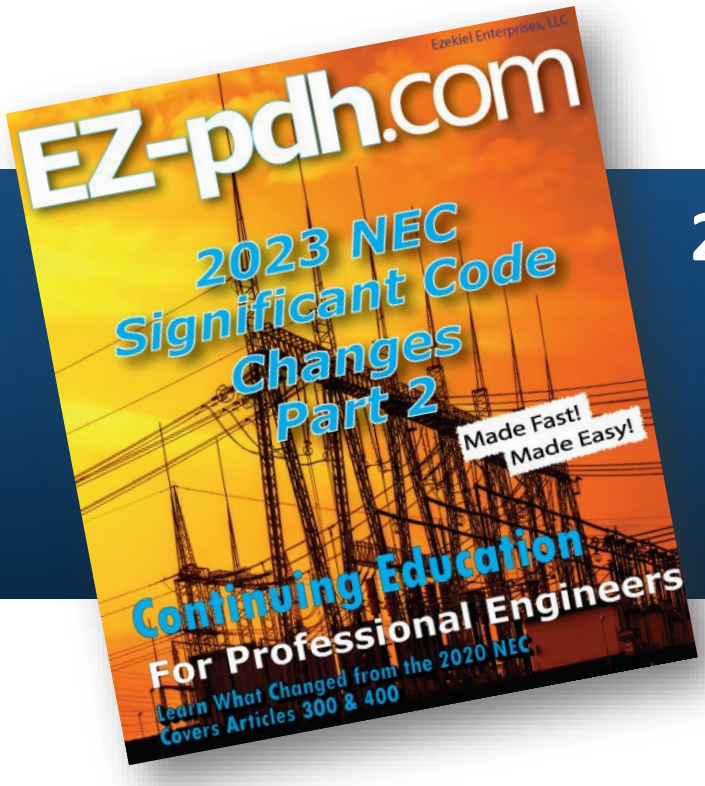

2023 NEC Significant Code Changes Part 2

Four (4) Continuing Education Hours
Course #EE2302

Approved Continuing Education for Licensed Professional Engineers

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301 Mission Dr. Unit 571
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Course Description:

The 2023 NEC Significant Code Changes Part 2 course satisfies four (4) hours of professional development.
The course is designed as a distance learning course that overviews the significant changes to the updated National Electrical Code (NEC).

Objectives:

The primary objective of this course is to enable the student to understand some of the significant changes including additions, deletions, and modification to Articles 300 and 400 of the 2023 Edition of NFPA 70: National Electrical Code (NEC) from the 2020 Edition.

Grading:

Students must achieve a minimum score of 70% on the online quiz to pass this course. The quiz may be taken as many times as necessary to successfully pass and complete the course.
A copy of the quiz questions are attached to the last pages of this document.

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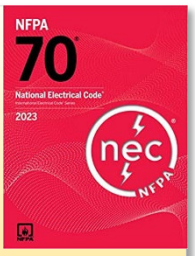
Introduction

Every three years, the National Electrical Code® (NEC®) is revised and expanded. Initially the NFPA® received **4,006** public suggestions for changes, which resulted in **1,805** first revisions. There were **1,956** public comments submitted in response to these **1,805** first revisions, resulting in **900** second revisions. Changes included editorial clarification, expanded requirements, new requirements, deleted requirements, and the relocation of other requirements

2023 NEC



5,962 Public Suggestions
2,705 Revisions Made
Changes Include

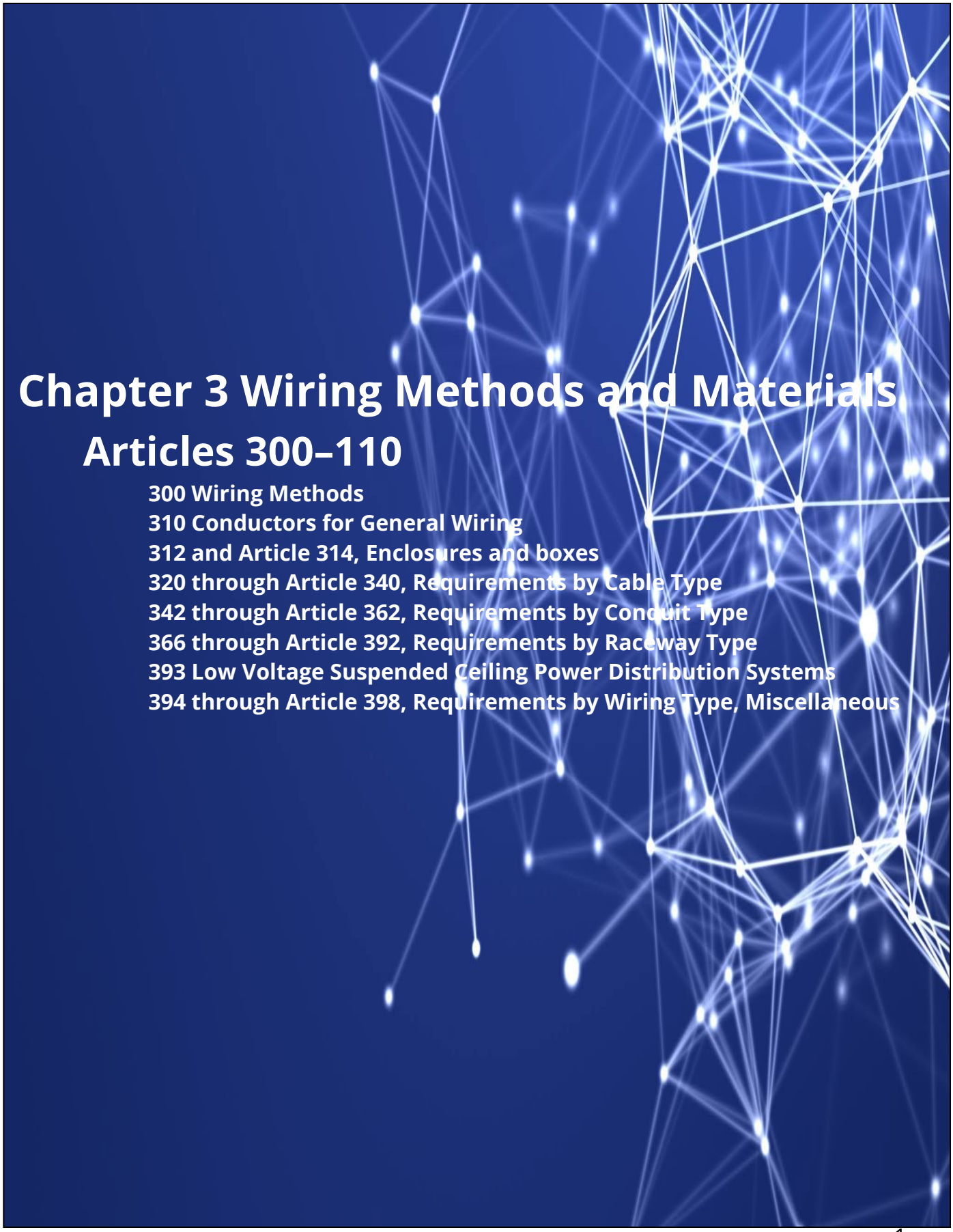
- Editorial Clarification
- Expanded Requirements
- New Requirements
- Deleted Requirements
- Relocation of Requirements

What to Expect

In this course the student will be presented an overview of the most significant changes found in the 2023 NEC. This is part 2 of a series of courses covering the changes and will progress through each chapter and its articles presenting the many important changes. The changes will be underlined for easy recognition and a short synopsis of the reason for the change is presented as well

Disclaimer

Although every effort has been made to the accuracy of the material presented, by no means shall the student use or substitute this material for official 2023 NEC. Additionally, Ezekiel Enterprises, LLC shall not be liable for any special, incidental, consequential, or exemplary damages resulting, in whole or in part, from the reader's uses of or reliance upon this material.



Chapter 3 Wiring Methods and Materials

Articles 300–110

300 Wiring Methods
310 Conductors for General Wiring
312 and Article 314, Enclosures and boxes
320 through Article 340, Requirements by Cable Type
342 through Article 362, Requirements by Conduit Type
366 through Article 392, Requirements by Raceway Type
393 Low Voltage Suspended Ceiling Power Distribution Systems
394 through Article 398, Requirements by Wiring Type, Miscellaneous

Revision - Multiple Articles

Articles 342, 344, 348, 350, 352, 353, 354, 355, 356, 358, 360, and 362

■ **What Changed:** Multiple Articles were revised by removing the word "Types" from their titles. This coincides with the word "Type" being removed from the new definitions found in Article 100 for conduit and tubings.

■ **Its Effect:** This change will increase the usability and application of the NEC by the electrical professional.

Revision - 300.2(A)

Limitations, Voltage

■ **What Changed:** Section 300.2(A) was modified to add 1500 volts dc in two locations. Rules for medium voltage are being reorganized in the Code in an attempt to increase usability. New articles for installations greater than 1000 volts ac and 1500 volts dc have been added for these items

■ **Its Effect:** As medium voltage work is increasingly being installed by electrical contractors and not the utility company, focused articles will help with the location of requirements, education, and inspection and will help both installers and inspectors for use.

.

(A) Voltage.

Wiring methods specified in Chapter 3 shall be used for 1000 volts ac, 1500 volts dc, nominal, or less where not specifically limited elsewhere in Chapter 3. Wiring methods shall be permitted for over 1000 volts ac, 1500 volts dc, nominal, where specifically permitted elsewhere in this Code.

Revision - 300.4(E)

Ex. No. 1 and 2 Cables, Raceways, or Boxes Installed in or Under Metal-Corrugated Roof Decking

■ **What Changed:** A new Exception No. 1 and modifications to Exception No. 2 have been added to 300.4(E). These changes recognize poured concrete on top of the metal roof decking as a means of physical protection and addition of “listed steel or malleable iron fittings and boxes” used with rigid metal conduit (RMC) and intermediate metal conduit (IMC). The use of concrete on top of metal roof decking limits screws from penetrating into the raceway system, causing damage to the raceway and wiring. When the metal-corrugated sheet roof decking is covered with a minimum thickness of 50 mm (2 in.) concrete slab, the 38 mm (1 ½ in.) spacing requirements found in the main rule are not necessary

■ **Its Effect:** The update to 300.4(E) provides clarity to the installer and the AHJ that abiding by these exceptions will not require the installer to also comply with the main rule requirements of 300.4(E)

(E) Cables, Raceways, or Boxes Installed in or Under Metal-Corrugated Roof Decking.

A cable, raceway, or box, installed in exposed or concealed locations under metal-corrugated sheet roof decking, shall be installed and supported so there is not less than 38 mm (1 1⁄2 in.) measured from the lowest surface of the roof decking to the top of the cable, raceway, or box. A cable, raceway, or box shall not be installed in concealed locations in metal-corrugated, sheet decking–type roof.

Informational Note: Roof decking material is often repaired or replaced after the initial raceway or cabling and roofing installation and ~~may~~ might be penetrated by ~~the~~ screws or other mechanical devices designed to provide "hold down" strength of the waterproof membrane or roof insulating material.

Exception No. 1: Rigid metal conduit and intermediate metal conduit, with malleable iron fittings or boxes, shall not be required to comply with 300.4(E).

Exception No. 2: The 38 mm (1 1⁄2in.) spacing is not required where metal-corrugated sheet roof decking is covered with a minimum thickness 50 mm (2 in.) concrete slab, measured from the top of the corrugated roofing.

Revision - 300.4(G)

Fittings

■ **What Changed:** New language added in 300.4(G), noting that protective fittings need to be installed "prior to the installation of conductors." Installing this fitting after the conductors have been installed allows possible damage to occur to conductors being pulled into the raceway.

■ **Its Effect:** Even though there are fittings that can be installed after the conductors have been pulled in, this new language will clarify that the intent of the protective fitting is to protect the conductors as they are being put into the raceway and is not intended to be added after the conductors have been installed in the raceway.

(G) Fittings.

Where raceways contain 4 AWG or larger insulated circuit conductors, and these conductors enter a cabinet, a box, an enclosure, or a raceway, prior to the installation of conductors, the conductors shall be protected in accordance with any of the following:

1) An identified fitting providing a smoothly rounded insulating surface
2) A listed metal fitting that has smoothly rounded edges
3) Separation from the fitting or raceway using an identified insulating material that is securely fastened in place
4) Threaded hubs or bosses that are an integral part of a cabinet, box, enclosure, or raceway providing a smoothly rounded or flared entry for conductors

Conduit bushings constructed wholly of insulating material shall not be used to secure a fitting or raceway. The insulating fitting or insulating material shall have a temperature rating not less than the insulation temperature rating of the installed conductors.

Revision - Table 300.5

Minimum Cover Requirements, 0 to 1000 Volts, ac, 1500 Volts dc, Nominal, Burial in Millimeters (Inches)

■ **What Changed:** Electrical Metallic Tubing (EMT) was added to Column 3 of Table 300.5 to clearly indicate that EMT can be installed in an underground location.

■ **Its Effect:** This change clarifies for the electrical professional that EMT can be used in underground installations when the UL guide card and Article 358 requirements are followed.

Note: Complete Table Not shown

Column 2
Electrical Metallic Tubing,
Rigid Metal Conduit,
or Intermediate Metal Conduit

Deletion - 300.5(D)

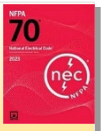
Protection from Damage

■ **What Changed:** The words “direct buried” were removed from the text at 300.5(D) by leaving behind “conductors and cables.” As previously written, with the text reading as “direct buried conductors and cables,” this section did not apply to buried raceways containing conductors and only conductors that themselves were directly buried.

■ **Its Effect:** This revision will provide both the installers and inspectors with clarity as to requirements for underground conductor and cables installations.

(D) Protection from Damage.

~~Direct-buried conductors~~ Conductors and cables shall be protected from damage in accordance with 300.5(D)(1) through (D)(4).



Revision - 300.6(A)

Ferrous Metal Equipment

■ **What Changed:** The informational note referencing field-cut threads was removed, and the reference was turned into positive language. Adding "anywhere other than at the factory where the product is listed" provides clarity that threads cut in the field are to be coated with an electrically conductive, corrosion-resistant compound that has been approved for that purpose.

■ **Its Effect:** This change will allow the AHJ enforcement options by creating positive code language that can be cited instead of pointing the installer to an informational note that is not enforceable and is of an informative nature.

(A) Ferrous Metal Equipment.

Ferrous metal raceways, cable trays, cablebus, auxiliary gutters, cable armor, boxes, cable sheathing, cabinets, ~~meter socket enclosures~~ enclosures (other than surrounding fences and walls), ~~metal~~ elbows, couplings, nipples, fittings, supports, and support hardware shall be suitably protected against corrosion inside and outside (except threads at joints) by a coating of approved corrosion-resistant material. Where corrosion protection is necessary and the conduit is threaded ~~in the field~~ anywhere other than at the factory where the product is listed, the threads shall be coated with an approved electrically conductive, corrosion-resistant compound.

~~*Informational Note: Field-cut threads are those threads that are cut in conduit, elbows, or nipples anywhere other than at the factory where the product is listed.*~~

Revision - 300.11(C)

Raceways Used as Means of Support

■ **What Changed:** Class 3 circuit conductors were added as a conductor permitted to be supported by the raceway containing power supply conductors that supplies the equipment. It was pointed out that there is no basis for allowing Class 2 cables and not also specifying Class 3 cables from being attached to their raceway that supplies the equipment. These cables are typically the same in size and weight.

■ **Its Effect:** This allows the electrical professional utilization of the same techniques to be used with a Class 3 installation that are currently allowed for Class 2 cables.

(C) Raceways Used as Means of Support.

Raceways shall be used only as a means of support for other raceways, cables, or nonelectrical equipment under any of the following conditions:

1) Where the raceway or means of support is identified as a means of support
2) Where the raceway contains power supply conductors for electrically controlled equipment and is used to support Class 2 or Class 3 circuit conductors or cables that are solely for the purpose of connection to the equipment control circuits
3) Where the raceway is used to support boxes or conduit bodies in accordance with 314.23 or to support luminaires in accordance with 410.36(E)

Revision - 300.14

Length of Free Conductors at Outlets, Junctions, and Switch Points

■ **What Changed:** Text at 300.14 was added permitting free conductors to be spliced at outlet, junction, and switch points. The text as it was written left it up to interpretation as to if the free conductor had to be continuous or was permitted to be spliced and extended at the box.

■ **Its Effect:** This change will aid electrical professionals in interpreting the requirement. It will also be clear that the conductor is permitted to be spliced with a shorter conductor to add length to it and meet the 6 inches required by this section.

300.14 Length of Free Conductors at Outlets, Junctions, and Switch Points.

At least 150 mm (6 in.) of free conductor, measured from the point in the box where it emerges from its raceway or cable sheath, shall be left at each outlet, junction, and switch point for splices or the connection of luminaires or devices. The 150 mm (6 in.) free conductor is permitted to be spliced or unspliced. Where the opening to an outlet, junction, or switch point is less than 200 mm (8 in.) in any dimension, each conductor shall be long enough to extend at least 75 mm (3 in.) outside the opening.

Exception: Conductors that are not spliced or terminated at the outlet, junction, or switch point shall not be required to comply with 300.14.

Revision - 300.17

Number and Size of Conductors and Cables in Raceway

■ **What Changed:** Section 300.17 was revised to recognize that cables are installed in raceways and that requirements are needed so that they are not damaged during and after the installation. The revised Informational Note offers direction to the location of the various wiring methods. The NEC references for "Class 1, Class 2, and Class 3 circuits," "fire alarm circuits," and "optical fiber cables and raceways" were changed in the Informational Note. These changes will direct users of the Code to the proper code sections.

■ **Its Effect:** The revisions to the Informational Note will help direct both installers and inspectors to the appropriate sections for additional information.

300.17 Number and Size of Conductors and Cables in Raceway.
The number and size of conductors and cables in any raceway shall not be more than will permit dissipation of the heat and ready installation or withdrawal of the conductors or cables without damage to the conductors or cables, or to their insulation.
Informational Note: See the following sections of this Code: intermediate metal conduit, 342.22; rigid metal conduit, 344.22; flexible metal conduit, 348.22; liquidtight flexible metal conduit, 350.22; PVC conduit, 352.22; HDPE conduit, 353.22; RTRC, 355.22; liquidtight nonmetallic flexible conduit, 356.22; electrical metallic tubing, 358.22; flexible metallic tubing, 360.22; electrical nonmetallic tubing, 362.22; cellular concrete floor raceways, 372.22; cellular metal floor raceways, 374.22; metal wireways, 376.22; nonmetallic wireways, 378.22; surface metal raceways, 386.22; surface nonmetallic raceways, 388.22; underfloor raceways, 390.22; fixture wire, 402.7; theaters, 520.6; signs, 600.31(C); elevators, 620.33; audio signal processing, amplification, and reproduction equipment, 640.23(A) and 640.24; ~~Class 1, Class 2, and Class 3 circuits, Article 725; fire alarm circuits, Article 760~~Class 1 circuits, 724.3(A); Class 2, Class 3, Class 4, and power-limited fire alarm (PLFA) circuits, 722.3(A); non-power-limited fire alarm (NPLFA) circuits, 760.3(H); and optical fiber cables and raceways, ~~Article 770~~722.135(J) and 770.100(B).

New - 300.25

Exit Enclosures (Stair Towers)

■ **What Changed:** The term “be separated from the building” was removed and the words “have a fire resistance rating” were added to Section 300.25. An exception was also added addressing egress lighting on outside exterior doorways. “Be separated from the building” could mean different things and is not a defined term. “Fire resistance rating” is a defined term in the building code and, therefore, will clarify what the requirement applies to. Outside exterior doorways are part of the means of egress and frequently require egress lighting to extend to the public way. Without the addition of the exception, it was a code violation to provide power to the required exterior egress lighting from the lighting circuit inside the exit enclosure.

■ **Its Effect:** This revised text will add clarity for the electrical professional regarding this egress lighting requirement. Providing a defined term from the building code makes the requirements easier to understand. The new exception will address a long-standing trade

300.25 Exit Enclosures (Stair Towers).

Where an exit enclosure is required to ~~be separated from the building~~have a fire resistance rating, only electrical wiring methods serving equipment permitted by the authority having jurisdiction in the exit enclosure shall be installed within the exit enclosure.

Exception: Where egress lighting is required on outside exterior doorways from the exit enclosure, luminaires shall be permitted to be supplied from the inside of the exit enclosure.

Informational Note: See NFPA *101*-2021, *Life Safety Code*, 7.1.3.2.1(10)(b), for more information.

New - 300.26

Remote-Control and Signaling Circuits Classification

■ **What Changed:** A new Section 300.26 was created by for remote-control and signaling circuits. Along with the moving of Class 1 circuitry out of Article 725, this new section directs the Code user to the location of Class 2, and Class 3 circuitry requirements. It also provides necessary clarity on power-limited and non-power-limited installations.

■ **Its Effect:** This revision will provide much-needed clarity, and approved usability, for remote control and signaling circuit installations for both installers and inspectors.

300.26 Remote-Control and Signaling Circuits Classification.

Remote-control and signaling circuits shall be classified as either power-limited or non-power-limited and comply with the following:

1) Class 1 power-limited remote-control and signaling circuits shall comply with 724.3.
2) Class 2 and Class 3 power-limited remote-control and signaling circuits shall comply with 725.3.
3) Non-power-limited remote-control and signaling circuits shall be installed in accordance with 300.2 through 300.25.

New - Article 305

General Requirements for Wiring Methods and Materials for Systems Rated Over 1000 Volts ac, 1500 Volts dc, Nominal

■ **What Changed:** A new Article 305 was created by for general wiring methods and installations applying to Wiring Methods and Materials for Systems Rated Over 1000 Volts ac, 1500 Volts dc. Before this update, information on medium voltage (MV) installations was scattered throughout multiple sections of the NEC.

■ **Its Effect:** Consolidating the information for medium voltage (MV) into one article and adding additional information on MV installations will provide the electrical industry, including installers and inspectors, with more guidance in terms of medium voltage (MV) installations.

Article 305 General Requirements for Wiring Methods and Materials for Systems Rated Over 1000 Volts ac, 1500 Volts dc, Nominal

SEE NEC FOR COMPLETE TEXT

Deletion - Tables 310.16, 310.17 and 310.20

Ampacities of Conductor Tables

■ **What Changed:** "XHWN" was deleted from the 90-degree Celsius columns of Tables 310.16, 310.17, and 310.20. The term "XHWN" means an insulation that can be used in dry and wet locations and is of a flame-retardant, moisture-resistant thermoset type. It is listed in Table 310.4(1) as being rated for 75 degrees Celsius.

■ **Its Effect:** These revisions aid the electrical professional in proper conductor insulation selection and assure these conductors are used properly within the range that it has been rated/tested.

New - 312.10

Screws and Other Fasteners

■ **What Changed:** A new Section 312.10 was added to address field-installed screws or other fasteners entering a cabinet, cutout box, or meter socket. This additional language protects against damage to conductors resulting from sharp projections from exposed threads of screws that are run through covers. Damage to the conductors has been an issue for some time, creating a shock or fire hazard. This addresses the installation of fasteners that enter into the wiring space.

■ **Its Effect:** Greater attention will be required by the installer as to the type of fastener they use and how far it protrudes into the wiring space. This will protect conductors from damage from screws and fasteners.

312.10 Screws or Other Fasteners.

Screws or other fasteners used for attaching covers or devices shall be as provided by or as specified by the manufacturer. Screws or fasteners installed in the field for labels or other equipment and that enter wiring spaces shall comply with the following as applicable:

1) Screws shall be machine type with blunt ends.
2) Other fasteners shall have blunt ends.
3) Screws or other fasteners shall extend into the enclosure no more than 6 mm (1⁄4 in.) unless the end is protected with an approved means.

Exception to (3): Screws or other fasteners shall be permitted to extend into the enclosure not more than 11 mm (7⁄16 in.) if located within 10 mm (3⁄8 in.) of an enclosure wall

New - 314.5

Screws and Other Fasteners

■ **What Changed:** A new Section 314.5 was added to address screws and fasteners entering the wiring space of boxes and conduit bodies. This language was added to protect against damage to conductors resulting from sharp projections from exposed threads of screws run through covers or sides of boxes.

■ **Its Effect:** Greater attention by the electrical professional will be required as to the type and length of the fastener used. Fasteners such as drywall screws will not be acceptable. This will help to protect conductors from damage

314.5 Screws or Other Fasteners.

Screws or other fasteners that enter a box through a cover or a wall shall be machine-type screws or other fasteners with blunt ends, having an extension length into the box limited in accordance with the following as applicable.

1) Screws attaching a cover shall extend no more than 10 mm (3⁄8 in.).
2) Screws or other fasteners, other than in (1), penetrating a cover shall extend no more than 8 mm (5⁄16 in.).
3) Screws or other fasteners penetrating a wall of a box exceeding 1650 cm3 (100 in.3) shall extend no more than 6 mm (1⁄4 in.), or more than 11 mm (7⁄16 in.) if located within 10 mm (3⁄8 in.) of an adjacent box wall.
4) Screws or other fasteners penetrating the wall of a box not exceeding 1650 cm3 (100 in.3) and not covered in 314.23(B)(1) shall be made flush with the box interior.
5) Screws or other fasteners penetrating the wall of a conduit body shall be made flush with the conduit body interior.

Exception No.1 to (1) through (4): A screw shall be permitted to be longer if the end of the screw is protected.

Exception No. 2 to (4): Screws provided by a box manufacturer for the purpose of creating multiple-gang boxes from single device boxes shall not be required to be made flush with the box interior.

New - 314.16(B)(6)

Terminal Block Fill

■ **What Changed:** New subdivision 314.16(B)(6) was added to address terminal blocks installed in boxes. The word assembly was added so as not to count all the poles of the terminal block for volume allowance towards box fill concerns. Terminal blocks are being used more frequently, and the volume of cubic inches they take up in the boxes needs to be addressed. By adding the word assembly, it can be understood how to calculate box fill for terminal blocks

■ **Its Effect:** Care must be taken by the electrical professional when choosing the size of box to be used. This will be a better understanding of how to calculate box fill for terminal blocks. When terminal block assemblies are used a larger box could be required based on the box fill calculations. A terminal block could also be added at a later time.
This could possibly create an overfilled box when the terminal block(s) are installed

(6) Terminal Block Fill.
Where a terminal block is present in a box, a single volume allowance in accordance with Table 314.16(B) shall be made based on the largest conductor(s) terminated within it.

Revision - 314.24

Dimensions of Boxes

■ **What Changed:** The existing language at Section 314.24 was adjusted by broadening the reach of this section to address side entries for outlet and device boxes. Outlet and device boxes need appropriate dimensions allowing equipment that is being installed within them to be installed properly without the possibility of damage to conductors that have been installed within the box. This envelope is 1 ¾ in. wide by 2 13/16 inch high, with rounded corners having a radius of 7/16 inch, and several devices take advantage of this profile.

■ **Its Effect:** The electrical professional will need to become aware of these requirements to assure that boxes of the proper size are installed in the field. There will need to be communication between the authority having jurisdiction (AHJ) and the installers as to what devices are intended to be installed in boxes to assure the box is of the appropriate size.

314.24 ~~Depth~~Dimensions of Boxes.

Outlet and device boxes shall have ~~an~~ approved ~~depth~~dimensions to allow equipment installed within them to be mounted properly and without likelihood of damage to conductors within the box.

(A) Depth of Outlet Boxes Without Enclosed Devices or Utilization Equipment. Outlet boxes that do not enclose devices or utilization equipment shall have a minimum internal depth of 12.7 mm (½ in.).

(B) Depth of Outlet and Device Boxes with Enclosed Devices or Utilization Equipment.

Outlet and device boxes that enclose devices or utilization equipment shall have a minimum internal depth that accommodates the rearward projection of the equipment and the size of the conductors that supply the equipment. The internal depth shall include, where used, that of any extension boxes, plaster rings, or raised covers. The internal depth shall comply with ~~all applicable provisions of~~ 314.24(B)(1) through (B)(5) as applicable.

(1) to **(3)** NO CHANGE

(4) Conductors 12 or 10 AWG.

Boxes that enclose devices or utilization equipment supplied by 12 or 10 AWG conductors shall have an internal depth that is not less than 30.2 mm (1 3/16 in.). Where the equipment projects rearward from the mounting plane of the box by more than 25 mm (1 in.), the box shall have a depth not less than that of the equipment plus 6 mm (¼ in.). Where wiring enters the center portion of the rear of a box opposite to the equipment, the minimum clearance shall be increased to 13 mm (½ in.)

(5) Conductors 14 AWG and Smaller.

Boxes that enclose devices or utilization equipment supplied by 14 AWG or smaller conductors shall have a depth that is not less than 23.8 mm (15/16 in.).

Exception to (1) through (5): Devices or utilization equipment that is listed to be installed with specified boxes shall be permitted.

(C) Clearances for Side-Wiring Entrances.

The rearward projection of devices or equipment shall not be greater than the depth of a knockout being used for a side-wiring entrance, as measured to its centerline parallel to the rear of the box opposite to the equipment, unless the clearance from the inside wall of the box equals or exceeds 13 mm (½ in.). The term *side* applies to any wall of a box other than the one opposite to the opening.

New - 315.1

Scope

■ **What Changed:** Clarifications made as to the voltages covered by Article 315, which is entitled Medium Voltage Conductors, Cable, Cable Joints, and Cable Terminations. Article 311 has been deleted with those requirements relocated to Article 315. New requirements for cable joints and terminations were also added to this article. Specification of the voltage requirements was needed to improve the usability of the Code. This article includes voltages from 2001 volts to 35,000 volts. This article does not include voltages from 2001 volts to 2500 volts dc, nominal or voltages above 2500 for dc circuits.

■ **Its Effect:** This information will help the electrical professional assure the conductors are installed properly and within the range they are rated/tested. This revision will also add clarity for the user at 315.16 on how to identify Type MV, medium voltage cable.

315.1 Scope.
This article covers the use, installation, construction specifications, and ampacities for Type MV medium voltage conductors, cable, cable joints, and cable terminations. This article includes voltages from 2001 volts to 35,000 volts~~does not include voltages above~~ac, nominal and 2001 volts to 2500 volts ~~for~~ dc~~, circuits~~nominal.

Revision - 320.23(A)

Cables Run Across the Top of Framing Members. (In Accessible Attics)

■ **What Changed:** The term “Framing Members” replaced the word “Joists” in Section 320.23(A) when considering the installations of armored cable: Type AC. Most attic locations do not contain floor joists; they have ceiling joists. This change is made to eliminate confusion for ceiling or floor locations where cables are installed by using the phrase “framing members.”

■ **Its Effect:** This change adds clarity for the installer and AHJ when making interpretations of code language reflecting the location designated as “In Accessible Attics.”

320.23 In Accessible Attics.

Type AC cables in accessible attics or roof spaces shall be installed as specified in 320.23(A) and (B).

(A) Cables Run Across the Top of ~~Joists~~Framing Members.

Where run across the top of ~~joists~~framing members, or across the face of rafters or studding within 2.1 m (7 ft) of the floor or ~~joists~~horizontal surface, the cable shall be protected by guard strips that are at least as high as the cable. Where this space is not accessible by permanently installed stairs or ladders, protection shall only be required within 1.8 m (6 ft) of the nearest edge of the scuttle hole or attic entrance.

(B) Cable Installed Parallel to Framing Members.

Where the cable is installed parallel to the sides of rafters, studs, or ceiling or floor joists, neither guard strips nor running boards shall be required, and the installation shall also comply with 300.4(D).

Revision - 322.56(B)

Taps

■ **What Changed:** Changes made to flat cable assembly requirements by removing the term “color-coded” and replacing it with “marked” in Section 322.56(B). The term “color-coded” was changed to “marked” to correlate with the terminology found at 322.120, which is entitled “Marking.” This change does not change the meanings of the requirements found at this location.
■ How this will affect the electrical industry:

■ **Its Effect:** This change will provide clarity and unison with other code sections. It allows “marking” for conductor taps for flat cable assemblies (Type FC) to be installed per requirements found at 322.56(B).

(B) Taps.
Taps shall be made between any phase conductor and the grounded conductor or any other phase conductor by means of devices and fittings identified for the use. Tap devices shall be rated at not less than 15 amperes, or more than 300 volts to ground, and shall be ~~color-coded~~ marked in accordance with ~~the requirements~~ of 322.120(C).

Revision - 330.112(A)

1000 Volts or Less. (MC Cable)

■ **What Changed:** Few editorial changes added in Section 330.112(A) to correlate with the addition of 16 AWG copper conductors for general use wiring methods used with metal-clad cable (Type MC). The recognition of 16 AWG copper conductors for use as ungrounded, grounded, and equipment grounding conductors in 330.104 was necessary for the useability of the Code. These shall be of a type that is listed in Table 310.4(1) for conductor applications and installations rated for 600 volts.

■ **Its Effect:** This revision will clarify and allow the use of 16 AWG as control and signal circuits for ungrounded, grounded, and equipment grounding conductors.

(A) 1000 Volts or Less.

Insulated control and signal conductors in sizes 18 AWG and 16 AWG shall be of a type listed in Table 402.3, with a maximum operating temperature not less than 90°C (194°F) and as permitted by ~~725.49~~724.49. ~~Conductors larger than 16 AWG~~Ungrounded, grounded, and equipment grounding conductors 16 AWG and larger shall be of a type listed in Table 310.4(1) or of a type identified for use in Type MC cable.

Revision - Article 337

Industrial Mobile Cable: Type IM

■ **What Changed:** All references to the former Type P cable to Type IM in Article 337 was changed. Installation requirements can be found in this article for topics such as bending radius, ampacity, listing, and uses permitted or not permitted. This article should not dwell on marine-type installations, as most would not be found in the scope of the NEC. Type P cables are used for offshore drilling rigs and not under the purview of the NEC.

■ **Its Effect:** This revision will clarify for the electrical professional the application of this type of cable and the severe environments that it is capable of functioning in.

Article 337 ~~Drilling Rig~~Industrial Mobile Cable: Type ~~P~~IM

Part I. General

337.1 Scope.

This article covers the use, installation, and construction specifications for up through 2000 volt ~~drilling rig~~industrial mobile cable, Type ~~P~~IM (armored and unarmored).

Revision - 342.20(B)

Maximum

■ **What Changed:** Section 342.20(B), was revised for intermediate metal conduit (IMC) by specifying that a 6-inch trade size is the largest that can be installed.

■ **Its Effect:** This change would allow for the use of Trade Size 5 and 6 IMC. It should be noted that UL standard 1242 does not currently include IMC trade sizes 5 and 6. It will be of concern for AHJs, installers, and designers that they are able to comply with 342.6 regarding listing requirements.

(B) Maximum.
IMC larger than metric designator ~~103~~155 (trade size ~~4~~6) shall not be used.

Revision - 344.28

Reaming and Threading (Rigid Metal Conduit)

■ **What Changed:** Clarification added for adherence to the manufacturer's requirements for reaming and threading of PVC-coated rigid metal conduit (RMC) in Section 344.28. This change was due to installers accidentally damaging PVC rigid metal conduit when they were reaming and adding threads to the conduit. A new informational note was added to assist installers with this procedure.

■ **Its Effect:** This guidance will help assure this product (when field modified by cutting, reaming, and threading) is not damaged and can function properly in the environment it is being used. The electrical professional will need to utilize the correct tools and follow the manufacturer's guidelines when installing this product.

344.28 Reaming and Threading.

All cut ends shall be reamed or otherwise finished to remove rough edges. Where conduit is threaded in the field, a standard cutting die with a 1 in 16 taper (3⁄4 in. taper per foot) shall be used. PVC-coated RMC shall be threaded in accordance with manufacturer's instructions to prevent damage to the exterior coating.

Informational Note No. 1: See ANSI/ASME B1.20.1-2013, Standard for Pipe Threads, General Purpose (Inch).

Informational Note No. 2: See NECA 101-2013, Standard for Installing Steel Conduits (RMC, IMC, EMT), for information on threading and clamping methods for RMC and PVC-coated RMC.

New - 352.44(B)

Expansion Fittings (Earth Movement)

■ **What Changed:** Requirements added for an expansion fitting to be installed for underground runs of direct buried PVC conduit that emerge from the ground. Different soil conditions and weather conditions exist, and this change attempts to eliminate damage to PVC conduit and electrical equipment and enclosures from occurring.

■ **Its Effect:** The electrical professional will need to provide expansion fittings for PVC conduit installations emerging from the ground. When necessary, these should be provided above grade to compensate for earth settling or movement.

(B) Earth Movement.
Expansion fittings for underground runs of direct buried PVC conduit emerging from the ground shall be provided above grade when required to compensate for earth settling or movement, including frost heave.
Informational Note: See 300.5(J).

Revision - 353.48

Joints

■ **What Changed:** Section 353.48 was revised by to specify that the joining methods of High Density Polyethylene Conduit (HDPE) are to be made by a method identified by the manufacturer. Heat fusion or butt fusion joints are not to be permitted. Heat or butt fusion joining methods result in an internal lip or bead formed on the conduit ID, which may "burn" or damage the cabling when it is subsequently pulled over the lip. Additionally, the lip will reduce the potential wire pull surface area and conduit fill calculations.

■ **Its Effect:** This change will affect the electrical inspector and installer by not requiring an "Approved method" for joining HDPE conduit. Joints shall be made by a method identified by the manufacturer, while heat fusion or butt fusion joints are not permitted.

353.48 Joints.

All joints between lengths of conduit, fittings, and boxes shall be made ~~using either electrofusion or mechanical fittings~~by a method identified by the manufacturer. Heat fusion or butt fusion joints shall not be permitted.

Revision - 358.20(B)

Maximum

■ **What Changed:** The maximum size of electrical metallic conduit (EMT) was increased to metric designator 155 (trade size 6) in Section 358.20(B). There is a need for 5- and 6-inch EMT that is not being addressed in the current Code. The 5- and 6-inch EMT is similar to materials used to create 5- and 6-inch rigid metal conduit (RMC), which have a proven result. The outer diameter of 5- and 6-inch EMT will be the same as 5- and 6-inch RMC but will have a thinner wall.

■ **Its Effect:** This change would allow for the use of 5- and 6-inch EMT.

(A) Minimum.

EMT smaller than metric designator 16 (trade size 1/2) shall not be used.

Exception: ~~For~~Metric designator 12 (trade size 3/8) shall be permitted for enclosing the leads of motors as permitted in 430.245(B).

New - Article 369

Insulated Bus Pipe (IBP)/Tubular Covered Conductors (TCC), Systems

■ **What Changed:** A new Article 369 was added to cover the use, installation, and construction specifications for insulated bus pipe (IBP) systems. Insulated bus pipe systems (IBP) are not new to the electrical industry. IBP systems are currently in use or being installed by both U.S. and Canadian-based utilities. These systems can be used for both indoor & outdoor locations. The system incorporates cable systems, bus bars, metal-enclosed bus, resin-impregnated bushings, and tap boxes. Insulated bus pipe (IBP), also known as Tubular Covered Conductor (TCC), has been used for many years in shipboard and utility applications in Europe and utility applications in the United States. These systems are lighter, consume less volume, and take less time to install than a traditional system. It has been proven as a practical alternative to using medium voltage cables, bare busbars, or bare conductors. They could provide a level of safety equivalent or better than those wiring methods that are already allowed in locations accessible to qualified persons only when listing becomes available.

■ **Its Effect:** It is important for inspectors, installers, and designers to note that (IBP) and IBP systems shall be listed per NEC 369.9 and must be installed by qualified persons, with all documentation made available to the authority having jurisdiction.

Article 369 Insulated Bus Pipe: IBP/ Tubular Covered Conductors: TCC. Article 369 Insulated Bus Pipe: IBP/ Tubular Covered Conductors: TCC.

SEE NEC FOR COMPLETE TEXT

New - Article 371

Flexible Bus Systems

■ **What Changed:** Article 371 was created to address the new product (Flexible Bus Systems), which provides many of the benefits of both bus duct and cable. It can easily be customized during installation in the field to account for field conditions. It is not rigid and does not have the bending radius limitations that cable has; therefore, it allows installation where there are space limitations or structural interference. Its flexibility reduces installation time by making it easier to make connections in the field without the need for special tools. It is light in weight compared to an equivalent bus duct or conductors in a conduit. It may reduce the installation time and cost associated with the electrical installation.

■ **Its Effect:** It is of special interest to inspectors, installers, and designers that flexible bus systems be listed per NEC 371.6. Currently, there is not a specific standard available for listing this product.

Article 371 Flexible Bus Systems.

SEE NEC FOR COMPLETE TEXT

Deletion - 398.15(C)

Exposed to Physical Damage

■ **What Changed:** High-density polyethylene conduit (HDPE) was removed as a permitted means to provide physical protection for open wiring on insulators in Section 398.15(C). It was discovered 353.12(1), Uses Not Permitted, prohibits its use for exposed installations. This conduit is also not permitted within a building per 353.12(2

■ **Its Effect:** The installer and the inspector will need to conduct an assessment to make sure that the marking will stay adhered to the electrical equipment. These requirements will ensure the safety of the electrical professional as well as keep important hazard labels and signs where they need to be installed.

(C) Exposed to Physical Damage.

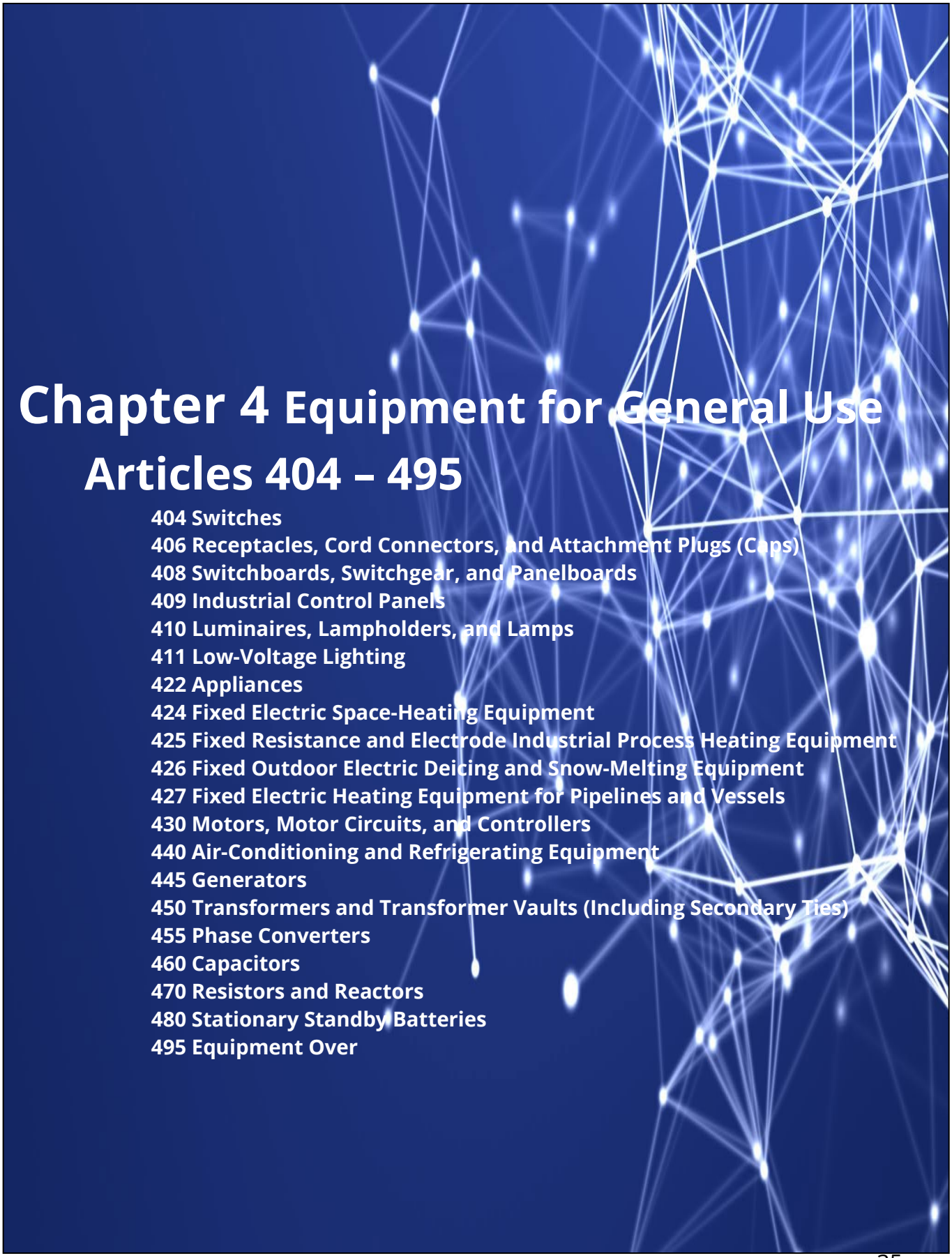
Conductors within 2.1 m (7 ft) from the floor shall be considered exposed to physical damage. Where open conductors cross ceiling joists and wall studs and are exposed to physical damage, they shall be protected by one of the following methods:

Guard strips shall not be less than 25 mm (1 in.) nominal in thickness and at least as high as the insulating supports, placed on each side of and close to the wiring.

A substantial running board at least 13 mm (1⁄2 in.) thick in back of the conductors with side protections. Running boards shall extend at least 25 mm (1 in.) outside the conductors, but not more than 50 mm (2 in.), and the protecting sides shall be at least 50 mm (2 in.) high and at least 25 mm (1 in.), nominal, in thickness.

Boxing made in accordance with 398.15(C)(1) or (C)(2) and furnished with a cover kept at least 25 mm (1 in.) away from the conductors within. Where protecting vertical conductors on side walls, the boxing shall be closed at the top and the holes through which the conductors pass shall be bushed.

Rigid metal conduit (RMC), intermediate metal conduit (IMC), rigid polyvinyl chloride conduit (PVC), reinforced thermosetting resin conduit (RTRC), ~~high density polyethylene conduit (HDPE)~~, or electrical metallic tubing (EMT). When installed in metal piping, the conductors shall be encased in continuous lengths of approved flexible tubing.



Chapter 4 Equipment for General Use

Articles 404 – 495

404 Switches
406 Receptacles, Cord Connectors, and Attachment Plugs (Caps)
408 Switchboards, Switchgear, and Panelboards
409 Industrial Control Panels
410 Luminaires, Lampholders, and Lamps
411 Low-Voltage Lighting
422 Appliances
424 Fixed Electric Space-Heating Equipment
425 Fixed Resistance and Electrode Industrial Process Heating Equipment
426 Fixed Outdoor Electric Deicing and Snow-Melting Equipment
427 Fixed Electric Heating Equipment for Pipelines and Vessels
430 Motors, Motor Circuits, and Controllers
440 Air-Conditioning and Refrigerating Equipment
445 Generators
450 Transformers and Transformer Vaults (Including Secondary Ties)
455 Phase Converters
460 Capacitors
470 Resistors and Reactors
480 Stationary Standby Batteries
495 Equipment Over

New - 404.1

Wall-Mounted Control Devices

■ **What Changed:** A new informational note was added to Section 404.1 addressing wall-mounted control devices. Battery-powered wireless lighting wall control devices are a new technology, and guidance was needed as to how they should be addressed.

■ **Its Effect:** With the addition of the informational note, the electrical professional will have a better understanding that these wireless switch devices are not under the purview of the Code.

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404.1 Scope.

This article covers all switches, switching devices, and circuit breakers used as switches operating at 1000 volts and below, unless specifically referenced elsewhere in this Code for higher voltages.

This article does not cover wireless control equipment to which circuit conductors are not connected.

Informational Note: See 210.70 for additional information related to branch circuits that include switches or listed wall-mounted control devices.

New - 404.14(D)

Snap Switch Terminations

■ **What Changed: A** new 404.14(D), Snap Switches with Push-In Terminals, was inserted in between the pre-existing subdivisions. The change to this section is to highlight this limitation for switches that may have push-in terminals provided. The introduction of 14 AWG copper-clad aluminum into the NEC for branch circuit wiring needs this limitation to ensure push-in terminals on wiring devices are installed according to their listing.

■ **Its Effect:** The clarification for 14 AWG solid copper conductors to be used with push-in terminals of snap switches ensures that the authority having jurisdiction (AHJ) and other electrical professionals will be provided with the intended requirements for use.

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(D) Snap Switch~~es with Push-in Terminals~~ Terminations.

~~Push-in terminals of snap switches rated 15 amperes shall only be connected directly to 14 AWG solid copper conductors. For use with conductors other than 14 AWG solid copper, the snap switch shall be listed and marked for the specific use.~~Snap switch terminations shall be in accordance with the following:

1) Terminals of 15-ampere and 20-ampere snap switches not marked CO/ALR shall be used with copper and copper-clad aluminum conductors only.
2) Terminals marked CO/ALR shall be permitted to be used with copper, aluminum, and copper-clad aluminum conductors.
3) Snap switches connected using screwless terminals of the conductor push-in type construction (also known as conductor push-in terminals) shall be installed on not greater than 15-ampere branch circuits and shall be connected with 14 AWG solid copper wire only unless listed and marked for other types of conductors.

New - 404.16

Reconditioned Equipment

■ **What Changed:** The change: New Section 404.16 was added to address reconditioned equipment. This change addresses control devices that can and cannot be reconditioned after being damaged. Damage might occur to control devices after being subjected to water, fire, or products of combustion. The reliability or function may be compromised if reconditioning of the items is attempted.

■ **Its Effect:** In cases where the control device has been subjected to damage from water, fire, or products of combustion, they can not be cleaned and put back into service. An inspector will have to be keen on what to look for to determine if the device was replaced or not.

404.16 Reconditioned Equipment.

(A) Lighting, Dimmer, and Electronic Control Switches.
~~Lighting~~Reconditioned lighting, dimmer, and electronic control switches shall not be permitted ~~to be reconditioned~~.

(B) Snap Switches.
~~Snap~~Reconditioned snap switches of any type shall not be permitted ~~to be reconditioned~~.

(C) Knife Switches, Switches with Butt Contacts, and Bolted Pressure Contact Switches.
~~Knife~~Reconditioned knife switches, switches with butt contacts, and bolted pressure contact switches shall be permitted ~~to be reconditioned~~. ~~The reconditioning process shall use design qualified parts verified under applicable standards and shall be performed in accordance with any instructions provided by the manufacturer.~~ If equipment has been damaged by fire, products of combustion, corrosive influences, or water, it shall be specifically evaluated by its manufacturer or a qualified testing laboratory prior to being returned to service. ~~Reconditioned switches shall be listed or field labeled as reconditioned and marked in accordance with 110.21(A)(2).~~

(D) Molded-Case Switches.
Reconditioned molded-case switches shall not be permitted.

New - 404.30

Switch Enclosures with Doors

■ **What Changed:** Text added to clarify the requirement for doors with switch mechanisms. Switches of this type may allow access to live parts with the door open that unqualified persons may come into contact. Access to the interior of a switch in the closed position will require the use of a tool. An approved design providing equivalent protections is also allowed.

■ **Its Effect:** The electrical professional will need to be aware of these changes and ensure the proper switch enclosure has a door with these provisions. This needs to be installed and verified before the installation is put into service.

404.30 witch Enclosures with Doors.
Switch mechanisms mounted within enclosures with doors that, when opened, expose uninsulated live parts shall be constructed so that ~~either a tool is required to open the door or other approved means to restrict interior~~ when the switch is in the closed position access to the switch interior is restricted. Access to the interior with the switch in the closed position shall require the use of a tool or an approved design that provides equivalent protection from access by unqualified persons ~~are provided~~.

Relocation - 406.2

Reconditioned Equipment

■ **What Changed:** Limitations for reconditioned equipment from 406.3(A) and 406.7 were relocated into new Section 406.2 for consistency and better usability of the Code. Relocating reconditioning requirements into one section within Article 406 for receptacles, attachment plugs, cord connectors, and flanged surface devices provides one location for the user of the Code to find these requirements.

■ **Its Effect:** The xxx.02 sections of NEC articles are becoming the placeholder for reconditioned equipment requirements. Combining all reconditioned requirements and limitations in 406.2 will improve the useability for the electrical professional.

406.2 Reconditioned Equipment.
Reconditioned receptacles, attachment plugs, cord connectors, and flanged surface devices shall not be permitted.

New - 406.3(D)

Receptacle Terminations

■ **What Changed:** The new text added in 406.3(D) is intended to emphasize the limitations for receptacles installed on 15-ampere branch circuits. Only 14 AWG copper conductors used with “push-in” type terminals for receptacles are permitted. The old text at 406.3(D) has been moved to subdivision (E).

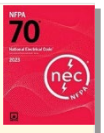
■ **Its Effect:** The new text will ensure inspectors and the installers will better understand the limitations of the terminations on receptacles. The additional text will reemphasize the type of conductors allowed based on the specific markings on the receptacle terminals. There has also been confusion within the electrical industry on the proper use of push-in type terminals and the type and size of conductors allowed to be terminated into these push-in type terminals. This new text will clear the confusion and alleviate future misapplication of the size and type of conductors allowed in push-in type terminals.

Revision - 406.4(D)(3)

Ground-Fault Circuit-Interrupter Protection

■ **What Changed:** Ground-fault circuit interrupter (GFCI) receptacles are now required to be listed per 406.4(D)(3). By adding this requirement, the public will be assured that all GFCI’s are listed and manufactured according to the minimum standards set forth in UL 943, Ground-Fault Circuit Interrupters. Also revised the term “outlet,” was removed which improves and clarifies the intent of the current Code

■ **Its Effect:** Requiring the listing specifically within Article 406 will add clarity for the electrical professional and remove any uncertainty about whether these GFCI devices are or are not required to be listed. Listing of these and other electrical equipment assists in providing safe electrical products and assures all electrical devices are manufactured to the same standard and the same safety technologies are being provided for
GFCI receptacles.



(D) ~~Receptacles for Copper-Clad Aluminum Conductors~~ Receptacle Terminations.

Receptacle terminations shall be in accordance with the following:

1) Terminals of 15-ampere and 20-ampere receptacles not marked CO/ALR shall be used with copper and copper-clad aluminum conductors only.
2) Terminals marked CO/ALR shall be permitted to be used with aluminum, copper, and copper-clad aluminum conductors ~~that are sized in accordance with 240.4(D).~~
3) ~~Screwless~~Receptacles installed using screwless terminals of the conductor push-in type construction (also known as *push-in-terminals*) ~~employed in a receptacle~~ shall be installed on not greater than 15-ampere branch circuits and shall be connected with 14 AWG solid copper wire only unless listed and marked for other types of conductors.

Informational Note: See UL 498, *Attachment Plugs and Receptacles*, for information regarding screwless terminals of various type constructions employed on receptacles. Screwless terminals of the separable-terminal assembly, spring-action clamp, and insulation-displacement type constructions are not classified in UL 498 as screwless terminals of the conductor push-in type construction (also known as push-in terminals).

New - 406.4(D)(8)

Ground-Fault Protection of Equipment (GFPE)

■ **What Changed:** New requirement added to require ground-fault protection of equipment (GFPE) to be provided for replacement receptacles that now require GFPE protection by the current Code. This requirement is very similar to section 406.4(D)(3) of this section, which requires ground fault circuit-interrupter (GFCI) protection to be provided if a receptacle is replaced where the NEC presently requires GFCI protection. A

■ **Its Effect:** This new requirement will improve the safety of electrical systems that have been installed previously and will enhance the safety for the people who use electrical systems where the ground-fault protection of equipment is required by newer versions of the Code.

(8) Ground-Fault Protection of Equipment (GFPE).
Receptacles shall be provided with GFPE where replacements are made at receptacle outlets that are required to be so protected elsewhere in this Code.

Revision - 406.6(D)

Receptacle Faceplate (Cover Plates) with Integral Night Light and/or USB Charger

■ **What Changed:** Revised language to 406.6(D), limiting the faceplate's load to one watt or less and specifically requires the screws on the receptacles to be made only of brass or copper alloy.

■ **Its Effect:** There has been uncertainty if these devices were safely connected to receptacles by friction contact with the screw terminals. This change will add clarity for the electrical professionals that they are safe to install. This change will allow these faceplates to be used as they have been in the past but will limit the wattage allowed to be carried thru the connection points between the receptacle and the faceplates. The new language also requires these faceplates to be utilized with receptacles equipped with brass or copper alloy only.

(D) Receptacle Faceplate (Cover Plates) with Integral Night Light and/or USB Charger.

A flush device cover plate that additionally provides a night light and/or Class 2 output connector(s) shall be listed and constructed such that the night light and/or Class 2 circuitry is integral with the flush device cover plate.

~~Such a faceplate shall connect to the branch circuit using approved wiring methods. It shall not connect through the use of friction or spring contact members with the screw heads or other components of the receptacle unless specifically evaluated and identified by the receptacle manufacturer.~~Listed receptacle faceplates with integral night light, USB charger, or both, that rely solely on spring-tensioned contacts shall be connected to only brass or copper alloy receptacle terminal screws and shall be rated 1 watt or less.

Exception: Effective January 1, 2026, spring-tensioned contact connections to steel receptacle terminal screws shall be permitted if the receptacle faceplate is specifically listed and identified for connection to steel receptacle terminal screws.

Revision - 406.9(C)

Bathtub and Shower Space

■ **What Changed:** Clarification of receptacle restrictions in and around bathtubs and showers in Section 406.9(C). A new Exception #4 was added to allow single receptacles within 36" of the tub or shower with limitations. This change was accepted because the area below the bathtub rim was not included in the language added in the 2020 NEC. The areas outside of and below the rim of a bathtub are just as important as the area above the rim extending out three feet. A new Exception #4 was added to accommodate the toilets with electronic seats and other functions, which require 120-volt receptacles to be installed within the 36" zone or personal hygiene devices for people with physical limitations. This receptacle is required to be a single receptacle and not be located in the space between the bathtub or shower and the toilet or bidet.

■ **Its Effect:** These changes help clarify the receptacle requirements for the electrical professionals in areas containing a bathtub or shower space. They will enhance the safety within these areas.

(C) Bathtub and Shower Space.

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

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

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

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

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

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

Informational Note No. 1: See 210.8(A)(1) for GFCI requirements in a bathroom.

Informational Note No. 2: See 210.11(C) for bathroom branch circuits.

Informational Note No. 3: See 210.21(B)(1) for single receptacle on an individual branch.

Revision - 406.12

Tamper-Resistant Receptacles

■ **What Changed:** Revision includes some editorial changes to allow for an easier understanding of where tamper-resistant receptacles are required. Additional areas and occupancies were also added where tamper-resistant receptacles will now be required.

■ **Its Effect:** The editorial changes made within the subdivisions of 406.12 will make these requirements and where the tamper-resistant receptacles are required easier to understand for the electrical professional. The expansion of the areas requiring tamper-resistant receptacles will provide an additional level of safety for the occupant in these occupancies.

406.12 Tamper-Resistant Receptacles.

All 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles in the following locations shall be listed tamper-resistant receptacles:

1) All dwelling units, boathouses, mobile homes and manufactured homes, including their attached and detached garages, accessory buildings ~~to dwelling units~~, and ~~their~~ common areas
2) Guest rooms and guest suites of hotels, motels, and their common areas
3) Child care facilities
4) Preschools and education facilities
5) Within clinics, medical and dental offices, and outpatient facilities, the following spaces ~~and the like~~:
   a. Business offices accessible to the general public
   b. Lobbies, ~~corridors,~~and waiting spaces~~, and spaces used for patient sleeping~~
   c. Spaces of nursing homes and limited care facilities covered in 517.10(B)(2)~~patient sleeping rooms~~
6) Places of awaiting transportation, gymnasiums, skating rinks, fitness centers, and auditoriums
7) Dormitory units
8) Residential care/assisted living facilities, social and substance abuse rehabilitation facilities, ~~convents,~~ and group homes
9) Foster care facilities, nursing homes, and psychiatric hospitals
10) Areas of agricultural buildings accessible to the general public and any common areas

Informational Note No. 1: See ANSI/NEMA WD 6-2016, *Wiring Devices — Dimensional Specifications*. This requirement would include receptacles identified as 5-15, 5-20, 6-15, and 6-20.

Informational Note No. 2: See NFPA 5000-2021, *Building Construction and Safety Code*, and the *International Building Code* (IBC)-2021 for more information on occupancy classifications for the types of facilities covered by this requirement.

Informational Note No. 3: Areas of agricultural building are frequently converted to hospitality areas. These areas can include petting zoos, stables, and buildings used for recreation or educational purposes where receptacles are installed.

406.12 Tamper-Resistant Receptacles. (CONT)

Exception to (1) through (10): Receptacles in the following locations shall not be required to be tamper resistant:

1) *Receptacles located more than 1.7 m (5 ½ ft) above the floor*
2) *Receptacles that are part of a luminaire or appliance*
2) ~~*A single receptacle that is not readily accessible and that supplies one appliance, or a duplex receptacle that is not readily accessible and that supplies two appliances, where the receptacle outlet is installed within the space occupied by or designated for each appliance that, in normal use, is not easily moved from one place to another and that is cord-and-plug-connected in accordance with 400.10(A)(6), (A)(7), or (A)(8)*~~
3) *Where the receptacle outlet is installed within the space occupied by or designated for each appliance that, in normal use, is not easily moved from one place to another and is cord-and-plug-connected in accordance with 400.10(A)(6), (A)(7), or (A)(8) the following are permitted:*
   a. *A single receptacle that is not readily accessible and supplies one appliance*
   b. *A duplex receptacle that is not readily accessible and supplies two appliances*

Revision - 408.4

Descriptions Required

■ **What Changed:** This revision placed requirements for circuit directories and descriptions in Section 408.4 into a list format for clarity.
■ Why it happened: There was confusion with the previous text as written in paragraph form. Generalized labeling was removed in a previous cycle, but there was still confusion left when looking at it in the field as to what was being written. The new list format layout for these requirements is for the end user's benefit.

■ **Its Effect:** This change will clarify labeling and description for panelboards and panels for the electrical professional.

408.4 Descriptions Required.

(A) Circuit Directory or Circuit Description.

Every circuit and circuit modification shall be ~~legibly and permanently described as to its clear, evident, and specific purpose or use. The description shall include an approved degree of detail that allows each circuit to be distinguished from all others. Spare positions that contain unused overcurrent devices or switches shall be described accordingly. The description shall be included in a circuit directory that is located on the face of, inside of, or in an approved location adjacent to the panel door in the case of a panelboard and at each switch or circuit breaker in a switchboard or switchgear. No circuit shall be described in a manner that depends on transient conditions of occupancy.~~provided with a legible and permanent description that complies with all of the following conditions as applicable:

1) Located at each switch or circuit breaker in a switchboard or switchgear
2) Included in a circuit directory that is located on the face of, inside of, or in an approved location adjacent to the panel door in the case of a panelboard
3) Clear, evident, and specific to the purpose or use of each circuit including spare positions with an unused overcurrent device
4) Described with a degree of detail and clarity that is unlikely to result in confusion between circuits
5) Not dependent on transient conditions of occupancy
6) Clear in explaining abbreviations and symbols when used

(B) Source of Supply.

All switchboards, switchgear, and panelboards supplied by a feeder(s) in other than one- or two-family dwellings shall be permanently marked ~~to indicate each device or equipment where the power originates and its physical location. The label shall be permanently affixed, of sufficient durability to withstand the environment involved, and not handwritten.~~in accordance with the following:

1) With the identification and physical location of where the power originates
2) With a label that is permanently affixed and of sufficient durability to withstand the environment involved
3) Using a method that is not handwritten

Revision - 408.9

Replacement Panelboards

■ **What Changed:** The replacement requirements for panelboards in Section 408.9. were revised for clarification. There are now two list items for the replacement of existing panelboards in an enclosure or cabinet.

■ **Its Effect:** This offers a degree of clarity to the electrical professional regarding the replacement of a panelboard within an existing cabinet. There has been confusion regarding the replacement of a panelboard. Can one manufacturer's panel board be installed in another manufacturer's cabinet? What is the panelboard is no longer available from a specific manufacturer? This will alleviate the confusion that exists between
the AHJ and the installer when these instances present themselves in the field.

408.9 Replacement Panelboards.

Replacement panelboards shall be permitted to be installed in existing enclosures in accordance with (A) or (B).

(A) Panelboards Listed for the Specific Enclosure.

~~Panelboards shall not be permitted to be reconditioned. This shall not prevent~~ If the replacement ~~of a panelboard within an enclosure. In the event the replacement has not been~~ panelboard is listed for the specific enclosure ~~and the~~ identified by either catalog number or dimensional information, the panelboard shall be permitted to maintain its short-circuit current rating.

(B) Panelboards Not Listed for the Specific Enclosure.

If the available fault current is greater than 10,000 amperes, the completed work shall be field labeled ~~, and any~~ . If the available fault current is 10,000 amperes or less, the replacement panelboard shall be identified for the application. Any previously applied listing marks on the cabinet that pertain to the panelboard shall be removed.

~~**(B)** Switchboards and Switchgear.~~

~~Switchboards and switchgear, or sections of switchboards or switchgear, shall be permitted to be reconditioned. Reconditioned switchboards and switchgear shall be listed or field labeled as reconditioned.~~

Revision - 408.38

Enclosure

■ **What Changed:** Text revised where a panelboard installed in a cabinet, cutout box, or identified enclosure has an available fault current greater than 10,000 amperes, the panelboard and enclosure combination shall be evaluated for the application.

■ **Its Effect:** This offers guidance and a degree of clarity to the electrical professional when panelboards with a deadfront are installed in cabinets, cutout boxes, or other identified enclosures. An exception for installations that are not associated with dead fronts is allowed to be accessible only to a qualified person.

408.38 Enclosure.
Panelboards shall be mounted in cabinets, cutout boxes, or identified enclosures and shall be dead-front. Where the available fault current is greater than 10,000 amperes, the panelboard and enclosure combination shall be ~~evaluated~~ listed or field-labeled for the application.
Exception: Panelboards other than of the dead-front, externally operable type shall be permitted where accessible only to qualified persons.

Revision - 408.43

Panelboard Orientation

■ **What Changed:** Section revised adding that panelboards cannot be installed in the face-down position. The face-down position criteria were added due to working space concerns. Even with acceptable working space, it would be very difficult for a qualified worker to safely work in this position due to the installer lying, kneeling, or standing on a floor surface looking up.

■ **Its Effect:** This revision in 408.43 clarifies how panelboards can be installed. It now includes language for the electrical professional that these items cannot be installed in the face-up or face-down position.

408.43 Panelboard Orientation.
Panelboards shall not be installed in the face-up or face-down position.
Exception: A listed commercial appliance outlet center shall be permitted to be installed in a face-up orientation in a floor, provided the installation complies with (1), (2), and (3):
(1) The number of circuit positions does not exceed 8
(2) There is not less than 900 mm (3 ft) of clear floor workspace on at least three sides of the outlet center.
(3) There are no obstructions above the outlet center or above the required workspace

Reorganization - 409.60

Bonding

■ **What Changed:** Section 409.60 for industrial control panels was restructured, creating (A) Grounding and (B) Bonding to clarify where grounding and bonding would occur and have the revised language comply with the section title. Further clarification was added to indicate applicable sections for sizing these grounding and bonding conductors.

■ **Its Effect:** The reorganization of 409.60 will clarify to the Code user that grounding and bonding are required for these industrial control panels and provide the applicable code sections based on which direction or situation is present.

409.60 Bonding.

~~Multisection industrial control panels shall be bonded together with an equipment bonding conductor or an equivalent equipment grounding bus sized in accordance with Table 250.122. Equipment bonding conductors shall be connected to this equipment grounding bus or to an equipment grounding termination point provided in a single-section industrial control panel.~~Industrial control panels shall be grounded and bonded in accordance with 409.60(A) and (B).

(A) Grounding.

~~Equipment bonding conductors~~An equipment grounding conductor sized in accordance with 250.122 shall be connected to ~~this~~an equipment grounding bus or to an equipment grounding termination point provided in a single-section industrial control panel.

(B) Bonding.

Multisection industrial control panels shall be bonded together ~~with~~using an equipment bonding ~~conductor or an equivalent equipment grounding bus~~jumper sized in accordance with ~~Table 250.122~~250.102(D).

New - 409.70

Surge Protection

■ **What Changed:** New Section 409.70 has been added requiring surge protection for industrial control panels. In previous editions of the NEC, surge protection wasn't required in industrial control panels.

■ **Its Effect:** The added requirement at Section 409.70 provides a level of equipment and personnel safety for the electrical professional when working on industrial control panels. Additionally, a level of equipment protection is also inadvertently provided.

409.70 Surge Protection.

Safety ~~interlock control devices~~circuits for personnel protection that are subject to damage from surge events shall have surge protection installed ~~in accordance with Part II of Article 242~~within or immediately adjacent to the control panel.

Revision - 410.2

Reconditioned Equipment

■ **What Changed:** Revision added specifying ballasts, LED drivers, and lamps should be added into updated Section 410.2 for items not allowed to be reconditioned. The 2023 change will add lighting ballasts, LED drivers, and lamps to this existing list of items.

■ **Its Effect:** The addition of these other items will assist the electrical professional in maintaining the safety of the public. It also adds clarity and usability to the Code.

R410.2 Reconditioned Equipment.

~~Luminaires~~Reconditioned luminaires, lampholders, ballasts, LED drivers, lamps, and retrofit kits shall not be permitted ~~to be reconditioned~~. If a retrofit kit is installed in a luminaire in accordance with the installation instructions, the retrofitted luminaire shall not be considered reconditioned.

Revision - 410.10(F)

Luminaires Installed in or Under Roof Decking

■ **What Changed:** This requirement has been revised to require luminaires to be located a minimum of 38 mm (1 ½ in.) from any type of roof. An exception was also added for concrete of 50 mm (2 in.) covering metal-corrugated sheet roof decking that the 38 mm (1 ½ in.) spacing is not required.

■ **Its Effect:** The electrical professional will need to understand that this change expands the requirement for luminaires for all roof systems to be a minimum of 1 ½ inch from the lowest part of the roof system. This will assure other trades, such as roofers, will be less likely to damage luminaires installed near the underside of roofs. This will now apply to all roofs in all occupancies; therefore, dwellings will now be more likely to be affected by this requirement due to the fact this applies to all roofs. Previous editions of the NEC only applied to metal corrugated roof systems, which are typically installed on commercial or industrial buildings.

(F) Luminaires Installed in or Under Roof Decking.
Luminaires installed in exposed or concealed locations ~~under metal-corrugated sheet roof decking~~under roof decking where subject to physical damage, shall be installed and supported so there is not less than 38 mm (1½ in.) measured from the lowest surface of the roof decking to the top of the luminaire.

Exception: The 38 mm (1 1/2 in.) spacing is not required where metal-corrugated sheet roof decking is covered with a minimum thickness 50 mm (2 in.) concrete slab, measured from the top of the corrugated roofing.

Relocation - 410.71

Disconnecting Means for Fluorescent or LED Luminaires the Utilize Double-Ended Lamps

■ **What Changed:** The requirement for disconnects for luminaires was relocated to 410.71 because LED drivers were added to this section. Lighting systems have evolved, and fluorescent lamps are being discontinued and replaced with LED lamps. Man of the existing fluorescent luminaires are being upgraded to incorporate LED lamps to meet energy conservation requirements. The additional requirement for LED luminaires was added to address a hazard that would exist with either style of luminaire.

■ **Its Effect:** The electrical professional will need to know that the information previously located in 410.130(G) is now located at 410.71. This change will better align the wiring requirement within Article 410. It will also make the installation safer for the installer and the maintenance personnel who may be involved with repairing and maintaining the luminaire.

410.71 Disconnecting Means for Fluorescent or LED Luminaires that Utilize Double-Ended Lamps.

(1) General.

In indoor locations other than dwellings and associated accessory structures, fluorescent or LED luminaires that utilize double-ended lamps and contain ballast(s) or LED driver(s) that can be serviced in place shall have a disconnecting means either internal or external to each luminaire. For existing installed luminaires without disconnecting means, at the time a ballast or LED driver is added or replaced a disconnecting means shall be installed. The line side terminals of the disconnecting means shall be guarded.

Exception No. 1: A disconnecting means shall not be required for luminaires installed in hazardous (classified) location(s).

Exception No. 2: A disconnecting means shall not be required for luminaires that provide emergency illumination required in 700.16.

Exception No. 3: For cord-and-plug-connected luminaires, an accessible separable connector or an accessible plug and receptacle shall be permitted to serve as the disconnecting means.

Exception No. 4: Disconnecting means shall not be required for every luminaire in a building area if all of the following conditions apply:

More than one luminaire is installed in the building area

The luminaires are not connected to a multiwire branch circuit

The design of the installation includes disconnecting means

The building area will not be left in total darkness should only one disconnect be opened

(2) Multiwire Branch Circuits.

When connected to multiwire branch circuits, the disconnecting means shall simultaneously break all the supply conductors to the ballast, including the grounded conductor.

(3) Location.

The disconnecting means shall be located so as to be accessible to qualified persons before servicing or maintaining the ballast. Where the disconnecting means is external to the luminaire, it shall be a single device, and it shall be attached to the luminaire or the luminaire shall be located within sight of the disconnecting means.

New - Article 410, Part XVII

Special Provisions for Germicidal Irradiation Luminaires

■ **What Changed:** A new Part XVII was added to Article 410 to address the increasing use of germicidal luminaires for disinfecting purposes. These products are increasingly being used due to the COVID 19 pandemic and other concerns.

■ **Its Effect:** Bringing these requirements into the NEC allows the installer and the AHJ to understand the limitations and installation requirements for the specialized luminaires.

Part XVII. Special Provisions for Germicidal Irradiation Luminaires

410.190 General.

410.191 Listing.

Luminaires intended to emit germicidal irradiation shall be listed and identified as germicidal equipment.

410.193 Installation.

Luminaires intended to emit germicidal irradiation shall be installed in accordance with the manufacturer's instructions and equipment markings.

410.195 Locations Not Permitted.

(A) General Lighting.

Luminaires intended to emit germicidal irradiation shall not be installed as lighting for general illumination unless such use is indicated in the manufacturer's instructions.

(B) Installed Location.

Luminaires intended to emit germicidal irradiation shall not be installed where likely to be subject to physical damage.

(C) Dwellings.

Luminaires intended to emit germicidal irradiation shall not be installed in a dwelling unless listed and identified for use in dwellings.

(D) Mounting Height.

Luminaires intended to emit germicidal irradiation and installed in a building space that will be occupied during luminaire operation shall not be mounted below the minimum height specified by its listing and installation instructions.

410.197 Germicidal Irradiation Systems.

(A) Listing.

A germicidal irradiation system intended to provide a safeguard against UV exposure by ensuring that a building space will not be occupied during luminaire operation shall be listed and identified as a germicidal system.

(B) System Components.

All system components shall be provided by the system manufacturer or clearly specified in the installation instructions as a component that the installer is required to source separately.

(C) Installation.

A germicidal irradiation system shall be installed in accordance with the manufacturer's installation instructions and installation markings.

(D) Dwellings.

A germicidal irradiation system shall not be installed in a dwelling unless listed and identified for use in dwellings.

Revision - 410.184

Ground-Fault Circuit-Interrupter (GFCI) Protection and Special Purpose Ground-Fault Circuit-Interrupter (SPGFCI) Protection

■ **What Changed:** Section 410.184 was revised to clarify when GFCI protection is required for horticultural lighting, with an exception added to require the use of a special purpose ground fault circuit interrupter (SPGFCI) on circuits exceeding 150 volts to ground. An Informational Note was also added to point readers to UL 943C, Outline of Investigation for Special Purpose Ground-Fault Circuit-Interrupters, for further information on SPGFCI devices.

■ **Its Effect:** The revisions will provide relief to the electrical professionals from having to provide GFCI or SPGFCI protection for 277-volt, cord-connected, horticultural lighting that is hard-wired. Electrical inspectors will have clear and enforceable Code language and will no longer have to resort to using 90.4 to approve an installation.

410.184 Ground-Fault Circuit-Interrupter (GFCI) Protection and Special Purpose Ground-Fault Circuit-Interrupter (SPGFCI) Protection.

Lighting equipment identified for horticultural use and employing flexible cord(s) with one or more ~~conductors~~separable connector(s) or attachment plug(s) shall be supplied by lighting outlets protected by a listed ~~ground-fault circuit interrupter~~GFCI.

Exception: Circuits exceeding 150 volts to ground shall be protected by a listed ~~special purpose ground-fault circuit interrupter~~SPGFCI.

Informational Note: See UL 943C, *Outline of Investigation for Special Purpose Ground-Fault Circuit-Interrupters*, for information on special purpose ground-fault circuit interrupters.

Deletion - Article 422

Appliances

■ **What Changed:** Sections 422.3, 422.4, 422.15, 422.23, 422.46. 422.50 for appliances were identified as redundant or unnecessary and deleted from the 2023 edition of the NEC. Many of the removed sections are covered in the listings.

■ **Its Effect:** Deletion of this material does not reduce safety as the material is covered in product standards or in other general requirements in the NEC. This allows installers and AHJs to simply confirm listing and utilize nameplate ratings to verify installation requirements.

Revision - 422.16(B)(2)

Built-in Dishwashers and Trash Compactors

■ **What Changed:** Provisions added at Section 422.16(B)(2) for supply cords to trash compactors and dishwashers to pass through an item such as a wood cabinet to be provided with protections that incorporate smoothed edges. While grommets and bushings are practical solutions in metal cabinet separations, those fittings were not practical with wood cabinets.

■ **Its Effect:** While previous text allowed other approved means as an acceptable means to protect cords, this revision eliminates the need for a judgment call when an obvious solution exists. This should clarify issues between the installer and the inspector when they arise in the field.

(2) Built-in Dishwashers and Trash Compactors.

Built-in dishwashers and trash compactors shall be permitted to be cord-and-plug-connected with a flexible cord identified as suitable for the purpose in the installation instructions of the appliance manufacturer where all of the following conditions are met:

1) For a ~~trash compactor, the length of the cord shall be 0.9 m to 1.2 m (3 ft to 4 ft) measured from the face of the attachment plug to the plane of the rear of the appliance.~~
2) ~~For a~~ built-in dishwasher and trash compactor, the length of the cord shall be 0.9 m to 2.0 m (3 ft to 6.5 ft) measured from the face of the attachment plug to the plane of the rear of the appliance.
3) Receptacles shall be located to protect against physical damage to the flexible cord.
4) The receptacle for a trash compactor shall be located in the space adjacent to space occupied by the ~~appliance or adjacent thereto~~trash compactor. Where the flexible cord passes through an opening, it shall be protected against damage by a bushing, grommet, smoothed edge, or other approved means.
5) The receptacle for a built-in dishwasher shall be located in the space adjacent to the space occupied by the dishwasher. Where the flexible cord passes through an opening, it shall be protected against damage by a bushing, grommet, smoothed edge, or other approved means.
6) The receptacle shall be accessible.
7) The flexible cord shall have an equipment grounding conductor and be terminated with a grounding-type attachment plug.

Exception: A listed appliance distinctly marked to identify it as protected by a system of double insulation shall not be required to be terminated with a grounding-type attachment plug.

Revision - 422.18

Ceiling-Suspended (Paddle) Fans

■ **What Changed:** Text covering ceiling-suspended (paddle) fans have been subdivided and includes a new first-level subdivision (B) that prohibits metal parts of ceiling fans from areas over tub and shower spaces. That prohibited "zone" correlates with the prohibited zone described in 410.10(D) for luminaires. This prohibited zone for luminaires recognized an elevated risk where an individual could touch the luminaire while standing in the water. This change correlates the ceiling fan requirement with luminaires since the risk is similar.

■ **Its Effect:** Many electrical professionals were already likely applying the requirement in 410.10(D) to ceiling fans. This change improves usability by including text to provide equivalent safety to installations with similar risks.

422.18 ~~Support of~~ Ceiling-Suspended (Paddle) Fans.

~~Ceiling-suspended (paddle) fans shall be supported independently of an outlet box or by one of the following:~~

~~1) A listed outlet box or listed outlet box system identified for fan support installed in accordance with 314.27(C)~~

~~2) A listed outlet box system, a listed weight-supporting ceiling receptacle, and a compatible factory-installed weight-supporting attachment fitting that is installed in accordance with 314.27(E)~~

(A) Support.

Ceiling-suspended (paddle) fans shall be supported independently of an outlet box or by one of the following:

1) A listed outlet box or listed outlet box system identified for fan support installed in accordance with 314.27(C)
2) A listed outlet box system, a listed weight-supporting ceiling receptacle, and a compatible factory-installed weight-supporting attachment fitting that is installed in accordance with 314.27(E)

(B) Location.

No metal parts of ceiling-suspended (paddle) fans in bathrooms and shower spaces shall be located within a zone measured 900 mm (3 ft) horizontally and 2.5 m (8 ft) vertically from the top of the bathtub rim or shower stall threshold. This zone is all-encompassing and shall include the space directly over the tub or shower stall.

Deletion - 424.10

General

■ **What Changed:** Section 424.10, Special Permission, was deleted and 424.9, General, was relocated to 424.10 at the beginning of Article 424 Part II.

■ **Its Effect:** While the provision for use of special permission was removed from Article 424, AHJs can utilize 90.4 where an equivalent installation is provided and the option for special permission is needed for approval. This will add clarity and usability to the Code.

New - 424.48

Installation of Cables in Walls

■ **What Changed:** The new section at 424.28 was created and will allow heating cables to be installed in walls with specific protection and limitations. The provision includes a January 1, 2026, effective date. While concerns exist for heating cable installed in walls, the need for that installation with proper protection was evident. Installations were already being considered in Canada to permit these types of installations with adequate protection. Understanding that installation codes, product standards, and certification would all need correlation and some effort to determine the heating products would be operating with available protection resulted in the future effective date.

■ **Its Effect:** This change allows equipment manufacturers, standards developers, and certification agencies an opportunity to develop products and address interoperability issues before the effective date.

424.48 Installation of Cables in Walls.

Unless prohibited by 424.38(B), heating cables and cable sets shall be permitted to be installed in, on, or behind walls provided all of the following are met:

1) Heating cables and cable sets shall be identified as suitable for installation in, on, or behind walls.
2) Heating cables and cable sets shall be GFCI protected.
3) Grounding means, such as copper braid, metal sheath, or other approved means, shall be provided.
4) Heating cables and cable sets shall be AFCI protected.
5) Heating cables and cable sets shall be permitted to be installed no more than 1.2 m (4 ft) above the floor.

This requirement shall become effective January 1, 2026.

New - 424.93(C)

Installation of Heating Panels in Walls

■ **What Changed:** This new first-level subdivision created will allow heating panels and heating panel sets to be installed in walls with specific protection and limitations. The provision includes a January 1, 2026, effective date.
■ Why it happened: While concerns exist for heating panels and heating panel sets installed in walls, the need for that installation with proper protection was evident. Understanding that installation codes, product standards, and certification would all need correlation and some effort to determine the heating products would be operated with available protection resulted in the future effective date. This revision correlates with requirements in 424.48 for heating cables.

■ **Its Effect:** This change allows equipment manufacturers, standards developers, and certification agencies an opportunity to develop products and address interoperability issues before the effective date.

(C) Installation of Heating Panels in Walls.

Unless prohibited by 424.93(A)(2), heating panels shall be permitted to be installed in, on, or behind walls provided all of the following are met:

1) Heating panels shall be identified as suitable for installation in, on, or behind walls.
2) Heating panels shall be installed per the manufacturer's instructions and in accordance with the product listing.
3) Heating panels shall be GFCI protected.
4) Grounding means, such as copper braid, metal sheath, or other approved means, shall be provided.
5) Heating panels shall be AFCI protected.
6) Heating panels shall be permitted to be installed no more than 1.2 m (4 ft) above the floor.

Exception: Low-voltage heating panels shall not be required to be GFCI protected.
This requirement shall become effective January 1, 2026.

Deletion - 425.10

General

■ **What Changed:** Section 425.10 was deleted for special permission requirements and 425.8 General was relocated to 425.10 as the beginning of Article 425 Part II. The 2020 NEC included a provision to permit the installation of industrial process heating equipment by methods other than those included in Article 425 with special permission. This provision was determined to be redundant as 90.4(C) permits the use of special permission.

■ **Its Effect:** While the provision for use of special permission was removed from Article 425, AHJs can utilize 90.4 where an equivalent installation is provided, and the option for special permission is needed for approval..

~~**425.10 Special Permission.**~~

~~Fixed industrial process heating equipment and systems installed by methods other than covered by this article shall be permitted only by special permission.~~

Deletion - 426.14

Special Permission

■ **What Changed:** Section 426.14 pertaining to special permission for fixed outdoor electric deicing and snow-melting equipment was deleted. This provision was determined to be redundant as 90.4(C) permits the use of special permission.

■ **Its Effect:** While the provision for the use of special permission was removed from Article 426, AHJs can utilize 90.4 where an equivalent installation is provided, and the option for special permission is needed for approval.

~~**426.14 Special Permission.**~~

~~Fixed outdoor deicing and snow-melting equipment employing methods of construction or installation other than covered by this article shall be permitted only by special permission.~~

Revision - 426.28

Ground-Fault Protection

■ **What Changed:** Manufacturers of fixed outdoor electric deicing and snow-melting equipment have an option to require ground-fault protection with reduced current and time threshold values providing a higher degree of protection than previously required. Therefore, Section 426.28 was revised, allowing the manufacturer to specify the ground fault trip level.

■ **Its Effect:** While NEC 110.3(B) is not new, this change is a clear application where utilization equipment manufacturers have included "additional" protection for the utilization equipment. Designers, installers, and AHJs must review installation instructions prior to installation to assure compliance.

426.28 Ground-Fault Protection ~~of Equipment~~.
Ground-fault protection ~~of equipment~~ shall be provided for fixed outdoor electric deicing and snow-melting equipment. The trip level of ground-fault protection shall be as specified by the manufacturer.

Deletion - 427.35

Scope

■ **What Changed:** Section 427.35, which covered the installation of line frequency induction heating equipment and accessories for pipelines and vessels, was deleted. This section was determined to be redundant as 427.1 already covers the scope of the article

■ **Its Effect:** This specialized heating equipment will continue to be covered by this article. The removal of the scope requirements at 427.35 will increase usability and reduce confusion for the electrical professional.

~~**427.35 Scope.**~~
~~This part covers the installation of line frequency induction heating equipment and accessories for pipelines and vessels.~~
~~Informational Note: See Article 665 for other applications.~~

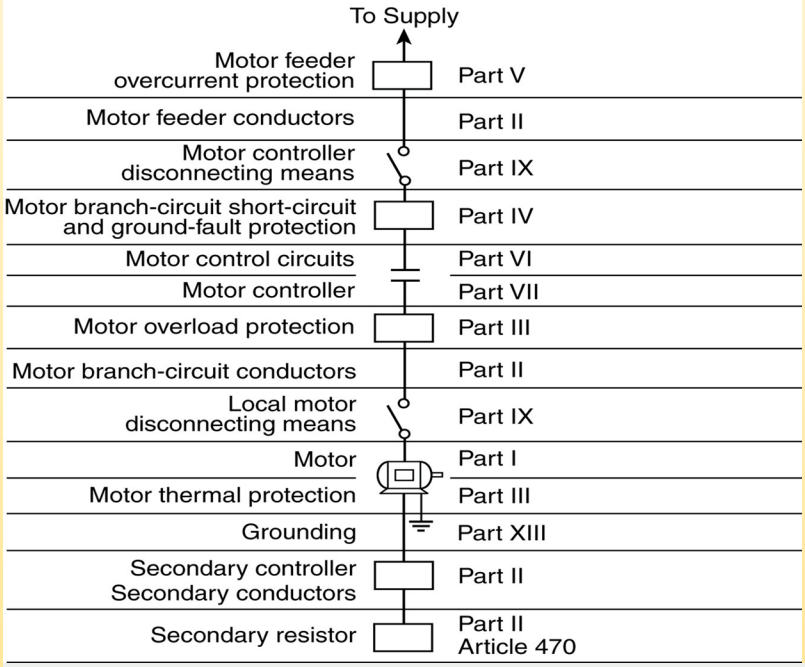
Revision - 430.1

Scope

■ **What Changed:** The previous figure at Section 430.1 has been deleted, and an expanded figure has been added to include all relevant parts of the motor circuit and what parts of Article 430 apply. The previous figure in 430.1 has been in the NEC for several decades. The revised figure provides a pictogram of the various elements of a motor circuit and includes the applicable part where information can be found within Article 430.

■ **Its Effect:** This change provides a more comprehensive detail for motors and their control devices. The electrical professional will be provided with additional clarity and application to the various requirements that apply to this equipment.

General, 430.1 through 430.18	Part I
Motor Circuit Conductors, 430.21 through 430.29	Part II
Motor and Branch-Circuit Overload Protection, 430.31 through 430.44	Part III
Motor Branch-Circuit Short-Circuit and Ground-Fault Protection, 430.51 through 430.58	Part IV
Motor Feeder Short-Circuit and Ground-Fault Protection, 430.61 through 430.63	Part V
Motor Control Circuits, 430.71 through 430.75	Part VI
Motor Controllers, 430.81 through 430.90	Part VII
Motor Control Centers, 430.92 through 430.99	Part VIII
Disconnecting Means, 430.101 through 430.113	Part IX
Adjustable-Speed Drive Systems, 430.120 through 430.131	Part X
Over 1000 Volts, Nominal, 430.221 through 430.227	Part XI
Protection of Live Parts — All Voltages, 430.231 through 430.233	Part XII
Grounding — All Voltages, 430.241 through 430.246	Part XIII
Tables, Tables 430.247 through 430.252	Part XIV



~~Informational Note No. 1: Installation requirements for motor control centers are covered in 110.26(E). Air-conditioning and refrigerating equipment are covered in Article 440.~~

~~Informational Note No. 2: Figure 430.1 is for information only.~~

Informational Note No. 1: See Informational Note Figure 430.1 for the arrangement of this article.

Informational Note No. 2: See 110.26(E) for installation requirements for motor control centers.

Informational Note No. 3: See 440.1 for air-conditioning and refrigerating equipment.

Informational Note No. 4: See Part X for additional requirements for motors utilizing adjustable-speed drive systems.

Informational Note No. 5: See Part XI for additional requirements for motors that operate over 1000 volts, nominal.

New - 430.2

Reconditioned Motors

■ **What Changed:** New guidance added for reconditioning of motors in Section 430.2, including a new informational note that references ANSI/EASA AR100-2020, Recommended Practice for the Repair of Rotating Electrical Apparatus. The new informational note references ANSI/EASA AR100-2020, Recommended Practice for the Repair of Rotating Electrical Apparatus. This information is helpful if the reconditioning facility is no longer in business. This reference contains valuable information about the rewinding and repair of electric motors.

■ **Its Effect:** Most electrical professionals are aware that motors are being reconditioned and safely placed back into service. There is now language in the NEC that provides guidance and acceptance for this practice.

430.2 Reconditioned Motors.

Reconditioned motors shall be permitted if the reconditioning has been conducted in accordance with the manufacturer's instructions or, if no instructions are provided, nationally recognized standards.

Reconditioned motors identified for use in hazardous (classified) locations shall be listed as reconditioned if installed in hazardous (classified) locations.

Informational Note: See ANSI/EASA AR100-2020, *Recommended Practice for the Repair of Rotating Electrical Apparatus*, for information on the rewinding and repair of motors.

Revision - 440.8

Single Machine and Location

■ **What Changed:** New language has been added to Section 440.8, indicating that mini-split units are not to be installed in a tub or shower zone. Mini-split heating and cooling systems are being installed in bathtub and shower spaces due to a lack of wall space. This is increasingly occurring in older homes with smaller bathrooms where the shower was on the outside wall, making it a prime place to install these systems. This installation provides a clear danger to the occupants, and the new language revises Section 440.8 to prohibit the installation of these units in the zone around bathtub and shower spaces. The dimensions of the zone stated with this change are consistent with code requirements for other electrical equipment or devices.

■ **Its Effect:** This added language makes it clear to installers and inspectors that mini-split systems are not allowed in a tub and shower zone.

440.8 Single Machine and Location.

An air-conditioning or refrigerating system shall be considered to be a single machine under the provisions of 430.87, Exception No. 1, and 430.112, Exception. The motors shall be permitted to be located remotely from each other. Air-conditioning and refrigeration equipment shall not be installed within a zone measured 900 mm (3 ft) horizontally and 2.5 m (8 ft) vertically from the top of a bathtub rim or shower stall threshold. The zone shall be all-encompassing and include the space directly over the tub or shower stall.

Revision - 440.11

General

■ **What Changed:** Additional language added at Section 440.11 that requires disconnects with covers that expose live parts to be locked for protection. Language was added requiring air-conditioning and refrigerating equipment disconnects that have hinged covers, and when open, have exposed live parts, be locked to prevent children and unqualified people from accidental contact. As “zip-ties” would require the use of a tool to remove the cover; it is allowed, a practice already used by many electrical and mechanical contractors.

■ **Its Effect:** This added language provides an additional level of protection for the public and the electrical professional concerning disconnects that have no internal covers that protect live parts. Exposure of these live parts to unqualified individuals could cause injury or death.

440.11 General.

~~Part II is intended to require disconnecting means~~Disconnecting means shall be capable of disconnecting air-conditioning and refrigerating equipment, including motor-compressors and controllers, from the circuit conductors. If the disconnecting means is readily accessible to unqualified persons, any enclosure door or hinged cover of a disconnecting means enclosure that exposes lenergized parts when open shall be locked or require a tool to open or be capable of being locked.

Revision - 440.14

Location

■ **What Changed:** A reference to 110.26(A) was added in Section 440.14, which now makes it clear that working space clearances are required for air-conditioning and refrigerating equipment. Many HVAC contractors install their equipment per the manufacturer's specifications but pay little attention to the minimum required clearances in NEC 110.26 for disconnects that require servicing.

■ **Its Effect:** This added information makes it clear to the inspector and installer that minimum clearances must be maintained at air-conditioning and refrigerating disconnects.

440.14 Location.

Disconnecting means shall be located within sight from, and readily accessible from, the air-conditioning or refrigerating equipment. The disconnecting means shall be permitted to be installed on or within the air-conditioning or refrigerating equipment. Disconnecting means shall meet the working space requirements of 110.26(A).

The disconnecting means shall not be located on panels that are designed to allow access to the air-conditioning or refrigeration equipment or ~~to obscure~~where it obscures the equipment nameplate(s).

Exception No. 1: Where the disconnecting means provided in accordance with 430.102(A) is lockable in accordance with 110.25 and the refrigerating or air-conditioning equipment is essential to an industrial process in a facility with written safety procedures, and where the conditions of maintenance and supervision ensure that only qualified persons service the equipment, a disconnecting means within sight from the equipment shall not be required.

Exception No. 2: Where an attachment plug and receptacle serve as the disconnecting means in accordance with 440.13, their location shall be accessible but shall not be required to be readily accessible.

Informational Note: See Parts VII and IX of Article 430 for additional requirements.

~~Informational Note No. 2: See 110.26.~~

Revision - 445.18(A) & 445.19

Disconnecting Means & Emergency Shutdown of Prime Mover

■ **What Changed:** New language was added to (A), permitting the disconnecting means to be located within the generator behind a hinged cover, door, or enclosure panel. When the generator disconnecting means is located in the generator, a field-applied label has to be provided indicating the location of the disconnecting means. Additional modifications are made for 445.18(A) to clarify the permitted locations for emergency disconnecting means and marking means. Field labeling requirements have been added, providing clarity for the purpose of the disconnecting means to aid first responders.

A new Section 445.19 will separate the generator emergency shutdown requirements from the generator disconnect requirements. Generators with greater than 15 kW rating located at other than one- and two-family dwelling units are to be equipped with a remote emergency stop switch that will shut down the prime mover. This switch is to be located outside the equipment room or generator enclosure at a readily accessible location and meets the requirements found at 445.19(A)(1) and (A)(2).

New language at (C) clarifies that the emergency shutdown device located at one- and two-family dwelling units mounted on the exterior of the generator enclosure meets the requirements of this section. This device is to be marked as the “Generator Emergency Shutdown” and meets the requirements of 110.21(B).

■ **Its Effect:** There has been confusion among electrical professionals as to the requirements for generator disconnecting means and the requirements for emergency shutdown of the prime mover. These revisions help to clarify the requirements and aid in the usability of the Code. This work will help the installer and AHJ better understand these requirements.

445.18 Disconnecting Means ~~and Emergency Shutdown~~.

(A) Disconnecting Means.

Generators other than cord-and-plug-connected portable generators shall have one or more disconnecting means. Each disconnecting means shall simultaneously open all associated ungrounded conductors. Each disconnecting means shall be lockable open in accordance with 110.25. The disconnecting means shall be permitted to be located within the generator behind a hinged cover, door, or enclosure panel. Where the generator disconnecting means is located within the generator, a field applied label meeting the requirements of 110.21(B) shall be provided indicating the location of the generator disconnecting means.

445.18 Disconnecting Means ~~and Emergency Shutdown~~.

SEE NEC FOR COMPLETE TEXT

New - 450.2

Interconnection of Transformers

■ **What Changed:** New guidance was added for transformer interconnection and operation requirements within Article 450. This change addresses how the provisions in the article are to be applied to transformers either individually or interconnected as a single unit.

■ **Its Effect:** There should not be much of an effect on the electrical professional regarding this change. Much of this addressed NEC Style Manual concerns and correcting some issues that occurred in the 1987 code cycle.

450.2 Interconnection of Transformers.
Transformers shall individually comply with the requirements of this article unless specific provisions allow for interconnection and operation as a single unit.

New - 470.2

Reconditioned Equipment

■ **What Changed:** Section 470.2 is now the new placeholder for reconditioned equipment, indicating that reconditioning of a resistor is not permitted and that reactors shall follow manufacturers' guidelines. Resistor manufacturers have made it clear that resistors are not to be reconditioned. Reactor manufacturers provide guidelines on the reconditioning of these apparatus in their installation instructions and also have standards for the reconditioning of them.

■ **Its Effect:** This change will provide clear information to all electrical professionals regarding the reconditioning allowances for resistors and reactors.

Article 470 Resistors and Reactors

Part I. General

470.1 Scope.

This article covers the installation of separate resistors and reactors on electrical circuits.

Exception: This article does not cover resistors and reactors that are component parts of other apparatus.

470.2 Reconditioned Equipment.

(A) Resistors.

Reconditioned resistors shall not be permitted.

(B) Reactors.

Reconditioned reactors shall be permitted.

New / Relocation - Article 495

Equipment Over 1000 Volts AC, 1500 Volts DC, Nominal

■ **What Changed:** All the requirements previously found in Article 490, Equipment Over 1000 Volts, Nominal, have been moved to Article 495. This will provide an article that will contain all installation requirements pertaining to equipment over 1000 volts AC and 1500 volts DC in future NEC additions.

■ **Its Effect:** This will result in easier use of the Code when searching for requirements on this topic.

Article 495 Equipment Over 1000 Volts AC, 1500 Volts DC, Nominal

Part I. General

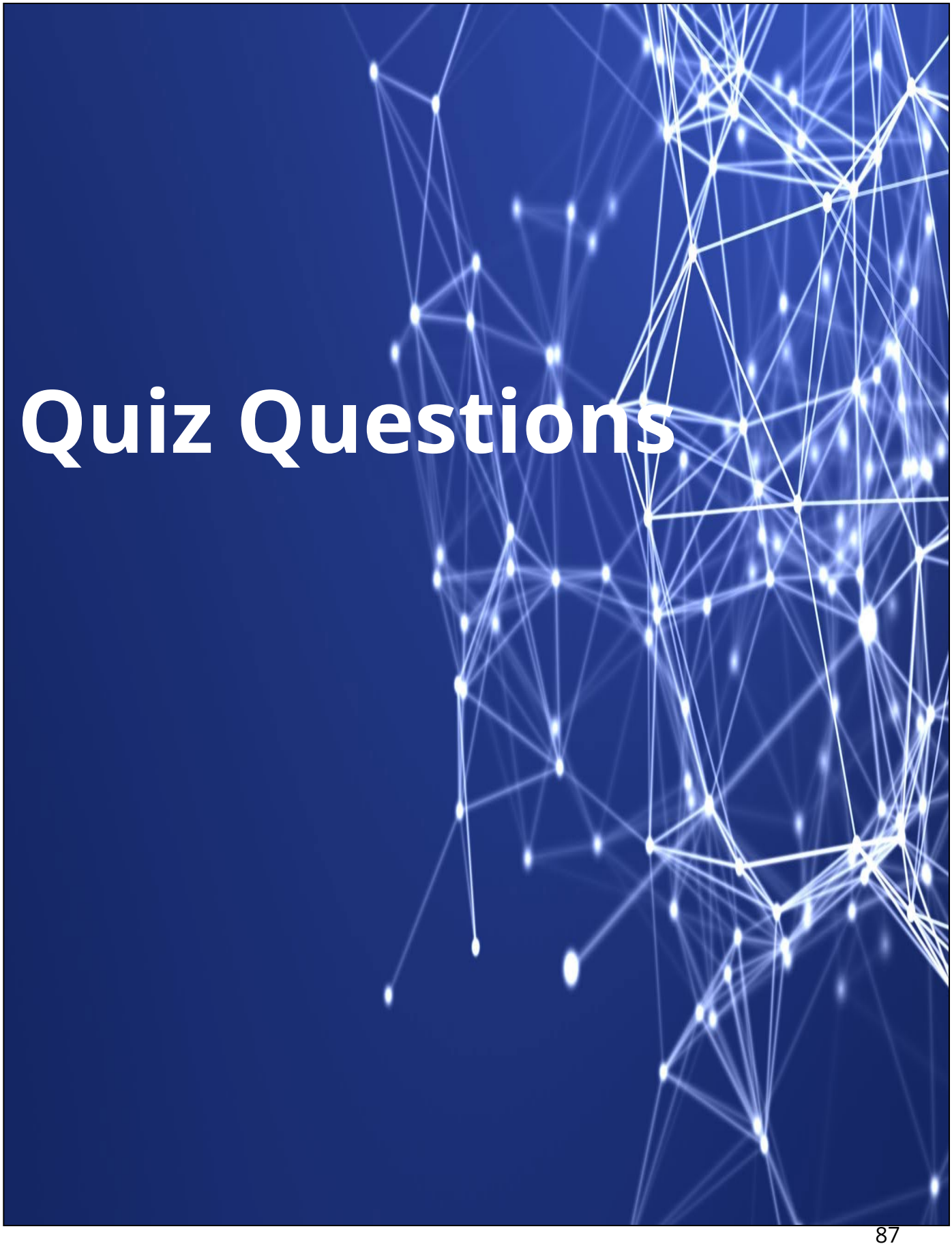
495.1 Scope.

This article covers the general requirements for equipment operating at more than 1000 volts ac, 1500 volts dc, nominal.

Informational Note No. 1: See NFPA 70E-2021, Standard for Electrical Safety in the Workplace, for electrical safety requirements for employee workplaces.

Informational Note No. 2: See ANSI Z535.4-2011, Product Signs and Safety Labels, for further information on hazard signs and labels.

Informational Note No. 3: See IEEE 3001.5-2013, Recommended Practice for the Application of Power Distribution Apparatus in Industrial and Commercial Power Systems, for information regarding power distribution apparatus.



Quiz Questions

1. **Which of the following words has been removed from Raceway titles?**
   - Conduit
   - Tubing
   - Types
   - Rigid

2. **When are protective fittings installed to raceways?**
   - Prior to the installation of the conductors
   - After the installation of the conductors
   - Concurrently with the installation of the conductors
   - Any time before, after, or during the installation of the conductors

3. **Can a conductor be spliced with a shorter conductor to meet the six-inch free length requirement at a junction?**
   - Yes
   - No
   - Yes, but only if the free length is already six inches or greater
   - No, but the six-inch requirement can be waived with justification

4. **What new change occurred regarding Medium voltage (MV) installations?**
   - Deletion of medium voltage (MV) from the NEC
   - Scattered installation requirements throughout multiple sections of the NEC
   - Consolidation of the information for medium voltage (MV) into one article 305
   - Consolidation of medium voltage (MV) with large voltage (LV) requirements

5. **Why was a new requirement added regarding screws and fasteners entering a cabinet, cutout box, or meter socket?**
    - Protects against damage to conductors resulting from sharp projections from exposed threads of screws that are run through covers
    - Allows a greater use of fasteners and fastener types to accommodate field installations
    - Adds a torquing requirement to any field installed fastener
    - Substitutes plastic fasteners for metal fasteners

6. **What new term replaced the word "joists" to provide better clarity?**
    - Floor joists
    - Ceiling joists
    - Framing members
    - Structural member

7. **What is the maximum size of intermediate metal conduit (IMC)?**
    - 6-inch
    - 5-inch
    - 4-inch
    - 3-inch

8. **What is now the required joining method for High Density Polyethylene Conduit (HDPE)?**
    - Heat fusion
    - Butt fusion
    - Method identified by the manufacturer
    - Any of the above

9. **This new article was created to address a new product which provides many of the benefits of both bus duct and cable?**
    - Article 404 Wall-Mounted Control Devices
    - Article 398 High-Density Polyethylene Conduit (HDPE Conduit)
    - Article 371 Flexible Bus Systems
    - Article 409 Surge Protection for Industrial Control Panels

10. **Switch enclosures with doors now require what due to safety concerns?**
    - Full accessibility
    - Access to the interior of a switch in the closed position will require the use of a tool
    - A safety plaque indicating warning of electrical shock
    - To be mounted at least six feet above floor level to prevent access from children

11. **Which of the following conductors are only permitted for use in "push-in" type terminals for receptacles?**
    - 14 AWG copper
    - 12 AWG copper
    - 14 AWG stranded copper
    - 12 AWG stranded copper

12. **Tamper-resistant receptacles are now required where?**
    - Bus stations
    - Airports
    - Gymnasiums
    - All of the above

13. **Panelboards are now restricted from being installed?**
    - Face Down
    - Face Up
    - As a direct replacement
    - With another manufactures substitute

14. **What minimum distance from under a roof decking can a luminaire be installed?**
    - ½ inches
    - 1 ½ inches
    - 2 inches
    - Maybe flush mounted to roof decking

15. **What new part XVII was added to article 410 to address the increased use of these for disinfecting purposes?**
    - Special Provisions for Germicidal Irradiation Luminaires
    - Special Purpose Ground-Fault Circuit-Interrupter (SPGFCI) Protection
    - Provisions for disinfecting equipment
    - Special Provisions for disinfection procedures

16. **A trash compactor or dishwasher supply cord that pass through a wood cabinet requires what?**
    - 4-inch minimum diameter hole
    - Protection that incorporates smoothed edges
    - Fire retardant at the interface
    - Cannot pass through a wood cabinet

17. **A new article was added that goes into effect January 1, 2026, to give equipment manufacturers, standards developers, and certification agencies an opportunity to develop products and address interoperability issues before this date, what does this concern?**
    - Line Frequency Induction Heating Equipment
    - Outdoor Electric Deicing
    - Heating cables in walls
    - Snow-Melting Equipment

18. **Where are mini-split heating and cooling systems not to be installed?**
    - Tub or shower zone
    - Kitchen areas
    - Garage areas
    - Residential housing 2nd floor or above

19. **Air-conditioning and refrigerating equipment disconnects that have hinged covers, and when open, have exposed live parts, must be locked by anything that requires a tool to open. Is a "zip-tie" an acceptable lock?**
    - Only as a temporary lock
    - Disconnects do not require locks
    - Yes, as it requires the use of a tool
    - No

20. **Which of the following cannot be reconditioned?**
    - Resistors
    - Reactors
    - Motors
    - Panelboards