Public Input No. 2480-NFPA 70-2023 [Global Input]

Article 420 Ceiling Mounted Multi-Function Platforms

(1) General

420.1 Scope. This article covers requirements for multi-function platforms and their associated components to provide functions and power. These platforms can include integral functions such as, internet connectivity, monitoring of the elderly, occupancy detection, temperature and humidity detection. These platforms can also provide for connection of power to utilization equipment such as, lighting, paddle fans, heater components, projectors, security cameras, night lights, and speakers..

420.2 Reconditioning. Multifunction platforms shall not be reconditioned.

420.6 Listing. Multifunction platforms shall be listed.

(1) Installation

420.10 Uses permitted. Multifunction platforms shall be permitted to provide functions or to connect and support equipment provided with a weight-supporting attachment fitting (WSAF) in accordance with 420.10(A) and 420.10(B).

Informational Note: See ANSI/NEMA WD-6, American National Standard for Wiring Devices–Dimensional Specifications, for standard configurations of weight-supporting ceiling receptacles and weight-supporting attachment fittings.

(A)Multifunction platforms shall be permitted to provide integral functions, such as:

(1) Internet connectivity

(2) Monitoring of the elderly

(3) Occupancy detection

(4) Temperature and humidity detection

(5) Night lighting

(6) Other functions as provided in the equipment listing

(B)Multifunction platforms shall be permitted to connect and support equipment provided with a weight-supporting attachment fitting (WSAF) such as:

(1) Luminaires

(2) Utilization equipment

(3) Projectors

(4) Security cameras

(5) Speakers

(6) Paddle fans, with a multifunction platform listed for fan support, and installed into an outlet box with a WSCR that are both rated for fan support.

(7) Cabon Monoxide

(8) Single- and multi-station smoke alarms

Informational Note: For information on locations of smoke alarms, see NFPA 72, National Fire Alarm and Signaling Code.

(8) Carbon Monoxide detectors

420.12 Uses not permitted. Multifunction platforms shall not

(1) Exceed the marked weight limit of the outlet box and WSCR in accordance with 314.27

(2) Be installed in indoor damp or wet locations, unless marked as suitable for the location

(3) Be installed outdoors

(4) Be installed in hazardous (classified) locations except as permitted by other articles in this Code

(5) Be installed in bathtub and shower areas 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 includes the space directly over the tub or shower stall.

(6) Provide detector or annunciator functions for a fire alarm system

420.22 Branch circuit. The branch circuit supply shall not exceed 15 amperes, 120 volts, single-phase.

420.24 Disconnecting Means. The multifunction platform shall be installed using a WSCR. If installed where 314.27 requires a fan rated box, the WSCR shall be rated for fan support.

420.30 Securing and supporting. Multifunction platforms shall be installed in an outlet box using a WSCR in accordance with 314.27(E).

(1) Marking

420.100 Nameplate. Each multifunction platform shall be provided with a nameplate giving the identifying manufacturers name and model number, and the rating in volts and amperes. If the multifunction platform is to be used on a specific frequency or frequencies, it shall be so marked.

420.120 Markings. In addition to the markings required in 420.100, the marking on the multifunction platform shall specify the maximum weight limit and suitability for other than dry locations.

Statement of Problem and Substantiation for Public Input

The Ceiling Mounted Multifunction Platforms are a new technology that is not currently addressed in the NEC. It's a compilation of elements that are covered in the NEC, and other elements that are not covered. These platforms provide electrical loads and weight loads for outlet boxes that need to be contemplated in the selection and installation of boxes, supporting framework and other aspects based on the weight load. If multifunction platforms supply paddle fans, the weight and dynamic load of the fan must be considered. A single article is needed because these devices combine a multitude of functions and capabilities within a single device.

Multifunction platforms are a new and innovative product class. This is not a proprietary product It is intended to allow similar products to interface and be installed safely. This new product class incorporates a number of integral functions that go beyond those currently covered by many existing articles, such as in Articles 410 and 422, as independent devices. In addition, the multifunction platform provides a means to connect other equipment. The application multifunction platforms greatly broadens the use of infrastructure beyond ordinary lighting, sensing, signaling and other single-use products.

The multifunction platform can incorporate features such as wifi with technology that has a limited technology lifespan; the technology becomes obsolete. Installing devices like routers and extenders in the ceiling improves the range and performance of these devices. The multifunction platform enhances safety and simplifies upgrades for outdated technology or when a more energy efficient product is available. The "plug and play" feature proposed is intended to facilitate safe and easy upgrades by the user. In this way, we are not locking the end-user into a technology that will be quickly be outdated. It will allow the end-user to

exchange the unit safely.

The lighter weight and flexibility also reduce strain for the installer while handling. Ease of installation

The following provides the detailed substantiation for each of the sections in this new article.

Scope - Article 420 is a proposed new article that provides installation requirements for multifunction platforms, a new and innovative product class. The scope proposed includes features that can be integral to a platform, as well as utilization equipment that can also be supplied from the platform.

Definition of Ceiling Mounted Multifunction Platform…the definition provides the description of what a MFP is relative to its application and installation under this Article.

Reconditioning – this product has complex electronics included that are not compatible with being reconditioned, similar to a number of other devices in the NEC that have been determined as not suitable for reconditioning.
Listing – Ceiling Mounted Multifunction Platforms are a new device in the NEC and is being supported by an UL Outline of Investigation. This system needs to be supported by listing requirements to ensure consistent construction to meet the NEC installation requirements. The listing will establish the limits for such things as the installation environmental, mechanical support limits, ambient temperature and other such considerations. An investigation is anticipated/underway by UL to create an Outline of Investigation for the multifunction platform. This activity is being conducted in parallel with establishing the code requirements to permit the use and application of this product.

Uses permitted – the list of items provided in the proposed text are those presently anticipated as uses permitted for the Ceiling Mounted Multifunction Platform. The section was divided to separate the functions integral to the device in Section (A) from those that are accessory equipment in Section (B) that may be supported by the platform. The accessory equipment identified may be listed separately.
The following provides some specific substantiation for the permitted uses. The application for the other features is considered self-explanatory.

The elderly monitoring function is an important function for senior citizens today who wish to remain safe, and in their own homes. It can provide the ability to cause an alert if the person has fallen or is otherwise in distress. The internet function that is also provided in the multifunction platform permits the elderly monitoring to be accomplished via internet connectivity.

Internet connectivity in the platform will provide better coverage for the space since it is ceiling mounted because the higher position in the room results in a reduced number of obstacles likely to interfere with the signal. The “plug and play” connection of the multifunction platform facilitates easy upgrades to later versions of technology.

The “other functions as provided in the equipment listing” is provided to facilitate future applications.

The application for ceiling mounted paddle fans has additional conditions to ensure that the device outlet box, structural support, and dynamic loads are considered.

Uses not permitted – the list of items provided in the proposed text are those presently anticipated as uses not permitted for the Ceiling Mounted Multifunction Platform. The following provides some specific substantiation for the not permitted uses. The prohibition of the other features is considered self-explanatory.

The prohibition on the platform outdoors is due to the sensitive electronics in the device that are not suitable to be in an outdoor environment with wide-ranging temperatures and levels of moisture.

The “installation in bathtub and shower areas zone” was incorporated for consistency with 410.10(D).

The devices that connect to a fire alarm system as provided in Article 760 must be determined to be fully compatible with all manufacturers of fire alarm systems. At this time, the multifunction platform is not being configured to provide these functions because it would require correlation with the Technical Committee responsible for NFPA 72, National Fire Alarm and Signaling Code.

Branch circuit installation – the branch circuit requirement establishes the limits of the branch circuit supply to this equipment. Specifically, it cannot be installed on a 120-volt, 20 ampere circuit, for example due to component limitations within the equipment.

Disconnecting Means – the WSCR is a load make/load break rated disconnecting means to facilitate safe interchange for upgrades in technology for the platform or other servicing needs. The requirements from

314.27 are referenced to ensure the fan-rated outlet box and WSCR are provided where ceiling mounted paddle fans could be installed.

Securing and Supporting – provided with the WSCR and appropriately rated outlet box that has suitable weight ratings as well as electrical connections. A weight supporting ceiling receptacle is specified for installation because the platform can support detectors, sensors, and routers, all of which are likely to require replacement or updating. The WSCR will simplify that routine maintenance.

Nameplate – The requirement for the nameplate including the manufacturer's name or trademark, identification and specific ratings of the device is important to ensure safe installation in accordance with the NEC and correlation to the listing marking requirements.

Markings – the maximum weight limit marking is required to ensure any accessory equipment installed is within the weight limit of the platform. While the overall markings are specified in the NEC article, the details of the markings are to be established in the listing process.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 4324-NFPA 70-2023 [New Definition after Definition: Multi-Circuit Cable Outlet...]	

Submitter Information Verification

Submitter Full Name: Mark Earley
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Affiliation: SKYX Platforms
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Submittal Date: Fri Aug 18 11:14:15 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: Currently, there is not a product standard, but one is needed, for a multi-function platform unit as a whole, with or without interconnection capability, when inserted into a weight support ceiling receptacle. Multi-function platforms can consist of multiple elements, some that are covered by the NEC, and some that are not. There are questions as to how a connected multi-function platform would interact with items covered by other Codes or standards, such as smoke detectors. Adding these requirements to the NEC will not assist the inspectors and installers when they encounter such an installation. A connected multi-function platform would be considered utilization equipment and therefore is more appropriately addressed in a product safety standard. Regardless of the connection method, this is already permitted by the Code.

Public Input No. 1378-NFPA 70-2023 [New Section after 90.9(D)]

Article 100 Definition - Receptacle, Weather Resistant

Receptacle, weather-resistant (WR). A contact device intended for installation in a wet location to reduce the adverse influence of weather-related environmental elements. (CMP-18).

Statement of Problem and Substantiation for Public Input

A definition for weather-resistant receptacle is needed because the term is used in Article 406.

Submitter Information Verification

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Submittal Date: Tue Jul 11 13:32:04 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-7968-NFPA 70-2024
Statement: Clarifies a term that is used in CMP 18 scope. The submitters language was modified to reflect that the device (receptacles) is resistant to environmental conditions.

Public Input No. 856-NFPA 70-2023 [New Article after 100]

Proposal to add definition of Yoke

I would like to propose the addition of the definition of Yoke to Article 100. Due to the uncommon use of this word in the electrical industry, also it would benefit people outside of the professional scope trying to understand the terminology. I would propose a simple definition such as, the "Yoke" is the structural frame of a receptacle or switch. In my own experience while learning through an electrical apprenticeship program this word was uncommon knowledge. While calculating Device or Equipment fill yoke was prevalent with no description of what it ment making it challenging to understand.

Statement of Problem and Substantiation for Public Input

The use of the word Yoke is prevalent with the code yet there is no definition, and it would resolve confusion to those who are unfamiliar with the terminology seeking to meet code requirements.

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Submittal Date: Sun May 21 11:22:28 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-9127-NFPA 70-2024
Statement: The term "yoke" is used in Article 406 in multiple paragraphs. Adding the definition of a "yoke" is intended to improve the understanding of requirements when the term is used.

Public Input No. 4211-NFPA 70-2023 [Definition: Busbar Support.]

Busbar ~~Support~~ Support (as applied to Low-Voltage Suspended Ceiling Power Distribution Systems) .

An insulator that runs the length of a section of suspended ceiling bus rail that serves to support and isolate the busbars from the suspended grid rail. (393) (CMP-18)

Statement of Problem and Substantiation for Public Input

The term "busbar support" appears in numerous locations in the NEC but has no generic definition. Instead the NEC mostly relies on the dictionary definition, which is adequate. The definition that does appear in Article 100 indicates that it only applies to Article 393 by way of the (393) at the end, but this may still confuse those users new to the NEC. For the sake of clarity, I propose making it clear that this definition applies only to Low-Voltage Suspended Ceiling Power Distribution Systems.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 4210-NFPA 70-2023 [Definition: Busbar.]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4213-NFPA 70-2023 [Definitions (100): Connector, ... to Connector, ...]	
Public Input No. 4215-NFPA 70-2023 [Definition: Grid Bus Rail.]	
Public Input No. 4216-NFPA 70-2023 [Definition: Power Supply.]	
Public Input No. 4217-NFPA 70-2023 [Definition: Rail.]	
Public Input No. 4218-NFPA 70-2023 [Definition: Reverse Polarity Protection (Backfeed Protectio...]	
Public Input No. 4219-NFPA 70-2023 [Definition: Suspended Ceiling Grid.]	

Submitter Information Verification

Submitter Full Name: Jason Potterf
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Submittal Date: Wed Sep 06 22:55:33 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8131-NFPA 70-2024

Statement: The text “as applied to Low-Voltage Suspended Ceiling Power Distribution Systems” was added to the defined term “Busbar Support” to comply with Section 2.1.2.1 of the NEC Style Manual.

Public Input No. 1081-NFPA 70-2023 [Definition: Busbar.]

Busbar.

A noninsulated conductor electrically connected to the source of supply and physically supported on an insulator providing a power rail for bonding or connection to utilization equipment, such as sensors, actuators, A/V devices, low-voltage luminaire assemblies, and similar electrical equipment. (393) (CMP-18)

Statement of Problem and Substantiation for Public Input

250.64(C)(2) says “Sections of busbars shall be permitted to be connected together to form a grounding electrode conductor.” This is neither utilization nor similar equipment except by the most tortured interpretation of “similar.”

I suspect that the Busbar definition will be expanded considerably in this cycle; I just don't want this use of the busbar terminating grounded conductors left out when that happens.

Submitter Information Verification

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Submittal Date: Wed Jun 14 14:20:33 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: The busbars of a Low-Voltage Suspended Ceiling Power Distribution Systems differ from the requirements of 250.64(C)(2) as they do not contain an equipment grounding conductor.

Public Input No. 4210-NFPA 70-2023 [Definition: Busbar.]

~~Busbar~~ **Busbar (as applied to Low-Voltage Suspended Ceiling Power Distribution Systems).**

A noninsulated conductor electrically connected to the source of supply and physically supported on an insulator providing a power rail for connection to utilization equipment, such as sensors, actuators, A/V devices, low-voltage luminaire assemblies, and similar electrical equipment. (393) (CMP-18)

Statement of Problem and Substantiation for Public Input

The term "busbar" appears in numerous locations in the NEC but has no generic definition. Instead the NEC mostly relies on the dictionary definition, which is adequate. The definition that does appear in Article 100 indicates that it only applies to Article 393 by way of the (393) at the end, but this may still confuse those users new to the NEC. For the sake of clarity, I propose making it clear that this definition applies only to Low-Voltage Suspended Ceiling Power Distribution Systems.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 4211-NFPA 70-2023 [Definition: Busbar Support.]	
Public Input No. 4213-NFPA 70-2023 [Definitions (100): Connector, ... to Connector, ...]	
Public Input No. 4215-NFPA 70-2023 [Definition: Grid Bus Rail.]	
Public Input No. 4216-NFPA 70-2023 [Definition: Power Supply.]	
Public Input No. 4217-NFPA 70-2023 [Definition: Rail.]	
Public Input No. 4218-NFPA 70-2023 [Definition: Reverse Polarity Protection (Backfeed Protectio...]	
Public Input No. 4219-NFPA 70-2023 [Definition: Suspended Ceiling Grid.]	

Submitter Information Verification

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Submittal Date: Wed Sep 06 22:47:00 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8123-NFPA 70-2024

Statement: To improve usability of the Code and to differentiate from the common term “busbar”, the phrase “as applied to Low-Voltage Suspended Ceiling Power Distribution Systems” was added to the defined term “Busbar”.

Public Input No. 587-NFPA 70-2023 [Definition: Busbar.]

~~Busbar~~ **Busbar (as applied to low-voltage suspended ceiling power distribution systems)** .

A noninsulated conductor electrically connected to the source of supply and physically supported on an insulator providing a power rail for connection to utilization equipment, such as sensors, actuators, A/V devices, low-voltage luminaire assemblies, and similar electrical equipment. (393) (CMP-18)

Statement of Problem and Substantiation for Public Input

This Public Input corrects a correlation issue. As written, this definition violates NEC® Style Manual 2.2.2.3.2: "For definitions that apply in ONLY ONE ARTICLE, the article number in parentheses shall follow the definition." The term "busbar" appears not only in parenthetically-indicated Article 393, but also in Articles 215, 230, 250, 235, 305, 315, 366, 404, 408, 409, 430, 517, 520, 522, 525, 555, 650, 665, 669, 682, and 705, as well as in Annex D. In nearly all, if not all, other Articles beyond Article 393, the Article 100 definition of "Busbar" is inappropriate and creates confusion to the readers of the Code.

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This confusion can be resolved by QUALIFYING this defined term by appending "(as applied to low-voltage suspended ceiling power distribution systems)" to the title of the defined term in accordance with NEC® Style Manual 2.2.2.4. With this qualification, the defined term then can remain under the jurisdiction of CMP-18.

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The NEC® Correlating Committee should consider revising the charging text of NEC® Style Manual 2.2.2.3.2 to read as follows: "Article Number. For definitions that apply in only one article, the article number in parentheses shall follow the definition. IF THE DEFINED TERM IS USED IN OTHER ARTICLES IN WHICH THE DEFINITION WOULD BE FOUND TO BE INCONSISTENT, INACCURATE OR CONFUSING FOR THE CONTEXT OF THOSE OTHER ARTICLES, THE DEFINED TERM'S TITLE SHALL BE FOLLOWED PARENTHETICALLY BY IDENTIFYING THE CONTEXT OF THE SPECIFIC APPLICATION; SEE ALSO 2.2.2.4."

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 803-NFPA 70-2023 [Section No. 215.18(A)]	

Submitter Information Verification

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Submittal Date: Tue Apr 11 15:34:05 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8123-NFPA 70-2024

Statement: To improve usability of the Code and to differentiate from the common term “busbar”, the phrase “as applied to Low-Voltage Suspended Ceiling Power Distribution Systems” was added to the defined term “Busbar”.

Public Input No. 2285-NFPA 70-2023 [Definition: Electric Sign.]

Sign, Electric ~~Sign~~ .

~~A fixed, stationary, or portable self-contained, electrically operated and/or electrically illuminated~~ Electrically operated utilization equipment with words ~~or symbols~~ , symbols, art, or other advertising designed to convey information or attract attention. (CMP-18)

Statement of Problem and Substantiation for Public Input

In accordance with 2.2.2.3 of the NFPA Style Manual, “sign” is the base term and “electric” is a modifying descriptor. The words “fixed, stationary, or portable” refer to the full universe of options so they are collectively unneeded within the definition. Electrically “illuminated” is redundant to “operated”; the term “operated” is more relevant as there are motor-equipped signs that are not illuminated but within the scope of Article 600. The addition of “art” and “other advertising” help to better capture the full range of sign designs that fall within the scope of Article 600 and provide better alignment with the definition in the applicable product standard, UL 48.

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Submittal Date: Tue Aug 15 16:37:00 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8829-NFPA 70-2024
Statement: The change will further clarify the intent and be consistent with the NEC Style Manual section 2.2.2.3. The words "fixed, stationary, or portable" refer to the full universe of options so they are collectively unneeded with the definition. "Illuminated" was removed because it is redundant.

Public Input No. 4215-NFPA 70-2023 [Definition: Grid Bus Rail.]

Grid Bus ~~Rail~~ Rail (as applied to Low-Voltage Suspended Ceiling Power Distribution Systems) .

A combination of the busbar, the busbar support, and the structural suspended ceiling grid system. (393) (CMP-18)

Statement of Problem and Substantiation for Public Input

This term applies only to Low-Voltage Suspended Ceiling Power Distribution Systems but that is not clear from the definition. The definition indicates that it only applies to Article 393 by way of the (393) at the end, but this may still confuse those users new to the NEC. For the sake of clarity, I propose making it clear that this definition applies only to Low-Voltage Suspended Ceiling Power Distribution Systems.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 4210-NFPA 70-2023 [Definition: Busbar.]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4211-NFPA 70-2023 [Definition: Busbar Support.]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4213-NFPA 70-2023 [Definitions (100): Connector, ... to Connector, ...]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4216-NFPA 70-2023 [Definition: Power Supply.]	
Public Input No. 4217-NFPA 70-2023 [Definition: Rail.]	
Public Input No. 4218-NFPA 70-2023 [Definition: Reverse Polarity Protection (Backfeed Protectio...]	
Public Input No. 4219-NFPA 70-2023 [Definition: Suspended Ceiling Grid.]	

Submitter Information Verification

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Submittal Date: Wed Sep 06 23:04:24 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: Section 2.1.2.6.2 of the NEC Style Manual requires the article number in parentheses to follow a definition that applies to only one article.

Public Input No. 2286-NFPA 70-2023 [Definition: Host Sign.]

Host Sign.

A sign or outline lighting system already installed in the field that is designated by a retroft kit for field conversion of the illumination system~~- with a retrofit kit~~ . (600) (CMP-18)

Statement of Problem and Substantiation for Public Input

This aligns the definition with that recently revised and unanimously approved by the technical committee for the applicable product standard, UL 879A (balloting closed Sept 5; the publication date is not yet known as of the NFPA PI submission deadline). It simply clarifies that the host sign plays no role in its designation as a 'host sign' and that it takes on this role only through being targeted by a retrofit kit.

See related PIs for Retrofit Kit, General Use and for Retrofit Kit, Sign Specific.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2288-NFPA 70-2023 [Definition: Retrofit Kit, General Use. (General Use Retrofi...]	
Public Input No. 2290-NFPA 70-2023 [Definition: Retrofit Kit, Sign Specific. (Sign Specific Ret...]	
Public Input No. 2288-NFPA 70-2023 [Definition: Retrofit Kit, General Use. (General Use Retrofi...]	
Public Input No. 2290-NFPA 70-2023 [Definition: Retrofit Kit, Sign Specific. (Sign Specific Ret...]	

Submitter Information Verification

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Submittal Date: Tue Aug 15 16:46:12 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8103-NFPA 70-2024
Statement: The change will better clarify the use of the "Sign, Host" definition. Changed the location where "a retrofit kit" is located to clarify the meaning.

Public Input No. 2292-NFPA 70-2023 [Definition: LED Sign Illumination System.]

~~**LED Sign Illumination System.**~~

~~A complete lighting system for use in signs and outline lighting consisting of light-emitting diode (LED) light sources, power supplies, wire, and connectors to complete the installation. (600) (CMP-18)~~

Statement of Problem and Substantiation for Public Input

This term is no longer used in Article 600, as 600.33 was revised in 2017 to instead refer to Class 2 Sign Illumination Systems, Secondary Wiring. The definition was introduced in 2011 (Log #3545); the panel statement cited the need to clarify that "certain compatible components are needed to be used together to provide a system for sign illumination." While the compatibility of components may have been true for early generation LED systems, it is not the case for class 2 systems whose safeguards against the risk of fire and electric shock are established by the limited voltage and current/power ratings of the class 2 power source and the ampacity of the load conductors. Further, the secondary wiring requirements in 600.33 should apply to class 2 circuits whether directly associated with sign illumination or for other purposes (such as control, communications, or energy management).

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Submittal Date: Tue Aug 15 17:11:43 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8104-NFPA 70-2024
Statement: This definition is removed because it is no longer used in the Code.

Public Input No. 3140-NFPA 70-2023 [Definition: Lighting Outlet.]

Lighting Outlet.

~~An outlet intended for the direct connection of a lampholder or luminaire.~~ A point where the branch circuit conductors connect to, or are intended to be connected to a lampholder, luminaire, or fixture whip conductors. (CMP-18)

Statement of Problem and Substantiation for Public Input

There continues to be misunderstanding in the field as to what outlets are. This is intended to clarify exactly what an lighting outlet is.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 3141-NFPA 70-2023 [Definition: Receptacle Outlet.]	
Public Input No. 174-NFPA 70-2023 [Definition: Outlet.]	
Public Input No. 174-NFPA 70-2023 [Definition: Outlet.]	
Public Input No. 3141-NFPA 70-2023 [Definition: Receptacle Outlet.]	

Submitter Information Verification

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Submittal Date: Tue Aug 29 16:03:39 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: The current definition is clear. The word “whip” does not appear in the NEC, so adding the phrase “fixture whip conductors” would not reduce confusion.

Public Input No. 2293-NFPA 70-2023 [Definition: Luminaire.]

Luminaire.

~~A complete lighting unit consisting of a light source such as a lamp or lamps, together with the parts designed to position the light source and connect it to the power supply. It may also include parts to protect the light source or the ballast or to distribute the light. A lampholder itself is not a luminaire.~~ ~~(CMP-18)~~ Electrical equipment intended to illuminate a space or object(s), to facilitate visual tasks, activities, aesthetics, or security, or for similar purposes. Light emitting devices such as lamps or LED modules may be removable or replaceable. The equipment may connect directly to the branch circuit (AC or DC) or be used with a separate power source that regulates the voltage and/or current from the branch circuit.

Statement of Problem and Substantiation for Public Input

Luminaires now come in a wide range of form factors. The current NEC definition aligns well with the product-level definition in UL 1598, Standard for Luminaires, but it does not work as well for low voltage luminaires within the scope of Article 411 or 680 which may be less “complete” due to their dependence on a separate power supply or LED driver. It is not necessary for the definition to discuss “parts designed to position the light source” or “to protect the light source” or “distribute the light” as these parts are either integral to the luminaire (which is required to be Listed in most, if not all, Articles) or they can be added (or removed) after installation without engaging in a permitting process involving an AHJ.

Submitter Information Verification

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Submittal Date: Tue Aug 15 17:15:47 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8014-NFPA 70-2024
Statement: The definition of “Luminaire” was updated to clarify that the light source within a luminaire may be replaceable and to clarify that certain luminaires do not connect directly to the branch circuit. The sentence concerning lampholders not being luminaires was retained to preserve the intent.

Public Input No. 732-NFPA 70-2023 [Definition: Multioutlet Assembly.]

~~**Multioutlet**~~ **Multi-Outlet** **Assembly.**

A surface, flush, or freestanding assemblage with a raceway and fittings or other enclosure provided with one or more receptacles, for the purpose of supplying power to utilization equipment. (CMP-18)

Statement of Problem and Substantiation for Public Input

"Multioutlet" is not found in any dictionary of any variety of English, so it is not a word in English. It is only found in the Free Dictionary by Farlex, which is unofficial.

Submitter Information Verification

Submitter Full Name: Conrad Ko
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Street Address:
City:
State:
Zip:
Submittal Date: Wed Apr 26 01:25:49 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: The term multioutlet is a Standard Term in Annex A of the NEC Style Manual.

Public Input No. 4216-NFPA 70-2023 [Definition: Power Supply.]

Power Supply (as applied to Low-Voltage Suspended Ceiling Power Distribution Systems) .

A Class 2 power supply connected between the branch-circuit power distribution system and the busbar low-voltage suspended ceiling power distribution system. (393) (CMP-18)

Statement of Problem and Substantiation for Public Input

The term "power supply" appears in numerous locations in the NEC but has no generic definition. Instead the NEC mostly relies on the dictionary definition, which is adequate. The definition that does appear in Article 100 indicates that it only applies to Article 393 by way of the (393) at the end, but this may still confuse those users new to the NEC. For the sake of clarity, I propose making it clear that this definition applies only to Low-Voltage Suspended Ceiling Power Distribution Systems.

Note, of the related PIs, this is the most egregiously generic term defined in a way that would confuse novice users of other parts of the code.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 4210-NFPA 70-2023 [Definition: Busbar.]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4211-NFPA 70-2023 [Definition: Busbar Support.]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4213-NFPA 70-2023 [Definitions (100): Connector, ... to Connector, ...]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4215-NFPA 70-2023 [Definition: Grid Bus Rail.]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4217-NFPA 70-2023 [Definition: Rail.]	
Public Input No. 4218-NFPA 70-2023 [Definition: Reverse Polarity Protection (Backfeed Protectio...]	
Public Input No. 4219-NFPA 70-2023 [Definition: Suspended Ceiling Grid.]	

Submitter Information Verification

Submitter Full Name: Jason Potterf
Organization: Cisco
Affiliation: ESTA
Street Address:
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Submittal Date: Wed Sep 06 23:06:56 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8134-NFPA 70-2024

Statement: The text “as applied to Low-Voltage Suspended Ceiling Power Distribution Systems” was added to the defined term “Power Supply” to comply with Section 2.1.2.1 of the NEC Style Manual.

Public Input No. 4217-NFPA 70-2023 [Definition: Rail.]

Rail (as applied to Low-Voltage Suspended Ceiling Power Distribution Systems) .

The structural support for the suspended ceiling system typically forming the ceiling grid supporting the ceiling tile and listed utilization equipment, such as sensors, actuators, A/V devices, and low-voltage luminaires and similar electrical equipment. (393) (CMP-18)

Statement of Problem and Substantiation for Public Input

The term "rail" appears in numerous locations in the NEC but has no generic definition. Instead the NEC mostly relies on the dictionary definition, which is adequate. The definition that does appear in Article 100 indicates that it only applies to Article 393 by way of the (393) at the end, but this may still confuse those users new to the NEC. For the sake of clarity, I propose making it clear that this definition applies only to Low-Voltage Suspended Ceiling Power Distribution Systems.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 4210-NFPA 70-2023 [Definition: Busbar.]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4211-NFPA 70-2023 [Definition: Busbar Support.]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4213-NFPA 70-2023 [Definitions (100): Connector, ... to Connector, ...]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4215-NFPA 70-2023 [Definition: Grid Bus Rail.]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4216-NFPA 70-2023 [Definition: Power Supply.]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4218-NFPA 70-2023 [Definition: Reverse Polarity Protection (Backfeed Protectio...]	
Public Input No. 4219-NFPA 70-2023 [Definition: Suspended Ceiling Grid.]	

Submitter Information Verification

Submitter Full Name: Jason Potterf
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Street Address:
City:
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Zip:
Submittal Date: Wed Sep 06 23:09:28 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: Section 2.1.2.6.2 requires the article number in parentheses to follow a definition that applies to only one article.

Public Input No. 1745-NFPA 70-2023 [Definition: Receptacle Outlet.]

Receptacle Outlet.

An outlet where one or more receptacles are installed. (CMP-18)

Delete definition

Statement of Problem and Substantiation for Public Input

There have been many opinions on where the outlet is located, some have stated the outlet is at the receptacle, I have always believed the receptacle is a device and the outlet is the box. However, clarification from Code Making Panel 18 based on the intent of the definition for a receptacle outlet, would be helpful.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1744-NFPA 70-2023 [Definition: Device.]	
Public Input No. 1742-NFPA 70-2023 [Definition: Disconnecting Means.]	
Public Input No. 452-NFPA 70-2023 [Definition: Outlet.]	
Public Input No. 1746-NFPA 70-2023 [Definition: Receptacle.]	
Public Input No. 452-NFPA 70-2023 [Definition: Outlet.]	
Public Input No. 1742-NFPA 70-2023 [Definition: Disconnecting Means.]	
Public Input No. 1744-NFPA 70-2023 [Definition: Device.]	
Public Input No. 1746-NFPA 70-2023 [Definition: Receptacle.]	

Submitter Information Verification

Submitter Full Name: James Stallcup
Organization: Volt Online Academy
Street Address:
City:
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Submittal Date: Mon Jul 31 15:30:18 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: Deleting the definition does not improve clarity. The current definition of a receptacle outlet is intended to differentiate from other outlets such as a luminaire outlet.

Public Input No. 3141-NFPA 70-2023 [Definition: Receptacle Outlet.]

Receptacle Outlet.

~~An outlet where~~ A point where the branch circuit conductors are connected to one or more receptacles ~~are installed~~ . (CMP-18)

Statement of Problem and Substantiation for Public Input

This is intended to clarify exactly what a receptacle outlet is. This is not always correctly understood.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 174-NFPA 70-2023 [Definition: Outlet.]	
Public Input No. 3140-NFPA 70-2023 [Definition: Lighting Outlet.]	
Public Input No. 174-NFPA 70-2023 [Definition: Outlet.]	
Public Input No. 3140-NFPA 70-2023 [Definition: Lighting Outlet.]	

Submitter Information Verification

Submitter Full Name: Don Ganiere
Organization: none
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City:
State:
Zip:
Submittal Date: Tue Aug 29 16:06:50 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-7963-NFPA 70-2024
Statement: The term "outlet" is already defined. The definition has been updated to improve clarity.

Public Input No. 1746-NFPA 70-2023 [Definition: Receptacle.]

Receptacle.

A contact device installed at the outlet for the connection of an attachment plug, or for the direct connection of electrical utilization equipment designed to mate with the corresponding contact device. A single receptacle is a single contact device with no other contact device on the same yoke or strap. A multiple receptacle is two or more contact devices on the same yoke or strap. (CMP-18)

Informational Note: A duplex receptacle is an example of a multiple receptacle that has two receptacles on the same yoke or strap.

Add another Informational Note:

Informational Note No. 2: A receptacle is considered an outlet and not a device.

Statement of Problem and Substantiation for Public Input

There have been many opinions on where the outlet is located, some have stated the outlet is at the receptacle, I have always believed the receptacle is a device and the outlet is box. However, clarification from Code Making Panel 18 based on the intent of the definition for a receptacle, would be helpful.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1745-NFPA 70-2023 [Definition: Receptacle Outlet.]	
Public Input No. 1744-NFPA 70-2023 [Definition: Device.]	
Public Input No. 1742-NFPA 70-2023 [Definition: Disconnecting Means.]	
Public Input No. 452-NFPA 70-2023 [Definition: Outlet.]	
Public Input No. 452-NFPA 70-2023 [Definition: Outlet.]	
Public Input No. 1742-NFPA 70-2023 [Definition: Disconnecting Means.]	
Public Input No. 1744-NFPA 70-2023 [Definition: Device.]	
Public Input No. 1745-NFPA 70-2023 [Definition: Receptacle Outlet.]	

Submitter Information Verification

Submitter Full Name: James Stallcup
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Submittal Date: Mon Jul 31 15:35:15 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: The suggested additional note 2 would create confusion since a receptacle by definition is a "contact device", not an outlet.

Public Input No. 2288-NFPA 70-2023 [Definition: Retrofit Kit, General Use. (General Use Retrofi...]

Retrofit Kit, General Use. (General Use Retrofit Kit)

A kit ~~consisting of primary parts, which does not include all the parts for a complete subassembly but includes a list of required parts and installation instructions~~ that includes some but not all parts needed to replace the illumination system of a host sign, and installation instructions that identify the parts required to complete the subassembly in the field. (600) (CMP-18)

Statement of Problem and Substantiation for Public Input

This aligns the definition with that recently revised and unanimously approved by the technical committee for the applicable product standard, UL 879A (balloting closed Sept 5; the publication date is not yet known as of the NFPA PI submission deadline). It eliminates the undefined term “primary” and explicitly requires the installation instructions to identify any parts needed to be supplied by the installer.

See related PIs for Host Sign and for Retrofit Kit, Sign Specific.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2286-NFPA 70-2023 [Definition: Host Sign.]	
Public Input No. 2290-NFPA 70-2023 [Definition: Retrofit Kit, Sign Specific. (Sign Specific Ret...]	
Public Input No. 2286-NFPA 70-2023 [Definition: Host Sign.]	
Public Input No. 2290-NFPA 70-2023 [Definition: Retrofit Kit, Sign Specific. (Sign Specific Ret...]	

Submitter Information Verification

Submitter Full Name: Michael Shulman
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Submittal Date: Tue Aug 15 16:53:48 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8105-NFPA 70-2024
Statement: The section was rearranged to conform with the product standard.

Public Input No. 2290-NFPA 70-2023 [Definition: Retrofit Kit, Sign Specific. (Sign Specific Ret...]

Retrofit Kit, Sign Specific. (Sign Specific Retrofit Kit)

A kit consisting of ~~the necessary~~ all necessary parts and hardware to allow for field installation in a host sign, based on the included installation instructions. (600) (CMP-18)

Statement of Problem and Substantiation for Public Input

This aligns the definition with that recently revised and unanimously approved by the technical committee for the applicable product standard, UL 879A (balloting closed Sept 5; the publication date is not yet known as of the NFPA PI submission deadline). It emphasizes the distinction between Sign Specific and General Use retrofit kits.

See related PIs for Host Sign and for Retrofit Kit, General Use.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2286-NFPA 70-2023 [Definition: Host Sign.]	
Public Input No. 2288-NFPA 70-2023 [Definition: Retrofit Kit, General Use. (General Use Retrofi...]	
Public Input No. 2286-NFPA 70-2023 [Definition: Host Sign.]	
Public Input No. 2288-NFPA 70-2023 [Definition: Retrofit Kit, General Use. (General Use Retrofi...]	

Submitter Information Verification

Submitter Full Name: Michael Shulman
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Submittal Date: Tue Aug 15 17:00:38 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8108-NFPA 70-2024
Statement: The change to refer to “all necessary parts,” which will better clarify the use and be consistent with the product standard.

Public Input No. 3829-NFPA 70-2023 [Definition: Retrofit Kit.]

Retrofit Kit.

A complete ~~subassembly of parts and devices~~ kit, including parts, devices, markings, and installation instructions (as applicable) for field conversion of ~~utilization~~ equipment. (CMP-18)

Statement of Problem and Substantiation for Public Input

Listed retrofit kits are now available for power production equipment, that are not considered to be utilization equipment. For example, the field replacement of microinverters on PV AC modules or replacement or removal of a rapid shutdown device as part of a transition from a PVRSS to a PVHCS. Removal of the term “utilization” addresses this situation, and the restructuring of the text, with the parenthetical “(as applicable)” addresses kits where no parts are added as part of the field conversion. Detailed instructions are critical to the proper installation of retrofit kits to maintain the performance and safety of the equipment during and following the retrofit procedure.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 3839-NFPA 70-2023 [Section No. 690.4(B)]	example of why the modification to the definition of retrofit kit is needed.
Public Input No. 3839-NFPA 70-2023 [Section No. 690.4(B)]	

Submitter Information Verification

Submitter Full Name: Colleen OBrien
Organization: UL LLC
Street Address:
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Submittal Date: Tue Sep 05 18:01:46 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: This current definition of "retrofit kit" is adequate. Revising the definition as proposed would not add clarity. The definition is meant to be general in nature.

Public Input No. 4218-NFPA 70-2023 [Definition: Reverse Polarity Protection (Backfeed Protectio...]

Reverse Polarity Protection (Backfeed Protection) (as applied to Low-Voltage Suspended Ceiling Power Distribution Systems) .

A system that prevents two interconnected power supplies, connected positive to negative, from passing current from one power source into a second power source. (393) (CMP-18)

Statement of Problem and Substantiation for Public Input

This term applies only to Low-Voltage Suspended Ceiling Power Distribution Systems but that is not clear from the definition. The definition indicates that it only applies to Article 393 by way of the (393) at the end, but this may still confuse those users new to the NEC. For the sake of clarity, I propose making it clear that this definition applies only to Low-Voltage Suspended Ceiling Power Distribution Systems.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 4210-NFPA 70-2023 [Definition: Busbar.]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4211-NFPA 70-2023 [Definition: Busbar Support.]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4213-NFPA 70-2023 [Definitions (100): Connector, ... to Connector, ...]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4215-NFPA 70-2023 [Definition: Grid Bus Rail.]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4216-NFPA 70-2023 [Definition: Power Supply.]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4217-NFPA 70-2023 [Definition: Rail.]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4219-NFPA 70-2023 [Definition: Suspended Ceiling Grid.]	

Submitter Information Verification

Submitter Full Name: Jason Potterf
Organization: Cisco
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Street Address:
City:
State:
Zip:
Submittal Date: Wed Sep 06 23:13:59 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: Section 2.1.2.6.2 requires the article number in parentheses to follow a definition that applies to only one article. This term is unique to Article 393 and does not require additional references to differentiate from common industry terms.

Public Input No. 736-NFPA 70-2023 [Definition: Reverse Polarity Protection (Backfeed Protectio...]

Reverse Polarity Protection (~~Backfeed~~ Back-Feed Protection).

A system that prevents two interconnected power supplies, connected positive to negative, from passing current from one power source into a second power source. (393) (CMP-18)

Statement of Problem and Substantiation for Public Input

"Backfeed" is not found in any dictionary of any variety of English, so it is not a word in English. However, I do see that it is a widely used term in the electrical industry. As a result, it is the responsibility of the electrical industry to inform dictionary publishers that the word "backfeed" exists, or else the spelling should be corrected to "back-feed". Since this spelling is so widely used and is the standard form within the electrical industry, I would rather have it appear in Merriam-Webster, Dictionary.com, Collins Dictionary, Cambridge Dictionary, and Oxford English Dictionary than the spelling be changed in the NEC, but since the spelling isn't in any of those yet, I have to submit this to make it go one way or the other.

Submitter Information Verification

Submitter Full Name: Conrad Ko
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Street Address:
City:
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Submittal Date: Wed Apr 26 01:55:41 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: The term “Backfeed” is a standard term found in Annex A of the NEC Style Manual and used eleven times in seven articles of the NEC.

Public Input No. 2284-NFPA 70-2023 [Definition: Sign Body.]

Sign Body.

A portion of a sign that may provide protection from the weather ~~but is not an~~ and may additionally serve as an electrical enclosure. (600) (CMP-18)

Statement of Problem and Substantiation for Public Input

The term sign body is used in several locations in Article 600, but always as an alternative to “enclosure” (for example, “…sign enclosure or sign body…”). The current definition is overly and unnecessarily constrained in declaring that a sign body is not an electrical enclosure. While the same definition currently exists within the product standard (UL 48), that can be updated separately. The definition of an “enclosure” in UL 48 explicitly states that an enclosure can serve as a sign body, so the standard permits a sign body (with the appropriate additional properties related to fire containment and limiting accessibility to live parts) to also serve as an enclosure. The NEC 100 definition of “enclosure” states “the case or housing of apparatus” and a sign body does in fact comply with that definition.

This proposed revision will have no material effect on product approvals or application of the requirements in Article 600. It simply prevents rejection of a sign body that may also be serving as the sign enclosure.

Submitter Information Verification

Submitter Full Name: Michael Shulman
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Street Address:
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Submittal Date: Tue Aug 15 16:32:01 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8109-NFPA 70-2024
Statement: The text is revised because the outer portion of the sign intended to protect the interior of the sign may not necessarily serve as an electrical enclosure.

Public Input No. 4219-NFPA 70-2023 [Definition: Suspended Ceiling Grid.]

Suspended Ceiling Grid (as applied to Low-Voltage Suspended Ceiling Power Distribution Systems) .

A system that serves as a support for a finished ceiling surface and other utilization equipment. (393) (CMP-18)

Statement of Problem and Substantiation for Public Input

The phrase "suspended ceiling" appears elsewhere in the NEC but this definition is particular to Low-Voltage Suspended Ceiling Power Distribution Systems because it refers to supporting utilization equipment. The definition in Article 100 indicates that it only applies to Article 393 by way of the (393) at the end, but this may still confuse those users new to the NEC. For the sake of clarity, I propose making it clear that this definition applies only to Low-Voltage Suspended Ceiling Power Distribution Systems.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 4210-NFPA 70-2023 [Definition: Busbar.]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4211-NFPA 70-2023 [Definition: Busbar Support.]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4213-NFPA 70-2023 [Definitions (100): Connector, ... to Connector, ...]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4215-NFPA 70-2023 [Definition: Grid Bus Rail.]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4216-NFPA 70-2023 [Definition: Power Supply.]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4217-NFPA 70-2023 [Definition: Rail.]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4218-NFPA 70-2023 [Definition: Reverse Polarity Protection (Backfeed Protectio...]	Group of PIs to address confusing definitions due to move to Article 100

Submitter Information Verification

Submitter Full Name: Jason Potterf
Organization: Cisco
Affiliation: ESTA
Street Address:
City:
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Submittal Date: Wed Sep 06 23:15:42 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: Section 2.1.2.6.2 requires the article number in parentheses to follow a definition that applies to only one article. This term is unique to Article 393 and does not require additional references to differentiate from common industry terms.

Public Input No. 4213-NFPA 70-2023 [Definitions (100): Connector, ... to Connector, ...]

Definitions (100): Connector, ... to Connector, ...

Connector, ~~Load~~ Load (as applied to Low-Voltage Suspended Ceiling Power Distribution Systems) . (Load Connector)

An electromechanical connector used for power from the busbar to utilization equipment. (393) (CMP-18)

Connector, Pendant (as applied to Low-Voltage Suspended Ceiling Power Distribution Systems) . (Pendant Connector)

An electromechanical or mechanical connector used to suspend low-voltage luminaire or utilization equipment below the grid rail and to supply power to connect from the busbar to utilization equipment. (393) (CMP-18)

Connector, Power Feed (as applied to Low-Voltage Suspended Ceiling Power Distribution Systems) . (Power Feed Connector)

An electromechanical connector used to connect the power supply to a power distribution cable, to connect directly to the busbar, or to connect from a power distribution cable to the busbar. (393) (CMP-18)

Connector, Pressure (Solderless). (Pressure Connector)

A device that establishes a connection between two or more conductors or between one or more conductors and a terminal by means of mechanical pressure and without the use of solder. (CMP-1)

Connector, Rail to Rail (as applied to Low-Voltage Suspended Ceiling Power Distribution Systems) . (Rail to Rail Connector)

An electromechanical connector used to interconnect busbars from one ceiling grid rail to another grid rail. (393) (CMP-18)

Statement of Problem and Substantiation for Public Input

The amended terms could be construed to apply generically to other articles in the NEC despite having very specific meanings for Low-Voltage Suspended Ceiling Power Distribution Systems. The definition in Article 100 indicates that it only applies to Article 393 by way of the (393) at the end, but this may still confuse those users new to the NEC. For the sake of clarity, I propose making it clear that these definitions apply only to Low-Voltage Suspended Ceiling Power Distribution Systems.

Note: A single CMP 1 definition was caught in this PI because of Terra limitations, only CMP 18 definition edits were intended.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 4210-NFPA 70-2023 [Definition: Busbar.]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4211-NFPA 70-2023 [Definition: Busbar Support.]	Group of PIs to address confusing definitions due to move to Article 100
Public Input No. 4215-NFPA 70-2023 [Definition: Grid Bus Rail.]	
Public Input No. 4216-NFPA 70-2023 [Definition: Power Supply.]	
Public Input No. 4217-NFPA 70-2023 [Definition: Rail.]	

Public Input No. 4218-NFPA 70-2023 [Definition: Reverse Polarity Protection (Backfeed Protectio...]

Public Input No. 4219-NFPA 70-2023 [Definition: Suspended Ceiling Grid.]

Submitter Information Verification

Submitter Full Name: Jason Potterf
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Affiliation: ESTA
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City:
State:
Zip:
Submittal Date: Wed Sep 06 22:59:49 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: Section 2.1.2.6.2 requires the article number in parentheses to follow a definition that applies to only one article. These terms are unique to Article 393 and do not require additional references to differentiate from common industry terms.

Public Input No. 4324-NFPA 70-2023 [New Definition after Definition: Multi-Circuit Cable Outlet...]

TITLE OF NEW CONTENT

Add new definition as follows:

Multi-Function Platforms, Ceiling Mounted (Ceiling Mounted Multi-Function Platforms):

A ceiling mounted electronic assembly that includes multiple functions, such as routers, environmental sensing, occupancy detection, lighting control, and audio. It also provides mechanical support and power connection to utilization equipment, such as luminaires and ceiling (paddle) fans.

Statement of Problem and Substantiation for Public Input

This new definition is needed to correlate with the proposed new Article 420. Ceiling Mounted Multifunction Platforms are a new technology that is not currently addressed in the NEC. It's a compilation of elements that are covered in the NEC, and other elements that are not covered. These platforms are electronic utilization equipment that can include routers, and various detection devices. These platforms also supply electrical loads and weight loads for outlet boxes that need to be contemplated in the selection and installation of boxes, supporting framework and other aspects based on the weight load. If multifunction platforms also supply paddle fans, the weight and dynamic load of the fan must be considered.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2480-NFPA 70-2023 [Global Input]	
Public Input No. 2480-NFPA 70-2023 [Global Input]	

Submitter Information Verification

Submitter Full Name: Mark Earley
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City:
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Zip:
Submittal Date: Thu Sep 07 11:29:55 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: Article 420 was not added, and the term "Multi-Function Platforms, WSCR Connected" was not added to the Code, so a definition is not necessary.

Public Input No. 2294-NFPA 70-2023 [New Definition after Definition: Portable (as applied to eq...]

Portable Handlamp.

A cord-and-plug connected luminaire with a handle and a hook for temporary mounting and hand free operation.

Statement of Problem and Substantiation for Public Input

The term “portable handlamp” is used in 250.114(3)(e) and 250.114(4)(e) in the context of grounding requirements. These products are listed under UL 153, Standard for Portable Luminaires. The term “portable lighting equipment” used in 511.4(B)(2) describes a handlamp; a related PI is being submitted to bring uniformity to the terms used in the Code for these devices.

Providing a definition establishes a clearer understanding and consistency between the Code sections that refer to these products. Per the NFPA style manual, it is better to use the sequence “portable handlamp” rather than “handlamp, portable” because it is a singular identifiable product.

See related PI 2297 for 511.4(B)(2).

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2297-NFPA 70-2023 [Section No. 511.4(B)(2)]	
Public Input No. 2297-NFPA 70-2023 [Section No. 511.4(B)(2)]	

Submitter Information Verification

Submitter Full Name: Michael Shulman
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Zip:
Submittal Date: Tue Aug 15 17:27:13 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8016-NFPA 70-2024
Statement: A definition for “Portable Handlamp” has been added to correlate with the use of the term in 250.114(3)(e) and 250.114(4)(e).

Public Input No. 1529-NFPA 70-2023 [New Definition after Definition: Wireways, Nonmetallic. (No...]

TITLE OF NEW CONTENT

Wiring Device - An electrical device that serves as either a connection point to facilitate the flow of current or as a control device in general distribution and branch circuits. (CMP-18)

Informational note: Examples of wiring devices include attachment plug, receptacle, general-use snap switch, pendant switch, surface switch, dimmer, and electronic control switches and lighting control switches.

Statement of Problem and Substantiation for Public Input

This Public Input is submitted on behalf of a Correlating Committee established Task Group consisting of Bryan Tatum (Co-Chair),Chuck Kurten (Co-Chair), Paul Costello, Frank Tse, Nick Malouf, Doug Smith, Diane Lynch, and Randy Dollar.

The present scope of Article 404 address 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.

The intent of this Public Input is to modify the scope of Article 404 to only cover general-use switches, motor-circuit switches, isolating switches, circuit breakers used as switches, and molded case switches. Other types of switches that fit outside of the modified scope of Article 404, i.e., general-use snap switch, pendant switch, surface switch, dimmer, and electronic control switches, and lighting control switches are relocated to Article 406. This relocation is logical as these types of switches (also referred to as 'wiring devices') are installed similar to how receptacles are installed. It should also be noted that the Standard for Electrical Equipment Maintenance, NFPA 70B, currently has "Wiring Devices" in Chapter 24 and "Switches" in Chapter 17. This PI would create a similar alignment of requirements.

This Public Input, along with another companion Public Input, was developed with the goal of improving usability of Article 404 Switches and facilitate the reassignment of switches to CMP's with the right focus for the equipment (namely, CMP-18 for 'wiring devices' and CMP-10 for larger switches).

Additionally, operating at voltages not over 1000 volts ac, 1500 volts dc, nominal was introduced to clarify what is meant by unless specifically referenced elsewhere in this code for higher voltages and for consistency with other parts of the code where 1500 volts dc is used.

Related Public Input No. 1544-NFPA 70-2026 [Revised Article 406]
1543 -NFPA 70-2026 [Revised Article 404]
1529 - NFPA 70 -2026 [New Definition – Wiring Device]
1528 - NFPA 70 -2026 [Revised Definitions Switch, General-Use. (General-Use Switch); Switch, General-Use Snap. (General-Use Snap Switch); and Switch, Isolating. (Isolating Switch)

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1528-NFPA 70-2023 [Definitions (100): Switch, Gen... to Switch, Iso...]	PI's 1544,1543,1529 and 1528
Public Input No. 1543-NFPA 70-2023 [Article 404]	

Public Input No. 1544-NFPA 70-2023 [Article 406]

Submitter Information Verification

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Submittal Date: Mon Jul 24 09:18:45 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-7965-NFPA 70-2024
Statement: The addition of this definition will clarify how the term is used throughout CMP 18 scope, and provide examples. This also correlates with the proposed revisions to the scope of Article 404.

Public Input No. 1629-NFPA 70-2023 [New Section after 393.6]

393.9 Qualified Persons.

Low-voltage suspended ceiling power distribution systems and associated equipment covered by this Article shall be installed by Qualified Persons.

Informational Note: See definition of *Qualified Person* in Article 100.

Statement of Problem and Substantiation for Public Input

Low-voltage suspended ceiling power distribution systems and associated equipment are becoming more complicated and, in most cases, requiring far more training and experience. These systems are part of the building power systems requiring a greater degree of training and experience, in design, planning, installation, and programing in many instances. These systems and others require trained qualified personnel and contractors. Qualified contractors, electricians and technicians are a crucial element of safety, related to these installations and systems. These types of systems present a unique safety issues as suspended ceilings, grids and supports are traditionally installed by carpenters or other non-electrically trained persons, which makes the need to ensuring qualified persons even more important. See companion PIs.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1708-NFPA 70-2023 [New Section after 800.3]	
Public Input No. 1706-NFPA 70-2023 [New Section after 770.3]	
Public Input No. 1701-NFPA 70-2023 [New Section after 760.3]	
Public Input No. 1698-NFPA 70-2023 [New Section after 726.3]	
Public Input No. 1695-NFPA 70-2023 [New Section after 725.3]	
Public Input No. 1694-NFPA 70-2023 [New Section after 724.3]	
Public Input No. 1690-NFPA 70-2023 [New Section after 722.3]	
Public Input No. 1686-NFPA 70-2023 [New Section after 708.8]	
Public Input No. 1684-NFPA 70-2023 [New Section after 701.7]	
Public Input No. 1672-NFPA 70-2023 [New Section after 700.8]	
Public Input No. 4394-NFPA 70-2023 [New Section after 625.6]	
Public Input No. 1557-NFPA 70-2023 [Section No. 90.2(A)]	
Public Input No. 1557-NFPA 70-2023 [Section No. 90.2(A)]	
Public Input No. 1672-NFPA 70-2023 [New Section after 700.8]	
Public Input No. 1684-NFPA 70-2023 [New Section after 701.7]	
Public Input No. 1686-NFPA 70-2023 [New Section after 708.8]	
Public Input No. 1690-NFPA 70-2023 [New Section after 722.3]	
Public Input No. 1694-NFPA 70-2023 [New Section after 724.3]	
Public Input No. 1695-NFPA 70-2023 [New Section after 725.3]	
Public Input No. 1698-NFPA 70-2023 [New Section after 726.3]	
Public Input No. 1701-NFPA 70-2023 [New Section after 760.3]	
Public Input No. 1706-NFPA 70-2023 [New Section after 770.3]	
Public Input No. 1708-NFPA 70-2023 [New Section after 800.3]	
Public Input No. 4394-NFPA 70-2023 [New Section after 625.6]	

Submitter Information Verification

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Submittal Date: Thu Jul 27 15:02:05 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: Article 393 does not modify the requirements of Article 110 as outlined in 90.3 Code Arrangement and does not need to be repeated. See section 4.1.1 of the NEC Style Manual.

Public Input No. 3537-NFPA 70-2023 [Section No. 393.6]

393.6 ~~—~~ **2** Listing Requirements.

Suspended ceiling power distribution systems and associated fittings shall be listed as in 393.6(A) or (B).

(A) Listed System.

Low-voltage suspended ceiling distribution systems operating at 30 volts ac or less or 60 volts dc or less shall be listed as a complete system, with the utilization equipment, power supply, and fittings as part of the same identified system.

(B) Assembly of Listed Parts.

A low-voltage suspended ceiling power distribution system assembled from the following parts, listed according to the appropriate function, shall be permitted:

(1) Listed low-voltage utilization equipment

(2) Listed Class 2 power supply

(3) Listed or identified fittings, including connectors and grid rails with bare conductors

(4) Listed low-voltage cables in accordance with 722.179, conductors in raceways, or other fixed wiring methods for the secondary circuit

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. A new section is added to comply with the NEC Style Manual Section 2.2.1 regarding Listing Requirements.
2.2.1 Parallel Numbering Required. Technical committees shall use the following section numbers for the same purposes within articles. This requirement shall not apply to Articles 90, 100, and 110. If the article does not contain listing or reconditioning requirements, the subdivisions shall not be included in the article.
Required Parallel Numbering Format
XXX.1 Scope.
XXX.2 Listing Requirements.
XXX.3 Reconditioned Equipment.
XXX.3(A) Permitted to be Installed.
XXX.3(B) Not Permitted to be Installed.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

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Submittal Date: Mon Sep 04 17:53:39 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8110-NFPA 70-2024

Statement: Article 393 does not modify the requirements of Article 110 as outlined in 90.3 Code Arrangement, and does not need to be repeated. See section 4.1.1 of the NEC Style Manual.

Public Input No. 1630-NFPA 70-2023 [Section No. 393.14]

393.~~14~~ 14 Installation.

(A) General Requirements.

~~Support wiring shall be installed in a neat and workmanlike manner.~~ Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable is not damaged by normal building use. Such cables shall be supported by straps, staples, hangers, cable ties listed and identified for securement and support, or similar fittings designed and installed so as not to damage the cable.

~~Informational Note: Suspended ceiling low-voltage power grid distribution systems should be installed by qualified persons in accordance with the manufacturer's installation instructions.~~

(B) Insulated Conductors.

Exposed insulated secondary circuit conductors shall be listed, of the type, and installed as described as follows:

(1) Class 2 cable supplied by a listed Class 2 power source and installed in accordance with Part I of Article 722 and Parts I and II of Article 725

(2) Wiring methods described in Chapter 3

Statement of Problem and Substantiation for Public Input

All other Code sections pertaining to “Workmanlike Manner” are found in the XXX.24 Section of the Article. Moving this first sentence into a new Section 393.24 covering Workmanship for consistency to support the parallel numbering clause in the NEC Style Manual -2023 Section 2.2.1.1:

Parallel Numbering Within Similar Articles. To the extent possible, technical committees shall use the same section numbers (and part numbers, where applicable) for the same purposes within articles covering similar subjects.

See Companion PIs pertaining to the various Sections covering mechanical execution of work.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]	
Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]	
Public Input No. 1632-NFPA 70-2023 [New Section after 393.21]	
Public Input No. 1669-NFPA 70-2023 [New Section after 600.24]	
Public Input No. 1668-NFPA 70-2023 [Section No. 600.24]	
Public Input No. 1670-NFPA 70-2023 [Section No. 600.33(B)]	
Public Input No. 1687-NFPA 70-2023 [Section No. 722.24]	
Public Input No. 1692-NFPA 70-2023 [New Section after 724.21]	
Public Input No. 1691-NFPA 70-2023 [Section No. 724.24]	
Public Input No. 1696-NFPA 70-2023 [New Section after 725.21]	
Public Input No. 1697-NFPA 70-2023 [Section No. 725.24]	
Public Input No. 1699-NFPA 70-2023 [New Section after 726.12]	
Public Input No. 1700-NFPA 70-2023 [Section No. 726.24]	
Public Input No. 1702-NFPA 70-2023 [Section No. 760.24]	

Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]
Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]
Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]
Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]
Public Input No. 1632-NFPA 70-2023 [New Section after 393.21]
Public Input No. 1668-NFPA 70-2023 [Section No. 600.24]
Public Input No. 1669-NFPA 70-2023 [New Section after 600.24]
Public Input No. 1670-NFPA 70-2023 [Section No. 600.33(B)]
Public Input No. 1687-NFPA 70-2023 [Section No. 722.24]
Public Input No. 1692-NFPA 70-2023 [New Section after 724.21]
Public Input No. 1696-NFPA 70-2023 [New Section after 725.21]
Public Input No. 1697-NFPA 70-2023 [Section No. 725.24]
Public Input No. 1699-NFPA 70-2023 [New Section after 726.12]
Public Input No. 1700-NFPA 70-2023 [Section No. 726.24]
Public Input No. 1702-NFPA 70-2023 [Section No. 760.24]
Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]
Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]

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Committee: NEC-P18

Committee Statement

Resolution: FR-8236-NFPA 70-2024

Statement: The text “Support wiring shall be installed in a neat and workmanlike manner.” was deleted, as those terms are possibly unenforceable and vague per the NEC Style Manual section 3.2.1. Article 393 does not modify the requirements of Article 110 as outlined in Section 90.3.

The informational note was changed to mandatory text to comply with the NEC Style Manual Section 2.1.10.1, and moved to the beginning to emphasize its importance.

Public Input No. 1381-NFPA 70-2023 [Section No. 393.14(A)]

(A) General Requirements.

Support wiring shall be installed in a ~~neat~~ professional and ~~workmanlike manner~~ skillful manner . Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable is not damaged by normal building use. Such cables shall be supported by straps, staples, hangers, cable ties listed and identified for securement and support, or similar fittings designed and installed so as not to damage the cable.

Informational Note: Suspended ceiling low-voltage power grid distribution systems should be installed by qualified persons in accordance with the manufacturer's installation instructions.

Statement of Problem and Substantiation for Public Input

To more closely correlate with 110.12

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 203-NFPA 70-2023 [Global Input]	

Submitter Information Verification

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Submittal Date: Wed Jul 12 11:13:11 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8236-NFPA 70-2024

Statement: The text "Support wiring shall be installed in a neat and workmanlike manner." was deleted, as those terms are possibly unenforceable and vague per the NEC Style Manual section 3.2.1. Article 393 does not modify the requirements of Article 110 as outlined in Section 90.3.

The informational note was changed to mandatory text to comply with the NEC Style Manual Section 2.1.10.1, and moved to the beginning to emphasize its importance.

Public Input No. 2016-NFPA 70-2023 [Section No. 393.14(A)]

(A) General Requirements.

Support wiring shall be installed in a ~~neat~~ professional and ~~workmanlike manner~~ skillful manner . Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable is not damaged by normal building use. Such cables shall be supported by straps, staples, hangers, cable ties listed and identified for securement and support, or similar fittings designed and installed so as not to damage the cable.

Informational Note: Suspended ceiling low-voltage power grid distribution systems should be installed by qualified persons in accordance with the manufacturer's installation instructions.

Statement of Problem and Substantiation for Public Input

This revision is needed to correlate with the wording in 110.12

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2009-NFPA 70-2023 [Section No. 722.24(A)]	"professional and skillful" instead of "neat and workmanlike"
Public Input No. 2010-NFPA 70-2023 [Section No. 724.24]	"professional and skillful" instead of "neat and workmanlike"
Public Input No. 2011-NFPA 70-2023 [Section No. 725.24]	"professional and skillful" instead of "neat and workmanlike"
Public Input No. 2012-NFPA 70-2023 [Section No. 726.24]	"professional and skillful" instead of "neat and workmanlike"
Public Input No. 2013-NFPA 70-2023 [Section No. 800.24(A)]	"professional and skillful" instead of "neat and workmanlike"
Public Input No. 2014-NFPA 70-2023 [Section No. 770.24(A)]	"professional and skillful" instead of "neat and workmanlike"
Public Input No. 2015-NFPA 70-2023 [Section No. 600.33(B)]	"professional and skillful" instead of "neat and workmanlike"
Public Input No. 2017-NFPA 70-2023 [Section No. 760.24(A)]	

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Submittal Date: Fri Aug 11 06:54:15 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: Article 393 does not modify the requirements of Section 110.12 as outlined in Section 90.3 Code Arrangement and does not need to be repeated or changed to the new terms in the 2023 NEC

“professional” and “skillful manner”. The sentence is proposed to be removed in other action.

Public Input No. 49-NFPA 70-2023 [Section No. 393.14(A)]

(A) General Requirements.

~~Support wiring shall be installed in a neat and workmanlike manner.~~ Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable is not damaged by normal building use. Such cables shall be supported by straps, staples, hangers, cable ties listed and identified for securement and support, or similar fittings designed and installed so as not to damage the cable.

Informational Note: Suspended ceiling low-voltage power grid distribution systems should be installed by qualified persons in accordance with the manufacturer's installation instructions.

Statement of Problem and Substantiation for Public Input

Article 393 is not exempt from 90.3. Therefore, the requirements of Article 110 apply to Chapter 3 of the NEC. Accordingly, there is no need to restate the requirements of 110.12 in Article 393 that "electrical equipment must be installed in a professional and skillful manner. Further, in addition to there being no need to repeat general requirements from Article 110 here in this section, the requirements in this section do not comply with the NEC Style Manual whereby it was determined that "neat" and "workmanlike" were vague and unenforceable and were therefore changed to "professional" and "skillful." In sum, this sentence should be removed because it is unnecessary as it is redundant per 90.3, there is lack of correlation with 110.12, and it is in violation of the NEC Style Manual.

Submitter Information Verification

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Submittal Date: Fri Jan 06 10:36:36 EST 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8236-NFPA 70-2024

Statement: The text "Support wiring shall be installed in a neat and workmanlike manner." was deleted, as those terms are possibly unenforceable and vague per the NEC Style Manual section 3.2.1. Article 393 does not modify the requirements of Article 110 as outlined in Section 90.3.

The informational note was changed to mandatory text to comply with the NEC Style Manual Section 2.1.10.1, and moved to the beginning to emphasize its importance.

Public Input No. 2670-NFPA 70-2023 [Section No. 393.14(B)]

(B) Insulated Conductors.

Exposed insulated secondary circuit conductors shall be listed, of the type, and installed as described as follows:

(1) Class 2 cable supplied by a listed Class 2 power source and installed in accordance with ~~Part I of~~ Article 722 ~~and~~ , Part I and Article 725, Parts I and II ~~of Article 725~~

(2) Wiring methods described in Chapter 3

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.
4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

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Submittal Date: Thu Aug 24 08:28:03 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8237-NFPA 70-2024
Statement: The references have been revised to reference specific parts of articles to comply with the NEC Style Manual section 4.1.4.

Public Input No. 1632-NFPA 70-2023 [New Section after 393.21]

393.24 Workmanship

Support wiring shall be mechanically executed and installed in a manner that is consistent with acceptable industry practices and standards.

Informational Note No. 1: See definition of *Workmanship* in Article 100.

Informational Note No. 2: See Section 110.12 for more information on Workmanship.

Statement of Problem and Substantiation for Public Input

Relocating the mechanical execution of work and workmanship requirements to a new Section XXX.24 for consistency, and to support the parallel numbering clause in the NEC Style Manual -2023 Section 2.2.1.1:

Parallel Numbering Within Similar Articles. To the extent possible, technical committees shall use the same section numbers (and part numbers, where applicable) for the same purposes within articles covering similar subjects.

All other Code sections pertaining to “Workmanlike Manner” are found in the XXX.24 Section of the Article. Moving this first sentence into a new Section 393.24 covering Workmanship. See companion PIs.

See Companion PIs:
1571
1596
1630
1632
1668
1669
1670
1687
1692
1691
1696
1697
1699
1700
1702
1707
1709

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]	
Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]	
Public Input No. 1630-NFPA 70-2023 [Section No. 393.14]	
Public Input No. 1668-NFPA 70-2023 [Section No. 600.24]	
Public Input No. 1669-NFPA 70-2023 [New Section after 600.24]	
Public Input No. 1670-NFPA 70-2023 [Section No. 600.33(B)]	
Public Input No. 1687-NFPA 70-2023 [Section No. 722.24]	
Public Input No. 1692-NFPA 70-2023 [New Section after 724.21]	
Public Input No. 1691-NFPA 70-2023 [Section No. 724.24]	
Public Input No. 1696-NFPA 70-2023 [New Section after 725.21]	

Public Input No. 1697-NFPA 70-2023 [Section No. 725.24]
Public Input No. 1699-NFPA 70-2023 [New Section after 726.12]
Public Input No. 1700-NFPA 70-2023 [Section No. 726.24]
Public Input No. 1702-NFPA 70-2023 [Section No. 760.24]
Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]
Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]
Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]
Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]
Public Input No. 1630-NFPA 70-2023 [Section No. 393.14]
Public Input No. 1668-NFPA 70-2023 [Section No. 600.24]
Public Input No. 1669-NFPA 70-2023 [New Section after 600.24]
Public Input No. 1670-NFPA 70-2023 [Section No. 600.33(B)]
Public Input No. 1687-NFPA 70-2023 [Section No. 722.24]
Public Input No. 1692-NFPA 70-2023 [New Section after 724.21]
Public Input No. 1696-NFPA 70-2023 [New Section after 725.21]
Public Input No. 1697-NFPA 70-2023 [Section No. 725.24]
Public Input No. 1699-NFPA 70-2023 [New Section after 726.12]
Public Input No. 1700-NFPA 70-2023 [Section No. 726.24]
Public Input No. 1702-NFPA 70-2023 [Section No. 760.24]
Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]
Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]

Submitter Information Verification

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Submittal Date: Thu Jul 27 15:14:50 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: Article 393 does not modify the requirements of Section 110.12 as outlined in Section 90.3 Code arrangement and does not need to be repeated.

Public Input No. 2671-NFPA 70-2023 [Section No. 393.40(B)]

(B) Enclosures.

Where made in a wall, connections shall be installed in an enclosure in accordance with Article 314, Parts I, II, and III ~~of Article 314~~ .

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.
4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

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Submittal Date: Thu Aug 24 08:29:24 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8118-NFPA 70-2024
Statement: The references have been revised to reference specific parts of articles to comply with the NEC Style Manual section 4.1.4.

Public Input No. 2672-NFPA 70-2023 [Section No. 393.57]

393.57 Connections.

Connections in busbar grid rails, cables, and conductors shall be made with listed insulating devices and be accessible after installation. Where made in a wall, connections shall be installed in an enclosure in accordance with Article 314, Parts I, II, and III ~~of Article 314~~ , as applicable.

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.
4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

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Submittal Date: Thu Aug 24 08:30:04 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8119-NFPA 70-2024
Statement: The references have been revised to reference specific parts of articles to comply with the NEC Style Manual section 4.1.4.

Public Input No. 2673-NFPA 70-2023 [Section No. 393.60]

393.60 Equipment Grounding Conductor.

The supply side of the Class 2 power source shall be connected to an equipment grounding conductor in accordance with the applicable requirements in ~~Part IV of~~ Article 250 , Part IV .

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.
4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

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Submittal Date: Thu Aug 24 08:32:05 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8120-NFPA 70-2024
Statement: The references have been revised to reference specific parts of articles to comply with the NEC Style Manual section 4.1.4.

Public Input No. 3581-NFPA 70-2023 [Section No. 393.60]

393.60 ~~Equipment Grounding Conductor.~~ 60 Grounding and Bonding

The supply side of the Class 2 power source shall be connected to an equipment grounding conductor in accordance with the applicable requirements in Part IV of Article 250.

Statement of Problem and Substantiation for Public Input

There are 23 sections in Chapter 3 that have a .60 section. 19 of these sections are titled "Grounding." 3 of these sections are titled "Grounding and Bonding." 1 of these sections is titled "Equipment Grounding Conductor."
My suggestion is to rename all of these sections with "Grounding and Bonding."

Submitter Information Verification

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Committee: NEC-P18

Committee Statement

Resolution: Changing the title from” equipment grounding conductor” to “grounding and bonding” will not improve the language. Bonding does not necessarily mean grounding.

Public Input No. 1544-NFPA 70-2023 [Article 406]

~~**Article 406** Receptacles, Cord Connectors, and Attachment Plugs (Caps)~~

~~**406.1** Scope.~~

~~This article covers the rating, type, and installation of receptacles, cord connectors, and attachment plugs (cord caps).~~

~~**406.2** Reconditioned Equipment.~~

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

~~**406.3** Receptacle Rating and Type.~~

~~**(A)** Receptacles.~~

~~Receptacles shall be listed and marked with the manufacturer's name or identification and voltage and ampere ratings.~~

~~**(B)** Rating.~~

~~Receptacles and cord connectors shall be rated not less than 15 amperes, 125 volts, or 15 amperes, 250 volts, and shall be of a type not suitable for use as lampholders.~~

~~Informational Note: See 210.21(B) for receptacle ratings where installed on branch circuits.~~

~~**(C)** CO/ALR Receptacles.~~

~~Receptacles rated 20 amperes or less and designed for the direct connection of aluminum conductors shall be marked CO/ALR.~~

~~**(D)** 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.~~

(3) ~~Receptacles installed using screwless terminals of the conductor push-in type construction (also known as *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.~~

~~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).~~

~~**(E)** Isolated Ground Receptacles.~~

~~Receptacles incorporating an isolated equipment grounding conductor connection intended for the reduction of electromagnetic interference as permitted in 250.146(D) shall be identified by an orange triangle located on the face of the receptacle.~~

~~**(1)** Isolated Equipment Grounding Conductor Required.~~

~~Receptacles so identified shall be used only with equipment grounding conductors that are isolated in accordance with 250.146(D) .~~

(2) Installation in Nonmetallic Boxes.

Isolated ground receptacles installed in nonmetallic boxes shall be covered with a nonmetallic faceplate.

Exception: *Where an isolated ground receptacle is installed in a nonmetallic box, a metal faceplate shall be permitted if the box contains a feature or accessory that permits the connection of the faceplate to the equipment grounding conductor.*

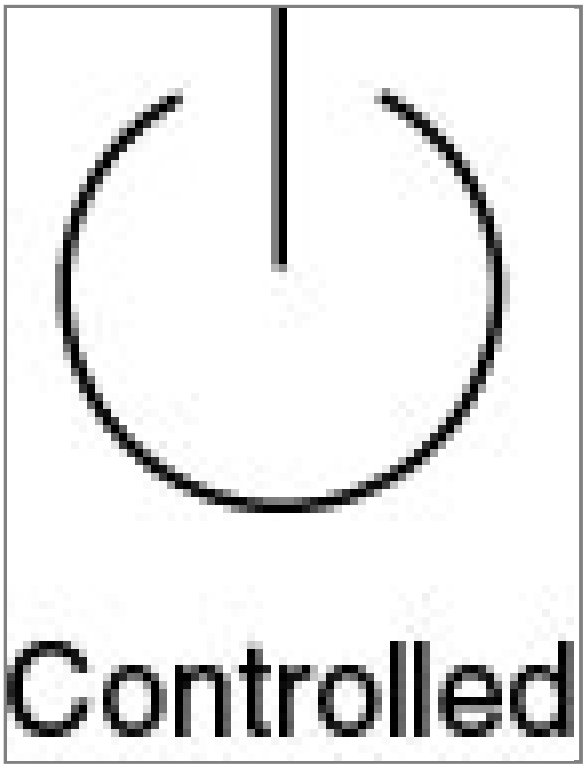
(F) Controlled Receptacle Marking.

All nonlocking-type, 125-volt, 15- and 20-ampere receptacles that are controlled by an automatic control device, or that incorporate control features that remove power from the receptacle for the purpose of energy management or building automation, shall be permanently marked with the symbol shown in Figure 406.3(F) and the word "controlled."

For receptacles controlled by an automatic control device, the marking shall be located on the receptacle face and visible after installation.

In both cases where a multiple receptacle device is used, the required marking of the word "controlled" and symbol shall denote which contact device(s) are controlled.

Figure 406.3(F) Controlled Receptacle Marking Symbol.



Exception: *The marking shall not be required for receptacles controlled by a wall switch that provide the required room lighting outlets as permitted by 210.70 .*

(G) Receptacle with USB Charger.

A 125-volt 15- or 20-ampere receptacle that additionally provides Class 2 power shall be listed and constructed such that the Class 2 circuitry is integral with the receptacle.

406.4 General Installation Requirements.

Receptacle outlets shall be located in branch circuits in accordance with Part III of Article 210 . General installation requirements shall be in accordance with 406.4(A) through (G).

(A) Grounding Type.

Except as provided in 406.4(D) , receptacles installed on 15- and 20-ampere branch circuits shall be of the grounding type. Grounding-type receptacles shall be installed only on circuits of the voltage class and current for which they are rated, except as provided in 210.21(B)(1) for single receptacles or Table 210.21(B)(2) and Table 210.21(B)(3) for two or more receptacles.

(B) Connection to Equipment Grounding Conductor.

Receptacles and cord connectors that have equipment grounding conductor contacts shall have those contacts connected to an equipment grounding conductor.

Exception No. 1: *Receptacles mounted on portable and vehicle-mounted generator sets and generators in accordance with* *250.34* .

Exception No. 2: *Replacement receptacles as permitted by* *406.4(D)* .

(C) Methods of Connection to Equipment Grounding Conductor.

The equipment grounding conductor contacts of receptacles shall be connected to an equipment grounding conductor of the circuit supplying the receptacle in accordance with 250.146 .

Cord connectors shall be connected to the equipment grounding conductor of the circuit supplying the cord connector.

Informational Note No. 1: See 250.118 for acceptable grounding means.

Informational Note No. 2: See 250.130 for extensions of existing branch circuits.

(D) Replacements.

Replacement of receptacles shall comply with 406.4(D)(1) through (D)(8), as applicable. Arc-fault circuit-interrupter type and ground-fault circuit-interrupter type receptacles shall be installed in a readily accessible location.

(1) Grounding-Type Receptacles.

Where a grounding means exists in the receptacle enclosure or an equipment grounding conductor is installed in accordance with 250.130(C) , grounding-type receptacles shall be used and shall be connected to the equipment grounding conductor in accordance with 406.4(C) or 250.130(C) .

(2) Non–Grounding-Type Receptacles.

Where attachment to an equipment grounding conductor does not exist in the receptacle enclosure, the installation shall comply with 406.4(D)(2) (a), (D)(2)(b), or (D)(2)(c).

(1) A non–grounding-type receptacle(s) shall be permitted to be replaced with another non–grounding-type receptacle(s).

(2) A non–grounding-type receptacle(s) shall be permitted to be replaced with a ground-fault circuit interrupter-type of receptacle(s). These receptacles or their cover plates shall be marked "No Equipment Ground." An equipment grounding conductor shall not be connected from the ground-fault circuit-interrupter-type receptacle to any outlet supplied from the ground-fault circuit-interrupter receptacle.

(3) A non–grounding-type receptacle(s) shall be permitted to be replaced with a grounding-type receptacle(s) where supplied through a ground-fault circuit interrupter. Where grounding-type receptacles are supplied through the ground-fault circuit interrupter, grounding-type receptacles or their cover plates shall be marked "GFCI Protected" and "No Equipment Ground," visible after installation. An equipment grounding conductor shall not be connected between the grounding-type receptacles.

Informational Note No. 1: Some equipment or appliance manufacturers require that the branch circuit to the equipment or appliance includes an equipment grounding conductor.

Informational Note No. 2: See 250.114 for a list of a cord-and-plug-connected equipment or appliances that require an equipment grounding conductor.

(3) Ground-Fault Circuit-Interrupter Protection.

Ground-fault circuit-interrupter protection for receptacles shall be provided where replacements are made at receptacle outlets that are required to be so protected elsewhere in this *Code* . Ground-fault circuit interrupters shall be listed.

Exception: *Where the outlet box size will not permit the installation of the GFCI receptacle, the receptacle shall be permitted to be replaced with a new receptacle of the existing type, where GFCI protection is provided and the receptacle is marked "GFCI Protected" and "No Equipment Ground," in accordance with* *406.4(D)(2)(a) , (D)(2)(b), or (D)(2)(c), as applicable.*

(4) Arc-Fault Circuit-Interrupter Protection.

If a receptacle located in any areas specified in 210.12(A) , (B), or (C) is replaced, a replacement receptacle at this outlet shall be one of the following:

(1) A listed outlet branch-circuit type AFCI receptacle

(2) A receptacle protected by a listed outlet branch-circuit type AFCI type receptacle

(3) A receptacle protected by a listed combination type AFCI circuit breaker

Exception: Section 210.12(E) , Exception, shall not apply to replacement of receptacles.

(5) Tamper-Resistant Receptacles.

Listed tamper-resistant receptacles shall be provided where replacements are made at receptacle outlets that are required to be tamper-resistant elsewhere in this *Code* , except in one of the following cases:

(1) Where a nongrounding receptacle is replaced with another nongrounding receptacle

(2) Where aluminum branch-circuit conductors are directly terminated on a CO/ALR receptacle, installed as replacement

(6) Weather-Resistant Receptacles.

Weather-resistant receptacles shall be provided where replacements are made at receptacle outlets that are required to be so protected elsewhere in this *Code* .

(7) Controlled Receptacles.

Automatically controlled receptacles shall be replaced with equivalently controlled receptacles. If automatic control is no longer required, the receptacle and any associated receptacles marked in accordance with 406.3(F) shall be replaced with a receptacle and faceplate not marked in accordance with 406.3(F) .

(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* .

(E) Cord- and Plug-Connected Equipment.

The installation of grounding-type receptacles shall not be used as a requirement that all cord-and plug-connected equipment be of the grounded type.

Informational Note: See 250.114 for types of cord-and plug-connected equipment to be grounded.

(F) Noninterchangeable Types.

Receptacles connected to circuits that have different voltages, frequencies, or types of current (ac or dc) on the same premises shall be of such design that the attachment plugs used on these circuits are not interchangeable.

(G) Protection of Floor Receptacles.

Protection for floor receptacles shall be in accordance with the following:

(1) Physical protection of floor receptacles shall allow floor-cleaning equipment to be operated without damage to receptacles.

(2) All 125-volt, single-phase, 15- and 20-ampere floor receptacles installed in food courts and waiting spaces of passenger transportation facilities where food or drinks are allowed shall be GFCI protected.

406.5 Receptacle Mounting.

Receptacles shall be mounted in identified boxes or assemblies. The boxes or assemblies shall be securely fastened in place unless otherwise permitted elsewhere in this *Code* . Screws used for the purpose of attaching receptacles to a box shall be of the type provided with a listed receptacle, or shall be machine screws having 32 threads per inch or part of listed assemblies or systems, in accordance with the manufacturer's instructions.

(A) Boxes That Are Set Back.

Receptacles mounted in boxes that are set back from the finished surface as permitted in 314.20 shall be installed such that the mounting yoke or strap of the receptacle is held rigidly at the finished surface.

(B) Boxes That Are Flush.

Receptacles mounted in boxes that are flush with the finished surface or project therefrom shall be installed such that the mounting yoke or strap of the receptacle is held rigidly against the box or box cover.

(C) Receptacles Mounted on Covers.

Receptacles mounted to and supported by a cover shall be held rigidly against the cover by more than one screw or shall be a device assembly or box cover listed and identified for securing by a single screw.

(D) Position of Receptacle Faces.

After installation, receptacle faces shall be flush with or project from faceplates of insulating material and shall project a minimum of 0.4 mm (0.015 in.) from metal faceplates.

Exception: Listed kits or assemblies encompassing receptacles and nonmetallic faceplates that cover the receptacle face, where the plate cannot be installed on any other receptacle, shall be permitted.

(E) Receptacles in Countertops.

Receptacle assemblies for installation in countertop surfaces shall be listed for countertop applications. Where receptacle assemblies for countertop applications are required to provide ground-fault circuit-interrupter protection for personnel in accordance with 210.8 , such assemblies shall be permitted to be listed as GFCI receptacle assemblies for countertop applications.

(F) Receptacles in Work Surfaces.

Receptacle assemblies and GFCI receptacle assemblies listed for work surface or countertop applications shall be permitted to be installed in work surfaces.

(G) Receptacle Orientation.

(1) Countertop and Work Surfaces.

Receptacles shall not be installed in a face-up position in or on countertop surfaces or work surfaces unless listed for countertop or work surface applications.

(2) Under Sinks.

Receptacles shall not be installed in a face-up position in the area below a sink.

(H) Receptacles in Seating Areas and Other Similar Surfaces.

In seating areas or similar surfaces, receptacles shall not be installed in a face-up position unless the receptacle is any of the following:

(1) Part of an assembly listed as a furniture power distribution unit

(2) Part of an assembly listed either as household furnishings or as commercial furnishings

(3) Listed either as a receptacle assembly for countertop applications or as a GFCI receptacle assembly for countertop applications

(4) Installed in a listed floor box

(I) Exposed Terminals.

Receptacles shall be enclosed so that live wiring terminals are not exposed to contact.

(J) Voltage Between Adjacent Devices.

A receptacle shall not be grouped or ganged in enclosures with other receptacles, snap switches, or similar devices, unless they are arranged so that the voltage between adjacent devices does not exceed 300 volts, or unless they are installed in enclosures equipped with identified, securely installed barriers between adjacent devices.

406.6 Receptacle Faceplates (Cover Plates).

Receptacle faceplates shall be installed so as to completely cover the opening and seat against the mounting surface.

Receptacle faceplates mounted inside a box having a recess-mounted receptacle shall effectively close the opening and seat against the mounting surface.

(A) Thickness of Metal Faceplates.

Metal faceplates shall be of ferrous metal not less than 0.76 mm (0.030 in.) in thickness or of nonferrous metal not less than 1.02 mm (0.040 in.) in thickness.

(B) Grounding.

Metal faceplates shall be grounded.

(C) Faceplates of Insulating Material.

Faceplates of insulating material shall be noncombustible and not less than 2.54 mm (0.10 in.) in thickness but shall be permitted to be less than 2.54 mm (0.10 in.) in thickness if formed or reinforced to provide adequate mechanical strength.

(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.

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.

406.7 Attachment Plugs, Cord Connectors, and Flanged Surface Devices.

All attachment plugs, cord connectors, and flanged surface devices (inlets and outlets) shall be listed and marked with the manufacturer's name or identification and voltage and ampere ratings.

(A) Construction of Attachment Plugs and Cord Connectors.

Attachment plugs and cord connectors shall be constructed so that there are no exposed current-carrying parts except the prongs, blades, or pins. The cover for wire terminations shall be a part that is essential for the operation of an attachment plug or connector (dead-front construction).

(B) Connection of Attachment Plugs.

Attachment plugs shall be installed so that their prongs, blades, or pins are not energized unless inserted into an energized receptacle or cord connectors. No receptacle shall be installed so as to require the insertion of an energized attachment plug as its source of supply.

(C) Attachment Plug Ejector Mechanisms.

Attachment plug ejector mechanisms shall not adversely affect engagement of the blades of the attachment plug with the contacts of the receptacle.

(D) Flanged Surface Inlet.

A flanged surface inlet shall be installed such that the prongs, blades, or pins are not energized unless an energized cord connector is inserted into it.

406.8 Noninterchangeability.

Receptacles, cord connectors, and attachment plugs shall be constructed such that receptacle or cord connectors do not accept an attachment plug with a different voltage or current rating from that for which the device is intended. However, a 20-ampere T-slot receptacle or cord connector shall be permitted to accept a 15-ampere attachment plug of the same voltage rating. Non–grounding-type receptacles and connectors shall not accept grounding-type attachment plugs.

406.9 Receptacles in Damp or Wet Locations.

(A) Damp Locations.

A receptacle installed outdoors in a location protected from the weather or in other damp locations shall have an enclosure for the receptacle that is weatherproof when the receptacle is covered (attachment plug cap not inserted and receptacle covers closed).

An installation suitable for wet locations shall also be considered suitable for damp locations.

A receptacle shall be considered to be in a location protected from the weather where located under roofed open porches, canopies, marquees, and the like, and will not be subjected to a beating rain or water runoff. All 125- and 250-volt nonlocking receptacles shall be a listed weather-resistant type. Hinged covers of outlet box hoods shall be able to open at least 90 degrees, or fully open if the cover is not designed to open 90 degrees from the closed to open position, after installation.

Informational Note: See ANSI/NEMA WD 6–2016, *Wiring Devices — Dimensional Specifications* , for the types of receptacles covered by this requirement.

(B) Wet Locations.

(1) Receptacles of 15 Amperes and 20 Amperes in a Wet Location.

Receptacles of 15 amperes and 20 amperes, 125 volts and 250 volts installed in a wet location shall have an enclosure that is weatherproof whether or not the attachment plug cap is inserted. An outlet box hood installed for this purpose shall be listed and shall be identified as extra-duty. Other listed products, enclosures, or assemblies providing weatherproof protection that do not utilize an outlet box hood need not be identified extra duty. Hinged covers of outlet box hoods shall be able to open at least 90 degrees, or fully open if the cover is not designed to open 90 degrees from the closed to open position, after installation.

Informational Note No. 1: See ANSI/UL 514D–2016, *Cover Plates for Flush-Mounted Wiring Devices* , for extra-duty outlet box hoods. Extra duty identification and requirements are not applicable to listed receptacles, faceplates, outlet boxes, enclosures, or assemblies that are identified as either being suitable for wet locations or rated as one of the outdoor enclosure–type numbers of Table 110.28 that does not utilize an outlet box hood.

Exception: 15- and 20-ampere, 125- through 250-volt receptacles installed in a wet location and subject to routine high-pressure spray washing shall be permitted to have an enclosure that is weatherproof when the attachment plug is removed.

All 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles shall be listed and so identified as the weather-resistant type.

Informational Note No. 2: See ANSI/NEMA WD 6–2016, *Wiring Devices — Dimensional Specifications* , for receptacle configurations. The configuration of weather-resistant receptacles covered by this requirement are identified as 5-15, 5-20, 6-15, and 6-20.

(2) Other Receptacles.

All other receptacles installed in a wet location shall be listed weather-resistant type, and installation shall comply with 406.9(B)(2) (a) or (B)(2)(b).

(1) A receptacle installed in a wet location where the product intended to be plugged into it is not attended while in use shall have an enclosure that is weatherproof with the attachment plug cap inserted or removed.

(2) A receptacle installed in a wet location where the product intended to be plugged into it will be attended while in use (e.g., portable tools) shall have an enclosure that is weatherproof when the attachment plug is removed.

(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.

(D) Flush Mounting with Faceplate.

The enclosure for a receptacle installed in an outlet box flush-mounted in a finished surface shall be made weatherproof by means of a weatherproof faceplate assembly that provides a watertight connection between the plate and the finished surface.

406.10 Grounding-Type Receptacles, Adapters, Cord Connectors, and Attachment Plugs.

(A) Grounding Poles (Connections).

Grounding-type receptacles, cord connectors, and attachment plugs shall be provided with one fixed grounding pole in addition to the circuit poles. The grounding contacting pole of grounding-type plug-in ground-fault circuit interrupters shall be permitted to be of the movable, self-restoring type on circuits operating at not over 150 volts between any two conductors or any conductor and ground.

(B) Grounding-Pole (Connection) Identification.

Grounding-type receptacles, adapters, cord connections, and attachment plugs shall have a means for connection of an equipment grounding conductor to the grounding pole.

A terminal for connection to the grounding pole shall be designated by one of the following:

(1) A green-colored hexagonal-headed or -shaped terminal screw or nut, not readily removable.

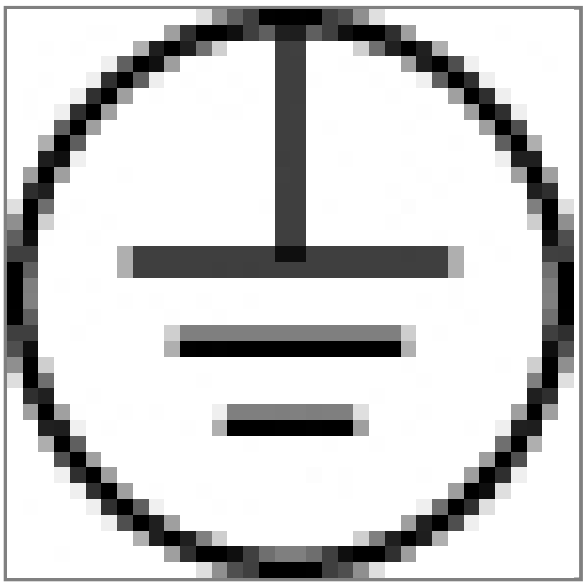
(2) A green-colored pressure wire connector body (a wire barrel).

(3) A similar green-colored connection device, in the case of adapters. The grounding terminal of a grounding adapter shall be a green-colored rigid ear, lug, or similar device. The equipment grounding connection shall be so designed that it cannot make contact with current-carrying parts of the receptacle, adapter, or attachment plug. The adapter shall be polarized.

(4) If the terminal for the equipment grounding conductor is not visible, the conductor entrance hole shall be marked with the word *green* or *ground*, the letters *G* or *GR*, a grounding symbol, or otherwise identified by a distinctive green color. If the terminal for the equipment grounding conductor is readily removable, the area adjacent to the terminal shall be similarly marked.

Informational Note: See Informational Note Figure 406.10(B).

Figure Informational Note Figure 406.10(B) One Example of a Symbol Used to Identify the Termination Point for an Equipment Grounding Conductor.



(C) Grounding Terminal Use.

A grounding terminal shall not be used for purposes other than connection to the equipment grounding conductor.

(D) Grounding-Pole (Connection) Requirements.

Grounding-type attachment plugs and mating cord connectors and receptacles shall be designed such that the equipment grounding connection is made before the current-carrying connections. Grounding-type devices shall be so designed that grounding poles of attachment plugs cannot be brought into contact with current-carrying parts of receptacles or cord connectors.

(E) Use.

Grounding-type attachment plugs shall be used only with a cord having an equipment grounding conductor.

Informational Note: See 250.126 for identification of equipment grounding conductor terminals.

406.11 Connecting Receptacle Grounding Terminal to Box.

The connection of the receptacle grounding terminal shall comply with 250.146 .

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, and 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:

(6) Business offices accessible to the general public

(7) Lobbies, and waiting spaces

(8) Spaces of nursing homes and limited care facilities covered in 517.10(B)(2)

(9) Places of awaiting transportation, gymnasiums, skating rinks, fitness centers, and auditoriums

(10) Dormitory units

(11) Residential care/assisted living facilities, social and substance abuse rehabilitation facilities, and group homes

(12) Foster care facilities, nursing homes, and psychiatric hospitals

(13) 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.

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

(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:

(4) A single receptacle that is not readily accessible and supplies one appliance

(5) A duplex receptacle that is not readily accessible and supplies two appliances

(6) Nongrounding receptacles used for replacements as permitted in 406.4(D)(2)(a)

406.13 Single-Pole Separable-Connector Type.

~~Single-pole separable connectors shall be listed and labeled and shall comply with 406.13(A) through (D).~~

~~**(A)** Locking or Latching Type.~~

~~Single-pole separable connectors shall be of either the locking or latching type and marked with the manufacturer's name or identification and voltage and ampere ratings.~~

~~**(B)** Identification.~~

~~Connectors designated for connection to the grounded circuit conductor shall be identified by a white-colored housing; connectors designated for connection to the grounding circuit conductor shall be identified by a green-colored housing.~~

~~**(C)** Interchangeability.~~

~~Single-pole separable connectors shall be permitted to be interchangeable for ac or dc use or for different current ratings or voltages on the same premises, provided they are listed for ac/dc use and marked in a suitable manner to identify the system to which they are intended to be connected.~~

~~**(D)** Connecting and Disconnecting.~~

~~The use of single-pole separable connectors shall be performed by a qualified person and shall comply with at least one of the following conditions:~~

(1) ~~Connection and disconnection of connectors are only possible where the supply connectors are interlocked to the source, and it is not possible to connect or disconnect connectors when the supply is energized.~~

(2) ~~Line connectors are of the listed sequential-interlocking type so that load connectors are connected in the following sequence and that disconnection is in the reverse sequence:~~

(3) ~~Equipment grounding conductor connection~~

(4) ~~Grounded circuit conductor connection, if provided~~

(5) ~~Ungrounded conductor connection~~

(6) ~~A caution notice that complies with 110.21(B) is provided on the equipment employing single-pole separable connectors, adjacent to the line connectors, indicating that connections are to be performed in the following sequence and that disconnection is in the reverse sequence:~~

(7) ~~Equipment grounding conductor connectors~~

(8) ~~Grounded circuit-conductor connectors, if provided~~

(9) ~~Ungrounded conductor connectors~~

~~Informational Note: See ANSI-UL 1691-2014, *Single Pole Locking-Type Separable Connectors* , for more information on single-pole locking-type separable connectors.~~

Additional Proposed Changes

File Name	Description	Approved
Article_406_7-24-2023.docx	Re-write of Article 406	

Statement of Problem and Substantiation for Public Input

This Public Input is submitted on behalf of a Correlating Committee established Task Group consisting of Bryan Tatum (Co-Chair), Chuck Kurten (Co-Chair), Paul Costello, Frank Tse, Nick Malouf, Doug Smith, Diane Lynch, and Randy Dollar.

The present scope of Article 404 address 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.

The intent of this Public Input is to modify the scope of Article 404 to only cover general-use switches, motor-circuit switches, isolating switches, circuit breakers used as switches, and molded case switches. Other types of switches that fit outside of the modified scope of Article 404, i.e., general-use snap switch, pendant switch, surface switch, dimmer, and electronic control switches, and lighting control switches are relocated to Article 406. This relocation is logical as these types of switches (also referred to as 'wiring devices') are installed similar to how receptacles are installed. It should also be noted that the Standard for Electrical Equipment Maintenance, NFPA 70B, currently has "Wiring Devices" in Chapter 24 and "Switches" in Chapter 17. This PI would create a similar alignment of requirements.

This Public Input, along with another companion Public Input, was developed with the goal of improving usability of Article 404 Switches and facilitate the reassignment of switches to CMP's with the right focus for the equipment (namely, CMP-18 for 'wiring devices' and CMP-10 for larger switches).

Additionally, operating at voltages not over 1000 volts ac, 1500 volts dc, nominal was introduced to clarify what is meant by unless specifically referenced elsewhere in this code for higher voltages and for consistency with other parts of the code where 1500 volts dc is used.

Related Public Input No. 1544-NFPA 70-2026 [Revised Article 406]
1543 -NFPA 70-2026 [Revised Article 404]
1529 - NFPA 70 -2026 [New Definition – Wiring Device]
1528 - NFPA 70 -2026 [Revised Definitions Switch, General-Use. (General-Use Switch); Switch, General-Use Snap. (General-Use Snap Switch); and Switch, Isolating. (Isolating Switch)

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1528-NFPA 70-2023 [Definitions (100): Switch, Gen... to Switch, Iso...]	1544,1543,1529 and 1528
Public Input No. 1529-NFPA 70-2023 [New Definition after Definition: Wireways, Nonmetallic. (No...]	1544,1543,1529 and 1528
Public Input No. 1543-NFPA 70-2023 [Article 404]	1544,1543,1529 and 1528

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Committee: NEC-P18

Committee Statement

Resolution: FR-7914-NFPA 70-2024

Statement: The present scope of Article 404 address 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.

Article 404 scope should be modified to only cover general-use switches, motor-circuit switches, isolating switches, circuit breakers used as switches, and molded case switches. Other types of switches that fit outside of the modified scope of Article 404, i.e., general-use snap switch, pendant switch, surface switch, dimmer, and electronic control switches, and lighting control switches are relocated to Article 406.

This relocation is logical as these types of switches (also referred to as ‘wiring devices’) are installed similar to how receptacles are installed. It should also be noted that the Standard for Electrical Equipment Maintenance, NFPA 70B, currently has “Wiring Devices” in Chapter 24 and “Switches” in Chapter 17. This revision would create a similar alignment of requirements. This revision will improve usability of Article 404 Switches and facilitate the reassignment of switches to CMP’s with the right focus for the equipment (namely, CMP-18 for ‘wiring devices’ and CMP-10 for larger switches). Additionally, operating at voltages not over 1000 volts ac, 1500 volts dc, nominal was introduced to clarify what is meant by unless specifically referenced elsewhere in this code for higher voltages and for consistency with other parts of the code where 1500 volts dc is used.

Article 406 Wiring Devices

Part I. General

406.1 Scope.

~~This article covers the rating, type, and installation of receptacles, cord connectors, and attachment plugs (cord caps).~~ This article covers the rating, type, and installation of wiring devices.

406.2 Listing Requirements.
Wiring devices shall be listed.

406.~~3~~2 Reconditioned Equipment.
Reconditioned ~~receptacles, attachment plugs, cord connectors, and flanged surface devices~~ wiring devices shall not be permitted to be installed.

Commented [TBL1]: Added. Article 406 divided into Parts I, II, and III in accordance with the style manual.

Commented [TBL2]: 406.2 added to comply with 2.2.1 of the style manual. Listing is presently required.

Commented [TBL3]: 406.2 renumbered to 406.3 to comply with 2.2.1 of the style manual.

Commented [KCS4]: Replaced “receptacles, attachment plugs, cord connectors, and flanged surface devices" with “wiring devices” to be inclusive of other types of wiring devices.

406.9 ~~Receptacles~~Wiring Devices in Damp or Wet Locations.

(A) Damp Locations.

(1) Receptacles.

A receptacle installed outdoors in a location protected from the weather or in other damp locations shall have an enclosure for the receptacle that is weatherproof when the receptacle is covered (attachment plug cap not inserted and receptacle covers closed).
An installation suitable for wet locations shall also be considered suitable for damp locations.
A receptacle shall be considered to be in a location protected from the weather where located under roofed open porches, canopies, marquees, and the like, and will not be subjected to a beating rain or water runoff. All 125- and 250-volt nonlocking receptacles shall be a listed weather-resistant type. Hinged covers of outlet box hoods shall be able to open at least 90 degrees, or fully open if the cover is not designed to open 90 degrees from the closed to open position, after installation.
Informational Note: See ANSI/NEMA WD 6–2016, *Wiring Devices — Dimensional Specifications*, for the types of receptacles covered by this requirement.

(2) Switches.

A switch installed in a damp locations shall comply with the following:

(1) A surface-mounted switch shall be enclosed in a weatherproof enclosure that complies with 312.2.

(2) A flush-mounted switch shall be equipped with a weatherproof cover.

(B) Wet Locations.

(1) Receptacles of 15 Amperes and 20 Amperes in a Wet Location.
Receptacles of 15 amperes and 20 amperes, 125 volts and 250 volts installed in a wet location shall have an enclosure that is weatherproof whether or not the attachment plug cap is inserted. An outlet box hood installed for this purpose shall be listed and shall be identified as extra-duty. Other listed products, enclosures, or assemblies providing weatherproof protection that do not utilize an outlet box hood need not be identified extra duty. Hinged covers of outlet box hoods shall be able to open at least 90 degrees, or fully open if the cover is not designed to open 90 degrees from the closed to open position, after installation.

Informational Note No. 1: See ANSI/UL 514D–2016, *Cover Plates for Flush-Mounted Wiring Devices*, for extra-duty outlet box hoods. Extra duty identification and requirements are not applicable to listed receptacles, faceplates, outlet boxes, enclosures, or assemblies that are identified as either being suitable for wet locations or rated as one of the outdoor enclosure–type numbers of Table 110.28 that does not utilize an outlet box hood.

Exception: 15- and 20-ampere, 125- through 250-volt receptacles installed in a wet location and subject to routine high-pressure spray washing shall be permitted to have an enclosure that is weatherproof when the attachment plug is removed.

All 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles shall be listed and so identified as the weather-resistant type.

Informational Note No. 2: See ANSI/NEMA WD 6–2016, *Wiring Devices — Dimensional Specifications*, for receptacle configurations. The configuration of weather-resistant receptacles covered by this requirement are identified as 5-15, 5-20, 6-15, and 6-20.

(2) Other Receptacles.
All other receptacles installed in a wet location shall be listed weather-resistant type, and installation shall comply with 406.9(B)(2)(a) or (B)(2)(b).

(a) A receptacle installed in a wet location where the product intended to be plugged into it is not attended while in use shall have an enclosure that is weatherproof with the attachment plug cap inserted or removed.

(b) A receptacle installed in a wet location where the product intended to be plugged into it will be attended while in use (e.g., portable tools) shall have an enclosure that is weatherproof when the attachment plug is removed.

Commented [TBL5]: Title modified from receptacles to wiring devices.

Commented [TBL6]: Section moved up in document for numbering continuity in this draft.

Commented [TBL7]: Integration of Receptacles and Switches under (A). Added (1) and (2) with headers per style manual.

Commented [TBL8]: Relocated from 404.4 with removal of circuit breaker. Relocated to 406.9 wet and damp location for switches. Integrated part (E) switches into the (B) area for continuity.

Commented [TBL9]: Area reformatted to meet the style manual. Removed the header on parts (1) "Surface-Mounted Switch" and (2) "Flush-Mounted Switch" since redundant information.

(3) Switches.

A switch installed in a wet locations shall comply with the following:

(1) A surface-mounted switch shall be enclosed in a weatherproof enclosure that complies with 312.2.

(2) A flush-mounted switch shall be equipped with a weatherproof cover.

(C) Wiring Devices in Bathtub and Shower Space.

(1) Receptacles.

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.

(2) Switches.

Switches shall not be installed within tub or shower spaces unless installed as part of a listed tub or shower assembly.

(D) Flush Mounting with Faceplate.
The enclosure for a receptacle installed in an outlet box flush-mounted in a finished surface shall be made weatherproof by means of a weatherproof faceplate assembly that provides a watertight connection between the plate and the finished surface.

406.10 Wiring Device Terminations.

~~**(D) Receptacle Terminations.**~~
~~Receptacle~~Wiring device terminations shall be in accordance with the following:

(1) Terminals of 15-ampere and 20-ampere ~~receptacles~~wiring devices 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.

(3) ~~Receptacles~~Wiring devices installed using screwless terminals of the conductor push-in type construction (also known as *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.

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).

Commented [TBL10]: Relocated from 404.4 with removal of circuit breaker. Relocated to 406.9 wet and damp location for switches. Integrated part (E) switches into the (B) area for continuity.

Commented [TBL11]: Area reformatted to meet the style manual. Removed the header on parts (1) "Surface-Mounted Switch" and (2) "Flush-Mounted Switch" since redundant information.

Commented [TBL12]: Integration of Receptacles and Switches under (C). Added (1) and (2) with headers per style manual.

Commented [TBL13]: Relocated from 404.4 with removal of circuit breaker. Relocated to 406.9 wet and damp location for switches. Integrated part (E) switches into the (C) area for continuity.

Commented [TBL14]: 406.3(D) relocated to new section 406.10 titled Wiring Device Terminations. "receptacle" reference changed to "wiring device" in body.

Part II. Receptacles, Cord Connectors, and Attachment Plugs (Caps)

406.113 Receptacle Rating and Type.

(A) Receptacles.
Receptacles shall be ~~listed and~~ marked with the manufacturer's name or identification and voltage and ampere ratings.

(B) Rating.
Receptacles and cord connectors shall be rated not less than 15 amperes, 125 volts, or 15 amperes, 250 volts, and shall be of a type not suitable for use as lampholders.
Informational Note: See 210.21(B) for receptacle ratings where installed on branch circuits.

~~**(C) CO/ALR Receptacles.**~~
~~Receptacles rated 20 amperes or less and designed for the direct connection of aluminum conductors shall be marked CO/ALR.~~

~~**(D) 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.~~

~~(3) Receptacles installed using screwless terminals of the conductor push-in type construction (also known as *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.~~

~~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).~~

(EC) Isolated Ground Receptacles.
Receptacles incorporating an isolated equipment grounding conductor connection intended for the reduction of electromagnetic interference as permitted in 250.146(D) shall be identified by an orange triangle located on the face of the receptacle.

(1) Isolated Equipment Grounding Conductor Required.
Receptacles so identified shall be used only with equipment grounding conductors that are isolated in accordance with 250.146(D).

(2) Installation in Nonmetallic Boxes.
Isolated ground receptacles installed in nonmetallic boxes shall be covered with a nonmetallic faceplate.
Exception: Where an isolated ground receptacle is installed in a nonmetallic box, a metal faceplate shall be permitted if the box contains a feature or accessory that permits the connection of the faceplate to the equipment grounding conductor.

(FD) Controlled Receptacle Marking.
All nonlocking-type, 125-volt, 15- and 20-ampere receptacles that are controlled by an automatic control device, or that incorporate control features that remove power from the receptacle for the purpose of energy management or building automation, shall be permanently marked with the symbol shown in Figure 406.113(DF) and the word "controlled."
For receptacles controlled by an automatic control device, the marking shall be located on the receptacle face and visible after installation.
In both cases where a multiple receptacle device is used, the required marking of the word "controlled" and symbol shall denote which contact device(s) are controlled.

Figure 406.311(FD) Controlled Receptacle Marking Symbol.

Exception: The marking shall not be required for receptacles controlled by a wall switch that provide the required room lighting outlets as permitted by 210.70.

Commented [TBL15]: Added. Article 406 divided into Parts I, II, and III per style manual.

Commented [TBL16]: 406.3 renumbered to 406.11. Renamed "receptacles" with "wiring devices". Also relocated requirements from 404.14(D).

Commented [TBL17]: Removed. Listing requirement moved to 406.2.

Commented [TBL18]: 406.3(c) removed. Covered by 406.10 (1) and 406.10 (2). 406.3 (D) (1) through (3) relocated to 406.10 items (1) through (3).

Commented [TBL19]: 406.3(D) relocated to 406.10.

Commented [TBL20]: 406.3(E) renumbered to 406.11(C).

Commented [TBL21]: 406.3(E) renumbered to 406.11(D).

Commented [TBL22]: Figure 406.3(F) renumbered to 406.11(D).

(EG) Receptacle with USB Charger.

A 125-volt 15- or 20-ampere receptacle that additionally provides Class 2 power shall be listed and constructed such that the Class 2 circuitry is integral with the receptacle.

406.124 General Installation Requirements.
Receptacle outlets shall be located in branch circuits in accordance with Part III of Article 210. General installation requirements shall be in accordance with 406.124(A) through (G).

(A) Grounding Type.
Except as provided in 406.124(D), receptacles installed on 15- and 20-ampere branch circuits shall be of the grounding type. Grounding-type receptacles shall be installed only on circuits of the voltage class and current for which they are rated, except as provided in 210.21(B)(1) for single receptacles or Table 210.21(B)(2) and Table 210.21(B)(3) for two or more receptacles.

(B) Connection to Equipment Grounding Conductor.
Receptacles and cord connectors that have equipment grounding conductor contacts shall have those contacts connected to an equipment grounding conductor.
Exception No. 1: Receptacles mounted on portable and vehicle-mounted generator sets and generators in accordance with 250.34.
Exception No. 2: Replacement receptacles as permitted by 406.124(D).

(C) Methods of Connection to Equipment Grounding Conductor.
The equipment grounding conductor contacts of receptacles shall be connected to an equipment grounding conductor of the circuit supplying the receptacle in accordance with 250.146.
Cord connectors shall be connected to the equipment grounding conductor of the circuit supplying the cord connector.
Informational Note No. 1: See 250.118 for acceptable grounding means.
Informational Note No. 2: See 250.130 for extensions of existing branch circuits.

(D) Replacements.
Replacement of receptacles shall comply with 406.124(D)(1) through (D)(8), as applicable. Arc-fault circuit-interrupter type and ground-fault circuit-interrupter type receptacles shall be installed in a readily accessible location.

(1) Grounding-Type Receptacles.
Where a grounding means exists in the receptacle enclosure or an equipment grounding conductor is installed in accordance with 250.130(C), grounding-type receptacles shall be used and shall be connected to the equipment grounding conductor in accordance with 406.124(C) or 250.130(C).

(2) Non–Grounding-Type Receptacles.
Where attachment to an equipment grounding conductor does not exist in the receptacle enclosure, the installation shall comply with 406.124(D)(2)(a), (D)(2)(b), or (D)(2)(c).

(a) A non–grounding-type receptacle(s) shall be permitted to be replaced with another non–grounding-type receptacle(s).

(b) A non–grounding-type receptacle(s) shall be permitted to be replaced with a ground-fault circuit interrupter-type of receptacle(s). These receptacles or their cover plates shall be marked "No Equipment Ground." An equipment grounding conductor shall not be connected from the ground-fault circuit-interrupter-type receptacle to any outlet supplied from the ground-fault circuit-interrupter receptacle.

(c) A non–grounding-type receptacle(s) shall be permitted to be replaced with a grounding-type receptacle(s) where supplied through a ground-fault circuit interrupter. Where grounding-type receptacles are supplied through the ground-fault circuit interrupter, grounding-type receptacles or their cover plates shall be marked "GFCI Protected" and "No Equipment Ground," visible after installation. An equipment grounding conductor shall not be connected between the grounding-type receptacles.

Informational Note No. 1: Some equipment or appliance manufacturers require that the branch circuit to the equipment or appliance includes an equipment grounding conductor.

Informational Note No. 2: See 250.114 for a list of a cord-and-plug-connected equipment or appliances that require an equipment grounding conductor.

(3) Ground-Fault Circuit-Interrupter Protection.

Commented [TBL23]: 406.3(G) renumbered to 406.11(E).

Commented [TBL24]: 406.4 renumbered to 406.12.

Commented [TBL25]: 406.4(D) reference changed to 406.12 (D).

Commented [TBL26]: 406.4(D) reference changed to 406.12 (D).

Commented [TBL27]: 406.4(D)(1) reference changed to 406.12 (D)(1).

Commented [TBL28]: 406.4(C) reference changed to 406.12(C).

Commented [TBL29]: 406.4(D)(2)(a) reference changed to 406.12(D)(2)(a).

Ground-fault circuit-interrupter protection for receptacles shall be provided where replacements are made at receptacle outlets that are required to be so protected elsewhere in this *Code*. Ground-fault circuit interrupters shall be listed.
Exception: Where the outlet box size will not permit the installation of the GFCI receptacle, the receptacle shall be permitted to be replaced with a new receptacle of the existing type, where GFCI protection is provided and the receptacle is marked "GFCI Protected" and "No Equipment Ground," in accordance with 406.124(D)(2)(a), (D)(2)(b), or (D)(2)(c), as applicable.

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

(1) A listed outlet branch-circuit type AFCI receptacle

(2) A receptacle protected by a listed outlet branch-circuit type AFCI type receptacle

(3) A receptacle protected by a listed combination type AFCI circuit breaker

Exception: Section 210.12(E), Exception, shall not apply to replacement of receptacles.

(5) Tamper-Resistant Receptacles.
Listed tamper-resistant receptacles shall be provided where replacements are made at receptacle outlets that are required to be tamper-resistant elsewhere in this *Code*, except in one of the following cases:

(1) Where a nongrounding receptacle is replaced with another nongrounding receptacle

(2) Where aluminum branch-circuit conductors are directly terminated on a CO/ALR receptacle, installed as replacement

(6) Weather-Resistant Receptacles.
Weather-resistant receptacles shall be provided where replacements are made at receptacle outlets that are required to be so protected elsewhere in this *Code*.

(7) Controlled Receptacles.
Automatically controlled receptacles shall be replaced with equivalently controlled receptacles. If automatic control is no longer required, the receptacle and any associated receptacles marked in accordance with 406.113(DF) shall be replaced with a receptacle and faceplate not marked in accordance with 406.113(DF).

(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*.

(E) Cord- and Plug-Connected Equipment.
The installation of grounding-type receptacles shall not be used as a requirement that all cord-and plug-connected equipment be of the grounded type.
Informational Note: See 250.114 for types of cord-and plug-connected equipment to be grounded.

(F) Noninterchangeable Types.
Receptacles connected to circuits that have different voltages, frequencies, or types of current (ac or dc) on the same premises shall be of such design that the attachment plugs used on these circuits are not interchangeable.

(G) Protection of Floor Receptacles.
Protection for floor receptacles shall be in accordance with the following:

(1) Physical protection of floor receptacles shall allow floor-cleaning equipment to be operated without damage to receptacles.

(2) All 125-volt, single-phase, 15- and 20-ampere floor receptacles installed in food courts and waiting spaces of passenger transportation facilities where food or drinks are allowed shall be GFCI protected.

406.145 Receptacle Mounting.
Receptacles shall be mounted in identified boxes or assemblies. The boxes or assemblies shall be securely fastened in place unless otherwise permitted elsewhere in this *Code*. Screws used for the purpose of attaching receptacles to a box shall be of the type provided with a listed receptacle, or shall be machine screws having 32 threads per inch or part of listed assemblies or systems, in accordance with the manufacturer's instructions.

(A) Boxes That Are Set Back.

Commented [TBL30]: 406.4(D)(2)(a) reference changed to 406.12(D)(2)(a).

Commented [TBL31]: 406.3(F) reference changed to 406.11 (D).

Commented [TBL32]: 406.3(F) reference changed to 406.11 (D).

Commented [TBL33]: 406.5 renumbered to 406.14.

Receptacles mounted in boxes that are set back from the finished surface as permitted in 314.20 shall be installed such that the mounting yoke or strap of the receptacle is held rigidly at the finished surface.

(B) Boxes That Are Flush.
Receptacles mounted in boxes that are flush with the finished surface or project therefrom shall be installed such that the mounting yoke or strap of the receptacle is held rigidly against the box or box cover.

(C) Receptacles Mounted on Covers.
Receptacles mounted to and supported by a cover shall be held rigidly against the cover by more than one screw or shall be a device assembly or box cover listed and identified for securing by a single screw.

(D) Position of Receptacle Faces.
After installation, receptacle faces shall be flush with or project from faceplates of insulating material and shall project a minimum of 0.4 mm (0.015 in.) from metal faceplates.
Exception: Listed kits or assemblies encompassing receptacles and nonmetallic faceplates that cover the receptacle face, where the plate cannot be installed on any other receptacle, shall be permitted.

(E) Receptacles in Countertops.
Receptacle assemblies for installation in countertop surfaces shall be listed for countertop applications. Where receptacle assemblies for countertop applications are required to provide ground-fault circuit-interrupter protection for personnel in accordance with 210.8, such assemblies shall be permitted to be listed as GFCI receptacle assemblies for countertop applications.

(F) Receptacles in Work Surfaces.
Receptacle assemblies and GFCI receptacle assemblies listed for work surface or countertop applications shall be permitted to be installed in work surfaces.

(G) Receptacle Orientation.

(1) Countertop and Work Surfaces.
Receptacles shall not be installed in a face-up position in or on countertop surfaces or work surfaces unless listed for countertop or work surface applications.

(2) Under Sinks.
Receptacles shall not be installed in a face-up position in the area below a sink.

(H) Receptacles in Seating Areas and Other Similar Surfaces.

In seating areas or similar surfaces, receptacles shall not be installed in a face-up position unless the receptacle is any of the following:

(1) Part of an assembly listed as a furniture power distribution unit

(2) Part of an assembly listed either as household furnishings or as commercial furnishings

(3) Listed either as a receptacle assembly for countertop applications or as a GFCI receptacle assembly for countertop applications

(4) Installed in a listed floor box

(I) Exposed Terminals.
Receptacles shall be enclosed so that live wiring terminals are not exposed to contact.

(J) Voltage Between Adjacent Devices.
A receptacle shall not be grouped or ganged in enclosures with other receptacles, snap switches, or similar devices, unless they are arranged so that the voltage between adjacent devices does not exceed 300 volts, or unless they are installed in enclosures equipped with identified, securely installed barriers between adjacent devices.

406.16 Receptacle Faceplates (Cover Plates).
Receptacle faceplates shall be installed so as to completely cover the opening and seat against the mounting surface.
Receptacle faceplates mounted inside a box having a recess-mounted receptacle shall effectively close the opening and seat against the mounting surface.

(A) Thickness of Metal Faceplates.

Commented [TBL34]: 406.6 renumbered to 406.16.

Metal faceplates shall be of ferrous metal not less than 0.76 mm (0.030 in.) in thickness or of nonferrous metal not less than 1.02 mm (0.040 in.) in thickness.

(B) Grounding.
Metal faceplates shall be grounded.

(C) Faceplates of Insulating Material.
Faceplates of insulating material shall be noncombustible and not less than 2.54 mm (0.10 in.) in thickness but shall be permitted to be less than 2.54 mm (0.10 in.) in thickness if formed or reinforced to provide adequate mechanical strength.

(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. 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.

406.~~187~~ Attachment Plugs, Cord Connectors, and Flanged Surface Devices.
All attachment plugs, cord connectors, and flanged surface devices (inlets and outlets) shall be listed and marked with the manufacturer's name or identification and voltage and ampere ratings.

Commented [TBL35]: 406.7 renumbered to 406.18.

(A) Construction of Attachment Plugs and Cord Connectors.
Attachment plugs and cord connectors shall be constructed so that there are no exposed current-carrying parts except the prongs, blades, or pins. The cover for wire terminations shall be a part that is essential for the operation of an attachment plug or connector (dead-front construction).

(B) Connection of Attachment Plugs.
Attachment plugs shall be installed so that their prongs, blades, or pins are not energized unless inserted into an energized receptacle or cord connectors. No receptacle shall be installed so as to require the insertion of an energized attachment plug as its source of supply.

(C) Attachment Plug Ejector Mechanisms.
Attachment plug ejector mechanisms shall not adversely affect engagement of the blades of the attachment plug with the contacts of the receptacle.

(D) Flanged Surface Inlet.
A flanged surface inlet shall be installed such that the prongs, blades, or pins are not energized unless an energized cord connector is inserted into it.

406.~~208~~ Noninterchangeability.
Receptacles, cord connectors, and attachment plugs shall be constructed such that receptacle or cord connectors do not accept an attachment plug with a different voltage or current rating from that for which the device is intended. However, a 20-ampere T-slot receptacle or cord connector shall be permitted to accept a 15-ampere attachment plug of the same voltage rating. Non–grounding-type receptacles and connectors shall not accept grounding-type attachment plugs.

Commented [TBL36]: 406.8 renumbered to 406.20.

~~**406.9 Receptacles in Damp or Wet Locations.**~~

Commented [TBL37]: 406.9 location change in document only.

~~**(A) Damp Locations.**~~
~~A receptacle installed outdoors in a location protected from the weather or in other damp locations shall have an enclosure for the receptacle that is weatherproof when the receptacle is covered (attachment plug cap not inserted and receptacle covers closed).~~
~~An installation suitable for wet locations shall also be considered suitable for damp locations.~~
~~A receptacle shall be considered to be in a location protected from the weather where located under roofed open porches, canopies, marquees, and the like, and will not be subjected to a beating rain or water runoff. All 125- and 250-volt nonlocking receptacles shall be a listed weather-resistant type. Hinged covers of outlet box hoods shall be able to open at least 90 degrees, or fully open if the cover is not designed to open 90 degrees from the closed to open position, after installation.~~
~~Informational Note: See ANSI/NEMA WD 6-2016, *Wiring Devices — Dimensional Specifications*, for the types of receptacles covered by this requirement.~~

~~**(B) Wet Locations.**~~

~~**(1) Receptacles of 15 Amperes and 20 Amperes in a Wet Location.**~~

~~Receptacles of 15 amperes and 20 amperes, 125 volts and 250 volts installed in a wet location shall have an enclosure that is weatherproof whether or not the attachment plug cap is inserted. An outlet box hood installed for this purpose shall be listed and shall be identified as extra-duty. Other listed products, enclosures, or assemblies providing weatherproof protection that do not utilize an outlet box hood need not be identified extra-duty. Hinged covers of outlet box hoods shall be able to open at least 90 degrees, or fully open if the cover is not designed to open 90 degrees from the closed-to-open position, after installation.~~

~~Informational Note No. 1: See ANSI/UL 514D-2016, *Cover Plates for Flush-Mounted Wiring Devices*, for extra-duty outlet box hoods. Extra-duty identification and requirements are not applicable to listed receptacles, faceplates, outlet boxes, enclosures, or assemblies that are identified as either being suitable for wet locations or rated as one of the outdoor enclosure-type numbers of Table 110.28 that does not utilize an outlet box hood.~~

~~*Exception: 15- and 20-ampere, 125- through 250-volt receptacles installed in a wet location and subject to routine high-pressure spray washing shall be permitted to have an enclosure that is weatherproof when the attachment plug is removed.*~~

~~All 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles shall be listed and so identified as the weather-resistant type.~~

~~Informational Note No. 2: See ANSI/NEMA WD 6-2016, *Wiring Devices — Dimensional Specifications*, for receptacle configurations. The configuration of weather-resistant receptacles covered by this requirement are identified as 5-15, 5-20, 6-15, and 6-20.~~

~~**(2) Other Receptacles.**~~

~~All other receptacles installed in a wet location shall be listed weather-resistant type, and installation shall comply with 406.9(B)(2)(a) or (B)(2)(b).~~

~~(a) A receptacle installed in a wet location where the product intended to be plugged into it is not attended while in use shall have an enclosure that is weatherproof with the attachment plug cap inserted or removed.~~

~~(b) A receptacle installed in a wet location where the product intended to be plugged into it will be attended while in use (e.g., portable tools) shall have an enclosure that is weatherproof when the attachment plug is removed.~~

~~**(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.~~

~~**(D) Flush-Mounting with Faceplate.**~~

~~The enclosure for a receptacle installed in an outlet box flush-mounted in a finished surface shall be made weatherproof by means of a weatherproof faceplate assembly that provides a watertight connection between the plate and the finished surface.~~

406.2210 Grounding-Type Receptacles, Adapters, Cord Connectors, and Attachment Plugs.

Commented [TBL38]: 406.10 renumbered to 406.22.

(A) Grounding Poles (Connections).

Grounding-type receptacles, cord connectors, and attachment plugs shall be provided with one fixed grounding pole in addition to the circuit poles. The grounding contacting pole of grounding-type plug-in ground-fault circuit interrupters shall be permitted to be of the movable, self-restoring type on circuits operating at not over 150 volts between any two conductors or any conductor and ground.

(B) Grounding-Pole (Connection) Identification.
Grounding-type receptacles, adapters, cord connections, and attachment plugs shall have a means for connection of an equipment grounding conductor to the grounding pole.
A terminal for connection to the grounding pole shall be designated by one of the following:

(1) A green-colored hexagonal-headed or -shaped terminal screw or nut, not readily removable.

(2) A green-colored pressure wire connector body (a wire barrel).

(3) A similar green-colored connection device, in the case of adapters. The grounding terminal of a grounding adapter shall be a green-colored rigid ear, lug, or similar device. The equipment grounding connection shall be so designed that it cannot make contact with current-carrying parts of the receptacle, adapter, or attachment plug. The adapter shall be polarized.

(4) If the terminal for the equipment grounding conductor is not visible, the conductor entrance hole shall be marked with the word *green* or *ground*, the letters *G* or *GR*, a grounding symbol, or otherwise identified by a distinctive green color. If the terminal for the equipment grounding conductor is readily removable, the area adjacent to the terminal shall be similarly marked.

Informational Note: See Informational Note Figure 406.22 ~~10~~(B).

Figure Informational Note Figure 406.22~~10~~(B) One Example of a Symbol Used to Identify the Termination Point for an Equipment Grounding Conductor.

(C) Grounding Terminal Use.
A grounding terminal shall not be used for purposes other than connection to the equipment grounding conductor.

(D) Grounding-Pole (Connection) Requirements.
Grounding-type attachment plugs and mating cord connectors and receptacles shall be designed such that the equipment grounding connection is made before the current-carrying connections. Grounding-type devices shall be so designed that grounding poles of attachment plugs cannot be brought into contact with current-carrying parts of receptacles or cord connectors.

(E) Use.
Grounding-type attachment plugs shall be used only with a cord having an equipment grounding conductor.
Informational Note: See 250.126 for identification of equipment grounding conductor terminals.

406.24~~11~~ Connecting Receptacle Grounding Terminal to Box.
The connection of the receptacle grounding terminal shall comply with 250.146.

406.26~~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, and 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:

a. Business offices accessible to the general public

b. Lobbies, and waiting spaces

c. Spaces of nursing homes and limited care facilities covered in 517.10(B)(2)

(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, and group homes
(9) Foster care facilities, nursing homes, and psychiatric hospitals

Commented [TBL39]: Reference to Figure 406.10(B) renumbered to Figure 406.22(B).

Commented [TBL40]: Figure 406.10(B) renumbered to Figure 406.22(B).

Commented [TBL41]: 406.11 renumbered to 406.24.

Commented [TBL42]: 406.12 renumbered to 406.26.

(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.

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

(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

(4) Nongrounding receptacles used for replacements as permitted in 406.4(D)(2)(a)

406.2~~813~~ Single-Pole Separable-Connector Type.

Single-pole separable connectors shall be listed and labeled and shall comply with 406.2~~813~~(A) through (D).

(A) Locking or Latching Type.
Single-pole separable connectors shall be of either the locking or latching type and marked with the manufacturer's name or identification and voltage and ampere ratings.

(B) Identification.
Connectors designated for connection to the grounded circuit conductor shall be identified by a white-colored housing; connectors designated for connection to the grounding circuit conductor shall be identified by a green-colored housing.

(C) Interchangeability.
Single-pole separable connectors shall be permitted to be interchangeable for ac or dc use or for different current ratings or voltages on the same premises, provided they are listed for ac/dc use and marked in a suitable manner to identify the system to which they are intended to be connected.

(D) Connecting and Disconnecting.
The use of single-pole separable connectors shall be performed by a qualified person and shall comply with at least one of the following conditions:

(1) Connection and disconnection of connectors are only possible where the supply connectors are interlocked to the source, and it is not possible to connect or disconnect connectors when the supply is energized.

(2) Line connectors are of the listed sequential-interlocking type so that load connectors are connected in the following sequence and that disconnection is in the reverse sequence:

a. Equipment grounding conductor connection

b. Grounded circuit conductor connection, if provided

c. Ungrounded conductor connection

(3) A caution notice that complies with 110.21(B) is provided on the equipment employing single-pole separable connectors, adjacent to the line connectors, indicating that connections are to be performed in the following sequence and that disconnection is in the reverse sequence:

a. Equipment grounding conductor connectors

b. Grounded circuit-conductor connectors, if provided

c. Ungrounded conductor connectors

Informational Note: See ANSI-UL 1691-2014, *Single Pole Locking-Type Separable Connectors*, for more information on single-pole locking-type separable connectors.

Commented [TBL43]: 406.13 renumbered to 406.28.

Commented [TBL44]: 406.13(A) reference changed to 406.28(A).

Part III General-Use Snap Switches, Dimmers, and Electronic Control Switches

406.3014 Switch Connections.

(A) Three-Way and Four-Way Switches.

Three-way and four-way switches shall be wired so that all switching is done only in the ungrounded circuit conductor. Where in metal raceways or metal-armored cables, wiring between switches and outlets shall be in accordance with 300.20(A).

Exception: Switch loops shall not require a grounded conductor.

(B) Grounded Conductors.

Switches shall not disconnect the grounded conductor of a circuit.
Exception: A switch shall be permitted to disconnect a grounded circuit conductor where all circuit conductors are disconnected simultaneously, or where the device is arranged so that the grounded conductor cannot be disconnected until all the ungrounded conductors of the circuit have been disconnected.

(C) Switches Controlling Lighting Loads.

The grounded circuit conductor for the controlled lighting circuit shall be installed at the location where switches control lighting loads that are supplied by a grounded general-purpose branch circuit serving bathrooms, hallways, stairways, and habitable rooms or occupiable spaces as defined in the applicable building code. Where multiple switch locations control the same lighting load such that the entire floor area of the room or space is visible from the single or combined switch locations, the grounded circuit conductor shall only be required at one location. A grounded conductor shall not be required to be installed at lighting switch locations under any of the following conditions:

(1) Where conductors enter the box enclosing the switch through a raceway, provided that the raceway is large enough for all contained conductors, including a grounded conductor

(2) Where snap switches with integral enclosures comply with 300.15(E)

(3) Where lighting in the area is controlled by automatic means

(4) Where a switch controls a receptacle load

The grounded conductor shall be extended to any switch location as necessary and shall be connected to switching devices that require line-to-neutral voltage to operate the electronics of the switch in the standby mode and shall meet the requirements of 406.5025.

Exception: The connection requirement shall not apply to replacement or retrofit switches installed in locations prior to local adoption of 406.3014(C) and where the grounded conductor cannot be extended without removing finish materials. The number of electronic control switches on a branch circuit shall not exceed five, and the number connected to any feeder on the load side of a system or main bonding jumper shall not exceed 25. For the purpose of this exception, a neutral busbar, in compliance with 200.2(B) and to which a main or system bonding jumper is connected shall not be limited as to the number of electronic lighting control switches connected.

Informational Note: The provision for a grounded conductor is to complete a circuit path for electronic lighting control devices.

406.3215 Switch Enclosure.

~~(A) General.~~

Switches shall be of the externally operable type installed in device boxes or on box covers listed for the intended use.

Exception: Pendant- and surface-type snap switches mounted on an open-face switchboard or panelboard shall be permitted without enclosures.

406.3417 Time Switches, Flashers, and Similar Devices.

Time switches, flashers, and similar devices shall be of the enclosed type or shall be installed in device boxes.

Commented [TBL45]: Added. Article 406 divided into Parts I, II, and III per style manual.

Commented [KCS46]: Relocated from 404.2

Commented [KCS47]: Relocated from 404.3. Added "Switch" for clarity on enclosure pertains to switches.

Commented [TBL48]: Removed the "(A) General" to meet style manual.

Commented [KCS49]: Transfer from Article 404.3. "mounted" removed and "device boxes or on box covers" added to reflect wiring device mounting.

Commented [KCS50]: Relocated from 404.5. "Cabinets", "or equipment enclosures" removed to be reflective of intended mounting in boxes.

406.3618 Indicating.

General-use and motor-circuit switches, where mounted in an enclosure as described in 406.3215, shall indicate, in a location that is visible when accessing the external operating means, whether they are in the open (off) or closed (on) position.

Where these switch handles are operated vertically rather than rotationally or horizontally, the up position of the handle shall be the closed (on) position.

Exception : Vertically operated double-throw switches shall be permitted to be in the closed (on) position with the handle in either the up or down position.

406.3819 Accessibility and Grouping.

(A) Location.
All switches shall be located so that they can be operated from a readily accessible place. They shall be installed such that the center of the grip of the operating handle of the switch when in its highest position, is not more than 2.0 m (6 ft 7 in.) above the floor or working platform. ~~, except as follows:~~
~~(1)~~ Switches installed adjacent to motors, appliances, or other equipment that they supply shall be permitted to be located higher than 2.0 m (6 ft 7 in.) and to be accessible by portable means.

(B) Voltage Between Adjacent Devices.

A snap switch shall not be grouped or ganged in enclosures with other snap switches, receptacles, or similar devices, unless they are arranged so that the voltage between adjacent devices does not exceed 300 volts, or unless they are installed in enclosures equipped with identified, securely installed barriers between adjacent devices.

(C) Multipole Snap Switches.
A multipole, general-use snap switch shall not be fed from more than a single circuit unless it is listed and marked as a two-circuit or three-circuit switch.

Informational Note: See 210.7 for disconnect requirements where more than one circuit supplies a switch.

406.240 General-Use Snap Switches, Dimmers, and Control Switches.

(A) Faceplates.
Faceplates provided for snap switches, dimmers, and control switches mounted in boxes and other enclosures shall be installed so as to completely cover the opening and, where the switch is flush mounted, seat against the finished surface.

(B) Grounding.
Snap switches, dimmers, and control switches shall be connected to an equipment grounding conductor and shall provide a means to connect metal faceplates to the equipment grounding conductor, whether or not a metal faceplate is installed. Metal faceplates shall be bonded to the equipment grounding conductor. Snap switches, dimmers, control switches, and metal faceplates shall be connected to an equipment grounding conductor using either of the following methods:

(1) The switch is mounted with metal screws to a metal box or metal cover that is connected to an equipment grounding conductor or to a nonmetallic box with integral means for connecting to an equipment grounding conductor.

(2) An equipment grounding conductor or equipment bonding jumper is connected to an equipment grounding termination of the snap switch.

Exception No. 1: Where no means exists within the enclosure for bonding to the equipment grounding conductor, or where the wiring method does not include or provide an equipment grounding conductor, a snap switch without a connection to an equipment grounding conductor shall be permitted for replacement purposes only. A snap switch wired under the provisions of this exception and located within 2.5 m (8 ft) vertically, or 1.5 m (5 ft) horizontally, of ground or exposed grounded metal objects shall be provided with a faceplate of nonconducting noncombustible material with nonmetallic attachment screws, unless the switch mounting strap or yoke is nonmetallic or the circuit is protected by a ground-fault circuit interrupter.

Exception No. 2: Listed kits or listed assemblies shall not be required to be bonded to an equipment grounding conductor if all of the following conditions are met:

Commented [KCS51]: Relocated from 404.7. "Circuit breakers and molded case switches" retained in Article 404.

Commented [KCS52]: Relocated from 404.8.
"circuit breakers" retained in 404.
404.8 (A)1 and (A)3 retained in 404.
404.8(A)2 was modified by removing "circuit breaker" and renumbered as 406.19(A)(1).

Commented [TBL53]: Format changed since we only have one item. Format to comply style manual.

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Commented [KCS54]: Relocated from 404.9

(1) The device is provided with a nonmetallic faceplate, and the device is designed such that no metallic faceplate replaces the one provided.

(2) The device does not have mounting means to accept other configurations of faceplates.

(3) The device is equipped with a nonmetallic yoke.

(4) All parts of the device that are accessible after installation of the faceplate are manufactured of nonmetallic materials.

Exception No. 3: A snap switch with integral nonmetallic enclosure complying with 300.15(E) shall be permitted without a bonding connection to an equipment grounding conductor.

(C) Construction.
Metal faceplates shall be of ferrous metal not less than 0.76 mm (0.030 in.) in thickness or of nonferrous metal not less than 1.02 mm (0.040 in.) in thickness. Faceplates of insulating material shall be noncombustible and not less than 2.54 mm (0.100 in.) in thickness, but they shall be permitted to be less than 2.54 mm (0.100 in.) in thickness if formed or reinforced to provide adequate mechanical strength.

406.~~42~~21 Mounting of General-Use Snap Switches, Dimmers, and Control Switches.

Commented [KCS55]: Relocated from 404.10

(A) Surface Type.
General-use snap switches, dimmers, and control switches used with open wiring on insulators shall be mounted on insulating material that separates the conductors at least 13 mm (1/2 in.) from the surface wired over.

(B) Box Mounted.
Flush-type general-use snap switches, dimmers, and control switches mounted in boxes that are set back of the finished surface as permitted in 314.20 shall be installed so that the extension plaster ears are seated against the surface. Flush-type devices mounted in boxes that are flush with the finished surface or project from it shall be installed so that the mounting yoke or strap of the device is seated against the box. Screws used for the purpose of attaching a device to a box shall be of the type provided with a listed device, or shall be machine screws having 32 threads per inch or part of listed assemblies or systems, in accordance with the manufacturer's instructions.

406.~~42~~22 Grounding of Enclosures.

Commented [KCS56]: Relocated from 404.12. "circuit breakers" retained in 404.

Metal enclosures for switches shall be connected to an equipment grounding conductor as specified in Part IV of Article 250. Metal enclosures for switches used as service equipment shall comply with the provisions of Part V of Article 250. Where nonmetallic enclosures are used with metal raceways or metal-armored cables, they shall comply with 314.3, Exception No. 1 or No. 2.

Except as covered in 404.~~40~~9(B), Exception No. 1, nonmetallic boxes for switches shall be installed with a wiring method that provides or includes an equipment grounding conductor.

406.~~46~~23 Rating and Use of Switches

Commented [KCS57]: Relocated from 404.14

Switches shall be listed and marked with their ratings. Switches of the types covered in 406.~~46~~23(A) through (~~E~~F) shall be limited to the control of loads as specified accordingly. Switches used to control cord-and-plug-connected loads shall be limited as covered in 406.~~462~~34(~~F~~G).

Informational Note No. 1: See 600.6 for switches for signs and outline lighting.

Informational Note No. 2: See 430.83, 430.109, and 430.110 for switches controlling motors.

(A) Alternating-Current General-Use Snap Switch.

This form of switch shall only be used on ac circuits and used for controlling the following:

(1) Resistive and inductive loads not exceeding the ampere rating of the switch at the voltage applied

(2) Tungsten-filament lamp loads not exceeding the ampere rating of the switch at 120 volts

(3) Electric discharge lamp loads not exceeding the marked ampere and voltage rating of the switch

(4) Motor loads not exceeding 80 percent of the ampere rating of the switch at its rated voltage

(5) Electronic ballasts, self-ballasted lamps, compact fluorescent lamps, and LED lamp loads with their associated drivers, not exceeding 20 amperes and not exceeding the ampere rating of the switch at the voltage applied

(B) Alternating-Current or Direct-Current General-Use Snap Switch.

This form of switch shall be permitted on either ac or dc circuits and used only for controlling the following:

(1) Resistive loads not exceeding the ampere rating of the switch at the voltage applied.

(2) Inductive loads not exceeding 50 percent of the ampere rating of the switch at the applied voltage. Switches rated in horsepower are suitable for controlling motor loads within their rating at the voltage applied.

(3) Tungsten-filament lamp loads not exceeding the ampere rating of the switch at the applied voltage if T-rated.

(4) Electronic ballasts, self-ballasted lamps, compact fluorescent lamps, and LED lamp loads with their associated drivers, not exceeding the ampere rating of the switch at the voltage applied.

~~**(C) CO/ALR Snap Switches.**~~

~~Snap switches directly connected to aluminum conductors and rated 20 amperes or less shall be marked CO/ALR.~~

Commented [TBL58]: Relocated to 406.10(2).

(CD) Snap Switch Terminations.

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.

(DE) Alternating-Current General-Use Snap Switches Rated for 347 Volts.

This form of switch shall not be rated less than 15 amperes at a voltage of 347 volts ac, and they shall not be readily interchangeable in box mounting with switches covered in 404.14(A) and (B). These switches shall be used only for controlling any of the following:

(1) Noninductive loads other than tungsten-filament lamps not exceeding the ampere and voltage ratings of the switch.

(2) Inductive loads not exceeding the ampere and voltage ratings of the switch. Where particular load characteristics or limitations are specified as a condition of the listing, those restrictions shall be observed regardless of the ampere rating of the load.

(3) Electronic ballasts, self-ballasted lamps, compact fluorescent lamps, and LED lamp loads with their associated drivers, not exceeding 20 amperes and not exceeding the ampere rating of the switch at the voltage applied.

(EF) Dimmer and Electronic Control Switches.

General-use dimmer switches and electronic control switches, such as timing switches and occupancy sensors, shall be used only to control permanently connected loads, such as incandescent luminaires, unless listed for the control of other loads and installed accordingly. They shall be marked by their manufacturer with their current and voltage ratings and used for loads that do not exceed their ampere rating at the voltage applied.

(FG) Cord- and-Plug-Connected Loads.

Where a snap switch or control device is used to control cord-and-plug-connected equipment on a general-purpose branch circuit, each snap switch or control device controlling receptacle outlets or cord connectors that are supplied by permanently connected cord pendants shall be rated at not less than the rating of the maximum permitted ampere rating or setting of the overcurrent device protecting the receptacles or cord connectors, as provided in 210.21(B).

Informational Note: See 210.50(A) and 400.10(A)(1) for equivalency to a receptacle outlet of a cord connector that is supplied by a permanently connected cord pendant.

Exception: Where a snap switch or control device is used to control not more than one receptacle on a branch circuit, the switch or control device shall be permitted to be rated at not less than the rating of the receptacle.

406.4824 Marking

(A) Ratings.
Switches shall be marked with the current, voltage, and, if horsepower rated, the maximum rating for which they are designed.

(B) Off Indication.
Where in the off position, a switching device with a marked OFF position shall completely disconnect all ungrounded conductors to the load it controls.

406.5025 Electronic Control Switches

Electronic control switches shall be listed. Electronic control switches shall not introduce current on the equipment grounding conductor during normal operation.

Exception: Electronic control switches that introduce current on the equipment grounding conductor shall be permitted for applications covered by 404.302(C), Exception. Electronic control switches that introduce current on the equipment grounding conductor shall be listed and marked for use in replacement or retrofit applications only.

Commented [KCS59]: Relocated from 404.20

Commented [KCS60]: Relocated from 404.22

Public Input No. 3713-NFPA 70-2023 [New Section after 406.2]

406.2 Listing Requirements.

Receptacles shall be listed. All attachement plugs, cord connectors, and flanged surface devices (inlets and outlets) shall be listed. Single-pole separable connectors shall be listed and labelled.

Statement of Problem and Substantiation for Public Input

The requirements for listing are relocated from 406.3, 406.7, and 406.13 for compliance with the NEC Style Manual Section 2.2.1.

Submitter Information Verification

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Submittal Date: Tue Sep 05 14:37:01 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-7915-NFPA 70-2024
Statement: The requirements for listing are relocated from Sections 406.3, 406.7, and 406.13 for compliance with the NEC Style Manual Section 2.2.1.

Article reference numbers change throughout the entire article.

Public Input No. 2607-NFPA 70-2023 [Section No. 406.2]

406. ~~2~~ **3** Reconditioned Equipment.

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

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to comply with the NEC Style Manual Section 2.2.1 regarding reconditioned equipment.
2.2.1 Parallel Numbering Required. Technical committees shall use the following section numbers for the same purposes within articles. This requirement shall not apply to Articles 90, 100, and 110. If the article does not contain listing or reconditioning requirements, the subdivisions shall not be included in the article.
Required Parallel Numbering Format
XXX.1 Scope.
XXX.2 Listing Requirements.
XXX.3 Reconditioned Equipment.
XXX.3(A) Permitted to be Installed.
XXX.3(B) Not Permitted to be Installed.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

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Zip:
Submittal Date: Wed Aug 23 19:57:42 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8815-NFPA 70-2024
Statement: The term “permitted” was replaced with “installed” for consistency with NEC Style Manual section 2.2.1.1.

Public Input No. 3706-NFPA 70-2023 [Section No. 406.2]

406.~~2~~ 3 Reconditioned Equipment.

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

Statement of Problem and Substantiation for Public Input

The section should be relocated to 406.3 for compliance with the NEC Style Manual Section 2.2.1.

Submitter Information Verification

Submitter Full Name: Derrick Atkins
Organization: Minneapolis Electrical JATC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Sep 05 14:29:41 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-7914-NFPA 70-2024

Statement: The present scope of Article 404 address 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.

Article 404 scope should be modified to only cover general-use switches, motor-circuit switches, isolating switches, circuit breakers used as switches, and molded case switches. Other types of switches that fit outside of the modified scope of Article 404, i.e., general-use snap switch, pendant switch, surface switch, dimmer, and electronic control switches, and lighting control switches are relocated to Article 406.

This relocation is logical as these types of switches (also referred to as ‘wiring devices’) are installed similar to how receptacles are installed. It should also be noted that the Standard for Electrical Equipment Maintenance, NFPA 70B, currently has “Wiring Devices” in Chapter 24 and “Switches” in Chapter 17. This revision would create a similar alignment of requirements. This revision will improve usability of Article 404 Switches and facilitate the reassignment of switches to CMP’s with the right focus for the equipment (namely, CMP-18 for ‘wiring devices’ and CMP-10 for larger switches). Additionally, operating at voltages not over 1000 volts ac, 1500 volts dc, nominal was introduced to clarify what is meant by unless specifically referenced elsewhere in this code for higher voltages and for consistency with other parts of the code where 1500 volts dc is used.

Public Input No. 3705-NFPA 70-2023 [Section No. 406.3]

406.3 ~~–~~ **XX** Receptacle Rating and Type.

(A) Receptacles.

Receptacles shall be listed and marked with the manufacturer's name or identification and voltage and ampere ratings.

(B) Rating.

Receptacles and cord connectors shall be rated not less than 15 amperes, 125 volts, or 15 amperes, 250 volts, and shall be of a type not suitable for use as lampholders.

Informational Note: See 210.21(B) for receptacle ratings where installed on branch circuits.

(C) CO/ALR Receptacles.

Receptacles rated 20 amperes or less and designed for the direct connection of aluminum conductors shall be marked CO/ALR.

(D) 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.

(3) Receptacles installed using screwless terminals of the conductor push-in type construction (also known as *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.

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).

(E) Isolated Ground Receptacles.

Receptacles incorporating an isolated equipment grounding conductor connection intended for the reduction of electromagnetic interference as permitted in 250.146(D) shall be identified by an orange triangle located on the face of the receptacle.

(1) Isolated Equipment Grounding Conductor Required.

Receptacles so identified shall be used only with equipment grounding conductors that are isolated in accordance with 250.146(D).

(2) Installation in Nonmetallic Boxes.

Isolated ground receptacles installed in nonmetallic boxes shall be covered with a nonmetallic faceplate.

Exception: Where an isolated ground receptacle is installed in a nonmetallic box, a metal faceplate shall be permitted if the box contains a feature or accessory that permits the connection of the faceplate to the equipment grounding conductor.

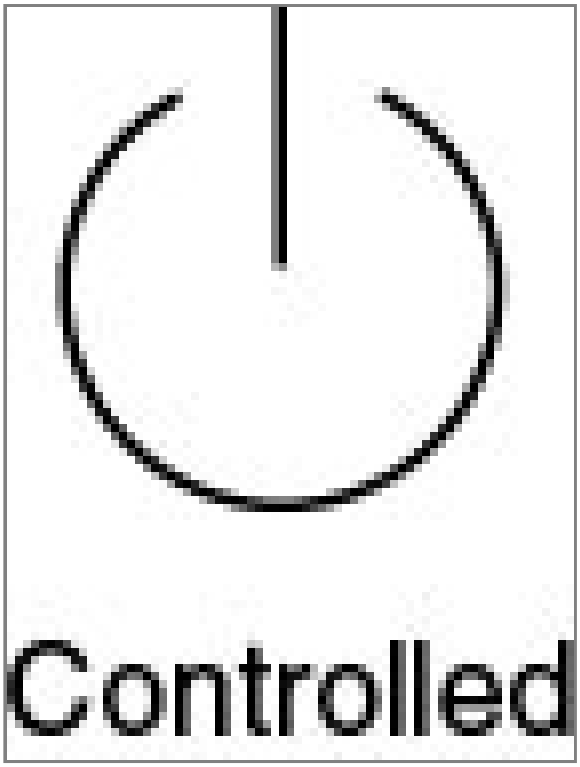
(F) Controlled Receptacle Marking.

All nonlocking-type, 125-volt, 15- and 20-ampere receptacles that are controlled by an automatic control device, or that incorporate control features that remove power from the receptacle for the purpose of energy management or building automation, shall be permanently marked with the symbol shown in Figure 406.3(F) and the word “controlled.”

For receptacles controlled by an automatic control device, the marking shall be located on the receptacle face and visible after installation.

In both cases where a multiple receptacle device is used, the required marking of the word “controlled” and symbol shall denote which contact device(s) are controlled.

Figure 406.3(F) Controlled Receptacle Marking Symbol.



Exception: The marking shall not be required for receptacles controlled by a wall switch that provide the required room lighting outlets as permitted by 210.70.

(G) Receptacle with USB Charger.

A 125-volt 15- or 20-ampere receptacle that additionally provides Class 2 power shall be listed and constructed such that the Class 2 circuitry is integral with the receptacle.

Statement of Problem and Substantiation for Public Input

The Section should be relocated for compliance with the NEC Style Manual Section 2.2.1.

Submitter Information Verification

Submitter Full Name: Derrick Atkins
Organization: Minneapolis Electrical JATC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Sep 05 14:28:39 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-7914-NFPA 70-2024

Statement: The present scope of Article 404 address 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.

Article 404 scope should be modified to only cover general-use switches, motor-circuit switches, isolating switches, circuit breakers used as switches, and molded case switches. Other types of switches that fit outside of the modified scope of Article 404, i.e., general-use snap switch, pendant switch, surface switch, dimmer, and electronic control switches, and lighting control switches are relocated to Article 406.

This relocation is logical as these types of switches (also referred to as ‘wiring devices’) are installed similar to how receptacles are installed. It should also be noted that the Standard for Electrical Equipment Maintenance, NFPA 70B, currently has “Wiring Devices” in Chapter 24 and “Switches” in Chapter 17. This revision would create a similar alignment of requirements. This revision will improve usability of Article 404 Switches and facilitate the reassignment of switches to CMP’s with the right focus for the equipment (namely, CMP-18 for ‘wiring devices’ and CMP-10 for larger switches). Additionally, operating at voltages not over 1000 volts ac, 1500 volts dc, nominal was introduced to clarify what is meant by unless specifically referenced elsewhere in this code for higher voltages and for consistency with other parts of the code where 1500 volts dc is used.

Public Input No. 4297-NFPA 70-2023 [Section No. 406.3]

406.3 Receptacle Rating and Type.

(A) Receptacles.

Receptacles shall be listed and marked with the manufacturer's name or identification and voltage and ampere ratings.

(B) Rating.

Receptacles and cord connectors shall be rated not less than 15 amperes, 125 volts, or 15 amperes, 250 volts, and shall be of a type not suitable for use as lampholders.

Informational Note: See 210.21(B) for receptacle ratings where installed on branch circuits.

(C) CO/ALR Receptacles.

Receptacles rated 20 amperes or less and designed for the direct connection of aluminum conductors shall be marked CO/ALR.

(D) 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.

(3) Receptacles installed using screwless terminals of the conductor push-in type construction (also known as *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.

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).

(E) Isolated Ground Receptacles.

Receptacles incorporating an isolated equipment grounding conductor connection intended for the reduction of electromagnetic interference as permitted in 250.146(D) shall be identified by an orange triangle located on the face of the receptacle.

(1) Isolated Equipment Grounding Conductor Required.

Receptacles so identified shall be used only with equipment grounding conductors that are isolated in accordance with 250.146(D).

(2) Installation in Nonmetallic Boxes.

Isolated ground receptacles installed in nonmetallic boxes shall be covered with a nonmetallic faceplate.

Exception: Where an isolated ground receptacle is installed in a nonmetallic box, a metal faceplate shall be permitted if the box contains a feature or accessory that permits the connection of the faceplate to the equipment grounding conductor.

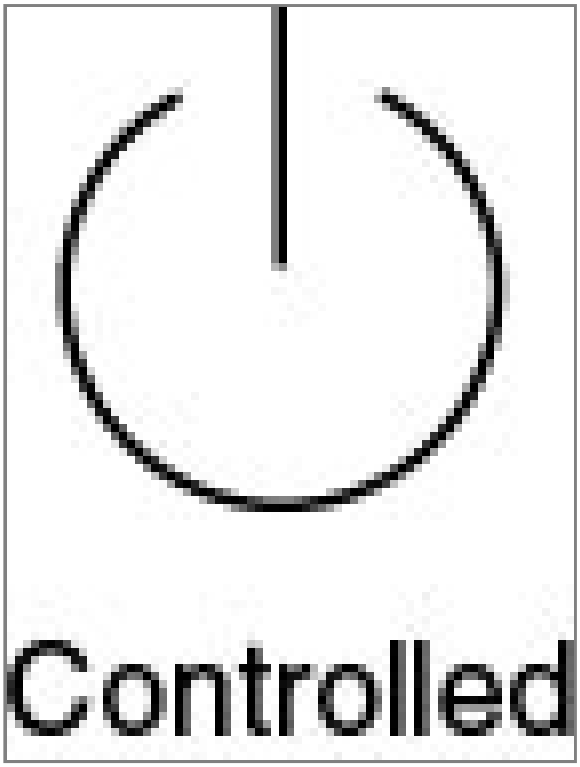
(F) Controlled Receptacle Marking.

All nonlocking-type, 125-volt, 15- and 20-ampere receptacles that are controlled by an automatic control device, or that incorporate control features that remove power from the receptacle for the purpose of energy management or building automation, shall be permanently marked with the symbol shown in Figure 406.3(F) and the word “controlled.”

For receptacles controlled by an automatic control device, the marking shall be located on the receptacle face and visible after installation.

In both cases where a multiple receptacle device is used, the required marking of the word “controlled” and symbol shall denote which contact device(s) are controlled.

Figure 406.3(F) Controlled Receptacle Marking Symbol.



Exception: The marking shall not be required for receptacles controlled by a wall switch that provide the required room lighting outlets as permitted by 210.70.

(G) Receptacle with USB Charger.

Exception: The Class 2 circuitry shall not be required to be integral with the receptacle if the housing, including covers and faceplates, complies with UL 62368-1 fire enclosure requirements with 5VA rated plastic materials, the power supply compartment has no openings to the exterior when all covers are in place and the entire assembly shall be listed by an OSHA NRTL.

A 125-volt 15- or 20-ampere receptacle that additionally provides Class 2 power shall be listed and constructed such that the Class 2 circuitry is integral with the receptacle.

Additional Proposed Changes

File Name	Description	Approved
JB_Cables_Outlet_s_.png	Product Picture	
JB_Cables_Outlet_Breakout.png	Breakout Picture	
JB_Cables_Spool_Housing_Breakout.png	Breakout Picture 2	

Statement of Problem and Substantiation for Public Input

The proposed exception allows for innovative receptacle and charging device products that will enhance the ability of end users to charge their devices and utilize receptacles. The design of the JB Cables product is

built around UL standards that achieve this innovation while maintaining safety. All products should still be listed by an OSHA NRTL that has verified this safety.

Submitter Information Verification

Submitter Full Name: Brennan Tucker
Organization: JB Cables
Street Address:
City:
State:
Zip:
Submittal Date: Thu Sep 07 10:12:19 EDT 2023
Committee: NEC-P18

Committee Statement

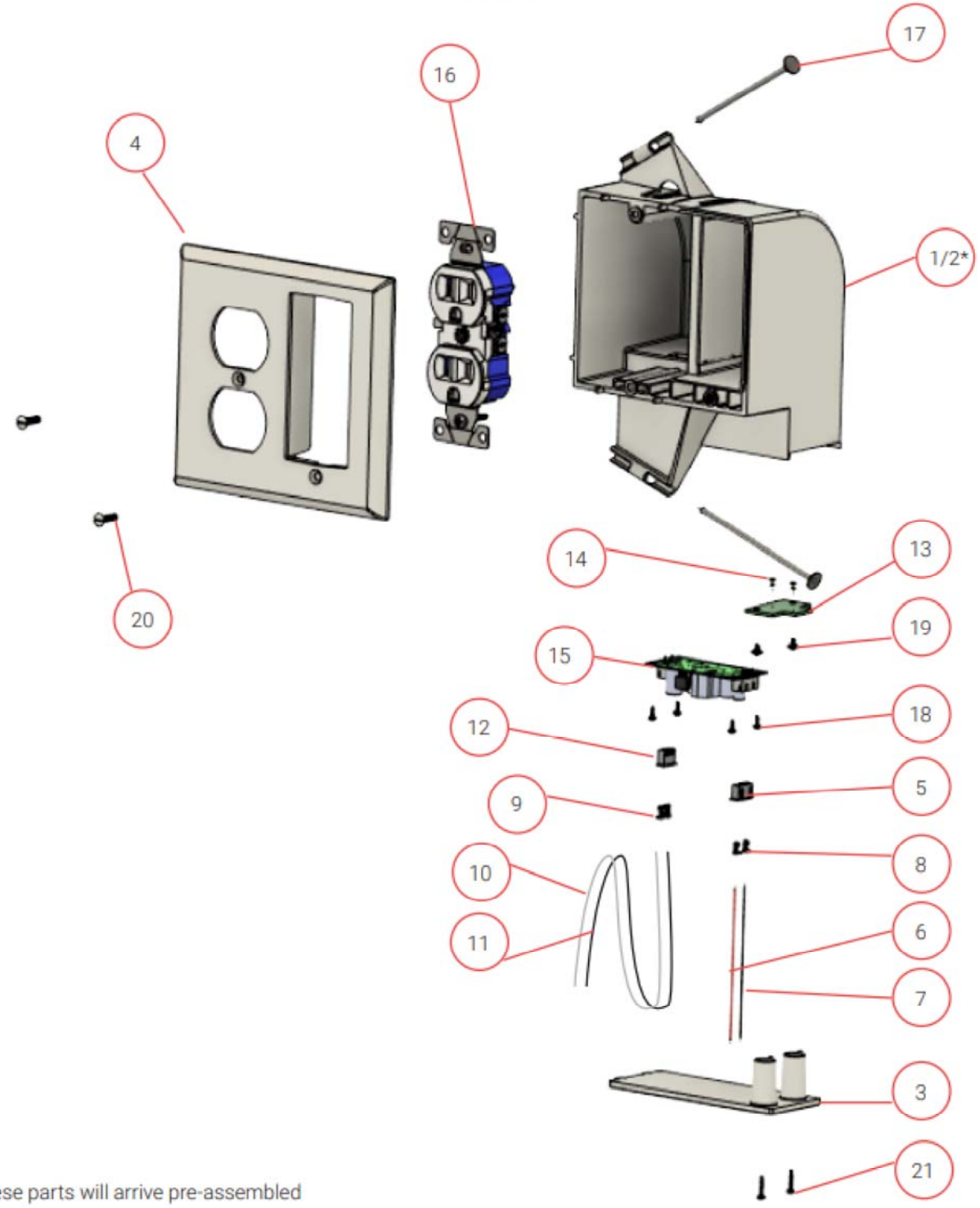
Resolution: The construction described and photos are not a receptacle with an integral USB. The description and photos appears to be an assembly of various devices cover plate, outlet box, receptacle, and USB power supply/cord reel and are not prohibited by current requirements

JB Cables Outlet
(Duplex Receptacle and Charging Cable)

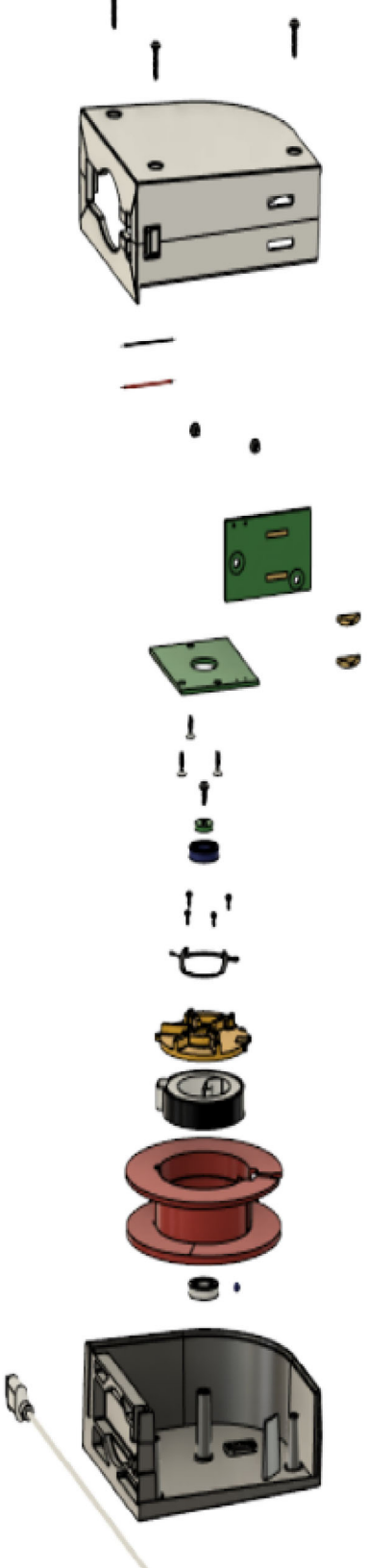
New Work Housing

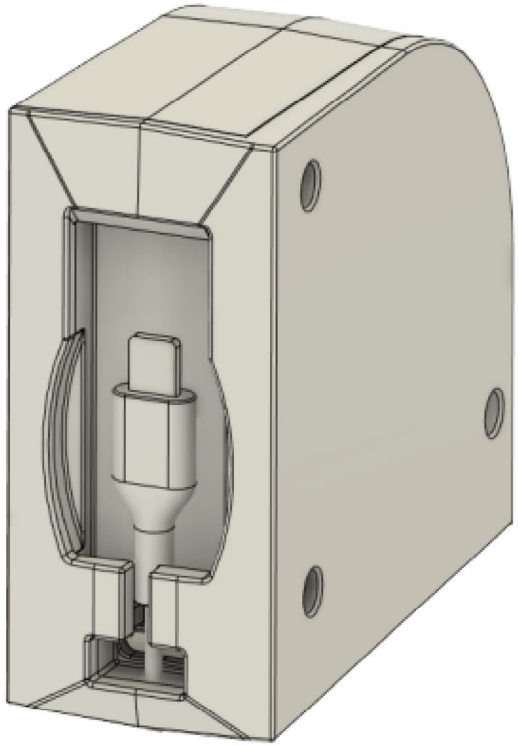
Old Work Housing

NEW WORK BOX EXPLODED VIEW



*These parts will arrive pre-assembled





Public Input No. 3712-NFPA 70-2023 [Section No. 406.3(A)]

(A) Receptacles.

Receptacles shall ~~be listed and marked~~ be marked with the manufacturer's name or identification and voltage and ampere ratings.

Statement of Problem and Substantiation for Public Input

The listing requirement should be relocated to 406.2 for compliance with the NEC Style Manual Section 2.2.1.

Submitter Information Verification

Submitter Full Name: Derrick Atkins
Organization: Minneapolis Electrical JATC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Sep 05 14:35:49 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-7918-NFPA 70-2024
Statement: The phrase "listed and" was removed to comply with NEC Style Manual section 2.2.1, which coincides with the proposed new 406.2 for listing requirements.

Public Input No. 909-NFPA 70-2023 [Section No. 406.3(C)]

(C) CO/ALR Receptacles.

Receptacles rated 20 amperes or less and designed for the direct connection of aluminum conductors shall be marked CO/ALR.

Labeling requirements for presence of aluminum branch wiring. All CO/ALR devices must be labeled on the surrounding surface facing out, and on the backside of the receptacle cover, making the presence of aluminum branch wiring know to anyone who attemps to access this connection for future maintenance or repairs.

Additional Proposed Changes

File Name	Description	Approved
Alumiware_12_4_18_sticker_drawing_with_spanish_12.4.18.pdf	proposed label for warning of the presence of aluminum branch wiring.	
pic_2_outlet.jpg	picture of label in use at outlet location	

Statement of Problem and Substantiation for Public Input

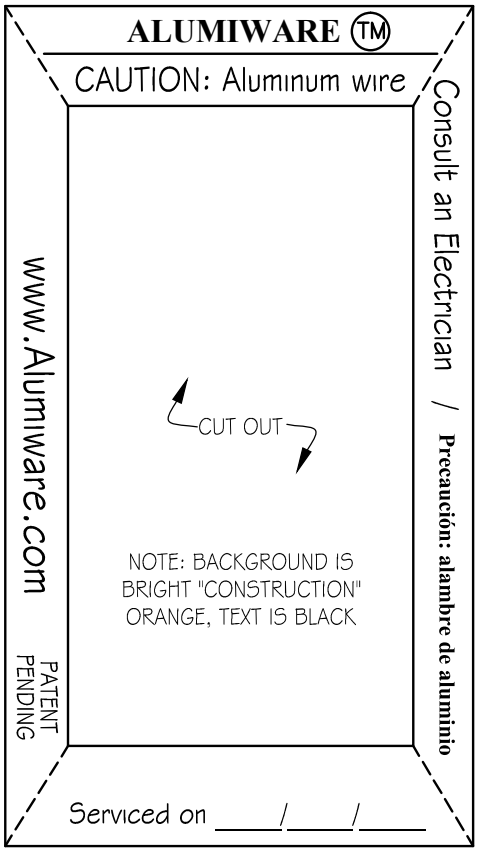
This input seeks to prevent mishandling of aluminum wiring conditions, when nonprofessionals seek to make repairs and/or receptacle changes without proper knowledge of aluminum wiring requirements. Many "do it yourself" homeowners, and amateur handymen will attempt to make repairs, when ignorant of aluminum wire conditions or hazards. This label will add an additional level of protection against incorrect material being used for repairs and modifications.

Submitter Information Verification

Submitter Full Name: Matthew Kirvan
Organization: Matthew Kirvan
Street Address:
City:
State:
Zip:
Submittal Date: Tue May 30 12:28:38 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: An additional label placed within the outlet box to advise a non-professional and/or unqualified person about the potential safety hazards when terminating aluminum conductors will not improve safety. There is no data to support this claim. The proposed requirement to identify aluminum branch circuit wiring is more appropriate for chapter 3 Wiring Methods.



SCALE: 1 : 1	ALUMIWARE LABEL FOR ALUMINUM WIRING DEVICES PATENT PENDING
DATE: 12/4/18	Matthew Kirvan, 4515 Roxbury Dr., Bethesda, MD 20814, 301-512-8928

Public Input No. 2161-NFPA 70-2023 [Section No. 406.3(D)]

~~(D)~~ ~~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.~~

(3) ~~Receptacles installed using screwless terminals of the conductor push-in type construction (also known as *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.~~

~~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).~~

Additional Proposed Changes

File Name	Description	Approved
NEC_article_406.3_D_Receptacle_PI.docx	PI for article 406.3(D)	

Statement of Problem and Substantiation for Public Input

Substantiation: (1) and (2) were reversed for clarity to the reader. For (1): "terminated directly" was added to clarify that a receptacle terminal can be in direct contact with any of the identified conductor types. (2) was also revised to clarify that receptacles not marked CO/ALR are not intended for direct connection to aluminum conductor. (2) was also revised for clarity and consistency with NEC 110.3(B) manufacturers' instruction. (3) was revised for consistency with the product listing standard.

Submitter Information Verification

Submitter Full Name: Ralph Baldwin
Organization: Legrand
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 14 10:17:05 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8816-NFPA 70-2024

Statement: These changes are intended to clarify that aluminum conductors may not be used unless the device is marked "CO/ALR". The current paragraph uses confusing reverse language stating that if not marked CO/ALR they may only be used with copper and copper-clad wiring. Unfortunately, this is being misinterpreted in the field that copper and copper-clad wire may be

used interchangeably.

The intent of the code was to address the use of aluminum wire. These revisions use clear and positive language.

Many manufacturers mark their devices copper wire only and many also mark copper and copper-clad. There are many factors manufacturers consider in making this determination including type of termination, solid or stranded wire, etc. Any device must be used in accordance with the manufacturer's markings and instructions to assure safe use and compliance with this code.

To improve the language, (1) and (2) were reversed to provide clarity to the reader.

For (1): directly terminated was added to clarify that a receptacle terminal can be in direct contact with any of the identified conductor types.

(2) was revised to clarify that receptacles not marked “CO/ALR” are prohibited from direct connection to aluminum conductor.

(1) and (2) were further revised for clarity and consistency with Article 110.3(B) that requires equipment installation to be in accordance with manufacturers’ instructions.

(3) was revised for consistency with the product listing standard.

Date was added to the informational note reference to comply with NFPA Regulations.

Article 406.3(D)

D) Receptacle Terminations.

Receptacle terminations shall be in accordance with the following:

(1) ~~(2)~~
A receptacle ~~Terminals~~ marked CO/ALR shall be permitted to terminate directly to ~~be used with~~ aluminum, copper, or ~~and~~ copper-clad aluminum conductors in accordance with the branch circuit conductor size (AWG) identified by the manufacturers' instruction.

(2) ~~(1)~~
~~Terminals of 15-ampere and 20-ampere~~ A receptacle~~s~~ not marked CO/ALR shall not be permitted to terminate directly to ~~be used with copper and copper-clad~~ aluminum conductors. ~~only~~. These terminals shall be permitted to terminate directly to conductors other than aluminum in accordance with the branch circuit conductor size (AWG) and type identified by the manufacturers' instruction.

(3)

Receptacles installed using screwless terminals of the conductor push-in type construction (also known as *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~~.

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).

Public Input No. 2189-NFPA 70-2023 [Section No. 406.3(D)]

(D) Receptacle Terminations.

Receptacle terminations shall be in accordance with the following:

- ~~Terminals of 15-ampere and 20-ampere receptacles not marked CO/ALR shall be used with copper and copper-clad aluminum conductors only.~~
- ~~Terminals marked CO/ALR shall be permitted to be used with aluminum, copper, and copper-clad aluminum conductors.~~
- ~~Receptacles installed using screwless terminals of the conductor push-in type construction (also known as *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.~~

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).

Additional Proposed Changes

File Name	Description	Approved
NECproposal_to_406.3_D_LUTZ.docx	Proposed changes to 406.3(D) (1), (2) and (3)	

Statement of Problem and Substantiation for Public Input

The intent of 406.3(D) is to clarify that aluminum conductors may NOT be used unless the device is marked CO/ALR. The current paragraph uses confusing reverse language stating that if not marked CO/ALR they may only be used with copper and copper-clad wiring. Unfortunately this is being misinterpreted in the field that copper and copper-clad wire may be used interchangeably. The intent of the code was to address the use of aluminum wire. Proposed revision uses a clear positive statement
Many manufacturers mark their devices copper wire only and many also mark copper and copper-clad. There are many factors manufacturers consider in making this determination including type of termination, solid or stranded wire, etc. Any device MUST be used in accordance with the manufacturer's markings and instructions to assure safe use and compliance with this code.

(1) and (2) were reversed to improve clarity to the reader. For (1): terminated directly was added to clarify that a receptacle terminal can be in direct contact with any of the identified conductor types. (2) was revised to clarify that receptacles not marked CO/ALR are prohibited from direct connection to aluminum conductor. (1) and (2) were further revised for clarity and consistency with Article 110.3(B) that requires equipment installation to be in accordance with manufacturers' instruction. (3) was revised for consistency with the product listing standard.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2194-NFPA 70-2023 [Section No. 404.14(D)]	
Public Input No. 2194-NFPA 70-2023 [Section No. 404.14(D)]	

Submitter Information Verification

Submitter Full Name: David Lutz

Organization: Hubbell
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 14 13:35:07 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8816-NFPA 70-2024

Statement: These changes are intended to clarify that aluminum conductors may not be used unless the device is marked “CO/ALR”. The current paragraph uses confusing reverse language stating that if not marked CO/ALR they may only be used with copper and copper-clad wiring. Unfortunately, this is being misinterpreted in the field that copper and copper-clad wire may be used interchangeably.

The intent of the code was to address the use of aluminum wire. These revisions use clear and positive language.

Many manufacturers mark their devices copper wire only and many also mark copper and copper-clad. There are many factors manufacturers consider in making this determination including type of termination, solid or stranded wire, etc. Any device must be used in accordance with the manufacturer's markings and instructions to assure safe use and compliance with this code.

To improve the language, (1) and (2) were reversed to provide clarity to the reader.

For (1): directly terminated was added to clarify that a receptacle terminal can be in direct contact with any of the identified conductor types.

(2) was revised to clarify that receptacles not marked “CO/ALR” are prohibited from direct connection to aluminum conductor.

(1) and (2) were further revised for clarity and consistency with Article 110.3(B) that requires equipment installation to be in accordance with manufacturers’ instructions.

(3) was revised for consistency with the product listing standard.

Date was added to the informational note reference to comply with NFPA Regulations.

NEC proposal to article 406.3(D) **D Lutz** 8/14/2023

Submitted by deleting Items (1), (2), and (3) and submitting below as " Additional Proposed Change" TerraView would not allow proper editing.

PROPOSED REVISION

Article 406.3(D)

D) Receptacle Terminations

Receptacle terminations shall be in accordance with the following:

(1) ~~(2)~~ A receptacle ~~Terminals~~ marked CO/ALR shall be permitted to terminate directly to ~~be used with~~ aluminum, copper, or ~~and~~ copper-clad aluminum conductors in accordance with the branch circuit conductor size (AWG) identified by the manufacturers' instruction.

(2) ~~(1)~~ ~~Terminals of 15-ampere and 20-ampere~~ A receptacle~~s~~ not marked CO/ALR shall not be permitted to terminate directly to ~~be used with copper and copper-clad~~ aluminum conductors. ~~only~~. These terminals shall be permitted to terminate directly to conductors other than aluminum in accordance with the branch circuit conductor size (AWG) and type identified by the manufacturers' instruction.

(3) Receptacles installed using screwless terminals of the conductor push-in type construction (also known as *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~~.

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).

SUBSTANTIATION:

(1) and (2) were reversed to improve clarity to the reader. For (1): terminated directly was added to clarify that a receptacle terminal can be in direct contact with any of the identified conductor types. (2) was revised to clarify that receptacles not marked CO/ALR are prohibited from direct connection to aluminum conductor. (1) and (2) were further revised for clarity and consistency with Article 110.3(B) that requires equipment installation to be in accordance with manufacturers' instruction. (3) was revised for consistency with the product listing standard.

Public Input No. 365-NFPA 70-2023 [Section No. 406.3(D)]

(D) 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.

(3) Receptacles installed using screwless terminals of the conductor push-in type construction with or without locking levers (also known as *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.

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).

Statement of Problem and Substantiation for Public Input

New devices are coming to market with 'locking levers' to fasten or bind conductor to the push-in terminals. Adding 'with or without locking levers' closes the loop for a potential loophole when installers are terminating these devices. They can't say, "locking lever type isn't in the code," so I can 'backstab' all these devices with 12 gauge stranded if I want to.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 366-NFPA 70-2023 [Section No. 404.14(D)]	

Submitter Information Verification

Submitter Full Name: Jacob Riddle
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Tue Feb 21 17:05:17 EST 2023
Committee: NEC-P18

Committee Statement

Resolution: What is identified as "with or without locking levers" are not "push-in " type terminal constructions but rather 'spring action" type terminals. The levers do not provide locking action on conductors. See informational note. Locking levers are called "spring-action" type terminals and are used in a variety of wiring device products, including wire connectors, receptacles, switches, etc. Many receptacles employ "spring-action" terminals which are permitted by the UL 498 Standard for Attachment Plugs and Receptacles and are not restricted to conductor size (AWG). "Push-in "terminal construction identified in the UL 498 Standard are limited in physical

size (conductor terminal opening) will only accept a No. 14 AWG solid copper only conductor size.

Public Input No. 1804-NFPA 70-2023 [Section No. 406.4(D)(2)]

(2) Non–Grounding-Type Receptacles.

Where attachment to an equipment grounding conductor does not exist in the receptacle enclosure, the installation shall comply with 406.4(D)(2)(a), (D)(2)(b), or (D)(2)(c).

(a) A non–grounding-type receptacle(s) shall be permitted to be replaced with another non–grounding-type receptacle(s).

(b) A non–grounding-type receptacle(s) shall be permitted to be replaced with a ground-fault circuit interrupter-type of receptacle(s). These receptacles or their cover plates shall be marked “No Equipment Ground.” ~~An equipment grounding conductor~~ A conductor of the wire type shall not be connected from the grounding terminal of the ground-fault circuit-interrupter-type receptacle to any outlet supplied from the ground-fault circuit-interrupter receptacle.

(c) A non–grounding-type receptacle(s) shall be permitted to be replaced with a grounding-type receptacle(s) where supplied through a ground-fault circuit interrupter. Where grounding-type receptacles are supplied through the ground-fault circuit interrupter, grounding-type receptacles or their cover plates shall be marked “GFCI Protected” and “No Equipment Ground,” visible after installation. ~~An equipment grounding conductor~~ A conductor of the wire type shall not be connected between the grounding terminals of the grounding -type receptacles.

Informational Note No. 1: Some equipment or appliance manufacturers require that the branch circuit to the equipment or appliance includes an equipment grounding conductor.

Informational Note No. 2: See 250.114 for a list of a cord-and-plug-connected equipment or appliances that require an equipment grounding conductor.

Additional Proposed Changes

File Name	Description	Approved
406.4_D_2_b_.pdf	406.4(D)(2)(b)+(c) revisions	

Statement of Problem and Substantiation for Public Input

Using the term "equipment grounding conductor" is incorrect in this application. Remember, the wiring method supplying power to the receptacle does not include an equipment grounding conductor! Therefore, there is no possible way that a wire connected between the grounding contacts of the GFCI receptacle and any other receptacles or outlets could possibly be considered an equipment grounding conductor. This wire provides no path for clearing fault currents, and is not connected to the system grounded conductor or the grounding electrode conductor. It is NOT an equipment grounding conductor as defined in Article 100! This wire does not quite meet the definition of a "bonding conductor" either, since these ungrounded metal parts are not required to be electrically connected. This revision is necessary to clarify this rule and eliminate the use of incorrect terminology. Please see attached PDF !

Submitter Information Verification

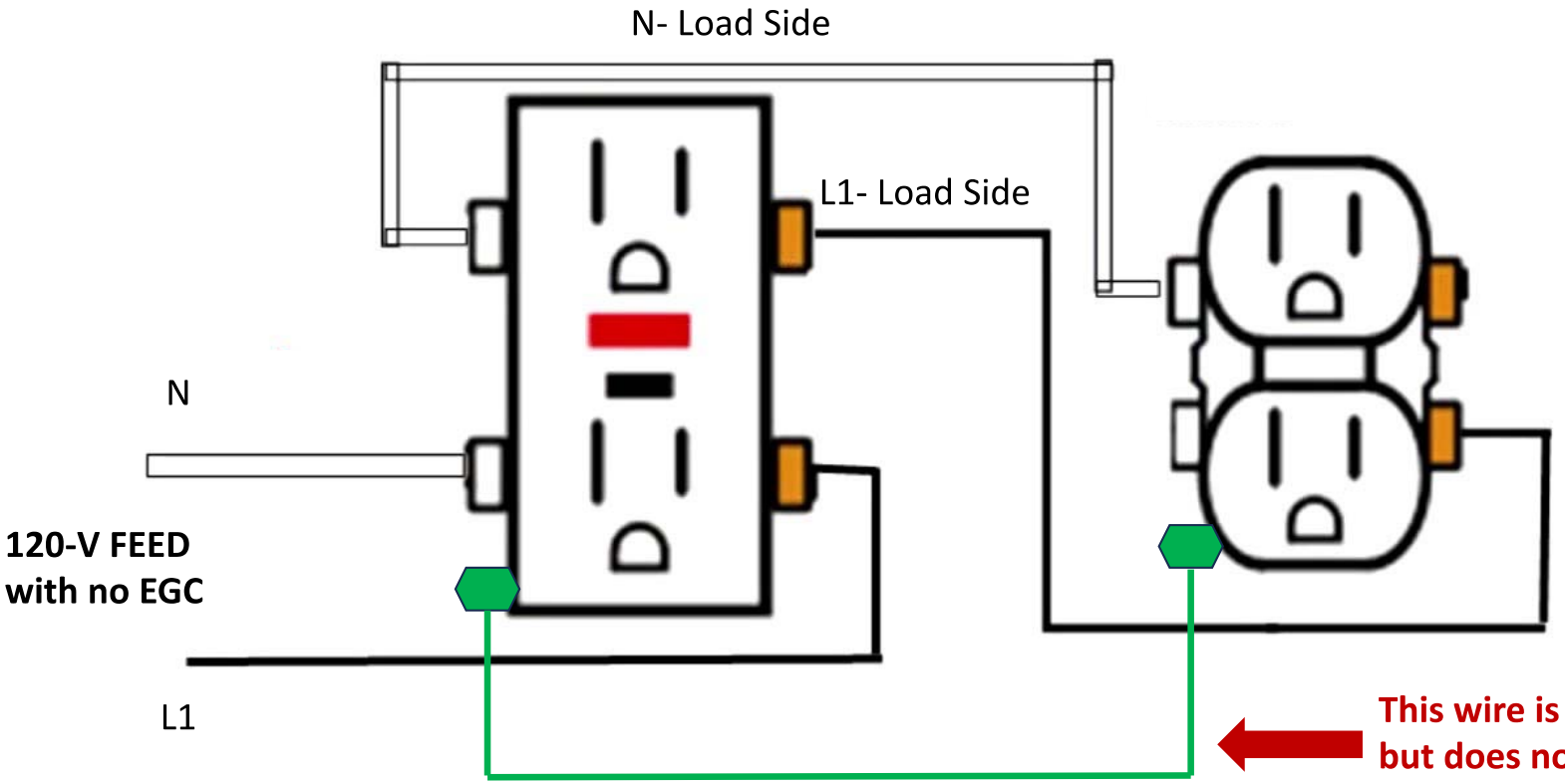
Submitter Full Name: Russ Leblanc
Organization: Leblanc Consulting Services
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 04 09:26:40 EDT 2023

Committee: NEC-P18

Committee Statement

Resolution: The suggested wording "a conductor of the wire type" does not improve the meaning of the requirement. Secondly, Section 406.(D)(2) is intended to address “non-grounding receptacle replacement”. For a replacement application, the branch circuit would not have a grounding conductor in the first place. If it did, a grounding type receptacle would be used instead for replacement.

406.4(D)(2)(b)+(c) Revisions



Public Input No. 1420-NFPA 70-2023 [Section No. 406.4(D)(3)]

(3) Ground-Fault Circuit-Interrupter Protection.

Ground-fault circuit-interrupter protection for receptacles shall be provided where replacements are made at receptacle outlets that are required to be so protected elsewhere in this *Code*. Ground-fault circuit interrupters shall be listed.

Exception 1 : Where the outlet box size will not permit the installation of the GFCI receptacle, the receptacle shall be permitted to be replaced with a new receptacle of the existing type, where GFCI protection is provided and the receptacle is marked "GFCI Protected" and "No Equipment Ground," in accordance with 406.4(D)(2)(a), (D)(2)(b), or (D)(2)(c), as applicable.

Exception 2: Where 3 wire nongrounding receptacles are replaced in existing circuits meeting the requirements of Art 250.140(B) and 250.142(B) Exception No. 1, GFCI protection shall not be required.

Statement of Problem and Substantiation for Public Input

Adding GFCI protection to a circuit utilizing the grounded conductor as means for a low impedance fault path will lead to unnecessary tripping if that appliance has any other unintended circuit from the frame of the appliance. For example, a 3-wire clothes dryer with a meal vent could be terminated onto conductive exterior siding. This siding could be grounding through inadvertent connections to exterior mounted service equipment, luminaires, receptacles, or other grounded metal enclosures. The same concern is present of 3 wire ranges. Any type of conductive back splash touching the range which could be grounded through another local appliance (such as a range hood or microwave) could lead to the same potential issue.

Submitter Information Verification

Submitter Full Name: Matt Bednarik
Organization: State of Iowa
Street Address:
City:
State:
Zip:
Submittal Date: Sat Jul 15 12:47:50 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: The cited Sections 250.140(B) and 250.142(B) require GFCI protection.

Public Input No. 1885-NFPA 70-2023 [Section No. 406.4(D)(3)]

(3) Ground-Fault Circuit-Interrupter Protection.

Ground-fault circuit-interrupter protection for receptacles shall be provided where replacements are made at receptacle outlets that are required to be so protected elsewhere in this *Code*. Ground-fault circuit interrupters shall be listed.

Exception: ~~Where the outlet box size will not permit the installation of the GFCI receptacle, the receptacle shall be permitted to be replaced with a new receptacle of the existing type, where GFCI protection is provided and the receptacle is marked "GFCI Protected" and "No Equipment Ground," in accordance with 406.4(D)(2)(a) , (D)(2)(b), or (D)(2)(c), as applicable~~ GFCI protection shall not be required for replacement receptacles for electric ranges, wall-mounted ovens, counter-mounted cooking units, and clothes dryers installed in accordance with 250.140(B) .

Statement of Problem and Substantiation for Public Input

First:

Delete the existing exception as it is simply superfluous. A GFCI-type of receptacle is not required anyways. Providing GFCI protection through a GFCI circuit breaker, or a faceless GFCI device or another GFCI-type of receptacle is already permitted. The present exception is not needed. And why would we be required to mark the receptacle "No Equipment Ground" if in fact there was an equipment grounding conductor present and connected to the receptacle? This makes absolutely no sense at all.

Second:

Include my proposed exception to provide relief for existing installations where GFCI protection would be incompatible with the existing wiring arrangement. It was recently brought to my attention that GFCI devices simply will not work on previously installed dryer receptacles where the frame is bonded to the neutral when the dryer incorporates a steam feature and is connected to a copper water line. The GFCI breaker will keep tripping since the bonded water line provides an additional path for neutral current. Metallic dryer vents and range vents may also provide an additional path for neutral current if these vents are bonded in multiple location to the electric system ground.
Forcing a rewire of an entire circuit instead of a simple receptacle replacement is overreaching especially for a circuit that was otherwise perfectly safe and Code-compliant as originally installed. Making a direct receptacle replacement without GFCI protection should be permitted in these instances.

The product standard for electric ranges, ovens , and cooktops (UL 858) and electric clothes dryers (UL 2158) still permits appliance grounding through the neutral-grounding link.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2004-NFPA 70-2023 [Section No. 250.114]	Using the neutral conductor instead of the EGC for equipment grounding

Submitter Information Verification

Submitter Full Name: Russ Leblanc
Organization: Leblanc Consulting Services
Street Address:
City:
State:

Zip:
Submittal Date: Mon Aug 07 06:19:28 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: The cited Sections 250.140(B) and 250.142(B) require GFCI protection.

Public Input No. 2180-NFPA 70-2023 [Section No. 406.4(D)(3)]

(3) Ground-Fault Circuit-Interrupter Protection.

Ground-fault circuit-interrupter protection for receptacles shall be provided where replacements are made at receptacle outlets that are required to be so protected elsewhere in this *Code*. Ground-fault circuit interrupters shall be listed.

Exception: Where the outlet box size will not permit the installation of the GFCI receptacle and if no electrically upstream outlet box will permit the installation of a GFCI receptacle and if a GFCI circuit breaker cannot provide required GFCI protection , the receptacle shall be permitted to be replaced with a new receptacle of the existing type, where GFCI protection is provided and the receptacle is marked "GFCI Protected" and "No Equipment Ground," in accordance with 406.4(D)(2)(a), (D)(2)(b), or (D)(2)(c), as applicable.

Statement of Problem and Substantiation for Public Input

Application of the exception should not be limited to the size of a single box size only. Code language should be added that requires consideration of upstream outlet boxes to accommodate the installation of a GFCI receptacle to provide downstream protection. Another option for providing GFCI protection is the use of a GFCI circuit breaker. Both of these additional options should be required before allowing the use of the exception.

Submitter Information Verification

Submitter Full Name: Gary Hein
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 14 12:43:33 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8817-NFPA 70-2024

Statement: Application of the exception should not be limited to the size of a single box size only. It should also consider upstream outlet boxes to accommodate the installation of a GFCI receptacle to provide downstream protection. Alternatively, another option for providing GFCI protection is the use of a GFCI circuit breaker. Both of these additional options should be required before allowing the use of the exception.

Additionally, the entire sentence "Ground -fault circuit interrupters shall be listed" was removed to comply with the NEC Style Manual, and coincides with the proposed addition of a new 406.2.

Public Input No. 2003-NFPA 70-2023 [Section No. 406.4(D)(4)]

(4) Arc-Fault Circuit-Interrupter Protection.

If a receptacle ~~located~~ supplied by a 120-volt, single-phase, 10-, 15-, or 20-ampere branch circuit, located in any areas specified in 210.12(~~A~~ B), (~~B~~ C), or (~~C~~ D) is replaced, a replacement receptacle at this outlet shall be one of the following:

(1) A listed outlet branch-circuit type AFCI receptacle

(2) A receptacle protected by a listed outlet branch-circuit type AFCI type receptacle

(3) A receptacle protected by a listed combination type AFCI circuit breaker

Exception: Section 210.12(E), Exception, shall not apply to replacement of receptacles.

Statement of Problem and Substantiation for Public Input

This revision is needed to clarify which areas and which replacement receptacles will trigger AFCI protection requirements. 210.12(A) should not be referenced since it specifies the "means" of AFCI protection but does not specify any "areas". The correct references are 210.12(B),(C), (D). Branch circuit voltage and amperages should also be specified in this section as well as 210.12 to minimize the possibility of misinterpreting which replacement receptacles will need AFCI protection. With the present wording, installers might mistakenly assume AFCI protection requirements also apply when replacing a 250-volt receptacle on a 240-volt circuit if located in any of the "areas" in 210.12(B)-(D). My proposed revision will help clarify the intent.

Submitter Information Verification

Submitter Full Name: Russ Leblanc
Organization: Leblanc Consulting Services
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 10 17:36:56 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-7927-NFPA 70-2024
Statement: Section 406.4(D)(4) is now Section 406.5(D)(4).

This revision clarifies which areas and which replacement receptacles will require AFCI protection requirements.

Section 210.12(A) should not be referenced since it specifies the "means" of AFCI protection but does not specify any "areas". The correct references are 210.12(B),(C), (D).

Branch circuit voltage and amperages should also be specified in this section as well as 210.12, to minimize the possibility of misinterpreting which replacement receptacles will need AFCI protection.

This change addresses the concern that installers might mistakenly assume AFCI protection requirements also apply when replacing a 250-volt receptacle on a 240-volt circuit, if located in any of the "areas" in 210.12(B)-(D).

Finally, “10- ampere receptacle branch circuit” was not included since it is not permitted based upon Article 210.

Public Input No. 2366-NFPA 70-2023 [Section No. 406.4(G)]

(G) Protection of Floor Receptacles.

Protection for floor receptacles shall be in accordance with the following:

(1) Physical protection of floor receptacles shall allow floor-cleaning equipment to be operated without damage to receptacles.

(2) All 125-volt, single-phase, 15- and 20-ampere floor receptacles installed in food courts and waiting spaces of passenger transportation facilities ~~where food or drinks are allowed~~ shall be GFCI protected.

Statement of Problem and Substantiation for Public Input

Deleting 'where food or drinks are allowed' from this requirement because that is very subjective language that is unenforceable for AHJ's. See NEC Style Manual section 3.2 which states "the documents shall not contain references or requirements that are unenforceable or vague."

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 16 14:56:52 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-7933-NFPA 70-2024
Statement: The text "where food or drinks are allowed" was removed to comply with the NEC Style Manual section 3.2 regarding vague and unenforceable language.

Public Input No. 2679-NFPA 70-2023 [Section No. 406.4 [Excluding any Sub-Sections]]

Receptacle outlets shall be located in branch circuits in accordance with ~~Part III of~~ Article 210 , Part III . General installation requirements shall be in accordance with 406.4(A) through (G).

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.
4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

Submitter Full Name: David Williams
Organization: Delta Charter Township
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 24 09:32:58 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-7935-NFPA 70-2024
Statement: The references have been revised to reference specific parts of articles to comply with the NEC Style Manual section 4.1.4.

Public Input No. 2280-NFPA 70-2023 [Section No. 406.5(A)]

(A) Boxes That Are Set Back.

Receptacles mounted in boxes that are set back from the finished surface as permitted in 314.20 shall be installed such that the mounting yoke or strap of the receptacle is held rigidly at the finished surface.

Exception: Receptacle(s) are permitted to be rigidly against wall spacers if mounted on noncombustible materials in accordance with 314.20.

Additional Proposed Changes

File Name	Description	Approved
Ideal_Wall_plate_spacer.png		
Gardener_Bender_Wall_plate_spacer.png		

Statement of Problem and Substantiation for Public Input

Adding wall plate spacers would allow installers an easy inexpensive solution no different than plastic extenders to mount devices where the box is not flush with the finished surface. Both ideal and gardener bender have this product available. See website and photos.

Website: Gardner Bender 4-Pack 0.75-in W x 4-in L Green Plastic Wall Plate Spacers in the Wall Plate Spacers department at Lowes.com
Website: IDEAL 10-Pack 1-in W x 0.5-in L Plastic Wall Plate Spacer in the Wall Plate Spacers department at Lowes.com

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 15 15:27:56 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: The existing language does not prohibit the use of a spacer as permitted by Section 314.20. Section 406.5 (A) says rigidly at the finished surface not against it.

Public Input No. 219-NFPA 70-2023 [New Section after 406.5(G)(2)]

TITLE OF NEW CONTENT

Type your content here ...

(3)Laundry Areas

Statement of Problem and Substantiation for Public Input

Receptacles placed face up in a laundry room that are energized but do not have an attachment plug inserted are susceptible to exposure to lent, water, or other foreign debris. An example would be a higher voltage/amperage receptacle (that is not required by nfpa 70 to be tamper resistant) provided for an electric dryer in a dwelling but is not used due to the installed dryer being natural gas and only requiring a 115 volt nonlocking receptacle.

Submitter Information Verification

Submitter Full Name: Mason Flanagan
Organization: Sully Electric and Controls Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jan 23 20:52:15 EST 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8818-NFPA 70-2024

Statement: Section 406.5(G) was revised to remove the repeated text “Receptacles shall not be installed in a face-up position” in list items 1 and 2, which was placed in the first level subdivision of the section, for clarity.

List item 3 was added to include receptacles installed in a laundry area. Receptacles placed face up in a an energized laundry room, with receptacles facing up, and not having an attachment plug inserted, are susceptible to exposure to liquid.

Public Input No. 2253-NFPA 70-2023 [Section No. 406.5(J)]

(J) Voltage Between Adjacent Devices.

A receptacle shall not be grouped or ganged in enclosures with other receptacles, snap switches, or similar devices, unless they are arranged so that the voltage between adjacent devices does not exceed 300 volts, or unless they are installed in enclosures equipped with identified, securely installed barriers between adjacent devices.

Exception: Barriers shall not be required between devices having no exposed conductor terminals. Terminals for connections of equipment grounding conductors shall be permitted to be exposed.

Additional Proposed Changes

File Name	Description	Approved
IMG_1671.jpeg	no exposed terminals	
IMG_1668.jpeg	no exposed terminals	
IMG_1667.jpeg	no exposed terminals	
IMG_1666.jpeg	no exposed terminals	
IMG_6602.jpeg	no exposed terminals	
IMG_6601.jpeg	no exposed terminals	
IMG_6600.jpeg	no exposed terminals	

Statement of Problem and Substantiation for Public Input

Finger-safe devices with no exposed terminals effectively have “barriers” built-in as part of the design of the device. These types of devices pose virtually no shock hazard compared to devices having exposed energized terminals. The risk of an arc between devices is also greatly reduced since there are no exposed terminals. Barriers should not be required where these types of devices are installed. If a device needs to be replaced, installers will need to continue to use these finger-safe type of devices in order to maintain a Code-compliant installation if no barrier is installed. See photo examples of devices with no exposed terminals provided.

Related Public Inputs for This Document

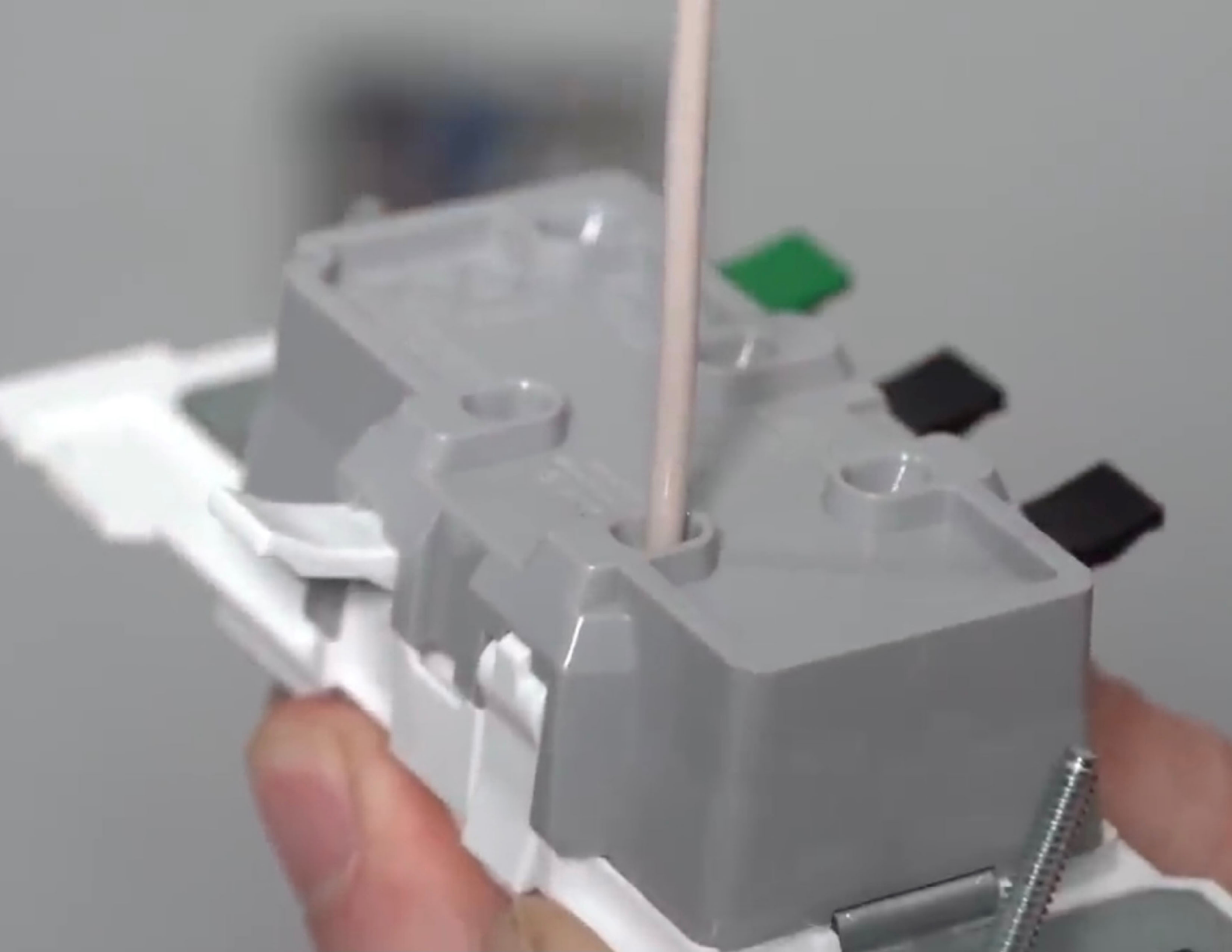
Related Input	Relationship
Public Input No. 2246-NFPA 70-2023 [Section No. 404.8(B)]	barriers not needed between devices having no exposed terminals
Public Input No. 2246-NFPA 70-2023 [Section No. 404.8(B)]	

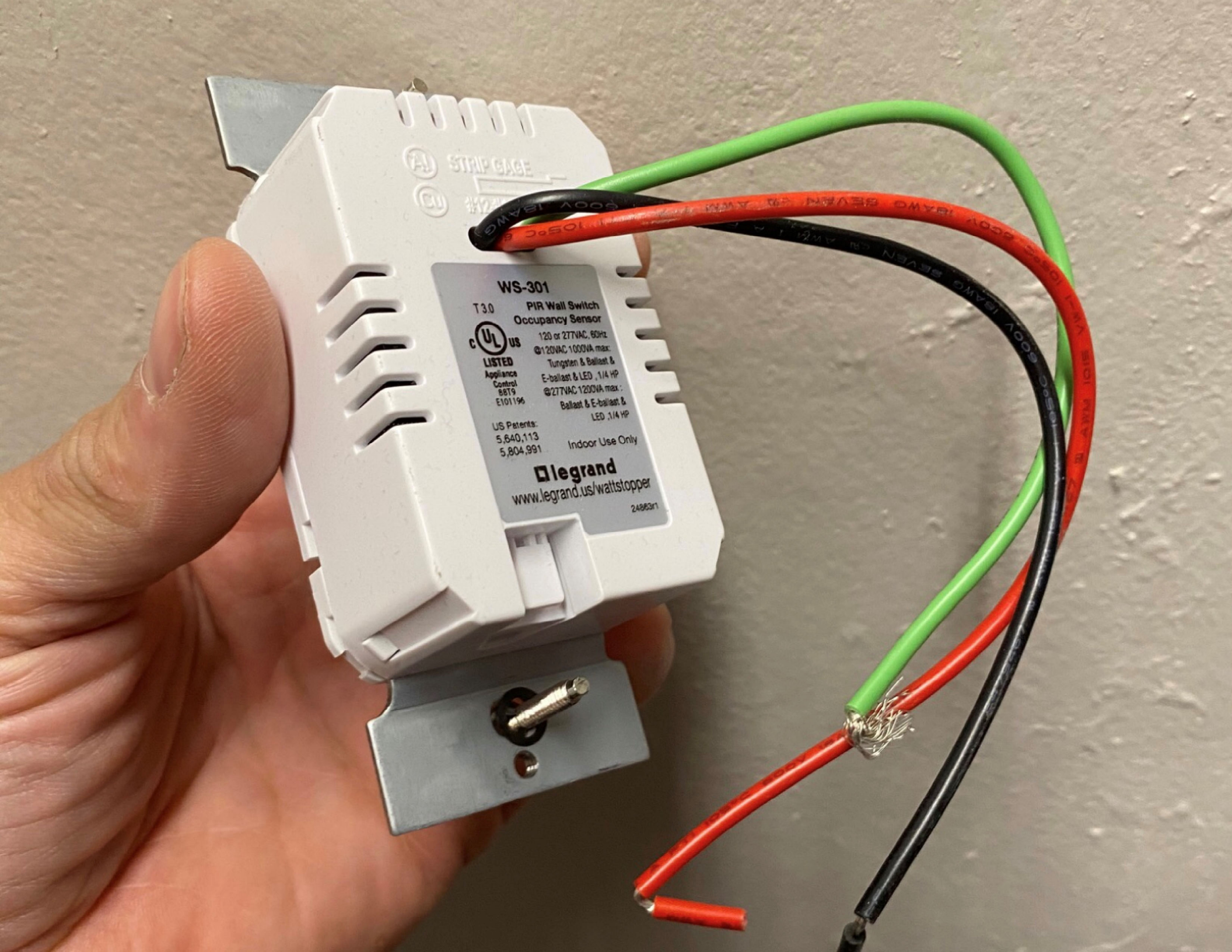
Submitter Information Verification

Submitter Full Name: Russ Leblanc
Organization: Leblanc Consulting Services
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 15 13:36:12 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: Adding an exception could potentially create a potential shock hazard if this specific form of wiring device shown in the attachments are replaced with wiring devices employing exposed wiring binding screw terminal construction.

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WS-301
T3.0
PIR Wall Switch
Occupancy Sensor
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Tungsten & Ballast &
E-ballast & LED ,1/4 HP
@277VAC 1200VA max :
Ballast & E-ballast &
LED ,1/4 HP
LISTED
Appliance
Control
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legrand
www.legrand.us/wattstopper
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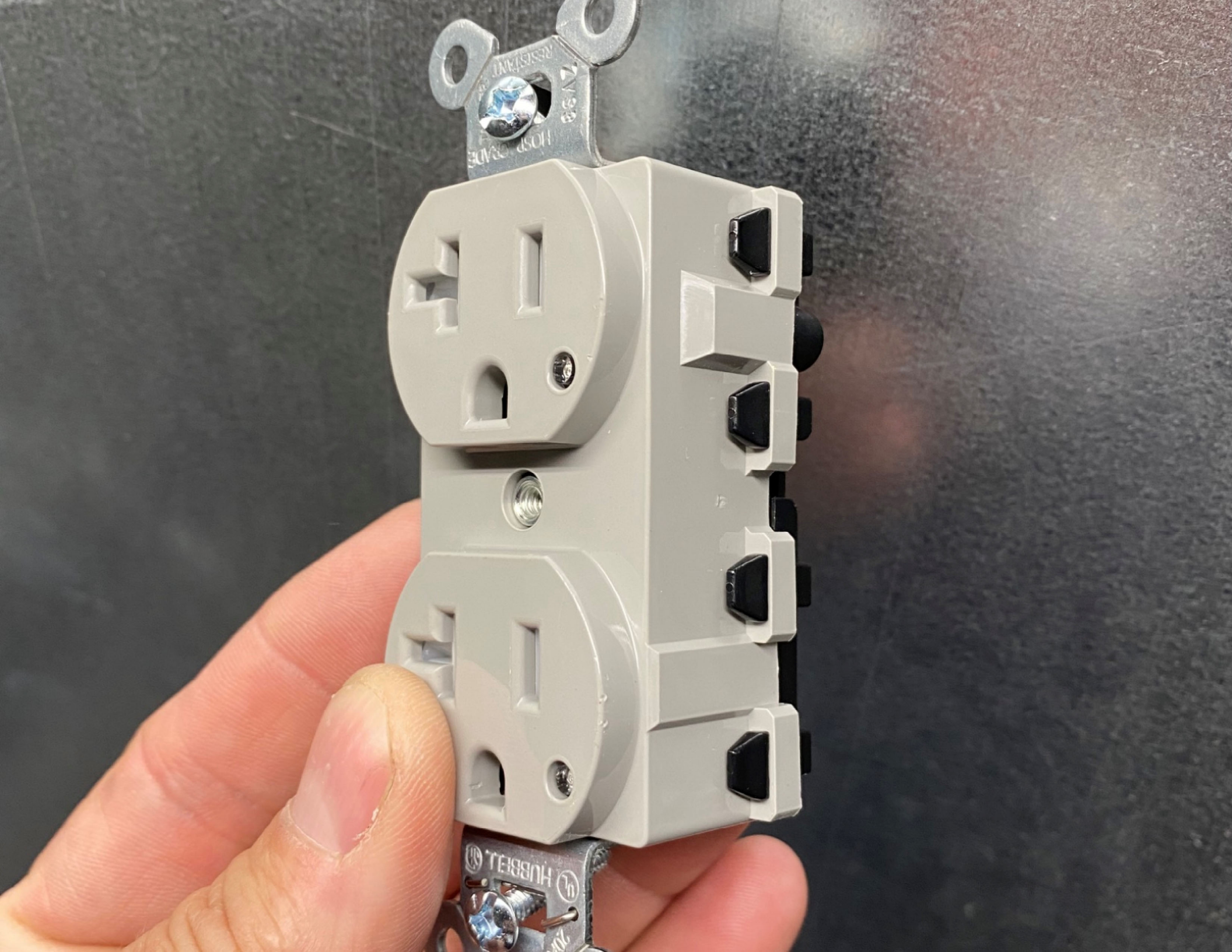
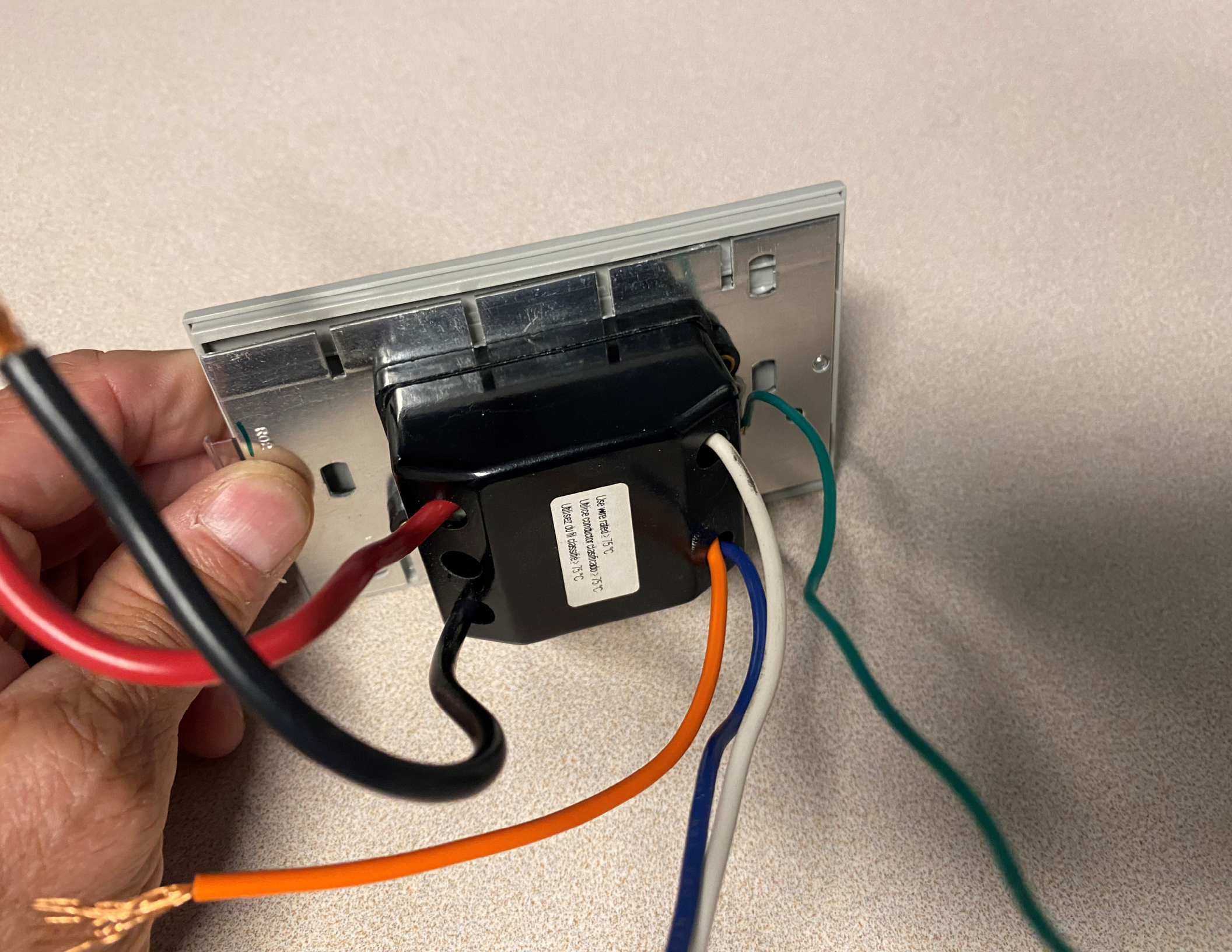
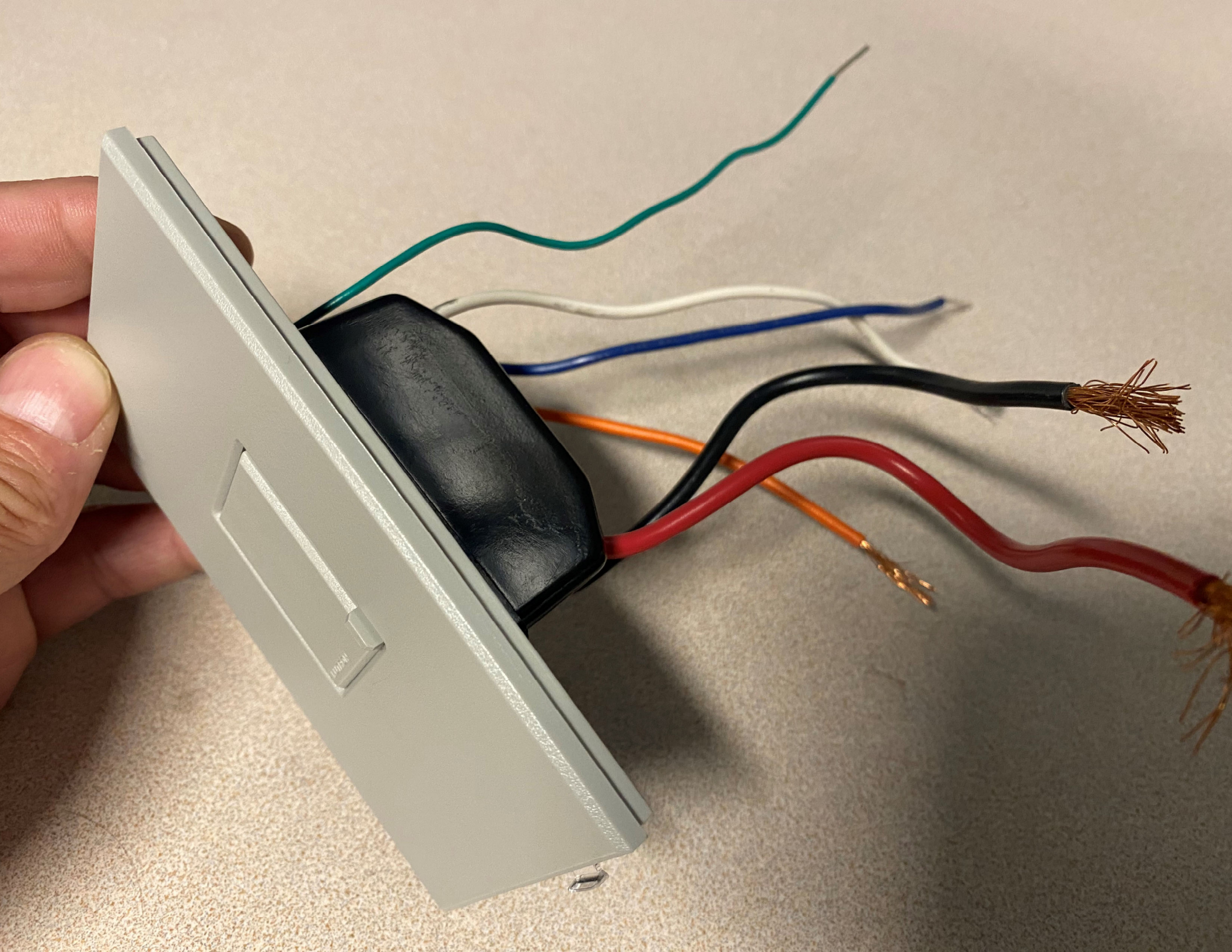

HUBBELL


90C 300V OR 1932 90C 1000V


Use wire rated ≥ 75°C
Utilisez des fil classifié ≥ 75°C
Utilisez du fil classifié ≥ 75°C




ILLUMINATED
CIRCUIT # / CIRCUITO #

Public Input No. 2310-NFPA 70-2023 [Section No. 406.6(B)]

(B)– **Equipment** Grounding Conductor .

Metal faceplates shall be ~~grounded~~ connected to an equipment grounding conductor by means of metal mounting screw(s) securing the faceplate to a metal yoke or strap of the receptacle or to a metal outlet box .

Statement of Problem and Substantiation for Public Input

Changing the title would make the text technically correct. In accordance with NEC style manual section 2.1.3.2 the title must be descriptive and concise with the intent of the requirement. This requirement is about connecting the equipment grounding conductor to receptacle metal faceplates, not about grounding. This language already exists in 517.13(B).

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 15 18:50:31 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: The suggested change seems to represent one wiring (installation) method. The proposal does not improve the language since a metal faceplate can be grounded by means other than through the equipment grounding conductor . No substantiation is provided for the panel to conclude that this proposed revision is necessary or will provide for a safer installation. It is also noted that this requirement pertains to the Receptacle Faceplates (Cover Plates), not the receptacle.

Public Input No. 3230-NFPA 70-2023 [Section No. 406.6(D)]

~~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.~~

(D) Receptacle ~~Faceplate~~ **Faceplates (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.~~

~~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.~~

Lights, USB Chargers, or Both.

Flush device faceplates (cover plates) that integrally incorporate night lights, Class 2 output connectors (USB chargers), or both, shall comply with all of the following:

(1) Faceplate (cover plate) assemblies shall be listed.

(2) During normal operation, night light and Class 2 supply connections shall not introduce current to the grounding means or to the equipment grounding conductor.

(3) Night lights and Class 2 connections (USB chargers), if relying on spring-tensioned contacts for electrical power, shall not be rated more than 1 watt and shall be connected to only unpainted or unenameled heads of receptacle terminal screws made of only copper alloy unless the faceplate (cover plate) is additionally listed and identifief that the spring-tensioned contacts are suitable for connection to unpainted or unenameled heads of terminal screws made of plated steel.

Statement of Problem and Substantiation for Public Input

To improve usability of the Code, to address that some receptacles employ as terminal screwhead polarity markings the use of nonconductive paint or enamel, incompatible with spring-tensioned contacts supplying power to faceplates with integral night lights and integral USB chargers, and to prohibit 2-wire (powered LINE to EQUIPMENT GROUNDING CONDUCTOR) faceplates with integral night lights and integral Class 2 USB chargers.

.

The title and the requirement content are a hodge-podge of plurals and singulars. In accordance with 3.5.3 of the NEC® Style Manual, these "shall be plural rather than singular".

.

Other than the requirement for being listed, the first sentence is a truism: "A flush device cover plate that additionally provides a night light and/or Class 2 output connector(s) shall be ... constructed such that the night light and/or Class 2 circuitry is integral with the flush device cover plate." Effectively, present wording is saying that "A rose is a rose is a rose." Move the listing requirement to a list format, with other essential attributes.

.

Because faceplates with integral night lights or Class 2 USB chargers are bring line power supply circuits onto the faceplates themselves, such faceplate assemblies must continue to be evaluated for safety by listing.

.

Furthermore, in accordance with 250.6, such supply circuits shall not utilize the equipment grounding conductor directly, or indirectly via the receptacle's grounding (bonding) means, as the return path for objectionable current of the night lights or USB chargers. Just as you are no longer permitted to have 2-wire passive infrared (PIR) switches powered by connection from LINE to EGC, so too should 2-wire faceplates be prohibited. All such leakage current to ground is cumulative.

.

The present 2023 NEC® 406.6(D) Exception has a January 1, 2026 effective date that corresponds to the overall effective date of the 2026 Edition. Further, in accordance with 2.1.9.1 and 2.1.9.1.1 of the NEC® Style

Manual, the existing permissive exception can be expressed in positive language without the use of an Exception.

Submitter Information Verification

Submitter Full Name: Brian Rock
Organization: Hubbell Incorporated
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 30 14:31:38 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8819-NFPA 70-2024

Statement: The title and requirements were reorganized to comply with section 3.5.3 of the NEC Style Manual.

Number 2 was clarified for consistency with Article 250.6. Supply circuits shall not utilize the equipment grounding conductor directly, or indirectly via the receptacle's grounding (bonding) means, as the return path for objectionable current of the night lights or USB chargers, as all such leakage current to ground is cumulative.

Number 3 was clarified that some receptacle terminal screwheads employ nonconductive paint or enamel for polarity and conductor identification.

This change also serves to address the exception effective date of January 1, 2026, in accordance with sections 2.1.9.1 and 2.1.9.1.1 of the NEC Style Manual. The existing permissive exception can be expressed in positive language without the use of an exception.

Public Input No. 3711-NFPA 70-2023 [Section No. 406.7 [Excluding any Sub-Sections]]

All attachment plugs, cord connectors, and flanged surface devices (inlets and outlets) shall be ~~listed and~~ marked with the manufacturer's name or identification and voltage and ampere ratings.

Statement of Problem and Substantiation for Public Input

The listing requirement should be relocated to 406.2 for compliance with the NEC Style Manual Section 2.2.1.

Submitter Information Verification

Submitter Full Name: Derrick Atkins
Organization: Minneapolis Electrical JATC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Sep 05 14:34:17 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-7940-NFPA 70-2024
Statement: Removed the phrase "listed and" as a result of the new proposal to relocate listing requirements to new section 406.2 in accordance with section 2.2.1 of the NEC Style Manual.

Public Input No. 1627-NFPA 70-2023 [Section No. 406.9]

406.9 Receptacles in Damp or Wet Locations.

(A) Damp Locations.

A receptacle installed outdoors in a location protected from the weather or in other damp locations shall have an enclosure for the receptacle that is weatherproof when the receptacle is covered (attachment plug cap not inserted and receptacle covers closed).

An installation suitable for wet locations shall also be considered suitable for damp locations.

A receptacle shall be considered to be in a location protected from the weather where located under roofed open porches, canopies, marquees, and the like, and will not be subjected to a beating rain or water runoff. All 125- and 250-volt nonlocking receptacles shall be a listed weather-resistant type. Hinged covers of outlet box hoods shall be able to open at least 90 degrees, or fully open if the cover is not designed to open 90 degrees from the closed to open position, after installation.

Informational Note: See ANSI/NEMA WD 6–2016, *Wiring Devices — Dimensional Specifications*, for the types of receptacles covered by this requirement.

(B) Wet Locations.

(1) Receptacles of 15 Amperes and 20 Amperes in a Wet Location.

Receptacles of 15 amperes and 20 amperes, 125 volts and 250 volts installed in a wet location shall have an enclosure that is weatherproof whether or not the attachment plug cap is inserted. An outlet box hood installed for this purpose shall be listed and shall be identified as extra-duty. Other listed products, enclosures, or assemblies providing weatherproof protection that do not utilize an outlet box hood need not be identified extra duty. Hinged covers of outlet box hoods shall be able to open at least 90 degrees, or fully open if the cover is not designed to open 90 degrees from the closed to open position, after installation.

Informational Note No. 1: See ANSI/UL 514D–2016, *Cover Plates for Flush-Mounted Wiring Devices*, for extra-duty outlet box hoods. Extra duty identification and requirements are not applicable to listed receptacles, faceplates, outlet boxes, enclosures, or assemblies that are identified as either being suitable for wet locations or rated as one of the outdoor enclosure–type numbers of Table 110.28 that does not utilize an outlet box hood.

Exception: 15- and 20-ampere, 125- through 250-volt receptacles installed in a wet location and subject to routine high-pressure spray washing shall be permitted to have an enclosure that is weatherproof when the attachment plug is removed.

All 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles shall be listed and so identified as the weather-resistant type.

Informational Note No. 2: See ANSI/NEMA WD 6–2016, *Wiring Devices — Dimensional Specifications*, for receptacle configurations. The configuration of weather-resistant receptacles covered by this requirement are identified as 5-15, 5-20, 6-15, and 6-20.

(2) Other Receptacles.

All other receptacles installed in a wet location shall be listed weather-resistant type, and installation shall comply with 406.9(B)(2)(a) or (B)(2)(b).

(a) A receptacle installed in a wet location where the product intended to be plugged into it is not attended while in use shall have an enclosure that is weatherproof with the attachment plug cap inserted or removed.

(b) A receptacle installed in a wet location where the product intended to be plugged into it will be attended while in use (e.g., portable tools) shall have an enclosure that is weatherproof when the attachment plug is removed.

(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.

(D) Flush Mounting with Faceplate.

The enclosure for a receptacle installed in an outlet box flush-mounted in a finished surface shall be made weatherproof by means of a weatherproof faceplate assembly that provides a watertight connection between the plate and the finished surface.

Additional Proposed Changes

File Name	Description	Approved
TIA_1598_70_20_15.pdf	NEC TIA 20-15 Log 1598	

Statement of Problem and Substantiation for Public Input

NOTE: This public input originates from Tentative Interim Amendment No. 20-15 (Log 1598) issued by the Standards Council on December 8, 2021 and per the NFPA Regs., needs to be reconsidered by the Code-Making Panel for the next edition of the Document.

Substantiation: It is quite common for a toilet to be located next to a bathtub or shower in a residential bathroom. The existing text in NFPA 70 could prevent the installation of a receptacle that is necessary for the operation of an electronic toilet (also known as a “smart toilet”) or personal hygiene device (e.g., electronic bidet seat) where a toilet is located within 3 feet horizontally of a bathtub or shower. Application of the receptacle placement requirements has the potential to place an undue burden on the consumer whereby additional cost may be incurred to position the receptacle in an acceptable location without considering potential structural barriers behind the wall that may further restrict installation. Therefore, the proposed exception is necessary to ensure that such plumbing products are permitted to be installed while not jeopardizing the level of electrical safety that the standard seeks [see below photo(s)/diagram(s) that provide clarity for the proposed exception]. As such, due to the proximity of the individual receptacle to the bathtub or shower, it would be required by NEC Section 210.8(A)(9) to be protected by a Class A GFCI device minimizing any potential shock hazard. Moreover, it is our understanding that products like electronic toilets and personal hygiene devices were not taken into consideration during the discussion of the proposal prior to adoption into the current standard.

Emergency Nature: The proposed TIA intends to correct a circumstance in which the revised NFPA Standard has resulted in an adverse impact on a product or method that was inadvertently overlooked in the total revision process or was without adequate technical (safety) justification of the action. Making an allowance for these listed products (which are permitted in all major plumbing

codes), which have been in the market for decades, is necessary for safeguarding public health and safety. People all over the United States use such products in their bathrooms, and they are necessary for people with special needs or abilities to maintain their dignity, privacy and selfreliance. Ease of cleaning for seniors is of immediate benefit and critical to their hygiene.
Additional hygiene-oriented benefits are obtained by people experiencing colorectal issues such as hemorrhoids, irritable bowel syndrome (IBS) and inflammatory bowel disease (IBD),1 as well as women experiencing severe constipation during pregnancy2 or recovering from postpartum activity. These products also help to maintain hand hygiene3 which is critical for preventing the spread of disease. Many smart toilets include health monitoring features that analyze one's stool or urine to detect health issues such as sugar levels for a diabetic. Also, smart toilets have proven to be quite beneficial for those who are rehabilitating from a stroke.4 Personal hygiene devices are necessary for some in maintaining their cleanliness as they may not be able to use toilet paper due to medical reasons. Also, personal hygiene devices have been proven to lead to fewer instances of rashes, hemorrhoids, and urinary tract infections. The bottom line is these products are necessary for many individuals around the United States for maintaining their health, and the existing text in NFPA 70 would prevent the installation of such products in many residential bathrooms.

1 "How to Decide If You Need a Bidet," by Amber J. Tresca, 2019, Verywell Health, https://www.verywellhealth.com/do-i-need-a-bidet-1942839
2 "The Effect of Bidet Use on Severity of Constipation and Quality of Life Among Pregnant Women," by Sultan Alan, Ebru Gozuyesil and Sule Gokyildiz Surucu, August 2020, Yonago Acta Medica (YAM), Journal of Medical
Sciences, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7435113/
3 "The Use of Electric Toilet Seats with Water Supply Is Efficacious in Maintaining Hand Hygiene in Experimental
Model," by Shigeharu Oie, Hiromi Aoshika, Emiko Arita and Akira Kamiya, 2018, Japanese Journal of Infectious
Diseases, https://www.jstage.jst.go.jp/article/yoken/71/4/71_JJID.2017.515/_article/-char/en
4 "Technology-assisted toilets: Improving independence and hygiene in stroke rehabilitation," by David Yachnin,
Georges Gharib, Jeffrey Jutai and Hillel Finestone, August 2017, Journal of Rehabilitation and Assistive Technologies Engineering, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6453101/

Submitter Information Verification

Submitter Full Name: CMP ON NEC-P18
Organization: NFPA
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jul 27 14:28:46 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: TIA 1598 information is correct but is now relocated from Exception No. 2 to Exception No. 4.

Tentative Interim Amendment

NFPA® 70®

National Electrical Code®

2020 Edition

Reference: 406.9(C), Exception No. 2(new)
TIA 20-15
(SC 21-12-12 / TIA Log #1598)

Pursuant to Section 5 of the NFPA *Regulations Governing the Development of NFPA Standards*, the National Fire Protection Association has issued the following Tentative Interim Amendment to NFPA 70®, *National Electrical Code*®, 2020 edition. The TIA was processed by the Code-Making Panel 18, and the NEC Correlating Committee, and was issued by the Standards Council on December 8, 2021, with an effective date of December 28, 2021.

1. Add a new Exception No. 2 to Section 406.9(C) to read as follows:

406.9 Receptacles in Damp or Wet Locations. …
(C) Bathtub and Shower Space. Receptacles shall not be installed within a zone measured 900 mm (3 ft) horizontally and 2.5 m (8 ft) vertically from the top of the bathtub rim or shower stall threshold. The identified zone is all-encompassing and shall include the space directly over the tub or shower stall.
Exception No. 1: In bathrooms with less than the required zone the receptacle(s) shall be permitted to be installed opposite the bathtub rim or shower stall threshold on the farthest wall within the room.
Exception No. 2: 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 located on one of the following:
(1) The wall behind the toilet but not behind the tank
(2) The opposite side of the toilet from the bathtub or shower

Issue Date: December 8, 2021

Effective Date: December 28, 2021

(Note: For further information on NFPA Codes and Standards, please see www.nfpa.org/docinfo**)**

Public Input No. 4121-NFPA 70-2023 [Section No. 406.9(A)]

(A) Damp Locations.

~~A receptacle installed outdoors in a location protected from the weather or in other damp locations shall have an enclosure for the receptacle that is weatherproof when the receptacle is covered (attachment plug cap not inserted and receptacle covers closed).~~

(1) General. An installation suitable for wet locations shall also be considered suitable for damp locations.~~A receptacle shall be considered to be in a location protected from the weather where located under roofed open porches, canopies, marquees, and the like, and will not be subjected to a beating rain or water runoff.~~

(2) Weatherproof Enclosure. A receptacle installed outdoors in a location protected from the weather or in other damp locations shall have an enclosure for the receptacle that is weatherproof when the receptacle is covered (attachment plug cap not inserted and receptacle covers closed).

(3) Weather-Resistant Receptacle Type. All 125- and 250-volt nonlocking receptacles shall be a listed weather-resistant type.

(4) Covers. Hinged covers of outlet box hoods shall be able to open at least 90 degrees, or fully open if the cover is not designed to open 90 degrees from the closed to open position, after installation.

Informational Note: See ANSI/NEMA WD 6–2016, *Wiring Devices — Dimensional Specifications*, for the types of receptacles covered by this requirement.

Statement of Problem and Substantiation for Public Input

Breaking up 409.6(A) into a list item format to facilitate understanding for Code users. In accordance with NFPA Style Manual section 3.5.1.2 additional subdivisions shall be used where multiple requirements can be broken into independent requirements.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Sep 06 17:11:24 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8820-NFPA 70-2024

Statement: Section 406.9(A) has been modified to comply with Style Manual section 3.5.1.2, additional subdivisions shall be used where multiple requirements can be broken into independent requirements.

"A receptacle shall be considered to be in a location protected from the weather where located under roofed open porches, canopies, marquees, and the like, and will not be subjected to a beating rain or water runoff" was retained for clarity.

(2) Weatherproof Enclosure was modified to include the cover.

Public Input No. 769-NFPA 70-2023 [Section No. 406.9(A)]

(A) Damp Locations.

A receptacle installed outdoors in a location protected from the weather or in other damp locations shall have an enclosure and cover for the receptacle that is weatherproof when the receptacle is covered (attachment plug cap not inserted and receptacle covers closed).

An installation suitable for wet locations shall also be considered suitable for damp locations.

A receptacle shall be considered to be in a location protected from the weather where located under roofed open porches, canopies, marquees, and the like, and will not be subjected to a beating rain or water runoff. All 125- and 250-volt nonlocking receptacles shall be a listed weather-resistant type. Hinged covers of outlet box hoods shall be able to open at least 90 degrees, or fully open if the cover is not designed to open 90 degrees from the closed to open position, after installation.

Informational Note: See ANSI/NEMA WD 6–2016, *Wiring Devices — Dimensional Specifications*, for the types of receptacles covered by this requirement.

Statement of Problem and Substantiation for Public Input

An enclosure, by article 100, does not imply a box with a cover. Those 2 items are separate pieces of material.

Submitter Information Verification

Submitter Full Name: Chad Privratsky
Organization: IBEW 280
Street Address:
City:
State:
Zip:
Submittal Date: Wed May 03 20:41:09 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8820-NFPA 70-2024

Statement: Section 406.9(A) has been modified to comply with Style Manual section 3.5.1.2, additional subdivisions shall be used where multiple requirements can be broken into independent requirements.

“A receptacle shall be considered to be in a location protected from the weather where located under roofed open porches, canopies, marquees, and the like, and will not be subjected to a beating rain or water runoff” was retained for clarity.

(2) Weatherproof Enclosure was modified to include the cover.

Public Input No. 4128-NFPA 70-2023 [Section No. 406.9(B)(1)]

(1) Receptacles of 15 Amperes and 20 Amperes in a Wet Location.

(a) Weatherproof Enclosure. Receptacles of 15 amperes and 20 amperes, 125 volts and 250 volts installed in a wet location shall have an enclosure that is weatherproof whether or not the attachment plug cap is inserted.

(b) Outlet Box Hood. An outlet box hood installed for this purpose shall be listed and shall be identified as extra-duty. Other listed products, enclosures, or assemblies providing weatherproof protection that do not utilize an outlet box hood need not be identified extra duty.

(c) Covers. Hinged covers of outlet box hoods shall be able to open at least 90 degrees, or fully open if the cover is not designed to open 90 degrees from the closed to open position, after installation.

Informational Note No. 1: See ANSI/UL 514D–2016, *Cover Plates for Flush-Mounted Wiring Devices*, for extra-duty outlet box hoods. Extra duty identification and requirements are not applicable to listed receptacles, faceplates, outlet boxes, enclosures, or assemblies that are identified as either being suitable for wet locations or rated as one of the outdoor enclosure–type numbers of Table 110.28 that does not utilize an outlet box hood.

Exception: 15- and 20-ampere, 125- through 250-volt receptacles installed in a wet location and subject to routine high-pressure spray washing shall be permitted to have an enclosure that is weatherproof when the attachment plug is removed.

(d) Weather-Resistant Receptacle Type. All 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles shall be listed and so identified as the weather-resistant type.

Informational Note No. 2: See ANSI/NEMA WD 6–2016, *Wiring Devices — Dimensional Specifications*, for receptacle configurations. The configuration of weather-resistant receptacles covered by this requirement are identified as 5-15, 5-20, 6-15, and 6-20.

Statement of Problem and Substantiation for Public Input

Breaking up 406.9(B)(1) into a list item format to facilitate understanding for Code users. In accordance with NFPA Style Manual section 3.5.1.2 additional subdivisions shall be used where multiple requirements can be broken into independent requirements.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Sep 06 17:25:21 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8821-NFPA 70-2024
Statement: Section 406.10(B)(1) has been modified to comply with Style Manual section 3.5.1.2, additional subdivisions shall be used where multiple requirements can be broken into independent requirements.

Public Input No. 864-NFPA 70-2023 [Section No. 406.9(B)(1)]

(1) Receptacles of 15 Amperes and 20 Amperes in a Wet Location.

Receptacles of 15 amperes and 20 amperes, 125 volts and 250 volts installed in a wet location shall have an enclosure that is weatherproof whether or not the attachment plug cap is inserted. An outlet box hood installed for this purpose shall be listed and shall be identified as extra-duty. Other listed products, enclosures, or assemblies providing weatherproof protection that do not utilize an outlet box hood need not be identified as extra duty. Hinged covers of outlet box hoods shall be able to open at least 90 degrees, or fully open if the cover is not designed to open 90 degrees from the closed to open position, after installation.

Informational Note No. 1: See ANSI/UL 514D–2016, *Cover Plates for Flush-Mounted Wiring Devices*, for extra-duty outlet box hoods. Extra duty identification and requirements are not applicable to listed receptacles, faceplates, outlet boxes, enclosures, or assemblies that are identified as either being suitable for wet locations or rated as one of the outdoor enclosure–type numbers of Table 110.28 that does not utilize an outlet box hood.

Exception: 15- and 20-ampere, 125- through 250-volt receptacles installed in a wet location and subject to routine high-pressure spray washing shall be permitted to have an enclosure that is weatherproof when the attachment plug is removed.

All 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles shall be listed and so identified as the weather-resistant type.

Informational Note No. 2: See ANSI/NEMA WD 6–2016, *Wiring Devices — Dimensional Specifications*, for receptacle configurations. The configuration of weather-resistant receptacles covered by this requirement are identified as 5-15, 5-20, 6-15, and 6-20.

Statement of Problem and Substantiation for Public Input

Grammatical consistency.

Submitter Information Verification

Submitter Full Name: David Shapiro
Organization: Safety First Electrical
Street Address:
City:
State:
Zip:
Submittal Date: Sun May 21 15:55:23 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8821-NFPA 70-2024
Statement: Section 406.10(B)(1) has been modified to comply with Style Manual section 3.5.1.2, additional subdivisions shall be used where multiple requirements can be broken into independent requirements.

Public Input No. 1507-NFPA 70-2023 [Section No. 406.9(B)(2)]

(2) Other Receptacles.

All other receptacles installed in a wet location shall be listed weather-resistant type, and installation shall comply with 406.9(B)(2)(a) or (B)(2)(b).

(a) ~~A receptacle installed in a wet location where~~ Where the product intended to be plugged into it is not attended while in use shall have an enclosure that is weatherproof with the attachment plug cap inserted or removed.

(b) ~~A receptacle installed in a wet location where~~ where the product intended to be plugged into it will be attended while in use (e.g., portable tools) shall have an enclosure that is weatherproof when the attachment plug is removed.

Statement of Problem and Substantiation for Public Input

The parent text already states, "a receptacle in a wet location" and does not need to be repeated.

Submitter Information Verification

Submitter Full Name: IEC National
Organization: IEC
Affiliation: Jake Gray
Street Address:
City:
State:
Zip:
Submittal Date: Sat Jul 22 12:50:12 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8822-NFPA 70-2024
Statement: Section 406.10(B)(2) has been modified to remove of “a receptacle installed in a location where” in (a) and (b) since the text of Section 406.10(B)(2) already identifies” a receptacle installed in a wet location where”.

Additionally, (a) and (b) were modified to improve the language.

Public Input No. 677-NFPA 70-2023 [Section No. 406.9(B)(2)]

(2) Other Receptacles.

All other receptacles installed in a wet location shall ~~be listed weather-resistant type, and installation shall~~ comply with 406.9(B)(2)(a) or (B)(2)(b).

(a) A receptacle installed in a wet location where the product intended to be plugged into it is not attended while in use shall have an enclosure that is weatherproof with the attachment plug cap inserted or removed.

(b) A receptacle installed in a wet location where the product intended to be plugged into it will be attended while in use (e.g., portable tools) shall have an enclosure that is weatherproof when the attachment plug is removed.

Statement of Problem and Substantiation for Public Input

There was no substantiation to require large receptacles like a 480V, 3-phase, 50A to be weather-resistant. Does the product standard even allow for it?

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 20 14:14:12 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: All receptacle types including locking-type and pin and sleeve receptacles already allow for weather-resistant construction and identification already in multiple product standards and the products already exist and in the marketplace. Receptacles other than 15- and 20-ampere, 125- and 250-volt rated are commonly installed in close-proximity and exposed to the same, and in many cases even more severe, environmental influences. Requiring weather-resistant for other receptacle types offers the same level of protection. Over-heating caused by corroded/compromised current path will be more severe due to the higher current drawn from these receptacles. Requiring these receptacles to be weather-resistant will result in improved safety for the users of these devices.

Public Input No. 4129-NFPA 70-2023 [Section No. 406.9(C)]

(C) Bathtub and Shower Space.

(1) Horizontal Zone. 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.

(2) Vertical 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.

Statement of Problem and Substantiation for Public Input

Breaking up 406.9(C) into a list item format to facilitate understanding for Code users. In accordance with NFPA Style Manual section 3.5.1.2 additional subdivisions shall be used where multiple requirements can be broken into independent requirements.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Sep 06 17:31:25 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8823-NFPA 70-2024
Statement: The section has been modified into a list format to comply with NEC Style Manual section 3.5.1.2; additional subdivisions shall be used where multiple requirements can be broken into independent requirements.

Public Input No. 865-NFPA 70-2023 [Section No. 406.9(C)]

(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. All 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles located this close shall be listed and identified as the weather-resistant type.

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.

Statement of Problem and Substantiation for Public Input

Corrosion increases contact impedance. The receptacle located near a source of fog or splashes is far more likely to suffer damp contacts. WR rating means the contact stand up to this better.

So what? Even more than outdoor receptacles, people leave things plugged in to bathroom receptacles, unattended. Like unwatched pots, unwatched chargers are more likely to cause fires.

I've found premature deterioration of electrical equipment even in full-size bathrooms, so I believe the damp-location rating is advisable, and the WR rating, wherever there's a tub or shower. This exception offers an even stronger case for the WR.

Submitter Information Verification

Submitter Full Name: David Shapiro
Organization: Safety First Electrical
Street Address:
City:
State:
Zip:
Submittal Date: Sun May 21 15:57:59 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: No substantiation provided to add weather-resistant receptacles in a bathroom. Weather-resistant receptacles are not investigated for protection against splashing water applied directly to the receptacle face.

Public Input No. 1450-NFPA 70-2023 [Section No. 406.12]

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, and 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:

(6) Business offices accessible to the general public

(7) Lobbies, and waiting spaces

(8) Spaces of nursing homes and limited care facilities covered in 517.10(B)(2)

(9) Places of awaiting transportation, gymnasiums, skating rinks, fitness centers, and auditoriums

(10) Dormitory units

(11) Residential care/assisted living facilities, social and substance abuse rehabilitation facilities, and group homes

(12) Foster care facilities, nursing homes, and psychiatric hospitals

(13) 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.

(11) In all other areas not covered in section 210.12 (B, C and D)

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

(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:

(4) A single receptacle that is not readily accessible and supplies one appliance

(5) A duplex receptacle that is not readily accessible and supplies two appliances

(6) Nongrounding receptacles used for replacements as permitted in 406.4(D)(2)(a)

Statement of Problem and Substantiation for Public Input

Same level of protection must be provided in all areas for life safety of occupants in these areas to avoid any fatal injuries.

Submitter Information Verification

Submitter Full Name: Mohinder Sood
Organization: Core Engineers
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 17 11:37:58 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: No substantiation was provided to add cited in all areas not covered in sections 210.12 (B,C & D).

Public Input No. 2181-NFPA 70-2023 [Section No. 406.12]

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, and 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:

(6) Business offices accessible to the general public

(7) Lobbies, and waiting spaces

(8) Spaces of nursing homes and limited care facilities covered in 517.10(B)(2)

(9) Places of awaiting transportation, gymnasiums, skating rinks, fitness centers, and auditoriums

(10) Dormitory units

(11) Residential care/assisted living facilities, social and substance abuse rehabilitation facilities, and group homes

(12) Foster care facilities, nursing homes, and psychiatric hospitals

(13) Areas of agricultural buildings accessible to the general public and any common areas

(14) Private garden areas, play areas, recreation areas and similar 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.

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

(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:

(4) A single receptacle that is not readily accessible and supplies one appliance

(5) A duplex receptacle that is not readily accessible and supplies two appliances

(6) Nongrounding receptacles used for replacements as permitted in 406.4(D)(2)(a)

Statement of Problem and Substantiation for Public Input

Require or add clarity that tamper resistant receptacles are required in private garden areas, play areas, recreation areas and similar areas.

Many of the same drivers of risk which are present and mitigated in the interior spaces will exist outside of the protected space. For example, in a dwelling unit the receptacle in a family room is protected while a receptacle in the lawn for lighting is not.

Submitter Information Verification

Submitter Full Name: Gary Hein
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 14 12:51:45 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8824-NFPA 70-2024
Statement: Added park and recreation areas in a new item (11), along with a new informational note no. 4 to clarify that park and recreation areas include garden areas, play areas, and similar indoor and outdoor areas.

The addition of tamper-resistant receptacles applies to all areas where children of all ages have access to these areas where receptacles may be installed.

“Dormitory units” was replaced with “Dormitories” for clarity.

Public Input No. 2226-NFPA 70-2023 [Section No. 406.12]

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, and 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:

(6) Business offices accessible to the general public

(7) Lobbies, and waiting spaces

(8) Spaces of nursing homes and limited care facilities covered in 517.10(B)(2)

(9) Places of awaiting transportation, gymnasiums, skating rinks, fitness centers, and auditoriums

(10) Dormitory units

(11) Residential care/assisted living facilities, social and substance abuse rehabilitation facilities, and group homes

(12) Foster care facilities, nursing homes, and psychiatric hospitals

(13) Areas of agricultural buildings accessible to the general public and any common areas

(14) Public garden areas, play areas, recreation areas and other similar public 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.

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

(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:

(4) A single receptacle that is not readily accessible and supplies one appliance

(5) A duplex receptacle that is not readily accessible and supplies two appliances

(6) Nongrounding receptacles used for replacements as permitted in 406.4(D)(2)(a)

Statement of Problem and Substantiation for Public Input

Require or add clarity that tamper resistant receptacles are required in public garden areas, play areas, recreation areas and other similar public areas.

Many of the same drivers of risk which are present and mitigated in the interior spaces will exist outside of the protected space. For example, in a preschool the receptacle in a classroom is protected while a receptacle in the outside play area is not.

Submitter Information Verification

Submitter Full Name: Gary Hein
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 15 12:18:16 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8824-NFPA 70-2024
Statement: Added park and recreation areas in a new item (11), along with a new informational note no. 4 to clarify that park and recreation areas include garden areas, play areas, and similar indoor and outdoor areas.

The addition of tamper-resistant receptacles applies to all areas where children of all ages have access to these areas where receptacles may be installed.

“Dormitory units” was replaced with “Dormitories” for clarity.

Public Input No. 3647-NFPA 70-2023 [Section No. 406.12]

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, and 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:~~

(6) ~~Business offices accessible to the general public~~

(7) ~~Lobbies, and waiting spaces~~

(8) ~~Spaces of nursing homes and limited care facilities covered in~~ ~~517.10(B)(2)~~

(9) Places of awaiting transportation, gymnasiums, skating rinks, fitness centers, and auditoriums

(10) Dormitory units

(11) ~~Residential care/assisted living facilities, social and substance abuse rehabilitation facilities, and group homes~~

(12) ~~Foster care facilities, nursing homes, and psychiatric hospitals~~

(13) 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.

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

(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:

(4) A single receptacle that is not readily accessible and supplies one appliance

(5) A duplex receptacle that is not readily accessible and supplies two appliances

(6) Nongrounding receptacles used for replacements as permitted in 406.4(D)(2)(a)

Statement of Problem and Substantiation for Public Input

CMP-15, and more broadly, NFPA 99 establishes requirements for these devices and their locations.

Submitter Information Verification

Submitter Full Name: Walter Vernon
Organization: Mazzetti
Affiliation: NFPA 99 ELS
Street Address:
City:
State:
Zip:
Submittal Date: Tue Sep 05 12:08:39 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: The substantiation that CMP-15, and more broadly, NFPA 99 establishes requirements for these devices and their locations is not accurate. Panel 18 is responsible for the content of Article 406 which identifies the locations where Tamper-Resistant Receptacles are installed. These requirements specifically address the areas not addressed by other parts of the Code.

Public Input No. 707-NFPA 70-2023 [Section No. 406.12]

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, and 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) Education facilities where children the age of 13 and younger attend

(6) Within clinics, medical and dental offices, and outpatient facilities, the following spaces:

(7) Business offices accessible to the general public

(8) Lobbies, and waiting spaces

(9) Spaces of nursing homes and limited care facilities covered in 517.10(B)(2)

(10) Places of awaiting transportation, gymnasiums, skating rinks, fitness centers, and auditoriums

(11) Dormitory units

(12) Residential care/assisted living facilities, social and substance abuse rehabilitation facilities, and group homes

(13) Foster care facilities, nursing homes, and psychiatric hospitals

(14) 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.

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

(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:

(4) A single receptacle that is not readily accessible and supplies one appliance

(5) A duplex receptacle that is not readily accessible and supplies two appliances

(6) Nongrounding receptacles used for replacements as permitted in 406.4(D)(2)(a)

Statement of Problem and Substantiation for Public Input

i believe that the statement of "and educational facilities" is too broad and vague. by separating them and adding an age to the educational facilities it will be easier to determine if it would be necessary to implement the use of tamper-resistant receptacles.

Submitter Information Verification

Submitter Full Name: matt s
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Sun Apr 23 21:16:03 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: The suggested change does not improve clarity and enforceability. Educational facilities are generally accessible to children of all ages.

Public Input No. 806-NFPA 70-2023 [Section No. 406.12]

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, and common areas

(2) Guest rooms and guest suites of hotels, motels, dormitories, 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:

(6) Business offices accessible to the general public

(7) Lobbies, and waiting spaces

(8) Spaces of nursing homes and limited care facilities covered in 517.10(B)(2)

(9) Places of awaiting transportation, gymnasiums, skating rinks, fitness centers, and auditoriums

(10) ~~Dormitory units~~ Dormitories

(11) Residential care/assisted living facilities, social and substance abuse rehabilitation facilities, and group homes

(12) Foster care facilities, nursing homes, and psychiatric hospitals

(13) 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.

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

(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:

(4) A single receptacle that is not readily accessible and supplies one appliance

(5) A duplex receptacle that is not readily accessible and supplies two appliances

(6) Nongrounding receptacles used for replacements as permitted in 406.4(D)(2)(a)

Statement of Problem and Substantiation for Public Input

OBJECTIVE:
• USABILITY of NEC® and consistent CORRELATION with the defined term's EXTRACT source NFPA 101® Life Safety Code® regarding INDIVIDUAL guest rooms and individual guest suites of dormitories versus the ENTIRE dormitory occupancy. NEC® Correlation Committee [NEC-AAC] take note.
.
BACKGROUND: Users of NEC® have encountered interpretational discrepancies with the present confusing wording. Presently, interpretation confusion exists to readers of NEC® regarding the use of the term "dormitory UNIT" versus the present definition's ambiguous clause " ... group SLEEPING ACCOMMODATIONS are provided for more than 16 persons who are not members of the same family IN ONE ROOM, OR A SERIES OF CLOSELY ASSOCIATED ROOMS, ...". Because of misinterpretation, it has been interpreted by some AHJs that the "UNIT" itself MUST accommodate "MORE THAN 16 PERSONS".
.
The phrase "IN ONE ROOM, OR A SERIES OF CLOSELY ASSOCIATED ROOMS" refers to "who are NOT MEMBERS of the SAME FAMILY", and does NOT refer to the "group SLEEPING ACCOMMODATIONS" having to be within in ONE room or ONE suite of rooms. Consequently, "dormitory" refers to the ENTIRE building or the ENTIRE space within that building AS AN OCCUPANCY that must accommodate MORE THAN 16 persons, and NOT to EACH specific sleeping room accommodating more than 16 persons.
.
NFPA 101® Informational Annex A has long ago addressed this misinterpretation: "A.3.3.68 Dormitory. Rooms within dormitories intended for the use of individuals for combined living and sleeping purposes are guest rooms or guest suites. Examples of dormitories are college dormitories, fraternity and sorority houses, and military barracks.". Further, "Guest Room" and "Guest Suite" are ALREADY explicitly defined terms in both NFPA 70® and NFPA 101 [3.3.136 for "Guest Room"; 3.3.285.1 for "Guest Suite"].
.
It is essential therefore that the terminology and usage for dormitories and for guest rooms and guest suites of dormitories in NFPA 70® be clarified at this time, CONSISTENT with NFPA 101®, to avoid enforcement confusion between Codes.
.
NOTA BENE: NO REVISIONS WHATSOEVER were made by this Public Input to »list items 5a, 5b or 5c« (misidentified as »indented list items 6, 7, and 8«, respectively, by the TerraView application program), or to the Exception's »list items 3a or 3b« (misidentified as »indented list items 4 and 5«, respectively, by TerraView artificial stupidity). Any underlining or renumbering indicated on any of those list items, and any spurious renumbering of subsequent list items were made without my authorization by NFPA's brain-dead excuse of an application program TerraView that NFPA seems to be incapable of remedying. Not my circus; not my monkeys. If ChatAI is programmed as well as TerraView, then humanity has absolutely no threat from Artificial Intelligence (AI).

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 798-NFPA 70-2023 [Definition: Dormitory Unit.]	Clarification of NEC ambiguity in the definition extracted from NFPA 101
Public Input No. 798-NFPA 70-2023 [Definition: Dormitory Unit.]	

Submitter Information Verification

Submitter Full Name: Brian Rock
Organization: Hubbell Incorporated
Street Address:
City:
State:
Zip:
Submittal Date: Fri May 12 17:37:10 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8824-NFPA 70-2024

Statement: Added park and recreation areas in a new item (11), along with a new informational note no. 4 to clarify that park and recreation areas include garden areas, play areas, and similar indoor and outdoor areas.

The addition of tamper-resistant receptacles applies to all areas where children of all ages have access to these areas where receptacles may be installed.

“Dormitory units” was replaced with “Dormitories” for clarity.

Public Input No. 883-NFPA 70-2023 [Section No. 406.12]

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, and 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:

(6) Business offices accessible to the general public

(7) Lobbies, and waiting spaces

(8) Spaces of nursing homes and limited care facilities covered in 517.10(B)(2)

(9) Places of awaiting transportation, gymnasiums, skating rinks, fitness centers, and auditoriums

(10) Dormitory units

(11) Residential care/assisted living facilities, social and substance abuse rehabilitation facilities, and group homes

(12) Foster care facilities, nursing homes, and psychiatric hospitals

(13) 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.

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

(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:

(4) A single receptacle that is not readily accessible and supplies one appliance

(5) A duplex receptacle that is not readily accessible and supplies two appliances

(6) Nongrounding receptacles used for replacements as permitted in 406.4(D)(2)(a)

(7) A military barracks or UEPH (Unaccompanied Enlisted Personnel Housing) where children are not allowed.

Statement of Problem and Substantiation for Public Input

I believe a barracks or UEPH meets the definition of dwelling unit but these locations are intended for single soldiers or unaccompanied soldiers and we have had issues in the field with regard to interpretation of this requirement. If I make an exception in our UFC (unified facilities criteria) then it would be going against the NEC since these locations meet the definition of dwelling units. I'm open to other ideas to help resolve this issue. thanks! -Brad Brack, PE

Submitter Information Verification

Submitter Full Name: Brad Brack
Organization: US Army Corps of Engineers
Street Address:
City:
State:
Zip:
Submittal Date: Wed May 24 02:01:43 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: It is unclear as to the permanency of such classification of the unit and whether or not children could have access to these location(s).

Public Input No. 3709-NFPA 70-2023 [Section No. 406.13 [Excluding any Sub-Sections]]

Single-pole separable connectors shall ~~be listed and labeled and shall~~ comply with 406.13(A) through (D).

Statement of Problem and Substantiation for Public Input

The listing and labeling requirement should be relocated to 406.2 for compliance with the NEC Style Manual Section 2.2.1.

Submitter Information Verification

Submitter Full Name: Derrick Atkins
Organization: Minneapolis Electrical JATC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Sep 05 14:32:39 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-7915-NFPA 70-2024
Statement: The requirements for listing are relocated from Sections 406.3, 406.7, and 406.13 for compliance with the NEC Style Manual Section 2.2.1.

Article reference numbers change throughout the entire article.

Public Input No. 3283-NFPA 70-2023 [Section No. 410.1]

410.1 Scope.

This article covers luminaires, portable luminaires, lampholders, pendants, incandescent filament lamps, arc lamps, electric-discharge lamps, decorative lighting products, lighting accessories for temporary seasonal and holiday use, portable flexible lighting products, and the wiring and equipment forming part of such products and lighting installations.

Informational Note: See *IEEE/IES Recommended Practice for the Design of Power Systems Supplying Lighting Systems in Commercial and Industrial Facilities* for detailed planning, design, construction, operation and maintenance of interior and exterior illumination systems.

Statement of Problem and Substantiation for Public Input

This is the most detailed and up-to-date recommended practice jointly developed by the Industrial Applications Society of the Institute of Electrical and Electronic Engineers and the Illumination Engineering Society. Much of the content replaces Chapter 10 of IEEE STD 241-1990 (Gray Book) last published more than 30 years ago; before LED illumination technologies were widely available. From the project prospectus:

"The design of power systems supplying lighting loads of industrial and commercial facilities are covered in this recommended practice. Common power system considerations specifically related to lighting loads are discussed, including voltage drop, transients, flicker, and circuiting recommendations for various applications. General fundamental concepts of lighting design, including common light sources, control methods, and application techniques, are discussed. Industry-recognized lighting design organizations and applicable lighting codes are discussed and identified as further resources for the lighting designer."

Submitter Information Verification

Submitter Full Name:	Michael Anthony
Organization:	Standards Michigan LLC (Michael A. Anthony) & Gary Fox (ABB-US)
Affiliation:	IEEE Industrial Applications Society
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Thu Aug 31 14:00:53 EDT 2023
Committee:	NEC-P18

Committee Statement

Resolution: The NEC is not a design guide and a reference to this would be too specific for Article 410 since it is limited to commercial & industrial establishments.

Public Input No. 2609-NFPA 70-2023 [Section No. 410.2]

410. ~~2~~ **3** Reconditioned Equipment.

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

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to comply with the NEC Style Manual Section 2.2.1 regarding reconditioned equipment.
2.2.1 Parallel Numbering Required. Technical committees shall use the following section numbers for the same purposes within articles. This requirement shall not apply to Articles 90, 100, and 110. If the article does not contain listing or reconditioning requirements, the subdivisions shall not be included in the article.
Required Parallel Numbering Format
XXX.1 Scope.
XXX.2 Listing Requirements.
XXX.3 Reconditioned Equipment.
XXX.3(A) Permitted to be Installed.
XXX.3(B) Not Permitted to be Installed.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

Submitter Full Name: David Williams
Organization: Delta Charter Township
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 23 20:01:46 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-7970-NFPA 70-2024
Statement: The text is revised to comply with the NEC Style Manual Section 2.2.1.

Public Input No. 3723-NFPA 70-2023 [Section No. 410.2]

410.~~2~~ 3 Reconditioned Equipment.

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

Statement of Problem and Substantiation for Public Input

The section should be relocated to 410.3 for compliance with the NEC Style Manual Section 2.2.1.

Submitter Information Verification

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Submittal Date: Tue Sep 05 14:55:05 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-7970-NFPA 70-2024
Statement: The text is revised to comply with the NEC Style Manual Section 2.2.1.

Public Input No. 3724-NFPA 70-2023 [Section No. 410.6]

410.6~~—~~2 Listing Required.

All luminaires, lampholders, and retrofit kits shall be listed.

Statement of Problem and Substantiation for Public Input

The section should be relocated to 410.2 for compliance with the NEC Style Manual Section 2.2.1.

Submitter Information Verification

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Submittal Date: Tue Sep 05 14:56:05 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-7972-NFPA 70-2024
Statement: The section has been renumbered and the title revised to comply with the NEC Style Manual Section 2.2.1.

Public Input No. 2228-NFPA 70-2023 [Section No. 410.16(C)]

(C) Luminaire Types Not Permitted.

~~Incandescent luminaires~~ Luminaires with open or partially enclosed lamps and pendant luminaires or lampholders shall not be permitted.

Statement of Problem and Substantiation for Public Input

410.16 (C) - does not need to exist as it is covered by 410.16 (B). Keeping 410.16(C) as is weakens 410.16 (B) as it may unintentionally imply that the usage of an LED or a compact fluorescent bulb/tube in place of an incandescent bulb is acceptable.

Delete or expand 410.16 (C) text to state that NO open or partially enclosed luminaires with bulbs, lamps, tubes, LEDs, etc. is permitted.

Submitter Information Verification

Submitter Full Name: Gary Hein
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 15 12:30:38 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-7973-NFPA 70-2024
Statement: Incandescent was removed and reference to 410.16(B) was added to clarify that this requirement applies to the luminaire and is independent of the light source.

Public Input No. 2229-NFPA 70-2023 [Section No. 410.16(D)]

(D) Location.

The minimum clearance between ~~luminaires~~ (add a point of reference such as the edge of or the center of the luminaire, etc.) luminaires installed in clothes closets and the nearest point of a clothes closet storage space shall be as follows:

(1) 300 mm (12 in.) for surface-mounted incandescent or LED luminaires with a completely enclosed light source installed on the wall above the door or on the ceiling.

(2) 150 mm (6 in.) for surface-mounted fluorescent luminaires installed on the wall above the door or on the ceiling.

(3) 150 mm (6 in.) for recessed incandescent or LED luminaires with a completely enclosed light source installed in the wall or the ceiling.

(4) 150 mm (6 in.) for recessed fluorescent luminaires installed in the wall or the ceiling.

Exception: Surface-mounted fluorescent or LED luminaires shall be permitted to be installed within the clothes closet storage space where identified for this use.

Statement of Problem and Substantiation for Public Input

410.16 (D) - specify from which part of the luminaire the measurement to the nearest point of a clothes closet storage space edge is to be taken from. For example, the edge of a decorative trim plate of a luminaire, the center of the luminaire, etc. The greatest contribution of the NEC is when ambiguity is eliminated.

Submitter Information Verification

Submitter Full Name: Gary Hein
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Street Address:
City:
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Submittal Date: Tue Aug 15 12:35:25 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: The term "minimum clearance: is not ambiguous. It is from the nearest point on the luminaire to the nearest point of the Clothes Closet Storage Space.

Public Input No. 3488-NFPA 70-2023 [Section No. 410.20]

410.20 Space for Conductors.

Canopies and outlet boxes taken together shall provide sufficient space so that luminaire conductors and their connecting devices are capable of being installed in accordance with 314.16. Conductors supplied as part of a luminaire shall be counted as originating outside the box in applying 314.16(B)(1).

Statement of Problem and Substantiation for Public Input

Boxes can get awfully crowded, even while installers believe they are complying with code rules. This calls for clarification.

314.16 counts conductors that originate outside the enclosure to determine needed fill. In calculating enclosure volume that's available to fill, 314.16 includes extensions such as domed covers with marked volume. In order to coordinate the two sections with the expression "luminaire conductors," it would be helpful to clarify that where luminaires incorporate leads rather than terminals for the building wiring, luminaire conductors doesn't just mean the building wire but includes the fixture leads.

The CMP notes that the standard for luminaires allows their construction to use internal compartments with reduced-volume in ROP: 18-41 Log #2313 NEC-P18. Some listed luminaires intended for installation over outlet boxes are designed with the presumption that there is volume inside those outlet boxes to help accommodate their wiring. Without a marking on a domed-cover type canopy indicating the volume it adds, whatever leads come from it need to be treated as requiring room in the outlet box. They might not take up even the full 3.0 cu in. that Table 314.16(B)(1) specifies for two 18 AWG conductors, but they can't be ignored. It is as easy to read "luminaire conductors" as referring solely to the building wiring that is attached as it is to take it as applying to the fixture leads.

410.20 uses the term "canopy"; 314.16 uses the term "domed covers," a subset of canopies, as the term is used ordinarily. Aside from the reference to 314.16, it is not clear what 410.20 adds.

Further Substantiation:
Canopies have shrunk since this was Section 4121. They no longer are a reliable source of additional wiring volume. The term "sufficient space" is a judgment call, and unfair given that the reference to 314.16 added in 2011 doesn't tell us how to calculate space added by canopies unless they are domed covers with marked volume. It was added with the substantiation (70-A2010-ROP, 18-109) that it is specific

Decades ago, canopies for flush and semi-flush luminaires were domes that kept lampholders away from building wiring–or so we thought. Then research found that building wiring nestled up closer and got hotter than had been assumed. Thermal insulation pads were added, taking up room. Then LEDs took over the market, with flat canopies.

Recently I swapped an outdoor lantern-type luminaire for a flood. The flood would not fit over the outlet box, a pancake that was fed quite legally by 12/2AC cable. The listed floodlight relied on the box's volume and depth to hold the splices of its fixture wires as well as their splices to the conductors feeding it. This risk is increasingly common.

Submitter Information Verification

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Submittal Date: Mon Sep 04 11:32:23 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: This should be addressed in Chapter 3 since the necessary box volume is independent upon the type of equipment attached to a box, this is not unique to luminaires.

Public Input No. 3287-NFPA 70-2023 [Section No. 410.36]

410.36 Means of Support.

(A) Luminaires Supported By Outlet Boxes.

Luminaires shall be permitted to be supported by outlet boxes or fittings installed as required by 314.23. The installation shall comply with the following requirements:

(1) The outlet boxes or fittings shall comply with 314.27(A)(1) and 314.27(A)(2).

(2) ~~Luminaires shall be permitted to be supported~~ In habitable rooms, hallways, and foyers of one- and two-family dwellings, a listed weight-supporting ceiling receptacle (WSCR), and a compatible weight-supporting attachment fitting (WSAF) installed in accordance with 314.27(E) shall be installed in all ceiling outlet boxes for luminaires . A listed WSCR shall not be required in outlet boxes for any of the following:

a. Electric-discharge or LED tube-type luminaires

b. Track Lighting

c. Recessed luminaires

d. Cove lighting

Informational Note: See ANSI/NEMA WD-6, American National Standard for Wiring Devices - Dimensional Specifications, for standard configurations of weight-supporting attachment fittings.

(3) Outlet boxes complying with 314.27(E) shall be considered lighting outlets as required by 210.70(A) , (B), and (C).

(B) Suspended Ceilings.

Framing members of suspended ceiling systems used to support luminaires shall be securely fastened to each other and shall be securely attached to the building structure at appropriate intervals. Luminaires shall be securely fastened to the ceiling framing member by mechanical means such as bolts, screws, or rivets. Listed clips identified for use with the type of ceiling framing member(s) and luminaire(s) shall also be permitted.

(C) Luminaire Studs.

Luminaire studs that are not a part of outlet boxes, hickeys, tripods, and crowfeet shall be made of steel, malleable iron, or other material suitable for the application.

(D) Insulating Joints.

Insulating joints that are not designed to be mounted with screws or bolts shall have an exterior metal casing, insulated from both screw connections.

(E) Raceway Fittings.

Raceway fittings used to support a luminaire(s) shall be capable of supporting the weight of the complete fixture assembly and lamp(s).

(F) Busways.

Luminaires shall be permitted to be connected to busways in accordance with 368.17(C).

(G) Trees.

Outdoor luminaires and associated equipment shall be permitted to be supported by trees.

Informational Note No. 1: See 225.26 for restrictions for support of overhead conductors.

Informational Note No. 2: See 300.5(D) for protection of conductors.

Statement of Problem and Substantiation for Public Input

The only change in this PI is to modify (2) and add an informational note.

WHY SHOULD THIS BE MODIFIED? This Public Input focuses on injury prevention. There are two categories of injuries that we are trying to prevent – those that can occur during installation, maintenance and replacement, and those that can happen subsequently if a fixture falls.
The WSCR significantly simplifies traditional wiring of luminaires involving exposed conductors and increases safety. Section 410.36(A)(2) is revised to require connection and support via weight-supporting ceiling receptacles (WSCR) and weight supporting attachment fittings (WSAF) to increase safety for the initial installation and for future exchanges of luminaires in one- and two-family dwellings. Four conditions are proposed where the WSCR is not presently practical or necessary due to configuration issues. The WSCR has been determined to be compatible with all known ceiling outlet boxes, and the revised text correlates with the requirements in 314.27.

PLACEMENT OF REQUIREMENT. The proposed text is recommended for placement in Article 410 because Panel 9 has determined this topic is within the scope of Panel 18, relating to the support of luminaires.

STANDARD CONFIGURATION. Guidance from Panel 18 resulting in obtaining a NEMA standard configuration, and is so noted in the proposed Informational Note. The WSCR for luminaires is keyed so that it will only accept the WSAF for luminaires. The WSCR for paddle fans is a more robust receptacle, which is designed to support up to 70- pounds and the vibration from the dynamic load of a fan. The WSCR for luminaires is designed to support up to a 50-pound static luminaire load. The keyed luminaire receptacle will prevent the installation of the WSAF for heavier paddle fans.

SAFETY. Once installed, the WSCR will provide shock protection during cleaning, maintenance and replacement by reducing the need to work inside outlet boxes where there are energized conductors. The luminaire can simply be removed through the WSCR. This requirement will provide fall protection by limiting both falls from unbalance and from the shock hazards during cleaning, maintenance and replacement that can result in falls and by reducing the time spent on ladders. Additionally, the WSCR reduces the falling fixtures since it is a secure mechanism by which to hang the luminaire. This 1:25 minute video demonstrates the simplicity of a WSCR/WSAF installation: https://youtu.be/0idb9sOudi0?si=RwjhHB2E7S-woHJv

DATA TO SUBSTANTIATE – SUMMARY OF SUPPORTING MATERIAL. A significant amount of information was collected and analyzed for this public input, including information from the U.S. Census Bureau, OSHA, NIOSH, CPSC, and CDC. It is included in the supporting material sent to NFPA for the Panel. The data include a death of a union electrician while installing a luminaire (OSHA); CPSC data shows falls from ladders while installing lights and lighting fixtures falling on people.
OSHA reports point to two professional electricians' deaths that potentially could've been prevented by the use of WSCR. See the following links: https://www.osha.gov/pls/imis/establishment.inspection_detail?id=18396960 https://www.osha.gov/pls/imis/establishment.inspection_detail?id=314163627
According to the American Housing Survey, which is a report generated every two years by the U.S. Census Bureau, a lot of home renovations are performed by the homeowner. Many homeowners are now installing their own luminaires. Some hire professionals, but often the installer is not an electrical professional. The installer could be a painter, carpenter, drywaller or handy person.
NFPA Report No. USS117 published in February 2022, "Home Fires Caused by Electrical Distribution and Lighting Equipment" provides clear evidence that not enough emphasis is placed on incorrect installation of lighting. The reports noted that fires involving electrical distribution and lighting equipment caused an estimated average of 430 civilian deaths and 1,070 civilian injuries per year in 2015–2019, as well as an estimated $1.3 billion in direct property damage each year. Specifically, wiring and related equipment accounted for 68% of these fires, 60% of the property damage and 42% of the civilian deaths and 53% of injuries. Arcing served as the heat source in 73% of these fires.

SNAPSHOT OF DATA. It should be noted that with any data collection, it is but a small percentage of actual injuries that have been reported. For instance, the CPSC uses data from only 96 select hospitals, and there are over 6000 hospitals, not to mention the 11,800 urgent care facilities in the US. The data indicate a need for more robust installations.

DIYers AND NON-ELECTRICIANS. A fundamental premise is that much of the home improvement work today is done by the do-it-yourselfer. The information on renovations is from the American Housing Survey, which is a report generated every two years by the U.S. Census Bureau. This report accumulates information on all aspects of housing. We have highlighted information that contrasts professional installations and do-it-yourself projects. It should be noted that licensing requirements vary among jurisdictions. A professional installer may not necessarily be licensed as an electrician.
Information of the number of home improvement centers and hardware stores is provided to present a perspective on the size of the support network for home improvement. Home improvement stores are now a major factor in the US economy.

RENOVATION DATA. This report includes all of the residential renovations for each reporting period. Some of the larger renovation projects reported would have included electrical work, which was not separately

categorized. Summary charts are provided on all renovations along with a single chart that reports on projects that were only classified as electrical.
DEATHS AND INJURIES REPORTED. Information from OSHA, NIOSH, CPSC, and CDC is based on reported accidents. OSHA and NIOSH data is reported in accordance with workplace accident reporting regulations. CPSC data is based on incidents that come to the attention of CPSC. Persons who are injured are not required to report their injuries to CPSC, so the information may be incomplete.
The data on falls is based on reports from hospitals and clinics, which is contained in the WISQARS database. Two separate reports are presented, one for fatalities and one for non-fatal injuries.
<SEE ATTACHMENT FOR SUPPORTING DATA>

THAT NEXT HOME IMPROVEMENT – IS IT SAFE? People are always dreaming of that next home improvement or update. One of the most desirable ways to do that is by changing luminaires and adding or updating ceiling paddle fans.
As more DIYers are doing this improvement work, safety concerns grow exponentially. Some of the biggest safety issues are falls from ladders, electric shocks and electrocutions.

…BECAUSE IT WAS ALWAYS DONE THAT WAY…? When overhead general lighting is going to be installed, why does the initial luminaire installation or future luminaire changes have to be hard-wired? Now technology exists to mitigate the hazards, as discussed here and should become mandatory for safety. Safety in the NEC is a continuing evolution. When the screw shell lampholder design was standardized, why wasn't a weight supporting quick-connect option for luminaires also included? Simply put, because the technology didn't exist. When looking around the home, most electrical equipment is plug and play, except ceiling luminaires. Furthermore, experience demonstrates that occupants would like to be able to change luminaires.
One example of code and technology evolution is the use of a 2-wire lighting socket screw-shell adapter to power appliances. Evolution brought 2-wire receptacles for this purpose and these evolved to 3-wire grounded receptacles, some of which became GFCI-type receptacles. Advancements in technology coupled with the need to improve safety is the fundamental principle of the NEC.

DANGERS OF DOING IT THE "OLD" WAY. From your own experience, you understand the dangers of working on a ladder (with or without the luminaire or paddle fan) while wiring. Do you realize that, excluding motor vehicle accidents, falls are the #1 cause of injuries in construction (US Census Bureau BLS, 2019), which includes electricians? The data shown below validates your own experiences of strains and falls. Shouldn't the wiring be done once, similar to any other receptacle, and the luminaire simply plugged in afterwards?
IT IS TIME TO TAKE ANOTHER STEP IN THE EVOLUTION TO FURTHER IMPROVE SAFETY.

DIYs ARE A LARGE SEGMENT OF RESIDENTIAL REMODELING
-- DIYers do between 36 - 38% of all home improvement projects (US Census Bureau, 2017)
-- DIYers do between 35.2 - 35.9% of all electrical home improvement projects (US Census Bureau, 2017).
-- Luminaires and paddle fans are two of the most popular electrical improvements.
-- HGTV, DIY Network, YouTube encourage DIY projects.
-- House flipping is popular among DIYers, encouraged by HGTV programming.
-- There are several thousand home improvement stores nationwide to support DIY projects
HAZARDS FROM THE DIY INSTALLATION
-- Incorrect installations go undetected
-- Incorrect wiring causing shorts and shocks
-- Incorrect support causing luminaires/paddle fans to fall or damage wires
-- Falls from ladders during installation from:
-- Shocks
-- Unsteadiness and losing balance
-- Awkwardness of handling luminaires while connecting wires
-- Shocks during installation of replacement luminaires due to exposure of live wires

The extent of the DIY problem installations is not really known. There is rarely an electrical inspection initially, and subsequent real estate home inspectors often have a low level of electrical training. Also, there is no one or entity that is keeping statistics.
SIMPLER MAINTENANCE
-- Easy removal for cleaning luminaires and bulb replacement
-- Easy removal and reinstallation for painting the ceiling
-- Quick install/removal of luminaires
IF THE WORK IS DONE BY PROFESSIONALS, WHO ARE "PROFESSIONALS" INSTALLING LIGHTING?
How many of the professional home improvement projects include an electrical professional on the team? Is the electrical work being performed by painters? Carpenters? Drywallers? Home handymen?
-- The CPSC estimates there are 4 electrocution deaths per year associated with lighting products (Hnatov, 2009) that they have been able to identify. One death is one too many.

-- CPSC data from the National Electronic Injury Surveillance System (NEISS) database (CPSC, 2019) from 2009 to 2013 revealed 38 incidents resulting in hospital emergency room visits involving the installation of luminaires; 32 of those incidents involved falls and at least four of those incidents involved the victims being shocked.
THE SOLUTION
The proposed solution is an innovative advance that makes the installation of luminaires/paddle fans safer not just for the current installation, but for future replacements. With this new technology installed during initial construction by electrical professionals there is:
-- a quick connect/disconnect capability (similar to a standard receptacle)
-- support of the weight of the luminaire
-- no supporting the weight or bulk of the luminaire during the receptacle installation
-- no additional rewiring necessary to install the new luminaire
-- no shock hazard during the quick connect of the luminaire
The WSCR is an advance that makes the installation of luminaires safer not just for the current installation, but for future replacements. For the initial installation, the only “weight” the installer has to deal with is the WSCR which is ounces not pounds.
Without the weight/bulk, the falls may not have occurred. With the new technology WSCR in place, the initial installation of the luminaire and any replacement is a quick connect and no shock would have occurred.
If the WSCR and WSAF are required, homeowners and other installers would be protected from shock and fall accidents. They would also be more able to change luminaires at will. The solution makes the initial installation safer and provides that future lighting replacements do not require the homeowner to come in contact with potentially live wiring. The WSCR and WSAF configurations protect homeowners and other DIY installers and make lighting replacements simple.
PUBLIC SAFETY.
The WSCR and WSAF would increase overall public safety; a previously installed WSCR will:
-- REDUCE installation time and time on ladders (due to ease of installation)
-- REDUCE time standing on something substituting for a ladder (chair, table, sofa, etc.)
-- ELIMINATE homeowners splicing of wiring especially while on ladders
-- REDUCE incorrect installations that could lead to fires or shock hazards
-- REDUCE injuries and deaths from
-- shock and electrocution
-- falls
-- PROMOTES robust and safe first-time installation by professionals
-- ALLOWS quick connect for initial and future installations
-- ELIMINATE straining of conductors and connectors holding the weight of luminaire during installation
-- ELIMINATE the need to support the weight of the luminaire during wiring; the WSCR weighs ounces.
-- FACILITATES safety when the inspector verifies polarity of the wiring to the WSCR via a circuit tester (versus no polarity verification of luminaires currently).
ADDITIONAL BENEFITS TO MANUFACTURERS WHO LICENSE TECHNOLOGY. This submission complies with the ANSI/NFPA Essential Patent Policy, and the necessary documentation has been provided to NFPA. The WSCR and WSAF would benefit manufacturers as follows:
-- REDUCE liability exposure
-- DECREASE time get a certificate of occupancy once WSCR is installed in ceiling
-- INCREASE purchasing of WSCR by homebuilders who wish to maximize spec homes (easy switch out of luminaires based on customer preference)
-- REDUCE procrastination of remodeling (entire construction industry benefits)
-- INCREASE interchangeability by promoting standardization
-- INCREASED business - interchangeability that anyone’s luminaire can be replaced with yours
-- DECREASE costs since multiple designs of connectors are not necessary
-- INCREASE product lines containing the “quick connect/disconnect” feature

REFERENCES
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National Electronic Injury Surveillance System On-Line Query System U.S. Consumer Products Safety Commission. (2019, July 08). Retrieved July 09, 2020, from https://www.cpsc.gov/cgibin/NEISSQuery/home.aspx

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statistics-and-reports/Electrical/osElectricalDistLighting.pdf.

Submitter Information Verification

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Submittal Date: Thu Aug 31 14:35:52 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: Data does not support a conclusion that the current installation practice for ceiling surface-mounted residential luminaires presents a safety concern that would be solved with mandating use of the WSCR. Additionally, data does not support the conclusion that DIY installers cannot safely install these products. Mandating the use of WSCRs and luminaires that incorporate WSAFs would limit the variety of products on the market (such as low-profile or large-footprint luminaries) and stifle innovation, while providing no enhanced safety. Mandating the use of WSCRs could increase the number of times that ladders must be used in the short to medium term.

Relevant Incidents involving Lighting Fixtures 2022-2013

Public Input #3287

This report contains the narrative reports of incidents involving injuries from falling lighting fixtures. These reports come from the National Electronic Injury Surveillance System (NEISS), which is maintained by the Consumer Product Safety Commission. According to the NEISS Coding Manual, "The primary purpose of NEISS is to provide timely data on unintentional consumer product-related injuries and deaths occurring in the U.S. NEISS injury data are gathered from the emergency departments (ED) of 96 hospitals selected as a probability sample of all U.S. hospitals with 24-hour EDs and at least 6 inpatient beds. Each participating NEISS hospital is hand-selected by CPSC because it provides an important representation of all other hospitals of its size and unique characteristics in the U.S."(January 2022, P.1) It is important to note that at the end of 2021, there were 6,129 hospitals in the US (https://www.statista.com/statistics/185843/number-of-all-hospitals-in-the-us/#:~:text=This%20statistic%20shows%20the%20number,2021%2C%20there%20were%206%2C129%20hospitals). In addition, there are approximately "10,800 active urgent care clinics in the US" (https://www.definitivehc.com/resources/healthcare-insights/urgent-care-clinics-us#:~:text=According%20to%20data%20from%20Definitive,urgent%20care%20clinics%20per%20capita.). This strongly indicates that the number of injuries is much higher.

The primary goal of admitting personnel is to collect the necessary information to begin treatment. It is important to understand that some incidents may simply be classified as falls, without digging deeper to determine what the patient was doing at the time, because the additional detail may not be considered clinically

important. Such incidents may not appear with complete details in these statistics. A few of the incidents that are included in this report involve pieces of fans falling on occupants. Such incidents likely occurred because the installation was not as robust as it needed to be, allowing parts to loosen and fall.

This report does not include workplace injuries. Workplace injury data is collected by the National Institute of Occupational Safety and Health.

Some lighting fixtures are installed on paddle fans. They are considered separately in a submission to 422.18. The dynamic forces of an operating fan motor result in a greater number of incidents. However, as mentioned above, these incident reports are based on data from only 96 hospitals..

Note: This report contains public domain information from the US Consumer Product Safety Commission

Lighting Fixture Incidents 2022-2013

CPSC Case #	Date	Narrative
221216134	2/18/2022	59YEAR OLD MALE FELL FROM LADDER WHILE INSTALLING A LIGHT AND LANDED ON LEFT ELBOW AND HIT HEAD. DX: CONCUSSION; SPRAIN OF LEFT ELBOW
220712075	6/30/2022	67 YEAR OLD MALE WAS 15 FT UP ON SCAFFOLDING AND FELL TO THE GROUND WITH A LIGHT FIXTURE POSSIBLY FALLING ON TOP OF HIM.DX: FRACTURE MULTIPLE RIBS LEFT SIDE, PNEUMOTHORAX, INFERIOR DISLOCATION LEFT SHOULDER, LACERATION SCALP, CHEST PAIN
210537574	5/11/2021	39YEAR OLD MALE FROM HOME WAS ON THE THIRD STEP OF A FOUR STEP STEPLADDER INSTALLING A LIGHT WHEN HE FELL OFF STRIKING THE COFFEE TABLE WITH HIS LOWER BACK DX: LOW BACK CONTUSION
211101131	10/25/2021	32 YEAR OLD MALE. C/O RIGHT KNEE PAIN. PT STATED HE WAS ON A LADDER FIXING A LIGHT AND FELL AROUND 4 FEET ONTO HIS RIGHT LEG. DX: KNEE SPRAIN.
211158157	11/22/2021	62 YEAR OLD MALE WAS TRYING TO SET UP A LIGHT WHEN HE FELL OFF THE LADDER LANDING ON HIS LEFT ELBOW AND FOREARM DX FOREARM SKIN TEAR, ELBOW CONTUSION
200500917	4/29/2020	78 YEAR OLD MALE WAS INSTALLING A LIGHT FIXTURE AT HOME WHEN HE FELL OFF OF A 3 STEP LADDER AND STRUCK HIS HEAD ROLLING DOWN 6 STEPS FROM HIS PORCH AFTER LANDING. DX: BILATERAL SAH, R TEMPORAL BONE FRACTURE, POSTERIOR SCALP LACERATION.
200922058	9/9/2020	32YEAR OLD MALE FELL OFF A LADDER PUTTING UP N/S LIGHTS--DX:ANKLE PAIN
190720595	7/4/2019	63YEAR OLD MALE FELL 10 FEET OFF LADDER WHILE ATTEMPTING TO HANG LIGHTS HIT HEAD + LOC DX FALL, LOC
190960016	9/7/2019	58YEAR OLD FEMALE REPORTS FALLING TO FLOOR 4 DAYS AGO WHILE TRYING TO CHANGE LIGHT FIXTURE INJURING TAILBONE DX FX COCCYX
180704997	6/30/2018	*57YEAR OLD MALE,FELL OFF LADDER W/IN ROOM CHANGING A LIGHT,FELL ONTO CONCRETE,CHESTPAIN,DX:CHI,STRAIN NECK
170233945	1/13/2017	79YEAR OLD MALE AT HOME CHANGING SOME LIGHTS & FELL OFF LADDER LANDED ON L SIDEDX MECHANICAL FALL, ACUTE MULT LEFT RIB FRACTURE, ACUTE LARGE L HEMOTHO
170447846	4/17/2017	49 YEAR OLD FEMALE STATES LIGHTING FIXTURE FELL AND STRUCK HEAD. C/O HA. DX CHI
161126227	10/28/2016	12YEAR OLD MALE SLEEPING WHEN *** FELL ON HEAD DX FOREHAD LACERATION, BLUNTHEAD INJURY@

150204164 1/28/2015 LUMBAR STR. 61YEAR OLD FEMALE FELL HANGING LIGHTS AND STRAINED LOWER BACK AT HOME.

130816514 8/2/2013 12YEAR OLD MALE LIGHT FIXTURE FELL ON PT HEAD;DX CHI

131029465 9/21/2013 72 YEAR OLD MALE HIT BY FALLING LIGHT. DX FOREHEAD LACERATION

September 2023

PROBLEMS AND SOLUTIONS SUMMARY

Problem: Traditional wiring

Existing practices allow wiring of luminaires and paddle fans that can result in faulty installations or hazards that can include:

- **Shocks, electrocutions, injuries & death**
- **Fires & shorts**
- **Exposure & contacting energized conductors**
- **Incorrect & sloppy wiring**
- **Splicing wires while on a ladder**
- **Straining of conductors & connectors holding the weight of luminaire during installation**
- **Incorrect installations go undetected**
  - **Loss of grounding/bonding connections**
- **Incorrect support causing luminaires/paddle fans to fall or damage wires**
- **Falls from ladders during installation from:**
  - **Shocks**
  - **Unsteadiness and losing balance**
  - **Awkwardness - handling while connecting wires**

Solution: Weight Supporting Ceiling Receptacle (WSCR)

Plugging-in luminaires & paddle fans using the WSCR & Weight Supporting Attachment Fitting (WSAF) will eliminate and/or reduce risk of faulty wire installations and can:

- **Reduce shocks, electrocutions, injuries & deaths**
- **Eliminate the need to touch wires; no exposed wires**
- **Prevent fires due to incorrect or sloppy wiring**
- **Provide a means to check polarity**
- **Eliminate straining of conductors & connectors holding the weight of luminaire during installation**
- **Eliminate splicing wires while on a ladder**
- **Reduce majority of time on ladders (unsteadiness & losing balance**
- **Reduce awkwardness of handling luminaires/paddle fans while connecting wires**

Supporting Material PI 3287

September 2023

Supporting Data for Public Input

REQUIREMENTS FOR WEIGHT SUPPORTING CEILING RECEPTACLE (WSCR) AND WEIGHT SUPPORTING ATTACHMENT FITTING (WSAF)

formerly Locking Support and Mounting Receptacle and Attachment Fitting

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MANY DIY'ERS MAKE THIS TECHNOLOGY CRUCIAL FOR SAFETY

Large Support Network for Do It Yourselfers

There is a significant market for do-it-yourself home improvement. Big-box retailers have sprung up across North America that supply products directly to the consumer. There are 2,286 North American Home Depot stores, 2155 Lowe's Stores, 5000 Ace Hardware stores, 3800 True Value stores, 4500 Do it Best stores, 1000 Harbor Freight stores and others that supply inexpensive tools to many of the DIYers. The DIY market is also supported by all sorts of You Tube videos, some of which is vendor supported, but much of which is generated by someone who may not be an expert. In addition, the Home and Garden TV Network (HGTV) has convinced many that they can make large profits by buying distressed existing home and flipping them. This has also encouraged homeowners to improve their own homes.

The big box stores are known for having large lighting departments that have extensive displays of fixtures. Many can arrange for a local contractor to do the installation. However, many consumers are taking on the project themselves or having some unlicensed handyman do the installation work.

The public inputs will propose to require that lighting outlets utilize listed WSCR and WSAF (locking support-type receptacles to connect to compatible attachment fittings) on luminaires and paddle fans. The use of the WSCR and WSAF simplify the replacement of luminaires and paddle fans. The use of the WSCR and WSAF limits the exposure to energized parts for future fixture replacements. Falls from ladders are a safety problem for professionals in the workplace. They are also a safety problem in the home. Simplifying the replacement process limits the time spent on ladders, and reduces the extended reach from higher ladder steps, minimizing the number of falls.

Fixtures have varying degrees of installation complexity and a variety of fastening means. There is also a lot of variety of degrees of assembly that is required. Some of assembly might take place on the ladder. With WSCR and WSAF, all of the assembly can take place off the ladder and the completed assembly can simply be raised into position and plugged in.

Renovation Statistics

The American Housing Survey, produced by the Census Bureau is generated every two years[1]. One of the many factors analyzed is home renovations. The survey analyzes professional and DIY renovations. The statistics appear to show a level percentage of DIY renovations out of the total number of renovations for each reporting period. Some renovations can easily be

[1] *U. S. Census Bureau, American Housing Survey*. (n.d.). Retrieved July 20, 2020, from https://www.census.gov/programs-surveys/ahs/data/interactive/ahstablecreator.html?s_areas=00000&s_year=2011&s_tablename=TABLE16&s_bygroup1=24&s_bygroup2=1&s_filtergroup1=1&s_filtergroup2=1.

performed by the homeowner. Surprisingly, the statistics also show a fairly consistent percentage of electrical renovations that are DIY. Permits are rarely taken out for DIY equipment replacements or renovations. That is sometimes the case with flipped homes. As a result, DIY work is rarely inspected by jurisdictional electrical inspectors. Even when permits are taken out, there is no guarantee that the work will be performed by professionals or that it will be inspected. Many jurisdictions will only spot check the work of homeowners because inspections cost money and if there is no inspection, the jurisdiction can just collect the permit fee. For those who are classified as professional, how many of the practitioners are electricians? How many are just handymen? Figures 1 through 4 illustrate the percentages of home improvement projects for a two-year period ending in 2017, 2015, 2013, and 2011. Figure 5 illustrates all of the electrical home improvement projects reported by the survey from 2010 through 2017. The background data is in Annex A.

FIGURES 1-4: LARGE PERCENTAGE OF HOME IMPROVEMENTS DONE BY DIY'ers; "PROFESSIONALS" CAN INCLUDE PAINTERS AND HANDYMEN, NOT ALWAYS ELECTRICIANS.

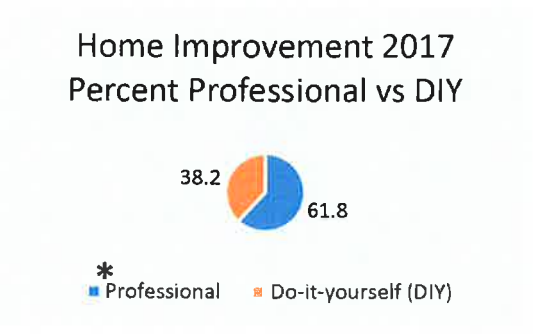


Figure 1.

* Professionals include handyman/painters/electricians

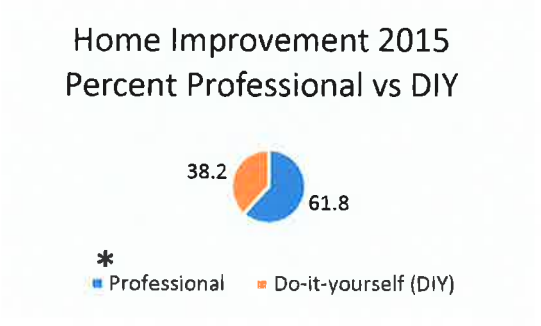


Figure 2.

* Professionals include handyman/painters/electricians

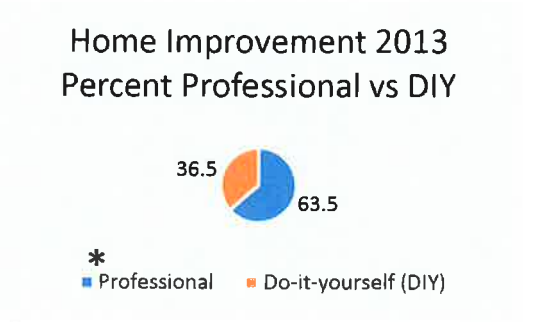


Figure 3.

* Professionals include handyman/painters/electricians

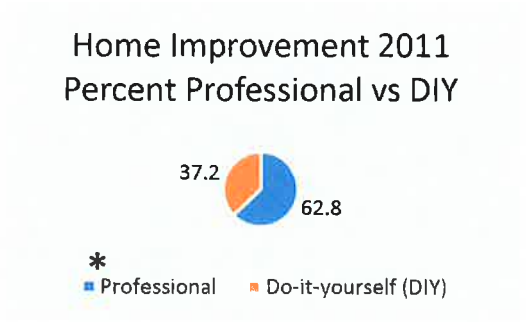
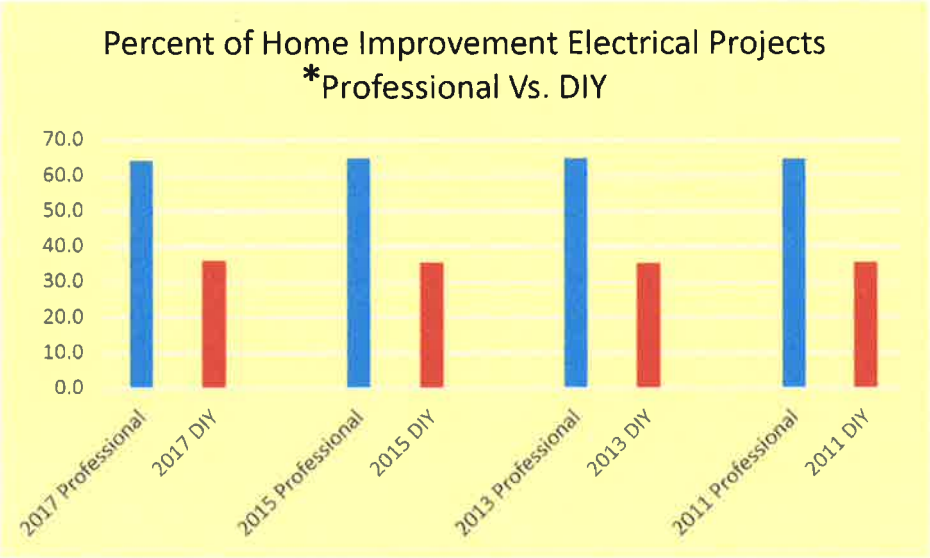


Figure 4.

* Professionals include handyman/painters/electricians

Electrical Home Improvement Projects

The number of people who are willing to do electrical work themselves has been a similar percentage to that of all DIY projects. It has also remained steady over the study periods of the survey. The raw statistics are included to provide a clearer picture of the types of home improvement projects undertaken. Many of the interior renovations likely include some electrical work, which may or may not be included separately as electrical work.



*Professionals include handyman/painters/electricians

Figure 5.

NFPA Residential Fire Statistics

NFPA estimates that 17,600 home fires in the US that are caused by faulty wiring connected with ceiling fans and lights (https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/Building-and-life-safety/oshomes.pdf) The report notes "Electrical distribution or lighting equipment was the leading cause of home fire property damage. An average of 35,000 such fires caused 500 deaths; 1,130 injuries; and $1.4 billion in direct property damage per year. Wiring and related equipment accounted for 7 percent of all home fires and 10 percent of all home fire deaths. Cords or plugs were involved in only 1 percent of the fires but 6 percent of the deaths. Extension cords dominated the cord or plug category. More information is available in the NFPA report, *Electrical Fires*[2]."

[2] Campbell, R. (2019, March). *Electrical Fires* (Tech.). Retrieved July 20, 2020, from National Fire Protection Association website: https://www.nfpa.org/News-and-Research/Data-research-and-tools/Electrical/Electrical

The following table notes fire statistics for lighting and distribution equipment. This is a rather broad category. There is a separate category for ceiling fans. It appears that fans category includes bathroom vent fans. It may also include kitchen exhaust fans.

Table 5.
Home Fires Involving Electrical Failure or Malfunction as Factor Contributing to Ignition by Equipment Involved in Ignition, 2012-2016 Annual Averages

Equipment Involved	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Electrical distribution and lighting equipment	**22,620**	**(50%)**	**310**	**(71%)**	**700**	**(56%)**	**$786**	**(62%)**
Wiring and related equipment	17,600	(39%)	190	(43%)	440	(35%)	$588	(46%)
Cord or plug	2,080	(5%)	100	(23%)	130	(11%)	$85	(7%)
Lamp, bulb or lighting	1,850	(4%)	10	(3%)	70	(5%)	$64	(5%)
Transformers and power supplies	1,080	(2%)	10	(2%)	60	(5%)	$49	(4%)

Later on, NFPA's *Electrical Fires* report contains the following table, which, for the same time period has different and larger numbers:

Table 14.
Home Fires Involving Electrical Distribution and Lighting Equipment, by Equipment Involved in Ignition 2012-2016 Annual Averages

Equipment Involved	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Wiring and related equipment	24,780	(67%)	270	(55%)	640	(53%)	$853	(67%)
Lamp, bulb or lighting	4,970	(13%)	40	(9%)	200	(17%)	$164	(13%)
Cord or plug	3,330	(11%)	160	(33%)	230	(19%)	$143	(11%)
Transformers and power supplies	2,060	(9%)	20	(3%)	130	(11%)	$108	(9%)
Other known equipment involved in ignition	20	(0%)	0	(0%)	0	(0%)	$0	(0%)
Total	35,150	(100%)	490	(100%)	1,200	(100%)	$1,270	(100%)

Injury Reports

OSHA Reports. Falls from ladders are a frequent hazard. They happen in commercial and industrial settings as well as in residential situations. For example: in the OSHA electrocution training materials, an OSHA Fatal Fact is presented[3] that details a union electrician's death by electrocution during trouble shooting with lamps. The shock caused the electrician to fall off the ladder (OSHA Incident Report #0418800).[4]

Another example: in 2011, an electrician was electrocuted when the wires of a light fixture he was attempting to hang became stripped energizing the light fixture. As he grabbed one of the attached steel hanging cables, he received a fatal shock (OSHA Incident Report #0317700).[5] It is reasonable to conclude that this incident could have been avoided if the new technology receptacle/attachment fitting technology had been used because the fixture could not have become energized, as there would be no access to electricity through the disconnected fixture.

NIOSH Reports. The National Institute for Occupational Safety and Health (NIOSH) conducts the Fatal Accident Circumstances and Epidemiology (FACE) Project. Data are collected from a sample of fatal accidents, including electrical-related fatalities.

For example: NIOSH FACE Report 87-55[6] summarized a 1987 electrocution of a North Carolina electrician. While repairing a fluorescent light fixture over a kitchen sink in a single-family residence, a 33-year-old journeyman electrician was electrocuted when he contacted an energized wire on the load side of the ballast (400 volts). The ballast had been replaced. However, he could not get the light to operate properly. The electrician was sitting on the sink when he apparently contacted an energized wire on the load side of the ballast. The circuit had not been de-energized at the panel box or at the single-pole switch on the wall beside the sink.

It is reasonable to conclude that this incident might have been avoided if the WSCR/WSAF technology had been used. The receptacle would've already been installed, and the fixture could've been taken down through a simple quick disconnect for examination. If the fixture was determined to be in working order, additional work could be completed with the fixture

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[3] Construction Focus Four: Electrocution Hazards, Instructor Guide. OSHA Training Institute, OSHA Directorate of Training and Education, April 2011. Document can be found online at https://www.osha.gov/dte/outreach/construction/focus_four/electrocution/electr_ig.pdf

[4] OSHA Report ID: 0418800 can be found at https://www.osha.gov/pls/imis/establishment.inspection_detail?id=18396960

[5] OSHA Report ID: 0317700 can be found at https://www.osha.gov/pls/imis/establishment.inspection_detail?id=314163627[6] NIOSH Face Reports 1982 to 2005 including 87-55 can be found at http://wwwn.cdc.gov/NIOSH-FACE/Default.cshtml?state=ALL&Incident_Year=ALL&Category2=0006&Submit=Submit#.VFjs8y7-DK0.email. This particular report can be located directly at http://www.cdc.gov/niosh/face/In-house/full8755.html

[6] NIOSH Face Reports 1982 to 2005 including 87-55 can be found at http://wwwn.cdc.gov/NIOSH-FACE/Default.cshtml?state=ALL&Incident_Year=ALL&Category2=0006&Submit=Submit#.VFjs8y7-DK0.email. This particular report can be located directly at http://www.cdc.gov/niosh/face/In-house/full8755.html

[7] 2004 Electrocutions Associated with Consumer Products, By Matthew V. Hnatov. Hazard Analysis Division, Directorate for Epidemiology, Consumer Products Safety Commission. April 2009

quickly disconnected and out of the vicinity so full attention could be given to the wiring. If the new technology had been used, the electrocution might have been avoided.

CPSC Data. It is important to note that CPSC data includes only the data the CPSC becomes aware of, and it is understood that there are many other incidents that are not reported or do not come to their attention. Consumers are not obligated to report incidents to the CPSC. The research from the National Electronic Injury Surveillance System (NEISS) database from 2009 to 2013 included the following:

- CPSC estimates 4 electrocution deaths per year associated with lighting products.[7]
- There were 38 incidents involving the installation of light fixtures that resulted in hospital emergency room visits;
- 32 of those incidents involved falls and at least four of those incidents involved the victims being shocked.

With the new technology, after the receptacle is installed in the ceiling, there is no additional wiring necessary, no weight or bulk of the fixture during the initial receptacle installation, certainty of connection of the fixture to the equipment grounding conductor, and no shock hazard during the quick connect of the fixture. Without the weight/bulk, the falls may not have occurred. With the new technology receptacle in place, installation of the luminaire is a quick connect and no shock would have occurred.

- There were 418 incidents involving changing light bulbs that resulted in hospital emergency room visits;
- 390 involved falls and at least six of those incidents involved the victims being shocked.
- There were 9 additional incidents associated with cleaning the light fixture that resulted in hospital emergency room visits; 8 of those involved falls.

Many of these incidents could have been avoided or minimized if the new technology receptacle/attachment fitting technology had been used. The fixture is simply disconnected and any bulb or fixture maintenance or cleaning can be done on a table, not at an elevation, thereby reducing the time at an elevated level, thereby reducing the hazard.

- There were 55 incidents involving a luminaire falling from the ceiling onto the victim that resulted in hospital emergency room visits.

If the receptacle/attachment fitting (WSCR/WSAF) technology had been used, many of these incidents could have been avoided or minimized. The new technology must pass weight support requirements in the UL product safety standards well beyond what the NEC permits.

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[7] 2004 Electrocutions Associated with Consumer Products, By Matthew V. Hnatov. Hazard Analysis Division, Directorate for Epidemiology, Consumer Products Safety Commission. April 2009

The NEC does not permit the assembly to support a luminaire weighing more than 50 lbs or a ceiling fan weighing more than 70 lbs, therefore the fixtures would not fall.

CDC Data. According to the Centers for Disease Control and Prevention (CDC), falls are the number one cause of injury. From 2001-2017, there were 144,895,242 falls reported to CDC. During the same period, there were 443,576 deaths from falls. It is not unreasonable to assume that many of these falls involved working on a luminaire. Ladder related accidents are common. In addition, some will resort to stools, chairs, and chairs with boxes or books on them to get to the right height. Detailed information can be found in Annex B. There is little information on what the victims were doing when they fell.

In 1997, Industrial Safety and Hygiene News (ISHN) noted "According the American Academy of Orthopedic Surgeons, every year 500,000 people are treated for ladder-related injuries and approximately 300 of these incidents prove to be fatal. The Liberty Mutual Research Institute for Safety found that in 2007 alone, more than 400 people died as a result of falls on or from ladders or scaffolding[8].

Summary

When viewing data contained in the Annexes, it is important to note that there is no way to know the exact number of improper installations. For example, if there were one million annual installations of luminaires (it could be argued that there are significantly *more* annual installations per Annex A) and just 2% of them were improperly installed by an untrained do-it-yourselfers, that would result in 20,000 improperly installed luminaires.

[8] 500,000 Falls from Ladders Annually; 97 Percent Occur at Home or on Farms. (July 6, 2017). *Industrial Safety and Hygiene News*. Retrieved July 20, 2020, from https://www.ishn.com/articles/106830-000-falls-from-ladders-annually-97-percent-occur-at-home-or-on-farms

Annex A. Home Renovations Reported in the American Housing Survey

Survey Notes: Estimates and Margins of Error in thousands of housing units, except as indicated. Medians are rounded to four significant digits as part of disclosure avoidance protocol. Margin of Error is calculated at the 90% confidence interval. Weighting consistent with Census 2010. Blank cells represent zero; Z rounds to zero; '.' Represents not applicable or no cases in sample; S represents estimates that did not meet publication standards or withheld to avoid disclosure.

Characteristics	Professional/Do-It-Yourself Total Estimate	Professional Estimate	Do-It-Yourself Estimate
HOME IMPROVEMENT ACTIVITY IN LAST TWO YEARS (2017)			
Total			
Number of projects (1,000)	113,155	69,975	43,181
Median expenditures ($)	1,364	2,408	600
Total expenditures (1,000)	450,089,818	368,366,827	81,722,991
Disaster Repairs.			
Earthquake			
Number of projects (1,000)	S	S	S
Median expenditures ($)	S	S	300
Total expenditures (1,000)	S	S	S
Tornado/hurricane			
Number of projects (1,000)	418	303	115
Median expenditures ($)	7,000	7,000	S
Total expenditures (1,000)	4,490,105	3,276,862	S
Landslide			
Number of projects (1,000)	S	S	.
Median expenditures ($)	6,020	6,020	.
Total expenditures (1,000)	S	S	.
Fire			

Number of projects (1,000)	113	85	S
Median expenditures ($)	10,000	10,000	S
Total expenditures (1,000)	S	S	S
Flood			
Number of projects (1,000)	197	121	76
Median expenditures ($)	S	13,500	S
Total expenditures (1,000)	5,283,698	S	S
Other			
Number of projects (1,000)	867	734	133
Median expenditures ($)	9,500	10,500	3,800
Total expenditures (1,000)	10,898,601	10,190,039	708,562
Room Additions and Renovations			
Bedroom			
Number of projects (1,000)	419	184	235
Median expenditures ($)	7,000	23,000	2,000
Total expenditures (1,000)	7,289,971	6,000,692	1,289,280
Bath			
Number of projects (1,000)	274	162	112
Median expenditures ($)	6,400	10,000	4,000
Total expenditures (1,000)	3,258,882	2,493,137	765,746
Recreation Room			
Number of projects (1,000)	196	105	91
Median expenditures ($)	S	24,000	3,750
Total expenditures (1,000)	4,880,565	3,875,457	S
Kitchen			
Number of projects (1,000)	159	94	65
Median expenditures ($)	S	30,000	S
Total expenditures (1,000)	4,559,506	3,686,182	S
Other			

Number of projects (1,000)	827	444	383
Median expenditures ($)	6,500	12,500	S
Total expenditures (1,000)	13,508,584	11,125,843	2,382,741
Remodeling.			
Bath			
Number of projects (1,000)	5,739	3,001	2,738
Median expenditures ($)	3,000	5,250	1,500
Total expenditures (1,000)	35,305,520	26,856,855	8,448,665
Kitchen			
Number of projects (1,000)	4,184	2,358	1,826
Median expenditures ($)	6,000	10,000	3,000
Total expenditures (1,000)	49,553,906	37,772,420	11,781,486
Exterior Additions and Replacements.			
Attached garage/carport			
Number of projects (1,000)	736	389	347
Median expenditures ($)	2,800	4,500	2,200
Total expenditures (1,000)	6,120,015	4,365,016	1,754,999
Porch/deck/patio/terrace			
Number of projects (1,000)	3,331	1,798	1,533
Median expenditures ($)	2,500	4,400	1,000
Total expenditures (1,000)	18,805,519	14,757,663	4,047,856
Roofing			
Number of projects (1,000)	6,766	5,656	1,110
Median expenditures ($)	6,000	6,800	2,200
Total expenditures (1,000)	50,222,041	45,937,650	4,284,391
Siding			
Number of projects (1,000)	1,937	1,264	672
Median expenditures ($)	3,000	4,800	920

Total expenditures (1,000)	9,468,686	8,030,873	1,437,813
Windows/doors			
Number of projects (1,000)	7,443	4,799	2,644
Median expenditures ($)	1,400	2,300	500
Total expenditures (1,000)	24,777,309	21,119,910	3,657,399
Chimney/stairs/other exterior additions			
Number of projects (1,000)	1,531	1,087	444
Median expenditures ($)	1,072	1,440	480
Total expenditures (1,000)	3,856,308	3,133,861	722,448
Interior Additions and Replacements.			
Insulation			
Number of projects (1,000)	2,712	1,451	1,261
Median expenditures ($)	750	1,250	400
Total expenditures (1,000)	3,886,216	2,948,857	937,359
Water pipes			
Number of projects (1,000)	3,014	1,792	1,221
Median expenditures ($)	550	1,000	200
Total expenditures (1,000)	4,549,002	3,972,440	576,562
Plumbing fixtures			
Number of projects (1,000)	8,192	3,924	4,268
Median expenditures ($)	400	700	250
Total expenditures (1,000)	10,766,188	8,227,445	2,538,743
Electrical wiring/fuse boxes/breaker switches			
Number of projects (1,000)	4,487	2,879	1,609
Median expenditures ($)	600	1,000	300
Total expenditures (1,000)	6,388,526	5,088,660	1,299,866
Security system			
Number of projects (1,000)	4,286	2,933	1,353

Median expenditures ($)	400	400	400
Total expenditures (1,000)	2,605,279	1,732,909	872,370
Flooring/carpeting/paneling/ceiling tiles			
Number of projects (1,000)	10,438	6,364	4,074
Median expenditures ($)	2,000	2,875	920
Total expenditures (1,000)	33,135,645	26,515,795	6,619,850
HVAC			
Number of projects (1,000)	9,930	8,571	1,359
Median expenditures ($)	3,600	4,000	2,000
Total expenditures (1,000)	43,413,330	39,616,745	3,796,585
Septic tank			
Number of projects (1,000)	355	300	55
Median expenditures ($)	3,000	3,000	S
Total expenditures (1,000)	1,474,779	1,387,439	S
Water heater/dishwasher/garbage disposal			
Number of projects (1,000)	14,569	8,457	6,113
Median expenditures ($)	500	700	400
Total expenditures (1,000)	10,813,487	7,882,752	2,930,735
Other interior			
Number of projects (1,000)	1,901	1,250	651
Median expenditures ($)	1,700	2,143	1,000
Total expenditures (1,000)	S	S	1,348,948
Lot or Yard Additions & Replacements			
Driveways/walkways			
Number of projects (1,000)	3,858	2,627	1,231
Median expenditures ($)	1,800	2,640	550
Total expenditures (1,000)	12,015,598	10,545,199	1,470,399
Fencing/walls			

Number of projects (1,000)	4,449	2,303	2,146
Median expenditures ($)	1,300	2,600	601
Total expenditures (1,000)	10,140,802	7,603,533	2,537,269
Swimming pool/tennis court/recreational structures			
Number of projects (1,000)	967	537	431
Median expenditures ($)	3,500	7,500	748
Total expenditures (1,000)	11,131,910	10,170,999	960,911
Shed/detached garage/other building			
Number of projects (1,000)	2,337	1,095	1,243
Median expenditures ($)	2,000	3,100	1,000
Total expenditures (1,000)	11,680,657	7,570,385	4,110,272
Landscaping/sprinkler system			
Number of projects (1,000)	5,541	2,279	3,262
Median expenditures ($)	900	2,000	500
Total expenditures (1,000)	13,390,741	9,353,303	4,037,438
Other			
Number of projects (1,000)	964	612	352
Median expenditures ($)	2,000	3,000	500
Total expenditures (1,000)	4,583,936	4,169,719	414,217

Characteristics	Professional/Do-It-Yourself		
	Total Estimate	Professional Estimate	Do-It-Yourself Estimate
HOME IMPROVEMENT ACTIVITY IN LAST TWO YEARS (2015)			
Total			
Number of projects (1,000)	123,481	76,277	47,204
Median expenditures ($)	1,200	2,000	600
Total expenditures (1,000)	431,497,494	347,110,853	84,386,641
Disaster Repairs.			
Earthquake			
Number of projects (1,000)	23	13	S
Median expenditures ($)	S	S	S
Total expenditures (1,000)	194,698	172,620	S
Tornado/hurricane			
Number of projects (1,000)	339	263	76
Median expenditures ($)	6,000	7,000	S
Total expenditures (1,000)	3,171,864	2,692,720	S
Lightning/fire			
Number of projects (1,000)	142	92	50
Median expenditures ($)	S	S	S
Total expenditures (1,000)	5,161,751	S	S
Flood			
Number of projects (1,000)	211	139	72
Median expenditures ($)	8,150	8,685	S
Total expenditures (1,000)	2,999,016	S	S
Other			
Number of projects (1,000)	823	708	115

Median expenditures ($)	8,550	9,000	3,000
Total expenditures (1,000)	10,029,780	9,309,961	S
Room Additions and Renovations.			
Bedroom			
Number of projects (1,000)	516	259	257
Median expenditures ($)	5,000	17,000	2,000
Total expenditures (1,000)	10,997,017	8,903,760	2,093,257
Bath			
Number of projects (1,000)	303	162	141
Median expenditures ($)	S	10,000	2,500
Total expenditures (1,000)	3,463,143	2,847,832	615,311
Recreation Room			
Number of projects (1,000)	253	124	130
Median expenditures ($)	S	15,000	2,800
Total expenditures (1,000)	3,036,052	2,510,855	525,197
Kitchen			
Number of projects (1,000)	198	133	65
Median expenditures ($)	12,110	15,000	5,000
Total expenditures (1,000)	4,355,845	3,925,883	S
Other			
Number of projects (1,000)	861	453	408
Median expenditures ($)	5,000	8,000	2,000
Total expenditures (1,000)	9,920,768	7,905,575	2,015,193
Remodeling.			
Bath			
Number of projects (1,000)	6,547	3,406	3,141
Median expenditures ($)	3,000	5,000	1,500
Total expenditures (1,000)	37,537,408	28,304,879	9,232,529

Kitchen			
Number of projects (1,000)	4,740	2,595	2,145
Median expenditures ($)	5,000	7,000	3,000
Total expenditures (1,000)	47,380,831	34,471,023	12,909,808
Exterior Additions and Replacements.			
Attached garage/carport			
Number of projects (1,000)	717	403	314
Median expenditures ($)	4,000	5,000	2,500
Total expenditures (1,000)	5,304,691	3,745,563	1,559,127
Porch/deck/patio/terrace			
Number of projects (1,000)	3,616	1,953	1,663
Median expenditures ($)	2,500	4,000	1,200
Total expenditures (1,000)	18,899,196	14,824,455	4,074,741
Roofing			
Number of projects (1,000)	8,035	6,543	1,492
Median expenditures ($)	5,500	6,000	2,500
Total expenditures (1,000)	52,948,893	47,088,310	5,860,584
Siding			
Number of projects (1,000)	2,275	1,607	667
Median expenditures ($)	3,000	4,000	1,000
Total expenditures (1,000)	12,524,667	10,787,609	1,737,057
Windows/doors			
Number of projects (1,000)	8,693	5,580	3,114
Median expenditures ($)	1,500	2,000	600
Total expenditures (1,000)	27,257,002	22,199,593	5,057,410
Chimney/stairs/other exterior additions			
Number of projects (1,000)	1,479	983	496
Median expenditures ($)	1,050	1,500	450
Total expenditures (1,000)	3,427,485	2,944,792	482,694

Interior Additions and Replacements.			
Insulation			
Number of projects (1,000)	3,531	1,862	1,669
Median expenditures ($)	750	1,200	400
Total expenditures (1,000)	4,991,329	3,779,128	1,212,201
Water pipes			
Number of projects (1,000)	3,540	2,080	1,461
Median expenditures ($)	500	900	200
Total expenditures (1,000)	5,259,795	4,233,234	1,026,561
Plumbing fixtures			
Number of projects (1,000)	9,116	4,313	4,804
Median expenditures ($)	400	550	250
Total expenditures (1,000)	9,667,129	6,882,298	2,784,831
Electrical wiring/fuse boxes/breaker switches			
Number of projects (1,000)	5,018	3,249	1,769
Median expenditures ($)	600	916	240
Total expenditures (1,000)	7,302,161	6,141,821	1,160,340
Security system			
Number of projects (1,000)	3,707	2,943	764
Median expenditures ($)	350	300	400
Total expenditures (1,000)	2,194,706	1,705,733	488,973
Flooring/carpeting/paneling/ceiling tiles			
Number of projects (1,000)	12,051	7,224	4,827
Median expenditures ($)	1,674	2,300	800
Total expenditures (1,000)	32,026,087	24,970,431	7,055,656
HVAC			
Number of projects (1,000)	10,301	8,915	1,387
Median expenditures ($)	3,150	3,429	1,800
Total expenditures (1,000)	40,379,006	36,507,489	3,871,517

Septic tank			
Number of projects (1,000)	387	319	68
Median expenditures ($)	3,000	3,000	900
Total expenditures (1,000)	1,584,211	1,255,016	S
Water heater/dishwasher/garbage disposal			
Number of projects (1,000)	15,838	9,316	6,522
Median expenditures ($)	500	700	400
Total expenditures (1,000)	11,087,649	7,899,118	3,188,531
Other interior			
Number of projects (1,000)	1,661	1,192	469
Median expenditures ($)	1,200	1,500	754
Total expenditures (1,000)	4,660,744	3,947,101	713,642
Lot or Yard Additions and Replacements.			
Driveways/walkways			
Number of projects (1,000)	4,099	2,712	1,387
Median expenditures ($)	1,500	2,000	500
Total expenditures (1,000)	10,744,436	9,123,787	1,620,649
Fencing/walls			
Number of projects (1,000)	4,369	2,289	2,080
Median expenditures ($)	1,000	2,000	600
Total expenditures (1,000)	9,239,951	6,722,489	2,517,462
Swimming pool/tennis court/recreational structures			
Number of projects (1,000)	806	445	361
Median expenditures ($)	4,000	7,000	800
Total expenditures (1,000)	8,864,172	7,345,981	1,518,191
Shed/detached garage/other building			
Number of projects (1,000)	2,359	1,023	1,337
Median expenditures ($)	1,500	2,500	1,000

Total expenditures (1,000)	9,333,571	5,637,621	3,695,950
Landscaping/sprinkler system			
Number of projects (1,000)	6,096	2,467	3,630
Median expenditures ($)	800	2,000	500
Total expenditures (1,000)	12,123,260	8,640,867	3,482,393
Other			
Number of projects (1,000)	829	514	315
Median expenditures ($)	1,500	2,250	S
Total expenditures (1,000)	3,429,179	2,945,964	483,215

Characteristics	Professional/Do-It-Yourself		
	Total Estimate	Professional Estimate	Do-It-Yourself Estimate
HOME IMPROVEMENT ACTIVITY IN LAST TWO YEARS (2013)			
Total			
Number of projects (1,000)	93,558	59,411	34,147
Median expenditures ($)	1,000	2,000	500
Total expenditures (1,000)	300,831,306	246,338,538	54,492,768
Remodeling.			
Kitchen			
Number of projects (1,000)	2,954	1,700	1,253
Median expenditures ($)	5,000	6,200	3,000
Total expenditures (1,000)	26,626,680	18,827,473	7,799,207
Bath			
Number of projects (1,000)	4,064	2,168	1,896
Median expenditures ($)	2,500	4,000	1,500
Total expenditures (1,000)	18,685,777	13,962,662	4,723,115
Room Additions and Renovations.			
Kitchen			
Number of projects (1,000)	45	34	11
Median expenditures ($)	35,000	35,821	15,000
Total expenditures (1,000)	1,584,009	1,441,692	142,317
Bath			
Number of projects (1,000)	546	293	253
Median expenditures ($)	5,000	8,221	3,000
Total expenditures (1,000)	4,600,965	3,556,359	1,044,605

Bedroom			
Number of projects (1,000)	907	451	456
Median expenditures ($)	3,343	8,500	1,600
Total expenditures (1,000)	12,578,231	10,045,582	2,532,649
Recreation Room			
Number of projects (1,000)	320	136	184
Median expenditures ($)	5,000	6,627	3,700
Total expenditures (1,000)	2,899,929	1,581,672	1,318,257
Other			
Number of projects (1,000)	1,624	798	826
Median expenditures ($)	3,500	6,866	1,848
Total expenditures (1,000)	14,945,765	11,958,530	2,987,235
Systems and Equipment			
Plumbing/pipes			
Number of projects (1,000)	2,767	1,716	1,051
Median expenditures ($)	500	800	200
Total expenditures (1,000)	3,604,401	3,009,925	594,475
Electrical system			
Number of projects (1,000)	3,716	2,409	1,307
Median expenditures ($)	500	800	200
Total expenditures (1,000)	4,269,937	3,549,517	720,420
Plumbing fixtures			
Number of projects (1,000)	6,881	3,437	3,444
Median expenditures ($)	331	500	200
Total expenditures (1,000)	5,957,561	4,210,317	1,747,244
HVAC			
Number of projects (1,000)	7,250	6,340	910
Median expenditures ($)	3,000	3,200	1,500
Total expenditures (1,000)	26,516,143	24,496,257	2,019,885

Appliances/major equipment			
Number of projects (1,000)	14,838	9,177	5,661
Median expenditures ($)	400	500	334
Total expenditures (1,000)	8,617,672	6,333,578	2,284,094
Exterior Additions and Replacements.			
Roofing			
Number of projects (1,000)	5,851	4,876	975
Median expenditures ($)	5,000	5,500	1,800
Total expenditures (1,000)	36,079,462	33,223,391	2,856,071
Siding			
Number of projects (1,000)	1,677	1,219	458
Median expenditures ($)	3,000	4,200	500
Total expenditures (1,000)	7,437,346	6,749,185	688,161
Windows/doors			
Number of projects (1,000)	6,491	4,108	2,383
Median expenditures ($)	1,100	1,800	500
Total expenditures (1,000)	16,670,157	13,622,788	3,047,369
Interior Additions and Replacements.			
Insulation			
Number of projects (1,000)	2,681	1,617	1,065
Median expenditures ($)	573	955	300
Total expenditures (1,000)	3,060,617	2,498,934	561,683
Flooring/paneling/ceiling			
Number of projects (1,000)	14,241	8,534	5,706
Median expenditures ($)	1,000	1,647	500
Total expenditures (1,000)	27,522,730	21,585,632	5,937,098
Other interior			
Number of projects (1,000)	1,761	1,236	524

Median expenditures ($)	1,200	1,500	800
Total expenditures (1,000)	5,620,345	4,070,664	1,549,681
Other Additions and Replacements.			
Deck/porch			
Number of projects (1,000)	489	282	207
Median expenditures ($)	3,000	5,373	1,200
Total expenditures (1,000)	2,625,615	2,236,047	389,568
Patio/terrace/detached deck			
Number of projects (1,000)	2,737	1,534	1,203
Median expenditures ($)	2,000	3,500	1,000
Total expenditures (1,000)	11,324,775	9,034,084	2,290,691
Garage			
Number of projects (1,000)	94	73	21
Median expenditures ($)	18,000	24,000	500
Total expenditures (1,000)	2,206,566	2,140,830	65,736
Carport			
Number of projects (1,000)	94	58	37
Median expenditures ($)	1,400	2,269	500
Total expenditures (1,000)	440,123	381,558	58,565
Shed			
Number of projects (1,000)	1,547	746	801
Median expenditures ($)	1,400	2,500	800
Total expenditures (1,000)	8,344,883	6,885,567	1,459,315
Swimming pool/tennis court/recreational structures			
Number of projects (1,000)	628	359	269
Median expenditures ($)	3,000	5,075	600
Total expenditures (1,000)	4,951,069	4,436,168	514,901
Other exterior			
Number of projects (1,000)	7,548	4,620	2,928

Median expenditures ($)	1,500	2,000	500
Total expenditures (1,000)	19,708,734	16,325,326	3,383,408
Disaster Repairs			
Number of projects (1,000)	1,807	1,490	316
Median expenditures ($)	7,000	7,600	2,000
Total expenditures (1,000)	23,951,815	20,174,799	3,777,017
Other interior			
Number of projects (1,000)	1,661	1,192	469
Median expenditures ($)	1,200	1,500	754
Total expenditures (1,000)	4,660,744	3,947,101	713,642
Lot or Yard Additions and Replacements.			
Driveways/walkways			
Number of projects (1,000)	4,099	2,712	1,387
Median expenditures ($)	1,500	2,000	500
Total expenditures (1,000)	10,744,436	9,123,787	1,620,649
Fencing/walls			
Number of projects (1,000)	4,369	2,289	2,080
Median expenditures ($)	1,000	2,000	600
Total expenditures (1,000)	9,239,951	6,722,489	2,517,462
Swimming pool/tennis court/recreational structures			
Number of projects (1,000)	806	445	361
Median expenditures ($)	4,000	7,000	800
Total expenditures (1,000)	8,864,172	7,345,981	1,518,191
Shed/detached garage/other building			
Number of projects (1,000)	2,359	1,023	1,337
Median expenditures ($)	1,500	2,500	1,000
Total expenditures (1,000)	9,333,571	5,637,621	3,695,950

Landscaping/sprinkler system			
Number of projects (1,000)	6,096	2,467	3,630
Median expenditures ($)	800	2,000	500
Total expenditures (1,000)	12,123,260	8,640,867	3,482,393
Other			
Number of projects (1,000)	829	514	315
Median expenditures ($)	1,500	2,250	S
Total expenditures (1,000)	3,429,179	2,945,964	483,215

Characteristics	Professional/Do-It-Yourself		
	Total	Professional	Do-It-Yourself
HOME IMPROVEMENT ACTIVITY IN LAST TWO YEARS (2011)			
Total			
Number of projects (1,000)	116,263	73,015	43,248
Median expenditures ($)	1,000	1,999	500
Total expenditures (1,000)	348,536,558	287,026,972	61,509,586
Remodeling			
Kitchen			
Number of projects (1,000)	3,608	2,081	1,527
Median expenditures ($)	5,000	7,993	3,000
Total expenditures (1,000)	34,661,061	26,886,023	7,775,039
Bath			
Number of projects (1,000)	4,825	2,503	2,323
Median expenditures ($)	2,500	4,000	1,500
Total expenditures (1,000)	22,723,885	16,388,045	6,335,840
Room Additions and Renovations			
Kitchen			
Number of projects (1,000)	63	52	11
Median expenditures ($)	27,353	30,000	8,000
Total expenditures (1,000)	1,830,275	1,683,443	146,832
Bath			
Number of projects (1,000)	713	392	321
Median expenditures ($)	3,500	5,882	2,000
Total expenditures (1,000)	4,523,881	3,460,385	1,063,497
Bedroom			

Number of projects (1,000)	1,142	506	636
Median expenditures ($)	2,500	5,000	1,500
Total expenditures (1,000)	8,537,461	5,954,937	2,582,524
Recreation Room			
Number of projects (1,000)	490	202	288
Median expenditures ($)	3,000	6,882	1,600
Total expenditures (1,000)	3,486,584	2,662,713	823,871
Other			
Number of projects (1,000)	1,978	997	981
Median expenditures ($)	3,000	5,000	1,500
Total expenditures (1,000)	16,627,399	13,298,699	3,328,700
Systems and Equipment			
Plumbing/pipes			
Number of projects (1,000)	3,312	2,082	1,231
Median expenditures ($)	500	900	180
Total expenditures (1,000)	4,506,681	3,955,534	551,146
Electrical system			
Number of projects (1,000)	4,434	2,864	1,569
Median expenditures ($)	500	800	200
Total expenditures (1,000)	4,976,258	4,231,366	744,892
Plumbing fixtures			
Number of projects (1,000)	7,944	3,811	4,133
Median expenditures ($)	305	500	200
Total expenditures (1,000)	6,207,328	4,125,458	2,081,870
HVAC			
Number of projects (1,000)	9,574	8,365	1,209
Median expenditures ($)	3,000	3,176	1,500
Total expenditures (1,000)	33,214,557	30,498,058	2,716,499
Appliances/major equipment			

Number of projects (1,000)	17,913	11,276	6,637
Median expenditures ($)	400	500	320
Total expenditures (1,000)	10,213,056	7,588,909	2,624,147
Exterior Additions and Replacements			
Roofing			
Number of projects (1,000)	7,269	5,950	1,319
Median expenditures ($)	4,800	5,276	1,807
Total expenditures (1,000)	42,534,922	38,896,570	3,638,351
Siding			
Number of projects (1,000)	2,154	1,444	710
Median expenditures ($)	3,000	4,500	762
Total expenditures (1,000)	10,342,508	8,965,278	1,377,230
Windows/doors			
Number of projects (1,000)	8,676	5,629	3,047
Median expenditures ($)	1,282	2,000	500
Total expenditures (1,000)	23,145,692	19,648,147	3,497,546
Interior Additions and Replacements			
Insulation			
Number of projects (1,000)	4,085	2,116	1,970
Median expenditures ($)	500	1,000	300
Total expenditures (1,000)	4,287,875	3,214,117	1,073,757
Flooring/paneling/ceiling			
Number of projects (1,000)	18,320	10,907	7,413
Median expenditures ($)	1,000	1,510	500
Total expenditures (1,000)	31,910,709	25,087,900	6,822,809
Other interior			
Number of projects (1,000)	1,780	1,218	561
Median expenditures ($)	1,000	1,500	500

Total expenditures (1,000)	4,129,829	3,416,024	713,805
Other Additions and Replacements.			
Deck/porch			
Number of projects (1,000)	505	287	217
Median expenditures ($)	2,000	3,000	1,342
Total expenditures (1,000)	2,701,309	2,290,101	411,208
Patio/terrace/detached deck			
Number of projects (1,000)	3,500	1,835	1,665
Median expenditures ($)	2,000	3,176	1,000
Total expenditures (1,000)	13,022,905	9,963,322	3,059,583
Garage			
Number of projects (1,000)	158	87	71
Median expenditures ($)	15,000	20,250	5,000
Total expenditures (1,000)	2,621,310	2,165,996	455,314
Carport			
Number of projects (1,000)	158	82	76
Median expenditures ($)	1,500	1,600	1,300
Total expenditures (1,000)	399,581	240,654	158,927
Shed			
Number of projects (1,000)	2,098	977	1,121
Median expenditures ($)	1,429	2,600	800
Total expenditures (1,000)	8,599,423	5,927,181	2,672,242
Swimming pool/tennis court/recreational structures			
Number of projects (1,000)	713	414	300
Median expenditures ($)	2,500	6,000	500
Total expenditures (1,000)	7,417,915	7,102,007	315,908
Other exterior			
Number of projects (1,000)	9,003	5,419	3,584
Median expenditures ($)	1,247	2,000	500

Total expenditures (1,000)	22,898,421	18,263,708	4,634,713
Disaster Repairs			
Number of projects (1,000)	1,846	1,519	327
Median expenditures ($)	7,000	8,000	2,736
Total expenditures (1,000)	23,015,733	21,112,396	1,903,337
Other interior			
Number of projects (1,000)	1,661	1,192	469
Median expenditures ($)	1,200	1,500	754
Total expenditures (1,000)	4,660,744	3,947,101	713,642
Lot or Yard Additions & Replacements			
Driveways/walkways			
Number of projects (1,000)	4,099	2,712	1,387
Median expenditures ($)	1,500	2,000	500
Total expenditures (1,000)	10,744,436	9,123,787	1,620,649
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Shed/detached garage/other building			
Number of projects (1,000)	2,359	1,023	1,337
Median expenditures ($)	1,500	2,500	1,000
Total expenditures (1,000)	9,333,571	5,637,621	3,695,950
Landscaping/sprinkler system			
Number of projects (1,000)	6,096	2,467	3,630

Median expenditures ($)	800	2,000	500
Total expenditures (1,000)	12,123,260	8,640,867	3,482,393
Other			
Number of projects (1,000)	829	514	315
Median expenditures ($)	1,500	2,250	S
Total expenditures (1,000)	3,429,179	2,945,964	483,215

FATAL DATA VISUALIZATION HOME | SELECTED YEARS | RESET FILTER | FILTER DATA

Year Range: 2001 - 2020 | Unintentional Fall Deaths x | Sex: Both Sexes | Age Range: All Ages | Race: All R

547,043	6,183,393,140	8.85	8.04	1,362,237
Number of Deaths	Population	Crude Rate	Age-Adjusted Rate	Years of Potential Life L

CAUSES OF INJURY-RELATED DEATH

For more information on a single cause of injury, select an element from the diagram to the right to filter the rest of the dashboard.

Hover over elements for details

Data source: NCHS Vital Statistics System for numbers of deaths. Bureau of Census for population estimates.

Users can filter data by clicking on chart or by selecting Filters from Filter Data button when using keyboard navigation.

DOWNLOAD DATA / IMAGE

Group By: Intent

View As: Graphic

SUBMIT

** indicates Unstable values, -- indicates Suppressed values, --* indicates Secondary Suppression

GO TO TOP

CDC Centers for Disease Control and Prevention

Leading Causes of Nonfatal Injury

Export Options

WISQARS - Data Filters

Data Years: 2001 to 2020 | Number of Causes: Top 10 | Intent of Injury: All Injuries | Sex: Both Sexes | Disposition: All Cases | Age: 1-14 in 5 year groups; 15-65+ in 10 year groups

Change Filters

10 Leading Causes of Nonfatal Emergency Department Visits, United States

2001 to 2020, All Injuries, Disposition: All Cases, Both Sexes, All Races, All Ages

Unintentional | Assault | Self-Harm

	< 1	1 to 4	5 to 9	10 to 14	15 to 24	25 to 34	35 to 44	45 to 54	55 to 64	65+	All Ages
1	Unintentional Fall 2,502,385	Unintentional Fall 16,372,166	Unintentional Fall 12,098,025	Unintentional Fall 11,207,526	Unintentional Struck by /Against 18,061,779	Unintentional Fall 14,564,377	Unintentional Fall 14,555,015	Unintentional Fall 16,694,734	Unintentional Fall 16,342,377	Unintentional Fall 47,487,924	Unintentional Fall 167,959,317
2	Unintentional Struck by /Against 591,729	Unintentional Struck by /Against 6,700,358	Unintentional Struck by /Against 7,569,449	Unintentional Struck by /Against 10,631,148	Unintentional Fall 16,124,530	Unintentional Overexertion 12,223,390	Unintentional Overexertion 10,790,668	Unintentional Overexertion 8,343,859	Unintentional Struck by /Against 4,788,473	Unintentional Struck by /Against 5,138,015	Unintentional Struck by /Against 83,016,455
3	Unintentional Bite: Other, including sting 234,289	Unintentional Bite: Other, including sting 2,769,068	Unintentional Cut/Pierce 2,139,090	Unintentional Overexertion 5,258,733	Unintentional Motor Vehicle Occupant 14,304,138	Unintentional Struck by /Against 12,207,063	Unintentional Struck by /Against 9,644,374	Unintentional Struck by /Against 7,680,435	Unintentional Overexertion 4,606,116	Unintentional Overexertion 3,964,282	Unintentional Overexertion 61,396,600
4	Unintentional Foreign Body 192,533	Unintentional Foreign Body 2,413,262	Unintentional Bite: Other, including sting 1,884,417	Unintentional Cut/Pierce 2,522,629	Unintentional Overexertion 13,148,869	Unintentional Motor Vehicle Occupant 11,191,851	Unintentional Motor Vehicle Occupant 8,357,307	Unintentional Motor Vehicle Occupant 6,758,207	Unintentional Motor Vehicle Occupant 4,313,897	Unintentional Motor Vehicle Occupant 3,841,979	Unintentional Motor Vehicle Occupant 52,337,178
5	Unintentional Fire / Burn 185,185	Unintentional Cut/Pierce 1,573,107	Unintentional Pedal cyclist (bicycle, etc.) 1,552,384	Unintentional Pedal cyclist (bicycle, etc.) 1,955,699	Unintentional Cut/Pierce 8,631,457	Unintentional Cut/Pierce 8,167,950	Unintentional Cut/Pierce 6,468,728	Unintentional Other Specified 5,389,638	Unintentional Cut/Pierce 3,431,278	Unintentional Cut/Pierce 2,779,745	Unintentional Cut/Pierce 41,160,894
6	Unintentional Other Specified 156,799	Unintentional Overexertion 1,466,098	Unintentional Overexertion 1,488,024	Unintentional Unknown / Unspecified 1,750,279	Assault - Other Struck by /Against 7,970,286	Assault - Other Struck by /Against 6,240,240	Unintentional Other Specified 5,229,003	Unintentional Cut/Pierce 5,326,151	Unintentional Other Specified 3,222,871	Unintentional Poisoning 1,815,178	Unintentional Other Specified 27,749,865
7	Unintentional Inhalation / Suffocation 139,460	Unintentional Other Specified 1,039,544	Unintentional Motor Vehicle Occupant 1,206,958	Unintentional Motor Vehicle Occupant 1,580,880	Unintentional Other Specified 4,808,939	Unintentional Other Specified 5,584,544	Assault - Other Struck by /Against 4,229,339	Unintentional Poisoning 4,138,681	Unintentional Poisoning 2,670,665	Unintentional Bite: Other, including sting 1,735,775	Assault - Other Struck by /Against 25,201,448
8	Unintentional Cut/Pierce 118,548	Unintentional Fire / Burn 999,974	Unintentional Foreign Body 1,120,799	Assault - Other Struck by /Against 1,507,773	Unintentional Bite: Other, including sting 3,246,432	Unintentional Poisoning 3,919,879	Unintentional Poisoning 3,891,642	Assault - Other Struck by /Against 2,878,372	Unintentional Bite: Other, including sting 1,724,033	Unintentional Other Specified 1,475,256	Unintentional Bite: Other, including sting 21,105,233
9	Unintentional Overexertion 104,837	Unintentional Poisoning 862,709	Unintentional Bite: Dog 850,041	Unintentional Bite: Other, including sting 1,176,531	Unintentional Poisoning 3,052,105	Unintentional Bite: Other, including sting 3,165,595	Unintentional Bite: Other, including sting 2,680,900	Unintentional Bite: Other, including sting 2,487,757	Assault - Other Struck by /Against 1,195,386	Unintentional Other Transportation 1,366,320	Unintentional Poisoning 20,858,231
10	Unintentional Unknown / Unspecified 101,913	Unintentional Unknown / Unspecified 841,770	Unintentional Other Transportation 763,369	Unintentional Other Transportation 1,007,414	Unintentional Unknown / Unspecified 2,938,464	Unintentional Unknown / Unspecified 2,114,561	Unintentional Unknown / Unspecified 1,750,668	Unintentional Unknown / Unspecified 1,506,079	Unintentional Unknown / Unspecified 981,476	Unintentional Unknown / Unspecified 1,300,755	Unintentional Unknown / Unspecified 14,008,972

Display as: Chart | Statistic to display: Estimated Number | Highlight Injury Cause: Unintentional Fall

Apply Selections

10 Leading Causes of Nonfatal Injury for ages <1

All Injuries, 2001 to 2020, Both Sexes, All Cases, All Races

Public Input No. 2232-NFPA 70-2023 [Sections 410.56(C), 410.56(D)]

Sections 410.56(C), 410.56(D)

(

~~C) Luminaire Stems.~~

~~Splices and taps shall not be located within luminaire arms or stems.~~

(

~~D) Splices and Taps.~~

~~No unnecessary splices or taps shall be made within or on a luminaire.~~

~~Informational Note: See 110.14 for approved means of making connections.~~

Statement of Problem and Substantiation for Public Input

Combine 410.56 (C) with 410.56 (D) - Article 410.56 (D) is titled “Splices and Taps” and therefore should contain all Article 410.56 splice and tap requirements. Article 410.56 (C) “Luminaire Stems” sole requirement addresses splices and taps. Integrating Article 410.56 (C) language into Article 410.56 (D) will merge two articles which deal with splices and taps into the article dedicate to splices and taps (410.56 (D) will make the NEC a little less fragmented and easier to use.

Submitter Information Verification

Submitter Full Name: Gary Hein
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 15 12:39:36 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8828-NFPA 70-2024
Statement: This section was reorganized to combine the requirements for splices and taps into one item for clarity. The informational note was reiterating Chapter 1 requirements, so it was deleted to eliminate redundancy.

Public Input No. 2032-NFPA 70-2023 [Section No. 410.62(C)(1)]

(1) Cord-Connected Installation.

A luminaire or a listed assembly in compliance with any of the conditions in 410.62(C)(1)(a) through (C)(1)(c) shall be permitted to be cord connected provided the luminaire is located directly below the outlet or busway, the cord is not subject to strain or physical damage, and the cord is visible over its entire length except at terminations.

Informational Note: See 400.10, Uses Permitted, and 400.12, Uses Not Permitted.

(a) A luminaire shall be permitted to be connected with a cord terminating in a grounding-type attachment plug or busway plug. If grounding is not required in accordance with 410.42, a polarized-type plug shall be permitted.

(b) A luminaire assembly equipped with a strain relief and canopy shall be permitted to use a cord connection between the luminaire assembly and the canopy. The canopy shall be permitted to include a section of raceway not over 150 mm (6 in.) in length and intended to facilitate the connection to an outlet box mounted above a suspended ceiling.

(c) Listed luminaires connected using listed assemblies that incorporate manufactured wiring system connectors in accordance with 604.100(C) shall be permitted to be cord connected.

(d) A luminaire with a cord connection shall be permitted to be terminated directly into an outlet box. The cord must have proper stain relief, and the connection shall be documented in the manufacturer's instructions.

Statement of Problem and Substantiation for Public Input

This public input is being submitted on behalf of the Minnesota Department of Labor and Industry. Currently, the Department's inspection staff includes 14-office/field staff, 12-state field inspectors, 2-virtual inspectors and 50 plus contract electrical inspectors that complete over 170,000 electrical inspections annually.

The use of flexible cord for the connection of luminaires has been debated for a number of years. The National Electrical Code (NEC) has specific requirements that allow for the installation to be made. However, the product standard, UL 1598 – Luminaires, allows the product manufacturers to require, through the installation instructions provided, how the connection can be made to the building's permanent wiring system. Assuming the fixture is not adjustable, NEC 410.62(C)(1) states: The luminaire or listed assembly shall be installed so the cord is directly below the outlet box, visible the entire length, has strain relief, and won't be exposed to physical damage. If all the conditions are met, the cord is allowed to be connected by one of the following means in (a) through (c).

(a) Grounding type attachment plug
(b) Luminaire assembly with strain relief and canopy
(c) Listed luminaires utilizing a manufactured wiring system

Our understanding is that the UL standard allows for a 4 square cover (with a knockout) to be considered a canopy, however, that assumption implies the installer is going through the bottom of the box.- not the side of the outlet box. The new proposed language in (d) would clarify that an installer could terminate a luminaire cord directly into an outlet or junction box provided all of the 410.62(C)(1) conditions are met. In addition, the manufacturer is required to provided specific language in their instructions permitting the installation.

Submitter Information Verification

Submitter Full Name: Dean Hunter
Organization: Minnesota Department of Labor
Street Address:
City:

State:
Zip:
Submittal Date: Fri Aug 11 10:54:20 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: 410.62(C)(1)(a) & (c) are intended to allow cord connection via a connector (plug or manufactured wiring system connector) for ease of luminaire replacement. 410.62(C)(1)(b) is an allowance for cylinder style luminaires that are suspended from the cord. While a manufacturer could supply a junction box cover with strain relief as part of their listed assembly, the intent of (b) is to not allow cord to be used as a substitute for Chapter 3 wiring methods.

Public Input No. 481-NFPA 70-2023 [Section No. 410.62(C)(1)]

(1) Cord-Connected Installation.

A luminaire or a listed assembly in compliance with any of the conditions in 410.62(C)(1)(a) through (C)(1)(c) shall be permitted to be cord connected provided the luminaire is located directly below the outlet or busway, the cord is not subject to strain or physical damage, and the cord is visible over its entire length except at terminations.

Informational Note: See 400.10, Uses Permitted, and 400.12, Uses Not Permitted.

(a) A luminaire shall be permitted to be connected with a cord terminating in a grounding-type attachment plug or busway plug. If grounding is not required in accordance with 410.42, a polarized-type plug shall be permitted.

(b) A luminaire assembly equipped with a strain relief and canopy shall be permitted to use a cord connection between the luminaire assembly and the canopy. The canopy shall be permitted to include a section of raceway not over 150 mm (6 in.) in length and intended to facilitate the connection to an outlet box mounted above a suspended ceiling.

(c) For surface mounted wiring a cord utilizing a strain relief fitting terminated in a box thru an opening without concentric or eccentric knockouts or or into conduit body with threaded hubs shall be acceptable.d

(d) Listed luminaires connected using listed assemblies that incorporate manufactured wiring system connectors in accordance with 604.100(C) shall be permitted to be cord connected.

Statement of Problem and Substantiation for Public Input

The existing wording requiring a canopy does not address surface wiring methods where a strain relief fitting without a canopy will suffice

Submitter Information Verification

Submitter Full Name: a Bryan
Organization: State Of Tennessee Inspector (retired)
Street Address:
City:
State:
Zip:
Submittal Date: Fri Mar 17 13:54:53 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: 410.62(C)(1)(a) & (c) are intended to allow cord connection via a connector (plug or manufactured wiring system connector) for ease of luminaire replacement. 410.62(C)(1)(b) is an allowance for cylinder style luminaires that are suspended from the cord. While a manufacturer could supply a junction box cover with strain relief as part of their listed assembly, the intent of (b) is to not allow cord to be used as a substitute for Chapter 3 wiring methods.

Public Input No. 1425-NFPA 70-2023 [New Section after 410.71]

Disconnecting Means for Luminaries With Integrated LEDs

In all indoor locations Luminaries which utilize an integrated LED must be equipped with a

plug style disconnect which disconnects all conductors supplying the luminare. This disconnect shall be installed

such that it makes it possible to replace the luminare without exposing persons to potential contact with conductive

parts.

Exceptions 1 and 2 of 410.71(1) shall also apply to this section

Statement of Problem and Substantiation for Public Input

I'm an electrician in Mn who has done extensive work in residential new construction and service. I am finding that a great deal of the lights we install are starting to come with integrated LEDs. The problem presented by these fixtures is that, when they fail, there is no bulb that a person with minimal electrical qualifications can safely replace. Property owners must either attempt to utilize wire splicing devices themselves to replace the fixture or pay an electrician for a service call to accomplish what has historically been an effortless household repair. Adding a simple plug style disconnect will make it possible for property owners with minimal skills to safely change these fixtures themselves by removing the mounting screws and unplugging the old fixture then plugging in the new one. Ideally the final version of this section would specify a standard for the disconnect that would guarantee the old fixture and new fixture utilized identical plugs.

Submitter Information Verification

Submitter Full Name: Bradley Dobie
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Sat Jul 15 23:50:10 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: The disconnect requirements of 410.71 were added to the NEC in the 2005 edition to address documented incidents regarding replacing ballasts in fluorescent luminaires with double-ended lamps. The submitter has not submitted any data to support a conclusion that luminaires with integrated LEDs should be required to have disconnecting means.

Public Input No. 551-NFPA 70-2023 [Section No. 410.71]

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

(~~1~~ A) 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:

(1) More than one luminaire is installed in the building area

(2) The luminaires are not connected to a multiwire branch circuit

(3) The design of the installation includes disconnecting means

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

(~~2~~ B) 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~~ C) 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.

Statement of Problem and Substantiation for Public Input

This editorial revision is meant to satisfy the Style Manual, nothing more.

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:
Submittal Date: Mon Apr 10 12:49:51 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-7983-NFPA 70-2024
Statement: 410.71 was revised to comply with 2.1.6 of the NEC Style Manual.

Public Input No. 4132-NFPA 70-2023 [Section No. 410.71(1)]

(1) General.

(A) New Installations. 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.

(B) Existing Installations. 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:

(1) More than one luminaire is installed in the building area

(2) The luminaires are not connected to a multiwire branch circuit

(3) The design of the installation includes disconnecting means

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

Statement of Problem and Substantiation for Public Input

Breaking up 410.71(1) into a list item format to facilitate understanding for Code users. In accordance with NFPA Style Manual section 3.5.1.2 additional subdivisions shall be used where multiple requirements can be broken into independent requirements.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Sep 06 17:48:14 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: The proposed list format changes the intent of the requirement, since the proposed “(B) Existing Installations” would not be limited to “fluorescent or LED luminaires that utilize double-ended lamps and contain ballasts(s) or LED driver(s) that can be serviced in place”. No substantiation has been provided for expanding the scope.

Public Input No. 1353-NFPA 70-2023 [Section No. 410.136(B)]

(B) Combustible Low-Density Cellulose Fiberboard.

Where a surface-mounted luminaire containing a ballast, transformer, LED driver, or power supply is to be installed on combustible low-density cellulose fiberboard, it shall be marked for this condition or shall be spaced not less than 38 mm (1½ in.) from the surface of the fiberboard. Where such luminaires are partially or wholly recessed, 410.110 through 410.126 shall apply.

Informational Note: See ASTM E84-~~20~~ 23a , *Standard Test Method for Surface Burning Characteristics of Building Materials*, or ANSI/UL 723-2018, *Standard for Test for Surface Burning Characteristics of Building Materials*. Combustible low-density cellulose fiberboard includes sheets, panels, and tiles that have a density of 320 kg/m^3 (20 lb/ft^3) or less and that are formed of bonded plant fiber material but does not include solid or laminated wood or fiberboard that has a density in excess of 320 kg/m^3 (20 lb/ft^3) or is a material that has been integrally treated with fire-retarding chemicals to the degree that the flame spread index in any plane of the material will not exceed 25, determined in accordance with tests for surface burning characteristics of building materials.

Statement of Problem and Substantiation for Public Input

It is important to reference the latest edition of ASTM E84, since this is a critical standard and many changes have been introduced that affect test results.

Submitter Information Verification

Submitter Full Name: Marcelo Hirschler
Organization: GBH International
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 10 17:00:00 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-7984-NFPA 70-2024
Statement: Updated the date for ASTM E84 reference within the Informational Note. The most current version is 2023c, published in September 2023.

Public Input No. 2684-NFPA 70-2023 [Section No. 410.137(C)]

(C) Wired Luminaire Sections.

Wired luminaire sections are paired, with a ballast(s) or LED driver(s) supplying a light source or light sources in both. For interconnection between paired units, it shall be permissible to use metric designator 12 (trade size 3/8) flexible metal conduit in lengths not exceeding 7.5 m (25 ft), installed in accordance with ~~Part II of~~ Article 348 , Part II . Luminaire wire operating at line voltage, supplying only the ballast(s) or LED driver(s) of one of the paired luminaires, shall be permitted in the same raceway as the light source supply wires of the paired luminaires where the voltage rating of the light source supply wires is greater than the line voltage.

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.
4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

Submitter Full Name: David Williams
Organization: Delta Charter Township
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 24 09:37:01 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-7985-NFPA 70-2024
Statement: The references have been revised to reference specific parts of articles to comply with the NEC Style Manual section 4.1.4.

Public Input No. 678-NFPA 70-2023 [Section No. 410.172]

~~**410.172** Listing.~~

~~Lighting equipment identified for horticultural use shall be listed.~~

Statement of Problem and Substantiation for Public Input

This is already required in 410.6.

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 20 14:18:04 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-7986-NFPA 70-2024
Statement: Removed 410.172 since 410.6 (Proposed new 410.2) already addresses listing requirements.

Public Input No. 679-NFPA 70-2023 [Section No. 410.174]

~~**410.174** Installation and Use.~~

~~Lighting equipment identified for horticultural use shall be installed and used in accordance with the manufacturer's installation instructions and installation markings on the equipment as required by that listing.~~

Statement of Problem and Substantiation for Public Input

This is already required by 110.3(B). See 4.1 of the Style Manual.

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 20 14:18:41 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-7987-NFPA 70-2024
Statement: Removed 410.174 since it is already addressed by 110.3(B).

Public Input No. 4304-NFPA 70-2023 [Section No. 410.184]

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 separable connector(s) or attachment plug(s) shall be supplied by lighting outlets protected by a listed GFCI.

Exception: Circuits exceeding 150 volts to ground ~~shall~~ are permitted to be protected by a listed 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.

Statement of Problem and Substantiation for Public Input

There are a very limited number of UL943C listed SPGFCI devices currently available. Those that do exist are primarily intended for use with commercial cooking appliances and are not readily adaptable to horticultural lighting applications. The mandatory word "shall" could impede the ability of an AHJ to enforce the provisions of 90.4(D) applicable to new products not yet available.

Submitter Information Verification

Submitter Full Name: Michael o`boyle
Organization: Signify North America Corp.
Street Address:
City:
State:
Zip:
Submittal Date: Thu Sep 07 10:27:30 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8189-NFPA 70-2024
Statement: This sections was reorganized to clarify the requirements, and to assist installers and AHJ's. Additional details were also included. Added date to UL 943C reference within the Informational Note.

Public Input No. 680-NFPA 70-2023 [Section No. 410.190]

~~**410.190** General.~~

Statement of Problem and Substantiation for Public Input

This section has no words in it.

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 20 14:19:44 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-7990-NFPA 70-2024
Statement: "410.190 General" was removed because it had no content.

Public Input No. 681-NFPA 70-2023 [Section No. 410.191]

~~**410.191** Listing.~~

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

Statement of Problem and Substantiation for Public Input

This is already required by 410.6.

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 20 14:20:22 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: The redundancy between 410.191 and 410.6 is needed to emphasize the importance of Listing on this relatively new product category. Besides electrical and mechanical hazards, these products are also potential photobiological hazards and listing to the proper standard is critical to ensure a safe installation.

Public Input No. 682-NFPA 70-2023 [Section No. 410.193]

~~**410.193** Installation.~~

~~Luminaires shall be installed in accordance with the manufacturer's instructions and equipment markings.~~

Statement of Problem and Substantiation for Public Input

This is already required by 110.3(B).

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 20 14:20:57 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: The redundancy between 410.193 and 110.3(B) is needed to emphasize the importance of installing the product in accordance with the manufacturer's instructions for this relatively new product category. In addition to electrical and mechanical hazards, these products are also potential photobiological hazards and adherence to the manufacturer's instructions is critical to ensure a safe installation.

Public Input No. 2262-NFPA 70-2023 [Article 411]

Article 411 Low-Voltage Lighting

411.1 Scope.

This article covers low voltage lighting systems and their associated components.

411.2 Reconditioned Equipment.

Listed low-voltage lighting systems or a lighting system assembled from listed parts shall not be reconditioned.

~~**(A)** Listed System.~~

~~The luminaires, power supply, and luminaire fittings (including the exposed bare conductors) of a low-voltage lighting system shall be listed for use as part of the same identified lighting system.~~

~~**(B)** Assembly of Listed Parts.~~

~~A lighting system assembled from the following listed parts shall be permitted:~~

(1) ~~Low-voltage luminaires identified for the use~~

(2) ~~Power supply identified for the use~~

(3) ~~Low-voltage luminaire fittings identified for the use~~

(4) ~~Suitably rated cord or cable, or any Chapter 3 wiring method for the secondary circuit~~

411.3 Voltage Limitations.

The operating voltage of low-voltage lighting systems and their associated components shall not exceed 30 volts ac or 60 volts dc. If wet contact is likely to occur, the operating voltage of low-voltage lighting systems and their associated components shall not exceed 15 volts ac or 30 volts dc.

Informational Note: See 680.1for swimming pools, fountains, and similar installations.

411.4 Low-Voltage Lighting Systems.

Low voltage lighting systems shall consist of an isolating power supply, low-voltage luminaires, and associated equipment that are all identified for the use. The output circuits of the power supply shall be rated for 25 amperes maximum under all load conditions.

411.6 Listed System. The luminaires , power supply, and luminaire fittings (including the exposed bare conductors) of a low-voltage lighting system shall be listed for use as part of the same identified lighting system.

(A) Assembly of Listed Parts. A lighting system assembled from the following listed parts shall be permitted:

(1) Low-voltage luminaires identified for the use

(2) Power supply identified for the use

(3) Low-voltage luminaire fittings identified for the use

(4) Suitably rated cord or cable, or any Chapter 3 wiring method for the secondary circuit

411.7 Specific Location Requirements.

(A) Walls, Floors, and Ceilings.

Conductors concealed or extended through a wall, floor, or ceiling shall be in accordance with one of the following:

(1) Installed using any of the wiring methods specified in Chapter 3

(2) Installed using wiring supplied by a listed Class 2 power source and installed in accordance with 725.130

(B) Pools, Spas, Fountains, and Similar Locations.

Lighting systems shall be installed not less than 3 m (10 ft) horizontally from the nearest edge of the water, unless permitted elsewhere in this *Code*.

411.~~7~~ 8 Secondary Circuits.

(A) Grounding.

Secondary circuits shall not be grounded.

Exception: Secondary circuits supplied by a Class 2 power source listed and identified as suitable for secondary grounding shall be permitted to be grounded.

(B) Isolation.

The secondary circuit shall be insulated from the branch circuit by an isolating transformer.

(C) Bare Conductors.

Exposed bare conductors and current-carrying parts shall be permitted for indoor installations only. Bare conductors shall not be installed less than 2.1 m (7 ft) above the finished floor, unless specifically listed for a lower installation height.

411.~~8~~ 9 Branch Circuit.

Lighting systems covered by this article shall be supplied from a maximum 20-ampere branch circuit.

Statement of Problem and Substantiation for Public Input

Relocating 411.2(A) and (B) listing requirements to 411.6 and renumbering preceding sections. This change will make it easier for the Code user to find listing requirements in this Article as the xxx.6 is typically used across the Code book in this manner. In accordance with NEC Style Manual section 2.2.1.1 the same section numbers (and part numbers, where applicable) for the same purposes within articles covering similar subjects.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 15 14:19:34 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8831-NFPA 70-2024

Statement: The listing requirements were separated from the reconditioned equipment requirement and put into a new 411.2 to have the correct title and description for compliance with Sections 2.1.6.2 and 2.2.1.1 of the NEC Style Manual.

Revised existing 411.2 (new 411.3) to make it clear that reconditioned equipment described in new 411.2 is not allowed to be installed. The NEC is an installation standard, and the installation of these reconditioned items is what should be prohibited. Removed the term “listed” as it is now covered in new 411.2.

Public Input No. 2263-NFPA 70-2023 [Article 411]

Article 411 Low-Voltage Lighting

411.1 Scope.

This article covers low voltage lighting systems and their associated components.

411.2 Reconditioned Equipment.

~~Listed low~~ Low -voltage lighting systems or ~~a~~ lighting ~~system~~ systems assembled from listed parts shall not be reconditioned.

~~**(A)** Listed System.~~

~~The luminaires, power supply, and luminaire fittings (including the exposed bare conductors) of a low-voltage lighting system shall be listed for use as part of the same identified lighting system.~~

~~**(B)** Assembly of Listed Parts.~~

~~A lighting system assembled from the following listed parts shall be permitted:~~

(1) ~~Low-voltage luminaires identified for the use~~

(2) ~~Power supply identified for the use~~

(3) ~~Low-voltage luminaire fittings identified for the use~~

(4) ~~Suitably rated cord or cable, or any Chapter~~ 3 ~~wiring method for the secondary circuit~~

411.3 Voltage Limitations.

The operating voltage of low-voltage lighting systems and their associated components shall not exceed 30 volts ac or 60 volts dc. If wet contact is likely to occur, the operating voltage of low-voltage lighting systems and their associated components shall not exceed 15 volts ac or 30 volts dc.

Informational Note: See 680.1for swimming pools, fountains, and similar installations.

411.4 Low-Voltage Lighting Systems.

Low voltage lighting systems shall consist of an isolating power supply, low-voltage luminaires, and associated equipment that are all identified for the use. The output circuits of the power supply shall be rated for 25 amperes maximum under all load conditions.

411.6 Listing.

Low-voltage lighting systems shall be listed as an assembly or be assembled from listed parts.

(A) Listed System.

The luminaires, power supply, and luminaire fittings (including the exposed bare conductors) of a low-voltage lighting system shall be listed for use as part of the same identified lighting system.

(B) Assembly of Listed Parts.

A lighting system assembled from the following listed parts shall be permitted:

(1) Low-voltage luminaires identified for the use

(2) Power supply identified for the use

(3) Low-voltage luminaire fittings identified for the use

(4) Suitably rated cord or cable, or any Chapter 3 wiring method for the secondary circuit

411.7 Specific Location Requirements.

(A) Walls, Floors, and Ceilings.

Conductors concealed or extended through a wall, floor, or ceiling shall be in accordance with one of the following:

(1) Installed using any of the wiring methods specified in Chapter 3

(2) Installed using wiring supplied by a listed Class 2 power source and installed in accordance with 725.130

(B) Pools, Spas, Fountains, and Similar Locations.

Lighting systems shall be installed not less than 3 m (10 ft) horizontally from the nearest edge of the water, unless permitted elsewhere in this *Code*.

411.~~7~~ 8 Secondary Circuits.

(A) Grounding.

Secondary circuits shall not be grounded.

Exception: Secondary circuits supplied by a Class 2 power source listed and identified as suitable for secondary grounding shall be permitted to be grounded.

(B) Isolation.

The secondary circuit shall be insulated from the branch circuit by an isolating transformer.

(C) Bare Conductors.

Exposed bare conductors and current-carrying parts shall be permitted for indoor installations only. Bare conductors shall not be installed less than 2.1 m (7 ft) above the finished floor, unless specifically listed for a lower installation height.

411.~~8~~ 9 Branch Circuit.

Lighting systems covered by this article shall be supplied from a maximum 20-ampere branch circuit.

Statement of Problem and Substantiation for Public Input

This PI simply seeks to place the listing requirements (proposed 411.6) and the reconditioing requirements (411.2) into seperate sections for consistency with other Code articles.

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 15 14:19:50 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8831-NFPA 70-2024

Statement: The listing requirements were separated from the reconditioned equipment requirement and put into a new 411.2 to have the correct title and description for compliance with Sections 2.1.6.2 and 2.2.1.1 of the NEC Style Manual.

Revised existing 411.2 (new 411.3) to make it clear that reconditioned equipment described in new 411.2 is not allowed to be installed. The NEC is an installation standard, and the installation of these reconditioned items is what should be prohibited. Removed the term “listed” as it is now covered in new 411.2.

Public Input No. 4470-NFPA 70-2023 [New Article after 411]

ARTICLE 412 Limited Energy Lighting

412.1 Scope.

This article covers lighting systems that utilize limited-energy power sources and their associated components.

412.2 Reconditioned Equipment.

Listed limited-energy lighting systems or a lighting system assembled from listed parts shall not be reconditioned.

412.2(A) Listed System.

The luminaires, power supply, and luminaire fittings (including the exposed bare conductors) of a limited-energy lighting system shall be listed for use as part of the same identified lighting system.

412.2(B) Assembly of Listed Parts.

A lighting system assembled from the following listed parts shall be permitted:

(1) Limited-energy luminaires identified for the use

(2) Power supply identified for the use

(3) Limited-energy luminaire fittings identified for the use

(4) Suitably rated cord or cable, or any Chapter 3 wiring method for the secondary circuit

412.3 Fault Energy Limitations.

Limited-energy lighting systems shall employ one of the following methods to limit the available fault energy:

(1) Consist of Class 2 or Class 3 Power-Limited Circuits, utilizing power supplies compliant with 725.60.

(2) Consist of Class 4 Fault-Managed Power Systems compliant with 726.121.

Informational Note No. 1: See Chapter 9, Table 11(A) and Table 11(B), for Class 2 and Class 3 power source limitations that consider the power waveform (i.e. AC, DC, interrupted DC, etc.) and provide requirements for both wet and dry locations.

Informational Note No. 2: See 726.121(A) for fault management requirements for Class 4 Fault-Managed Power Systems.

412.6 Specific Location Requirements.

412.6(A) Walls, Floors, and Ceilings.

Conductors concealed or extended through a wall, floor, or ceiling shall be in accordance with one of the following:

(1) Installed using any of the wiring methods specified in Chapter 3

(2) Installed using wiring supplied by a listed Class 2 power source and installed in accordance with 725.130

(3) Installed using a combination of both Parts I and II of Article 722

412.6(B) Pools, Spas, Fountains, and Similar Locations.

Lighting systems shall be installed not less than 3 m (10 ft) horizontally from the nearest edge of the water, unless permitted elsewhere in this *Code*.

412.7 Class 2 and Class 3 Secondary Circuits.

412.7(A) Grounding.

Secondary circuits shall not be grounded.

Exception: Secondary circuits supplied by a Class 2 power source listed and identified as suitable for secondary grounding shall be permitted to be grounded.

412.7(B) Isolation.

The secondary circuit shall be insulated from the branch circuit by an isolating transformer.

412.7(C) Bare Conductors.

Exposed bare conductors and current-carrying parts shall be permitted for indoor installations only. Bare conductors shall not be installed less than 2.1 m (7 ft) above the finished floor, unless specifically listed for a lower installation height.

412.7 Class 4 Lighting Loads

Class 4 lighting loads shall comply with 726.122.

412.8 Branch Circuit for Class 2 and Class 3 Power Sources

Lighting systems employing Class 2 and Class 3 Power supplies shall comply with 725.127.

Statement of Problem and Substantiation for Public Input

Article 725 changed significantly in the 2023 NEC code cycle, splitting into multiple Articles and adding a new Class 4 Fault Managed Power chapter. Class 2 lighting systems have proliferated in the past few years, and while they are covered by Article 411 in most cases, the requirements of Article 411 aren't an exact match with the Class 2 requirements in Article 725 and Tables 11(A) and 11(B). Rather than do a disservice to existing Article 411 users by closing these gaps and perhaps causing unintended consequences, I have proposed a new Article 412 to explicitly cover lighting systems employing Class 2, Class 3, and also newly added Class 4 circuits when used in lighting systems.

While Class 4 lighting is not yet common, this approach to powering luminaires that require more than 100 Watts has been proposed. Because Class 4 increases efficiency while maintaining a safety level that exceeds that of existing Class 2 circuits, there should be no reason not to allow lighting systems to utilize Class 4 Fault Managed Power systems as the underlying power distribution technology.

Submitter Information Verification

Submitter Full Name: Jason Potterf
Organization: Cisco
Affiliation: ESTA
Street Address:
City:
State:
Zip:
Submittal Date: Thu Sep 07 16:04:38 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: Limited Energy Lighting is undefined and could cause confusion with Article 411. Additionally proposed 412.6(A) implies Class 2 wiring is sufficient for Class 4 systems. Further investigation and information is needed to determine if a separate article is needed for Class 4 lighting.

Public Input No. 3729-NFPA 70-2023 [New Section after 411.2]

411.2 Listing Requirements

(A) Listed System.

The luminaires, power supply, and luminaire fittings (including the exposed bare conductors) of a low-voltage lighting system shall be listed for use as part of the same identified lighting system.

(B) Assembly of Listed Parts.

A lighting system assembled from the following listed parts shall be permitted:

(1) Low-voltage luminaires identified for the use

(2) Power supply identified for the use

(3) Low-voltage luminaire fittings identified for the use

(4) Suitably rated cord or cable, or any Chapter 3 wiring method for the secondary circuit

Statement of Problem and Substantiation for Public Input

The listing requirements should be located in 411.2 Listing Requirements for compliance with the NEC Style Manual Section2.2.1.

Submitter Information Verification

Submitter Full Name: Derrick Atkins
Organization: Minneapolis Electrical JATC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Sep 05 15:01:52 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8831-NFPA 70-2024

Statement: The listing requirements were separated from the reconditioned equipment requirement and put into a new 411.2 to have the correct title and description for compliance with Sections 2.1.6.2 and 2.2.1.1 of the NEC Style Manual.

Revised existing 411.2 (new 411.3) to make it clear that reconditioned equipment described in new 411.2 is not allowed to be installed. The NEC is an installation standard, and the installation of these reconditioned items is what should be prohibited. Removed the term “listed” as it is now covered in new 411.2.

Public Input No. 3087-NFPA 70-2023 [Section No. 411.2]

411.~~2~~ 3 Reconditioned Equipment.

Listed low-voltage lighting systems or a lighting system assembled from listed parts shall not be reconditioned.

(A) Listed System.

The luminaires, power supply, and luminaire fittings (including the exposed bare conductors) of a low-voltage lighting system shall be listed for use as part of the same identified lighting system.

(B) Assembly of Listed Parts.

A lighting system assembled from the following listed parts shall be permitted:

(1) Low-voltage luminaires identified for the use

(2) Power supply identified for the use

(3) Low-voltage luminaire fittings identified for the use

(4) Suitably rated cord or cable, or any Chapter 3 wiring method for the secondary circuit

Statement of Problem and Substantiation for Public Input

This Public Input is to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 2.2.1 regarding reconditioned equipment.
2.2.1 Parallel Numbering Required. Technical committees shall use the following section numbers for the same purposes within articles. This requirement shall not apply to Articles 90, 100, and 110. If the article does not contain listing or reconditioning requirements, the subdivisions shall not be included in the article.
Required Parallel Numbering Format
XXX.1 Scope.
XXX.2 Listing Requirements.
XXX.3 Reconditioned Equipment.
XXX.3(A) Permitted to be Installed.
XXX.3(B) Not Permitted to be Installed.
The panel needs to review the requirements in this section and determine appropriate wording for the xxx.2 and xxx.3 sections

Submitter Information Verification

Submitter Full Name: David Williams
Organization: Delta Charter Township
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 29 11:19:38 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8831-NFPA 70-2024
Statement: The listing requirements were separated from the reconditioned equipment requirement and put into a new 411.2 to have the correct title and description for compliance with Sections 2.1.6.2 and 2.2.1.1 of the NEC Style Manual.

Revised existing 411.2 (new 411.3) to make it clear that reconditioned equipment described in new 411.2 is not allowed to be installed. The NEC is an installation standard, and the installation of these reconditioned items is what should be prohibited. Removed the term “listed” as it is now covered in new 411.2.

Public Input No. 3727-NFPA 70-2023 [Section No. 411.2]

411.~~2~~ 3 Reconditioned Equipment.

Listed low-voltage lighting systems or a lighting system assembled from listed parts shall not be reconditioned.

~~**(A)** Listed System.~~

~~The luminaires, power supply, and luminaire fittings (including the exposed bare conductors) of a low-voltage lighting system shall be listed for use as part of the same identified lighting system.~~

~~**(B)** Assembly of Listed Parts.~~

~~A lighting system assembled from the following listed parts shall be permitted:~~

(1) ~~Low-voltage luminaires identified for the use~~

(2) ~~Power supply identified for the use~~

(3) ~~Low-voltage luminaire fittings identified for the use~~

(4) ~~Suitably rated cord or cable, or any Chapter~~ 3 ~~wiring method for the secondary circuit~~

Statement of Problem and Substantiation for Public Input

The listing requirements should be located in 411.2. The Recondition requirement should be located in 411.3 for compliance with the NEC Style Manual Section 2.2.1.

Submitter Information Verification

Submitter Full Name: Derrick Atkins
Organization: Minneapolis Electrical JATC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Sep 05 14:58:41 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8831-NFPA 70-2024

Statement: The listing requirements were separated from the reconditioned equipment requirement and put into a new 411.2 to have the correct title and description for compliance with Sections 2.1.6.2 and 2.2.1.1 of the NEC Style Manual.

Revised existing 411.2 (new 411.3) to make it clear that reconditioned equipment described in new 411.2 is not allowed to be installed. The NEC is an installation standard, and the installation of these reconditioned items is what should be prohibited. Removed the term “listed” as it is now covered in new 411.2.

Public Input No. 656-NFPA 70-2023 [Sections 411.2(A), 411.2(B)]

~~**Sections 411.2(A), 411.2(B)**~~

~~**(A)** Listed System.~~

~~The luminaires, power supply, and luminaire fittings (including the exposed bare conductors) of a low-voltage lighting system shall be listed for use as part of the same identified lighting system.~~

~~**(B)** Assembly of Listed Parts.~~

~~A lighting system assembled from the following listed parts shall be permitted:~~

(1) ~~Low-voltage luminaires identified for the use~~

(2) ~~Power supply identified for the use~~

(3) ~~Low-voltage luminaire fittings identified for the use~~

(4) ~~Suitably rated cord or cable, or any Chapter 3 wiring method for the secondary circuit~~

Statement of Problem and Substantiation for Public Input

The requirement for listing of either an assembly or of assembled parts is not only applicable to reconditioned equipment and needs to be in a separate section

Submitter Information Verification

Submitter Full Name: Christine Porter
Organization: Intertek Testing Services
Street Address:
City:
State:
Zip:
Submittal Date: Wed Apr 19 13:05:41 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8831-NFPA 70-2024

Statement: The listing requirements were separated from the reconditioned equipment requirement and put into a new 411.2 to have the correct title and description for compliance with Sections 2.1.6.2 and 2.2.1.1 of the NEC Style Manual.

Revised existing 411.2 (new 411.3) to make it clear that reconditioned equipment described in new 411.2 is not allowed to be installed. The NEC is an installation standard, and the installation of these reconditioned items is what should be prohibited. Removed the term “listed” as it is now covered in new 411.2.

Public Input No. 3728-NFPA 70-2023 [Section No. 411.3]

411.~~3~~ XX Voltage Limitations.

The operating voltage of low-voltage lighting systems and their associated components shall not exceed 30 volts ac or 60 volts dc. If wet contact is likely to occur, the operating voltage of low-voltage lighting systems and their associated components shall not exceed 15 volts ac or 30 volts dc.

Informational Note: See 680.1for swimming pools, fountains, and similar installations.

Statement of Problem and Substantiation for Public Input

The section should be relocated for compliance with the NEC Style Manual Section 2.2.1.

Submitter Information Verification

Submitter Full Name: Derrick Atkins
Organization: Minneapolis Electrical JATC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Sep 05 15:00:54 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8159-NFPA 70-2024

Statement: Sections 411.3 and 411.4 were combined into one Section with two first level subdivisions. Section 411.4 was retitled “Low-Voltage Lighting Systems” and included a description for compliance with Section 2.1.6.2 of the NEC Style Manual.

First level subdivision “(A) Power Supply Limitation” was added for the output circuit requirement.

The voltage limitations in 411.3 were added as a first level subdivision “(B) Voltage Limitations” for clarity and usability.

Public Input No. 657-NFPA 70-2023 [New Section after 411.4]

TITLE OF NEW CONTENT

Listing Required

Low-voltage lighting systems shall comply with 411.5(A) or (B).

(A) Listed System. The luminaires, power supply, and luminaire fittings (including the exposed bare conductors) of an exposed bare conductor lighting system shall be listed for the use as part of the same identified lighting system.

(B) Assembly of Listed Parts. A lighting system assembled from the following listed parts shall be permitted:

(1) low-voltage luminaires identified for the use

(2) Power supply identified for the use

(3) low-voltage luminaire fittings identified for the use

(4) Suitably rated cord, cable, conductors in conduit, or other fixed Chapter 3 wiring method for the secondary circuit.

Statement of Problem and Substantiation for Public Input

The listing requirement should not be tied to equipment that has not been reconditioned. It should be a separate requirement. The dot 2 sections of articles has been reserved for reconditioned equipment requirements, this input relocates the listing requirement to a new section.

Submitter Information Verification

Submitter Full Name: Christine Porter
Organization: Intertek Testing Services
Street Address:
City:
State:
Zip:
Submittal Date: Wed Apr 19 13:13:06 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8831-NFPA 70-2024

Statement: The listing requirements were separated from the reconditioned equipment requirement and put into a new 411.2 to have the correct title and description for compliance with Sections 2.1.6.2 and 2.2.1.1 of the NEC Style Manual.

Revised existing 411.2 (new 411.3) to make it clear that reconditioned equipment described in new 411.2 is not allowed to be installed. The NEC is an installation standard, and the installation of these reconditioned items is what should be prohibited. Removed the term “listed” as it is now covered in new 411.2.

Public Input No. 4479-NFPA 70-2023 [Section No. 411.8]

411.8 Branch Circuit.

Lighting systems covered by this article shall be supplied from a maximum 20-ampere branch circuit.

Exception: Class 2 and Class 3 power sources may comply with 725.127 instead of 411.8.

Statement of Problem and Substantiation for Public Input

725.127 was modified in the 2023 NEC cycle to more precisely convey the requirement that underlays the 20-ampere branch circuit limitation. The imprecise language used in 725.127 was causing users of multi-output Class 2 power supplies with the capability of utilizing a larger branch circuit safely to limit each device to a 20 Amp branch circuit. The new language in 725.127 addressed the real reason for this limitation and freed users of the code to more optimally utilize new technology.

In lieu of simply pasting the new 725.127 text in 411.8 I have offered an exception that allows compliance with that rule as an alternative to 411.8 when a Class 2 or Class 3 power supply is employed, leaving non-Class-2/3 technologies installed under Article 411 subject to the existing requirement.

Submitter Information Verification

Submitter Full Name: Jason Potterf
Organization: Cisco
Affiliation: ESTA
Street Address:
City:
State:
Zip:
Submittal Date: Thu Sep 07 16:13:06 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: There are concerns with providing a larger than 20 amp branch circuit to a class 2 or 3 power supply for lighting. 20 amps is the limit for dwelling units in accordance with 210.23(C). There are concerns as to how the proposal would apply to non-dwelling units or occupancies. Additional data is needed to evaluate the proposal for possible expansion to greater than 20 amps for non-dwelling applications.

Public Input No. 2801-NFPA 70-2023 [New Section after 600.1]

600.2 Listing Reqirements.

Fixed, mobile, or portable electric signs, section signs, outline lighting, photovoltaic (PV) powered signs, and retrofit kits, regardless of voltage, shall be listed and labeled, provided with installation instructions, and installed in conformance with that listing, unless otherwise approved by special permission.

600.2(A) Field-Installed Skeleton Tubing.

Field-installed skeleton tubing shall not be required to be listed where installed in conformance with this *Code* .

600.2(B) Outline Lighting.

Outline lighting shall not be required to be listed as a system when it consists of listed luminaires wired in accordance with Chapter 3.

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document when general listing requirements are covered within an article. The NEC Style Manual Section 2.2.1 Parallel Numbering Required, states that technical committees shall use the following section numbers for the same purposes within articles. The listing requirements are to be located in the .2 section.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2800-NFPA 70-2023 [Section No. 600.3]	Deleted and relocated to the .2 section
Public Input No. 2800-NFPA 70-2023 [Section No. 600.3]	

Submitter Information Verification

Submitter Full Name: Dean Hunter
Organization: Minnesota Department of Labor
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 25 12:14:23 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8239-NFPA 70-2024
Statement: This change relocates existing 600.3 and provides a list to conform with the NEC Style Manual section 2.2.1.

Public Input No. 2800-NFPA 70-2023 [Section No. 600.3]

~~**600.3** Listing.~~

~~Fixed, mobile, or portable electric signs, section signs, outline lighting, photovoltaic (PV) powered signs, and retrofit kits, regardless of voltage, shall be listed and labeled, provided with installation instructions, and installed in conformance with that listing, unless otherwise approved by special permission.~~

~~**(A)** Field-Installed Skeleton Tubing.~~

~~Field-installed skeleton tubing shall not be required to be listed where installed in conformance with this *Code* .~~

~~**(B)** Outline Lighting.~~

~~Outline lighting shall not be required to be listed as a system when it consists of listed luminaires wired in accordance with Chapter 3 .~~

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document when general listing requirements are covered within an article. The NEC Style Manual Section 2.2.1 Parallel Numbering Required, states that technical committees shall use the following section numbers for the same purposes within articles. The listing requirements are to be located in the .2 section.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2801-NFPA 70-2023 [New Section after 600.1]	Relocated text.
Public Input No. 2801-NFPA 70-2023 [New Section after 600.1]	

Submitter Information Verification

Submitter Full Name: Dean Hunter
Organization: Minnesota Department of Labor
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 25 12:13:21 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8239-NFPA 70-2024
Statement: This change relocates existing 600.3 and provides a list to conform with the NEC Style Manual section 2.2.1.

Public Input No. 1474-NFPA 70-2023 [Section No. 600.3 [Excluding any Sub-Sections]]

Fixed, mobile, or portable electric signs, section signs, outline lighting, photovoltaic (PV) powered signs, and retrofit kits, regardless of voltage, shall be listed and labeled~~, provided with installation instructions, and installed in conformance with that listing, unless otherwise approved by special permission~~ .

Statement of Problem and Substantiation for Public Input

This PI proposes to delete redundant language. The language can be deleted based on existing requirements that apply based on Section 90.4 Code Arrangement:

90.2(F) Special Permission
The authority having jurisdiction for enforcing this Code may grant exception for the installation of conductors and equipment that are not under the exclusive control of the electric utilities and are used to connect the electric utility supply system to the service conductors of the premises served, provided such installations are outside a building or structure, or terminate inside at a readily accessible location nearest the point of entrance of the service conductors.

110.3(B) Installation and Use
Equipment that is listed, labeled, or both, or identified for a use shall be installed and used in accordance with any instructions included in the listing, labeling, or identification.
Informational Note: The installation and use instructions may be provided in the form of printed material, quick response (QR) code, or the address on the internet where users can download the required instructions.

Submitter Information Verification

Submitter Full Name: Vincent Della Croce
Organization:
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jul 20 10:09:58 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8238-NFPA 70-2024
Statement: The statement "provided with installation instructions and installed in conformance with the listing" needs to remain. Installation instructions are necessary to install the sign or retrofit kit in accordance with its listing. Special permission was removed because the AHJ may not have access to the facilities and may not be properly equipped and qualified for experimental listing.

Public Input No. 2303-NFPA 70-2023 [Section No. 600.4(A)]

~~**(A)** Signs and Outline Lighting Systems.~~

~~Signs and outline lighting systems shall be listed and labeled; marked with the manufacturer's name, trademark, or other means of identification; and input voltage and current rating.~~

Statement of Problem and Substantiation for Public Input

These related PIs remove content that is duplicative and covered by the Listing requirements, in an effort to improve the efficiency of Code application.

600.3 already requires signs and outline lighting systems to be listed. Clause 7.2.1 of the listing standard (UL 48) requires the manufacturer's identity, voltage, and current to be marked.

See related PIs for 600.4(C), 600.4(D), and 600.4(E). No changes are proposed for 600.4(B), markings for signs with a retrofitted illumination system.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2305-NFPA 70-2023 [Section No. 600.4(C)]	
Public Input No. 2306-NFPA 70-2023 [Section No. 600.4(D)]	
Public Input No. 2307-NFPA 70-2023 [Section No. 600.4(E)]	
Public Input No. 2305-NFPA 70-2023 [Section No. 600.4(C)]	
Public Input No. 2306-NFPA 70-2023 [Section No. 600.4(D)]	
Public Input No. 2307-NFPA 70-2023 [Section No. 600.4(E)]	

Submitter Information Verification

Submitter Full Name: Michael Shulman
Organization: UL Solutions
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 15 18:24:54 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8068-NFPA 70-2024
Statement: These changes remove duplicative content already covered by the product Standard.

Public Input No. 2305-NFPA 70-2023 [Section No. 600.4(C)]

~~(C) Signs with Lampholders for Incandescent Lamps.~~

~~Signs and outline lighting systems with lampholders for incandescent lamps shall be marked to indicate the maximum allowable lamp wattage per lampholder. The markings shall be permanently installed, in letters at least 6 mm (1/4 in.) high, and shall be located where visible during relamping.~~

Statement of Problem and Substantiation for Public Input

These related PIs remove content that is duplicative and covered by the Listing requirements, in an effort to improve the efficiency of Code application.

Incandescent lamp replacement markings (min. 6 mm high, visible during relamping) are addressed by clause 7.3.1 of UL 48. There are many other required markings for signs and few (if any) new signs are designed for incandescent lamps so there is no value in retaining this in the Code.

See also related PIs for 600.4(A), 600.4(D), and 600.4(E). No changes are proposed for 600.4(B), markings for signs with a retrofitted illumination system.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2303-NFPA 70-2023 [Section No. 600.4(A)]	
Public Input No. 2306-NFPA 70-2023 [Section No. 600.4(D)]	
Public Input No. 2307-NFPA 70-2023 [Section No. 600.4(E)]	
Public Input No. 2303-NFPA 70-2023 [Section No. 600.4(A)]	
Public Input No. 2306-NFPA 70-2023 [Section No. 600.4(D)]	
Public Input No. 2307-NFPA 70-2023 [Section No. 600.4(E)]	

Submitter Information Verification

Submitter Full Name: Michael Shulman
Organization: UL Solutions
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 15 18:29:08 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8069-NFPA 70-2024
Statement: These changes remove duplicative content already covered by the product Standard.

Public Input No. 2306-NFPA 70-2023 [Section No. 600.4(D)]

(D) Visibility.

~~The markings required in~~ 600.4(A) ~~and listing labels~~ Listing labels and markings that identify the input voltage and current rating shall be visible after installation and shall be permanently applied in a location visible prior to servicing. The marking shall be permitted to be installed in a location not viewed by the public.

Statement of Problem and Substantiation for Public Input

These related PIs remove content that is duplicative and covered by the Listing requirements, in an effort to improve the efficiency of Code application.

600.4(D) has valuable installation-specific marking location requirements that cannot be addressed by the product standard. The proposed revision captures the needed information from 600.4(A), which is proposed for deletion in a related PI. The manufacturer's identifying information, which will be marked per the Standard, should not need to be "visible prior to servicing" as required by 600.4(D).

See related PIs for 600.4(A), 600.4(C), and 600.4(E). No changes are proposed for 600.4(B), markings for signs with a retrofitted illumination system.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2303-NFPA 70-2023 [Section No. 600.4(A)]	
Public Input No. 2305-NFPA 70-2023 [Section No. 600.4(C)]	
Public Input No. 2307-NFPA 70-2023 [Section No. 600.4(E)]	
Public Input No. 2303-NFPA 70-2023 [Section No. 600.4(A)]	
Public Input No. 2305-NFPA 70-2023 [Section No. 600.4(C)]	
Public Input No. 2307-NFPA 70-2023 [Section No. 600.4(E)]	

Submitter Information Verification

Submitter Full Name: Michael Shulman
Organization: UL Solutions
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 15 18:32:44 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8072-NFPA 70-2024
Statement: This section is reworded for clarity. 600.4(D) has valuable installation-specific marking location requirements that cannot be addressed by the product standard.

Public Input No. 2307-NFPA 70-2023 [Section No. 600.4(E)]

~~(E) Installation Instructions.~~

~~All signs, outline lighting, skeleton tubing systems, and retrofit kits shall be marked to indicate that field wiring and installation instructions are required.~~

~~*Exception: Portable, cord-connected signs are not required to be marked.*~~

Statement of Problem and Substantiation for Public Input

These related PIs remove content that is duplicative and covered by the Listing requirements, in an effort to improve the efficiency of Code application.

600.4(E) was added in 2014 (ROP 18-93, log #2624; ROC 18-45, log #1029). The CMP should recognize that signs and retrofit kits are not required by the product standards to be provided with “instruction markings”; they are simply required to be provided with instructions (section 8 of UL 48 for electric signs, and section 26 of UL 879A for sign retrofit kits). There is no indication that this lack of a marking has been noticed or has resulted in signs/kits not including the required installation instructions; it is likely just unintended phrasing. There is no identifiable purpose in a marking that simply notes the fact that installation instructions are provided.

See related PIs for 600.4(A), 600.4(C), and 600.4(D). No changes are proposed for 600.4(B), markings for signs with a retrofitted illumination system.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2303-NFPA 70-2023 [Section No. 600.4(A)]	
Public Input No. 2305-NFPA 70-2023 [Section No. 600.4(C)]	
Public Input No. 2306-NFPA 70-2023 [Section No. 600.4(D)]	
Public Input No. 2303-NFPA 70-2023 [Section No. 600.4(A)]	
Public Input No. 2305-NFPA 70-2023 [Section No. 600.4(C)]	
Public Input No. 2306-NFPA 70-2023 [Section No. 600.4(D)]	

Submitter Information Verification

Submitter Full Name: Michael Shulman
Organization: UL Solutions
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 15 18:36:20 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8075-NFPA 70-2024
Statement: These changes remove duplicative content already covered by the product standard.

Public Input No. 4196-NFPA 70-2023 [Section No. 600.5(A)]

(A) Required Branch Circuit.

(1) Required Sign Outlet. Each commercial building and each commercial occupancy accessible to pedestrians shall be provided with at least one outlet in an accessible location at each entrance to each tenant space for sign or outline lighting system use.

(2) Branch-Circuit Rating. The outlet(s) shall be supplied by a branch circuit rated at least 20 amperes that supplies no other load.

Exception No. 1: A sign or outline lighting outlet shall not be required at entrances for deliveries, service corridors, or service hallways that are intended to be used only by service personnel or employees.

Exception No. 2: The required branch circuit shall be permitted to supply loads directly related to the control of the sign such as electronic or electromechanical controllers.

Statement of Problem and Substantiation for Public Input

Breaking up 600.5(A) into a list item format to facilitate understanding for Code users. In accordance with NFPA Style Manual section 3.5.1.2 additional subdivisions shall be used where multiple requirements can be broken into independent requirements.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Sep 06 20:45:50 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8076-NFPA 70-2024
Statement: The section was revised to comply with the NEC Style Manual section 3.5.1.2.

"Required" was removed from the title of (A) for clarity. Compliance with 600.5 is already required, where applicable, so it did not need to be added in items (1) or (2).

Public Input No. 2081-NFPA 70-2023 [Section No. 600.5(D)(1)]

(1) Supply.

The wiring method used to supply signs and outline lighting systems shall terminate within a sign, an outline lighting system enclosure, a suitable box, a conduit body, or enclosed panelboard.

Statement of Problem and Substantiation for Public Input

The term ‘panelboard’ and ‘enclosed panelboard’ are defined terms. Adding the word ‘enclosed panelboard’ makes the text technically correct. Note: The term ‘Enclosed Panelboard’ was added to NEC Article 100 during the 2023 Code cycle.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 11 15:31:39 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8077-NFPA 70-2024
Statement: The terms “panelboard” and “enclosed panelboard” are different defined terms. “Enclosed panelboard” is the technically correct term. The term “enclosed panelboard” was added to NEC Article 100 during the 2023 code cycle.

Public Input No. 4306-NFPA 70-2023 [New Section after 600.6(A)]

(A) Location.

The disconnecting means shall be permitted to be located in accordance with 600.6(A)(1), (A)(2), (A)(3), ~~and~~ (A)(4), and (A)(5) :

(5). Located on the sign or sign body.

The disconnecting means shall be permitted to be located on the sign or sign body for branch circuit(s) conductor(s) provided all the following conditions are met:

(1) Branch circuit(s) conductor(s) pass through the sign where not accessible and enclosed in a Chapter 3 listed raceway or metal-jacketed cable identified for the location.

(2) Terminate into a device box where the externally operable switch is enclosed.

(3) The switch shall be marked with a label as the disconnect for the sign or outline lighting system. The label shall comply with 110.21(B).

Additional Proposed Changes

File Name	Description	Approved
PI-4306-NFPA_70-2023_Chris_A_Valtierra_600.6_A_5_.pdf	PI-4306-NFPA 70-2023 Chris A Valtierra 600.6(A)(5)	

Statement of Problem and Substantiation for Public Input

NFPA 70 2017, First Revision No. 5137-NFPA 70-2015 [New Section after 600.6(A)(1)] by CMP18 discusses allowing branch circuits and feeders on large signs incorporating internal panel boards supplying enclosures within sign bodies.

Self-contained signs are the same installations as mentioned in FR 5137 that contain a branch circuit(s). This change will bring positive language needed for the AHJ, designers, and installers to have a compliant method that also aligns with the Informational Note: The location of the disconnect is intended to allow service or maintenance personnel and first responders complete and local control of the disconnecting means found in 600.6 Disconnects. Allowing an additional option of locating a disconnect on the sign or sign body gives the service or maintenance person an equivalent method of safety and local control to de-energize signs while performing maintenance where it is needed rather than searching for the disconnect. Signs or sign bodies can also be labeled like 600.6(A)(4) with the location of the panelboard branch circuit for first responders if CMP 18 agrees.

The installation would consist of a toggle or snap switch installed on the filler of a sign or sign body, a device box on the interior of the sign is located over the switch, then the branch circuit conductors enter the sign in a chapter 3 wiring method suitable for the location passing through the sign and terminating into the device box. This would be as suitable as exception No 1. The branch circuit conductors are isolated entering the sign and terminating into the device box covering the switch. Many signs are not constructed with panelboards installed but are fabricated in this very fashion.

Submitter Information Verification

Submitter Full Name: Chris Valtierra
Organization: Valtierra Sign Electrician Learning Services LLC
Affiliation: Owner
Street Address:
City:

State:
Zip:
Submittal Date: Thu Sep 07 10:41:23 EDT 2023
Committee: NEC-P18

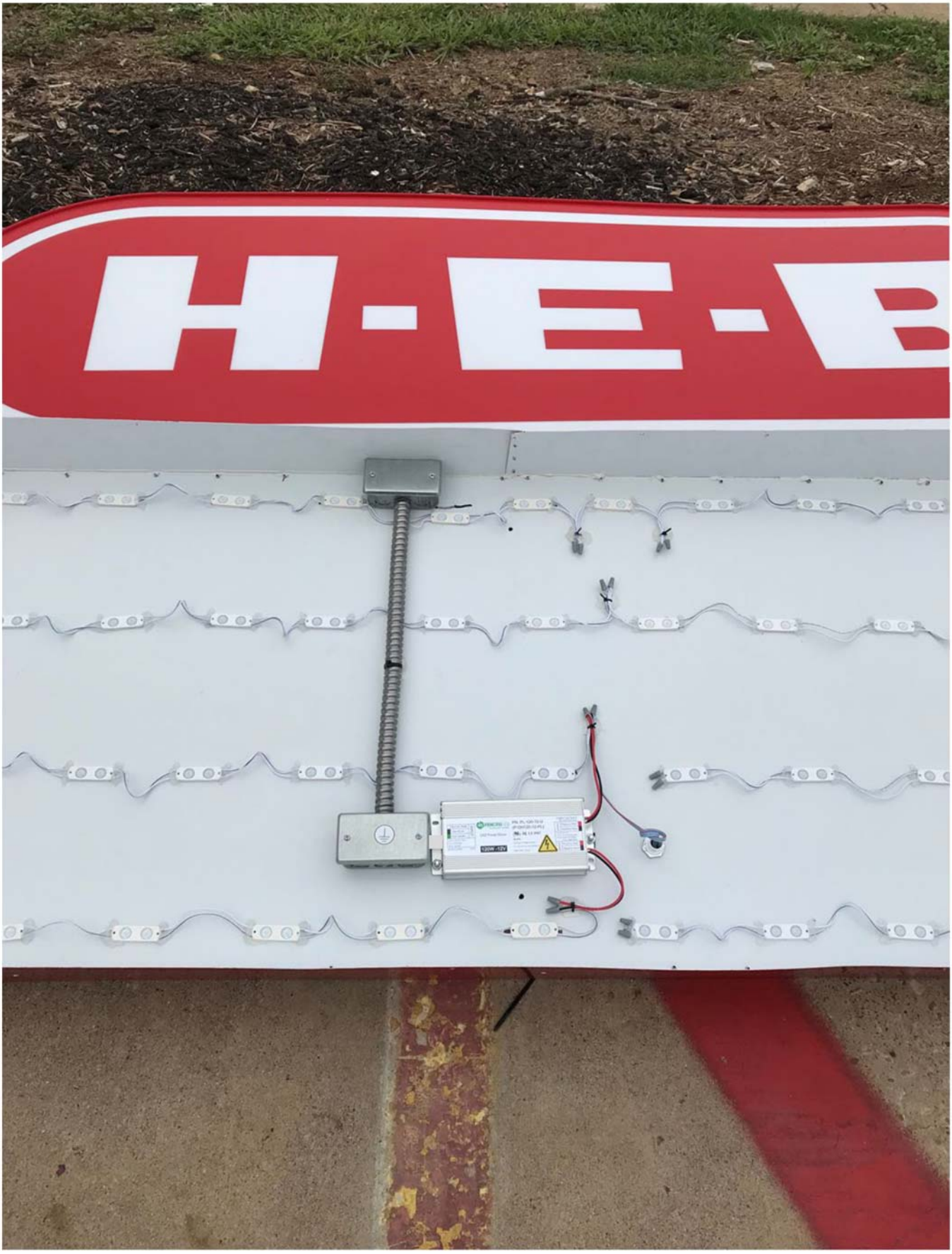
Committee Statement

Resolution: The proposed revision contradicts the intention of the disconnecting means.The intent is that all conductors are de-energized for safety.

PI-4306-NFPA 70-2023 Chris A Valtierra 600.6(A)(5)

Chapter 3 wiring method will terminate into a device box.

Device box covers switch located on filler.



Branch circuit conductors enter the top device box thru the sign body which is located over the switch, through the sign in a chapter 3 raceway to the termination with the Class 2 power supply conductors in the second device box.

Public Input No. 2542-NFPA 70-2023 [Section No. 600.6(A)]

(A) Location.

The disconnecting means shall be accessible and located in accordance with 600.6(A)(1), 600.6(A)(2), or 600.6(A)(3). If the disconnecting means is remote from the sign it controls, it shall comply with 600.6(A)(4).

(1) At Point of Entry to a Sign.

The disconnect shall be located at the point the feeder circuit or branch circuits supplying a sign or outline lighting system enters a sign enclosure, a sign body, or a pole in accordance with 600.5(D)(3). The disconnect shall open all ungrounded conductors where it enters the enclosure of the sign or pole.

Exception No. 1: A disconnect shall not be required for branch circuits or feeder conductors passing through the sign where not accessible and enclosed in a Chapter 3 listed raceway or metal-jacketed cable identified for the location.

Exception No. 2: A disconnect shall not be required at the point of entry to a sign enclosure or sign body for branch circuits or feeder conductors that supply an internal panelboards in a sign enclosure or sign body. The conductors shall be enclosed where not accessible in a Chapter 3 listed raceway or metal-jacketed cable identified for the location. A field-applied permanent hazard label that is visible during servicing shall be applied to the raceway at or near the point of entry into the sign enclosure or sign body. The danger label shall state the following: "Danger. This raceway contains energized conductors." The marking shall include the location of the disconnecting means for the energized conductors. The disconnecting means shall be capable of being locked in the open position.

(2) Within Sight of the Sign.

The disconnecting means shall be within sight of the sign or outline lighting system that it controls. Where the disconnecting means is out of the line of sight from any section that is able to be energized, the disconnecting means shall be lockable open in accordance with 110.25. A permanent field-applied marking identifying the location of the disconnecting means shall be applied to the sign in a location visible during servicing.

(3) Within Sight of the Controller.

The following shall apply for signs or outline lighting systems operated by electronic or electromechanical controllers located external to the sign or outline lighting system:

(1) The disconnecting means shall be located within sight of the controller or in the same enclosure with the controller.

(2) The disconnecting means shall disconnect the sign or outline lighting system and the controller from all ungrounded supply conductors.

(3) The disconnecting means shall be designed such that no pole can be operated independently and shall be lockable ~~in~~ open in accordance with 110.25.

Exception: Where the disconnecting means is not located within sight of the controller, a permanent field-applied marking identifying the location of the disconnecting means shall be applied to the controller in a location visible during servicing.

(4) Remote Location.

The disconnecting means, if located remote from the sign, sign body, or pole, shall be mounted at an accessible location available to first responders and service personnel. The location of the disconnect shall be marked with a label at the sign location and marked as the disconnect for the sign or outline lighting system.

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document when a disconnecting means is required to be lockable

open elsewhere in the code. The text is revised to comply with the NEC Style Manual. The NEC Style Manual Section 3.2.5 Consistent Application of Terms, 3.2.5.3 Lockable Open. Where a requirement specifies that a disconnecting means be capable of being locked in the open position, the phrase lockable open in accordance with 110.25 shall be used.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

Submitter Full Name: David Williams
Organization: Delta Charter Township
Street Address:
City:
State:
Zip:
Submittal Date: Sun Aug 20 07:03:05 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8083-NFPA 70-2024
Statement: The text “lockable in" is revised to "lockable open" to comply with the NEC Style Manual 3.2.5.3

Where a requirement specifies that the disconnecting means be capable of being locked in the open position, the phrase “lockable open” needs to be used, and is in accordance with 110.25.

Public Input No. 61-NFPA 70-2023 [Section No. 600.6(A)(3)]

(3) Within Sight of the Controller.

The following shall apply for signs or outline lighting systems operated by electronic or electromechanical controllers located external to the sign or outline lighting system:

(1) The disconnecting means shall be located within sight of the controller or in the same enclosure with the controller.

(2) The disconnecting means shall disconnect the sign or outline lighting system and the controller from all ungrounded supply conductors.

(3) The disconnecting means shall be designed such that no pole can be operated independently and shall be lockable in accordance with 110.25.

Exception: Where the disconnecting means is not located within sight of the controller and no likelihood of operation by a ghost exists , a permanent field-applied marking identifying the location of the disconnecting means ~~shall~~ may be applied to the controller in a location visible during servicing.

Statement of Problem and Substantiation for Public Input

We need to be concerned with the possibility of ghosts operating equipment.

Submitter Information Verification

Submitter Full Name: John Doe
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 06 22:53:06 EST 2023
Committee: NEC-P18

Committee Statement

Resolution: There is no section in the code which relates to Ghosts. The existing exception is adequate. Use of the term “may” is unenforceable and not permitted by the NEC Style Manual.

Public Input No. 2335-NFPA 70-2023 [Section No. 600.7(A)(1)]

(1) Equipment Grounding Conductor.

Metal equipment of signs, outline lighting, and skeleton tubing systems shall be ~~grounded by connection~~ connected to the equipment grounding conductor of the supply branch circuit(s) or feeder using the types of equipment grounding conductors specified in 250.118.

Exception: Portable cord-connected signs shall not be required to be connected to the equipment grounding conductor where protected by a system of double insulation or its equivalent. Double insulated equipment shall be distinctively marked.

Statement of Problem and Substantiation for Public Input

Changing the text would make the requirement technically correct. This requirement is about connecting the equipment grounding conductor to metal signs, not about grounding. This proposed revision will bring clarity for Code users.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 16 13:17:02 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8084-NFPA 70-2024
Statement: Language is revised to use the term “connected” instead of “grounded by connection” to be consistent with other sections of the Code.

Public Input No. 4401-NFPA 70-2023 [Section No. 600.7(B)(1)]

(1) Bonding of Metal Parts.

Metal parts and equipment of signs and outline lighting systems shall be bonded together and to the associated transformer or power-supply equipment grounding conductor of the branch circuit or feeder supplying the sign or outline lighting system and shall meet the requirements of 250.90. Remote metal parts of a section sign or outline lighting system only supplied by a remote Class 2 power supply shall be bonded together.

Exception: Remote metal parts of a section sign or outline lighting system only supplied by a remote Class 2 power supply shall not be required to be bonded to an equipment grounding conductor.

Additional Proposed Changes

File Name	Description	Approved
PI-4401-NFPA_70-2023_Chris_A_Valtierra_600.7_B_1_Examples.pdf	PI-4401-NFPA 70-2023 Chris A Valtierra 600.7(B)(1)	

Statement of Problem and Substantiation for Public Input

AHJ's, designers, and installers are not familiar with this Code section and do not realize there are two distinct requirements. As an AHJ, we are consistently finding at a rough inspection that the metal of remote wired class 2 signs do not comply. They are fabricated and installed with a two-wire class 2 cable and the metal parts are not bonded together as required because the text does not indicate that it applies to all signs fabricated from metal parts regardless of the illumination type installed. The exception only describes that the bonding conductor does not have to be connected to the Equipment Grounding Conductor of the branch circuit for a remote wired class 2 sign. The exception is erroneously being applied resulting in a failure to comply with the Code.

Submitter Information Verification

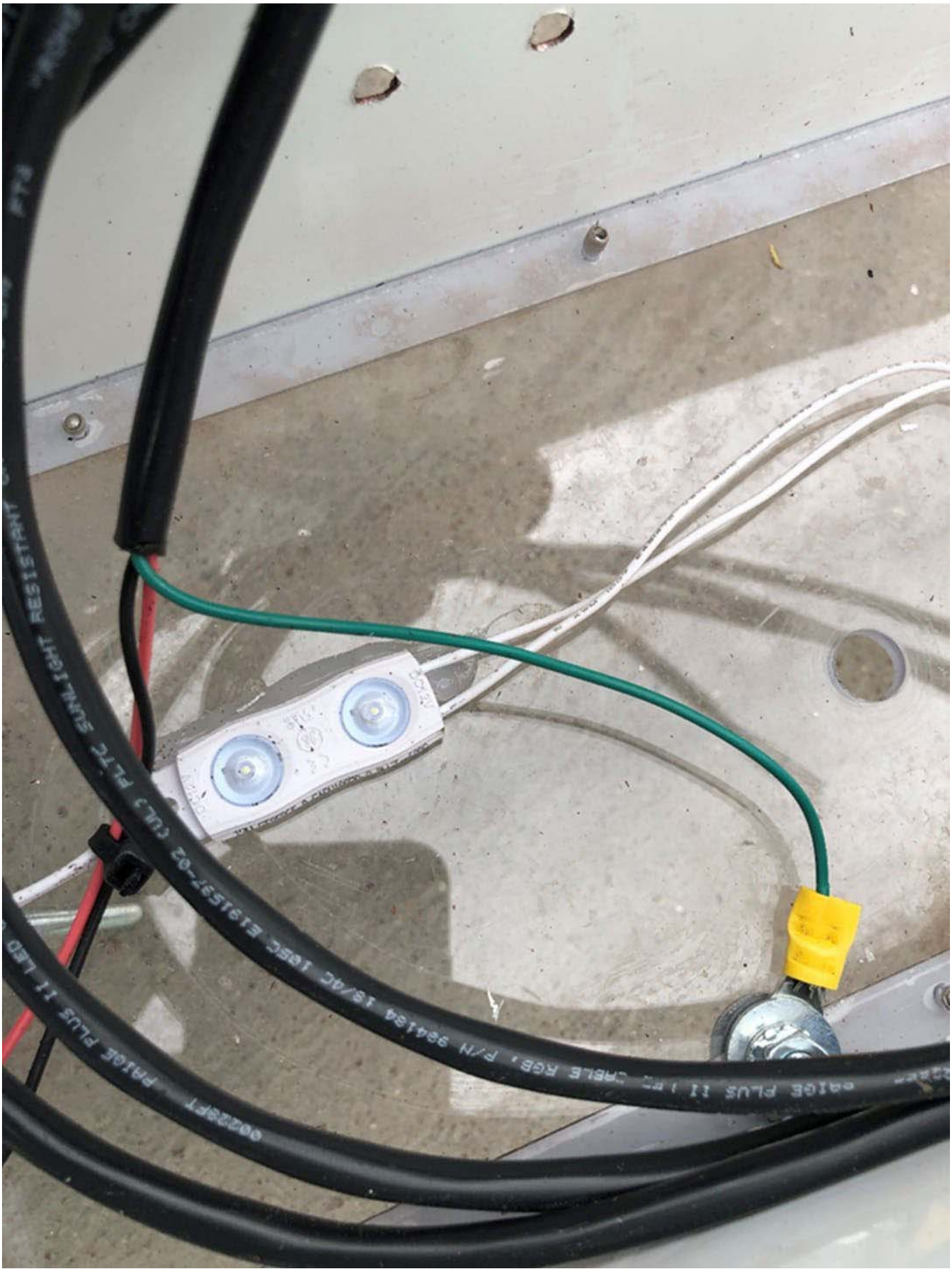
Submitter Full Name: Chris Valtierra
Organization: Valtierra Sign Electrician Learning Services LLC
Affiliation: Owner
Street Address:
City:
State:
Zip:
Submittal Date: Thu Sep 07 14:25:24 EDT 2023
Committee: NEC-P18

Committee Statement

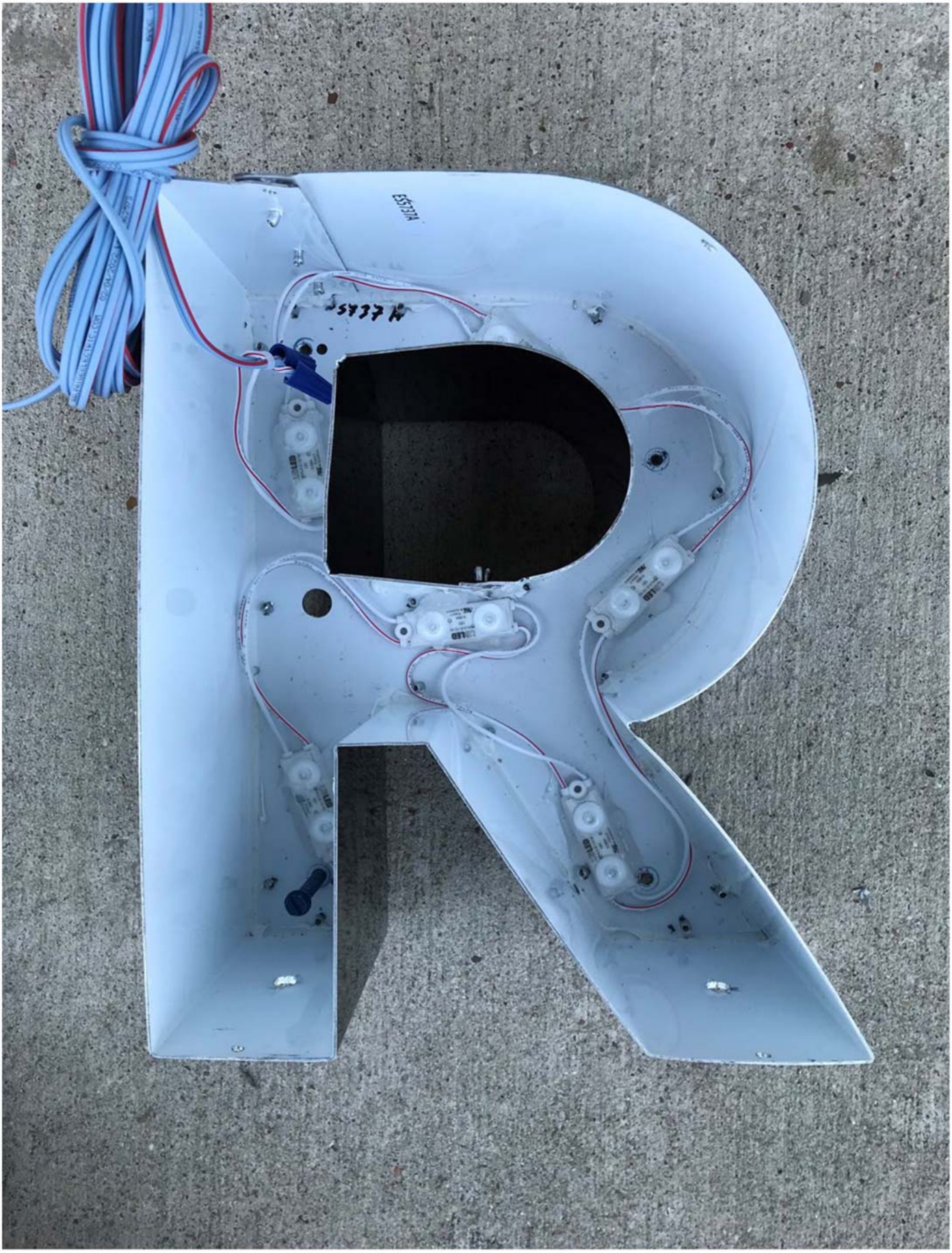
Resolution: The public input contradicts the intention of the Code, which does not require remote metal parts of a section sign or outline lighting system only supplied by a remote Class 2 power supply to be connected together or connected to the equipment grounding conductor of the branch circuit.

PI-4401-NFPA 70-2023 Chris A Valtierra 600.7(B)(1)

Halo rear illumination with Plexi glass illuminated face. Metal not bonded. 2 wire Class 2 cable installed.

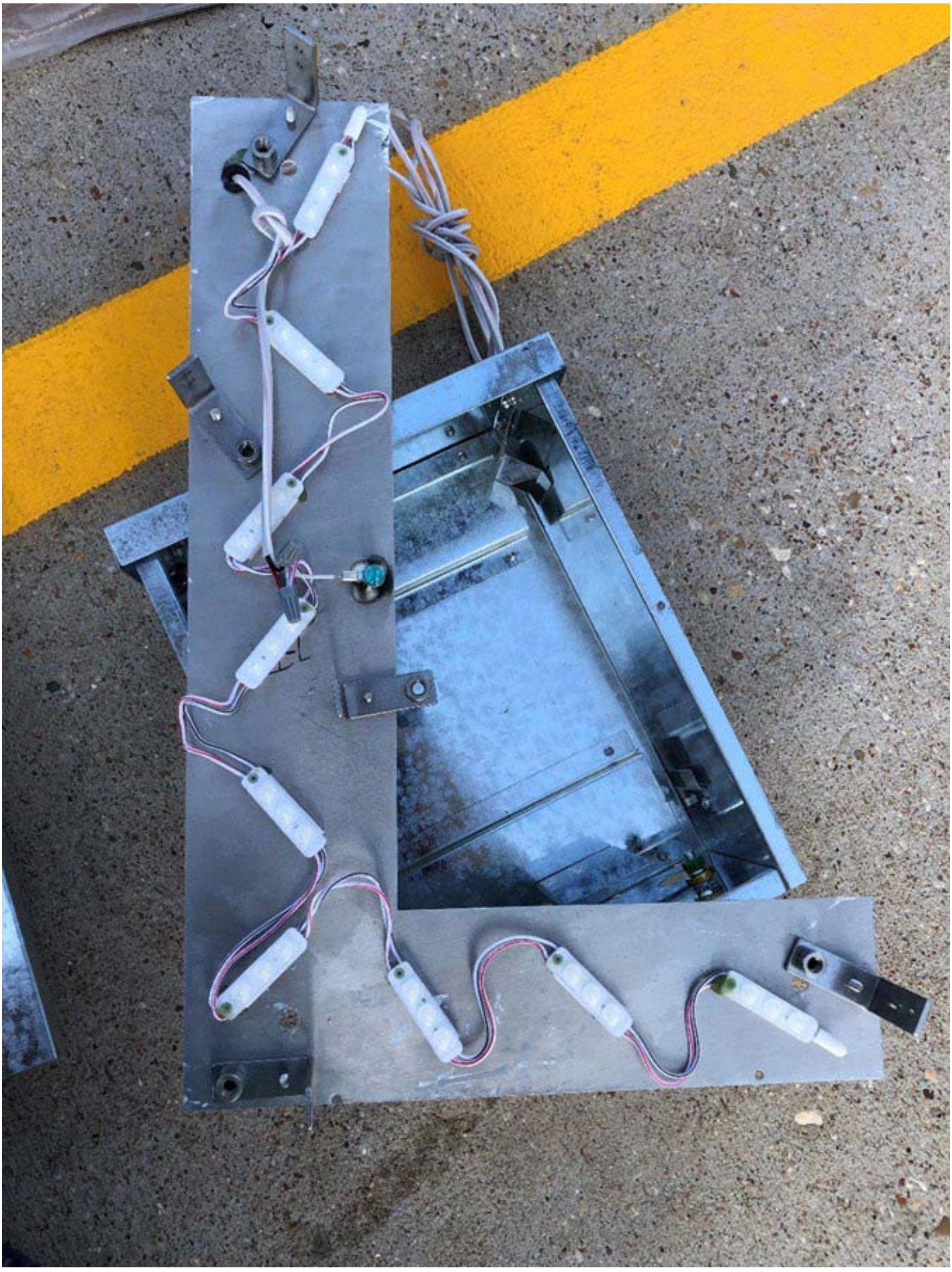


Halo rear illumination with Plexi glass illuminated face. Metal bonded. 3 wire Class 2 cable installed.



Remote wired Class 2 channel letter metal not bonded. 2 wire Class 2 cable installed.

Remote wired Class 2 channel letter metal bonded. 3 wire Class 2 cable installed.



Public Input No. 4399-NFPA 70-2023 [Section No. 600.7(B)(8)]

(8) Signs in Fountains.

Signs in fountains shall comply with 680.57. Signs or outline lighting installed inside a fountain shall have all metal parts bonded to the equipment grounding conductor of the branch circuit for the fountain recirculating system. The bonding connection shall be as near as practicable to the fountain and shall be permitted to be made to metal piping systems that are bonded in accordance with 680.54(B).

Informational Note: See 600.32(J) for restrictions on length of high-voltage secondary conductors.

Statement of Problem and Substantiation for Public Input

AHJ's, designers, and installers are not familiar with this Code section. 680.57 is a seldom known section that has very specific requirements for signs installed in fountains and should include detached signs installed within 10 feet of a pool such as can be found on hotel sites.

Submitter Information Verification

Submitter Full Name: Chris Valtierra
Organization: Valtierra Sign Electrician Learning Services LLC
Affiliation: Owner
Street Address:
City:
State:
Zip:
Submittal Date: Thu Sep 07 14:17:03 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8087-NFPA 70-2024
Statement: The section should be moved into an informational note, as it is provides additional information and is not a requirement.

Public Input No. 1148-NFPA 70-2023 [Section No. 600.21(E)]

(E) Attic and Soffit Locations.

Ballasts, transformers, electronic power supplies, and Class 2 power sources shall be permitted to be located in attics and soffits, provided there is an access door at least 900 mm × 562.5 mm (36 in. × 22 ½ in.) and a passageway of at least 900 mm (3 ft) high × 600 mm (2 ft) wide with a suitable permanent walkway at least 300 mm (12 in.) wide extending from the point of entry to each component. ~~At least one lighting outlet containing a switch or controlled by a wall switch shall be installed in such spaces. At least one point of control shall be at the usual point of entry to these spaces. The lighting outlet shall be provided at or near the equipment requiring servicing.~~

Statement of Problem and Substantiation for Public Input

The lighting outlet and point of control is required by the language in 210.70(C) and does not need to be repeated here.

Submitter Information Verification

Submitter Full Name: Don Ganiere
Organization: none
Street Address:
City:
State:
Zip:
Submittal Date: Tue Jun 20 13:02:56 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: This language does not repeat because the general reference in 210.70(C) cited by the submitter does not refer to soffits

Public Input No. 1669-NFPA 70-2023 [New Section after 600.24]

600.25 Class 2 Power Sources.

Class 2 transformers, power supplies, and power sources shall comply with the requirements of Class 2 circuits and 600.25(A), (B), (C), and (D).

(A) Listing.

Class 2 power supplies and power sources shall be listed for use with electric signs and outline lighting systems or shall be a component in a listed electric sign.

(B) Equipment Grounding Conductor.

Metal parts of Class 2 power supplies and power sources shall be connected to the equipment grounding conductor.

(C) Wiring Methods on the Supply Side of the Class 2 Power Supply.

Conductors and equipment on the supply side of the power source shall be installed in accordance with the appropriate requirements of Chapter 3.

(D) Secondary Wiring.

Secondary wiring on the load side of a Class 2 power source shall comply with 600.12(C) and 600.33

Statement of Problem and Substantiation for Public Input

All other Code sections pertaining to “Workmanlike Manner” are found in the XXX.24 Section of the Article. Moving the first sentence from Section 600.33(B) to into a revised Section 600.24 pertaining to “Mechanical Execution of Work” & “Workmanlike Manner” are found in the XXX.24 Section of the Article. Adding a new Section 600.24 covering Workmanship. Creating a Section 600.25 to accomodate what was in 600.24.

For consistency to support the parallel numbering clause in the NEC Style Manual -2023 Section 2.2.1.1:

Parallel Numbering Within Similar Articles. To the extent possible, technical committees shall use the same section numbers (and part numbers, where applicable) for the same purposes within articles covering similar subjects.
Workmanship is consistent and more appropriately applies to Article 600 installations generally.
Section 600.24(A)-(D) was moved to a new Section 600.25(A)-(D).
See Companion PIs

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]	
Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]	
Public Input No. 1630-NFPA 70-2023 [Section No. 393.14]	
Public Input No. 1632-NFPA 70-2023 [New Section after 393.21]	
Public Input No. 1668-NFPA 70-2023 [Section No. 600.24]	
Public Input No. 1670-NFPA 70-2023 [Section No. 600.33(B)]	
Public Input No. 1687-NFPA 70-2023 [Section No. 722.24]	
Public Input No. 1692-NFPA 70-2023 [New Section after 724.21]	
Public Input No. 1691-NFPA 70-2023 [Section No. 724.24]	
Public Input No. 1696-NFPA 70-2023 [New Section after 725.21]	
Public Input No. 1697-NFPA 70-2023 [Section No. 725.24]	
Public Input No. 1699-NFPA 70-2023 [New Section after 726.12]	

Public Input No. 1700-NFPA 70-2023 [Section No. 726.24]
Public Input No. 1702-NFPA 70-2023 [Section No. 760.24]
Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]
Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]
Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]
Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]
Public Input No. 1630-NFPA 70-2023 [Section No. 393.14]
Public Input No. 1632-NFPA 70-2023 [New Section after 393.21]
Public Input No. 1668-NFPA 70-2023 [Section No. 600.24]
Public Input No. 1670-NFPA 70-2023 [Section No. 600.33(B)]
Public Input No. 1687-NFPA 70-2023 [Section No. 722.24]
Public Input No. 1692-NFPA 70-2023 [New Section after 724.21]
Public Input No. 1696-NFPA 70-2023 [New Section after 725.21]
Public Input No. 1697-NFPA 70-2023 [Section No. 725.24]
Public Input No. 1699-NFPA 70-2023 [New Section after 726.12]
Public Input No. 1700-NFPA 70-2023 [Section No. 726.24]
Public Input No. 1702-NFPA 70-2023 [Section No. 760.24]
Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]
Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]

Submitter Information Verification

Submitter Full Name: Kyle Krueger
Organization: NECA
Affiliation: NECA
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 28 13:12:36 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8089-NFPA 70-2024
Statement: Deleting existing 600.24(C) conforms with NEC Style Manual section 4.1.4. Existing 600.24(D) will be renumbered as 600.24(C). Moving existing 600.24 to 600.25 will comply with NEC Style Manual 2.2.1.1 on parallel numbering.

Public Input No. 1668-NFPA 70-2023 [Section No. 600.24]

600.24 ~~Class 2 Power Sources~~ **Workmanship** .

Class 2 transformers, power supplies, ~~and~~ power sources ~~shall comply with the requirements of Class 2 circuits and 600.24(A)~~ , ~~(B), (C), and (D).~~

~~**(A)** Listing.~~

~~Class 2 power supplies and power sources shall be listed for use with electric signs and outline lighting systems or shall be a component in a listed electric sign.~~

~~**(B)** Equipment Grounding Conductor.~~

~~Metal parts of Class 2 power supplies and power sources shall be connected to the equipment grounding conductor.~~

~~**(C)** Wiring Methods on the Supply Side of the Class 2 Power Supply.~~

~~Conductors and equipment on the supply side of the power source shall be installed in accordance with the appropriate requirements of Chapter 3 .~~

~~**(D)** Secondary Wiring.~~

~~Secondary wiring on the load side of a Class 2 power source shall comply with 600.12(C) and 600.33 .~~

and all other installations covered by this Article shall be mechanically executed and installed in a manner consistent with industry practices and standards.

Informational Note No. 1: See definition of *Workmanship* in Article 100.

Informational Note No. 2: See Section 110.12 for more information on Workmanship.

Statement of Problem and Substantiation for Public Input

All other Code sections pertaining to “Mechanical Execution of Work” & “Workmanlike Manner” are found in the XXX.24 Section of the Article. Adding a new Section 393.24 covering Workmanship.
For consistency to support the parallel numbering clause in the NEC Style Manual -2023 Section 2.2.1.1:

Parallel Numbering Within Similar Articles. To the extent possible, technical committees shall use the same section numbers (and part numbers, where applicable) for the same purposes within articles covering similar subjects.

See Companion PIs

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]	
Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]	
Public Input No. 1630-NFPA 70-2023 [Section No. 393.14]	
Public Input No. 1632-NFPA 70-2023 [New Section after 393.21]	
Public Input No. 1669-NFPA 70-2023 [New Section after 600.24]	
Public Input No. 1670-NFPA 70-2023 [Section No. 600.33(B)]	
Public Input No. 1687-NFPA 70-2023 [Section No. 722.24]	
Public Input No. 1692-NFPA 70-2023 [New Section after 724.21]	
Public Input No. 1691-NFPA 70-2023 [Section No. 724.24]	
Public Input No. 1696-NFPA 70-2023 [New Section after 725.21]	
Public Input No. 1697-NFPA 70-2023 [Section No. 725.24]	

Public Input No. 1699-NFPA 70-2023 [New Section after 726.12]
Public Input No. 1700-NFPA 70-2023 [Section No. 726.24]
Public Input No. 1702-NFPA 70-2023 [Section No. 760.24]
Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]
Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]
Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]
Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]
Public Input No. 1630-NFPA 70-2023 [Section No. 393.14]
Public Input No. 1632-NFPA 70-2023 [New Section after 393.21]
Public Input No. 1669-NFPA 70-2023 [New Section after 600.24]
Public Input No. 1670-NFPA 70-2023 [Section No. 600.33(B)]
Public Input No. 1687-NFPA 70-2023 [Section No. 722.24]
Public Input No. 1692-NFPA 70-2023 [New Section after 724.21]
Public Input No. 1696-NFPA 70-2023 [New Section after 725.21]
Public Input No. 1697-NFPA 70-2023 [Section No. 725.24]
Public Input No. 1699-NFPA 70-2023 [New Section after 726.12]
Public Input No. 1700-NFPA 70-2023 [Section No. 726.24]
Public Input No. 1702-NFPA 70-2023 [Section No. 760.24]
Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]
Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]

Submitter Information Verification

Submitter Full Name: Kyle Krueger
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Affiliation: NECA
Street Address:
City:
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Zip:
Submittal Date: Fri Jul 28 13:06:03 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: The term "workmanship" is not defined in the NEC. Per NEC Style Manual table 3.2.1, the term "workmanship" is a possibly unenforceable and vague term.

Public Input No. 636-NFPA 70-2023 [Section No. 600.24]

600.24 Class 2 Power Sources.

Class 2 transformers, power supplies, and power sources shall comply with the requirements of Class 2 circuits and 600.24(A), (B), and (C)~~, and (D)~~ .

(A) Listing.

Class 2 power supplies and power sources shall be listed for use with electric signs and outline lighting systems or shall be a component in a listed electric sign.

(B) Equipment Grounding Conductor.

Metal parts of Class 2 power supplies and power sources shall be connected to the equipment grounding conductor.

(C)

~~Wiring Methods on the Supply Side of the Class 2 Power Supply.~~

~~Conductors and equipment on the supply side of the power source shall be installed in accordance with the appropriate requirements of Chapter 3 .~~

~~**(D)** Secondary Wiring.~~

~~Secondary wiring on the load side of a Class 2 power source shall comply with 600.12(C) and 600.33 .~~

Statement of Problem and Substantiation for Public Input

Referring the Code user to the applicable requirements of an entire chapter is not helpful nor is it needed. Nothing in this section is modifying the requirements of Chapter 3, so why are we talking about it?

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:
Submittal Date: Mon Apr 17 11:40:05 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8089-NFPA 70-2024
Statement: Deleting existing 600.24(C) conforms with NEC Style Manual section 4.1.4. Existing 600.24(D) will be renumbered as 600.24(C). Moving existing 600.24 to 600.25 will comply with NEC Style Manual 2.2.1.1 on parallel numbering.

Public Input No. 1382-NFPA 70-2023 [Section No. 600.33(B)]

(B) Installation.

Secondary wiring shall be installed in accordance with 600.33(B)(1) and (B)(2).

(1) Wiring shall be installed and supported in a ~~neat~~ professional and ~~workmanlike manner~~ skillful manner . Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable is not damaged by normal building use. The cable shall be supported and secured at intervals not exceeding 1.8 m (6 ft). Such cables shall be supported by straps, staples, hangers, cable ties, or similar fittings designed and installed so as not to damage the cable. The installation shall also comply with 300.4(D).

(2) Connections in cable and conductors shall be made with listed insulating devices and be accessible after installation. Where made in a wall, connections shall be enclosed in a listed box.

Statement of Problem and Substantiation for Public Input

To more closely correlate with 110.12

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 203-NFPA 70-2023 [Global Input]	
Public Input No. 1390-NFPA 70-2023 [Section No. 725.24]	

Submitter Information Verification

Submitter Full Name: Kelly Wofford
Organization: EIG
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jul 12 11:17:57 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: The proposed Removes terms are identified as possibly vague and unenforceable per NEC Style Manual table 3.2.1. There is no need to restate the requirements of 110.12 in Article 600, Further there is no need to repeat general requirements from Article 110 in this section.

Public Input No. 1670-NFPA 70-2023 [Section No. 600.33(B)]

(B) Installation.

Secondary wiring shall be installed in accordance with 600.33(B)(1) and (B)(2).

(1) ~~Wiring shall be installed and supported in a neat and workmanlike manner.~~ Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable is not damaged by normal building use. The cable shall be supported and secured at intervals not exceeding 1.8 m (6 ft). Such cables shall be supported by straps, staples, hangers, cable ties, or similar fittings designed and installed so as not to damage the cable. The installation shall also comply with 300.4(D).

(2) Connections in cable and conductors shall be made with listed insulating devices and be accessible after installation. Where made in a wall, connections shall be enclosed in a listed box.

Statement of Problem and Substantiation for Public Input

All other Code Sections pertaining to “Workmanlike Manner” are found in the XXX.24 Section of the Article. Moving the first sentence from Section 600.33(B) to into a revised Section 600.24 covering Workmanship is consistent and more appropriately applies to Article 600 installations generally.
Section 600.24(A)-(D) was moved to a new Section 600.25(A)-(D).

This also creates compliance with the NEC Style Manual Section 2.2.1.1:

Parallel Numbering Within Similar Articles. To the extent possible, technical committees shall use the same section numbers (and part numbers, where applicable) for the same purposes within articles covering similar subjects.

See Companion PIs

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]	
Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]	
Public Input No. 1630-NFPA 70-2023 [Section No. 393.14]	
Public Input No. 1632-NFPA 70-2023 [New Section after 393.21]	
Public Input No. 1669-NFPA 70-2023 [New Section after 600.24]	
Public Input No. 1668-NFPA 70-2023 [Section No. 600.24]	
Public Input No. 1687-NFPA 70-2023 [Section No. 722.24]	
Public Input No. 1692-NFPA 70-2023 [New Section after 724.21]	
Public Input No. 1691-NFPA 70-2023 [Section No. 724.24]	
Public Input No. 1696-NFPA 70-2023 [New Section after 725.21]	
Public Input No. 1697-NFPA 70-2023 [Section No. 725.24]	
Public Input No. 1699-NFPA 70-2023 [New Section after 726.12]	
Public Input No. 1700-NFPA 70-2023 [Section No. 726.24]	
Public Input No. 1702-NFPA 70-2023 [Section No. 760.24]	
Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]	
Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]	
Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]	
Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]	

Public Input No. 1630-NFPA 70-2023 [Section No. 393.14]
Public Input No. 1632-NFPA 70-2023 [New Section after 393.21]
Public Input No. 1668-NFPA 70-2023 [Section No. 600.24]
Public Input No. 1669-NFPA 70-2023 [New Section after 600.24]
Public Input No. 1687-NFPA 70-2023 [Section No. 722.24]
Public Input No. 1692-NFPA 70-2023 [New Section after 724.21]
Public Input No. 1696-NFPA 70-2023 [New Section after 725.21]
Public Input No. 1697-NFPA 70-2023 [Section No. 725.24]
Public Input No. 1699-NFPA 70-2023 [New Section after 726.12]
Public Input No. 1700-NFPA 70-2023 [Section No. 726.24]
Public Input No. 1702-NFPA 70-2023 [Section No. 760.24]
Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]
Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]

Submitter Information Verification

Submitter Full Name: Kyle Krueger
Organization: NECA
Affiliation: NECA
Street Address:
City:
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Zip:
Submittal Date: Fri Jul 28 13:20:48 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8096-NFPA 70-2024
Statement: This language was removed because it is redundant to 110.12.

Public Input No. 2015-NFPA 70-2023 [Section No. 600.33(B)]

(B) Installation.

Secondary wiring shall be installed in accordance with 600.33(B)(1) and (B)(2).

(1) Wiring shall be installed and supported in a ~~neat~~ professional and ~~workmanlike manner~~ skillful manner . Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable is not damaged by normal building use. The cable shall be supported and secured at intervals not exceeding 1.8 m (6 ft). Such cables shall be supported by straps, staples, hangers, cable ties, or similar fittings designed and installed so as not to damage the cable. The installation shall also comply with 300.4(D).

(2) Connections in cable and conductors shall be made with listed insulating devices and be accessible after installation. Where made in a wall, connections shall be enclosed in a listed box.

Statement of Problem and Substantiation for Public Input

This revision is needed to correlate with the wording in 110.12

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2009-NFPA 70-2023 [Section No. 722.24(A)]	“professional and skillful” instead of “neat and workmanlike”
Public Input No. 2010-NFPA 70-2023 [Section No. 724.24]	“professional and skillful” instead of “neat and workmanlike”
Public Input No. 2011-NFPA 70-2023 [Section No. 725.24]	“professional and skillful” instead of “neat and workmanlike”
Public Input No. 2012-NFPA 70-2023 [Section No. 726.24]	“professional and skillful” instead of “neat and workmanlike”
Public Input No. 2013-NFPA 70-2023 [Section No. 800.24(A)]	“professional and skillful” instead of “neat and workmanlike”
Public Input No. 2014-NFPA 70-2023 [Section No. 770.24(A)]	“professional and skillful” instead of “neat and workmanlike”
Public Input No. 2016-NFPA 70-2023 [Section No. 393.14(A)]	
Public Input No. 2017-NFPA 70-2023 [Section No. 760.24(A)]	

Submitter Information Verification

Submitter Full Name: Russ Leblanc
Organization: Leblanc Consulting Services
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 11 06:49:57 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: The proposed Removes terms are identified as possibly vague and unenforceable per NEC Style Manual table 3.2.1. There is no need to restate the requirements of 110.12 in Article 600, Further there is no need to repeat general requirements from Article 110 in this section.

Public Input No. 50-NFPA 70-2023 [Section No. 600.33(B)]

(B) Installation.

Secondary wiring shall be installed in accordance with 600.33(B)(1) and (B)(2).

(1) ~~Wiring shall be installed and supported in a neat and workmanlike manner.~~ Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable is not damaged by normal building use. The cable shall be supported and secured at intervals not exceeding 1.8 m (6 ft). Such cables shall be supported by straps, staples, hangers, cable ties, or similar fittings designed and installed so as not to damage the cable. The installation shall also comply with 300.4(D).

(2) Connections in cable and conductors shall be made with listed insulating devices and be accessible after installation. Where made in a wall, connections shall be enclosed in a listed box.

Statement of Problem and Substantiation for Public Input

Article 600 is not exempt from 90.3. Therefore, the requirements of Article 110 apply to Chapter 6 of the NEC. Accordingly, there is no need to restate the requirements of 110.12 in Article 600 that would then read that "wiring be installed in a professional and skillful manner" so that this requirement would correlate with 110.12. Further, in addition to there being no need to repeat general requirements from Article 110 here in this section, the requirements in this section do not comply with the NEC Style Manual whereby it was determined that "neat" and "workmanlike" were vague and unenforceable and were therefore changed to "professional" and "skillful." In sum, this sentence should be removed because it is unnecessary as it is redundant per 90.3, there is lack of correlation with 110.12, and it is in violation of the NEC Style Manual.

Submitter Information Verification

Submitter Full Name: Palmer Hickman
Organization: Electrical Training Alliance
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 06 11:32:09 EST 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8096-NFPA 70-2024
Statement: This language was removed because it is redundant to 110.12.

Public Input No. 2984-NFPA 70-2023 [Section No. 600.34(C)]

(C) Flexible Cords and Cables.

Flexible cords and cables shall ~~comply with Article~~ 400 ~~and~~ be identified as extra hard usage, rated for outdoor use, and water and sunlight resistant.

Statement of Problem and Substantiation for Public Input

Section 4.1.4 of the NEC(r) Style Manual prohibits referencing the entire article except for Article 100 or where required for context. In this case, the Flexible cord and cable article is Article 400 and that is well understood, so with the available table of context and index already provided in the document, it is suggested that we could delete this reference to Article 400 without changing the intent of the requirement.

Submitter Information Verification

Submitter Full Name: Richard Holub
Organization: The DuPont Company, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 28 14:26:00 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8099-NFPA 70-2024
Statement: Amend reference from 400 to 400.4 to comply with the NEC Style Manual section 4.1.4.

Public Input No. 2982-NFPA 70-2023 [Section No. 600.34 [Excluding any Sub-Sections]]

All field wiring of components and subassemblies for an off-grid stand-alone, on-grid interactive, or non-grid interactive PV installation shall be installed in accordance with Article 690, Part IV as applicable, 600.34, and the PV powered sign installation instructions.

Statement of Problem and Substantiation for Public Input

Section 4.1.4 of the NEC(r) Style Manual prohibits referencing the entire article except for Article 100 or where required for context. The wiring methods and materials requirements of Article 690 are found in Part IV, so it is suggested that this clause be revised accordingly.

Submitter Information Verification

Submitter Full Name: Richard Holub
Organization: The DuPont Company, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 28 14:21:59 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8097-NFPA 70-2024
Statement: Adding “Part IV” should clarify the section required. The references have been revised to reference specific parts of articles to comply with the NEC Style Manual section 4.1.4.

Public Input No. 4433-NFPA 70-2023 [New Section after 600.35]

600.36. Light-emitting diode (LED) light sources.

Light-emitting diode (LED) light sources conductors with splices and joints and the free ends of conductors shall be covered with an insulation equivalent to that of the conductors or with an identified insulating device.

Additional Proposed Changes

File Name	Description	Approved
PI-4433-NFPA_70-2023_Chris_A_Valtierra_New_Section_600.36.pdf	PI-4433-NFPA 70-2023 Chris A Valtierra New Section 600.36	

Statement of Problem and Substantiation for Public Input

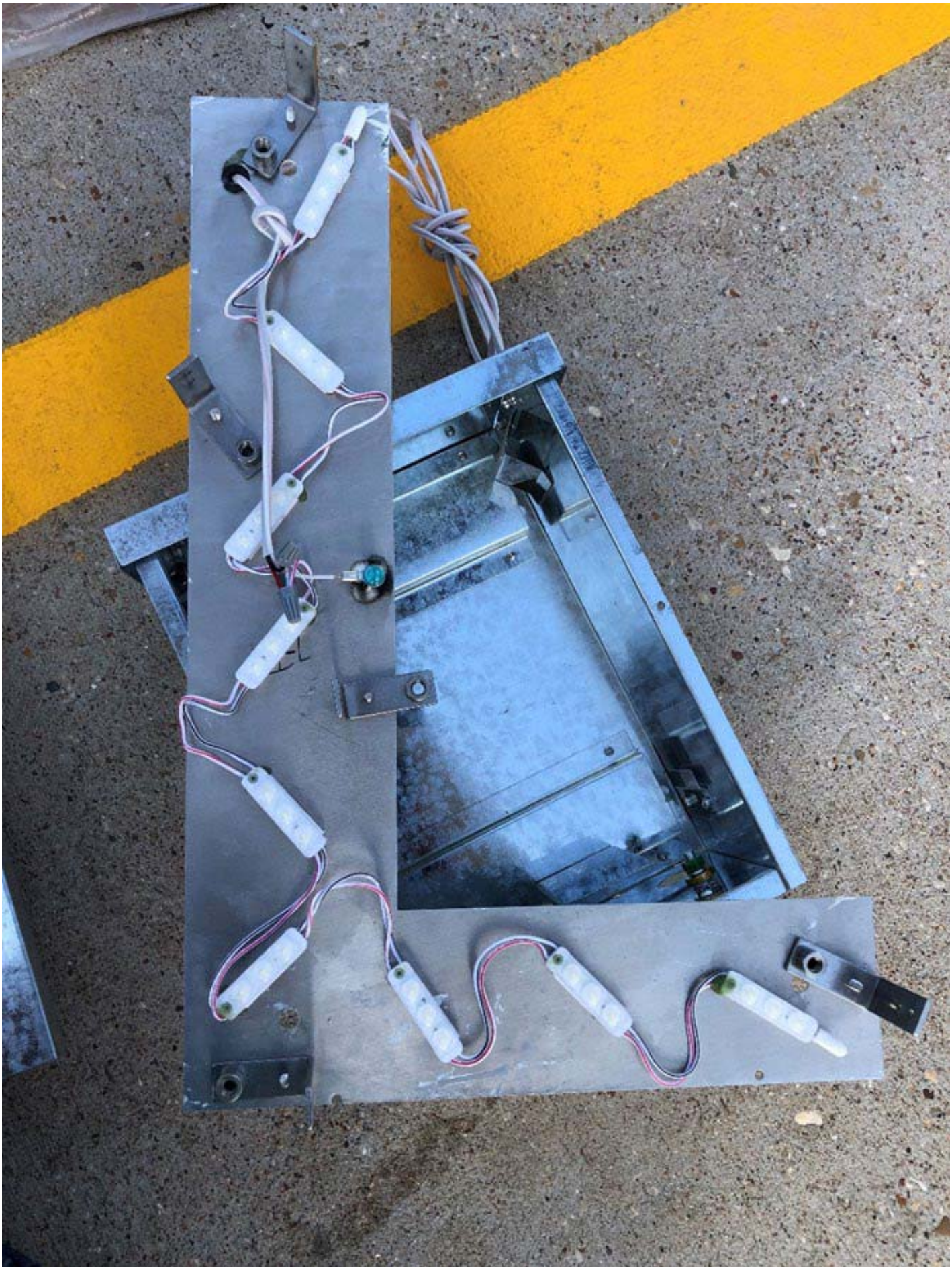
AHJ's, designers, and installers are not aware of the requirement to terminate the conductors properly on the last led module. It is typically cut off at the end of the module and does not comply with the led manufacturers installation instructions. As an AHJ, the most common refrain that I receive from installers and sign manufacturers is, it is only 12v or 24v DC. When asked to review or provide the led manufacturers instructions, it is then realized how this is to be accomplished. This addition to the Code will provide positive language for AHJ's, designers, manufacturers, and installers to understand how to finish the led module installation.

Submitter Information Verification

Submitter Full Name: Chris Valtierra
Organization: Valtierra Sign Electrician Learning Services LLC
Affiliation: Owner
Street Address:
City:
State:
Zip:
Submittal Date: Thu Sep 07 15:18:11 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: This would contradict the intention of the product standard and provided guidance in the installation nstructions.



Public Input No. 3904-NFPA 70-2023 [Section No. 605.6(B)]

(B) Connection.

Where cord and plug connection is provided, it shall comply with all of the following:

(1) The cord length shall be suitable for the intended application but shall not exceed 2.7 m (9 ft) in length.

(2) The cord shall not be smaller than 18 AWG.

(3) The cord shall contain an equipment grounding conductor, except as specified in 605.6(B)(4).

(4) Cords on the load side of a listed Class 2 power source shall not be required to contain an equipment grounding conductor.

(5) The cord shall be of the hard usage type, except as specified in 605.6(B)(6).

(6) A cord provided on a listed Class 2 power source shall be of the type provided with the listed luminaire assembly or of the type specified in 725.130 and 725.127.

(7) Connection by other means shall be identified as suitable for the conditions of use.

(8) Cords on the load side of a listed Class 4 transmitter shall not be required to contain an equipment grounding conductor.

(9) A cord provided on a listed Class 4 transmitter shall be of the type provided with the listed luminaire assembly.

Statement of Problem and Substantiation for Public Input

Adding Class 4 to the list. Class 4 systems were added in the 2023 code and have equivalent or better than fire and life safety requirements as Class 2 circuits. An effort to analyze all the locations of Class 2 in the code to see if Class 4 was also appropriate in the application should have happened for the 2023 code and not doing it was an oversight.
While products that would apply to 605 that use FMP do not exist, they COULD be developed and the lack of allowance could delay that development. As Class 2 are allowed, Class 4 should also be allowed.

Submitter Information Verification

Submitter Full Name: Chad Jones
Organization: Cisco Systems
Street Address:
City:
State:
Zip:
Submittal Date: Wed Sep 06 09:47:35 EDT 2023
Committee: NEC-P18

Committee Statement

Resolution: Further information is needed to determine if class 4 circuits could be applied to 605.

Public Input No. 132-NFPA 70-2023 [Sections Part VII., 410.80, 410.82, 410.84]

~~**Sections Part VII., 410.80, 410.82, 410.84**~~

~~**Part VII.** Construction of Luminaires~~

~~**410.80** Luminaire Rating.~~

~~**(A)** Marking.~~

~~All luminaires shall be marked with the maximum lamp wattage or electrical rating, manufacturer's name, trademark, or other suitable means of identification. A luminaire requiring supply wire rated higher than 60°C (140°F) shall be marked with the minimum supply wire temperature rating on the luminaire and shipping carton or equivalent.~~

~~**(B)** Electrical Rating.~~

~~The electrical rating shall include the voltage and frequency and shall indicate the current rating of the unit, including the ballast, transformer, LED driver, power supply, or autotransformer.~~

~~**410.82** Portable Luminaires.~~

~~Portable luminaires shall be wired with flexible cord recognized by 400.4 and an attachment plug of the polarized or grounding type. If used with Edison-base lampholders, the grounded conductor shall be identified and attached to the screw shell and the identified blade of the attachment plug.~~

~~**410.84** Cord Bushings.~~

~~A bushing or the equivalent shall be provided where flexible cord enters the base or stem of a portable luminaire. The bushing shall be of insulating material unless a jacketed type of cord is used.~~

Statement of Problem and Substantiation for Public Input

This part can be deleted in its entirety since luminaires are required to be listed and must meet product standards in order to achieve that listing.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 131-NFPA 70-2023 [Sections Part III., 388.100, 388.120]	Removal of construction specifications for listed wiring methods and equipment
Public Input No. 133-NFPA 70-2023 [Sections Part XI., 410.120, 410.122, 410.124, 410.126]	

Submitter Information Verification

Submitter Full Name: Russ Leblanc
Organization: Leblanc Consulting Services
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jan 11 15:16:29 EST 2023
Committee: NEC-P18

Committee Statement

Resolution: Due to reports of a high percentage of unlisted fixtures being installed, maintaining the language aids AHJs during the inspection process, and it should remain. Part VII of Article 410 assists AHJs when inspecting luminaires. It is difficult for inspectors to inspect a surface-mounted luminaire to determine a listing once installed.

Public Input No. 133-NFPA 70-2023 [Sections Part XI., 410.120, 410.122, 410.124, 410.126]

~~**Sections Part XI., 410.120, 410.122, 410.124, 410.126**~~

~~**Part XI.** Construction of Flush and Recessed Luminaires~~

~~**410.120** Temperature.~~

~~Luminaires shall be constructed such that adjacent combustible material is not subject to temperatures in excess of 90°C (194°F).~~

~~**410.122** Lamp Wattage Marking.~~

~~Incandescent lamp luminaires shall be marked to indicate the maximum allowable wattage of lamps. The markings shall be permanently installed, in letters at least 6 mm (1/4 in.) high, and shall be located where visible during relamping.~~

~~**410.124** Solder Prohibited.~~

~~No solder shall be used in the construction of a luminaire recessed housing.~~

~~**410.126** Lampholders.~~

~~Lampholders of the screw shell type shall be of porcelain or other suitable insulating materials.~~

Statement of Problem and Substantiation for Public Input

This part can be deleted in its entirety since luminaires are required to be listed and must meet product standards in order to achieve that listing.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 132-NFPA 70-2023 [Sections Part VII., 410.80, 410.82, 410.84]	Removal of construction specifications for listed wiring methods and equipment

Submitter Information Verification

Submitter Full Name: Russ Leblanc
Organization: Leblanc Consulting Services
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jan 11 15:20:47 EST 2023
Committee: NEC-P18

Committee Statement

Resolution: FR-8007-NFPA 70-2024

Statement: This part can be deleted in its entirety since luminaires are required to be listed and must comply with product standards in order to achieve that listing. There are few reports of unlisted flush and recessed luminaires being installed. They are easier to identify as listed by AHJs.