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Analysis of NEC® Code Changes 2011

Thomas&Betts

New Products

Steel City® 665-AV2 Floor Box

- 2" KOs enable pre-terminated AV cables to be pulled directly through the conduit
- Four recessed compartments can be configured for any combination of power, data, communications and AV
- Industry-exclusive solid brass covers provide a durable, aesthetic installation
- Device plates are available that accept Extron® MAAP plates to accommodate any AV requirements

Steel City®

T&B® XD Expansion/ Deflection Coupling for Rigid Conduit

- Accommodates axial expansion/ contraction up to ¾", parallel deflection up to ¾" and angular misalignment up to 30˚ from normal position
- Provides a flexible watertight connection
- Includes an Erickson® type conduit union for faster, easier installation
- Suitable for use indoors, outdoors, direct buried or embedded in concrete

T&B® Fittings

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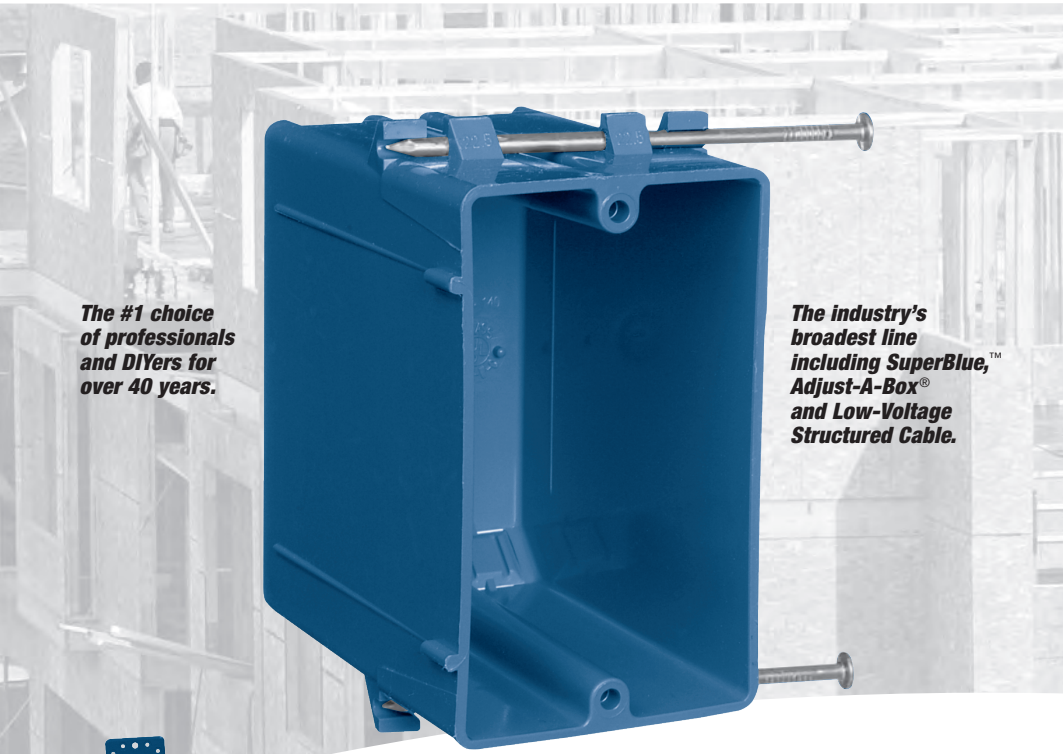
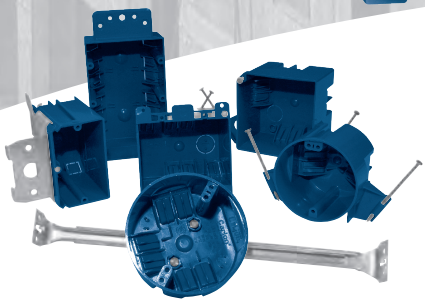
The color the electrical industry looks for – and trusts



The #1 choice of professionals and DIYers for over 40 years.

The industry's broadest line including SuperBlue,™ Adjust-A-Box® and Low-Voltage Structured Cable.



Market-driven innovation

Carlon®

Non-Metallic Wall and Ceiling Boxes

Over 40 years of experience in every blue box

Of course, it's not just the color that sets our boxes apart. It's the quality – the result of decades of precision molding experience to assure structural integrity. And the versatility – the broadest and most innovative line in the industry means there's a Carlon® box that's right for every application. To see what's new in blue, visit **www.tnb.com**.

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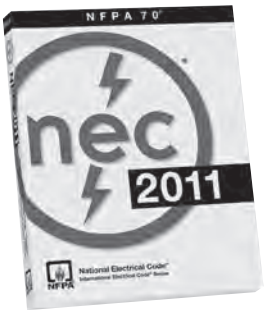

On the following pages are changes to the National Electrical Code for the 2011 Code cycle. This is not intended to be a recitation of all the changes, but a listing of those that may affect the Thomas & Betts product lines. For a complete document that includes all of the major changes, contact the International Association of Electrical Inspectors at **www.iaei.org**.

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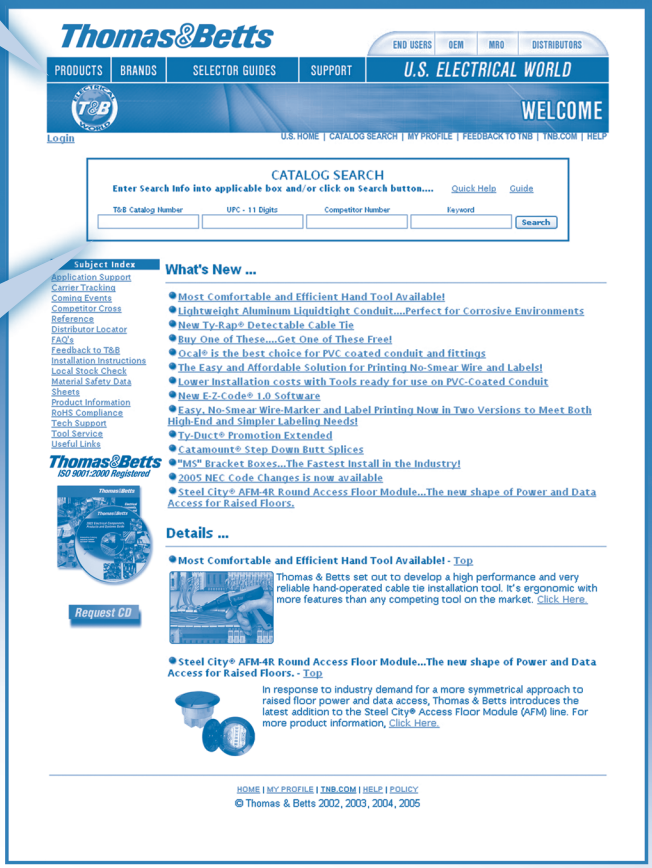
NOTE: Users do NOT have to enter dashes, slashes and spaces when entering the part number…simply enter the alphanumeric characters for which you are searching.



Introduction

Proposal Number: 1-37a
Comment Number(s): NA

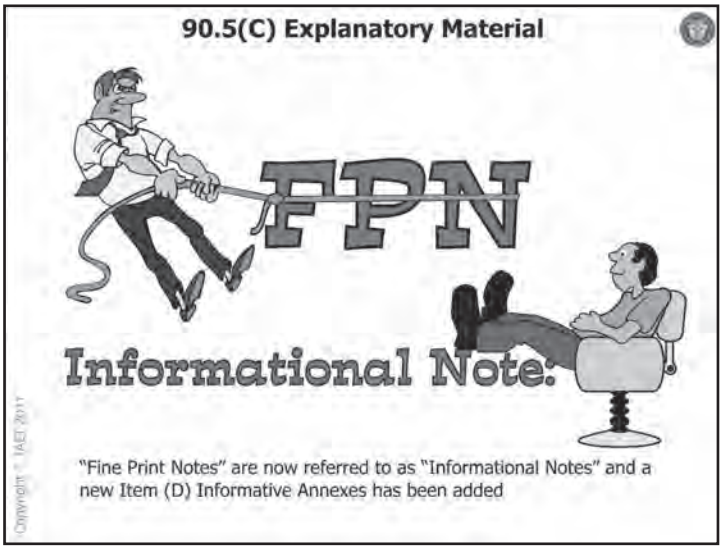
Section 90.5 Mandatory Rules, Permissive Rules and Explanatory Material

T&B Product:
General Information

Changes the titles of all Fine Print Notes (FPN) to "Informational Note" throughout the NEC. Changes all Annexes to "Informational Annexes".

Analysis of Change:

The members of Panel 1 determined that the term "Fine Print Note" does not clearly indicate that a Fine Print Note is not enforceable in the NEC and is only there for informational purposes. Therefore, the members of Panel 1 changed the name "Fine Print Note" to "Informational Note" throughout the NEC for clarity. The same reasoning pertained to the Annexes in the back of the NEC. Annexes are also printed in the NEC as informational sections and are not enforceable. Each of the "Annex" sections will be changed to "Informational Annex A, B, C….H".



Proposal Number: 5-52
Comment Number(s): 5-37

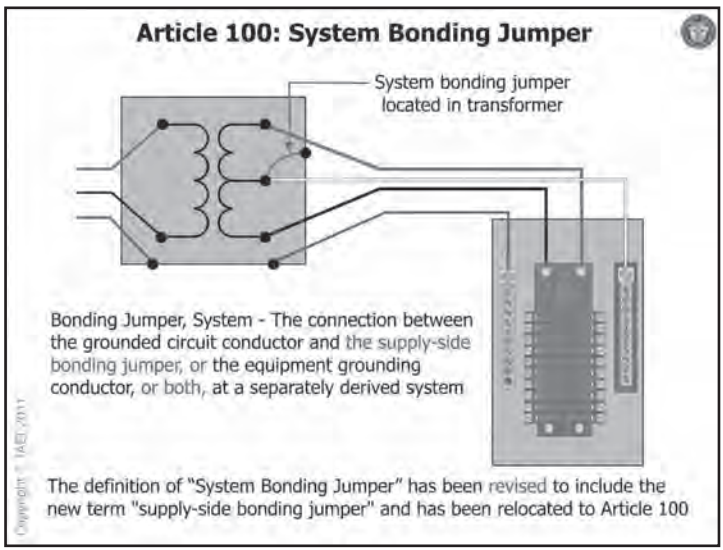
Article 100 Bonding Jumper, System

Bonding Jumper, System. The connection between the grounded circuit conductor and the supply-side bonding jumper, or the equipment grounding conductor, or both, at a separately derived system.

T&B Product:
General Information

Analysis of Change:

The definition was revised and moved to Article 100.



Article 100

Definitions

Proposal Number: 14-5
Comment Number(s): 14-1

Article 100 Explosion-Proof Equipment

T&B Product:
T&B® Fittings and Hazlux®

Explosion-Proof Equipment. Equipment enclosed in a case that is capable of withstanding an explosion of a specified gas or vapor that may occur within it and of preventing the ignition of a specified gas or vapor surrounding the enclosure by sparks, flashes or explosion of the gas or vapor within, and that operates at such an external temperature that a surrounding flammable atmosphere will not be ignited thereby.

Analysis of Change:

Revises the definition to remove the term “Apparatus” and replaced it with “Equipment” in the title and definition. The revision was accepted since “Equipment” is a defined term. Apparatus is included in the definition of “Equipment”.

Proposal Number: 5-13 and 5-15
Comment Number(s): 5-7, 5-8, 5-9, 5-10, 5-12 and 5-13

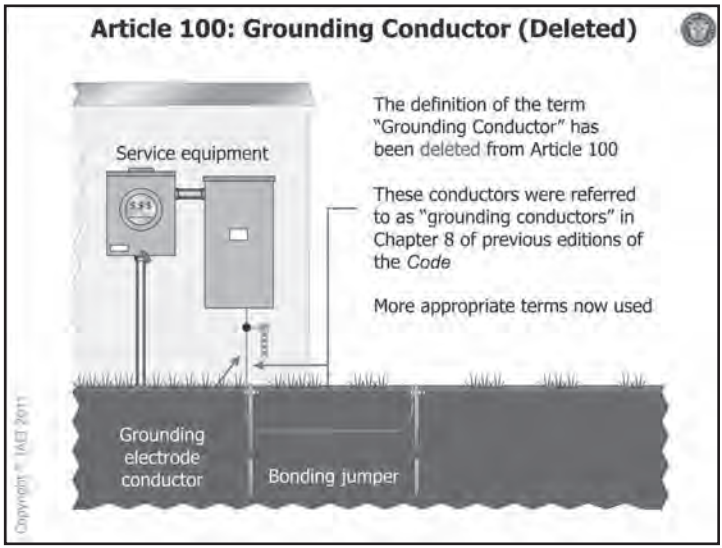
Article 100 Grounding Conductor

Grounding Conductor. This word and definition was removed from the NEC.

T&B Product:
Grounding and Bonding Connectors

Analysis of Change:

Deletes the definition for a "Grounding Conductor" from Article 100 and usage in the NEC. "Grounding Conductor" is not a very descriptive word. Grounding electrode conductor or bonding jumper are two examples of more descriptive words.



Proposal Number: 5-21
Comment Number(s): 5-18 and 5-19

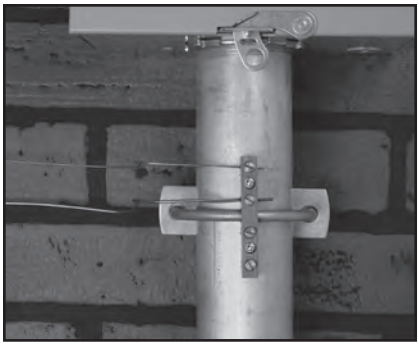
Article 100 Intersystem Bonding Termination

T&B Product:
Intersystem Bonding Termination

Intersystem Bonding Termination. A device that provides a means for connecting bonding conductors for communications systems to the grounding electrode system.

Analysis of Change:

The definition for “Intersystem Bonding Termination” was revised to simplify the definition.



Proposal Number: 1-111
Comment Number(s): 1-79, 1-80 and 1-81

Section 110.3(A)(1) Examination, Identification, Installation and Use of Equipment, Informational Note

(A) Examination. In judging equipment, considerations such as the following shall be evaluated:

(1) Suitability for installation and use in conformity with the provisions of this Code

T&B Product:
EZCODE®

Informational Note: Suitability of equipment use may be identified by a description marked on or provided with a product to identify the suitability of the product for a specific purpose, environment or application. Special conditions of use or other limitations and other pertinent information may be marked on the equipment, included in the product instructions or included in the appropriate listing or labeling information. Suitability of equipment may be evidenced by listing or labeling.

Analysis of Change:

The Informational Note in Section 110.3(A)(1) was revised to alert the user to special conditions that may be either marked on the electrical equipment or on an accompanying certificate.

Article 110

Requirements for Electrical Installations

Proposal Number: 1-149
Comment Number(s): 1-101 and 1-102

Section 110.14(A) Electrical Connections

T&B Product: Color-Keyed®, Blackburn® and Homac®

(A) Terminals. Connection of conductors to terminal parts shall ensure a thoroughly good connection without damaging the conductors and shall be made by means of pressure connectors (including set-screw type), solder lugs or splices to flexible leads. Connection by means of wire binding screws or studs and nuts that have upturned lugs or the equivalent shall be permitted for 10 AWG or smaller conductors.

Terminals for more than one conductor and terminals used to connect aluminum shall be so identified.

Connectors and terminals for conductors more finely stranded than Class B and Class C stranding as shown in Chapter 9, Table 10 shall be identified for the specific conductor class or classes.

Analysis of Change:

Section 110.14(A) was revised to add the requirement that connectors and terminals used with flexible, fine-stranded conductors and cables shall be identified for such use. Table 10 was added to Chapter 9 to define the flexible conductor or cable. Table 10 is the same table that is found in UL486A-486B (Table 14).

Proposal Number: 1-177
Comment Number(s): 1-109 and 1-110

Section 110.22(B) Identification of Disconnecting Means

T&B Product:
EZCODE®

(B) Engineered Series Combination Systems. Equipment enclosures for circuit breakers or fuses applied in compliance with series combination ratings selected under engineering supervision in accordance with 240.86(A) shall be legibly marked in the field as directed by the engineer to indicate the equipment has been applied with a series combination rating. The marking shall be readily visible and state the following:

CAUTION — ENGINEERED SERIES COMBINATION SYSTEM RATED _____ AMPERES. IDENTIFIED REPLACEMENT COMPONENTS REQUIRED.

Analysis of Change:

Proposal 1-177 revised Section 110.22(B) pertaining to the marking of an enclosure used with circuit breakers or fuses with engineered series combination systems to refer to 240.86(A). The Fine Print Note was deleted since it was no longer required.

Proposal Number: 1-178
Comment Number(s): 1-111

Section 110.22(C) Identification of Disconnecting Means

T&B Product:
EZCODE®

(C) Tested Series Combination Systems. Equipment enclosures for circuit breakers or fuses applied in compliance with the series combination ratings marked on the equipment by the manufacturer in accordance with 240.86(B) shall be legibly marked in the field to indicate the equipment has been applied with a series combination rating. The marking shall be readily visible and state the following:

CAUTION — ENGINEERED SERIES COMBINATION SYSTEM RATED ____ AMPERES. IDENTIFIED REPLACEMENT COMPONENTS REQUIRED.

Analysis of Change:

Proposal 1-178 revised Section 110.22(C) pertaining to the marking of an enclosure used with circuit breakers or fuses with tested series combination systems to refer to 240.86(B). The Fine Print Note was deleted since it was no longer required.

Proposal Number: 1-183
Comment Number(s): 1-114, 1-115, 1-116, 1-117, 1-118, 1-119, 1-120, 1-121, 1-122, 1-123, 1-124 and 1-125

Section 110.24 Available Fault Current

T&B Product:
EZCODE®

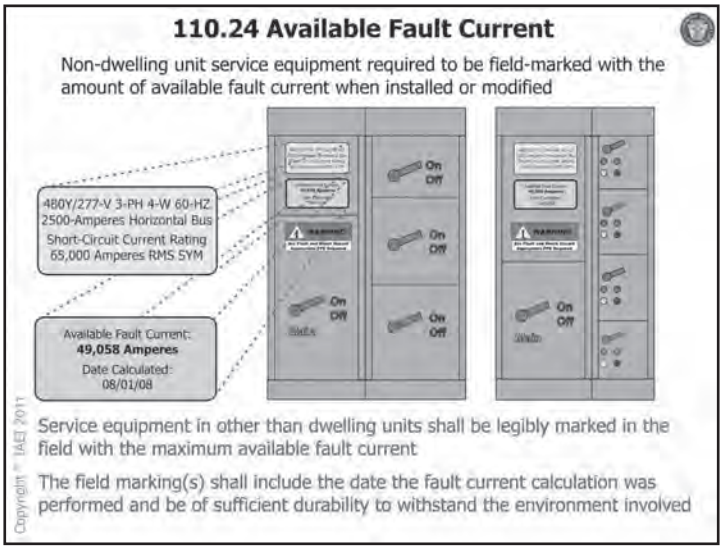
(A) Field Marking. Service equipment in other than dwelling units shall be legibly marked in the field with the maximum available fault current. The field marking(s) shall include the date the fault current calculation was performed and be of sufficient durability to withstand the environment involved.

(B) Modifications. When modifications to the electrical installation occur, that affect the maximum available fault current at the service, the maximum available fault current shall be verified or recalculated as necessary to ensure the service equipment ratings are sufficient for the maximum available fault current at the line terminals of the equipment. The required field marking(s) in 110.24(A) shall be adjusted to reflect the new level of maximum available fault current.

Exception: The field marking requirements in 110.24(A) and 110.24(B) shall not be required in industrial installations where conditions of maintenance and supervision ensure that only qualified persons service the equipment.

Analysis of Change:

This new section adds field marking requirements for service equipment with the available fault current (Short Circuit Current).



Proposal Number: 1-171 and 1-172
Comment Number(s): NA

Section 110.28 Enclosure Types

T&B Product:
Carlon® Enclosures

110.28 Enclosure Types. Enclosures (other than surrounding fences or walls) of switchboards, panelboards, industrial control panels, motor control centers, meter sockets, enclosed switches, transfer switches, power outlets, circuit breakers, adjustable-speed drive systems, pullout switches, portable power distribution equipment, termination boxes, general-purpose transformers, fire pump controllers, fire pump motors and motor controllers, rated not over 600 volts nominal and intended for such locations, shall be marked with an enclosure-type number as shown in Table 110.28.

Table 110.28 shall be used for selecting these enclosures for use in specific locations other than hazardous (classified) locations. The enclosures are not intended to protect against conditions such as condensation, icing, corrosion, or contamination that may occur within the enclosure or enter via the conduit or unsealed openings.

Analysis of Change:

Proposal 1-171 expanded the list of enclosures that are required to be marked with an environmental type number (i.e. NEMA Type 4X) to include enclosed switches, transfer switches, power outlets, circuit-breakers, adjustable-speed drive systems, pullout switches, portable power distribution equipment, termination boxes, general purpose transformers, fire pump controllers and fire pump motors.

Proposal 1-172 renumbered Section 110.20 to Section 110.28.

Proposal Number: 5-44
Comment Number(s): 5-32

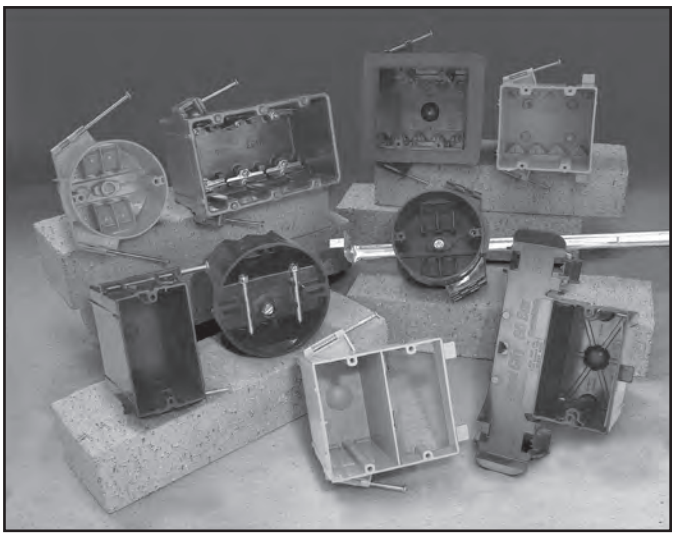
Section 200.7(C)(1) Use of Insulation of a White or Gray Color or With Three Continuous White Stripes/Circuits of 50 Volts or More

T&B Product:
Outlet Boxes

(1) If part of a cable assembly that has the insulation permanently reidentified to indicate its use as an ungrounded conductor by marking tape, painting or other effective means at its termination and at each location where the conductor is visible and accessible. Identification shall encircle the insulation and shall be a color other than white, gray or green. If used for single-pole, 3-way or 4-way switch loops, the reidentified conductor with white or gray insulation or three continuous white stripes shall be used only for the supply to the switch, but not as a return conductor from the switch to the outlet.

Analysis of Change:

This change clarifies marking requirements on switch loops. It is important to properly identify this conductor for the safety of the maintenance personnel that may work on this circuit in the future.



Proposal Number: 2-103
Comment Number(s): 2-42

Section 210.8(A)(7) Ground-Fault Circuit-Interrupter Protection for Personnel/Dwelling Units

T&B Product:
Outlet Boxes

(7) Sinks - located in areas other than kitchens, where receptacles are installed within 1.8m (6 ft.) of the outside edge of the sink.

Analysis of Change:

GFCI protection shall be provided to receptacles installed within 6 ft. of the outside edge of any sink in a dwelling. The requirement was previously limited to laundry, utility and wet bars. Kitchens are covered in 210.8(A)(6).

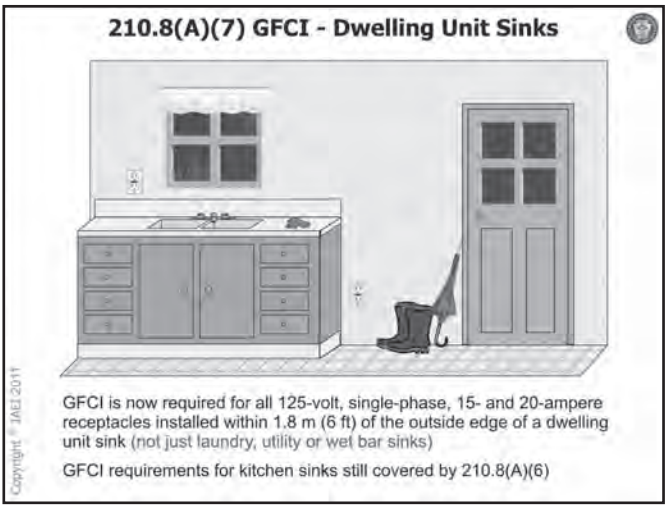


Photo courtesy of IAEI.

Proposal Number: 2-123
Comment Number(s): 2-51

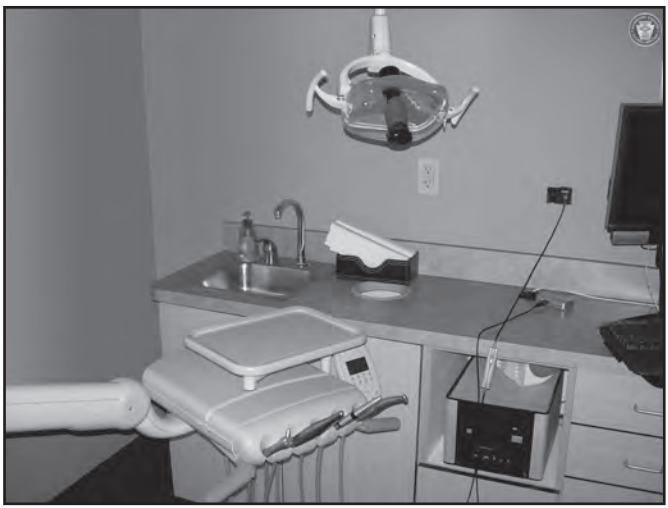
Section 210.8(B)(5) Ground-Fault Circuit-Interrupter Protection for Personnel/Other Than Dwelling Units

Exception No. 2 to (5): *For other than those receptacles covered under 210.8(B)(1), GFCI protection shall not be required for receptacles located at patient bed locations in basic care rooms general care rooms, or critical care rooms of health care facilities.*

T&B Product:
Outlet Boxes

Analysis of Change:

The change clarifies where GFCI protection is not required in patient bed locations.



Proposal Number: 2-105, 2-110 and 2-122
Comment Number(s): 2-45

Section 210.8(B)(6),(7),(8) Ground-Fault Circuit-Interrupter Protection for Personnel

T&B Product:
Outlet Boxes

(B) Other Than Dwelling Units. All 125 volt, single-phase, 15 and 20 ampere receptacles installed in the locations specified in (1) through (8) shall have ground-fault circuit-interrupter protection for personnel.

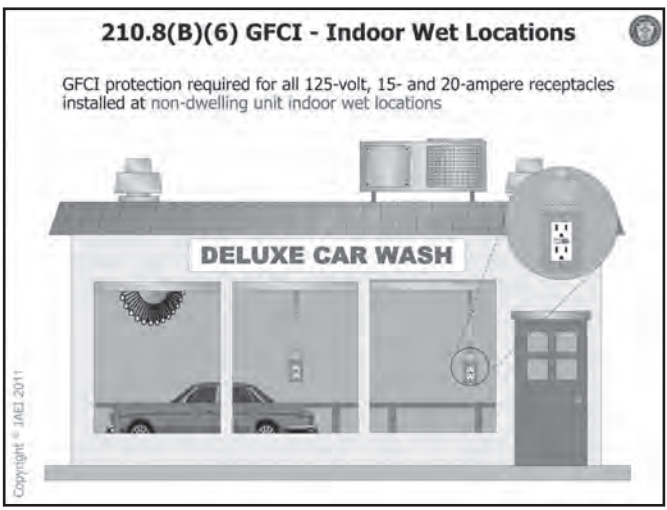
(6) Indoor wet locations

(7) Locker rooms with associated showering facilities

(8) Garages, service bays and similar areas where electrical diagnostic equipment, electrical hand tools or portable lighting equipment are to be used

Analysis of Change:

GFCI protection shall be provided to receptacles installed in indoor wet locations, locker rooms with adjacent showering facilities, garages and service bays. These three additional locations were added as a result of this change.



Proposal Number: 2-154
Comment Number(s): 2-64

Section 210.12 Exception No. 2 Arc-Fault Circuit-Interrupter Protection for Dwelling Units

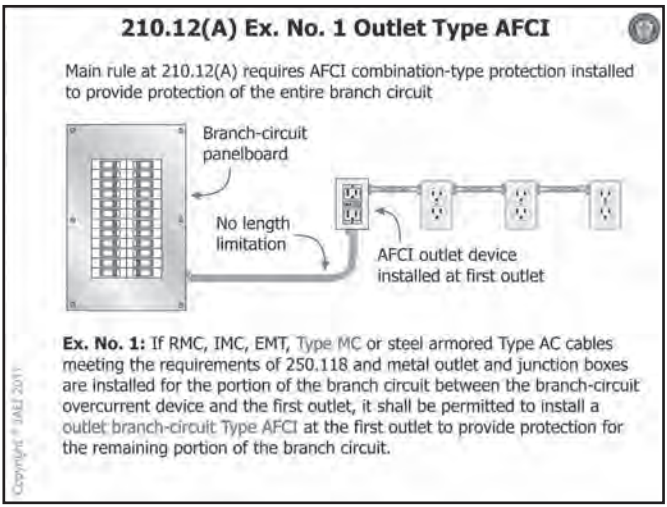
***Exception No. 2**. Where a listed metal or non-metallic conduit or tubing is encased in not less than 50mm (2 in.) of concrete for the portion of the branch circuit between the branch circuit over current device and the first outlet, it shall be permitted to install an outlet branch circuit AFCI at the first outlet to provide protection for the remaining portion of the branch circuit.*

T&B Product:
ENT and Fittings

Analysis of Change:

This change permits the use of metal or non metallic conduit or tubing to be used in concrete cover as protection for the portion of the branch circuit between the over current device and the first AFCI device.

These rules remain in the NEC as an opening for the product development of an AFCI device.



Proposal Number: 2-179
Comment Number(s): 2-90

Section 210.12(B) Arc-Fault Circuit-Interrupter Protection: Dwelling Units

T&B Product:
Outlet Boxes and Fittings

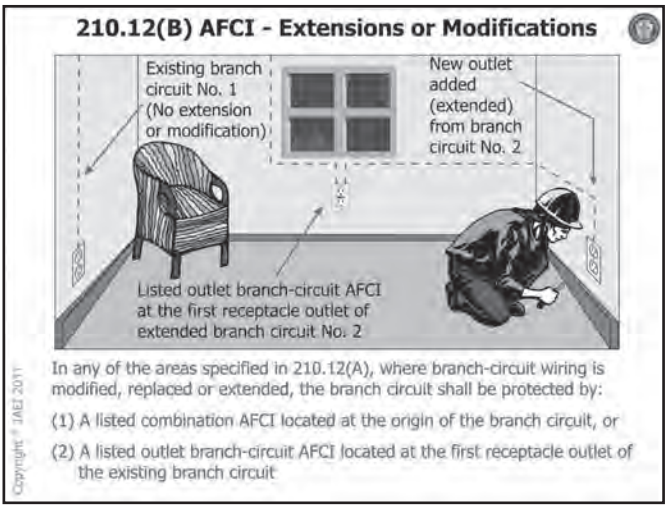
(B) Branch Circuit Extensions or Modifications - Dwelling Units. In any of the areas specified in 210.12(A), where branch circuit wiring is modified, replaced or extended, the branch circuit shall be protected by one of the following:

1. A listed combination-type AFCI located at the origin of the branch circuit

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

Analysis of Change:

This change provides requirements to provide AFCI protection in modified construction areas. It allows for the installation of an AFCI located at the receptacle.



Proposal Number: 2-253
Comment Number(s): 2-132

Section 210.52(C)(5) Dwelling Unit Receptacle Outlets/Countertops

(5) Receptacle Outlet Location.
Receptacle outlets shall be located on or above, but not more than 500mm (20 in.) above the countertop.
Receptacle outlet assemblies listed for the application shall be permitted to be installed in countertops.

T&B Product:
Carlon® Pop Up Receptacle

Informational Note: See section 406.5(E) for requirements for installation of receptacles in countertops.

Analysis of Change:

For kitchen installations, this change addresses a new product, a recessed counter top receptacle. This receptacle can be used when oriented above the counter top and has the ability to be recessed in the counter top when not in use.

Proposal Number: 2-258
Comment Number(s): 2-135

Section 210.52(D) Dwelling Unit Receptacle Outlets

T&B Product:
Carlon® Pop Up Receptacle

(D) Bathrooms. In dwelling units, at least one receptacle outlet shall be installed in bathrooms within 900mm (3 ft.) of the outside edge of each basin. The receptacle outlet shall be located on a wall or partition that is adjacent to the basin or basin countertop, located on the countertop, or installed on the side or face of the basin cabinet not more than 300mm (12 in.) below the countertop. Receptacle outlet assemblies listed for the application shall be permitted to be installed in the countertop.

Informational Note: See section 406.5(E) for requirements for installation of receptacles in countertops.

Analysis of Change:

For bathroom installations, this change addresses a new product, a recessed counter top receptacle. This receptacle can be used when oriented above the counter top and has the ability to be positioned in the counter top when not in use.

Proposal Number: 2-266
Comment Number(s): NA

Section 210.52(E)(3) Dwelling Unit Receptacle Outlets/ Outdoor Outlets

(3) Balconies, Decks and Porches. Balconies, decks and porches that are accessible from inside the dwelling unit shall have at least one receptacle outlet installed within the perimeter of the balcony, deck or porch. The receptacle shall not be located more than 2.0m (6½ ft.) above the balcony, deck or porch surface.

T&B Product:
Hooded Outlet Boxes Covers

Analysis of Change:

The Exception that defined a balcony minimum size was removed. This article now requires a receptacle to be installed regardless of balcony size. Balconies that are small are often decorated with holiday lighting and the receptacle installation reduces the usage of extension cords.

Proposal Number: 2-270
Comment Number(s): NA

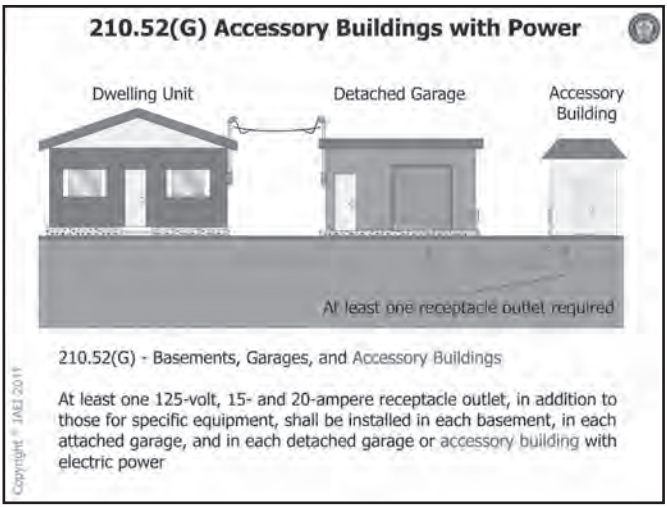
Section 210.52(G)(1) Dwelling Unit Receptacle Outlets/Basements and Garages and Accessory Buildings

T&B Product:
Outlet Boxes

(1) At least one receptacle outlet, in addition to those for specific equipment, shall be installed in each basement, in each attached garage and in each detached garage or accessory building with electric power.

Analysis of Change:

This change now requires at least one receptacle in each accessory building with electric power. Previously this was restricted to basements and garages.



Proposal Number: 2-223
Comment Number(s): 2-114

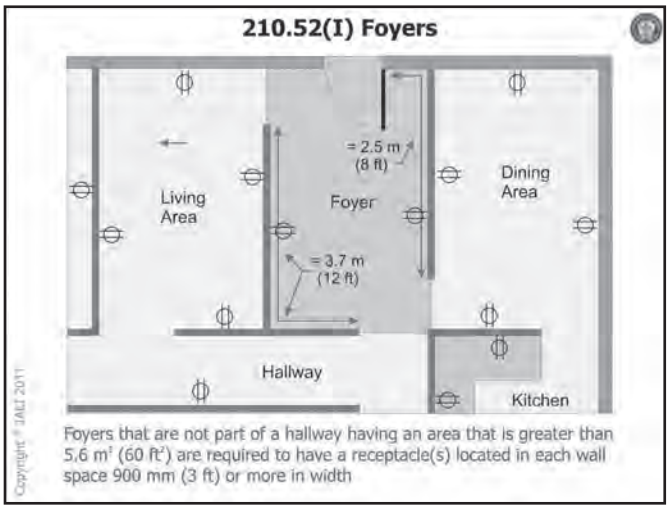
Section 210.52(I) Dwelling Unit Receptacle Outlets

(I) Foyers. Foyers that are not part of a hallway in accordance with 210.52(H) and that have an area that is greater than 5.6m² (60 ft.²) shall have a receptacle(s) located in each wall space 900mm (3 ft.) or more in width and unbroken by doorways, floor-to-ceiling windows and similar openings.

T&B Product:
Outlet Boxes

Analysis of Change:

This change now provides guidance for receptacle installations in foyers. There are needs for power in these areas and this change requires receptacles in this area to reduce the usage of extension cords.



Article 225

Outside Branch Circuits and Feeders

Proposal Number: 4-34
Comment Number(s): NA

Section 225.22 Raceways on Exterior Surfaces of Buildings or Other Structures

T&B Product:
PVC Conduit Elbows and Fittings

Raceways on exteriors of buildings or other structures shall be arranged to drain and shall be suitable for use in wet locations.

Analysis of Change:

The term “raintight” was removed and replaced with “suitable for use”.

Proposal Number: 4-35
Comment Number(s): 4-12

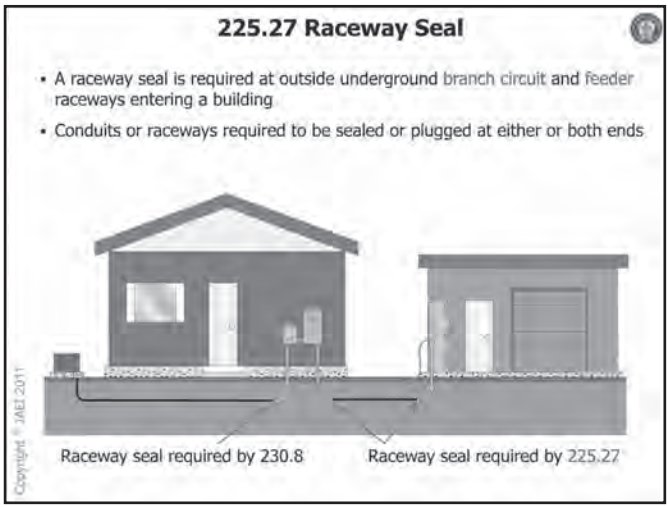
Section 225.27 Raceway Seal

Where a raceway enters a building or structure from an underground distribution system, it shall be sealed in accordance with 300.5(G). Spare or unused raceways shall also be sealed. Sealants shall be identified for use with the cable insulation, shield or other components.

T&B Product:
Duct Seal

Analysis of Change:

This new requirement is copied from the requirement for services in Section 230.8. The same condensation issues impact both installations.



Article 230

Services

Proposal Number: 4-112
Comment Number(s): 4-36

Section 230.44 Cable Trays

T&B Product: Cable Tray and Identification Products

Cable tray systems shall be permitted to support service-entrance conductors. Cable trays used to support service-entrance conductors shall contain only service-entrance conductors and shall be limited to the following methods:

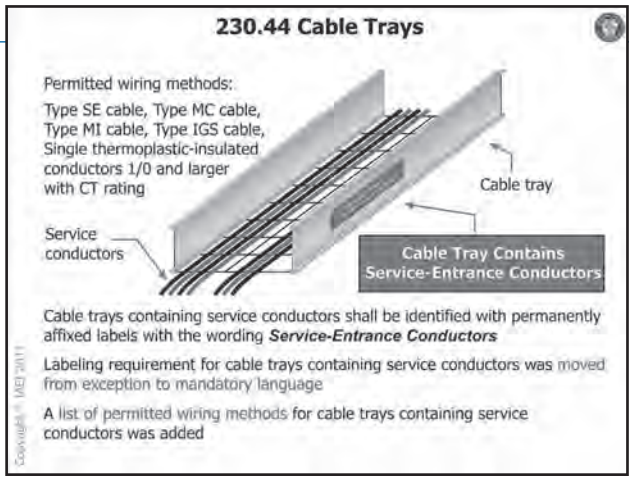
(1) Service-entrance cables
(2) Type MC cable
(3) Mineral-insulated, metal-sheathed cable
(4) Type IGS cable
(5) Single Thermoplastic-Insulated Conductors 1/0 and larger with CT rating

Such cable trays shall be identified with permanently affixed labels with the wording "Service-Entrance Conductors". The labels shall be located so as to be visible after installation and placed so that the service-entrance conductors may be readily traced through the entire length of the cable tray.

Exception: Conductors, other than service-entrance conductors, shall be permitted to be installed in a cable tray with service-entrance conductors, provided a solid fixed barrier of a material compatible with the cable tray is installed to separate the service-entrance conductors from other conductors installed in the cable tray.

Analysis of Change:

The 2008 NEC did not require permanently affixed labels for a cable tray containing service-entrance conductor unless the cable trays contained both service-entrance conductors and other conductors per the exception. This change now requires cable tray containing service-entrance conductors to be so marked.



Proposal Number: 4-122
Comment Number(s): NA

Section 230.54(A) and (B) Overhead Service Locations

(A) Service Head. Service raceways shall be equipped with a service head at the point of connection to service-drop or overhead service conductors. The service head shall be listed for use in wet locations.

T&B Product:
Service Heads

(B) Service-Entrance Cables Equipped with Service Head or Gooseneck. Service-entrance cables shall be equipped with a service head. The service head shall be listed for use in wet locations.

Analysis of Change:

This change requires service heads to be listed for use in wet locations. Previous code requirements stated the product must comply with 314.15 Damp or Wet Locations.

Proposal Number: 5-86a
Comment Number(s): 5-60

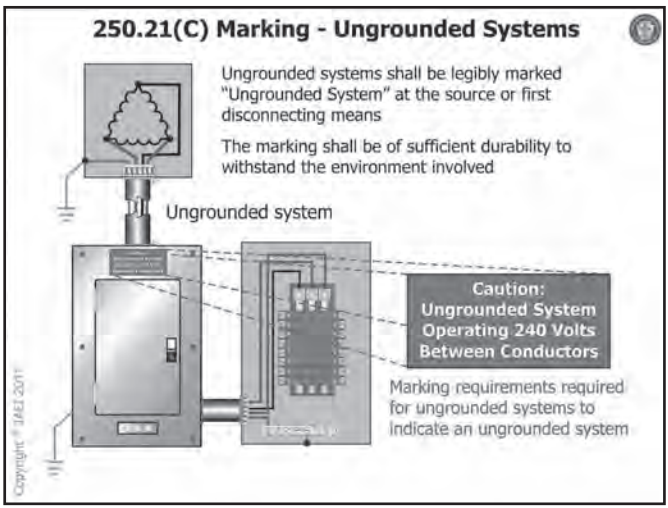
Section 250.21(C) Alternating-Current Systems of 50 Volts to Less Than 1000 Volts Not Required to Be Grounded

T&B Product:
EZCODE®

(C) Marking. Ungrounded systems shall be legibly marked "Ungrounded System" at the source or first disconnecting means of the system. The marking shall be of sufficient durability to withstand the environment involved.

Analysis of Change:

Because 200.6 requires the marking of grounded conductors, a system that also contained underground conductors could create confusion for the individual distinguishing between the grounded and ungrounded conductor. Now both will be marked appropriately. If voltage measurements indicate that one phase conductor is grounded, individuals are not sure if the system is intended to be grounded or if one conductor has faulted to ground. If the system is grounded, as in a corner grounded application, identification of that conductor is required by 200.6. The label will warn individuals who are considering removing the covers of energized equipment, that will be exposed to electrical hazards because the systems are supplying multiple loads that owners do not want to shut down.



Proposal Number: 5-102
Comment Number(s): 5-69

Section 250.30(A)(6)(c) Grounding Separately Derived Alternating-Current Systems

T&B Product:
Connectors

(c) Connections. All tap connections to the common grounding electrode conductor shall be made at an accessible location by one of the following methods:

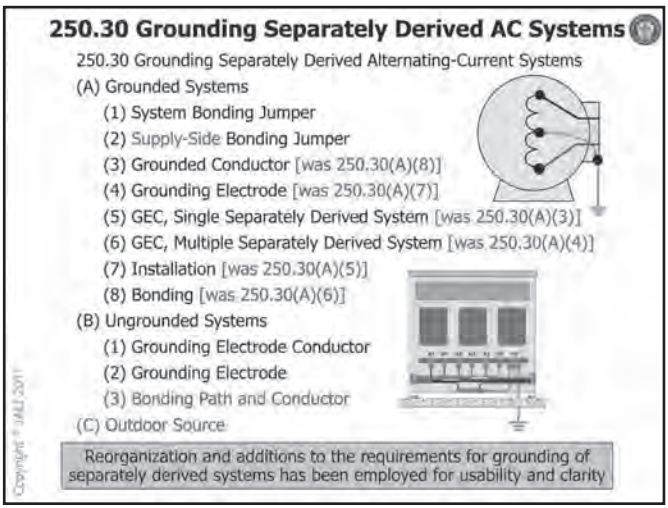
(1) A connector listed as grounding and bonding equipment.

(2) Listed connections to aluminum or copper busbars not smaller than 6mm x 50mm (¼ in. x 2 in.). If aluminum busbars are used, the installation shall comply with 250.64(A).

(3) The exothermic welding process.

Analysis of Change:

Section 250.30 was completely re-written. The section re-write includes a new requirement that connectors must be listed as grounding and bonding equipment. These connections can be subject to short-time high-current conditions and require this specific listing.



Proposal Number: 5-146
Comment Number(s): NA

Section 250.52(A)(1) Grounding Electrodes/Electrodes Permitted for Grounding

T&B Product:
Connectors

(1) Metal Underground Water Pipe.
A metal underground water pipe in direct contact with the earth for 3m (10 ft.) or more (including any metal well casing bonded to the pipe) and electrically continuous (or made electrically continuous by bonding around insulating joints or insulating pipe) to the points of connection of the grounding electrode conductor and the bonding conductor(s) or jumper(s) if installed.

Analysis of Change:

The requirement for the use of metal underground water pipe as an electrode was re-written. Exceptions, such as allowed in industrial establishments, were re-located to 250.62.

Proposal Number: 5-150
Comment Number(s): NA

250.52(A)(2) Grounding Electrodes/Electrodes Permitted for Grounding

(2) Metal Frame of the Building or Structure. The metal frame of the building or structure that is connected to the earth by one or more of the following methods:

T&B Product:
Connectors

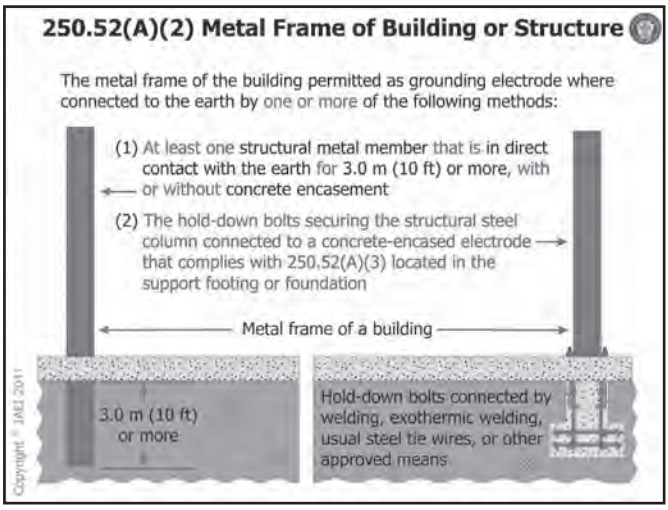
(1) At least one structural metal member that is in direct contact with the earth for 3mm (10 ft.) or more, with or without concrete encasement.

(2) Hold-down bolts securing the structural steel column are connected to a concrete-encased electrode that complies with 250.52(A)(3) and is located in the support footing or foundation. The hold-down bolts shall be connected to the concrete-encased electrode by welding, exothermic welding, the usual steel tie wires or other approved means.

Analysis of Change:

This change revised and removed existing language from 250.52(A)(2) that allowed a metal frame to "act" as a grounding electrode when connected to another grounding electrode. The revised language clarifies that the metal frame of the building or structure is actually permitted to be the grounding electrode when installed per 250.52(A)(1) or (2).

The metal frame of a building is still permitted to be connected to another grounding electrode per 250.68(C).



Proposal Number: 5-168
Comment Number(s): 5-110

Section 250.52(A)(5)(b) Grounding Electrodes/Electrodes Permitted for Grounding/Rod and Pipe Electrodes

T&B Product:
Grounding Connectors

(b) Rod-type grounding electrodes of stainless steel and copper or zinc coated steel shall be at least 15.87mm (⅝ in.) in diameter, unless listed.

Analysis of Change:

This change removes the ½ inch diameter requirement from a listed rod. There is no impact on the industry as this ½ inch dimensional requirement is in the listing standard, UL467 Grounding and Bonding Equipment. The product standard regulates the product construction requirement and the NEC regulates the installation of the listed product. Non-listed rod products construction is addressed by the NEC.

Proposal Number: 5-169
Comment Number(s): NA

Section 250.52(A)(7) Grounding Electrodes/Electrodes Permitted for Grounding

T&B Product: Grounding Plates, Grounding Connectors

(7) Plate Electrodes. Each plate electrode shall expose not less than 0.186m² (2 ft.²) of surface to exterior soil. Electrodes of bare or conductively coated iron or steel plates shall be at least 6.4mm (¼ in.) in thickness. Solid, uncoated electrodes of nonferrous metal shall be at least 1.5mm (0.06 in.) in thickness.

Analysis of Change:

The word "conductively" was added to the description of coated iron or steel plates to clarify, as epoxy or paint type coatings would not be acceptable.

Article 250

Grounding and Bonding

Proposal Number: 5-169a
Comment Number(s): 5-115

Section 250.53(A)(3) Grounding Electrode System Installation/ Rod, Pipe and Plate Electrodes

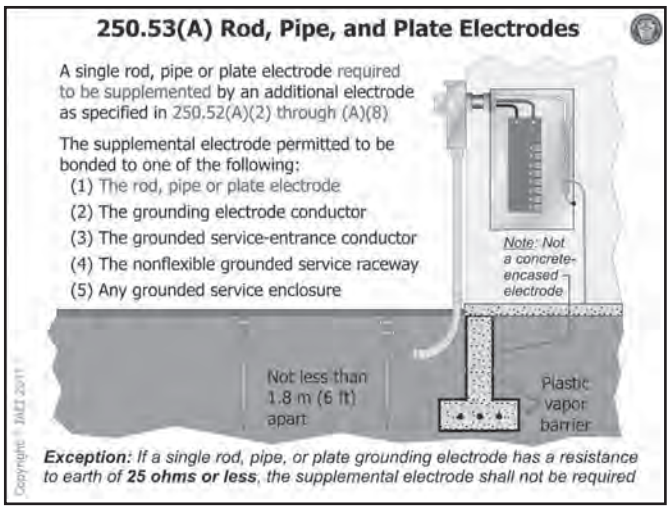
T&B Product: Ground Rods (Canada), Grounding Connectors

(3) Supplemental Electrode. If multiple rod, pipe or plate electrodes are installed to meet requirements of this section, they shall not be less than 1.8m (6 ft.) apart.

Informational Note: The paralleling efficiency of rods is increased by spacing them twice the length of the longest rod.

Analysis of Change:

Previously, the code guided that the paralleling efficiency of rods is increased by spacing them 6 feet apart. The new informational note shows the proper distance is twice the length of the longest rod. The farther apart rods are installed, the less overlap of the soil shoals is encountered.



Proposal Number: 5-169b
Comment Number(s): NA

Section 250.53(B) Grounding Electrode System Installation

T&B Product:
Grounding Connectors

(B) Electrode Spacing. Where more than one of the electrodes of the type specified in 250.52 (A)(5) or (A)(7) are used, each electrode of one grounding system (including that used for strike termination devices) shall not be less than 1.83m (6 ft.) from any other electrode or another grounding system. Two or more grounding electrodes that are bonded together shall be considered a single grounding electrode system.

Analysis of Change:

The term “air terminal” was changed to “strike termination device” to correlate with NFPA 780, Standard for the Installation of Lightning Protection Systems.

Proposal Number: 5-170
Comment Number(s): 5-116

Section 250.53(D)(2) Grounding Electrode System Installation; Metal Underground Water Pipe

T&B Product: Grounding Plates, Grounding Connectors

(2) Supplemental Electrode Required. A metal underground water pipe shall be supplemented by an additional electrode of a type specified in 250.52(A)(2) through (A)(8). If the supplemental electrode is of the rod, pipe or plate type, it shall comply with 250.53(A). The supplemental electrode shall be bonded to one of the following:

(1) Grounding electrode conductor

(2) Grounded service-entrance conductor

(3) Non-flexible grounded service raceway

(4) Any grounded service enclosure

(5) As provided by 250.32(B)

Analysis of Change:

The reference to the maximum resistance requirement for rod, pipe and plate electrodes is now located in 250.53(A). The 25 ohms maximum resistance requirement is not changed.

Proposal Number: 5-223
Comment Number(s): 5-138

Section 250.92(B) Services

(B) Method of Bonding at the Service. Bonding jumpers meeting the requirements of this article shall be used around impaired connections, such as reducing washers or oversized, concentric or eccentric knockouts. Standard locknuts or bushings shall not be the sole means for the bonding required by this section but shall be permitted to be installed to make a mechanical connection of the raceway(s).

T&B Product:
Grounding Wedge

Electrical continuity at service equipment, service raceways and service conductor enclosures shall be ensured by one of the following methods:

(1) Bonding equipment to the grounded service conductor in a manner provided in 250.8

(2) Connections utilizing threaded couplings or threaded hubs on enclosures if made up wrenchtight

(3) Threadless couplings and connectors if made up tight for metal raceways and metal-clad cables

(4) Other listed devices, such as bonding-type locknuts, bushings or bushings with bonding jumpers

Analysis of Change:

Bonding jumpers are now required to be installed around over-sized knockouts. Over-sized knockouts are formed from incorrectly knocking out concentric knockouts as well as a field fabricated knockout that is not precise.

Proposal Number: 5-226
Comment Number(s): NA

Section 250.94 Bonding for Other Systems

T&B Product:
Intersystem Bonding Terminations

An intersystem bonding termination for connecting intersystem bonding conductors required for other systems shall be provided external to enclosures at the service equipment or metering equipment enclosure and at the disconnecting means for any additional buildings or structures. The intersystem bonding termination shall comply with the following:

(1) Be accessible for connection and inspection

(2) Consist of a set of terminals with the capacity for connection of not less than three intersystem bonding conductors.

(3) Not interfere with opening the enclosure for a service, building or structure disconnecting means, or metering equipment

(4) At the service equipment, be securely mounted and electrically connected to an enclosure for the service equipment, to the meter enclosure, or to an exposed non-flexible metallic service raceway, or be mounted at one of these enclosures and be connected to the enclosure or to the grounding electrode conductor with a minimum 6 AWG copper conductor

(5) At the disconnecting means for a building or structure, be securely mounted and electrically connected to the metallic enclosure for the building or structure disconnecting means, or be mounted at the disconnecting means and be connected to the metallic enclosure or to the grounding electrode conductor with a minimum 6 AWG copper conductor

(6) The terminals shall be listed as grounding and bonding equipment

Analysis of Change:

There has been some confusion that the intersystem bonding termination cannot be applied to a metering equipment enclosure since 230.66 states that individual meter socket enclosures shall not be considered service equipment. This change clarifies this method is acceptable.

Proposal Number: 5-230
Comment Number(s): NA

Section 250.94 Bonding for Other Systems

Informational Note No. 2: See 770.100, 800.100, 810.21 and 820.100 and 830.100 for intersystem bonding and grounding requirements for conductive optical fiber cables, communications circuits, radio and television equipment, CATV circuits and network-powered broadband communications systems, respectively.

T&B Product:
Intersystem Bonding Termination

Analysis of Change:

Informational Note No. 2 in Section 250.94 was revised to clarify the Articles in Chapters 7 and 8 that have Intersystem Bonding Termination requirements.

Proposal Number: 5-251
Comment Number(s): 5-158

Section 250.104(B) Bonding of Piping Systems and Exposed Structural Steel

T&B Product:
General Information

(B) Other Metal Piping

Informational Note No. 2: Additional information for gas piping systems can be found in Section 7.13 of NFPA 54-2009, National Fuel Gas Code.

Analysis of Change:

A new informational note was added to the NEC for guidance on proper bonding of gas piping systems. There was some confusion on the bonding requirements for a specific gas piping system type, corrugated stainless steel tubing (CSST). This note refers users to NFPA 54 for guidance.

Proposal Number: 5-267
Comment Number(s): NA

Section 250.114 Equipment Connected by Cord and Plug

Under any of the conditions described in 250.114(1) through (4), exposed, normally non–current-carrying metal parts of cord- and plug-connected equipment shall be connected to the equipment grounding conductor.

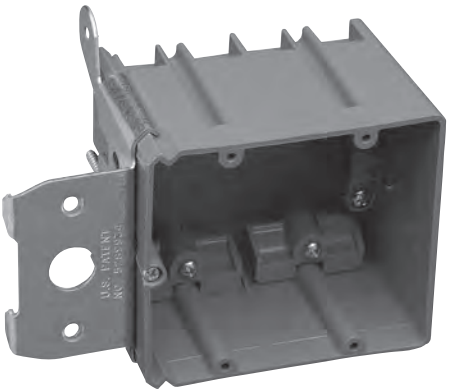
T&B Product:
Range Outlet Box

250.114(3)(b) In Residential Occupancies

(b) Clothes-washing, clothes-drying, dish-washing machines, ranges, kitchen waste disposers, information technology equipment, sump pumps and electrical aquarium equipment.

Analysis of Change:

The word “ranges” was added as a requirement to be connected to an equipment grounding conductor. This will require 4-wire cords and devices for ranges, as required for dryers and other appliances included in the list.



Proposal Number: 5-273, 5-274
Comment Number(s): NA

Section 250.118 Types of Equipment Grounding Conductors
Section 250.118(5)(d) Listed Flexible Metal Conduit Meeting All the Following Conditions:
Section 250.118(6)(e) Listed Liquidtight Flexible Metal Conduit Meeting All the Following Conditions:

T&B Product: Flexible Metal Conduit (FMC), Liquidtight Flexible Metal Conduit (LFMC) and Fittings, Electrical Connectors

If used to connect equipment where flexibility is necessary to minimize the transmission of vibration from equipment or to provide flexibility for equipment that requires movement after installation, an equipment grounding conductor shall be installed.

Analysis of Change:

This change impacts listed flexible metal conduit (FMC) and listed liquidtight flexible metallic conduit (LFMC) when used as an equipment grounding conductor. It requires an equipment grounding conductor to be installed where flexibility is necessary to minimize vibration from equipment or where flexibility is needed for equipment movement after installation.

Proposal Number: 5-259
Comment Number(s): 5-163

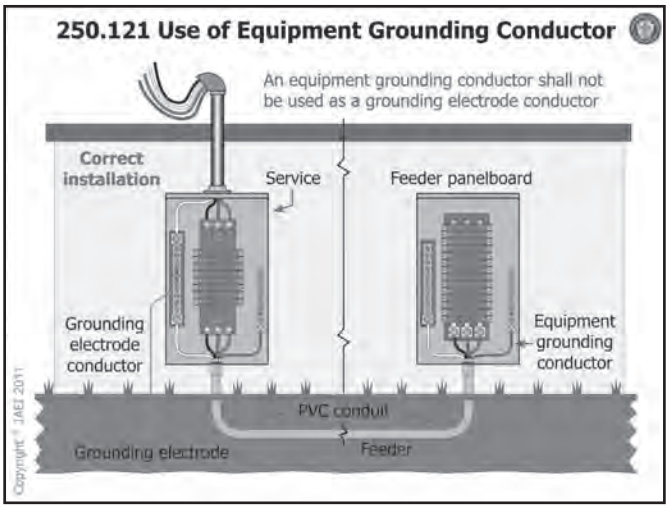
Section 250.121 Use of Equipment Grounding Conductors

An equipment grounding conductor shall not be used as a grounding electrode conductor.

T&B Product:
Grounding Connectors

Analysis of Change:

This new section clarifies that an equipment grounding conductor cannot be used as a grounding electrode conductor. These are two distinct conductors and should not share duties.



Proposal Number: 5-315
Comment Number(s): NA

Section 250.191 Grounding System in AC Substations

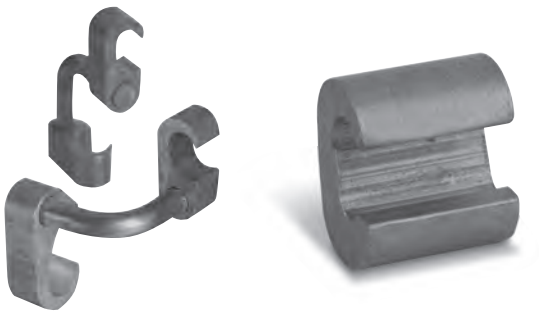
T&B Product:
Grounding Connectors

For AC substations, the grounding system shall be in accordance with Part III of Article 250.

Informational Note: For further information on outdoor AC substation grounding, see ANSI/IEEE 80-2000, IEEE Guide for Safety in AC Substation Grounding.

Analysis of Change:

This new section was added since some substations are not controlled by utilities and are not exempt from NEC requirements. An informational note was added to reference users to an IEEE Guide for AC substations grounding.



Proposal Number: 5-316 through 5-319
Comment Number(s): 5-196

Section 280.5 Listing

~~**280.5 Listing.** A surge arrester shall be a listed device.~~

T&B Product:
Surge Arrestors

Analysis of Change:

There is no listing requirement for surge arresters over 1kV. This listing requirement was added in 2008 and deleted in 2011. At the time of the publication of the 2008 NEC, there were no listed products. The public comments questioned the need for listings as these products protect equipment, not people.

Article 285

Surge-Protective Devices (SPDS), 1 kV or Less

Proposal Number: 5-324
Comment Number(s): 5-204

Section 285.25 Type 3 SPDs

T&B Product:
Surge Protection Devices

Type 3 SPDs (TVSSs) shall be permitted to be installed on the load side of branch-circuit overcurrent protection up to the equipment served. If included in the manufacturer's instructions, the Type 3 SPD connection shall be a minimum 10m (30 ft.) of conductor distance from the service or separately derived system disconnect.

Analysis of Change:

The product listing standard, UL 1449, third edition, includes an exception for Type 3 SPDs that have been subjected to the Type 2 SPD Nominal Discharge Current Test to be installed anywhere on the load side of the branch-circuit overcurrent protection.

Proposal Number: 3-34
Comment Number(s): NA

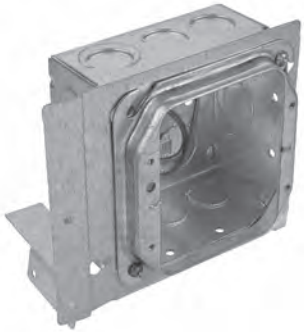
Section 300.4 (E) Protection Against Physical Damage

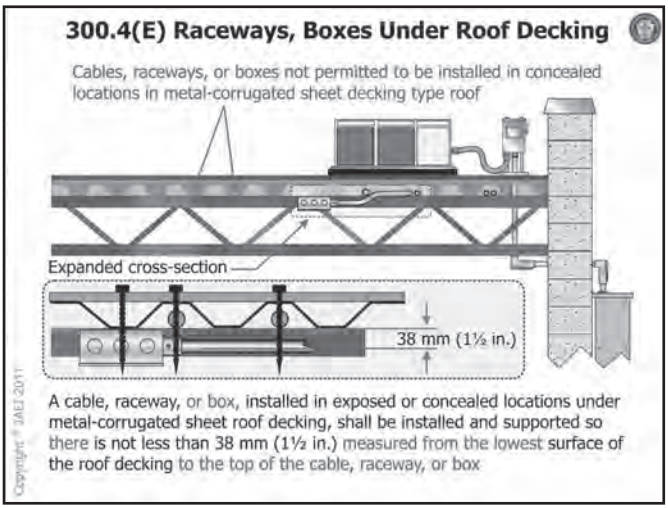
(E) Cables, Raceways or Boxes Installed in or Under Roof Decking. A cable, raceway or box, installed in exposed or concealed locations under metal-corrugated sheet roof decking, shall be installed and supported so there is not less than 38mm (1½ in.) measured from the lowest surface of the roof decking to the top of the cable, raceway or box. A cable, raceway or box shall not be installed in concealed locations in metal-corrugated sheet decking type roof.

T&B Product:
Raceways, Fittings and Boxes

Analysis of Change:

This section was revised to add boxes to the requirement for installation of raceway and cables under a metal-corrugated sheet roof. Also, a requirement forbidding cable, raceway and boxes to be placed on the top of the metal-corrugated sheet decking prior to the insulation material being installed was added.





Proposal Number: 3-46
Comment Number(s): 3-14 and 3-15

Section 300.4 (H) Protection Against Physical Damage

T&B Product:
Expansion Deflection Fitting

(H) Structural Joints. A listed expansion/deflection fitting or other approved means shall be used where a raceway crosses a structural joint intended for expansion, contraction or deflection, used in buildings, bridges, parking garages or other structures.

Analysis of Change:

This new section was added to address the issue that raceways can be damaged if improperly installed across a structural joint of a building, bridge, parking garage or other structure. Structural joints are used in structures to address the movement of the structure due to temperature and other forces such as wind loading and ground movement.

Proposal Number: 3-48, 3-49 and 3-52
Comment Number(s): 3-17

Section 300.5(C) Underground Installations

(C) Underground Cables Under Buildings. Underground cable installed under a building shall be in a raceway.

T&B Product:
MC Fittings and Raceway Fittings

Exception No. 1: Type MI Cable shall be permitted under a building without installation in a raceway where embedded in concrete, fill or other masonry in accordance with 332.10(6) or in underground runs where suitably protected against physical damage and corrosive conditions in accordance with 332.10(10).

Exception No. 2: Type MC Cable listed for direct burial or concrete encasement shall be permitted under a building without installation in a raceway in accordance with 330.10(A)(5) and in wet locations in accordance with 330.10(11).

Analysis of Change:

Proposals 3-48 and 3-52 added two new Exceptions to allow both MI and MC Cable to be installed below a building without a raceway.

Article 300

Wiring Methods

Proposal Number: 3-73
Comment Number(s): NA

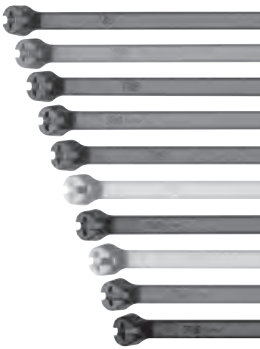
Section 300.11(A)(2) Securing and Supporting/Secured in Place

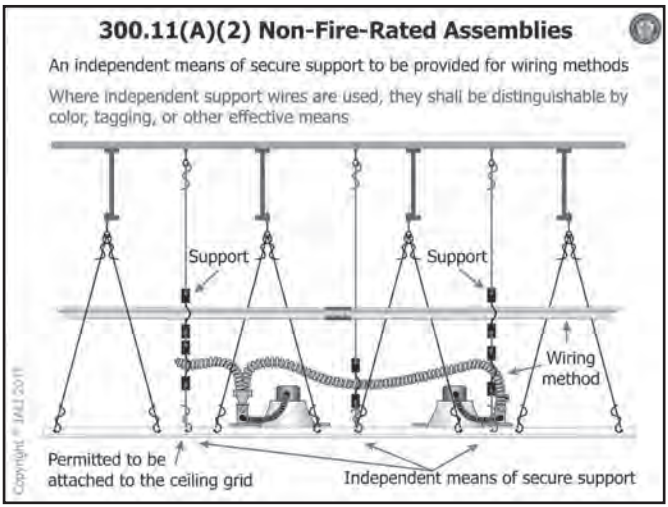
T&B Product:
Ty-Rap® and EZCODE®

(2) Non-Fire-Rated Assemblies. Wiring located within the cavity of a non-fire-rated floor-ceiling or roof-ceiling assembly shall not be secured to, or supported by, the ceiling assembly, including the ceiling support wires. An independent means of secure support shall be provided and shall be permitted to be attached to the assembly. Where independent support wires are used, they shall be distinguishable by color, tagging or other effective means.

Analysis of Change:

Section 300.11(A)(2) was revised to add a new sentence to require marking of the independent support wires by a distinguishable effective means. This could be accomplished by using colored Ty-Rap® cable ties or a tag from one of the EZCODE® printers.





Proposal Number: 3-97
Comment Number(s): 3-39, 3-40 and 3-41

Section 300.22(C)(2) Other Spaces Used for Environmental Air (Plenums)

(2) Cable Tray Systems. The provisions in (a) and (b) apply to the use of metallic cable tray systems in other spaces used for environmental air (plenums), where accessible, as follows:

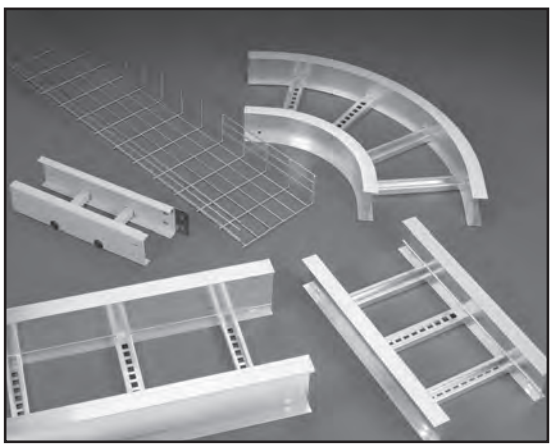
T&B Product:
Metal Cable Tray

(a) *Metal Cable Tray Systems*. Metal cable tray systems shall be permitted to support the wiring methods in 300.22(C)(1).

(b) *Solid Side and Bottom Metal Cable Tray Systems*. Solid side and bottom metal cable tray systems with solid metal covers shall be permitted to enclose wiring methods and cables not already covered in 300.22(C)(1), in accordance with 392.10(A) and (B).

Analysis of Change:

Section 300.22(C)(2) is a new section pertaining to the use of Metal Cable Tray Systems in Other Spaces Used for Environmental Air (Plenum). 300.22(C)(2)(a) makes it clear that all types of metal cable tray are permitted in the Other Spaces Used for Environmental Air (Plenum) when used with wiring methods and cables types that are also permitted to be used in these areas. 300.22(C)(2)(b) allows non-plenum rated wiring methods, such as electrical non-metallic tubing and non-plenum rated cables, to be installed in the Other Spaces Used for Environmental Air (Plenum) when enclosed in a solid side and bottom metal cable trays system with solid metal covers.



Proposal Number: 3-105
Comment Number(s): NA

Section 300.50(B) Underground Installations

T&B Product: Rigid, Schedule 40 and 80 PVC Elbows

(B) Wet Locations. The interior of enclosures or raceways installed underground shall be considered to be a wet location. Insulated conductors and cables installed in these enclosures or raceways in underground installations shall be listed for use in wet locations and shall comply with 310.10(C). Any connections or splices in an underground installation shall be approved for wet locations.

Analysis of Change:

Section 300.50(B) was revised to state that the interior of an enclosure or raceway, installed underground for high-voltage applications, is a wet location and that conductors and cables installed in an enclosure or raceway shall be listed for a wet location. This requirement is the same for voltage less than 600 volts per Section 300.5(B).

Proposal Number: 6-66
Comment Number(s): 6-28, 6-36, 6-37 and 6-47

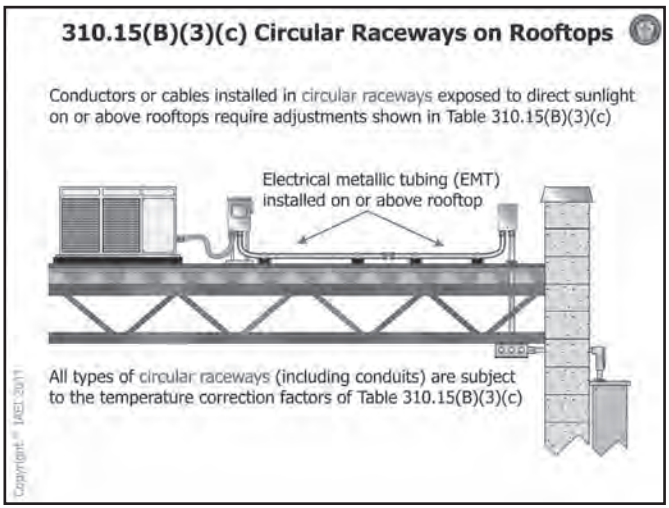
Section 310.15(B)(3)(c) Ampacities for Conductors Rated 0–2000 Volts/Ambient Temperature Correction Factors

(c) Circular Raceways Exposed to Sunlight on Rooftops. Where conductors or cables are installed in circular raceways exposed to direct sunlight on or above rooftops, the adjustments shown in Table 310.15(B)(3)(c) shall be added to the outdoor temperature to determine the applicable ambient temperature for application of the correction factors in Table 310.15(B)(2)(a) or Table 310.15(B)(2)(b).

T&B Product:
Raceway Fittings

Analysis of Change:

Section 310.15(B)(3)(c) was revised to replace "conduits" with "circular raceways" for roof tops. The intent of the revision was to replace "conduit" with "raceways" since conduit does not include "tubings" such as EMT.



Article 310

Conductors for General Wiring

Proposal Number: 6-99, 6-106, 6-113, 6-115 and 6-117
Comment Number(s): 6-62, 6-63, 6-64 and 6-65

Tables 310.15(B)(16), Table 310.15(B)(17), Table 310.15(B)(18), Table 310.15(B)(19) and Table 310.15(B)(20)

T&B Product:
General

Analysis of Change:

These Tables in Article 310 were revised to harmonize the ampacities listed between the Canadian Electrical Code and the NEC.

Table 310.15(B)(16) (in part)

Table 310.15(B)(16) Allowable Ampacities of Insulated Conductors Rated Up to and Including 2000 Volts, 60° C Through 90° C (140°F), Not More Than Three Current-Carrying Conductors in Raceway, Cable, or Earth (Directly Buried), Based on Ambient Temperature of 30°C (86°F)*

Size AWG or kcmil	Temperature Rating of Conductor [See Table 310.13(A)]						Size AWG or kcmil
	60°C (140°F)	75°C (167°F)	90°C (194°F)	60°C (140°F)	75°C (167°F)	90°C (194°F)	
	Types TW, UF	Types RHW, THHW, THW, THWN,XHHW, USE, ZW	Types TBS, SA, SIS, FEP, FEPB, MI, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE-2, XHH, XHHW, XHHW-2, ZW-2	Types TW, UF	Types RHW, THHW, THW, THWN,XHHW, USE	Types TBS, SA, SIS, THHN, THHW, THW-2, THWN-2, RHH, RHW-2, USE-2, XHH, XHHW, XHHW-2, ZW-2	
	COPPER			ALUMINUM OR COPPER-CLAD ALUMINUM			
18**	—	—	14	—	—	—	—
16**	—	—	18	—	—	—	—
14**	15	20	25	—	—	—	—
12**	20	25	30	15	20	25	12**
10**	30	35	40	25	30	35	10**
8	40	50	55	35	40	45	8
6	55	65	75	40	50	55	6
4	70	85	95	55	65	75	4
3	85	100	115	65	75	85	3
2	95	115	130	75	90	100	2
1	110	130	145	85	100	115	1
1/0	125	150	170	100	120	135	1/0
2/0	145	175	195	115	135	150	2/0
3/0	165	200	225	130	155	175	3/0
4/0	195	230	260	150	180	205	4/0

*Refer to 310.15(B)(2) for the ampacity correction factors where the ambient temperature is other than 30°C (86°F).
**Refer to 240.4(D) for conductor overcurrent protection limitations.

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Reproduction of NEC Table 310.16 (in part)

Proposal Number: 9-56a
Comment Number(s): NA

Section 314.24(A)(B)(1-5) Depth of Boxes

314.24 Depth of Boxes. Outlet and device boxes shall have sufficient depth to allow equipment installed within them to be mounted properly and without likelihood of damage to conductors within the box.

T&B Product:
Outlet Boxes

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

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

(1) Large Equipment. Boxes that enclose devices or utilization equipment that projects more than 48mm (1⅞ in.) rearward from the mounting plane of the box shall have a depth that is not less than the depth of the equipment plus 6mm (¼ in.).

(2) Conductors Larger Than 4 AWG. Boxes that enclose devices or utilization equipment supplied by conductors larger than 4 AWG shall be identified for their specific function.

Exception to (2): Devices or utilization equipment supplied by conductors larger than 4 AWG shall be permitted to be mounted on or in junction and pull boxes larger than 1650 cm³ (100 in.³) if the spacing at the terminals meets the requirements of 312.6.

(3) Conductors 8, 6 or 4 AWG. Boxes that enclose devices or utilization equipment supplied by 8, 6 or 4 AWG conductors shall have an internal depth that is not less than 52.4mm (2 1/16 in.).

Continues on page 60.

Outlet, Device, Pull and Junction Boxes; Conduit Bodies; Fittings; and Handhole Enclosures

Proposal Number: 9-56a
Comment Number(s): NA

Section 314.24(A)(B)(1-5) (continued)

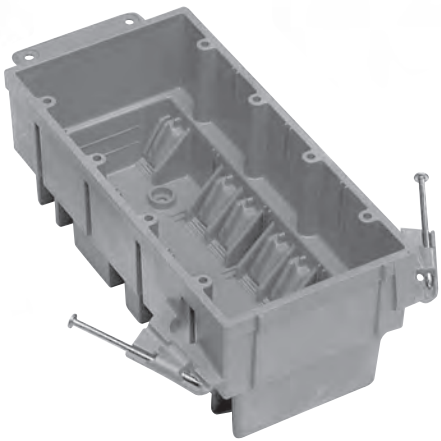
(4) Conductors 12 or 10 AWG. Boxes that enclose devices or utilization equipment supplied by 12 or 10 AWG conductors shall have an internal depth that is not less than 30.2mm (1 3/16 in.). Where the equipment projects rearward from the mounting plane of the box by more than 25mm (1 in.), the box shall have a depth not less than that of the equipment plus 6mm (1/4 in.).

(5) Conductors 14 AWG and Smaller. Boxes that enclose devices or utilization equipment supplied by 14 AWG or smaller conductors shall have a depth that is not less than 23.8mm (1 5/16 in.).

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

Analysis of Change:

Section 314.10(B) was revised to add devices for the required minimum box depth. The Panel determined that there was not a reason to exclude devices from the requirements presented in this section. A conductor pinned against the back wall of a box, particularly if forced against an inwardly-punched knockout or a poorly finished mounting hole, will be subject to insulation failure just as if it were pinched by utilization equipment.



Proposal Number: 9-77
Comment Number(s): 9-29 and 9-30

Section 314.27(A)(1)(2) Outlet Boxes

(A) Boxes at Luminaire or Lampholder Outlets. Outlet boxes or fittings designed for the support of luminaires and lampholders, and installed as required by 314.23 shall be permitted to support a luminaire or lampholder.

T&B Product:
Outlet Boxes and Ceiling Boxes

(1) Wall Boxes. Boxes used at luminaire or lampholder outlets in a wall shall be marked on the interior of the box to indicate the maximum weight of the luminaire that is permitted to be supported by the box in the wall, if other than 23 kg (50 lb).

Exception: A wall-mounted luminaire or lampholder weighing not more than 3 kg (6 lb) shall be permitted to be supported on other boxes or plaster rings that are secured to other boxes, provided the luminaire or its supporting yoke is secured to the box with no fewer than two No. 6 or larger screws.

(2) Ceiling Outlets. At every outlet used exclusively for lighting, the box shall be designed or installed so that a luminaire or lampholder may be attached. Boxes shall be required to support a luminaire weighing a minimum of 23 kg (50 lb). A luminaire that weighs more than 23 kg (50 lb) shall be supported independently of the outlet box, unless the outlet box is listed and marked for the maximum weight to be supported.

Analysis of Change:

Sections 314.27(A)(1) and (2) were revised for clarity by aligning the requirements with the specific applications and eliminating the redundant text. The new language also moves the minimum weight requirement for a ceiling box to 314.27(A)(2). Lampholders were added for clarity.

Outlet, Device, Pull and Junction Boxes; Conduit Bodies; Fittings; and Handhole Enclosures

Proposal Number: 9-81
Comment Number(s): 9-33 and 9-34

Section 314.27(C) Boxes at Ceiling-Suspended (Paddle) Fan Outlets

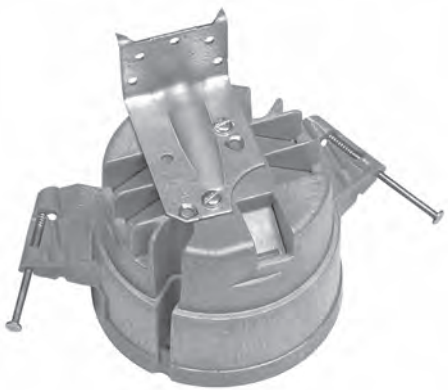
T&B Product:
Fan Rated Ceiling Boxes

(C) Boxes at Ceiling-Suspended (Paddle) Fan Outlets. Outlet boxes or outlet box systems used as the sole support of a ceiling-suspended (paddle) fan shall be listed, shall be marked by their manufacturer as suitable for this purpose and shall not support ceiling-suspended (paddle) fans that weigh more than 32 kg (70 lb). For outlet boxes or outlet box systems designed to support ceiling suspended (paddle) fans that weigh more than 16 kg (35 lb), the required marking shall include the maximum weight to be supported.

Where spare, separately switched, ungrounded conductors are provided to a ceiling mounted outlet box, in a location acceptable for a ceiling-suspended (paddle) fan in single or multi-family dwellings, the outlet box or outlet box system shall be listed for sole support of a ceiling-suspended (paddle) fan.

Analysis of Change:

Section 314.27(C) was revised to require a fan rated ceiling box to be installed if there are two wall switches installed for the ceiling box. The fan rated ceiling box is required whether a ceiling suspended (paddle) fan was installed or not. One switch is intended for the operation of the fan and the other for the operation of the light kit.



Proposal Number: 7-77
Comment Number(s): 7-25, 7-26, 7-27, 7-28 and 7-29

Section 334.10(1) Uses Permitted

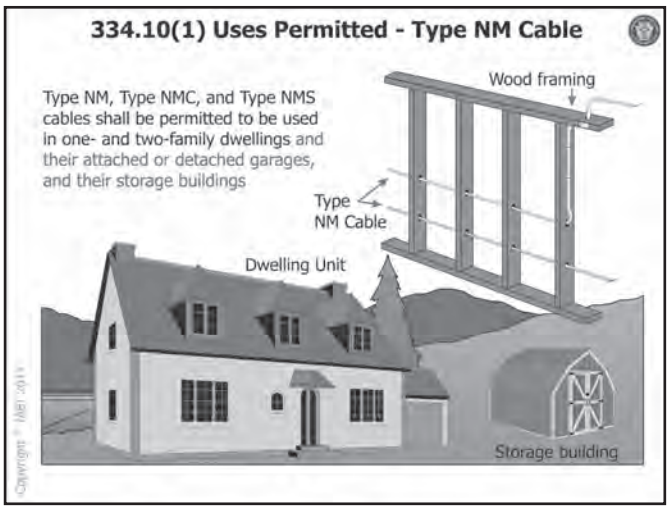
334.10 Uses Permitted. Type NM, Type NMC, and Type NMS cables shall be permitted to be used in the following:

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

T&B Product:
Outlet Boxes

Analysis of Change:

Section 334.10(1) was expanded to allow Type NM, Type NMC and Type NMS cables to be used in attached or detached garage and storage buildings, for a one- or two-family dwelling.



Article 342

Intermediate Metal Conduit: Type IMC

Proposal Number: 8-24a
Comment Number(s): 8-9, 8-10, 8-11, and 8-12

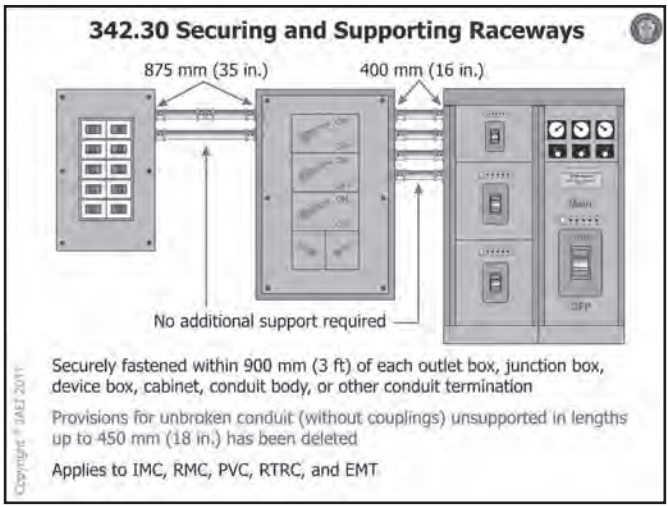
Section 342.30(C) Securing and Supporting

T&B Product:
Strut and Conduit Clamps

~~**(C) Unsupported Raceways**. Where oversized, concentric or eccentric knockouts are not encountered, Type IMC shall be permitted to be unsupported where the raceway is not more than 450 mm (18 in.) and remains in unbroken lengths (without coupling). Such raceways shall terminate in an outlet box, junction box, device box, cabinet, or other termination at each end of the raceway~~.

Analysis of Change:

Section 342.30(C) was deleted from the 2011 NEC. This section was added to the 2008 NEC to allow for short lengths of conduit to be unsupported when running between termination points. The new section became overly restrictive to the user. At first, it was thought the section would give some relief to the supporting requirement for short runs of raceways. In the past, electrical inspectors would allow for raceways to be used with oversized, concentric or eccentric knockouts and/or with couplings. The section was deleted to allow the Authority Having Jurisdiction (AHJ) some leeway to determine the acceptance of unsupported raceways in the field.



Proposal Number: 8-35
Comment Number(s): 8-16 and 80-17

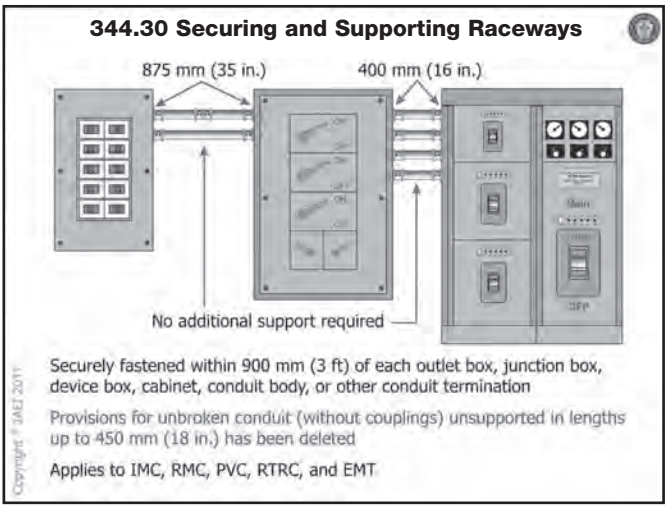
Section 344.30(C) Securing and Supporting

~~344.30(C) Unsupported Raceways~~. ~~Where oversized, concentric or eccentric knockouts are not encountered, Type RMC shall be permitted to be unsupported where the raceway is not more than 450 mm (18 in.) and remains in unbroken lengths (without coupling). Such raceways shall terminate in an outlet box, junction box, device box, cabinet, or other termination at each end of the raceway~~.

T&B Product:
Strut and Conduit Clamps

Analysis of Change:

Section 344.30(C) was deleted from the 2011 NEC. This section was added to the 2008 NEC to allow for short lengths of conduit to be unsupported when running between termination points. The new section became overly restrictive to the user. At first, it was thought, the section would give some relief to the supporting requirement for short runs of raceways. In the past, electrical inspectors would allow for raceways to be used with oversized concentric or eccentric knockouts and/or with couplings. The section was deleted to allow the Authority Having Jurisdiction (AHJ) some leeway to determine the acceptance of unsupported raceways in the field.



Article 348

Flexible Metal Conduit: Type FMC

Proposal Number: 8-47
Comment Number(s): NA

Section 348.30(A) Exception No. 2 Securing and Supporting

T&B Product:
FMC Fittings

(A) Securely Fastened

Exception No. 2: Where flexibility is necessary after installation, lengths from the last point where the raceway is securely fastened shall not exceed the following:

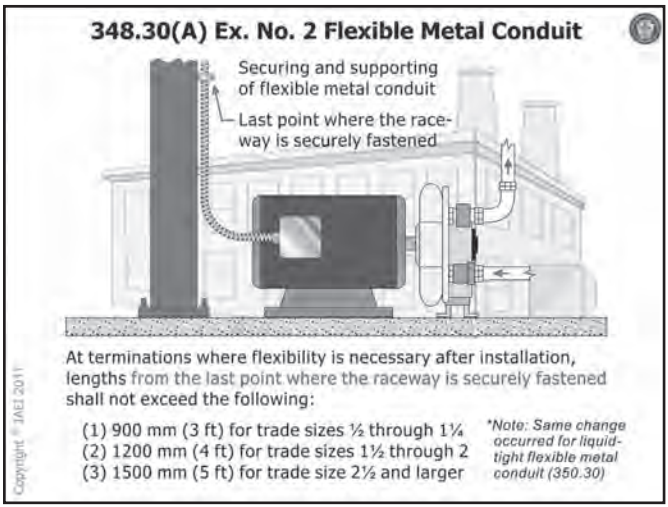
(1) 900mm (3 ft.) for metric designators 16 through 35 (trade sizes ½ through 1¼)

(2) 1,200mm (4 ft.) for metric designators 41 through 53 (trade sizes 1½ through 2)

(3) 1,500mm (5 ft.) for metric designators 63 (trade size 2½) and larger

Analysis of Change:

Exception No. 2 of Section 348.30(A) was revised to clarify that when Type FMC is used for flexibility the measurement of the Type FMC is to be taken from the last point where the Type FMC is securely fastened. This new text clarifies that the overall length of the Type FMC is not restricted to the lengths given in (1), (2) and (3) when used for flexibility after the installation.



Proposal Number: 8-61
Comment Number(s): NA

Section 350.30(A) Exception No. 2 Securing and Supporting

(A) Securely Fastened.

T&B Product:
LFMC Fittings

Exception No. 2: Where flexibility is necessary after installation, lengths from the last point where the raceway is securely fastened shall not exceed the following:

(1) 900mm (3 ft.) for metric designators 16 through 35 (trade sizes ½ through 1¼)

(2) 1,200mm (4 ft.) for metric designators 41 through 53 (trade sizes 1½ through 2)

(3) 1,500mm (5 ft.) for metric designators 63 (trade size 2½) and larger

Analysis of Change:

Exception No. 2 of Section 350.30(A) was revised to clarify that when Type LFMC is used for flexibility the measurement of the Type LFMC is to be taken from the last point where the Type LFMC is securely fastened. This new text clarifies that the overall length of the Type LFMC is not restricted to the lengths given in (1), (2) and (3) when used for flexibility after the installation.

Article 352

Rigid Polyvinyl Chloride Conduit: Type PVC

Proposal Number: 8-67a
Comment Number(s): NA

Section 352.10(I) Uses Permitted

T&B Product:
Type PVC Elbows and Fittings

(I) Insulation Temperature Limitations. Conductors or cables rated at a temperature higher than the listed temperature rating of PVC conduit shall be permitted to be installed in PVC conduit, provided the conductors or cables are not operated at a temperature higher than the listed temperature rating of the PVC conduit.

Analysis of Change:

Section 352.10(I) is a new section for the 2011 NEC and replaces the Exception in Section 352.12(E) for the 2008 NEC. Relocating the conductor operating temperature requirements makes it clear for the code user that conductors marked with a rated temperature higher than that of the raceway can be used when the conductors are operated within the raceway temperature rating. The Exception was redundant to the current requirement in the uses not permitted.

Proposal Number: 8-78
Comment Number(s): 8-35 and 8-36

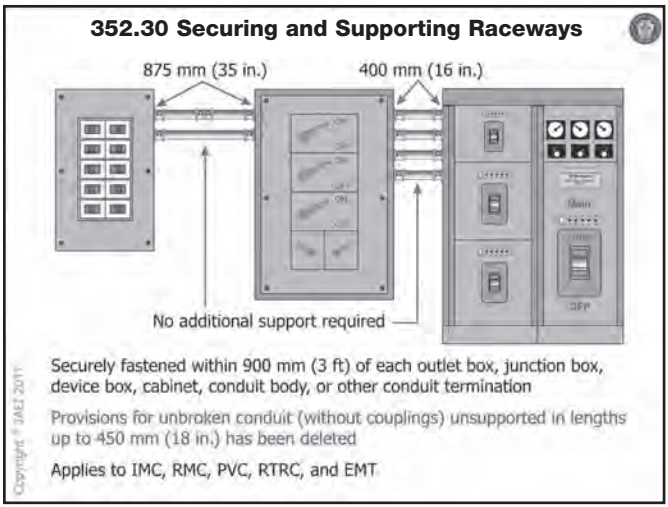
Section 352.30(C) Securing and Supporting

~~352.30(C) Unsupported Raceways~~. ~~Where oversized, concentric or eccentric knockouts are not encountered, Type PVC shall be permitted to be unsupported where the raceway is not more than 450 mm (18 in.) and remains in unbroken lengths (without coupling). Such raceways shall terminate in an outlet box, junction box, device box, cabinet, or other termination at each end of the raceway~~.

T&B Product:
Strut and Conduit Clamps

Analysis of Change:

Section 352.30(C) was deleted from the 2011 NEC. This section was added to the 2008 NEC to allow for short lengths of conduit to be unsupported when running between termination points. The new section became overly restrictive to the user. At first it was thought the section would give some relief to the supporting requirement for short runs of raceways. In the past, electrical inspectors would allow for raceways to be used with oversized, concentric or eccentric knockouts and/or with couplings. The section was deleted to allow the Authority Having Jurisdiction (AHJ) some leeway to determine the acceptance of unsupported raceways in the field.



Article 355

Reinforced Thermosetting Resin Conduit: Type RTRC

Proposal Number: 8-105
Comment Number(s): 8-43 and 8-44

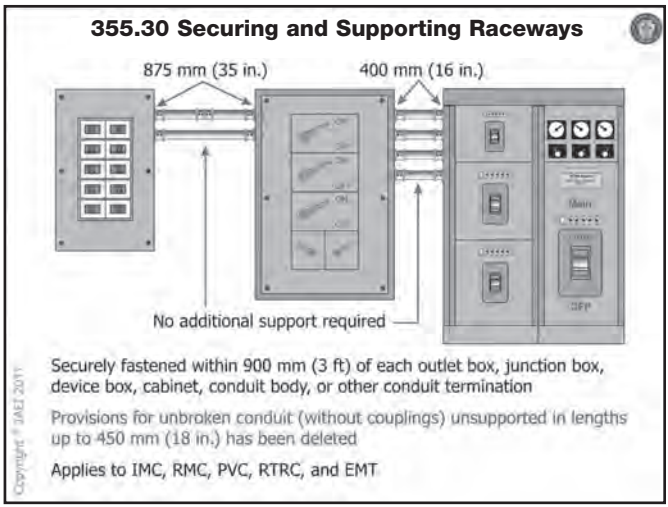
Section 355.30(C) Securing and Supporting

T&B Product:
Strut and Conduit Clamps

~~**355.30(C) Unsupported Raceways**. Where oversized, concentric or eccentric knockouts are not encountered, Type RTRC shall be permitted to be unsupported where the raceway is not more than 450 mm (18 in.) and remains in unbroken lengths (without coupling). Such raceways shall terminate in an outlet box, junction box, device box, cabinet, or other termination at each end of the raceway~~.

Analysis of Change:

Section 355.30(C) was deleted from the 2011 NEC. This section was added to the 2008 NEC to allow for short lengths of conduit to be unsupported when running between termination points. The new section became overly restrictive to the user. At first, it was thought the section would give some relief to the supporting requirement for short runs of raceways. In the past, electrical inspectors would allow for raceways to be used with oversized, concentric or eccentric knockouts and/or with couplings. The section was deleted to allow the Authority Having Jurisdiction (AHJ) some leeway to determine the acceptance of unsupported raceways in the field.



Proposal Number: 8-125
Comment Number(s): 8-49 and 8-50

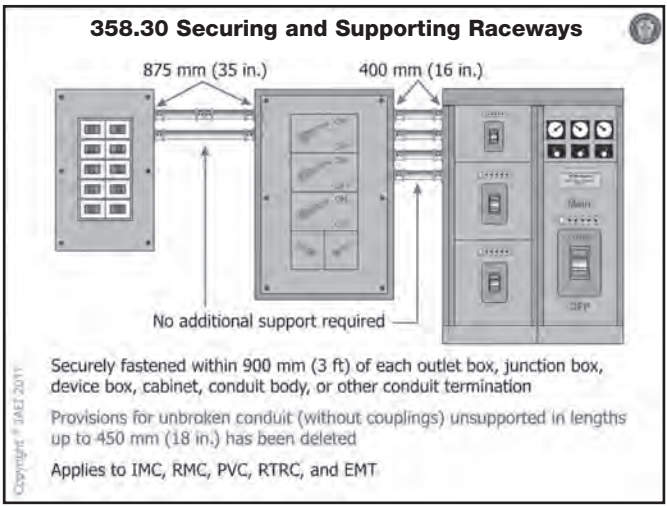
Section 358.30(C) Securing and Supporting

T&B Product:
Strut and Conduit Clamps

~~**358.30(C) Unsupported Raceways**. Where oversized, concentric or eccentric knockouts are not encountered, Type EMT shall be permitted to be unsupported where the raceway is not more than 450 mm (18 in.) and remains in unbroken lengths (without coupling). Such raceways shall terminate in an outlet box, junction box, device box, cabinet, or other termination at each end of the raceway~~.

Analysis of Change:

Section 358.30(C) was deleted from the 2011 NEC. This section was added to the 2008 NEC to allow for short lengths of conduit to be unsupported when running between termination points. The new section became overly restrictive to the user. At first, it was thought the section would give some relief to the supporting requirement for short runs of raceways. In the past, electrical inspectors would allow for raceways to be used with oversized, concentric or eccentric knockouts and/or with couplings. The section was deleted to allow the Authority Having Jurisdiction (AHJ) some leeway to determine the acceptance of unsupported raceways in the field.



Article 362

Electrical Non-Metallic Tubing: Type ENT

Proposal Number: 8-139a
Comment Number(s): NA

Section 362.10(9) Uses Permitted

T&B Product:
Flex-Plus® Blue ENT

(9) Conductors or cables rated at a temperature higher than the listed temperature rating of ENT shall be permitted to be installed in ENT, provided the conductors or cables are not operated at a temperature higher than the listed temperature rating of the ENT.

Analysis of Change:

Section 362.10(9) is a new section for 2011 NEC and replaces the Exception in Section 362.12(4) for the 2008 NEC. Relocating the conductor operating temperature requirements makes it clear for the code user that conductors marked with a rated temperature higher than that of the raceway can be used when the conductors are operated within the raceway temperature rating. The Exception was redundant to the current requirement in the uses not permitted.

Proposal Number: 8-235a
Comment Number(s): 8-100a, 8-101, 8-102, 8-103, 8-120 and 8-121

Article 392

I. General

T&B Product:
Cable Tray

392.1 Scope. This article covers cable tray systems, including ladder, ventilated trough, ventilated channel, solid bottom and other similar structures.

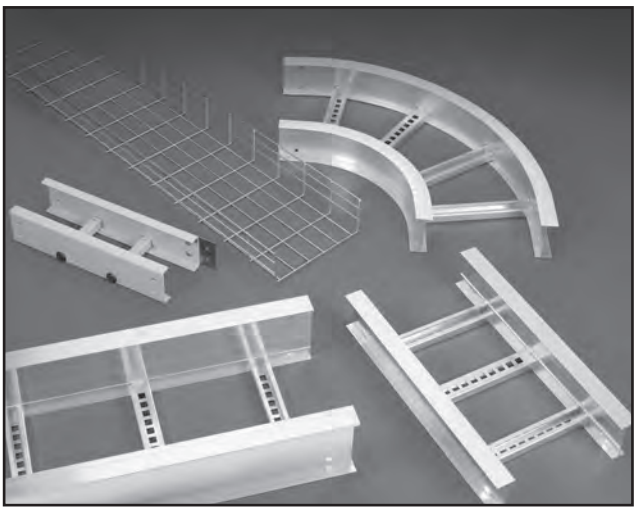
Informational Note: For further information on cable trays, see ANSI/NEMA–VE 1-2002, Metal Cable Tray Systems; NECA/NEMA 105-2007, Standard for Installing Metal Cable Tray Systems and NEMA–FG 1-1998, Nonmetallic Cable Tray Systems.

392.2 Definition.

Cable Tray System. A unit or assembly of units or sections and associated fittings forming a structural system used to securely fasten or support cables and raceways.

Analysis of Change:

Article 392 for the 2011 NEC was reformatted and renumbered. The rewrite includes changes in headings and numbering scheme to comply with the NEC Style Manual and for consistency with other Chapter 3 Articles. No wording or requirements have been added or deleted from the 2008 NEC Article 392 per this proposal, the only change was the renumbering to meet the basic style manual.



Article 392

Cable Tray

Proposal Number: 8-253
Comment Number(s): NA

Section 392.12 Uses Not Permitted

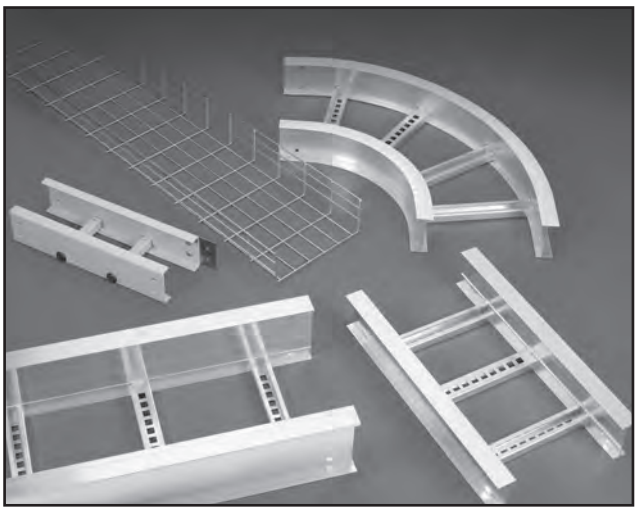
T&B Product:
Cable Tray

392.12 Uses Not Permitted. Cable tray systems shall not be used in hoistways or where subject to severe physical damage.

Analysis of Change:

Section 392.12 (Section 392.4, 2008 NEC) was revised to remove the language that cable tray systems were not acceptable to be used in an air-handling space. Section 300.22 makes it clear that cable tray can be used in these spaces.

See “Analysis Of Change:” for Proposal 3-97, Section 300.22(C)(2), Other Spaces Used for Environmental Air (Plenums), for additional information.



Proposal Number: 8-260
Comment Number(s): 8-110

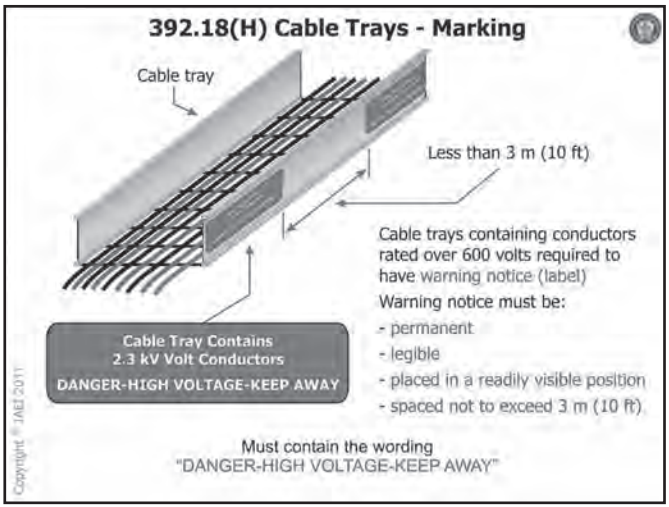
Section 392.18(H) Marking

392.18(H) Marking. Cable trays containing conductors rated over 600 volts shall have a permanent, legible warning notice carrying the wording "DANGER HIGH VOLTAGE KEEP AWAY" placed in a readily visible position on all cable trays with the spacing of warning notices not to exceed 3m (10 ft.).

T&B Product:
EZCODE® and Cable Tray

Analysis of Change:

Section 392.18(H) is a new section to require labeling of the cable tray systems containing conductors rated over 600 volts to indicate "DANGER HIGH VOLTAGE KEEP AWAY". The label is required to be installed every ten feet.



Article 392

Cable Tray

Proposal Number: 8-263
Comment Number(s): 8-114 and 8-115

Section 392.60(A) Grounding and Bonding

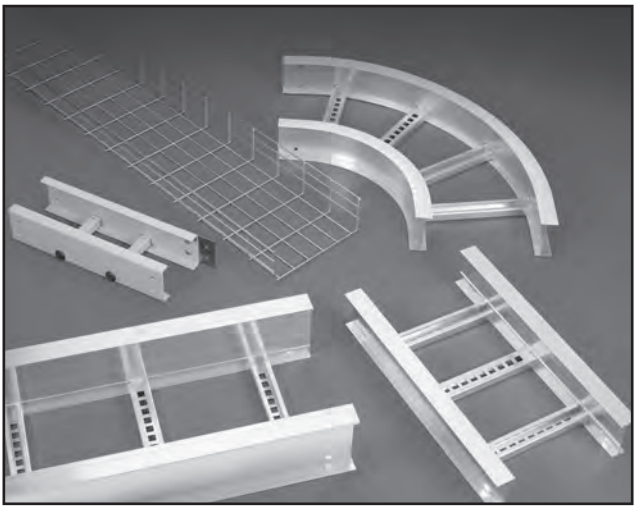
T&B Product:
Cable Tray

(A) Metallic Cable Trays. Metallic cable trays shall be permitted to be used as equipment grounding conductors where continuous maintenance and supervision ensure that qualified persons service the installed cable tray system and the cable tray complies with provisions of this section. Metallic cable trays that support electrical conductors shall be grounded as required for conductor enclosures in accordance with 250.96 and Part IV of Article 250. Metal cable tray containing only non-power conductors shall be electrically continuous, through approved connections or the use of a bonding jumper not smaller than a 10 AWG.

Informational Note: Examples of non-power conductors include nonconductive optical fiber cables and Class 2 and Class 3 Remote Control Signaling and Power Limited Circuits.

Analysis of Change:

Section 392.60 (392.7(A), 2011 NEC was revised to require the metal cable tray systems to be bonded when used with non-power conductors.



Proposal Number: 7-162
Comment Number(s): N/A

Article 399 Outdoor, Overhead Conductors, Over 600 Volts

T&B Product:
Overhead connectors

399.1 Scope. This article covers the use and installation for outdoor overhead conductors over 600 volts, nominal.

399.2 Definition.

Outdoor Overhead Conductors. Single conductors, insulated, covered or bare, installed outdoors on support structures.

Analysis of Change:

Article 399 is new for the 2011 NEC and covers the requirements for the use, installation and construction specifications for outdoor, overhead conductors, over 600 volts.

Premises wiring installations utilizing over 600 volt systems currently exist in numerous locations and have become more common as electrical usage has increased. Many of those installations utilize overhead bare conductors on insulators as feeders and branch circuits to safely distribute power to multiple building, structure and equipment locations. NEC Chapter 3 wiring methods did not recognize this “wiring method” and did not provide prescriptive permission or limitation for these installations. The new Article allows and requires designers to utilize existing industry standards for the specific details of the design and provides enforcement a basis for approval of the installations.

Photo courtesy of IAEI.

Proposal Number: 9-95
Comment Number(s): 9-45

Section 404.2(C) Switch Connections

T&B Product:
General Information

(C) Switches Controlling Lighting Loads. Where switches control lighting loads supplied by a grounded general purpose branch circuit, the grounded circuit conductor for the controlled lighting circuit shall be provided at the switch location.

Exception: The grounded circuit conductor shall be permitted to be omitted from the switch enclosure where either of the conditions in (1) or (2) apply:

(1) Conductors for switches controlling lighting loads enter the box through a raceway. The raceway shall have sufficient cross-sectional area to accommodate the extension of the grounded circuit conductor of the lighting circuit to the switch location whether or not the conductors in the raceway are required to be increased in size to comply with 310.15(B)(3)(a)

(2) Cable assemblies for switches controlling lighting loads enter the box through a framing cavity that is open at the top or bottom on the same floor level, or through a wall, floor or ceiling that is unfinished on one side

Information Note: The provision for a (future) grounded conductor is to complete a circuit path for electronic lighting control devices

Analysis of Change:

Section 404.2(C) is new for the 2011 NEC and requires a grounded circuit conductor at the switch location when the switch controls a lighting load, except when either of the conductors is enclosed in a raceway or where the cable assembly enters the box through a framing cavity that is open at the top or bottom on the same floor level, or through a wall, floor or ceiling that is unfinished on one side. When a raceway is used it shall be sized for a future grounded conductor.

Proposal Number: 18-30
Comment Number(s): 18-10, 18-16, 18-17, 18-18, 18-19, 18-20, 18-22, 18-23 and 18-24

Section 406.4(D)(4) Arc-Fault Circuit-Interrupter Protection

(4) Arc-Fault Circuit Interrupter Protection.
Where a receptacle outlet is supplied by a branch circuit that requires arc-fault circuit interrupter protection as specified elsewhere in this Code, a replacement receptacle at this outlet shall be one of the following:

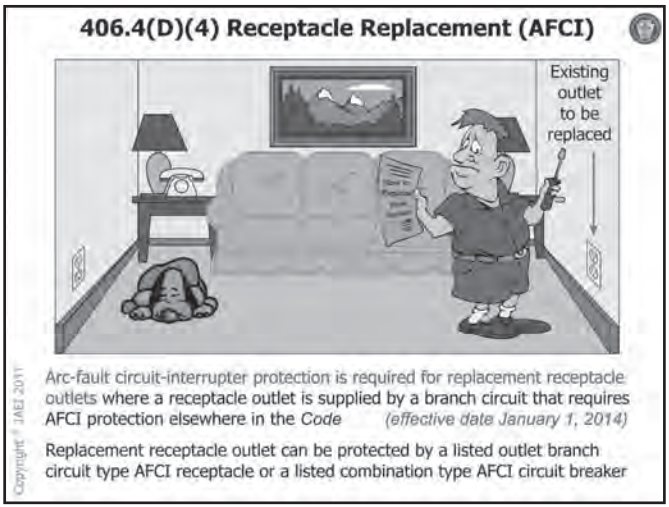
T&B Product:
General Information

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

This requirement becomes effective January 1, 2014.

Analysis of Change:

Section 406.4(D)(4) is new for the 2011 NEC and states wherever the NEC requires a combination arc-fault circuit-interrupter receptacle, all receptacles which are replaced, old or new, shall be replaced with either an arc-fault circuit interrupter receptacle, downstream from a arc-fault circuit interrupter receptacle or by a combination type arc-fault circuit interrupter type circuit breaker. This new rule is not effective until January 1, 2014.



Receptacles, Cord Connectors and Attachment Plugs (Caps)

Proposal Number: 18-24
Comment Number(s): 18-15

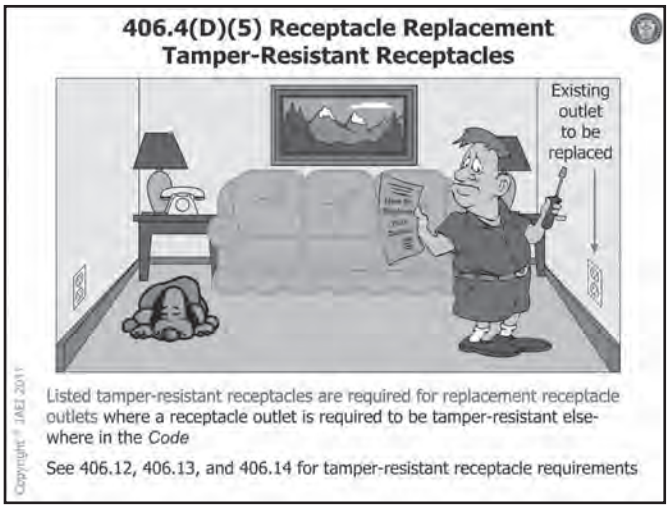
Section 406.4(D)(5) Tamper-Resistant Receptacles

T&B Product:
General Information

(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.

Analysis of Change:

Section 406.4(D)(5) is new for the 2011 NEC and states wherever the NEC requires tamper-resistant receptacles, all receptacles which are replaced shall be replaced with tamper-resistant receptacles.



Proposal Number: 18-33
Comment Number(s): 18-24

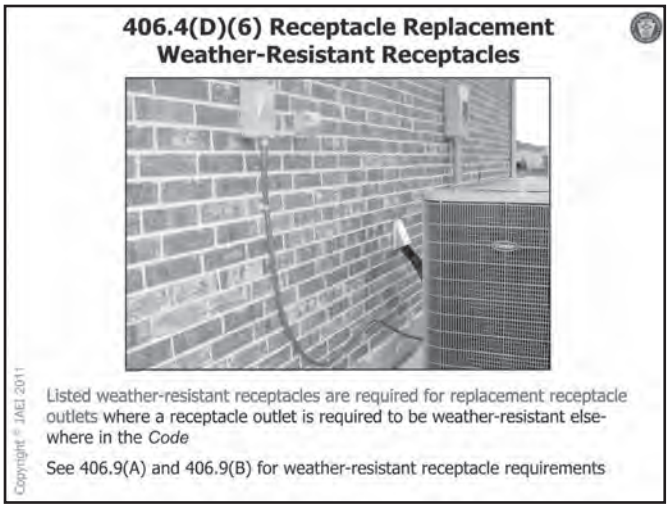
Section 406.4(D)(6) Weather-Resistant Receptacles

(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 the code.

T&B Product:
General Information

Analysis of Change:

Section 406.4(D)(6) is new for the 2011 NEC and states wherever the NEC requires weather-resistant receptacles, all receptacles which are replaced shall be replaced with weather-resistant receptacles.



Receptacles, Cord Connectors and Attachment Plugs (Caps)

Proposal Number: 18-41
Comment Number(s): NA

Section 406.6 Receptacle Faceplates (Cover Plates)

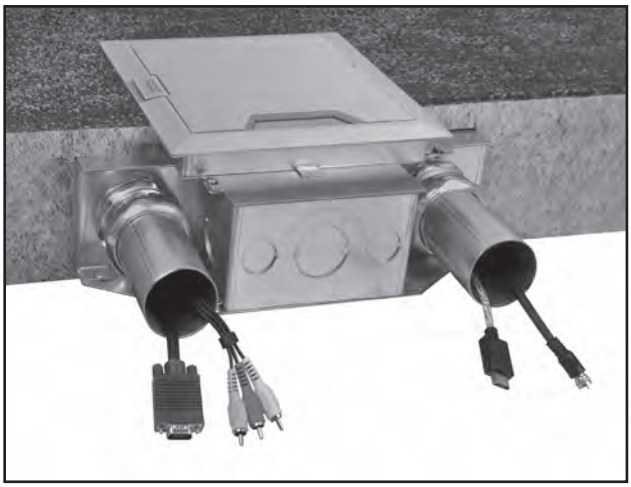
T&B Product:
Floor Boxes

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.

Analysis of Change:

The second sentence of Section 406.6 is new for the 2011 NEC and requires receptacle faceplates for receptacles that are recessed inside a floor box.



Proposal Number: 18-54
Comment Number(s): 18-29

Section 406.9(B)(1) 15 and 20 Ampere Receptacles in a Wet Location

T&B Product:
Extra-Duty Outlet Box Hoods

(1) 15 and 20 Ampere Receptacles in a Wet Location. 15 and 20 ampere, 125 and 250 volt receptacles installed in a wet location shall have an enclosure that is weatherproof whether or not the attachment plug is inserted. For other than one- or two-family dwellings, an outlet box hood installed for this purpose shall be listed, and where installed on an enclosure, supported from grade as described in 314.23(B) or as described in 314.23(F) shall be identified as "extra-duty". All 15 and 20 ampere, 125 and 250 volt nonlocking-type receptacles shall be listed weather-resistant type.

Informational Note No. 1: Requirements for extra-duty outlet box hoods are found in ANSI/ UL 514D-2000, Cover Plates for Flush-Mounted Wiring Devices.

Analysis of Change:

Section 406.9(B)(1) was revised to require in-use weatherproof covers used in other than one- or two-family dwellings to be listed as "Extra-Duty". UL514D, *Cover Plates for Flush-Mounted Wiring Devices*, has been revised to add a higher level of physical evaluation to list in-use weatherproof covers as "Extra-Duty". Extra-Duty covers are required in commercial applications and where boxes with receptacles are supported by Rigid or Intermediate Metal conduit.

Receptacles, Cord Connectors and Attachment Plugs (Caps)

Proposal Number: 18-71 and 18-82
Comment Number(s): 18-33

Section 406.12 Tamper-Resistant Receptacles for Dwelling Units

T&B Product:
General Information

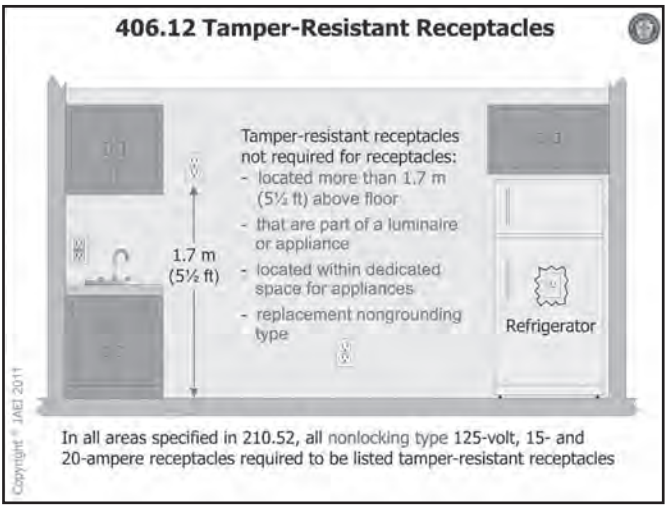
406.12 Tamper-Resistant Receptacles for Dwelling Units. In all areas specified in 210.52, all nonlocking-type 125 volt, 15 and 20 ampere receptacles shall be listed tamper-resistant receptacles.

Exception: Receptacles in the following locations shall not be required to be tamper-resistant:

(1) Receptacles located more than 1.7m (5½ ft.) above the floor
(2) Receptacles that are part of a luminaire or appliance
(3) A single receptacle or a duplex receptacle for two appliances located within dedicated space for each appliance that, in normal use, is not easily moved from one place to another and that is cord-and-plug connected in accordance with 400.7(A)(6), (A)(7), or (A)(8)
(4) Nongrounding receptacles used for replacements as permitted in 406.4(D)(2)(a)

Analysis of Change:

The tamper-resistant receptacle requirement for dwellings was revised to permit standard receptacles to be used when installed 5½ feet above the floor, as part of a luminaire or appliance, behind large appliances and where nongrounding type receptacles are used as replacements for other nongrounding type receptacles.



Proposal Number: 18-87
Comment Number(s): 18-35

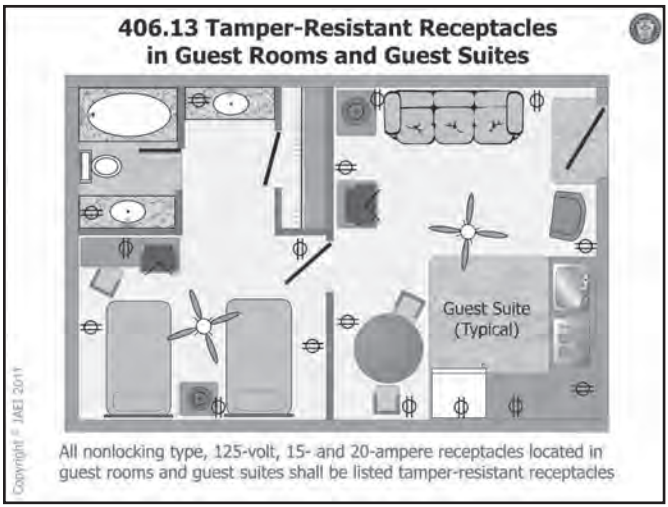
Section 406.13 Tamper-Resistant Receptacles in Guest Rooms and Guest Suites

All nonlocking-type, 125 volt, 15 and 20 ampere receptacles located in guest rooms and guest suites shall be listed tamper-resistant receptacles.

T&B Product:
General Information

Analysis of Change:

This new section requires the receptacles in Guest Rooms and Guest Suites to be tamper-resistant.



Receptacles, Cord Connectors and Attachment Plugs (Caps)

Proposal Number: 18-90
Comment Number(s): 18-36

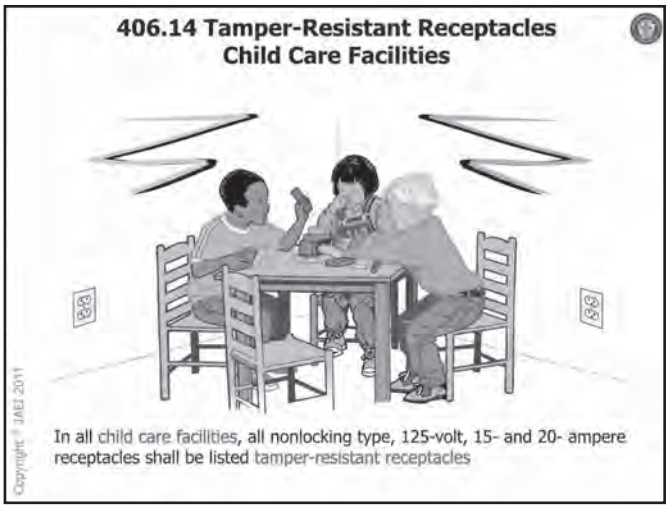
Section 406.14 Tamper-Resistant Receptacles Child Care Facilities

T&B Product:
General Information

In all child care facilities, all nonlocking-type, 125 volt, 15 and 20 ampere receptacles shall be listed tamper-resistant receptacles.

Analysis of Change:

This new section requires the receptacles in Child Care Facilities to be tamper-resistant.



Proposal Number: 18-109
Comment Number(s): 18-41

Section 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 the provisions of 314.16.

T&B Product:
Ceiling Boxes

Analysis of Change:

This revision adds the reference to 314.16 where the volume of the luminaire canopy, when marked, shall be included in the box volume calculations.

Article 410

Luminaires, Lampholders and Lamps

Proposal Number: 18-174a
Comment Number(s): NA

Section 410.130(E)(3) Exit Luminaires

T&B Product:
Emergency Lighting

(3) Exit Luminaires. A ballast in a fluorescent exit luminaire shall not have thermal protection.

Analysis of Change:

This revision changed the title for an “Exit Fixtures” to “Exit Luminaires”. This proposal also revised the Informational Note in 410.21 to replace “fixtures” with “luminaires”.

Proposal Number: 18-175
Comment Number(s): NA

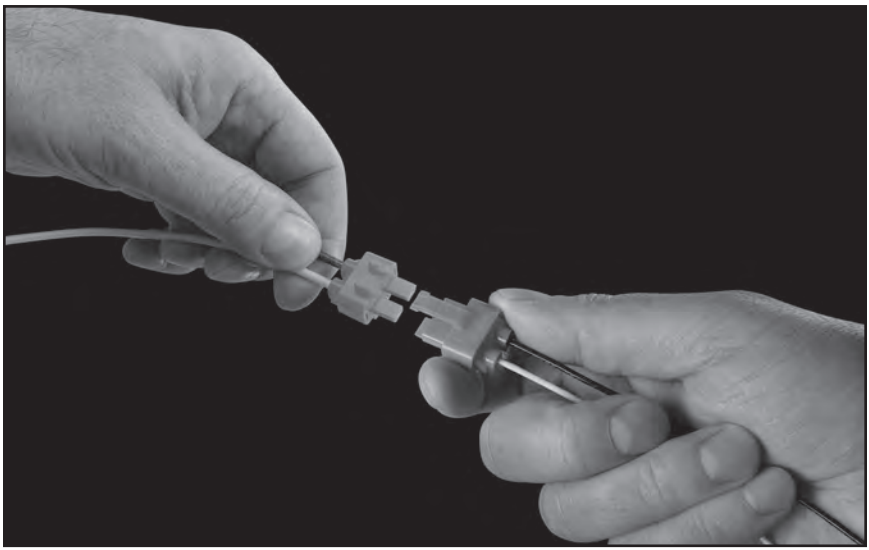
Section 410.130(G)(1) General/Disconnecting Means

T&B Product:
Luminaire Disconnect

(1) General. In indoor locations other than dwellings and associated accessory structures, fluorescent luminaires that utilize double-ended lamps and contain ballast(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 is replaced, a disconnecting means shall be installed. The line side terminals of the disconnecting means shall be guarded.

Analysis of Change:

A luminaire disconnect will be required to be installed whenever replacing a ballast in an existing luminaire.



Article 501

Class I Locations

Proposal Number: 14-66
Comment Number(s): 14-43

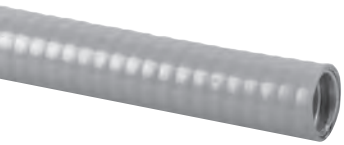
501.30(B) Grounding and Bonding, Class I, Divisions 1 and 2

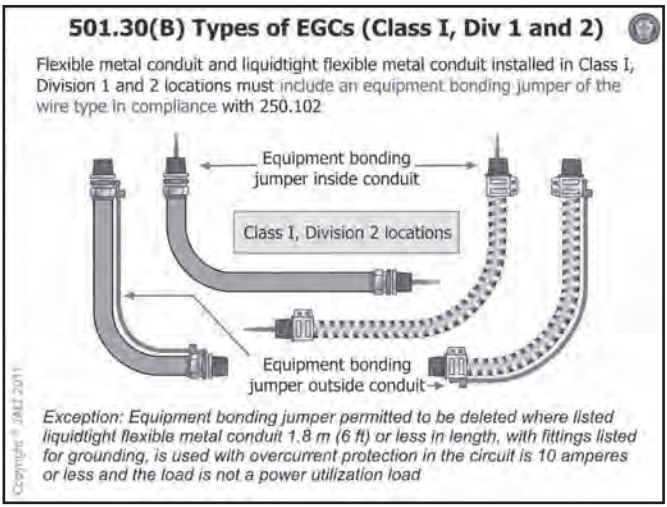
T&B Product:
LFMC Fittings

(B) Types of Equipment Grounding Conductors. Flexible metal conduit and liquidtight flexible metal conduit shall include an equipment bonding jumper of the wire type in compliance with 250.102.

Analysis of Change:

This change specifies a wire type equipment bonding jumper be installed with flexible metal conduit and liquidtight flexible metal conduit in Class 1 Division 2 locations.





Proposal Number: 14-88
Comment Number(s): 14-53a

501.140(B)(4) Flexible Cords. Class I, Division 1 and 2/Installations

T&B Product:
Fittings

(4) In Division 1 locations or in Division 2 locations where the boxes, fittings or enclosures are required to be explosion-proof, the cord shall be terminated with a cord connector or attachment plug listed for the location or a cord connector installed with a seal listed for the location. In Division 2 locations where explosion-proof equipment is not required, the cord shall be terminated with a listed cord connector or listed attachment plug.

Analysis of Change:

This new section clarifies the listing requirements for cord connectors and attachment plugs. Where the enclosures are required to be explosion-proof the connectors and attachment plugs must be listed for the location. In Division 2 locations, an “unclassified” location listing is acceptable.

Article 502

Class II Locations

Proposal Number: 14-93
Comment Number(s): NA

502.6 Zone Equipment

T&B Product:
DTS Dust Application Products

Equipment listed and marked in accordance with 506.9(C)(2) for Zone 20 locations shall be permitted in Class II, Division 1 locations for the same dust atmosphere, and with a suitable temperature class.

Equipment listed and marked in accordance with 506.9(C)(2) for Zone 20, 21 or 22 locations shall be permitted in Class II, Division 2 locations for the same dust atmosphere and with a suitable temperature class.

Analysis of Change:

This new section allows zone rated equipment to be installed into Class II applications. Zone 20 into Division 1 and Zone 20, 21 and 22 into Division 2 locations.

Proposal Number: 14-95
Comment Number(s): 14-55a

502.10(A)(2)(5) Wiring Methods/Class II, Division 1/Flexible Connections

(5) Flexible cord listed for extra-hard usage and terminated with listed dust-tight fittings. Where flexible cords are used, they shall comply with 502.140.

Informational Note: See 502.30(B) for grounding requirements where flexible conduit is used.

T&B Product:
Fittings

Analysis of Change:

This change adds a requirement for the flexible cord fitting to be listed as dust-tight.

Proposal Number: 14-123
Comment Number(s): 14-63b

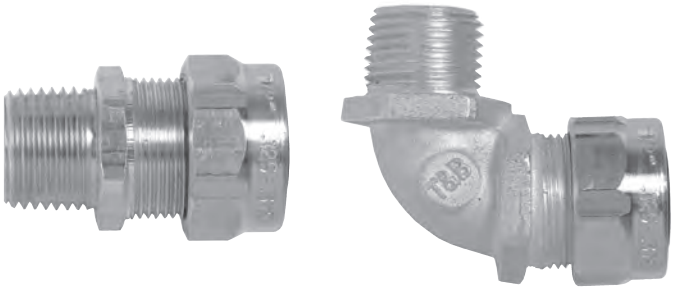
502.140(4) Flexible Cords — Class II, Divisions 1 and 2

T&B Product:
Fittings

(4) In Division 1 locations, the cord shall be terminated with a cord connector listed for the location or a listed cord connector installed with a seal listed for the location. In Division 2 locations, the cord shall be terminated with a listed dust-tight cord connector.

Analysis of Change:

This change clarifies the cord connectors required for Division 1 and Division 2 locations. It adds a dust-tight listing requirement for cord connectors installed in Division 2 locations.



Proposal Number: 14-130
Comment Number(s): 14-68

503.6 Zone Equipment

T&B Product:
DTS Equipment

Equipment listed and marked in accordance with 506.9(C)(2) for Zone 20 locations and with a temperature class of not greater than T120 °C (for equipment that may be overloaded) or not greater than T165 °C (for equipment not subject to overloading) shall be permitted in Class III, Division 1 locations.

Equipment listed and marked in accordance with 506.9(C)(2) for Zone 20, 21 or 22 locations and with a temperature class of not greater than T120 °C (for equipment that may be overloaded) or not greater than T165 °C (for equipment not subject to overloading) shall be permitted in Class III, Division 2 locations.

Analysis of Change:

This change allows the installation of zone rated equipment into Class III locations. Zone 20 rated equipment may be installed into Division 1 locations and Zone 20, 21 and 22 rated equipment may be installed into Division 2 locations. There are temperature rating restrictions for the equipment.

Proposal Number: 14-131
Comment Number(s): 14-69a

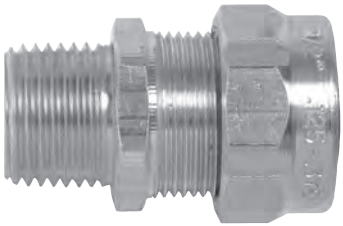
503.10(A)(3)(4) Wiring Methods/Class III, Division 1/Flexible Connections

T&B Product:
Fittings

(4) Interlocked armor Type MC cable having an overall jacket of suitable polymeric material and installed with listed dust-tight termination fittings.

Analysis of Change:

This change adds a listed dust-tight termination fitting for interlocked armor type MC cable in Class III Division 1 locations.



Proposal Number: 14-146
Comment Number(s): 14-80a

503.140(4) Flexible Cords – Class III, Divisions 1 and 2

(4) Be terminated with a listed dust-tight cord connector.

T&B Product:
Fittings

Analysis of Change:

Flexible cords installed in Class III Divisions 1 and 2 locations must now be installed with a listed dust-tight cord connector. This is a more restrictive requirement as previous requirements allowed any suitable means.

Proposal Number: 14-175
Comment Number(s): NA

505.7(E) Special Precaution

T&B Product:
Hazardous Locations Equipment

(E) Simultaneous Presence of Flammable Gases and Combustible Dusts or Fibers/Flyings. Where flammable gases, combustible dusts or fibers/flyings are or may be present at the same time, the simultaneous presence shall be considered during the selection and installation of the electrical equipment and the wiring methods, including the determination of the safe operating temperature of the electrical equipment.

Analysis of Change:

The new section clarifies the definition of simultaneous presence.

Proposal Number: 14-202
Comment Number(s): NA

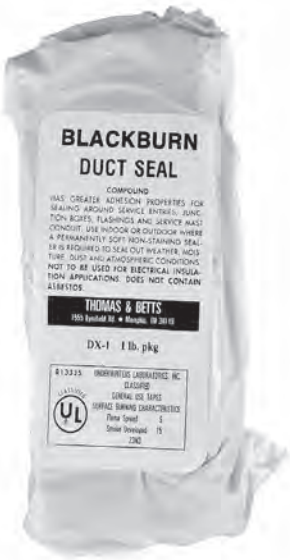
505.16(C)(1)(b) Sealing and Drainage/Zone 2/Conduit Seals

(b) Conduits shall be sealed to minimize the amount of gas or vapor within the Zone 2 portion of the conduit from being communicated to the conduit beyond the seal. Such seals shall not be required to be flame-proof or explosion-proof but shall be identified for the purpose of minimizing passage of gases under normal operating conditions and shall be accessible.

T&B Product:
Duct Seal

Analysis of Change:

This revision is similar to existing requirements in Article 501 where a seal is required between Division 2 and non-classified areas. Since the seal is located in a Zone 2 area, an explosion-proof type seal is not needed.



Article 505

Zone 0, 1 and 2 Locations

Proposal Number: 14-206
Comment Number(s): NA

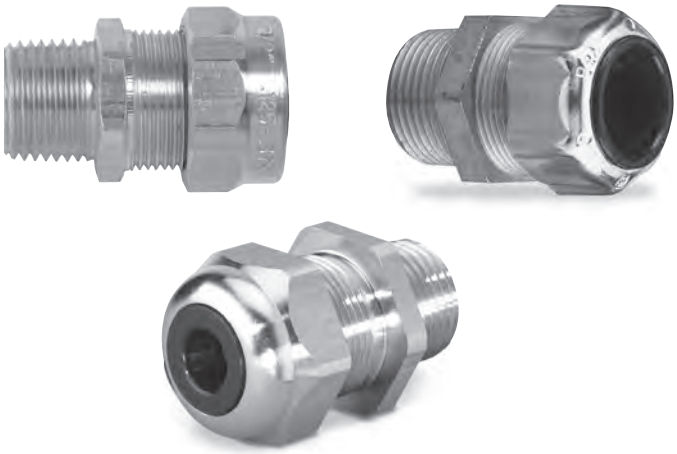
505.17(5) Flexible Cords, Class 1, Zones 1 and 2

T&B Product:
Sealing Type Cord Connectors

(5) Be terminated with a listed cord connector that maintains the type of protection where the flexible cord enters boxes, fittings or enclosures that are required to be explosion-proof or flameproof.

Analysis of Change:

The phrase “maintains the type of protection” replaces the phrase “provided with listed seals” in this requirement. This change is not as restrictive as previous wording. Cable seals are still required in 505.16(C)(2). There is a similar change to 506.17(5).



Proposal Number: 14-239
Comment Number(s): NA

506.20(A) Equipment Installation

(A) Zone 20. In Zone 20 locations, only equipment listed and marked as suitable for the location shall be permitted.

Exception: Equipment listed for use in Class II, Division 1 locations with a suitable temperature class shall be permitted.

T&B Product:
All Hazardous Locations Products

Analysis of Change:

The exception was revised to allow all listed Class II, Division 1 equipment with a suitable temperature class to be installed into Zone 20 installations. The previous wording required the Class II equipment to be intrinsically safe.

Proposal Number: 15-3a
Comment Number(s): 15-1

517.2 Definitions

T&B Product:
Emergency Lighting

Battery-Powered Lighting Units. Individual unit equipment for back-up illumination consisting of the following:

(1) Rechargeable battery

(2) Battery-charging means

(3) Provisions for one or more lamps mounted on the equipment, or with terminals for remote lamps, or both

(4) Relaying device arranged to energize the lamps automatically upon failure of the supply to the unit equipment

Analysis of Change:

This is a new definition for battery-powered lighting units.

Proposal Number: 15-29
Comment Number(s): 15-39, -41, -42 and -44

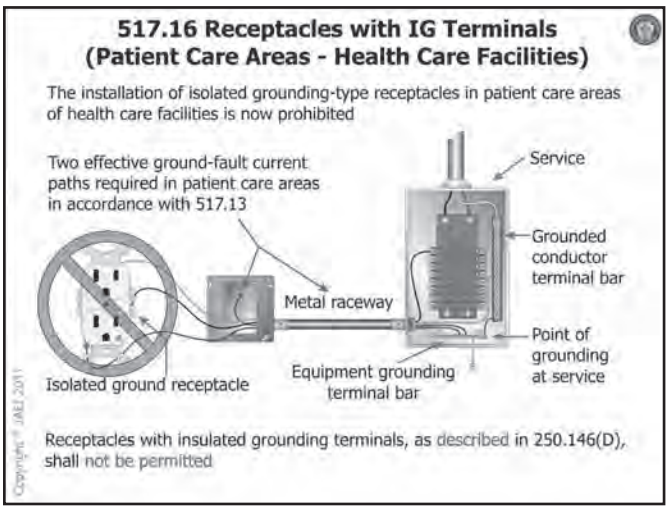
517.16 Receptacles with Insulated Grounding Terminals

Receptacles with insulated grounding terminals, as described in 250.146(D), shall not be permitted.

T&B Product:
Steel Boxes

Analysis of Change:

Isolated grounding receptacles are no longer allowed in health care facilities. The Fine Print note from the 2008 NEC informed users regarding the caution needed when using these receptacles. This was deleted and the receptacles are now no longer allowed.



Article 547

Agricultural Building

Proposal Number: 19-24
Comment Number(s): NA

547.5(G) Wiring Methods

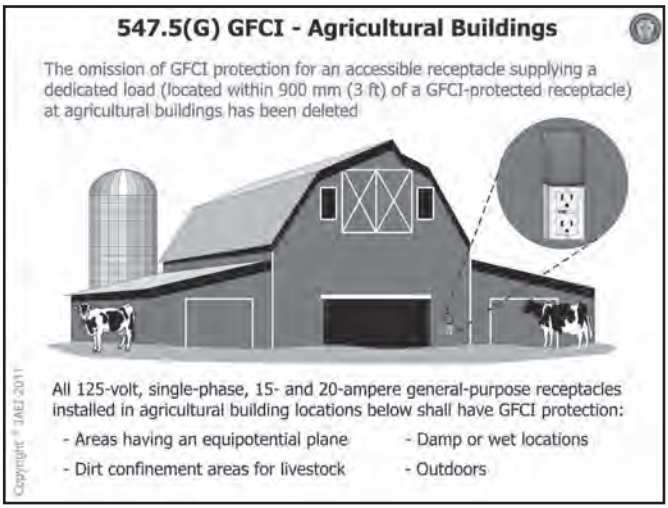
T&B Product:
Outlet Boxes, Covers

(G) Receptacles. The following exemption has been deleted.

Exception: GFCI protection shall not be required for an accessible receptacle supplying a dedicated load where a GFCI protected receptacle is located within 900mm (3 ft.) of the non-GFCI-protected receptacle.

Analysis of Change:

GFCI protection must be provided to all receptacles installed in 1) areas having an equipotential plane, 2) outdoors, 3) damp and wet locations, and 4) dirt confinement areas for livestock.



Proposal Number: 19-71
Comment Number(s): 19-33

550.13(B) Receptacle Outlets

T&B Product:
Outlet Boxes, Covers

(B) Ground-Fault Circuit Interrupters (GFCI). All 125 volt, single-phase, 15 and 20 ampere receptacle outlets installed outdoors, in compartments accessible from outside the unit or in bathrooms, including receptacles in luminaries, shall have GFCI protection. GFCI protection shall be provided for receptacle outlets serving countertops in kitchens, and receptacle outlets located within 1.8m (6 ft.) of a wet bar sink. The exceptions in 210.8(A) shall be permitted.

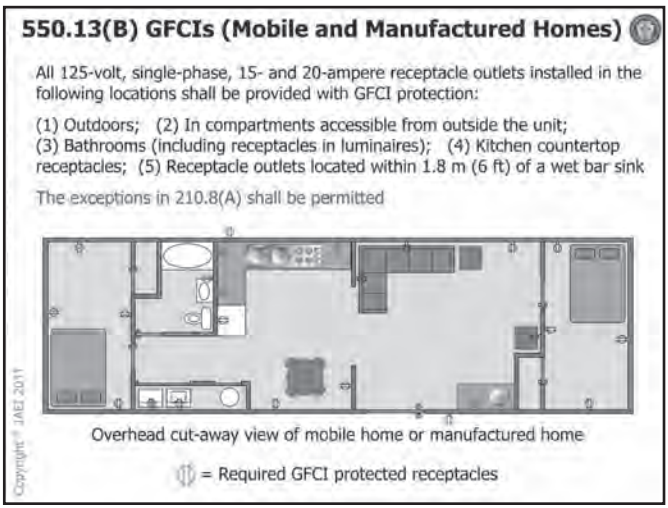
Feeders supplying branch circuits shall be permitted to be protected by a ground-fault circuit-interrupter in lieu of the provision for such interrupters specified herein.

Analysis of Change:

The following exception was removed from the code regarding the requirement for providing GFCI protection at receptacle outlets.

Exception: Receptacles installed for appliances in dedicated spaces, such as for dishwashers, disposals, refrigerators, freezers and laundry equipment.

GFCI Exceptions continue to be removed from the NEC to promote safety technology. The issue of nuisance tripping has been reduced, allowing technology usage to be expanded. The exceptions are now consistent with those in article 210.8(A) applied to dwellings.



Article 550

Mobile Homes, Manufactured Homes and Mobile Home Parks

Proposal Number: 19-81a
Comment Number(s): 19-37

550.15(H)(1)(2) Wiring Methods and Materials

T&B Product:
PVC Fittings, Elbows

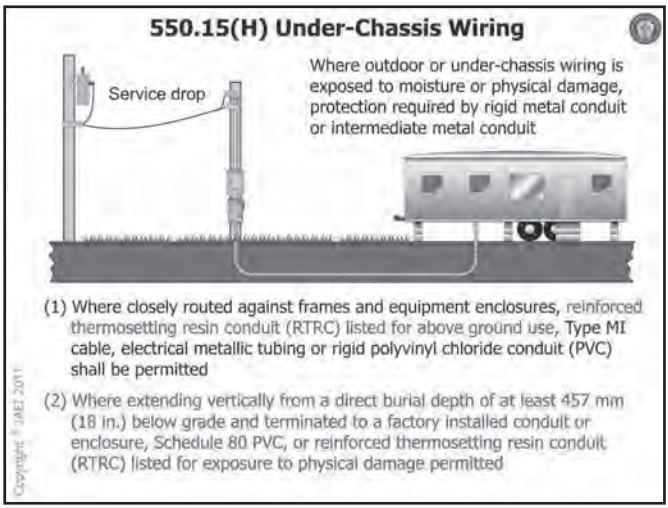
(H) Under-Chassis Wiring (Exposed to Weather). Where outdoor or under-chassis line-voltage (120 volts nominal or higher) wiring is exposed to moisture or physical damage, it shall be protected by rigid metal conduit or intermediate metal conduit except as provided in (1) or (2). The conductors shall be suitable for wet locations.

(1) Where closely routed against frames and equipment enclosures, reinforced thermosetting resin conduit (RTRC) listed for above ground use, Type MI cable, electrical metallic tubing or rigid polyvinyl chloride conduit (PVC) shall be permitted

(2) Where extending vertically from a direct-burial depth of at least 457mm (18 in.) below grade and terminated to a factory-installed conduit or enclosure, Schedule 80 PVC, or RTRC listed for exposure to physical damage

Analysis of Change:

Reinforced thermosetting resin conduit, Type RTRC, was added for under-chassis wiring and Schedule 80 PVC conduit, or RTRC conduit listed for exposure to physical damage where extending vertically from a direct burial depth of at least 457mm (18 in.) below grade and terminated to a factory installed conduit or enclosure.



Proposal Number: 19-97
Comment Number(s): NA

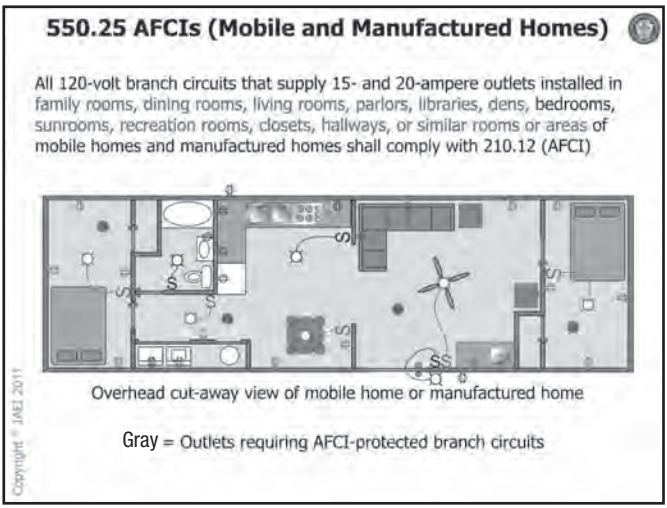
550.25(B) Arc-Fault Circuit-Interrupter Protection

T&B Product:
General Information

(B) Mobile Homes and Manufactured Homes. All 120 volt branch circuits that supply 15 and 20 ampere outlets installed in family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways or similar rooms or areas of mobile homes and manufactured homes shall comply with 210.12.

Analysis of Change:

This change expands the use of AFCI technology used in mobile homes and manufactured homes to be consistent with dwellings in article 210.



Proposal Number: 19-153
Comment Number(s): NA

551.47(P)(2)(e) Wiring Methods/Method of Connecting Expandable Units/Direct Wired

T&B Product:
PVC Fittings, Elbows

(e) Where the flexible cord passes through the floor to an exposed area inside of the recreational vehicle, it shall be protected by means of conduit and bushings or equivalent.

Where subject to physical damage, the flexible cord shall be protected with RMC, IMC, Schedule 80 PVC, reinforced thermosetting resin conduit (RTRC) listed for exposure to physical damage or other approved means and shall extend at least 150mm (6 in.) above the floor. A means shall be provided to secure the flexible cord where it enters the recreational vehicle.

Analysis of Change:

This change allows reinforced thermosetting resin conduit (RTRC) listed for exposure to physical damage to be used as a wiring method in connecting expandable units as well as underground service. Schedule 80 PVC was included in the existing code list and was used as substantiation to add the type RTRC conduit.

Proposal Number: 3-122
Comment Number(s): 3-56

590.4(D)(2) General Receptacles

T&B Product: New Product Rating — Extra-Duty Outlet Box Hoods

(2) Receptacles in Wet Locations. All 15 and 20 ampere, 125 and 250 volt receptacles installed in a wet location shall comply with Section 406.8(B)(1).

Analysis of Change:

Section 590.4(D)(2) was revised to require in-use weatherproof covers to be "Extra-Duty" type when used in temporary installations. UL514D, *Cover Plates for Flush-Mounted Wiring Devices*, has been revised to add a higher level of physical evaluation to list in-use weatherproof covers as "Extra-Duty".

Proposal Number: 3-141
Comment Number(s): 3-81

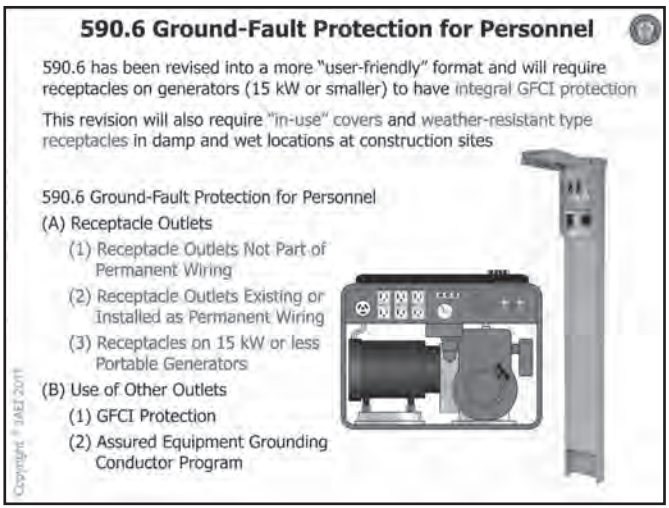
590.6(A)(3) Ground-Fault Protection for Personnel/ Receptacle Outlets

T&B Product: Weatherproof While-In-Use Covers, Extra-Duty Outlet Box Hoods

(3) Receptacles on 15 kW or less Portable Generators. All 125 volt and 125/250 volt, single-phase, 15, 20, and 30 ampere receptacle outlets that are a part of a 15 kW or smaller portable generator shall have listed ground-fault circuit interrupter protection for personnel. All 15 and 20 ampere, 125 and 250 volt receptacles, including those that are part of a portable generator, used in a damp or wet location shall comply with Section 406.9(A) and (B). Listed cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use shall be permitted for use with 15 kW or less portable generators manufactured or remanufactured prior to January 1, 2011.

Analysis of Change:

This change requires GFCI protection to be installed on portable generators. These generators are energized in wet locations and personnel should be protected when portable generators are used in these conditions.



Proposal Number: 12-49
Comment Number(s): NA

Section 625.2 Definitions

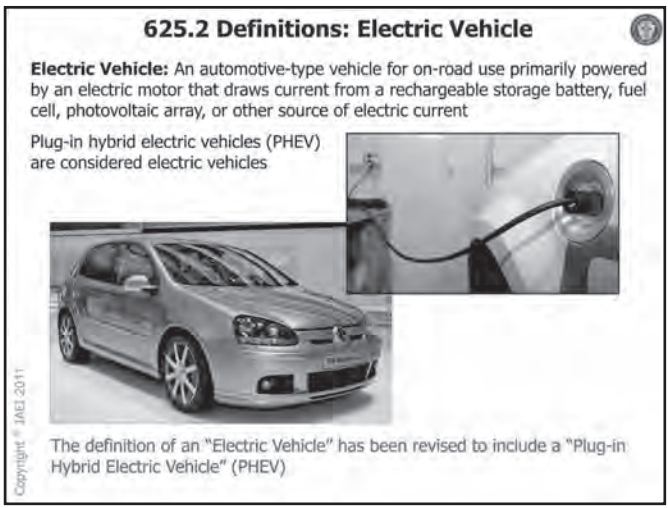
Electric Vehicle Supply Equipment. The conductors, including the ungrounded, grounded and equipment grounding conductors and the electric vehicle connectors, attachment plugs and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle.

T&B Product:
General Information

Informational Note: For further information, see 625.26 for interactive systems.

Analysis of Change:

The revision to the definition of an Electric Vehicle Supply Equipment addresses the bi-direction power feed as permitted in Section 625.26.



Article 625

Electrical Vehicle Charging Systems

Proposal Number: 12-42a
Comment Number(s): 12-26

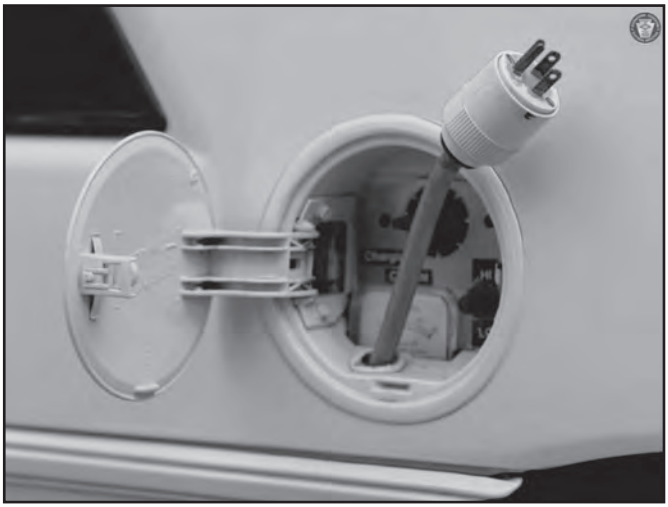
Section 625.2 Definitions

T&B Product:
General Information

Plug-in Hybrid Electric Vehicle (PHEV). A type of electrical vehicle intended for on-road use with the ability to store and use off-vehicle electrical energy in the rechargeable energy storage system, and having a second source of motive power.

Analysis of Change:

Section 625.2 added a new definition for “Plug-in Hybrid Electric Vehicle (PHEV)”.



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Proposal Number: 17-161
Comment Number(s): NA

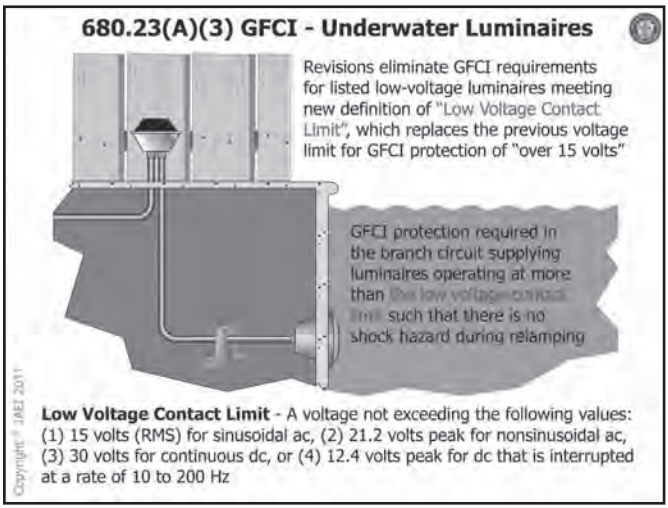
Section 680.24(D) Junction Boxes and Electrical Enclosures for Transformers or Ground Fault-Circuit Interrupters; Grounding Terminals

(D) Grounding Terminals. Junction boxes, transformer and power supply enclosures and ground-fault circuit interrupter enclosures connected to a conduit that extends directly to a forming shell or mounting bracket of a no-niche luminaire shall be provided with a number of grounding terminals that shall be no fewer than one more than the number of conduit entries.

T&B Product:
Swimming Pool Junction Boxes

Analysis of Change:

The revision to 680.24(D) clarifies the number of grounding terminals for DC rated LED luminaires for DC power supplies.



Proposal Number: 17-175
Comment Number(s): 17-81 and 17-83

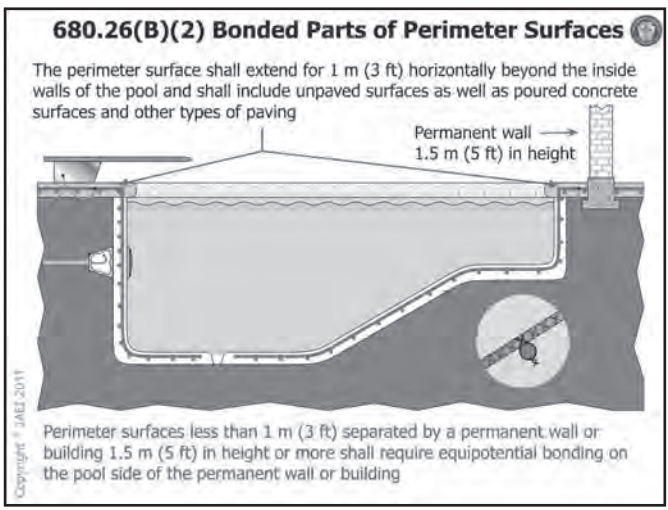
Section 680.26(B)(2) Equipotential Bonding; Bonded Parts

T&B Product:
Grounding

(2) Perimeter Surfaces. The perimeter surface shall extend for 1m (3 ft.) horizontally beyond the inside walls of the pool and shall include unpaved surfaces as well as poured concrete surfaces and other types of paving. Perimeter surfaces less than 1m (3 ft.) separated by a permanent wall or building 1.5m (5 ft.) in height or more shall require equipotential bonding on the pool side of the permanent wall or building. Bonding to perimeter surfaces shall be provided as specified in 680.26(B)(2)(a) or (2)(b) and shall be attached to the pool reinforcing steel or copper conductor grid at a minimum of four (4) points uniformly spaced around the perimeter of the pool. For non-conductive pool shells, bonding at four points shall not be required.

Analysis of Change:

The revision to 680.26(B)(2) clarifies that additional equipotential bonding is not required when the pool perimeter surface is separated by a wall or building that is less than 1m (3 ft.) from the inside of the pool wall.



Proposal Number: 17-201
Comment Number(s): 17-99

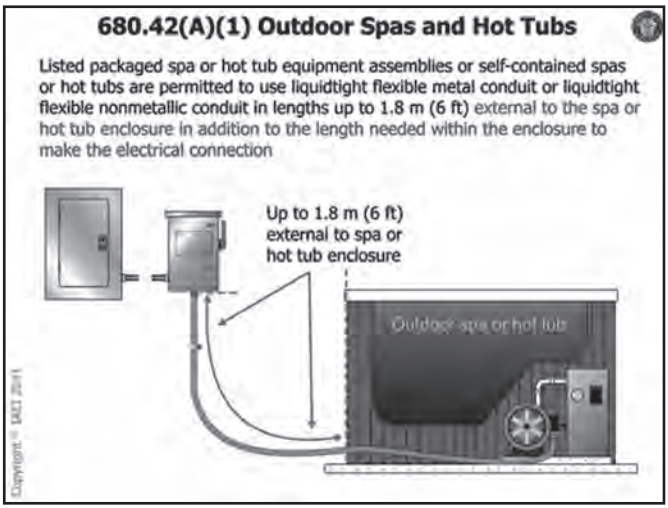
Section 680.42(A)(1) Outdoor Installations/Flexible Connections

T&B Product: Liquidtight Flexible Metal Conduit (LFMC) and Liquidtight Flexible Non-Metallic Conduit (LFNC) and Fittings

(1) Flexible Conduit. Liquidtight flexible metal conduit or liquidtight flexible non-metallic conduit shall be permitted in lengths of not more than 1.8m (6ft) external to the spa or hot tub enclosure in addition to the length needed within the enclosure to make electrical connection.

Analysis of Change:

680.42(A)(1) was revised to clarify that Liquidtight Flexible Metal Conduit (LFMC) and Liquidtight Flexible Non-Metallic Conduit (LFNC) can be used in lengths longer then 1.8m (6 ft.) when the additional length is within the enclosure of the spa or hot tub.



Proposal Number: 4-184
Comment Number(s): 4-64, 4-65 and 4-66

Section 690.4(B) Installations

T&B Product:
Ty-Rap® and EZCODE®

(B) Identification and Grouping. Photovoltaic source circuits and PV output circuits shall not be contained in the same raceway, cable tray, cable, outlet box, junction box or similar fitting as conductors, feeders or branch circuits of other non-PV systems, unless the conductors of the different systems are separated by a partition. Photovoltaic system conductors shall be identified and grouped as required by 690.4(B)(1) through (4). The means of identification shall be permitted by separate color coding, marking tape, tagging or other approved means.

(1) Photovoltaic Source Circuits. Photovoltaic source circuits shall be identified at all points of termination, connection and splices.

(2) Photovoltaic Output and Inverter Circuits. The conductors of PV output circuits and inverter input and output circuits shall be identified at all points of termination, connection and splices

(3) Conductors of Multiple Systems. Where the conductors of more than one PV system occupy the same junction box, raceway or equipment, the conductors of each system shall be identified at all termination, connection and splice points.

Exception: Where the identification of the conductors is evident by spacing or arrangement, further identification is not required.

(4) Grouping. Where the conductors of more than one PV system occupy the same junction box or raceway with removable cover(s), the AC and DC conductors of each system shall be grouped separately by wire ties or similar means at least once, and then shall be grouped at intervals not to exceed 1.8m (6 ft.).

Exception: The requirement for grouping shall not apply if the circuit enters from a cable or raceway unique to the circuit that makes the grouping obvious.

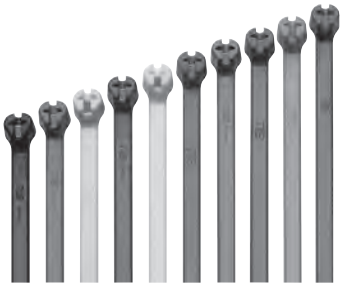
Continues on page 117

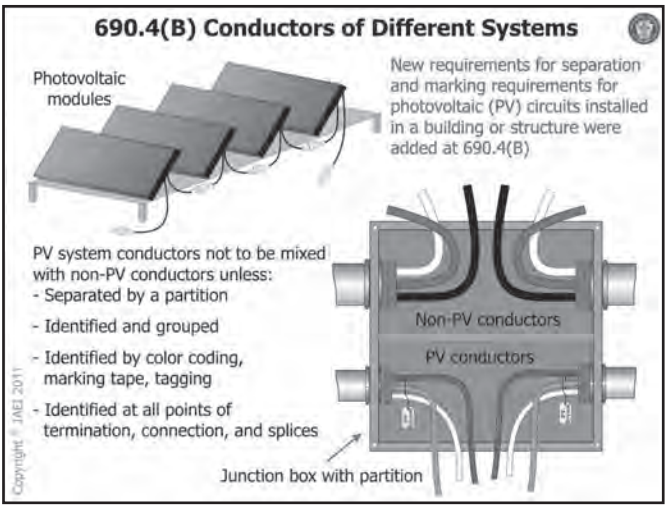
Proposal Number: 4-184
Comment Number(s): 4-64, 4-65 and 4-66

Section 690.4(B) (continued)

Analysis of Change:

Section 690.4(B) was rewritten to minimize the potentially hazardous contact with either energized photovoltaic (PV) DC source or output conductors that are energized whenever the PV array is illuminated. The additional grouping requirement for the conductors will help service personnel distinguish the conductors of different systems. This revision will extend the identification means to the conductors of the PV systems when DC and AC conductors are in the same raceway.





Article 690

Solar Photovoltaic Systems

Proposal Number: 4-187
Comment Number(s): 4-70

Section 690.4(F) Installation

(F) Circuit Routing. Photovoltaic source and PV output conductors, in and out of conduit and inside of a building or structure, shall be routed along building structural members such as beams, rafters, trusses and columns where the location of those structural members can be determined by observation. Where circuits are imbedded in built-up, laminate or membrane roofing materials in roof areas not covered by PV modules and associated equipment, the location of circuits shall be clearly marked.

T&B Product:
Cable Fittings and Hardware

Analysis of Change:

690.4(F) is a new section for the 2011 NEC and addresses concerns of firefighters about the safety of ventilating roofs where PV circuits are present. By routing these circuits along building structural elements, there is a lower probability that they will be contacted by the firefighters when ventilating the roof during a fire since PC circuits can still be energized. Several PV module systems are integrated into the roof and the circuits associated with these must be marked on the surface of the roof.

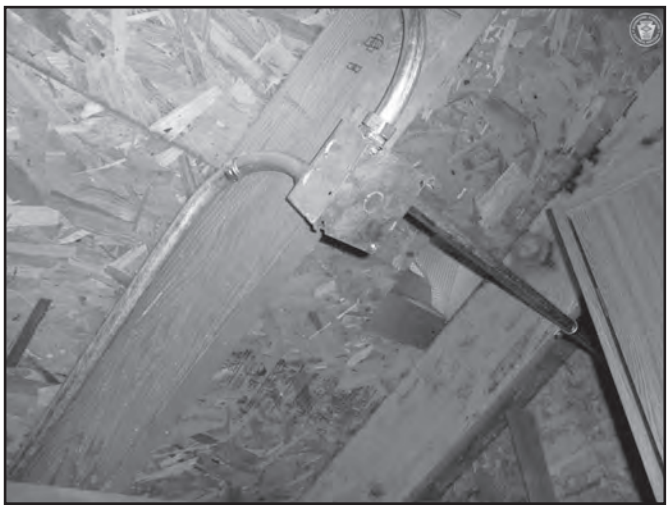


Photo courtesy of IAEI.

Proposal Number: 4-228 and 4-229
Comment Number(s): 4-96 and 4-97

Section 690.31(E) Methods Permitted; Direct-Current Photovoltaic Source and Output Circuits Inside a Building

T&B Product:
MC Cable Fittings and EZCODE®

(E) Direct-Current Photovoltaic Source and Output Circuits Inside a Building. Where DC photovoltaic source or output circuits from a building-integrated or other photovoltaic system are run inside a building or structure, they shall be contained in metal raceways, Type MC metal clad cable that complies with 250.118(10) or metal enclosures, from the point of penetration of the surface of the building or structure to the first readily accessible disconnecting means. The disconnecting means shall comply with 690.14(A), (B) and (D). The wiring methods shall comply with the additional requirements in (1) through (4).

(1) Beneath Roofs. Wiring methods shall not be installed within 25cm (10 in.) of the roof decking or sheathing except where directly below the roof surface covered by PV modules and associated equipment. Circuits shall be run perpendicular to the roof penetration point to supports a minimum of 25cm (10 in.) below the roof decking.

Informational Note: The 25cm (10 in.) requirement is to prevent accidental damage from saws used by firefighters for roof ventilation during a structure fire.

(2) Flexible Wiring Methods. Where flexible metal conduit (FMC) smaller than metric designator 21 (trade size ¾) or Type MC cable smaller than metric designator 25mm (1 in.) in diameter containing PV power circuit conductors is installed across ceilings or floor joists, the raceway or cable shall be protected by substantial guard strips that are at least as high as the raceway or cable. Where run exposed, other than within 1.8m (6 ft.) of their connection to equipment, these wiring methods shall closely follow the building surface or be protected from physical damage by an approved means:

(3) Marking and Labeling Required. The following wiring methods and enclosures that contain PV power source conductors shall be marked with the wording "Photovoltaic Power Source" by means of permanently affixed labels or other approved permanent marking:

(1) Exposed raceways, cable trays, and other wiring methods

(2) Covers or enclosures of pull boxes and junction boxes

(3) Conduit bodies in which any of the available conduit openings are unused

Continues on page 120.

Proposal Number: 4-228 and 4-229
Comment Number(s): 4-96 and 4-97

Section 690.31(E) (continued)

(4) Marking and Labeling Methods and Locations. The labels or markings shall be visible after installation. Photovoltaic power circuit labels shall appear on every section of the wiring system that is separated by enclosures, walls, partitions, ceilings or floors. Spacing between labels or markings, or between a label and a marking, shall not be more than 3m (10 ft.). Labels required by this section shall be suitable for the environment where they are installed.

Analysis of Change:

690.31(E) was revised to allow MC Cable to be an approved wiring method for photovoltaic systems when the wiring is inside the building. In addition, 690.31(E) was revised to state requirements for the routing of approved wiring methods to avoid the accidental contact of firefighters' equipment when ventilating a roof during a structural fire. The approved wiring methods and enclosures shall be visibly marked to state "Photovoltaic Power Source".

Proposal Number: 4-232
Comment Number(s): NA

Section 690.43 Equipment Grounding

690.43 Equipment Grounding. Equipment grounding conductors and devices shall comply with 690.43(A) through (F).

T&B Product:
Grounding and Hardware

(A) Equipment Grounding Required. Exposed non-current-carrying metal parts of PV module frames, electrical equipment and conductor enclosures shall be grounded in accordance with 250.134 or 250.136(A) regardless of voltage.

(B) Equipment Grounding Conductor Required. An equipment grounding conductor between a PV array and other equipment shall be required in accordance with 250.110.

(C) Structure as Equipment Grounding Conductor. Devices listed and identified for grounding the metallic frames of PV modules or other equipment shall be permitted to bond the exposed metal surfaces or other equipment to mounting structures. Metallic mounting structures, other than building steel, used for grounding purposes shall be identified as equipment-grounding conductors or shall have identified bonding jumpers or devices connected between the separate metallic sections and shall be bonded to the grounding system.

(D) Photovoltaic Mounting Systems and Devices. Devices and systems used for mounting PV modules that are also used to provide grounding of the module frames shall be identified for the purpose of grounding PV modules.

(E) Adjacent Modules. Devices identified and listed for bonding the metallic frames of PV modules shall be permitted to bond the exposed metallic frames of PV modules to the metallic frames of adjacent PV modules.

(F) All Conductors Together. Equipment grounding conductors for the PV array and structure (where installed) shall be contained within the same raceway or cable, or otherwise run with the PV array circuit conductors when those circuit conductors leave the vicinity of the PV array.

Analysis of Change:

Section 690.43 has been rearranged to allow the inclusion of two new requirements. Making a durable connection between an aluminum PV module frame and a grounding system is difficult because aluminum and copper are dissimilar metals and aluminum is frequently clear coated and/or oxidizes very rapidly when the surface is exposed to the atmosphere. UL has clarified UL Standard 1703 with respect to the grounding

Continues on page 122.

Proposal Number: 4-232
Comment Number(s): NA

Section 690.43 (continued)

Analysis of Change (continued)**:**

requirements of PV modules, and numerous devices are being developed to quickly and effectively ground the frames of PV modules. The Code must establish installation requirements that allow these grounding devices and methods to be used in a manner that effectively provides for a durable and safe grounded PV system.

690.43(C) was revised since devices are being developed that bond the module frame to an aluminum mounting rack. These racks are normally designed to mechanical standards and are not designed or certified as equipment grounding conductors. They may have mechanical joints that allow for thermal expansion but do not provide electrical continuity. Unlike building steel, which is generally acknowledged as a suitable grounded structure, these aluminum racks are as difficult to make electrical connections to as the PV modules themselves. Requiring them to be identified as equipment-grounding conductors will correct this problem. Additionally, these racks, after being identified as equipment-grounding conductors, must make a connection to an accepted grounding system. A copper conductor connected to ground would be acceptable.

690.43(D) was added since devices are being developed that will ground the module frame through the mechanical fasteners that hold the module to the supporting structure. The difficulty in making a good, durable electrical contact with aluminum and any other materials dictates that these devices must be identified for the use.

Proposal Number: 4-234
Comment Number(s): 4-99

Section 690.47(B) Grounding Electrode System

T&B Product: Exothermic Welding and Grounding Fittings

(B) Direct-Current Systems. If installing a DC system, a grounding electrode system shall be provided in accordance with 250.166 for grounded systems or 250.169 for ungrounded systems. The grounding electrode conductor shall be installed in accordance with 250.64.

A common DC grounding-electrode conductor shall be permitted to serve multiple inverters. The size of the common grounding electrode and the tap conductors shall be in accordance with 250.166. The tap conductors shall be connected to the common grounding-electrode conductor by exothermic welding or with connectors listed as grounding and bonding equipment in such a manner that the common grounding electrode conductor remains without a splice or joint.

Analysis of Change:

It is common for PV installations to use multiple small inverters. Since each inverter and the connected modules represent individual DC systems, a common DC grounding electrode can be used to provide the necessary connection to earth for all inverters. The size of this common grounding-electrode conductor is determined by the type of grounding electrode in accordance with 250.166. The new language adds the requirement to make the common conductor larger than the size of the grounding-electrode for a single inverter since the DC circuits for each inverter are separate and distinct.

Article 694

Small Wind Electrical Systems

Proposal Number: 4-263

Section 694 Small Wind Electrical Systems

694.1 Scope. The provisions of this article apply to small wind (turbine) electric systems that consisting of one or more wind electric generators with individual generators having a rated power up to and including 100 kW. These systems can include generators, alternators, inverters and controllers.

T&B Product:
T&B Product Line

Informational Note: Small wind electrical systems can be interactive with other electrical power production sources or might be stand-alone systems. Small wind electric systems can have AC or DC output, with or without electrical energy storage, such as batteries. See Informational Note Figures 694.1 and 694.2.

Analysis of Change:

Article 694 is a new article for the 2011 NEC for small wind (turbine) electrical systems that was generated by a working group from the small wind electrical industry comprising over 50 members, and is supported by the American Wind Energy Association.

Proposal Number: 13-182
Comment Number(s): NA

Section 700.12(F) General Requirements; Unit Equipment

(F) Unit Equipment. Individual unit equipment for emergency illumination shall consist of the following:

T&B Product:
Emergency Lighting

(1) A rechargeable battery

(2) A battery charging means

(3) Provisions for one or more lamps mounted on the equipment, or shall be permitted to have terminals for remote lamps, or both

(4) A relaying device arranged to energize the lamps automatically upon failure of the supply to the unit equipment

The batteries shall be of suitable rating and capacity to supply and maintain at not less than 87.5% of the nominal battery voltage for the total lamp load associated with the unit for a period of at least 1½ hours, or the unit equipment shall supply and maintain not less than 60% of the initial emergency illumination for a period of at least 1½ hours. Storage batteries, whether of the acid or alkali type, shall be designed and constructed to meet the requirements of emergency service.

Unit equipment shall be permanently fixed in place (i.e., not portable) and shall have all wiring to each unit installed in accordance with the requirements of any of the wiring methods in Chapter 3. Flexible cord-and-plug connection shall be permitted, provided that the cord does not exceed 900mm (3 ft.) in length. The branch circuit feeding the unit equipment shall be the same branch circuit as that serving the normal lighting in the area and connected ahead of any local switches. The branch circuit that feeds unit equipment shall be clearly identified at the distribution panel. Emergency luminaires that obtain power from a unit equipment and are not part of the unit equipment shall be wired to the unit equipment as required by 700.9 and by one of the wiring methods of Chapter 3.

Exception No. 1: In a separate and uninterrupted area supplied by a minimum of three normal lighting circuits, a separate branch circuit for unit equipment shall be permitted if it originates from the same panelboard as that of the normal lighting circuits and is provided with a lock-on feature.

Exception No. 2: Remote heads providing lighting for the exterior of an exit door shall be permitted to be supplied by the unit equipment serving the area immediately inside the exit door.

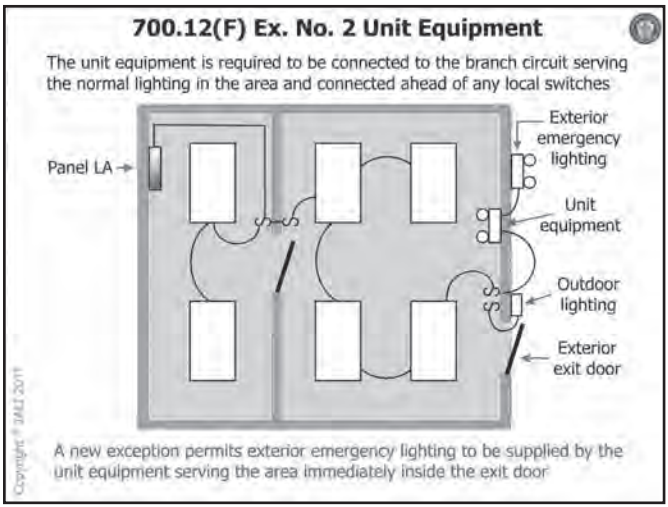
Continues on page 126.

Proposal Number: 13-182
Comment Number(s): NA

Section 700.12(F) (continued)

Analysis of Change:

A new Exception Number 2 was added to 700.12(F) to allow for remote heads providing light for the exterior of an exit door to be wired on the opposite side of the door.



Proposal Number: 13-270
Comment Number(s): 13-176

Section 708.10(A)(2) Feeder and Branch Circuit Wiring/Identification

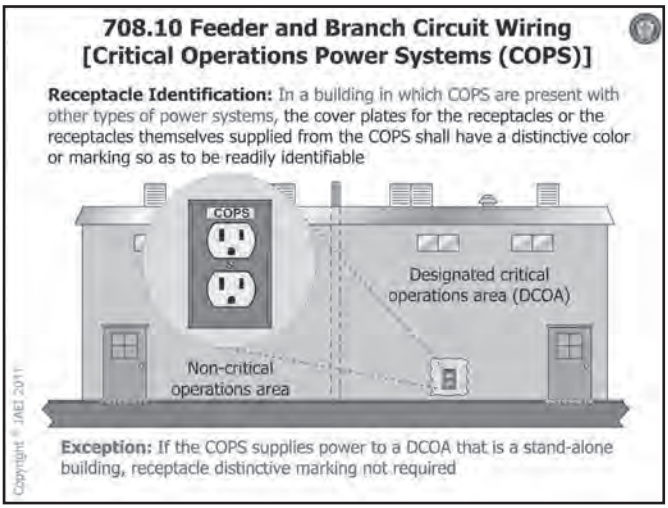
(2) Receptacle Identification. In a building in which COPS are present with other types of power systems described in other sections in this article, the cover plates for the receptacles or the receptacles themselves supplied from the COPS shall have a distinctive color or marking so as to be readily identifiable.

T&B Product:
EZCODE®

Exception: If the COPS supplies power to a DCOA that is a stand-alone building, receptacle cover plates or the receptacles themselves shall not be required to have distinctive marking.

Analysis of Change:

708.10(2) requires cover plates to be marked when the receptacle for critical operations power systems is present with other types of power systems.



Article 725

Class 1, Class 2 and Class 3 Remote-Control, Signaling and Power-Limited Circuits

Proposal Number: 3-158
Comment Number(s): NA

Section 725.3(H) Other Articles

T&B Product:
Duct Seal

(H) Raceways Exposed to Different Temperatures. Installations shall comply with 300.7(A).

Analysis of Change:

725.3(H) is a new section to the 2011 NEC which requires raceways to be sealed when subject to different temperatures and where condensation is known to be a problem, as in cold storage areas of buildings or where passing from interior to the exterior of the building. The raceway shall be filled with an approved material to prevent the circulation of warm air to the colder section of the raceway.

Proposal Number: 3-241
Comment Number(s): 3-163

Section 760.3(H) Other Articles

(H) Raceways or Sleeves Exposed to Different Temperatures. Installations shall comply with 300.7(A).

T&B Product:
Duct Seal

Analysis of Change:

760.3(H) is a new section to the 2011 NEC which requires raceways or sleeves, when used with fire alarm wiring, to be sealed when subject to different temperatures and where condensation is known to be a problem, as in cold storage areas of buildings or where passing from interior to the exterior of the building. The raceway or sleeve shall be filled with an approved material to prevent the circulation of warm air to the colder section of the raceway or sleeve.

Article 760

Fire Alarm Systems

Proposal Number: 3-244
Comment Number(s): 3-166

Section 760.3(J) Other Articles

T&B Product:
Raceways

(J) Number and Size of Cables and Conductors in Raceway. Installations shall comply with 300.17.

Analysis of Change:

760.3(J) is a new section to the 2011 NEC which requires raceways, when used with fire alarm wiring, to utilize the wirefill requirements for raceways pertaining to the number and size of the conductors being used.

Proposal Number: 16-23
Comment Number(s): 16-18

Section 770.24 Mechanical Execution of Work

Informational Note No. 2: See NFPA 90A-2009, Standard for Installation of Air-Conditioning and Ventilation Systems, for discrete combustible components installed in accordance with 300.22(B) and (C).

T&B Product:
Ty-Rap®

Analysis of Change:

New Informational Note No. 2 was added to the 2011 NEC to inform the user of the NFPA Standard used for evaluating the requirements of discrete combustible components, cable ties, which are used in a “Plenum”.

Article 770

Optical Fiber Cables and Raceways

Proposal Number: 16-33
Comment Number(s): 16-22

Section 770.100(B)(1) Entrance Cable Grounding/Electrode

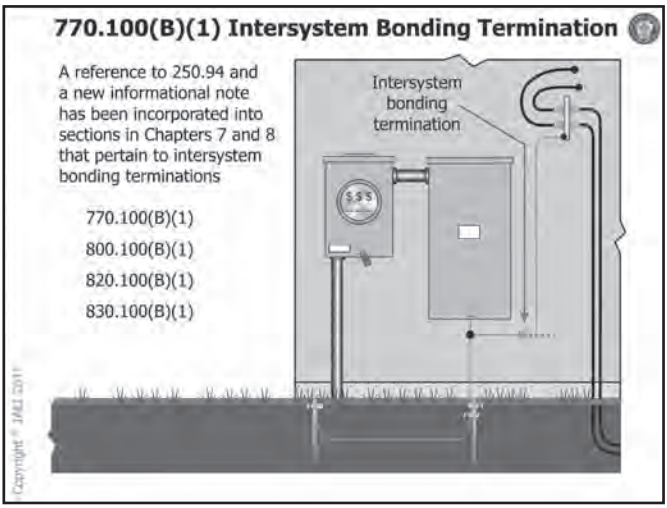
T&B Product:
Intersystem Bonding Termination

(1) In Buildings or Structures with an Intersystem Bonding Termination. If the building or structure served has an intersystem bonding termination as required by 250.94, the bonding conductor or grounding electrode conductor shall be connected to the intersystem bonding termination.

Informational Note: See Article 100 for the definition of Intersystem Bonding Termination.

Analysis of Change:

Section 770.100(B)(1) was revised to add the Informational Note to refer the user to Article 100 for the definition of an Intersystem Bonding Termination.



Proposal Number: 16-56
Comment Number(s): 16-43, 16-44, 16-45, 16-46, 16-47, 16-48 and 16-56

Section 770.154 Applications of Listed Optical Fiber Cables and Raceways and Cable Routing Assemblies

T&B Product: Optical Fiber/Communication Raceways

Permitted and non-permitted applications of listed optical fiber cables and raceways, and cable routing assembly types shall be as indicated in Table 770.154(a) on the following page. The permitted applications shall be subject to the installation requirements of 770.110 and 770.113. The substitutions for communications cables listed in Table 770.154(b) and illustrated in Figure 770.154 shall be permitted.

Table 770.154(a) Applications of Listed Optical Fiber Cables and Raceways, and Cable Routing Assemblies in Buildings

Analysis of Change:

The revised Section 770.154 and the new Table 770.154(a) combine both the application and installation rules under one section. This same concept was used for Articles 770, 800, 820 and 830.

Proposal Number: 16-129
Comment Number(s): 16-113 and 16-114

Section 800.47 Underground Communications Wires and Cables Entering Buildings

T&B Product:
General Information

Underground communications wires and cables entering buildings shall comply with 800.47(A) and (B). The requirements of 310.10(C) shall not apply to communications wires and cables.

Analysis of Change:

Section 310.10(C) states that communication cables installed in an underground installation are not required to be listed for use in a wet location.

Proposal Number: 16-148
Comment Number(s): NA

Section 800.100(B)(1) Cable and Primary Protector Grounding/ Electrode

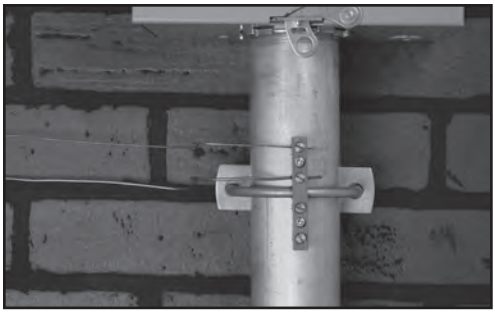
(1) In Buildings or Structures with an Intersystem Bonding Termination. If the building or structure served has an intersystem bonding termination as required by 250.94, the bonding conductor or grounding electrode conductor shall be connected to the intersystem bonding termination.

T&B Product:
Intersystem Bonding Termination

Informational Note: See Article 100 for the definition of Intersystem Bonding Termination.

Analysis of Change:

Section 800.100(B)(1) was revised to add the Informational Note to refer the user to Article 100 for the definition of an Intersystem Bonding Termination.



Proposal Number: 16-172
Comment Number(s): 16-147, 16-148, 16-149, 16-150, 16-151 and 16-152

Section 800.154 Applications of Listed Communications Wires and Cables and Raceways

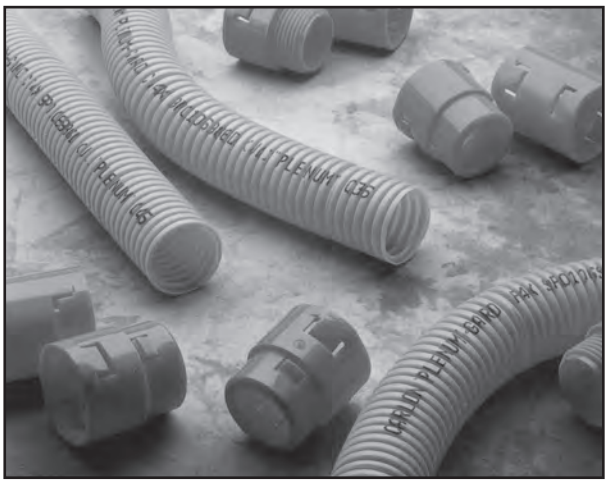
T&B Product: Optical Fiber/Communication Raceways

Permitted and non-permitted applications of listed communications wires, cables and raceways shall be as indicated in Table 800.154(a). The permitted applications shall be subject to the installation rules of 800.110 and 800.113. The substitutions for communications cables listed in Table 800.154(b) and illustrated in Figure 800.154 shall be permitted.

Table 800.154(A) Applications of Communications Wires, Cables and Raceways in Buildings

Analysis of Change:

The revised Section 800.154 and the new Table 800.154(a) combine both the application and installation rules under one section. This same concept was used for Articles 770, 800, 820 and 830.



Proposal Number: 16-216
Comment Number(s): 16-190

Section 810.21(F)(1) Grounding Conductors/Receiving Stations/ Electrode

(1) In Buildings or Structures with an Intersystem Bonding Termination. If the building or structure served has an intersystem bonding termination as required by 250.94, the bonding conductor or grounding electrode conductor shall be connected to the intersystem bonding termination.

T&B Product:
Intersystem Bonding Termination

Informational Note: See Article 100 for the definition of Intersystem Bonding Termination.

Analysis of Change:

Section 810.21(F)(1) was revised to add the Informational Note to refer the user to Article 100 for the definition of an Intersystem Bonding Termination.

Article 820

Community Antenna Television and Radio Distribution Systems

Proposal Number: 16-259
Comment Number(s): 16-224

Section 820.100(B)(1) Cable Grounding/Electrode

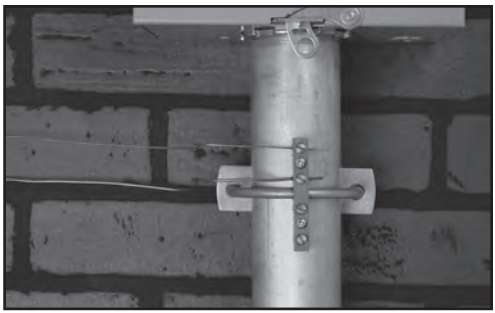
T&B Product:
Intersystem Bonding Termination

(1) In Buildings or Structures with an Intersystem Bonding Termination. If the building or structure served has an intersystem bonding termination as required by 250.94, the bonding conductor or grounding electrode conductor shall be connected to the intersystem bonding termination.

Informational Note: See Article 100 for the definition of Intersystem Bonding Termination.

Analysis of Change:

Section 820.100(B)(1) was revised to add the Informational Note to refer the user to Article 100 for the definition of an Intersystem Bonding Termination.



Proposal Number: 16-278
Comment Number(s): 16-239, 16-240, 16-241, 16-242, 16-243 and 16-245

Section 820.154 Applications of Listed CATV Cables

T&B Product: Optical Fiber/Communication Raceways

Permitted and non-permitted applications of listed coaxial cables shall be as indicated in Table 820.154(a) on the following page. The permitted applications shall be subject to the installation rules of 820.113. The substitutions for communications cables listed in Table 820.154(b) and illustrated in Figure 820.154 shall be permitted.

Table 820.154(a) Applications of Coaxial Cables in Buildings

Analysis of Change:

The revised Section 820.154 and the new Table 820.154(a) combine both the application and installation rules under one section. This same concept was used for Articles 770, 800, 820 and 830.

Network-Powered Broadband Communications Systems

Proposal Number: 16-326
Comment Number(s): 16-282

Section 830.100(B)(1) Cable, Network Interface Unit and Primary Protector Grounding/Electrode

T&B Product:
Intersystem Bonding Termination

(1) In Buildings or Structures with an Intersystem Bonding Termination. If the building or structure served has an intersystem bonding termination as required by 250.94, the bonding conductor or grounding electrode conductor shall be connected to the intersystem bonding termination.

Informational Note: See Article 100 for the definition of Intersystem Bonding Termination.

Analysis of Change:

Section 830.100(B)(1) was revised to add the Informational Note to refer the user to Article 100 for the definition of an Intersystem Bonding Termination.

Proposal Number: 16-339
Comment Number(s): 16-303, 16-304, 16-305, 16-306 and 16-307

Section 830.154 Applications of Network-Powered Broadband Communications System Cables

T&B Product: Optical Fiber/Communication Raceways

830.154 Applications of Network-Powered Broadband Communications System Cables. Permitted and non-permitted applications of listed network-powered broadband communications system cables shall be as indicated in Table 830.154(a) on the following page. The permitted applications shall be subject to the installation rules of 830.110 and 830.113. The substitutions for communications cables listed in Table 830.154(b) and illustrated in Figure 830.154 shall be permitted.

Table 830.154(a) Applications of Network-Powered Broadband Cables

Analysis of Change:

The revised Section 820.154 and the new Table 820.154(a) combine both the application and installation rules under one section. This same concept was used for Articles 770, 800, 820 and 830.

Article 840

Premises-Powered Broadband Communications Systems

Proposal Number: 16-349
Comment Number(s): 16-315, 16-316, 16-317, 16-318, 16-319, 16-320, 16-321, 16-322, 16-323, 16-324, 16-325, 16-326, 16-327, 16-328, 16-329, 16-330, 16-331, 16-332, 16-333, 16-334, 16-335, 16-336, 16-337, 16-338 and 16-339

Article 840 Premises-Powered Broadband Communications Systems

T&B Product: Optical Fiber/Communication Raceways

840.1 Scope. This article covers premises-powered optical fiber-based broadband communications systems that provide any combination of voice, video, data and interactive services through an optical network terminal (ONT).

Informational Note No. 1: A typical basic system configuration consists of an optical fiber cable to the premises (FTTP) supplying a broadband signal to an ONT that converts the broadband optical signal into component electrical signals such as traditional telephone, video, high-speed internet and interactive services. Powering of the ONT is typically accomplished through an ONT power supply Unit (OPSU) and battery backup unit (BBU) that derive their power input from the available AC at the premises. The optical fiber cable is unpowered and may be nonconductive or conductive.

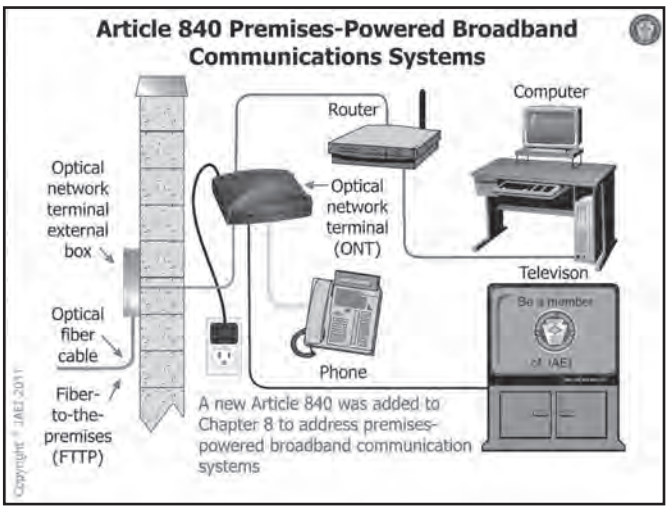
Informational Note No. 2: See 90.2(B)(4) for installations of premise powered broadband communications systems that are not covered.

Proposal Number: 16-349
Comment Number(s): 16-315, 16-316, 16-317, 16-318, 16-319, 16-320, 16-321, 16-322, 16-323, 16-324, 16-325, 16-326, 16-327, 16-328, 16-329, 16-330, 16-331, 16-332, 16-333, 16-334, 16-335, 16-336, 16-337, 16-338 and 16-339

Article 840 (continued)

Analysis of Change:

This is a new Article for the 2011 NEC to address Broadband services that are non-network powered. The new Article addresses all the applications involved in these types of services giving the state regulatory agencies, authorities having jurisdiction and companies a code to verify installations. Installations prior to the 2011 NEC have been found that created fire hazards and the potential for shock. This new Article 840 is an attempt to address these known issues.



Example D.13

Proposal Number: 8-287
Comment Number(s): NA

Information Annex D Example D.13 Cable Tray Calculation (See Article 392)

T&B Product:
Cable Tray

D13(a) Multiconductor Cables 4/0 and Larger

USE: NEC 392.22(A)(1)(a)

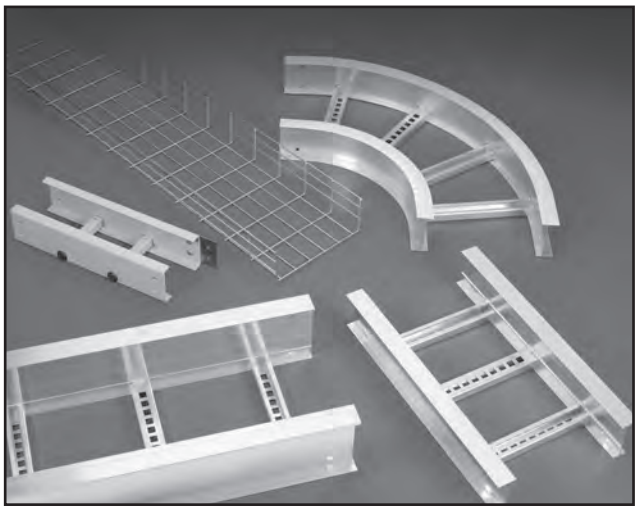
Cable tray must have an inside width equal to or greater than the sum of the diameters (Sd) of the cables, which must be installed in a single layer.

Example: Cable tray width is obtained as follows:
Cable size being used — 3-conductor Type MC Cable — 4/0 AWG
(OD) Cable outside Diameters (inches) - 1.57
(N) Number of Cables — 12
SD = (OD) × (N) (Sum of the Cable Diameters in Inches) = 18.84
The sum of the diameters (Sd) of all cables = 18.84 inches, therefore a **cable tray** with an inside width of at least **18.84** inches is required.

Informational Note: Cable outside diameter is a nominal diameter from catalog data.

Analysis of Change:

Panel 8 of the NEC revised Information Annex D to include four (4) examples of cable tray calculation pertaining to Article 392. The sample shown here is the first example found in Information Annex D, Example D13(a).



Recommended Tightening Torque Tables from UL Standard 486A-B

Proposal Number: 1-274
Comment Number(s): 1-152

Information Annex I Recommended Tightening Torque Tables from UL Standard 486A-B

T&B Product: Mechanical Connectors and T&B® Torque Set Screw

In the absence of connector or equipment manufacturer's recommended torque values, Tables I.1, Table I.2 and Table I.3 may be used to correctly tighten screw-type connections for power and lighting circuits*. Control and signal circuits may require different torque values and the manufacturer should be contacted for guidance.

*For proper termination of conductors, it is very important that the field connections be properly tightened. In the absence of manufacturer's instructions on the equipment, the torque values given in these tables are recommended. Because it is normal for some relaxation to occur in service, checking torque values sometime after installation is not a reliable means of determining the values of torque applied at installations.

Analysis of Change:

Panel 1 of the NEC added the new Information Annex I to address improper electrical connections in the electrical industry due to improper torque levels. The recommended torque tightening tables from UL468A-B will help the electrical industry by making proper tightening torque values readily available when the marking is not on the connector or equipment, or where the installation instructions no longer accompany the connector.

Furthermore, the explicit inclusion in the Code would also make it very clear that torque wrenches or specially designed connectors are needed to comply with manufacturers' installation instructions for mechanical set-screw type connectors.

Continues on page 146.

Information Annex I

Recommended Tightening Torque Tables from UL Standard 486A-B

Proposal Number: 1-274
Comment Number(s): 1-152

Information Annex I (continued)

Table I.1 Tightening Torque for Screws

Test Conductor Installed in Connector		Tightening Torque, N-m (lbf-in.)											
		Slotted head No. 10 and larger[a]						Hexagonal head — external drive socket wrench					
		Slot width 1.2 mm (0.047 in.) or less and slot length 6.4 mm (¼ in.) or less				Slot width over 1.2 mm (0.047 in.) or slot length over 8.4 mm (1.4 in.)							
								Split-bolt connectors				Other connectors	
AWG or kcmil	mm²	A		B		A		B		A		B	
30–10	0.05–5.3	1.7	(15)	2.3	(20)	2.8	(25)	4.0	(35)	7.3	(65)	9.0	(80)	6.8	(60)	8.5	(75)
8	8.4	2.3	(20)	2.8	(25)	3.4	(30)	4.5	(40)	7.3	(65)	9.0	(80)	6.8	(60)	8.5	(75)
6–4	13.2–21.2	2.8	(25)	4.0	(35)	4.0	(35)	5.1	(45)	15.3	(135)	18.5	(165)	10.2	(90)	12.4	(110)
3	26.7	2.8	(25)	4.0	(35)	4.5	(40)	5.6	(50)	25.4	(225)	31.1	(275)	14.1	(125	16.9	(150)
2	33.6	3.4	(30)	4.5	(40)	4.5	(40)	5.6	(50)	25.4	(225)	31.1	(275)	14.1	(125	16.9	(150)
1	42.4	—		—		4.5	(40)	5.6	(50)	25.4	(225)	31.1	(275)	14.1	(125	16.9	(150)
1/0–2/0	53.5–67.4	—		—		4.5	(40)	5.6	(50)	35.6	(315)	43.5	(385)	16.9	(150)	20.3	(180)
3/0–4/0	85.0–107.2	—		—		4.5	(40)	5.6	(50)	45.2	(400)	56.5	(500)	22.6	(200)	28.2	(250)
250–350	127–177	—		—		4.5	(40)	5.6	(50)	62.1	(550)	73.4	(650)	28.2	(250)	36.7	(325)
400	203	—		—		4.5	(40)	5.6	(50)	76.3	(675)	93.2	(825)	28.2	(250)	36.7	(325)
500	253	—		—		4.5	(40)	5.6	(50)	76.3	(675)	93.2	(825)	33.9	(300)	42.4	(375)
600–750	304–380	—		—		4.5	(40)	5.6	(50)	90.4	(800)	113.0	(1000)	33.9	(300)	42.4	(375)
800–1000	405–508	—		—		4.5	(40)	5.6	(50)	111.7	(900)	124.3	(1100)	45.2	(400)	56.5	(500)
1250–2000	635–1010	—		—		—		—		111.7	(900)	124.3	(1100)	56.5	(500)	67.8	(600)

[a]For values of slot width or length not corresponding to those specified, select the largest torque value associated with the conductor size. Slot width is the nominal design value. Slot length shall be measured at the bottom of the slot.

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Recommended Tightening Torque Tables from UL Standard 486A-B

Proposal Number: 1-274
Comment Number(s): 1-152

Information Annex I (continued)

Table I.2 Tightening Torque for Slotted Head Screws Smaller Than No. 10 Intended for Use with 8 AWG (8.4 mm^2) or Smaller Conductors

Slot Length of Screw[a]		Tightening Torque, N-m (lbf-in.)			
		Slot width of screw smaller than 1.2 mm (0.047 in.)[b]		Slot width of screw 1.2 mm (0.047 in.) and larger[b]	
mm	in.	A	B	A	B
Less than 4	Less than 5/32	0.68 (6)	0.79 (7)	0.79 (7)	1.0 (9)
4	5/32	0.68 (6)	0.79 (7)	1.1 (10)	1.4 (12)
4.8	3/16	0.68 (6)	0.79 (7)	1.1 (10)	1.4 (12)
5.5	7/32	0.68 (6)	0.79 (7)	1.1 (10)	1.4 (12)
6.4	1/4	0.79 (7)	1.0 (9)	1.1 (10)	1.4 (12)
7.1	9/32			1.4 (12)	1.7 (15)
Above 7.1	Above 9/32			1.8 (15)	2.3 (20)

[a]For slot lengths of intermediate values, select torques pertaining to next shorter slot lengths. Also, see 9.1.9.6 of UL 486A-B-2003 for screws with multiple tightening means. Slot length shall be measured at the bottom of the slot.
[b]Slot width is the nominal design value.

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Continues on page 148.

Information Annex I

Recommended Tightening Torque Tables from UL Standard 486A-B

Proposal Number: 1-274
Comment Number(s): 1-152

Information Annex I (continued)

Table I.3 Tightening Torque for Screws with Recessed Allen or Square Drives

Socket Width Across Flats[a]		Tightening Torque, N-m (lbf-in.)			
mm	in.	A		B	
3.2	1/8	4.0	(35)	5.1	(45)
4.0	5/32	9.0	(80)	11.3	(100)
4.8	3/16	11.3	(100)	13.5	(120)
5.5	7/32	13.5	(120)	16.9	(150)
6.4	1/4	16.9	(150)	22.5	(200)
7.9	5/16	25.4	(225)	31.1	(275)
9.5	3/8	33.9	(300)	42.4	(375)
12.7	1/2	45.2	(400)	56.5	(500)
14.3	9/16	56.5	(500)	67.8	(600)

[a]See 9.1.9.6 of UL 486A-B-2003 for screws with multiple tightening means.

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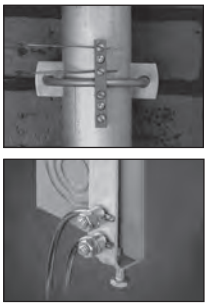
- Changes to the NEC originate as End-User/Inspector Problems/Issues
- Understanding the Problems/ Issues allows you to identify them and provide Real Solutions

Significant Changes = Opportunities:



100 AND 250.94

110.14(A)

USE POP-UP RECP. AND 210.52(C)(5) AND 210.52(D)

What You Can Do...

Set yourself apart from your competition.

Focus on Identifying and Solving Customer's Problems

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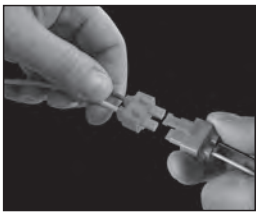
Know your jurisdiction's code year.

USE EXPANSION DEFINITION FITTINGS AND 300.4(H)

406.9(B)(1) AND 590.4(D)(2)



410.130(G)

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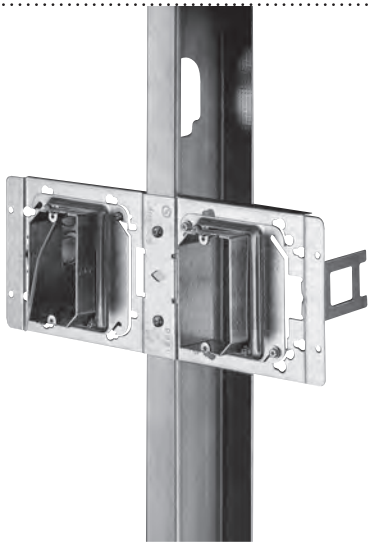

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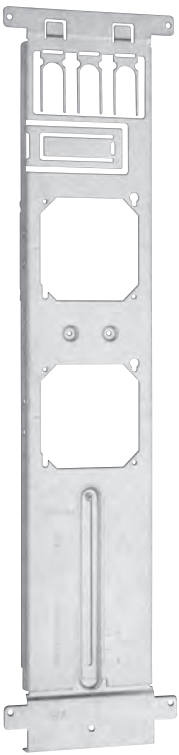
- Single-screw vertical height adjustment — height adjustable up to an extra 6"
- Built-in cable support, built-in slots for horizontal support bar and built-in far-side support for both 4" and 6" studs
- Accommodates both 4" and 4 11/16" boxes



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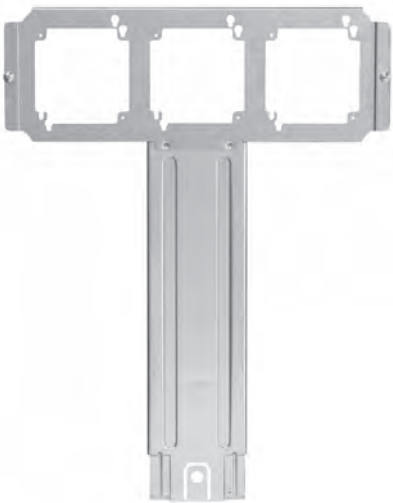

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