danvers Ma)
(4:30pm-9:45pm in Lynn Ma)
- Meeting times:** (Saturday and Sunday in Danvers Ma)
(Monday and Wednesday Nights in Lynn Ma)
- Classroom:** (Up to 25 Electricians)

Course Description

The 15 hour 2023, National Electrical Code Change Class is to inform the licensed Electricians of the 2023 NEC Code changes. During this class, I will be able to answer many of the questions regarding the rules and laws governed by the Board of Electricians. I will show and explain the Boards web site where the Electricians can get all different types of forms needed and show them how to check an electrical license, change an address, and apply for their Master's license.

Course Learning Objectives

The electrician shall be able to recognize the 2023 National Electrical Code changes. Be able to find the changes in the codebook. Be able to maneuver through the codebook to find answers to

the questions you might have. To properly understand what the appendix's are and how to use them along with understanding the Informational Note.

Textbook

The electrician will need a copy of the 2023 National Electrical Code Book. The 2023 National Code Book can be purchased at the class.

Other Readings

Current addition of NFPA 70E will be reviewed along with the State of New Hampshire RSA 319-C Administration Rules.

Other equipment

Calculator, pens, pencils, and a colored highlighter

Grading Standards

No grades for this course. A certificate will be given upon completion of all the requirements listed below.

Course Requirements

The electricians must attend all 15 hours of the class to receive full credit and a certificate. An hour is equal to 60 minutes. If the electricians is going to be late or absent then refer to the section below.

Policy on being late and/or missed classes

Missed time or missed classes will be made up later. No completion certificate will be given to the electrician until all time and classes are made up. If the licensee misses or is late for a class, he will need to make up that portion of the class he was late for or missed.

Schedule

Each class will be advertised in a variety of ways and the class time schedule will be adhered too.

REFUND POLICY

Any deposit sent in, is to reserve a spot in the class and will not be cashed before the class starts. This allows the licensee to change his /her mind. If the attendee participates in any portion of the class the refund will be proportional.

RONALD J. HENNESSEY

15 HOUR SYLLABUS FOR ELECTRICAL CONTINUING EDUCATION DAY ONE

7:00-9:30AM---- NATIONAL ELECTRICAL CODE CHANGES

9:30-9:45AM----COFFEE BREAK (15 minutes)

9:45-12:00PM----NATIONAL ELECTRICAL CODE CHANGES

12:00-12:30PM----LUNCH (30 minutes)

12:30- 3:00PM---- NATIONAL ELECTRICAL CODE CHANGES

3:00- 3:45PM----QUESTIONS AND ANSWERS

Course materials used

- International Association of Electrical Inspectors 2023 Code Changes
- Mike Holt 2023 Code Changes



RONALD J. HENNESSEY

15 HOUR SYLLABUS FOR ELECTRICAL CONTINUING EDUCATION DAY TWO

7:00-9:30AM---- NATIONAL ELECTRICAL CODE CHANGES ALONG
WITH THE MASSACHUSETTS AMENDMENTS

9:30-9:45AM----COFFEE BREAK (15 minutes)

9:45-12:00PM----NATIONAL ELECTRICAL CODE CHANGES

12:00-12:30PM----LUNCH (30 minutes)

12:30- 3:00PM---- NATIONAL ELECTRICAL CODE CHANGES

3:00- 3:15PM----QUESTIONS AND ANSWERS

3:15- 4:15-----RSA 319 NEW HAMPSHIRE ADMINISTRATION RULES
AND NFPA 70E
(PASS OUT CERTIFICATES TO NEW HAMPSHIRE LICENSEES)

Course materials used

- International Association of Electrical Inspectors 2023 Code Changes
- Mike Holt 2023 National Electrical Code Changes
- Review NFPA 70E
- RSA-319 New Hampshire Administration Rules



Ronald J. Hennessey
4 Chase Terrace
Beverly Ma 01915
508-364-5305

OBJECTIVE: To continue in the Electrical Field

EMPLOYMENT HISTORY:

- 9/97-Present Lynn Vocational Technical Institute
Lynn, MA
Electrical Instructor
- 9/12-Present City of Lynn
Lynn MA
Electrical Inspector (Assistant)
- 9/97-Present Lynn Vocational Technical Evening School
Lynn, MA
Electrical Instructor
(Journeyman, Masters, 15 hour Code Review)
- 9/94-1/12 Ronald J Hennessey Electrician
Danvers, MA
Electrical Business
- 9/94-6/97 Southeastern Regional Vocational High School
South Easton, MA
Electrical Instructor
- 9/93-6/97 Town Of Boxford
Boxford, MA
Electrical Inspector
- 11/75-7/91 Moulison Electric
Georgetown, MA
Industrial Electrician

EDUCATION:

1996-Present University of Massachusetts
Occupational Teachers Program
1973 Graduate Danvers High School
Danvers, MA 01923

SIGNIFICANT ACCOMPLISHMENTS:

Massachusetts Journeyman Electrical License (E24572)
Massachusetts Master Electrical License (A14054)
New Hampshire Master Electrical License (10816M)
Maine Master Electrical License (MS60018213)
Massachusetts Occupational Teacher's License (502519)
Massachusetts License 15 Hour Continuing Education Instructor
New Hampshire License 15 Hour Continuing Education Instructor
Maine License 15 Hour Continuing Education Instructor
Rhode Island 15 Hour Continuing Education Instructor

ACTIVITIES:

2010-2011 9th Grade Danvers High Football Coach

1995-Present Knights of Columbus

1981-2004 Little League Baseball Coach

1991-2006 Youth Football Coach

INTERESTS: Family, Sports, Politics, and Radio Talk Shows

REFERENCES: Furnished upon request

The State Of New Hampshire

This is to certify that:

RONALD J HENNESSEY

New Hampshire License 111117

*Has completed 15 hours of Continuing Education Covering 2023
National Electrical Code and RSA 319 and NFPA 70E
for the State Of New Hampshire*

Ronald J Hennessey

4 Chase Terrace

Beverly Ma 01915

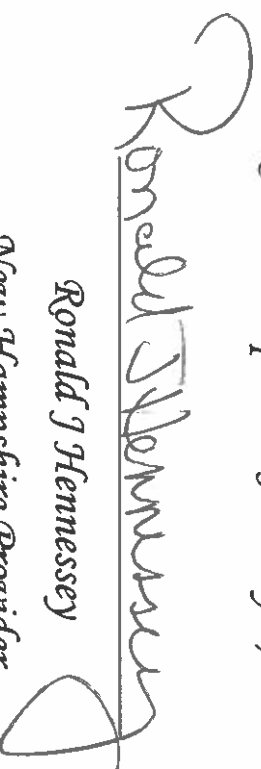
508-364-5305

MA-A14054 NH-10816M

Course completion January 1, 2023

Ronald J Hennessey

New Hampshire Provider













State of New Hampshire

OFFICE OF PROFESSIONAL LICENSURE AND CERTIFICATION
DIVISION OF TECHNICAL PROFESSIONS

121 South Fruit Street, Suite 201
Concord, N.H. 03301-2412
Telephone 603-271-2219 · Fax 603-271-7928

JOSEPH G. SHOEMAKER
Director

DAVID GROSSO
Executive Director



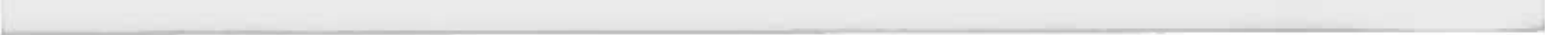
Electrical Licensing, Installation Concerns and Amendments In the State of New Hampshire 2020

The Electricians' Board (Board) in conjunction with the State Electrical Inspectors, municipal electrical and building inspectors and other representatives of the electrical industry in the State of New Hampshire have put together this list of installation concerns. Included are problems encountered by the Office of Professional Licensure, Technical Division (OPLC), office staff relative to the state's electricians licensing law RSA 319-C and the Electricians Board's administrative rules along with current amendments to the 2017 National Electrical Code NFPA70. The Board welcomes any input from instructors, inspectors, licensees and other concerned parties relative to this list or any other items of concern.

To all licensees: All licensees are required to complete their 15 hours of code change continuing education on the 2020 NEC between January 1, 2020 and December 31, 2020 regardless of when they renew their license. All licensees who renew in 2020 will have the entire year to complete their 15-hour code update. Any licensee who does not complete the required 15-hour update with a NH approved provider by December 31, 2020 will have their license listed as invalid on January 1, 2021.

The 2020 NEC adoption date is unknown at this time, check the Boards website for any updates, as part of the State Building Code RSA 155-A, specifically 155-A:1 IV. Some local municipalities may adopt the 2020 NEC at an earlier date therefore; it is recommended that you check with the local authority before starting an installation. Regardless of which edition of the NEC is enforced by the local municipality, installations in the State of New Hampshire must meet the minimum requirements of the current edition of the NEC as adopted by the NH Legislature as part of RSA 155-A.

Although adopting electrical installation codes and standards is the responsibility of the NH Legislature, Journeyman and Master Electricians should be aware, that continuing education for license renewal is the responsibility of the Electricians' Board. No matter which edition of the NEC is adopted as the state's electrical installation code, the Electrician's Licensing Board will base the continuing education requirements for license renewal on the most current edition of the



The following text is extremely faint and largely illegible. It appears to be a list or index of items, possibly related to a collection or inventory. The text is organized into several columns and rows, with some items appearing to be numbered or categorized.

Due to the low contrast and resolution of the scan, the specific details of the text cannot be accurately transcribed. The visible fragments suggest a structured list, possibly including names, dates, or identifiers.



Licensing Concerns

NEC as published by the National Fire Protection Association. Only Board approved continuing education courses based on the changes to the 2020 NEC will be accepted.

1. Licensees and apprentices must notify the Board's office if you have a change of address within **30 days**.

2. Apprentices should be aware that in order to perform electrical installations for heat, light and power purposes they must be employed by a master electrician or other employer who is not in the primary business of performing electrical installations, but also employs a NH master electrician from whom the apprentice electrician receives direct supervision. **They cannot perform installations on their own or as a subcontractor.**

3. Master and journeyman electricians should be aware of the following:

a. Master electricians need to be aware that they **cannot obtain a permit** for a journeyman electrician to perform an electrical installation. Even if the journeyman is receiving direction and supervision from the master electrician, as defined in RSA 319-C:2 a journeyman electrician must be employed by the master electrician. The Board considers procuring a permit for a journeyman electrician who is not employed by the master electrician as unprofessional conduct that affects the practice of the trade. As noted in RSA 319-C:12 II, misconduct sufficient to support disciplinary proceedings includes (c) any unprofessional conduct or dishonorable conduct unworthy of, and affecting the practice of the trade.

b. Journeyman licensees should be aware that in order to perform electrical installations for heat, light and power purposes, they must be employed by a master electrician. **They cannot perform installations on their own or as a subcontractor.**

4. The master licensee who employs electricians/apprentices or the corporate master of record for a corporation should be aware that they are responsible for:

a. Verifying that the licensees in their employ have valid licenses and all apprentices have active apprentice ID cards.

b. Verifying the ratios of licensees to apprentices performing electrical installations on the job site are in compliance as required below in **RSA 319-C:2-a Supervision of Apprentice Electricians.**

c. Periodically inspecting the work of the journeyman licensees in their employ and performing a final inspection of the journeyman's completed installation.

319-C:2-a Supervision of Apprentice Electricians. –

I. A journeyman electrician shall directly supervise no more than one apprentice in the first year following his or her initial date of licensure. A journeyman electrician may have 2 apprentice electricians under his or her direct supervision beginning on the first anniversary of the journeyman electrician's initial date of licensure.



Licensing Concerns

II. Each journeyman electrician on a work site may have 2 apprentice electricians working under his or her direct supervision, to a maximum of 3 journeyman electricians per work site. Each additional journeyman electrician may have one apprentice electrician under his or her direct supervision.

III. Each master electrician on a work site may have 2 apprentice electricians working under his or her direct supervision, to a maximum of 6 master electricians per work site. Each additional master electrician may have one apprentice electrician under his or her direct supervision.

IV. The maximum number of licensed electricians with 2 apprentice electricians working under their direct supervision on a work site shall not exceed 6.

5. Master and journeyman electricians need to be aware they are not required to submit proof of the 15-hour update course when they renew their license. All Licensees are required to complete their 15 hours of continuing education on the 2020 NEC between January 1, 2020 and December 31, 2020, regardless of when their license expires. Any licensee who has not completed their update by December 31, 2020 will have their license listed as invalid, which is equivalent to working without a license. Submitting proof of continuing education will be done electronically by the provider. Master and journeyman electricians are responsible to verify that the provider is approved by the Electrician's Licensing Board prior to attending a continuing education seminar. The Electrician's Licensing Board shall approve all providers whether they are conducting courses within or outside of the State of New Hampshire. Master and journeyman electricians should still receive a certificate from the provider for their own proof of attending the course.

6. New certification for private third party electrical inspections (HB271 Effective Date: June 6, 2019)

I. The board shall adopt rules under RSA 319-C:5-a requiring any entity engaging a person [to conduct] who conducts residential electrical inspections for up to 4 contiguous units, which shall be considered a level 1 inspector, or a person who conducts all types of electrical inspections, which shall be considered a level 2 inspector, who is conducting third-party electrical inspections of electrical installations in this state to have the person conducting the inspection be approved by the board. The board shall determine the qualifications necessary for approval as a level 1 or level 2 electrical inspector. The board shall maintain and make available a list of such persons approved for level 1 or level 2 third-party electrical inspections. The approval of a person to conduct either level of third-party electrical inspections shall not prohibit a city or town that has established inspections under RSA 47:22 or RSA 674:51 from contracting with any person of its choice to perform third-party electrical inspections.



Electrical Installation Concerns in the State of New Hampshire 2020

1. The use of electrical equipment without following the manufacturer's instructions

Section 110.3 (B) requires equipment that is listed, labeled, or both shall be installed and used in accordance with any instructions included in the listing or labeling. New in the 2017 NEC 110.3 (C) expands this requirement to state that product testing, evaluation, and listing shall be performed by qualified electrical testing laboratories. If specific installation requirements are provided by the manufacturer, they must be adhered to by the installer. All too often, the information provided on or with electrical equipment is overlooked by the installers. An item frequently installed improperly is listed below.

Installation and securing of expansion fittings in runs of Rigid Polyvinyl Chloride (PVC) Conduit. Quite often, when expansion fittings are installed they are secured on the wrong end. The manufacturer's listing requires that the expansion fitting be secured on the "bell" (fixed) end. Notice should be taken when mounting the fitting in a vertical position: the fitting must be installed with the "bell" end above the sliding or expanding end. In addition, the conduit must meet the securing requirements of the applicable raceway article.

2. Proper securing and supporting of raceways and cables

Often we find that securing and supporting of raceways and cables has not met the requirements in the .30 sections of their respective articles. For example, we see raceways not properly secured within 3' of its termination.

3. Clearances: working space, clear spaces, headroom and dedicated equipment space

A number of concerns relating to the clearance requirements of 110.26 are often overlooked in the field. This section requires that access and working space be provided about electrical equipment to provide ready and safe operation and maintenance of the equipment.

The depth of working space described in 110.26(A)(1) is required about equipment operating at 1000 volts or less to ground that may require examination, adjustment, servicing, or maintenance while energized. The depth of the space must be determined in accordance with Table 110.26(A)(1) which is based on the conditions described in the table notes.

Section 110.26(A)(2) "Width of Working Space" requires the working space to be at least 30 inches in width or the width of the equipment whichever is greater. This section further requires that in all cases the door or hinged panel of the equipment must open at least 90 degrees.

Section 110.26(A)(3) "Height of Working Space" requires the height of the working space to be at least 6 feet 6 inches, measured from the floor, grade, or platform, or the actual height of the equipment itself whichever is greater. Other equipment or support structures, such as concrete pads, associated with the installation that is located within the working space is not permitted to extend more than 6 inches beyond the front of the electrical equipment requiring the working space.



Common Concerns

Section 110.26(B) “Clear Spaces” requires the working space to be kept clear by not allowing it to be used for storage.

Section 110.26(E) “Dedicated Equipment Space” requires that switchboards, switchgear, panelboards, and motor control centers are located in dedicated spaces and be protected from damage.

Section 110.26(E)(1)(a) mandates a clear space, only for equipment listed in 110.26(E), that is the depth and width of the equipment that extends to a height of 6 feet above the equipment or the structural ceiling whichever is lower for equipment installed in indoor locations. Only equipment associated with the electrical installation is permitted in this space.

In indoor installations where the structural ceiling height is greater than 6 feet, 100.26(E) (1) (b) permits foreign systems above the six-foot space where protection from leaks breaks or condensation has been provided.

Section 110.26(E)(2) also includes that outdoor installations shall comply with 110.26(E)(2)(a) through (E)(2)(c). A new exception in 2020 NEC states that structural overhangs or roof extensions shall be permitted in this zone.

4. The sealing of raceways

Although often overlooked, there are specific requirements in the NEC with regard to sealing raceways entering buildings. Water can enter raceways through couplings or it can build up from condensation resulting from the exposure to different temperatures. The intent of the requirement is to prevent water from entering equipment via the raceway system. Any type of sealing material used cannot have a deteriorating effect on the conductor insulation.

Section 300.7 Raceways Exposed to Different Temperatures.

Section 300.7(A) Sealing. Where portions of a raceway or sleeve are known to be subjected to different temperatures, and where condensation is known to be a problem, as in cold storage areas of buildings or where passing from the interior to the exterior of a building. A raceway or sleeve shall be filled with an approved material to prevent the circulation of warm air to a colder section of the raceway or sleeve. An explosionproof seal shall not be required for this purpose.

5. PVC installations subjected to physical damage

Schedule 40 PVC is often found emerging from grade where it would be considered subject to physical damage. There can be varying opinions as to whether a PVC installation would be considered “subject to physical damage”. Areas subject to physical damage may include grassy areas where lawn mowing or weed whacking might take place, a paved area that encompasses a walkway or driveway that would be subject to snow removal. Varying cold temperatures in New Hampshire make schedule 40 PVC more susceptible to fracture and is not identified for areas of physical damage. In most applications, the installation of schedule 80 PVC would satisfy any questions regarding an area that may be considered subject to physical damage.



Common Concerns

Section 300.5(D)(1) Emerging from Grade. Direct-buried conductors and cables emerging from grade and specified in columns 1 and 4 of Table 300.5 shall be protected by enclosures or raceways extending from the minimum cover distance below grade required by 300.5(A) to a point at least 2.5 m (8 ft.) above finished grade. In no case shall the protection be required to exceed 450 mm (18 in.) below finished grade.

Section 300.5(D)(4) Enclosure or Raceway Damage. Where the enclosure or raceway is subject to physical damage, the conductors shall be installed in electrical metallic tubing, rigid metal conduit, intermediate metal conduit, RTRC-XW, Schedule 80 PVC conduit, or equivalent.

6. The use of Flexible Cords and Flexible Cables, Article 400

Flexible cords and flexible cables are located in Chapter 4, Equipment for General Use and are not considered a Chapter 3 General Wiring Method. Unless specifically allowed elsewhere in the code, the “Uses Permitted” for flexible cords, flexible cables and power supply cords are described in Section 400.10 and Section 400.12 for Uses Not Permitted.

a. When cord is used to supply power to Electric-discharge and LED luminaires it must meet the requirements of section 410.62(c) as applicable.

b. When cord is used to supply power to a small window sign, ceiling mounted TV or overhead projector. When the items mentioned are installed adjacent to or under a suspended ceiling, the flexible supply cord is commonly passed through a hole in the suspended ceiling and the attachment plug of the flexible cord is then inserted into a receptacle above the suspended ceiling or when supplying a sump pump for an elevator pit, passing the flexible cord through the wall between the elevator mechanical room and the elevator shaft.

These types of flexible cord installation are a violation of Section 400.12(2), which prohibits the flexible cords from being passed through a hole in a fixed ceiling, wall, suspended or dropped ceiling and floors and Section 400.12(5) where concealed by walls, floors, or ceilings or located above suspended or dropped ceilings.

However a new exception for Section 400.12(5) has been added and states the flexible cord shall be permitted if contained within an enclosure for use in other spaces used for environmental air as permitted by 300.22(C)(3).

In 2020, a new informational note was added to Section 400.12, which gives guidance to see UL standard 817, Cord Sets and Power-Supply Cords, and UL 62, Flexible Cords and Cables.

7. Mini-Split wiring

With the recent advancement of heat pump technology, the installation of mini split cooling and heating systems have increased exponentially. With that increase, we are finding many licensing and installation concerns.



Common Concerns

1. The wiring for the indoor air handler as well as the outdoor condenser both meet the definition of an electrical installation according to RSA 319-C:2 III. Most of the wiring deficiencies that are found, such as incorrect wiring methods and ty-raping the cable to the lineset, are from installations performed by unlicensed individuals wiring from the indoor to the outdoor unit.

RSA 319-C:2 Definitions. –

III. "Electrical installations" means the installation, repair, alteration and maintenance of electrical conductors, fittings, devices and fixtures for heating, lighting or power purposes, regardless of the voltage.

2. The use of TC-ER-JP cable is permitted to be installed in **one or two family dwellings only** as permitted Article 336.10(9) to interconnect the indoor unit to the outdoor unit.

3. Whether using TC-JP-ER cable or UF cable to interconnect the indoor to the outdoor unit, both of these wiring methods are required to be installed per the requirements of Part II in Article 334.

4. The requirement for a service switch to open all ungrounded conductors at the indoor unit is often overlooked but it is required as per Article 440.14.

8. The improper connection of septic pumps

There are several different problems that can stem from septic pump installations. First, 430.102(A) requires the installation of a disconnecting means in sight from a motor controller location that disconnects the controller. In the case of the typical residential septic pump installation, the controller would be the float switch in the pump tank. Section 430.102(B) requires a disconnecting means in sight from a motor location to disconnect the motor. In this case, it is possible to satisfy both requirements with one disconnecting means located at the tank as the controller and the motor are both within site of the disconnecting means. Article 100 defines "in sight from" to be visible and within 50'. Therefore, there must be a disconnecting means that is visible and located no more than 50' from the pump motor. In most residential cases, the cords for the pump and controller (float switch) are supplied from a receptacle located near the tank so the attachment cap for the controller and pump cord can serve as the disconnecting means.

Often the homeowner does not want to see a pedestal with a receptacle and the cords so the attachment caps are cut off and the cords are wired directly (hard wired) into a junction box that is located in the tank. If the pump and controller have been hard wired many times there is no disconnect at all located within site from the motor or controller.

In some cases, the manufacturer prohibits the removal of the cord cap and float assembly end so this would be a violation of 110.3(B) installing in accordance with the manufacturer's requirements. In other cases, the receptacle has been installed inside the pump tank.



Common Concerns

Before making this kind of installation, consideration should be given to the issues of accessibility and corrosion. Also, depending on the size and type of the system, there may be sufficient hazardous vapor in the pump chamber to consider classification of the location. Classified locations are more common in commercial and industrial applications.

9. Signs or Marking of equipment

90.1 (A), Practical Safeguarding. Explains that the purpose of the NEC, is to provide a practical safeguarding of persons and property from hazards arising from the use of electricity. **91.1 (B) Adequacy** highlights that the requirements of the NEC are considered necessary for safety and states in part, that compliance with the NEC and proper maintenance should result in an installation that is essentially free from hazard.

Installers take pride in a compliant and workmen like installation but a lot of installer's overlook the importance of completing all the prescribed requirements and omit the signage or marking requirements. It is important to understand with each type of installation a different hazard exists. The number and type of signage and markings will vary based on the level of hazard, scope of work and its related specifications.

So the next time you complete an electrical installation, ask yourself, did I include all the signage and marking requirements for the safe operation and maintenance of this installation? Whether it is marking a panel-board's circuit directory or an emergency systems source, the safety of the end user, first responders' and electrical maintenance personal depend on it.

Some signage requirements below are overlooked in the field and required by the NEC.

Section 110.16 Arc-Flash Hazard Warning. Labeling is required on equipment that may require servicing while energized and on service equipment in other than dwelling units.

Section 110.24 (A) and (B) Available Fault Currents. Service equipment in other than dwelling units shall be labeled with the available fault current and the date when fault current calculation was performed.

Sections 700.7(A) - 701.7(A) - 700.2 (A) the NEC requires the following signage shall be placed at the service-entrance equipment that indicates the type and location of on-site by power sources.

Section 700.7(B) -701.7(B) -702.7(B) A warning sign is required to identify the shock hazard if the bonding jumper or grounding electrode conductor is removed while the source is energized.

Photovoltaic Systems are more popular than ever. The signage for this electric system is very important for the safety of the electrician, owners, and first responders to an emergency such as a fire in or on the roof of a structure.

Section 690.13(B) PV system disconnect, marking
Section 690.31(D) (2) PV DC circuits on or in a building



Common Concerns

Section 690.56(A)(B) & (C)(1) – (2) Rapid Shutdown Type

Section 705.10 Multiple Power Sources

Section 705.12(B)3) 2-3 Load-Side Source Connections

Section 230.85 new in the 2020 is a requirement for 1-and 2- family dwelling units with an option for 1 of 3 signage requirements for an emergency disconnect.

10. The installation of branch circuits supplying emergency lighting

The most common misunderstanding of the requirements for the installation of branch circuits that supply emergency lighting occurs in stairwells. An example of this would be where a single branch circuit has been utilized to supply all the luminaires in a stairwell from an emergency panelboard. This section explains how emergency lighting branch circuits are installed and to more clearly identify the section that applies to branch circuits. In 2020, Section 700.16 was reorganized to include requirements that the emergency control devices must be listed for use in emergency systems. In addition, emergency lighting systems shall be designed and installed so that the failure of any illumination source cannot leave in total darkness any space that requires emergency illumination. Equipment listed in accordance with 700.12 (F) shall be considered as meeting the provisions of this section.

Section 700.17 requires branch circuits supplying emergency lighting to provide service from a source complying with 700.12 when the normal supply for lighting is interrupted. Such installations shall provide either:

Section 700.17(1) An emergency lighting supply, independent of the general lighting supply, with provisions for automatically transferring the emergency lights upon the event of a failure of the normal lighting branch circuit.

The most common application of 700.17(1) is where a single branch circuit has been used to supply the normal lighting in a stairwell and unit equipment or luminaires with self-contained batteries have been installed to provide the emergency lighting. In this case, there are provisions for automatically transferring to the emergency lighting upon failure of the normal lighting branch circuit.

Section 700.17 (2) Two or more branch circuits supplied from separate and complete systems with independent power sources. One of the two power sources and systems shall be part of the emergency system, and the other shall be permitted to be part of the normal power source and system. Each system shall provide sufficient power for emergency lighting purposes.

The section goes on to explain that unless both systems are used for regular lighting purposes and both are kept lighted, means shall be provided for automatically energizing either system upon the failure of the other system. Either or both systems are permitted to be part of the general lighting of the protected occupancy if circuits supplying lights for emergency illumination are installed in accordance with other sections of Article 700.

The most common compliant application of 700.17(2) is where two branch circuits have been installed to supply the lighting in a stairwell. One branch circuit is supplied from the normal lighting panelboard and the other is supplied from the emergency lighting panelboard.



Common Concerns

Each of the circuits individually must supply a sufficient number of luminaires to provide the minimum required emergency egress lighting. In this case, we have independent power supplies and because we have, two branch circuits supplied by independent power we have complete and separate systems.

11. Prime mover shutdown for permanently installed generators

In the 2017 NEC, a 15 KW or under generator required a prime mover shut down. Over 15 KW required two prime mover shut downs. If a prime mover shut down is readily accessible, lockable in the open position, and is within sight (50') of the building or structure supplied, then a disconnect opening the ungrounded conductors would not be required.

A new requirement in the 2020 NEC 445.18(D) requires an emergency shutdown outside for a generator installed at a one and two-family dwelling.

12. Flush-mounted installations section 314.20

Section 314.20 Flush-Mounted Installations. Installations within or behind a surface of concrete, tile, gypsum, plaster, or other noncombustible material, including boxes employing a flush type cover or faceplate, shall be made so that the front edge of the box, plaster ring, extension ring, or listed extender will not be set back of the finished surface more than 6 mm (1/4 in.). Installations within a surface of wood or other combustible surface material, boxes, plaster rings, extension rings, or listed extenders shall extend to the finished surface or project therefrom. The installation of common non-metallic 4" round ceiling boxes with the mounting nails on the side must meet the 1/4" maximum setback and be properly secured to the framing member. Nailing these boxes on the very edge of the joist may not meet the minimum setback and could result in the splitting of the lumber, compromising the attachment of the box to the joist.



New Hampshire 2017 NEC Amendments

1. Amendment EL-17-01-17 The use of NM cable in other structures permitted to be Types III, IV or V construction is entered into Article 334 below. (Effective March 10, 2017)

Section 334.10, Uses Permitted. Type NM and Type NMC cables shall be permitted to be used in the following, except as prohibited in 334.12:

(1) One- and two-family dwellings and their attached or detached garages, and their storage buildings.

(2) Multi-family dwellings permitted to be of Types III, IV, and V construction.

(3) Other structures permitted to be of Types III, IV, and V construction. *Except as permitted by 334.10(6), cables shall be concealed within walls, floors, or ceilings that provide a thermal barrier of material that has at least a 15-minute finish rating as identified in listings of fire-rated assemblies.*

Exception to (2) and (3): For building or structures required to be of type I or II construction, type NM, type NMC and type NMS cables shall be permitted to be used, provided that where so applied in buildings or structures exceeding three stories above grade, circuits run in type NM, NMC and NMS shall not leave the floor or dwelling unit which the circuits originate.

Informational Note No. 1: Types of building construction and occupancy classifications are defined in NFPA 220 -2015, Standard on Types of Building Construction, or the applicable building code, or both.

Informational Note No. 2: See Informative Annex E for determination of building types [NFPA 220, Table 3-1].

(4) Cable trays in structures permitted to be Types III, IV, or V where the cables are identified for the use.

Informational Note: See 310.15(A)(3) for temperature limitation of conductors.

(5) Types I and II construction where installed within raceways permitted to be installed in Types I and II construction.

(6) Exposed within:

a. dropped and suspended ceiling cavities

b. accessible attics and spaces

c. unfinished basements and crawl spaces

Except as permitted by 334.30(B)(2) for connections to luminaires and equipment, cables shall be installed to closely follow the surface of framing members, running boards or the equivalent.

(A) Type NM. Type NM cable shall be permitted as follows:



NH 2017 NEC Amendments

(1) For both exposed and concealed work in normally dry locations except as prohibited in 334.10(3)

(2) To be installed or fished in air voids in masonry block or tile walls

(B) Type NMC. Type NMC cable shall be permitted as follows:

(1) For both exposed and concealed work in dry, moist, damp, or corrosive locations, except as prohibited by 334.10(3)

(2) In outside and inside walls of masonry block or tile

(3) In a shallow chase in masonry, concrete, or adobe protected against nails or screws by a steel plate at least 1.59 mm (1/16 in.) thick and covered with plaster, adobe, or similar Finish

Section 334.12 Uses Not Permitted.

(A) Types NM and NMC. Types NM and NMC cables shall not be permitted as follows:

(1) In any dwelling or structure not specifically permitted in sections 334.10(1), (2), (3), and (5)

(2) ~~Removed text and renumbered - Exposed within a dropped or suspended ceiling cavity in other than one- and two-family and multifamily dwellings.~~

~~(3)~~(2) As service-entrance cable

~~(4)~~(3) In commercial garages having hazardous (classified) locations as defined in section 511.3

~~(5)~~(4) In theaters and similar locations, except where permitted in section 518.4(B)

~~(6)~~(5) In motion picture studios

~~(7)~~(6) In storage battery rooms

~~(8)~~(7) In hoistways or on elevators or escalators

~~(9)~~(8) Embedded in poured cement, concrete, or aggregate

~~(10)~~(9) In hazardous (classified) locations, except where specifically permitted by other articles in this Code

(B) Types NM. Types NM cables shall not be used under the following conditions or in the following locations:

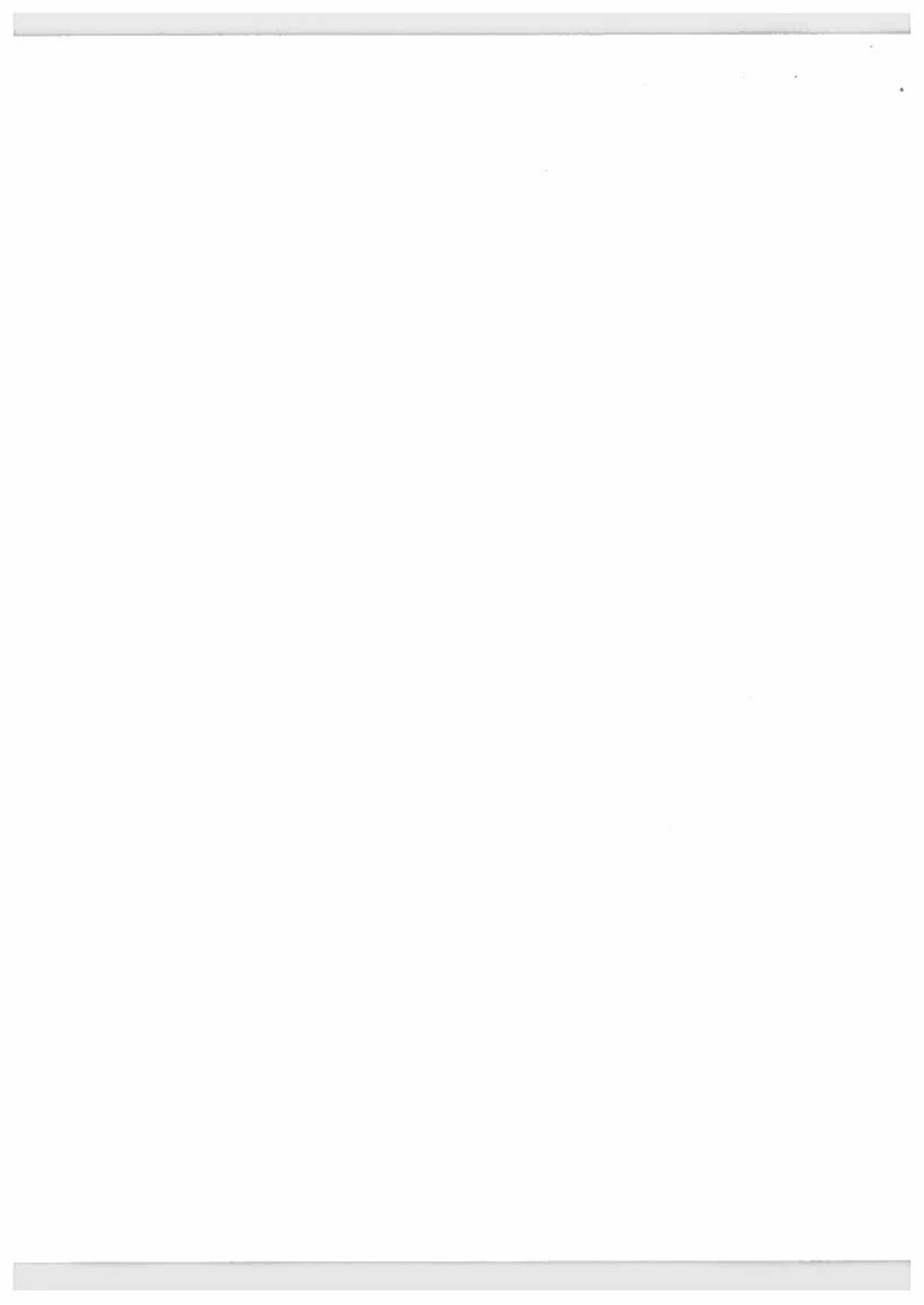
(1) Where exposed to corrosive fumes or vapors

(2) Where embedded in masonry, concrete, adobe, fill, or plaster

(3) In a shallow chase in masonry, concrete, or adobe and covered with plaster, adobe, or similar finish

(4) In wet or damp locations

Section 334.30(B)(2) Is not more than 1.4m(4 1/2ft.) from the last point of connection to a luminaire or other piece of electrical equipment and the cable and point of connection are within an accessible ceiling' ~~(Removed text) in one, two, or multifamily dwellings.~~



2. Section 210.5 Identification for Branch Circuits. (Effective February 10, 2017)

(C) Identification of Ungrounded Conductors. Ungrounded conductors shall be identified in accordance with 210.5(C)(1) or (2), as applicable

(1) Branch Circuits Supplied from More Than One Nominal Voltage System.

Where the premises wiring system has branch circuits supplied from more than one nominal voltage system, each ungrounded conductor of a branch circuit shall be identified by phase or line and system at all termination, connection, and splice points in compliance with 210.5(C)(1)(a) and (b).

(a) *Means of Identification.* The means of identification shall be permitted to be by separate color-coding, marking tape, tagging, or other approved means.

(b) *Posting of Identification Means.* The method utilized for conductors originating within each branch-circuit panelboard or similar branch-circuit distribution equipment shall be documented in a manner that is readily available or shall be permanently posted at each branch-circuit panelboard or similar branch-circuit distribution equipment. The label shall be of sufficient durability to withstand the environment involved and shall not be handwritten.

3. 2017 Legislation HB85 (Effective June 28, 2017)

RSA 155-A:3-c Installation of Arc-Fault Circuit Interrupters (AFCI) Exception. –

I. Notwithstanding any provision of the state building code or state fire code requiring the installation of arc-fault circuit interrupters, after repeated tripping of an AFCI device and determination the branch circuit is not causing the AFCI to trip, an AFCI device may be replaced with one without AFCI protection in accordance with this section.

II. All receptacle outlets supplied by the branch circuit without AFCI protection shall prior to occupancy either be:

- (a) Marked "No AFCI Protection;" or
- (b) Identified in a notice given by the property owner to all occupants.

III. If an electrician installs a device without AFCI protection, within 5 working days the electrician shall file an AFCI unwanted tripping report with the National Electrical Manufacturers Association on the association's webpage (<http://www.afcisafety.org/report.html>) for arc fault breaker safety, and shall submit a copy of the report to the property owner and the electricians' board.

IV. The device without AFCI protection shall be permitted to remain in place for the period of time it takes the manufacturer to resolve the matter.

V. Nothing in this section shall prevent a homeowner from making electrical installations in or about a single-family residence owned and occupied by him or her or to be occupied by him or her as his or her bona fide personal abode.



4. 2017 Legislation SB135 RSA 155-A:1 Definitions. – (Effective September 3, 2017)

IV. "New Hampshire building code" or "state building code" means the adoption by reference of the International Building Code 2015, the International Existing Building Code 2015, the International Plumbing Code 2015, the International Mechanical Code 2015, the International Energy Conservation Code 2015, the International Swimming Pool and Spa Code 2015, and the International Residential Code 2015, as published by the International Code Council, and the *National Electrical Code 2017, as amended by the state building code review board and ratified by the legislature in accordance with RSA 155-A:10.* The provisions of any other national code or model code referred to within a code listed in this definition shall not be included in the state building code unless specifically included in the codes listed in this definition.

RSA 155-A:2 State Building Code. –

XI. Notwithstanding the inclusion of the National Electrical Code 2017 in the state building code under RSA 155-A:1, IV, the amended provisions of section 210.12 of the National Electrical Code, which modify the National Electrical Code 2014 version to add arc-fault circuit interrupter requirements for dormitory unit devices and bathrooms, guest rooms and guest suites, and branch circuit extensions or modifications for dormitory units shall not be enforced under the state building code or this chapter.

2017 National Electrical Code as published by the NFPA

Article 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). The arc-fault circuit interrupter shall be installed in a readily accessible location. (A) Dwelling Units. All 120-volt, 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):

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

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

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

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

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

