Thomas&Betts

Analysis of NEC®

Code Changes

2008

featuring products from

Thomas&Betts

United States
Tel: 901.252.8000
800.816.7809
Fax: 901.252.1354

Technical Services
Tel: 888.862.3289

www.tnb.com

Sta-Kon®

UL Listed to Meet New Requirements for Fluorescent Fixtures and Ballasts!

Luminaire Disconnect

Count on Thomas & Betts to help you meet the latest standards and code updates! The Sta-Kon® Luminaire Disconnect is the first UL® listed, CSA certified device available to meet the UL standard for fluorescent light fixtures taking effect January 1, 2008.

Meets 2008 NEC® Section 410.130(G) requirements. See page 81

Designed in accordance with NEC 410.130(G), CEC part I, rule 30-308(4), the disconnect consists of two mating halves. Simply connect the finger-safe female (line) side via wire connectors to the incoming power side of the circuit, and the male (load) side to the ballast. When disconnected, the device enables safe servicing of the fixture and ballast without exposure to dangerous electrical shock hazard.

www.tnb.com

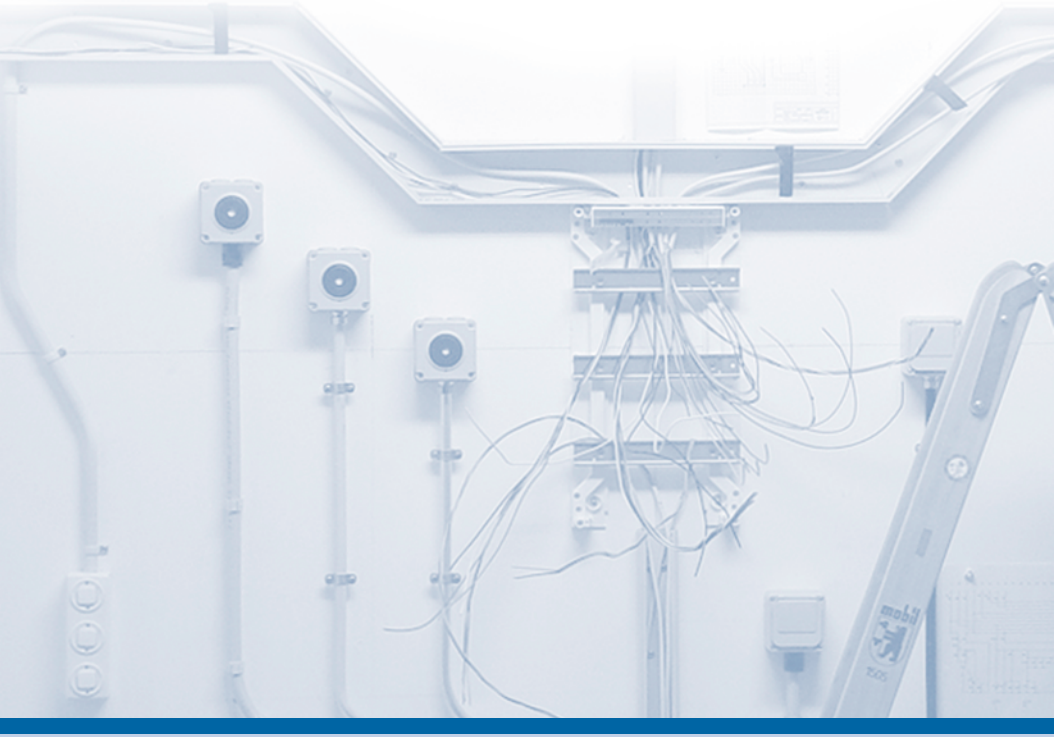
Please ask your Thomas & Betts sales representative for a complete catalog of quality Thomas & Betts electrical products or visit us at **www.tnb.com**.

Thomas&Betts

Table of Contents

Equipment for General Use, Articles 404–427

Special Occupancies, Articles 500–555



Special Equipment, Articles 600–830

On the following pages are changes to the National Electrical Code for the 2008 Code cycle. This is not intended to be an iteration of all the changes, but a listings 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**.

The title National Electrical Code and the acronym NEC are registered trademarks of the National Fire Protection Association. Quincy, Mass.

This document was compiled through the efforts of the Technical Liaison Department of Thomas & Betts, and is the property of Thomas & Betts. If you have any questions or require interpretation assistance, please contact one of the following:

Tim McNeive 1-800-888-0211 Ext. 5785

Greg Steinman 1-800-888-0211 Ext. 5719

George Dauberger 1-800-888-0211 Ext. 5191

Do not duplicate any part of this publication without the permission of a member of the T&B Technical Liaison Department.

© 2007 Thomas & Betts Corporation. Specifications are subject to change without notice.

More than ever, you need the *Analysis of Changes, NEC-2008.*

New articles explore critical operations power systems, reinforced thermosetting resin conduit, control systems for permanent amusement attractions, and electrified truck parking space equipment. Residential AFCI protection is extended. Most far-reaching is the definition of *neutral*. We'd recommend a thorough review of these and more than 350 other changes before your jurisdiction adopts *NEC-2008*. Be the first in your group to know. You'll be glad you did.

Available in September.

International Association of Electrical Inspectors

901 Waterfall Way, Richardson TX 75080-7702. Call: 1.800.786.4234

Section 90.2(A)(2) FPN Scope; Covered.

The fine print note that referenced additional information available in ANSI C2, National Electrical Safety Code, was deleted.

Analysis of Change:

The FPN reference to the National Electrical Safety Code, which contains provisions for installations on the line side of the service point, created confusion for the installer, designer and AHJ working on the load side of the service point. Some of these provisions conflict with the NEC and removal of the FPN clears up the confusion.

T&B Product:
General

NEC 2007 © National Fire Protection Association

Section 100. A new definition was added to this article.

Intersystem Bonding Termination. A device that provides a means for connecting communications system(s) grounding conductor(s)and bonding conductor(s) at the service equipment or at the disconnecting means for buildings or structures supplied by a feeder or branch circuit.

Analysis of Change:

The term was added to Article 100, Definitions, to correlate with the revision in 250.94 and in the Chapter 8 articles. The definition specifies the location of the device, which must have sufficient capacity to handle a minimum of three communications systems.

T&B Product: Intersystem Bonding Termination

Section 110.11 Deteriorating Agents.

Specific equipment identified as Types 2, 5, 12, 12K and 13 have been added to the products required to be protected against permanent damage from weather during the building process.

T&B Product:
Weatherproof Boxes

Analysis of Change:

Previously, equipment identified as “dry locations”, “Type 1” or “indoor use only” were required to be so protected. Equipment identified as Types 2, 5, 12, 12K and 13 are intended for use in dry locations and equipment marked with the type number provides the necessary identification for enforcement of the requirement.

Photo courtesy of IAEI.

Section 110.12 (A) Mechanical Execution of Work; Unused Openings.

"Unused openings other than those intended for operation of the equipment, intended for mounting purposes or permitted as part of the design for listed equipment, shall be closed to afford protection substantially equivalent to the wall of the equipment. Where metallic plugs or plates are used with nonmetallic enclosures, they shall be recessed at least 6 mm (¼ in.) from the outer surface of the enclosure."

T&B Product: Metal Outlet Boxes and Device Boxes

Analysis of Change:

The application of the requirement only to "unused cable or raceway openings" has seemingly been expanded. Part of the design for many listed metallic outlet and devices boxes has included a variety of open holes and the listing standard restricts the total permissible open area in these boxes. It is possible for some confusion in the interpretation of the new language in this section with respect to metallic outlet boxes and covers.

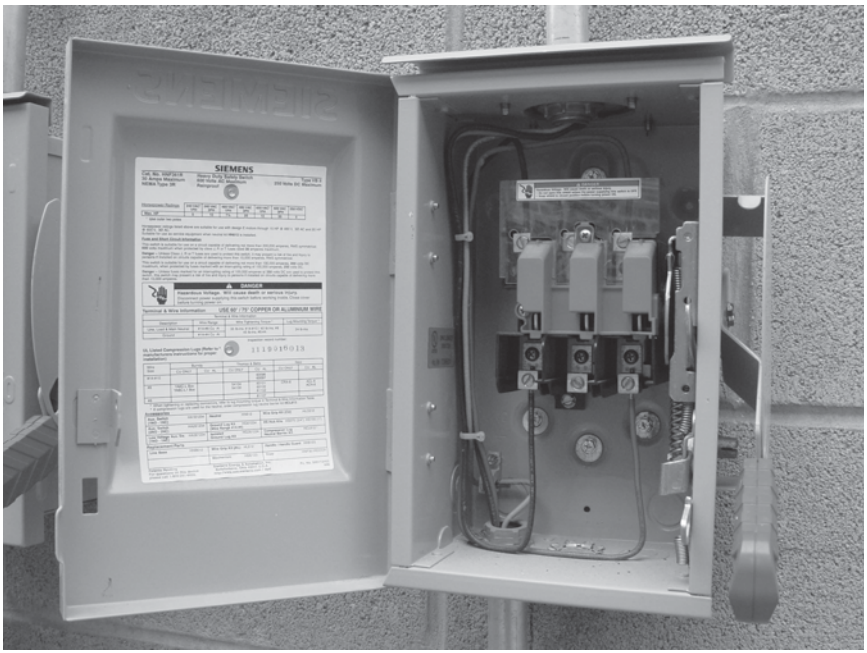


Photo courtesy of IAEI.

Section 110.20 Enclosure Types.

This new Section establishes marking requirements to indicate the NEMA or UL Type Rating code for a specific list of equipment used in the adverse environments indicated in Table 110.20.

T&B Product:
Weatherproof Boxes

Analysis of Change:

Previously, these "Type Ratings" were only located in Table 430.91 for Motor-Controller Enclosures. The requirements are now expanded for a broader list of equipment. By locating these "Type Ratings" in Article 110, they are now more readily accessible for future reference in other Sections of the Code if needed.

For Outdoor Use										
Provides a degree of protection against the following environmental conditions	Enclosure Type Number									
	3	3R	3S	3X	3RX	3SX	4	4X	6	6P
Incidental contact with the enclosed equipment	X	X	X	X	X	X	X	X	X	X
Rain, snow, and sleet	X	X	X	X	X	X	X	X	X	X
Sleet*	-	-	X	-	-	X	-	-	-	-
Windblown dust	X	-	X	X	-	X	X	X	X	X
Hose-down	-	-	-	-	-	-	X	X	X	X
corrosive agents	-	-	-	X	X	X	-	X	-	X
Temporary submersion	-	-	-	-	-	-	-	-	X	X
Prolonged submersion	-	-	-	-	-	-	-	-	-	X

For Indoor Use										
Provides a degree of protection against the following environmental conditions	Enclosure Type Number									
	1	2	4	4X	5	6	6P	12	12K	13
Incidental contact with the enclosed equipment	X	X	X	X	X	X	X	X	X	X
Falling dirt	X	X	X	X	X	X	X	X	X	X
Falling liquids and light splashing	-	X	X	X	X	X	X	X	X	X
Circulating dust, lint, fibers, and flyings	-	-	X	X	-	X	X	X	X	X
Settling airborne dust, lint, fibers and flyings	-	-	X	X	X	X	X	X	X	X
Hose-down and splashing water	-	-	X	X	-	X	X	-	-	-
Oil and coolant seepage	-	-	-	-	-	-	-	X	X	X
Oil or coolant spraying and splashing	-	-	-	-	-	-	-	-	-	X
Corrosive agents	-	-	-	X	-	-	X	-	-	-
Temporary submersion	-	-	-	-	-	X	X	-	-	-
Prolonged submersion	-	-	-	-	-	-	X	-	-	-

*Mechanism shall be operable when ice covered.

Reproduction of Table 110.20 (in part)

Typical enclosures

Copyright © IAEI 2007

Section 210.4(D) Multiwire Branch Circuits; Grouping

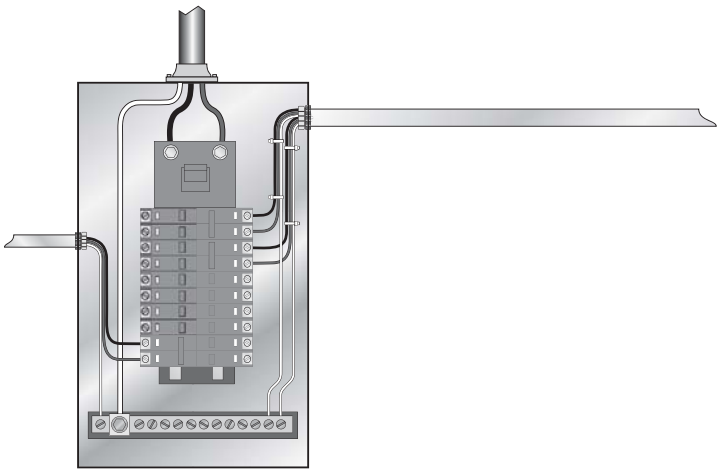
T&B Product:
Wiring Duct and Cable Ties

The grounded and ungrounded conductors of each multiwire branch circuit shall be grouped by wire ties or similar means in at least one location within the panelboard or other point of origin.

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.

Analysis of Change:

This new requirement provides a measure of safety for maintenance on multiwire branch circuits where one leg is worked on while another leg is still energized. There is an exception where obvious grouping is accepted.



Copyright © IAEI 2007

Section 210.8 (A) Ground-Fault Circuit Interrupter Protection for Personnel; Dwelling Units.

The exception numbers (1) and (2) have been removed and GFCI protection is now required for most receptacles in unfinished basements and in garages and accessory buildings that have a floor located at or below grade level not intended as habitable rooms and limited to storage areas, work areas and areas of similar use.

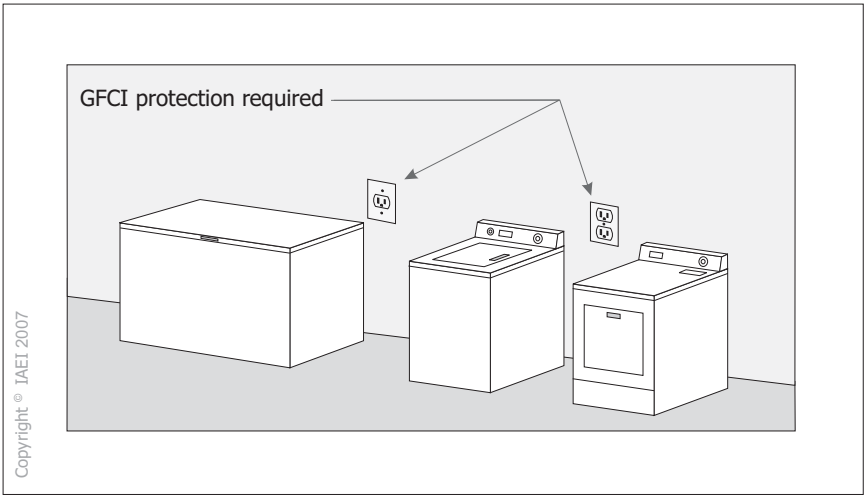
(1) Receptacles that are not readily accessible

(2) 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).

Analysis of Change:

Lack of "accessibility" of receptacles in these areas is no longer seen as reason to exempt them from the protection provided by ground-fault circuit interrupter protection for personnel. Similarly, the exception for receptacles in dedicated spaces for appliances in garages and accessory buildings has been removed. The expanded use of GFCI receptacles in these applications will necessitate boxes having larger capacity in some cases. Exception number (3) was retained for a receptacle supplying a permanently installed fire alarm or burglar alarm system.

T&B Product: Device Boxes and Covers



Copyright © IAEI 2007

Section 210.8 (B) Ground-Fault Circuit Interrupter Protection for Personnel; Other than Dwelling Units.

The requirement for GFCI receptacles has been expanded to include other non-residential kitchens in addition to commercial and institutional kitchens in (210.8(B)(2)). Also, with just two specific exceptions, all 125-volt, single-phase 15- and 20-ampere receptacles installed outdoors are now required to have GFCI protection (210.8(B)(4)). New Section 210.8(B)(5) has been added to require GFCI protected receptacles where installed within 6 ft. of any sink.

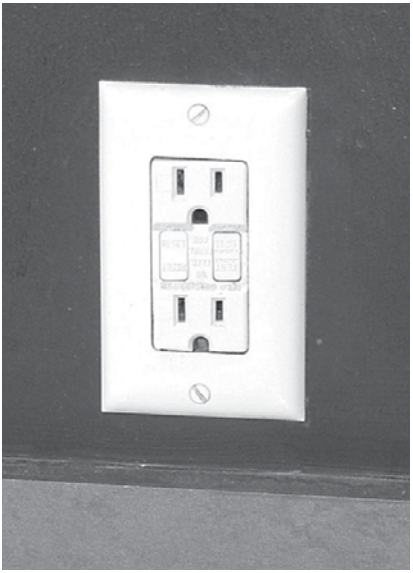
Section 210.8 (B) Exception New was added. Exception. In industrial laboratories, receptacles used to supply equipment where the removal of power would introduce a greater hazard shall be permitted to be installed without GFCI protection.

Analysis of Change:

The addition of “other non-residential kitchens” is intended to include office break rooms which often fall within the definition of a kitchen in 210.8(B)(2). The expanded requirement for outdoor receptacles replaces the somewhat more limited “in public spaces” language in the 2005 NEC. The expanded use of GFCI receptacles in these applications will necessitate boxes having larger capacity in some cases.

The exception was added for those applications where continuous power is needed to avoid hazards as a result of lost power. The exception is maintained for receptacles from a dedicated branch circuit for electric snow-melting and deicing equipment.

T&B Product:
Device Boxes and Covers



Section 210.8(C) Ground-Fault Circuit Interrupter Protection for Personnel; Boat Hoists.

The requirement for GFCI protection of outlets that supply boat hoists installed in dwelling unit locations has been revised to apply to all outlets not exceeding 240-volts.

Analysis of Change:

The previous requirement applied to outlets supplied by 125-volts, 15- and 20-ampere branch circuits. The increased requirement was seen as necessary to protect personnel from shock/electrocution at boat hoists. The expanded use of larger GFCI receptacles in these applications will necessitate boxes having larger capacity in some cases.

T&B Product: Weatherproof Devices Boxes & Covers

Photo courtesy of IAEI.

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

The section was revised as follows:

(B) Dwelling Units. All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets installed in dwelling unit family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sun rooms, recreation rooms, closets, hallways, or similar rooms or areas shall be protected by a listed arc fault circuit interrupter, combination-type, installed to provide protection of the branch circuit.

Section 210.12 (B) Exception NEW

The exception was added as follows:

T&B Product: General

Exception: Where RMC, IMC EMT, or steel armored cable, Type AC, meeting the requirements of 250.118, using metal outlet and junction boxes is installed for the portion of the branch circuit between the branch circuit overcurrent device and the first outlet, it shall be permitted to install a combination AFCI at the first outlet to provide protection for the remaining portion of the branch circuit.

Analysis of Change:

This is a further expansion of the arc-fault circuit interrupter requirement. The requirement for AFCI protection has been extended to include virtually all 120-volt single phase, 15 and 20 ampere branch circuits in a dwelling unit. Included are family rooms, dining rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, or similar rooms or areas. These products have gained a lot of field experience over the past few years and product acceptance has grown.

The added exception allows for the use of AFCI type receptacles as opposed to using circuit breakers. The metal raceway provides the mechanical protection of the branch circuit and the receptacle would provide electronic protection of the branch circuit downstream as well as cords plugged into the receptacle. It is unclear how this change will impact the market regarding the manufacture and distribution of the AFCI receptacle device.

Section 210.52(C) Dwelling Unit Receptacle Outlets; Countertops.

The section was revised to read as follows, "In kitchens, pantries, breakfast rooms, dining rooms and similar areas of dwelling units, receptacle outlets for countertop spaces shall be installed in accordance with 210.52(C)(1) through (C)(5).

T&B Product:
Boxes

Analysis of Change:

Breakfast rooms, pantries, and similar areas were added to the list of areas where the countertop receptacle locations and spacing requirements apply. These areas were identified as having issues where small appliances are used and to further avoid the use of extension cords for power in these areas. This arrangement is consistent with the arrangement of the same requirement in 210.52(B).

Section 210.52(E) Dwelling Unit Receptacle Outlets; Outdoor Outlets

The section was revised as follows:

(E) Outdoor Outlets. Outdoor receptacle outlets shall be installed in accordance with E(1) through E(3).

(1) One-family and Two-family Dwellings. For a one-family dwelling and each unit of a two-family dwelling that is at grade level, at least one receptacle outlet accessible while standing at grade level and located not more than 2.0 m (6½ ft.) above grade shall be installed at the front and back of the dwelling.

(2) Multi-family Dwellings. For each dwelling unit of a multifamily dwelling where the dwelling unit is located at grade level and provided with individual exterior entrance/egress, at least one receptacle outlet accessible from grade level and not more than 2.0 m (6½ ft.) above grade shall be installed.

(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 that 2.0 m (6½ ft.) above the balcony, deck or porch surface.

Exception to (3): Balconies, decks or porches with a useable area of less than 20 sq. ft. are not required to have a receptacle installed.

T&B Product:
Weatherproof Boxes & Covers

Analysis of Change:

The change includes the addition of balconies, decks and porches as locations where a receptacle needs to be installed. This is a change to further reduce reliance on extension cords for power in these areas. An exception was added for small areas where it is less likely for power needs.

Photo courtesy of IAEI.

Section 210.52(G) Dwelling Unit Receptacle Outlets; Basements and Garages

T&B Product:
Boxes

The section was revised to read:

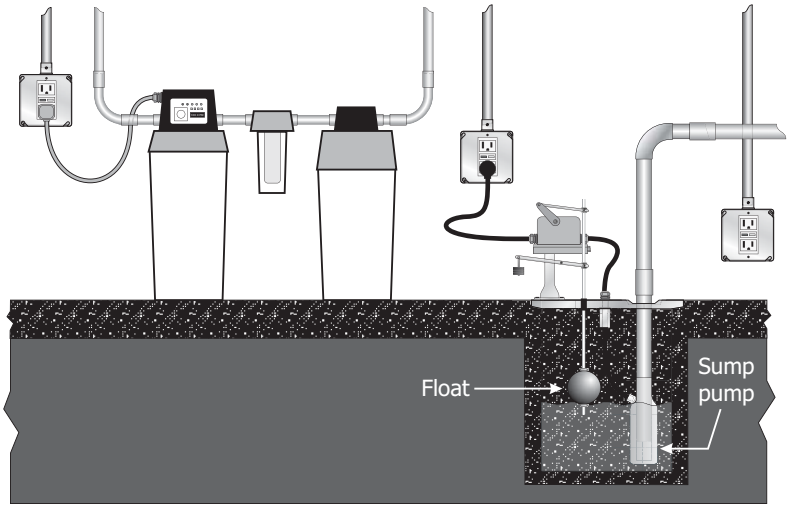
"(G) Basements and Garages. For a one-family dwelling, the following provisions shall apply:

(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 with electric power.

(2) Where a portion of the basement is finished into one or more habitable rooms, each separate unfinished portion shall have a receptacle outlet installed in accordance with this section."

Analysis of Change:

This change adds a requirement to install a receptacle outlet that can be used for general purposes in addition to other receptacles that are installed for specific equipment such as laundry, fire alarms, or sump pumps.



Copyright © IAEI 2007

Section 210.60(A) Guest Rooms, Guest Suites, Dormitories and Similar Occupancies.

(A) General.

"Dormitories" have been added to hotels, motels and similar occupancies for application of the general requirements for receptacle placement in 210.52 (A) and bathrooms in 210.52 (D).

Analysis of Change:

Dormitory rooms are seen as similar occupancies to other guest rooms and guest suites.

T&B Product:
Devices Boxes

Photo courtesy of IAEI.

Section 225.22 Raceways on Exterior Surfaces of Buildings or Other Structures.

This section was revised to delete the exception that allowed flexible metal conduit to be used in wet locations without a raintight requirement.

Analysis of Change:

Flexible metal conduit may no longer be used in a wet location as the allowance was removed from article 348 Flexible Metal Conduit. The conduit is not considered raintight.

T&B Product:
Conduit Fittings

Photo courtesy of IAEI.

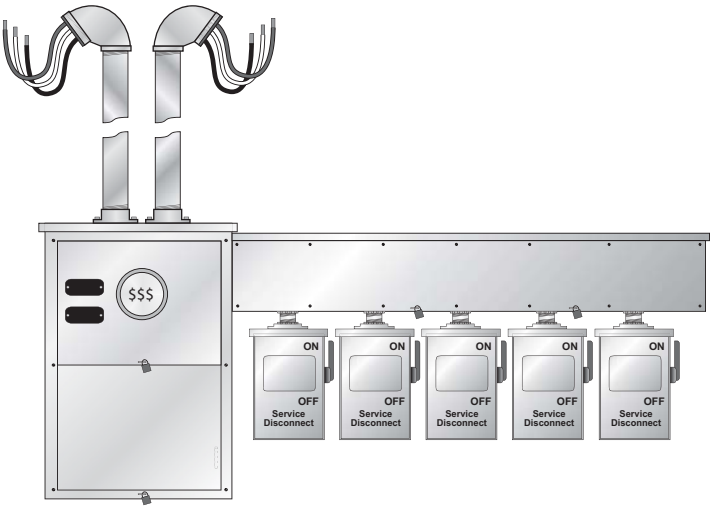
Section 230.53 Raceways to Drain

T&B Product:
Conduit Fittings

This section was revised to change the raintight requirement to suitable for wet locations. The word raintight is not needed as each raceway article includes provisions for wet locations.

Analysis of Change:

This change clarifies the correct phrase is “wet locations”, not “raintight” for raceways used in wet locations. Raceways suitable for use in wet locations are listed for use in wet locations, not “raintight”. Additionally, fittings are not raceways and section 314.15(A) requires that fittings installed in wet locations to be listed for use in “wet locations”, not “raintight”.



Copyright © IAEI 2007

Section 230.54 (A) Overhead Service Locations; Raintight Service Head.

The title and text of sub-section (A) was revised as follows:

(A) Service Head. Service raceways shall be equipped with a service head at the point of connection to service-drop conductors. The service head shall comply with the requirement for fittings in 314.15(A).

Section 230.54 (B) Overhead Service Locations; Service Cable Equipped with Raintight Service Head or Gooseneck.

The title and text of sub-section (B) was revised as follows:

(B) Service Cable Equipped with Service Head or Gooseneck. Service cable shall be equipped with a Service Head or Gooseneck. The service head shall comply with the requirement for fittings in 314.15(A).

Analysis of Change:

A word "raintight" has been removed from the title and text of both sub-sections. A service head is a conduit fitting that is always used in a wet location. Section 314.15(A) pertains to all fittings installed in damp and wet locations. The term "raintight" was removed in the 2005 NEC in 314.15(A).

T&B Product: Service Heads

Section Entire Article

The entire article was revised to remove “effectively” from the term “effectively grounded” and “effectively bonded”, also the word “bonded” was changed to “connected to” in many locations in the article.

Analysis of Change:

The word “effectively” is a subjective word and was difficult to inspect. The removal takes away a gray area of the code and allows for a more uniform interpretation of the requirements.

The word bonded is important as the definition was revised for this edition of the NEC, see Article 100. There is an increase in the use of the word bonded as opposed to grounded.

T&B Product: Conduit Fittings and Grounding Connectors

Section 250.8 Connection of Grounding and Bonding Equipment

This section was revised to better define the permitted methods of connections.

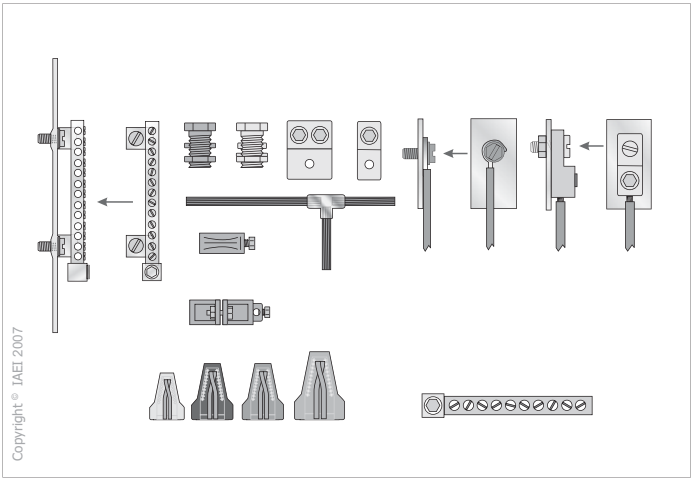
A) Permitted Methods. Grounding conductors and bonding jumpers shall be connected by one of the following means:

1. listed pressure connectors
2. terminal bars
3. pressure connectors listed as grounding and bonding equipment
4. the exothermic welding process
5. machine screw-type fasteners that engage not less than two threads or are secured with a nut
6. thread forming machine screws that engage not less than two threads in the enclosure
7. connections that are part of a listed assembly
8. other listed means

T&B Product: Electrical Connectors, Grounding Connectors

Analysis of Change:

Clarification was added to the requirement. For example, the previous requirement stated sheet metal screws shall not be used, but, did not disallow wood screws or drywall screws. Item one in the list continues to allow standard (not necessarily green) twist-on wire connectors to be used for the equipment grounding connection.



Copyright © IAEI 2007

Section 250.52(A)(3) Electrodes Permitted for Grounding; Concrete-Encased Electrodes.

This section was revised to add a new sentence. Where multiple concrete-encased electrodes are present at a building or structure it shall be permissible to bond only one into the grounding electrode system.

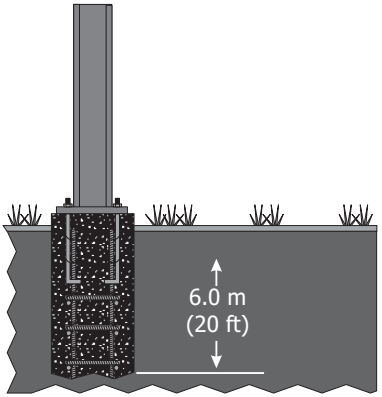
Analysis of Change:

This change states that although multiple concrete-encased electrodes are present in a building or structure, only one is required to be bonded to the grounding electrode system. There was some confusion with the previous language that could have been interpreted to mean all of the concrete-encased electrodes would have to be bonded to the grounding electrode system. Concrete encased electrodes installed vertically are now recognized as an acceptable installation.

T&B Product: Grounding Connectors

Encased by at least 50 mm (2 in.) of concrete, located horizontally near the bottom or vertically and within the portion of a concrete footing or foundation in direct contact with the earth.

Where multiple concrete-encased electrodes are present at a building or structure, it is permissible to bond one into the grounding electrode system.



Copyright© IAEI 2007

Section 250.54 Auxiliary Grounding Electrodes.

This section was revised to change the word “supplementary grounding electrode” to “auxiliary grounding electrode”.

Analysis of Change:

This is a revised term that differentiates the previous word, supplementary from supplemental. The optional grounding electrode at the parking lot luminaire is now referred to as an auxiliary grounding electrode because it is not required.

T&B Product: Grounding Connectors

Section 250.64(D) Grounding Electrode Conductor Installation; Service with Multiple Disconnecting Means Enclosures

Where a service consists of more than a single enclosure as permitted in 230.71(A), grounding electrode connections shall be made in accordance with (1), (2), or (3)

(1) Grounding Electrode Taps

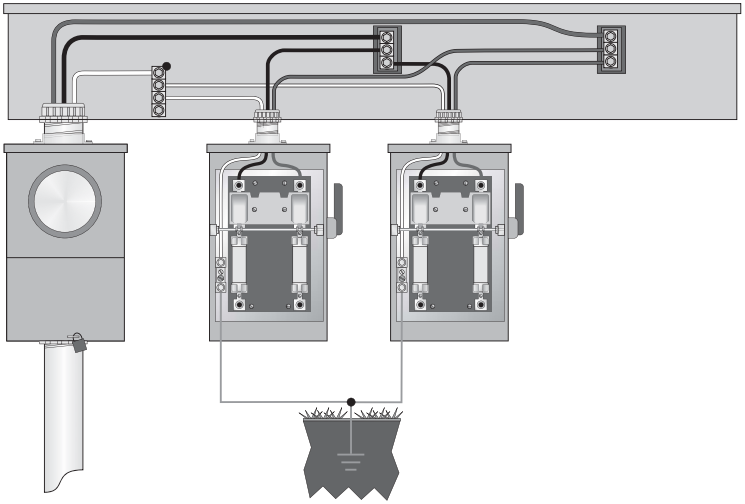
(2) Individual Grounding Electrode Conductors

(3) Common Location

Analysis of Change:

The 2005 NEC® did not include specific requirements for the installation of multiple grounding electrode conductors for separate disconnecting means enclosures as permitted in 230.71(A). Location (3) was added for making connections at an accessible location on the load side of a service drop or lateral.

T&B Product: Grounding Connectors



Copyright © IAEI 2007

Section 250.68(A) Exception No. 2 Grounding Electrode Conductor and Bonding Jumper Connection to Grounding Electrodes

This section was revised as follows:

(A) Accessibility. All mechanical elements used to terminate a grounding electrode shall be accessible.

Exception No. 1 An encased or buried connection to a concrete encased, driven, or buried electrode shall not be required to be accessible.

Exception No. 2 Exothermic or irreversible compression connections used at terminations, together with the mechanical means used to attach such terminations to fireproofed structural metal whether or not the mechanical means is reversible, shall not be required to be accessible.

Analysis of Change:

The change clarified the intent of the requirement in the 2005 NEC. The entire connection, including the lug and bolt/screw securement means does not have to be accessible if fireproofed.

T&B Product: Electrical Connectors

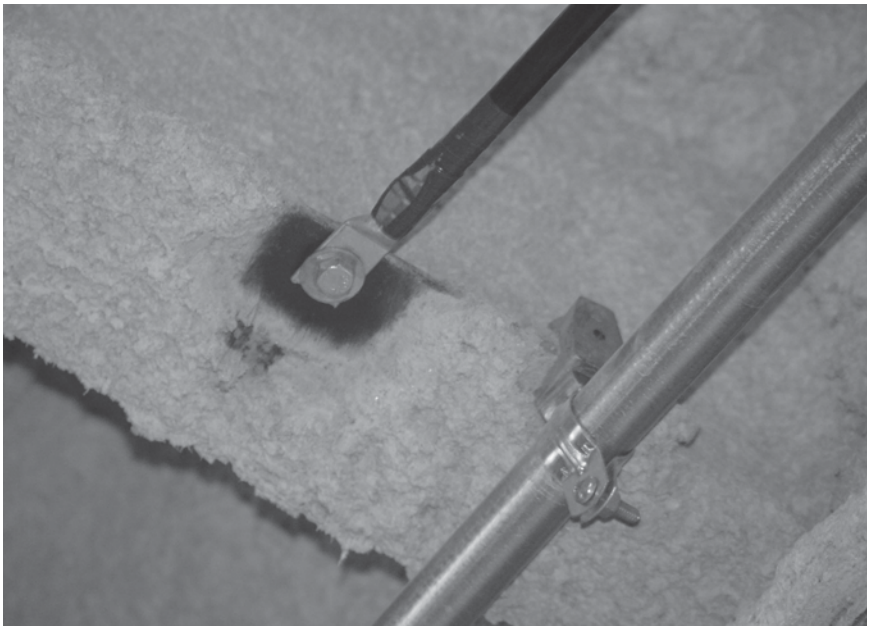


Photo courtesy of IAEI.

Section 250.94 Bonding for Other Systems.

A requirement was added to install an intersystem bonding termination for the attachment of bonding and grounding conductors required from other systems for attachment at the service equipment and at disconnecting means at additional buildings and structures. The intersystem bonding termination shall have the capacity for connection of not less than three intersystem bonding conductors and shall not interfere with opening a service or metering equipment enclosure.

Analysis of Change:

This is a major change to this article and the telecom industry. This requires the installation of an intersystem bonding termination at each service and at the disconnecting means at additional buildings or structure, regardless if there are any telecom services installed or planned to be installed at that building. In addition, the requirement includes a stipulation that the intersystem bonding termination must accept a minimum of three bonding conductors. In the past, these devices were installed by the telecom provider, at the time of telecom service installation. With this change, it will be expected that the intersystem bonding termination will be installed at the time the service and disconnecting means are installed.

T&B Product:
Telecom Grounding Products

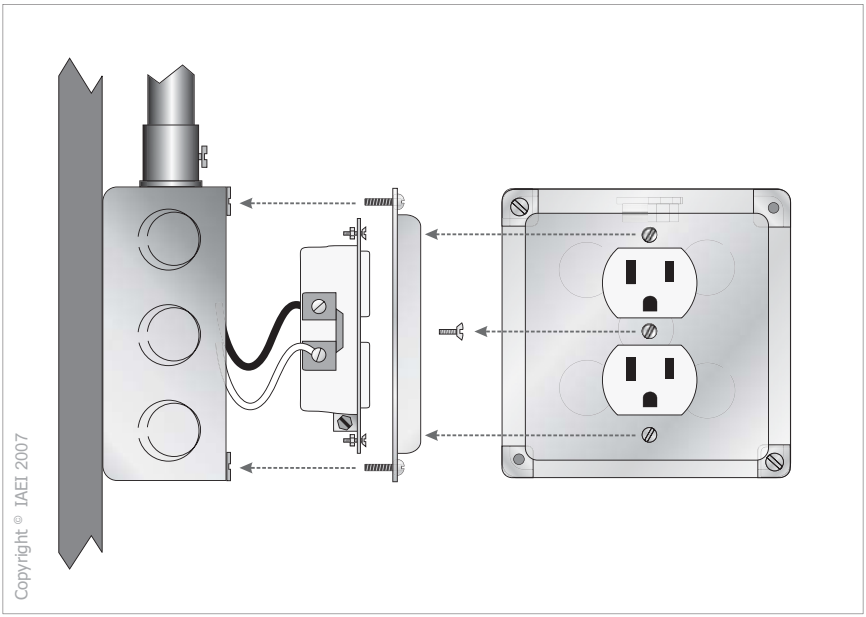
Section 250.146(A) Connecting Receptacle Grounding Terminal to Box; Surface Mounted Box

T&B Product:
Metallic Outlet Box Covers

The following wording was added, "A listed exposed work cover shall be permitted to be the grounding and bonding means when (1) the device is attached to the cover with at least two fasteners that are permanent (such as a rivet) or have a thread locking or screw locking means and (2) when the cover mounting holes are located on a flat non-raised portion of the cover."

Analysis of Change:

This is another application where a bonding jumper will not be required on a surface mounted box. It will now be permitted to mount a receptacle to the described cover and not include a bonding jumper.



Section 300.4 (A)(1) Protection Against Physical Damage; Cables and Raceways Through Wood Members; Bored Holes

Add an "(s)" to both plate and bushing in the last sentence.

Analysis of Change:

When the 32mm (1¼ in.) spacing from the edge of the bored hole to the nearest edge of the stud cannot be maintained, the cable or raceway shall be protected from penetration by screws or nails by steel plate(s) or bushing(s). Adding the (s) will indicate that adding one or more plate or bushing is acceptable to ensure protection of the cable or raceway.

T&B Product: CP-1 Cable Protectors

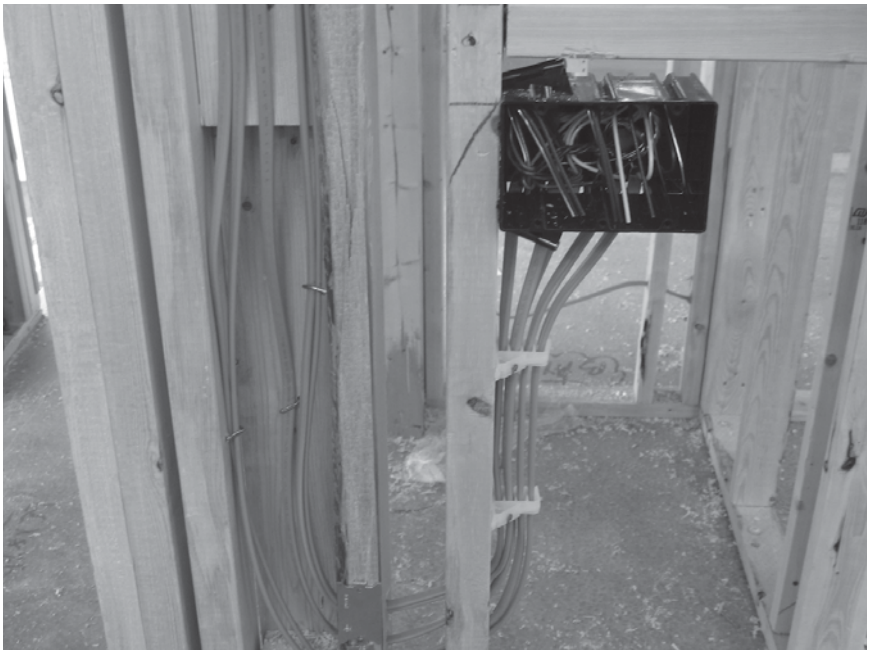


Photo courtesy of IAEI.

Section 300.4(E) Protection Against Physical Damage; Cables and Raceways Installed Under Roof Decking.

Existing (E), Cables and Raceways Installed in Shallow Grooves was moved to (F) and existing (F), Insulated Fittings was moved to (G).

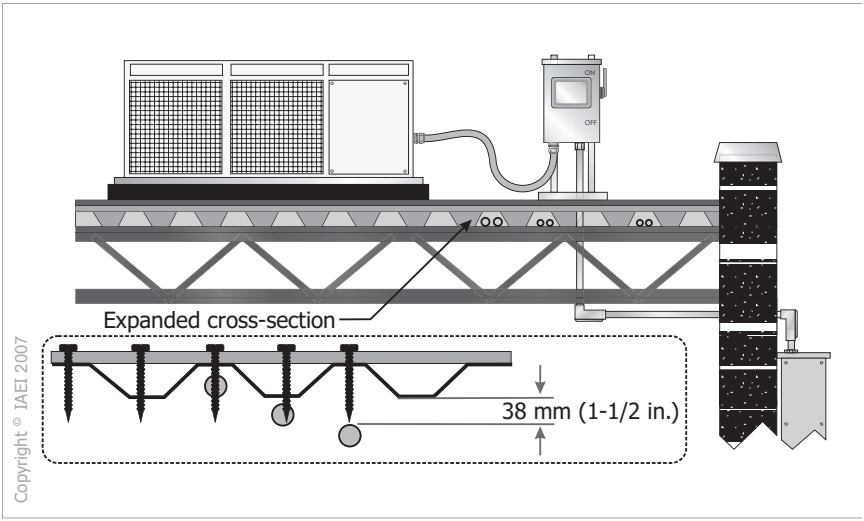
T&B Product:
Cable Supports

The new (E) will state that cables and raceways installed under roof decking shall be installed and supported so that the nearest outside surface of the cable or raceway is not less than 38 mm (1½ in.) from the nearest surface of the roof decking.

Rigid metal conduit and intermediate metal conduit shall be exempted from compliance to 300.4(E).

Analysis of Change:

Roof decking is often repaired or replaced after the initial installation and there has been a history of penetration by screws and other mechanical devices that hold the decking down. Cables and raceways which are supported by the roof deck must have supports (such as hangars or strut) that provide a 1½" space from the deck to the cable or raceway.



Copyright © IAEI 2007

Section 300.4(G)(NEW) Protection Against Physical Damage; Protection to Outlet Boxes During Construction

Add a new subsection to 300.4 to read:

"(G) Protection of Outlet Boxes During Construction. The open front of both metal and nonmetallic electrical outlet boxes shall be temporarily covered to protect insulated electrical conductors from physical damage or deterioration due to power routers, plaster spray, spray foam insulation, and other potential damage during construction. The covers shall be constructed of a nonmetallic material and shall be clearly marked "Not for Permanent Installation"."

This proposal was put on "Hold" pending the recommendation of a Task Group made up of members of CMP's 1, 3 and 9 to correlate the issue during the 2011 Code cycle.

Analysis of Change:

The intent of this proposal is to protect the box wiring from the effects of router bits during dry wall installation. As mentioned above, this proposal was put on hold until the 2011 cycle. It is interesting to note that CMP #9 rejected a similar proposal during this same cycle.

T&B Product: Switch Boxes (Information)

Section 300.5(B) Underground Installations; Listing

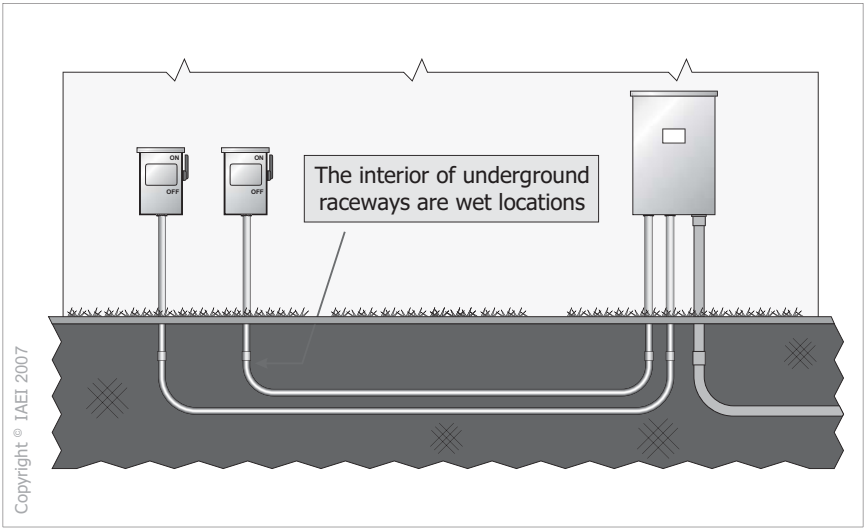
Revise Wet Locations to read:

T&B Product:
Connectors (Information)

"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 310.8(C). Any connections or splices in an underground installation shall be approved for wet locations."

Analysis of Change:

This change is for clarification that the interior of underground raceways or enclosures are considered to be a wet location. Connections are not permitted in a raceway.



Copyright © IAEI 2007

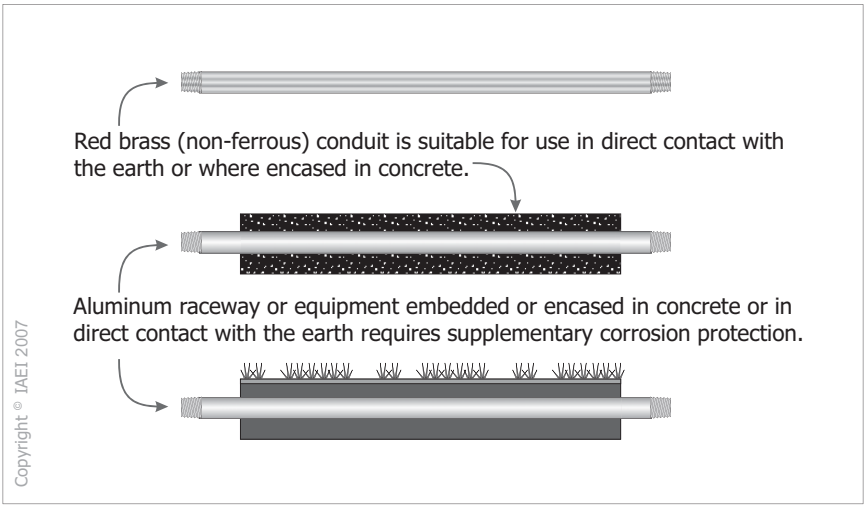
Section 300.6(B) Protection Against Corrosion and Deterioration; Aluminum Metal Equipment.

T&B Product:
Conduit Fittings

"Aluminum raceways, cable trays, cable bus, auxiliary gutters, cable armors, boxes, cable sheathings, cabinets, elbows, couplings, nipples, fittings, supports and support hardware embedded or encased in concrete or in direct contact with the earth will be provided with supplementary corrosion protection."

Analysis of Change:

Adding the term "aluminum" to the title and text will clarify that a supplemental coating will be required on aluminum products that are encased in concrete or in direct contact with the earth. In the previous Code cycle, brass conduit was included in Section 300.6(B) but the requirement for supplementary protection really doesn't apply to brass. The rewording in this proposal clarifies that the supplementary coating is for aluminum products only.



Copyright © IAEI 2007

Section 300.9(NEW) Raceways in Wet Locations Above Grade.

Add new subsection to cover raceways installed in wet locations above grade to read:

T&B Product:
Connectors (Information)

"Where raceways are installed in wet locations above grade, the interior of these raceways shall be considered to be a wet location. Insulated conductors and cables installed in raceway in wet locations above grade shall comply with 310.8(C).

Analysis of Change:

The interior of any raceway installed in a wet location is considered to be a wet location. This is clearly stated in 310.8(C), but there seems to be a need for clarity in the field. A previous Code change added 300.5 so it was clear that all underground installations were to be considered wet locations. However, in the absence of specific wording for above grade wet location installations, it was incorrectly assumed that the installation didn't have to comply with 310.8(C).

Photo courtesy of IAEI.

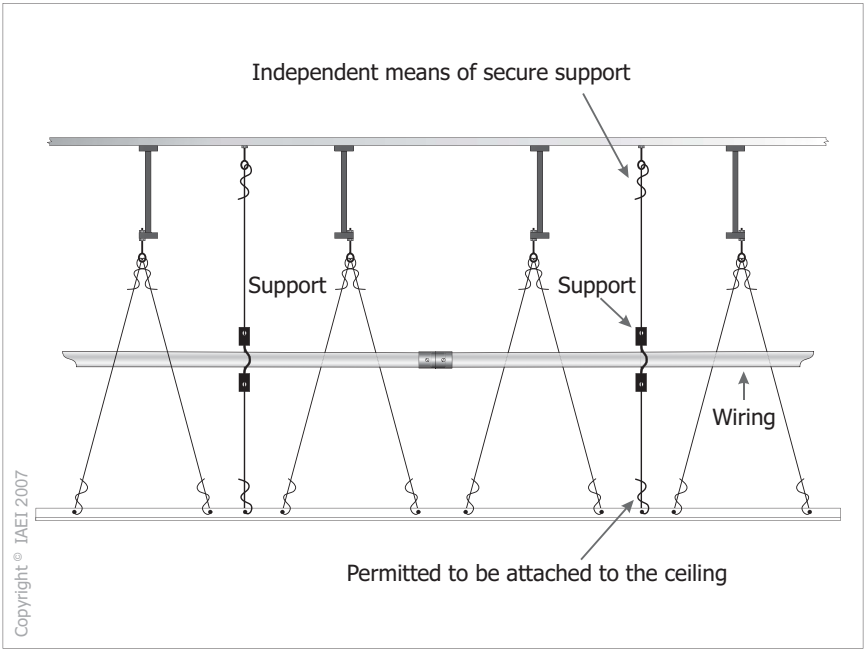
Section 300.11(A)(2) Securing and Supporting; Secured in Place; Non-Fire-Rated Assemblies.

Revise the last sentence to read: "An independent means of secure support shall be provided and shall be permitted to be attached to the assembly."

Analysis of Change:

The revision clarifies that connecting the lower end of the independent support for the raceway to the ceiling assembly is acceptable in a non-fire-rated assembly.

T&B Product:
Information



Section 300.16(A) Raceway or Cable to Open or Concealed Raceway; Box, Conduit Body or Fitting.

Add the term "Conduit Body" so the section reads:

"A box, conduit body, or terminal fitting having a separately bushed hole for each conductor shall be used wherever a change is made from conduit, electrical metallic tubing, electrical nonmetallic tubing, nonmetallic sheathed cable, Type AC cable, Type MC cable, or mineral-insulated, metal-sheathed cable and surface raceway wiring to open wiring or to concealed knob-and-tube wiring. A fitting used for this purpose shall contain no taps or splices and shall not be used at luminaire (fixture) outlets. A conduit body used for this purpose shall contain no taps or splices, unless it complies with 314.16(C)(2)."

Analysis of Change:

Since 314.17(B) permits the use of conduit bodies for the application of open wiring on insulators and for concealed knob-and-tube wiring, the term was added to the section.

T&B Product:
Conduit Bodies

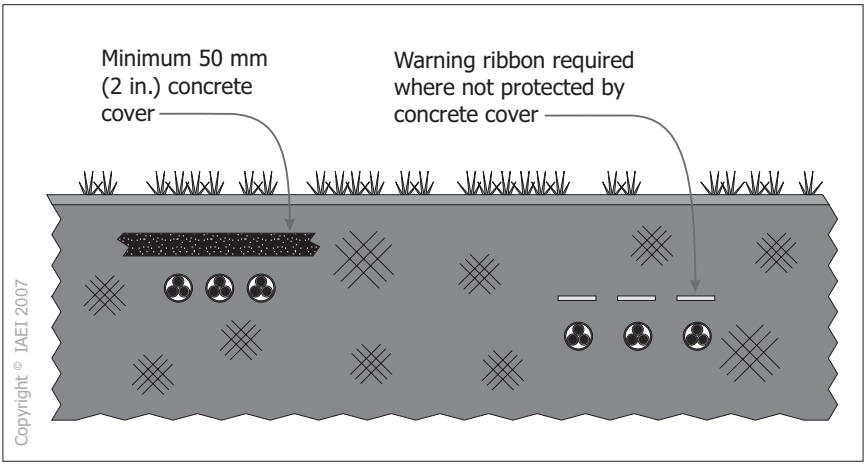
Section and Table 300.50 Minimum Cover Requirements

Add a superscript “4” to the first column “Direct Buried Cables” and a note “4” below that states: “Underground direct-buried cables that are not encased or protected by concrete and are buried 750 mm (30 in.) or more below grade shall have their location identified by a warning ribbon that is placed in the trench at least 300 mm (12 in.) above the cables.”

Analysis of Change:

Direct-buried cables at over 600 volts are more likely to be damaged when excavation takes place at existing installations. The application of a warning ribbon where the cables are not protected by concrete and are buried 750 mm (30 in.) or more below grade will help identify their location.

T&B Product:
Identification



Copyright © IAEI 2007

Section 310.15 (B)(2)(c)(New) Tables. Adjustment Factors; Conduit Exposed To Sunlight on Rooftops.

This new sub-section was added to read:

"Where conductors or cables are installed in conduits exposed to direct sunlight on or above rooftops, the adjustments shown in Table 310.15(B)(2)(c) shall be added to the outdoor temperature to determine the applicable ambient temperature for application of the correction factors in Tables 310.6 and 310.18."

Analysis of Change:

This new section provides requirements, which include Tables containing Adjustment Factors that must be applied where conductors or cables are installed in conduit exposed to sunlight on rooftops. Section 310.10 stipulates that no conductor shall be used in such a manner that its operating temperature exceeds that designated for the insulated conductor involved. This may result in the installer using hardware or other means to elevate the raceways to allow the adjusted ampacity of the conductors to be installed as designed.

T&B Product:
Strut and Hardware

Photo courtesy of IAEI.

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

Section 314.16(B)(4) Number of Conductors in Outlet, Device and Junction Boxes, and Conduit Bodies; Box Fill Calculations; Device or Equipment Fill.

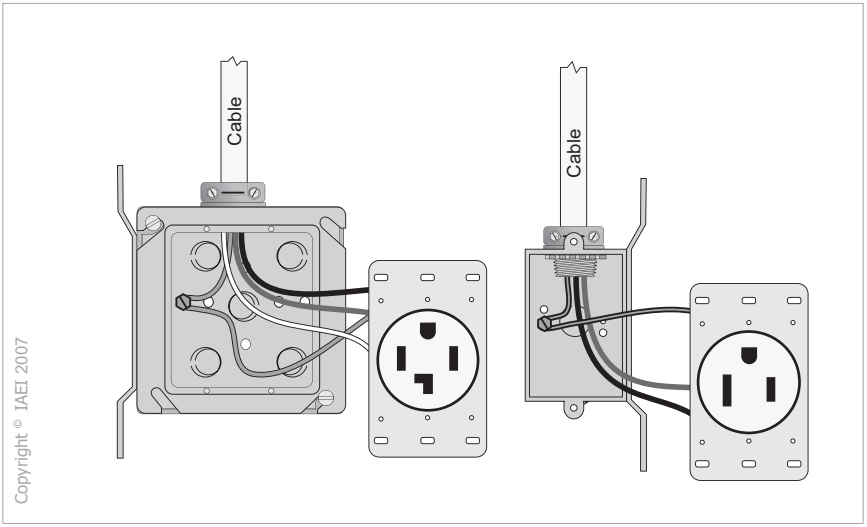
The following wording was added to the end of the Section:

"A device or utilization equipment wider than a single 50 mm (2 in.) device box as described in Table 314.16(A) shall have double volume allowances provided for each gang required for mounting."

Analysis of Change:

Devices that are too large to be mounted in a standard 50 mm (2 in.) device box and are therefore installed in a multi-gang box will carry the volume allowance for each gang.

T&B Product: Outlet and Device Boxes



Section 314.22 Exception Surface Extensions.

Revised Surface Extensions to read:

"Surface extensions shall be made by mounting and mechanically securing an extension ring over the box. Equipment grounding shall be in accordance with Part VI of Article 250.

Exception: A surface extension shall be permitted to be made from the cover of a box where the cover is designed so it is unlikely to fall off or be removed if its securing means becomes loose. The wiring method shall be flexible for a length sufficient to permit removal of the cover and provide access to the box interior, and arranged so that any grounding continuity is independent of the connection between the box and cover."

Analysis of Change:

The section was revised to clarify that surface extensions are permitted to be used on any box, not just flush box. All instances of the term flush-mounted were removed.

T&B Product: Outlet and Device Boxes

Section 314.24 Minimum Depth of Boxes

T&B Product:
Outlet and Device Boxes

Replace the existing requirement with the following:

"Outlet and device boxes shall have sufficient depth to allow equipment installed within them to be mounted properly and with sufficient clearance to prevent damage to conductors within the box.

(A) Outlet Boxes Without Enclosed Devices or Utilization Equipment. No box shall have an internal depth of less than 12.7 mm (½ in.).

(B) Outlet and Device Boxes with Enclosed Devices. Boxes intended to enclose flush devices shall have an internal depth of not less than 23.8 mm (15⁄16 in.).

(C) Utilization Equipment. Outlet and device boxes that enclose 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 utilization 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 (1) through (5).

(1) Larger Equipment. Boxes that enclose utilization equipment that projects more than 48 mm (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 6 mm (¼ in.).

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

(3) Conductors 8, 6 or 4 AWG. Boxes that enclose utilization equipment supplied by 8, 6 or 4 AWG conductors shall have an internal depth that is not less than 52.4 mm (2⅛ in.).

(4) Conductors 12 or 10 AWG. Boxes that enclose utilization equipment supplied by 12 or 10 AWG conductors shall have an internal depth that is not less than 30.2 mm (1⅜ in.). Where the equipment projects rearward from the mounting plane of the box by more than 25 mm (1 in.), the box shall have a depth not less than that of the equipment plus 6 mm (¼ in.).

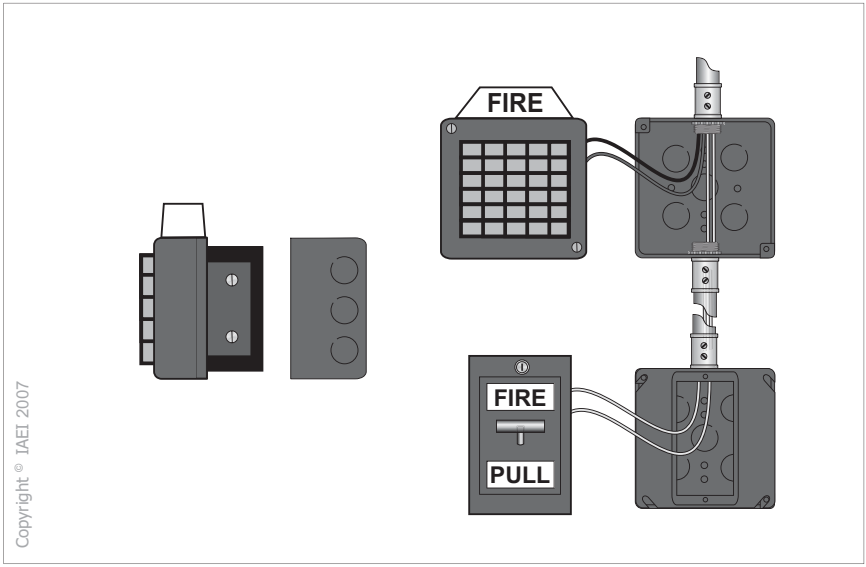
Exception to (1) through (2): Utilization equipment that is listed to be installed with specified boxes shall be permitted."

Section 314.24 (continued)

Analysis of Change:

This proposal was the work of a Task Group set up to review a proposal to the 2005 Code regarding inadequate box sizing requirements for enclosed utilization equipment. The change takes into consideration the rearward projection of the equipment and the size of the conductors that supply the equipment. The changes intend to address installation of utilization equipment in boxes, such as fire alarm signals, that often have deeper rearward projections than previously anticipated for wiring devices.

T&B Product:
Outlet and Device Boxes



Copyright © IAEI 2007

Section 314.27(A) and (B) Outlet Boxes; Boxes at Luminaire (Lighting Fixture) Outlets and Maximum Luminaire (Fixture) Weight.

T&B Product:
Outlet and Device Boxes

Revise the wording to read:

"(A) Boxes at Luminaire (Lighting Fixture) Outlets. Boxes used at luminaire (lighting fixture) or lampholder outlets in a ceiling shall be designed for the purpose and shall be required to support a luminaire (light fixture) weighing a minimum of 23 kg (50 lb.). Boxes used at luminaire (lighting fixture) or lamp holder outlets in a wall shall be designed for the purpose and shall be marked on the interior of the box to indicate the maximum weight of the luminaire (light fixture) that is permitted to be supported by the box in the wall if other than 23 kg (50 lb.). At every outlet used exclusively for lighting, the box shall be designed or installed so that a luminaire (lighting fixture) may be attached.

Exception: A wall-mounted luminaire (fixture) 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 (fixture) or its supporting yoke is secured to the box with no fewer than two No. 6 or larger screws.

(B) Maximum Luminaire (Fixture) Weight. Outlet boxes or fittings designed for the support of luminaires (lighting fixtures) and installed as required by 314.23 shall be permitted to support a luminaire (lighting fixture) weighing 23 kg (50 lb.) or less. A luminaire (lighting fixture) that weighs more than 23 kg (50 lb.) shall be supported independently of the outlet box unless the box is listed and marked for the maximum weight to be supported."

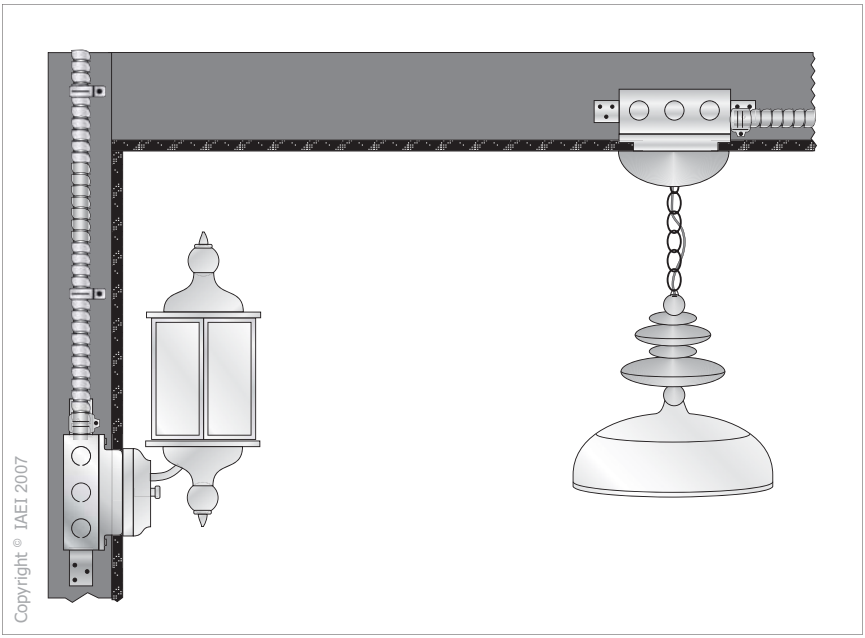
Section 314.27(A) and (B) (continued)

Analysis of Change:

The purpose of this change is to clarify the requirements for listed boxes used to support luminaires. Ceiling boxes must be designed to support luminaires weighing up to 50 lb. Boxes used at luminaire outlets in a wall must also be designed to support luminaires weighing up to 50 lb., or the maximum luminaire weight that the box is designed to support must be marked on the inside of the box. A wall mounted luminaire that weighs no more than 6 lb. can be supported on other boxes or plaster rings that are secured on the other boxes provided the luminaire or its supporting yoke is secured to the box with no fewer than two No. 6 or larger screws.

A luminaire that weighs more than 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.

T&B Product: Outlet and Device Boxes



Copyright © IAEI 2007

Section 314.27(E)(NEW) Outlet Boxes; Utilization Equipment

Add a new Section to read:

"Utilization Equipment. Boxes used for the support of utilization equipment other than ceiling-suspended (paddle) fans shall meet the requirements of 314.27 (A) and (B) for the support of a luminaire (fixture) that is the same size and weight.

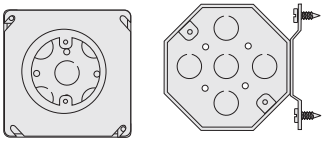
Exception: Utilization equipment weighing not more than 6 lb. shall be permitted to be supported on other boxes or plaster rings that are secured to other boxes, provided the equipment or its supporting yoke is secured to the box with no fewer than two No. 6 or larger screws.

Analysis of Change:

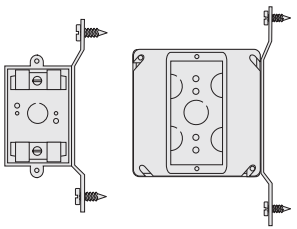
The change was adopted because there was no Code language that determined whether smoke detectors and the like installed in ceilings needed to be mounted on the outlet boxes as opposed to device boxes. Acceptance of this proposal provides the guidelines for acceptable practice.

T&B Product:
Outlet and Device Boxes

Boxes used for the support of utilization equipment other than ceiling-suspended (paddle) fans shall meet the requirements of 314.27(A) and (B) for the support of a luminaire that is the same size and weight.



By exception, utilization equipment weighing not more than 3 kg (6 lb) are permitted to be secured to boxes or plaster rings with not fewer than two No. 6 machine screws.



Unlike the exception for luminaires, this exception also applies to other ceiling-mounted equipment.

Copyright © IAEI 2007

Section 314.28(A)(2) Pull and Junction Boxes; Minimum Size; Angle or U Pulls.

Change the title to "Angle or U Pulls, or Splices"

Analysis of Change:

The change in title was made so that it was clear to the user that sizing of junction boxes was covered in 314.28(A)(2).

T&B Product: Outlet and Device Boxes

Outlet, Device, Pull, and Function Boxes; Conduit Bodies; Fittings; and Handhole Enclosures (continued)

Section 314.30 Handhole Enclosures.

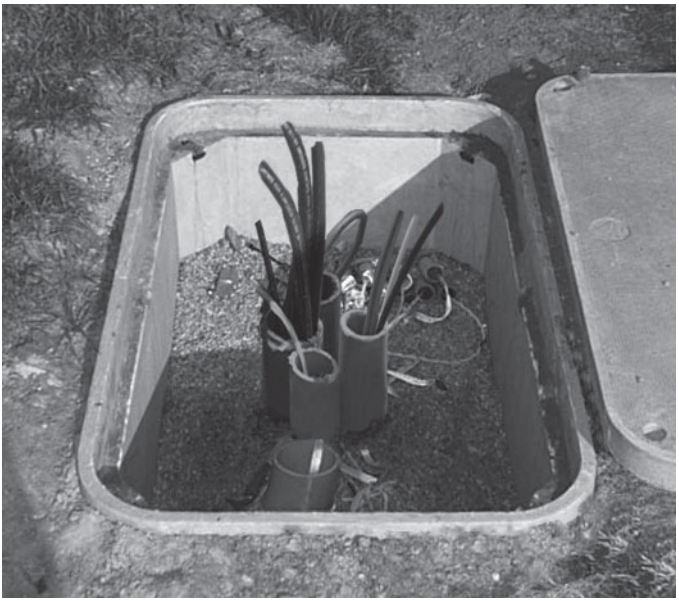
Revise the definition by adding the words "shall be identified for use in underground systems and…." so it reads:

T&B Product:
Information

"Handhole enclosures shall be identified for use in underground systems and shall be designed and installed to withstand all loads likely to be imposed on them."

Analysis of Change:

The changes reviewed here were made to correlate with the deletion of the word "identified" in the definition of Handhole in Article 100, because definitions are not permitted to contain requirements. This section now contains the requirement that the handhole must be "identified" for use in underground systems.



Section 314.30(C) Handhole Enclosures; Handhole Enclosures Without Bottoms.

Revise the text to read:

"All enclosed conductors and any splices or terminations, if present, shall be listed as suitable for wet locations."

T&B Product:
Information

Analysis of Change:

The interior of a Handhole Enclosure is classified as a wet location regardless of whether it has a bottom or not.

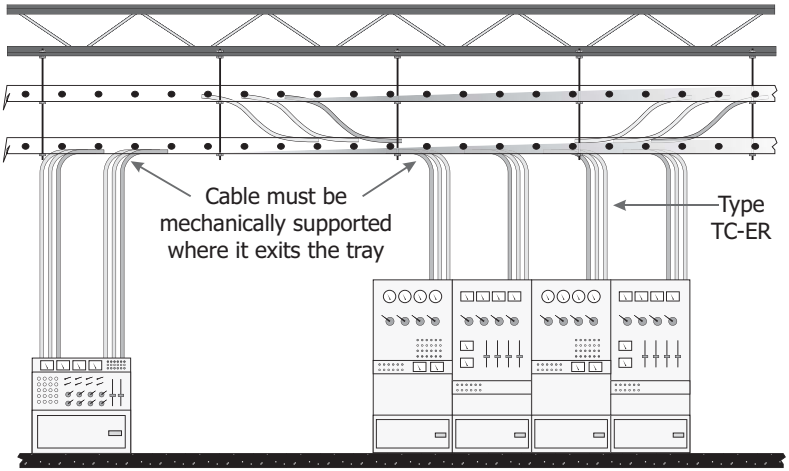
Section 336.10 Uses Permitted.

T&B Product:
Cable Tray

Add a new Exception to 336.10(7) that states that Type TC-ER can transition between cable trays a distance not to exceed 1.8 m (6 ft.). It must also be mechanically supported where exiting the cable tray to assure that the minimum-bending radius is not exceeded.

Analysis of Change:

This change clarifies that a proper installation of Type TC cable with the crush and impact requirements of Type MC cable, identified with the marking "Type TC-ER" (Tray Cable-Exposed Run) can be accomplished if the transition distance doesn't exceed 1.8 m (6 ft.) and the cable-bending radius isn't exceeded.



Permitted to transition between cable trays and utilization equipment without continuous support for a distance not to exceed 1.8 m (6 ft).

Copyright © IAEI 2007

Section 342.30(C) Securing and Supporting; Unsupported Raceways.

Add a new (C) to state:

"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, device box, cabinet, or other termination at each end of the raceway."

Analysis of Change:

If a raceway is run between two cabinets in unbroken lengths, that are located 18 in. or less apart, and oversized, concentric or eccentric knockouts do not exist, there is no support requirement for the raceway. If oversized, concentric or eccentric knockouts are utilized, or the raceway has a coupling, there must be support. The Code doesn't say where or how many supports are required, only that support is required. This also means that any raceway installations between termination points exceeding 18 in. apart must be supported.

Note:

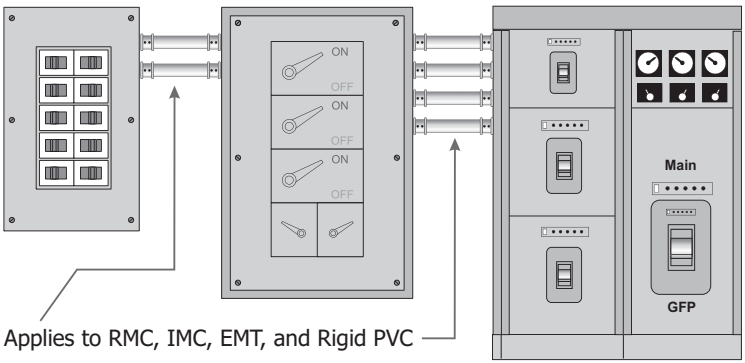
This is the same change that was also approved for the following Articles:

334 – Type RMC

352 – Type RNC

358 – Type EMT

T&B Product:
Pipe Straps



Copyright © IAEI 2007

Section 344.2 Definition.

Replace the term “silicon bronze” with the term “red brass.”

Analysis of Change:

Silicon bronze conduit is no longer being produced. Red brass conduit was added to the Code for direct burial and swimming pool applications.

T&B Product: Fittings

Section 344.10(A), (B) and (C) Uses Permitted; All Atmospheric Conditions and Occupancies; Corrosion Environments; Cinder Fill.

Red brass RMC and aluminum RMC were re-written under 344.10(A) as follows:

T&B Product:
Conduit Fittings, OCAL

"2. Red brass RMC shall be permitted to be installed for direct burial and swimming pool applications.

3. Aluminum RMC shall be permitted to be installed where judged suitable for the environment. Rigid aluminum conduit encased in concrete or in direct contact with the earth shall be provided with approved supplementary corrosion protection."

The Corrosive Environments section 344.10(B) was rewritten for aluminum RMC and conduit with approved supplementary protection.

"2. Aluminum RMC shall be provided with approved supplementary corrosion protection where encased in concrete or in direct contact with the earth.

FPN: The galvanizing on steel (ferrous) RMC provides corrosion protection. The AHJ may require supplementary corrosion protection for severely corrosive environments. Where aluminum (non-ferrous) RMC is encased in concrete or direct buried, approved supplementary corrosion protection is required. This protection can be provided in a variety of ways including factory PVC-coating, tape wrapping, or painting with zinc-rich paint."

Analysis of Change:

This change added clarity to the uses permitted for RMC. There was confusion regarding what types of conduit needed supplementary protection if installed in contact with the soil. In particular, the uses for red brass RMC and aluminum RMC were identified.

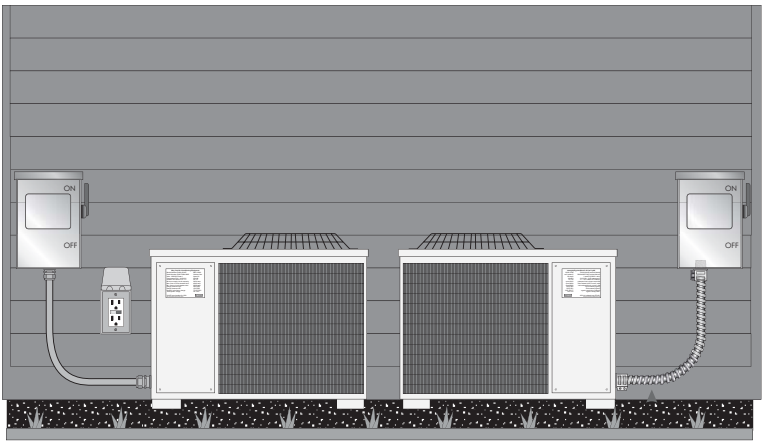
Section 348.12(1) Uses Not Permitted.

Delete the wording "..unless the conductors are approved for the specific conditions and the installation is such that liquid is not likely to enter raceways or enclosures to which the conduit is connected."

Analysis of Change:

Flexible metal conduit is no longer permitted to be used in wet locations. FMC does not have a continuous outer surface that would prohibit the entrance of water. Liquidtight conduit is specifically made so that liquid is not likely to enter the conduit system.

T&B Product: Liquidtight Conduit and Fittings



Copyright © IAEI 2007

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

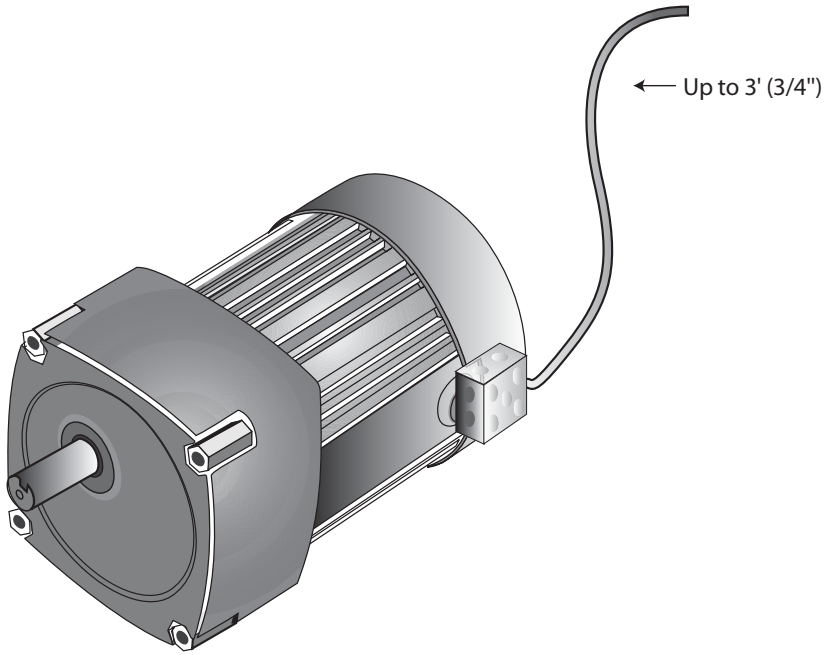
Replace the terminology “is required” with “installed for”.

Exception No. 2 will now read: “Where flexibility is necessary after installation, lengths shall not exceed…”

Analysis of Change:

The panel agreed that the term “is required” is too restrictive and didn’t provide the user with a clear understanding that FMC is approved to be installed where flexibility is needed for the specific application.

T&B Product:
Conduit Fittings



Section 348.60 Grounding and Bonding

Add the term "after installation" to the Grounding and Bonding section so it reads:

"Where used to connect equipment where flexibility is required after installation, an equipment grounding conductor shall be installed….Where flexibility is not required after installation, FMC shall be permitted to be used as an equipment grounding conductor…."

Analysis of Change:

This change was made for consistency between the current wording of 250.118(5) and this section. It also provides clarity and eliminates confusion.

T&B Product: Conduit Fittings

Section 350.30(A) Securing and Supporting; Securely Fastened.

Revise Exception No. 2 to read:

"Where flexibility is necessary after installation, lengths shall not exceed the following:

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

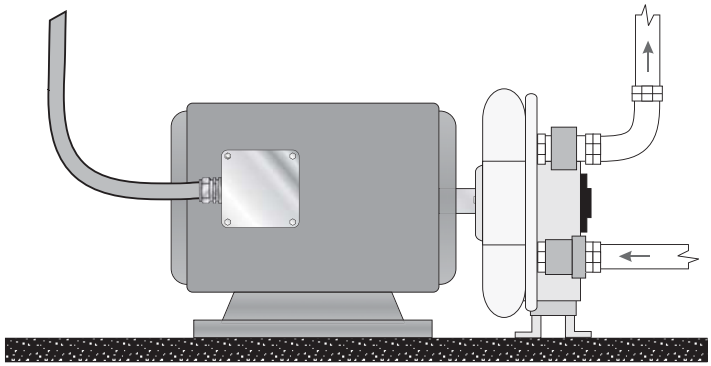
(2) 1200 mm (4 ft.) for metric designators 41 through 53 (trade sizes 1½ though 2)

(3) 1500 mm (5 ft.) for metric designators 63 (trade size 2½) and larger."

Analysis of Change:

Allowing extended lengths for the support of LFMC will provide consistency with a change to FMC that was approved for the 2005 Code.

T&B Product:
Liquidtight Fittings



Copyright © IAEI 2007

Section 350.60 Grounding and Bonding

T&B Product:
Liquidtight Fittings

Added the words "after installation" to the requirement of when an equipment grounding conductor must be installed. The new wording shall read:

"Where used to connect equipment where flexibility is necessary after installation, an equipment grounding conductor shall be installed….Where flexibility after installation is not required, LFMC shall be permitted to be used as an equipment grounding conductor when installed in accordance with 250.118(6)"

Analysis of Change:

This change was made for consistency between the current wording of 250.118(6) and this Article. It also provides clarity and eliminates confusion.

Section Entire Article

Revise the entire Article to replace the word "nonmetallic" and the acronym "RNC" with "polyvinyl chloride" and "PVC" respectively.

T&B Product:
Information

Analysis of Change:

This change correlates with the addition of a new Article 355 Reinforced Thermosetting resin Conduit: Type RTRC. Prior to the 2005 edition of the NEC, Article 352 included three forms of Rigid Nonmetallic conduit: Type RNC; PVC, HDPE and RTRC. The 2005 edition recognized new Article 353 High Density Polyethylene Conduit: Type HDPE and now the 2008 edition will recognize new Article 355 Reinforced Thermosetting Resin Conduit: Type RTRC. This particular change to Article 352 isolates the requirements for the polyvinyl chloride conduit: Type PVC in one Article.

Section 352.10 Used Permitted; Exposed.

Add a FPN (Fine Print Note) to 352.10(F) that reads:

"PVC conduit, Type schedule 80, is identified for areas of physical damage."

Analysis of Change:

Section 352.10(F) was revised for clarity so that it was understood that Schedule 80 PVC was listed to be used in areas where subject to physical damage.

T&B Product:
Information

Photo courtesy of IAEI.

Section 352.10(G) Uses Permitted; Underground Installations.

T&B Product:
Information

The text was revised to read as follows:

"For underground installations, homogeneous, and non-homogeneous PVC shall be permitted for direct burial and underground encased in concrete…"

Section 352.100 Construction

The text was revised to read as follows:

"PVC conduit shall be made of rigid (nonplasticized) polyvinyl chloride (PVC)".

Analysis of Change:

The foam core product as manufactured today, meeting all the criteria set forth in 352.100, and listed to UL651 can be applied in accordance with Article 352 without restrictions. It should be noted that couplings and connectors that support the foam core product are the standard PVC fittings currently manufactured for the PVC conduit covered by Article 352.

Photo courtesy of IAEI.

Section 352.12(A) Uses Not Permitted; Hazardous (Classified) Locations

T&B Product:
Information

Delete the specific references to hazardous (classified) locations by changing the wording as follows:

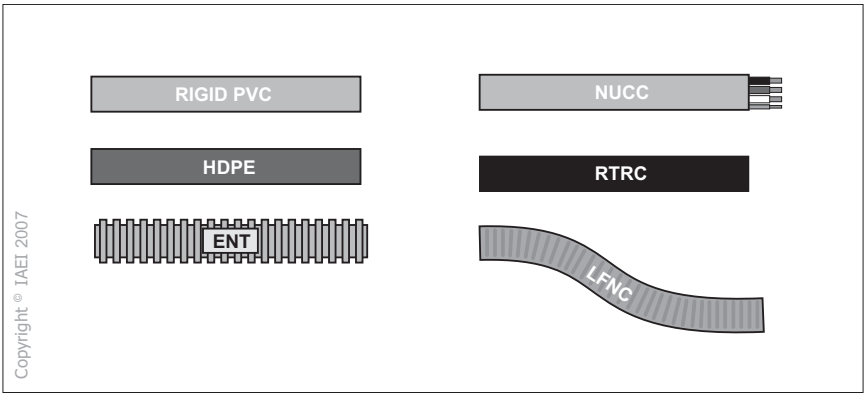
"In any hazardous (classified) locations, except as permitted by other Articles in this Code."

Note: This same change was also approved for the following Articles:

353 – Type HDPE conduit
354 – Type NUCC
356 – Type LFNC
358 – Type EMT
362 – Type ENT
372 – Cellular Concrete Floor Raceway
374 – Cellular Metal Floor Raceway
378 – Nonmetallic Wireways
380 – Multioutlet Assemblies
388 – Surface Nonmetallic Raceways

Analysis of Change:

The text in "Uses Not Permitted" in all of the above Articles for the 2005 Code didn't agree with all the potential applications for that particular raceway in hazardous (classified) locations, it was too limiting. The revised wording directs the user to the individual hazardous (classified) locations Article for the list of approved raceways.



Copyright © IAEI 2007

Section 355 (NEW) Entire Article

Add a new Article 355 to cover Type RTRC. This new Article is written without change from information taken from Article 352.

T&B Product:
Information

Analysis of Change:

Prior to the 2005 edition of the NEC, Article 352 included three forms of Rigid Nonmetallic Conduit: Type RNC; PVC, HDPE and RTRC. The 2005 edition recognized new Article 353 High Density Polyethylene Conduit: Type HDPE and now the 2008 edition will recognize new Article 355 Reinforced Thermosetting Resin Conduit: Type RTRC. The inclusion of this Article will also isolate the requirements for polyvinyl chloride conduit: Type PVC in one Article 352.

Section 360.20(A) (Exception No. 2) Size; Minimum

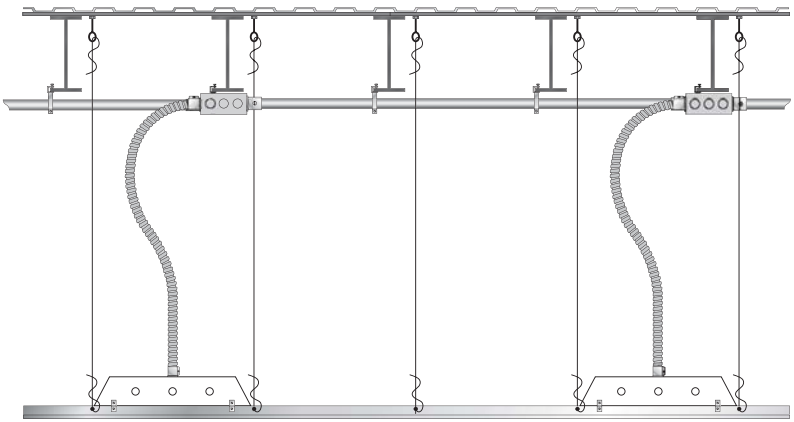
Change the word “approved” with “listed” so the exception reads:

“FMT of metric designator 12 (trade size ⅜) shall be permitted in lengths not in excess of 1.8 m (6 ft.) as part of a listed assembly or for luminaires (lighting fixtures). See 410.67(C).”

Analysis of Change:

The term “approved” means acceptable to the authority having jurisdiction. The assembly referenced in this section is a listed assembly and the AHJ can base his approval on the fact that the assembly is listed.

T&B Product:
FMT Fittings



Copyright © IAEI 2007

Section 362.30(A) (Exception No. 3)(NEW) Securing and Supporting; Securely Fastened.

Add Exception No. 3 to cover applications where ENT is fished.

"For concealed work in finished buildings or prefinished wall panels where such securing is impracticable, unbroken lengths (without coupling) of ENT shall be permitted to be fished."

Analysis of Change:

ENT's flexibility allows it to be fished between access points for the protection of conductors and communication cabling in accordance with 300.4(D)(Exception No. 2).

T&B Product:
Information

Copyright © TAEI 2007

Section 376.56(B)(4) Splices, Taps, and Power Distribution Blocks; Power Distribution Blocks; Live Parts.

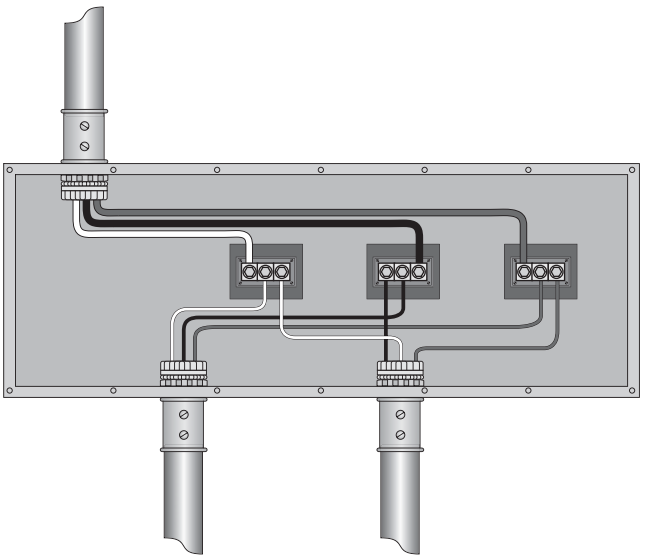
Change the wording to state:

"Power distribution blocks shall not have uninsulated live parts exposed within a wireway, whether or not the wireway cover is installed."

Analysis of Change:

The change to the 2005 Code needed clarification and this change makes it clear that the prohibition applies to uninsulated live parts in a wireway with or without a cover.

T&B Product: Power Distribution Blocks



Copyright © IAEI 2007

Section 382.2 Definition

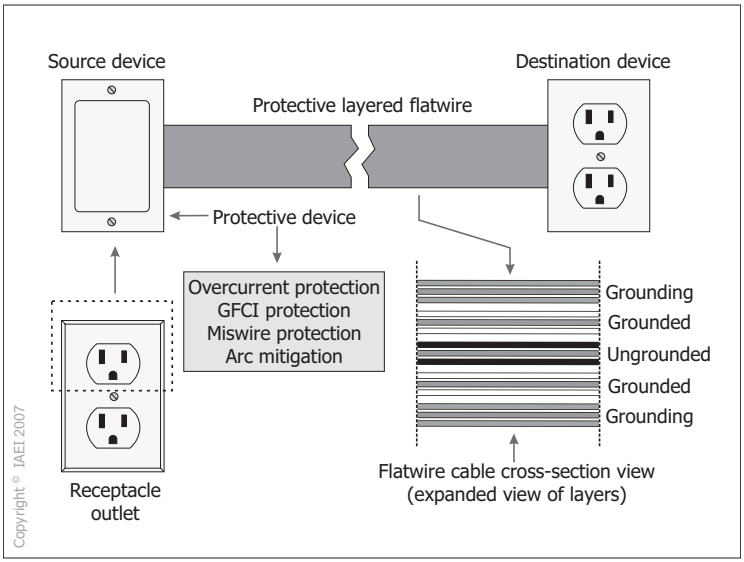
T&B Product:
Information

Revise the definition to cover concealable nonmetallic extensions and reword as follows:

"A Listed assembly of two, three, or four insulated circuit conductors within a nonmetallic jacket, an extruded thermoplastic covering, or a sealed nonmetallic covering. The classification includes surface extensions intended for mounting directly on the surface of walls or ceiling, and concealed with plaster, wallpaper, tile, wall paneling, or other similar materials."

Analysis of Change:

This change and others add a definition and requirements for Concealable Nonmetallic Extensions, a wiring method that can be concealed on the surface of walls and ceilings. Concealable Nonmetallic Extensions meeting these new requirements will serve as a safe alternative to the use of extension cords. The flat wire cable is a multi-layer flat conductor design consisting of a center ungrounded conductor enclosed by a sectioned grounded conductor, and an overall grounding conductor. Installation of this cable system is not subject to the protection from nails and screws typically required for concealed nonmetallic wiring systems and provided by the 1¼ in. installation depth requirement because of the five levels of protection required; 1)Supplementary over-current protection, 2) Level of protection equivalent to a Class A GFCI, 3) Level of protection equivalent to a portable GFCI, 4)Line and load-side miswire protection, 5) Provide protection from the effects of arc faults.



Section Table 384.22

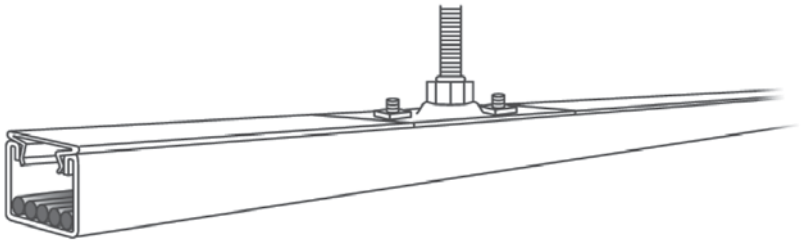
Change the title as follows:

Channel Size and Inside Cross Sectional Area

Analysis of Change:

The word “diameter” leads one to believe that the inside of strut is circular, so the title of the Table was wrong.

T&B Product: Strut Products



Section 388.30 Securing and Supporting.

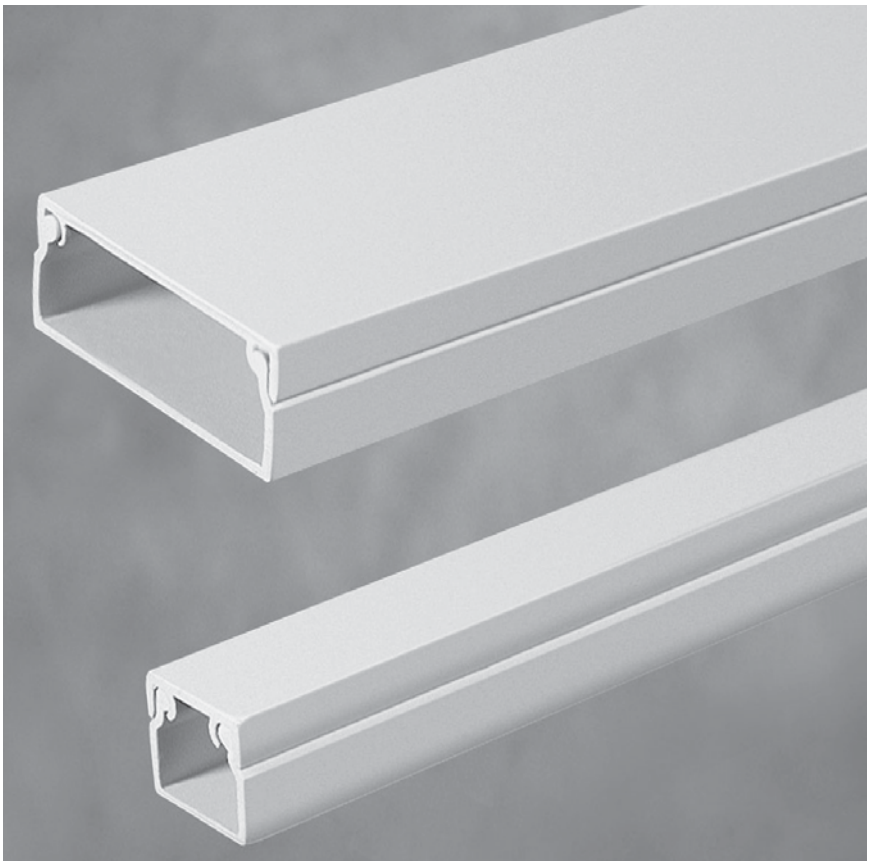
T&B Product:
Information

The wording for Securing and Supporting was added as follows:

"Surface nonmetallic raceways shall be supported at intervals in accordance with the manufacturer's installation instructions."

Analysis of Change:

The wording was added for consistency between the surface metal raceway Article 386 and this Article 388 Surface Nonmetallic Raceways. The wording for Article 386 was added during the 2005 cycle.



Section 388.56 Splices and Taps.

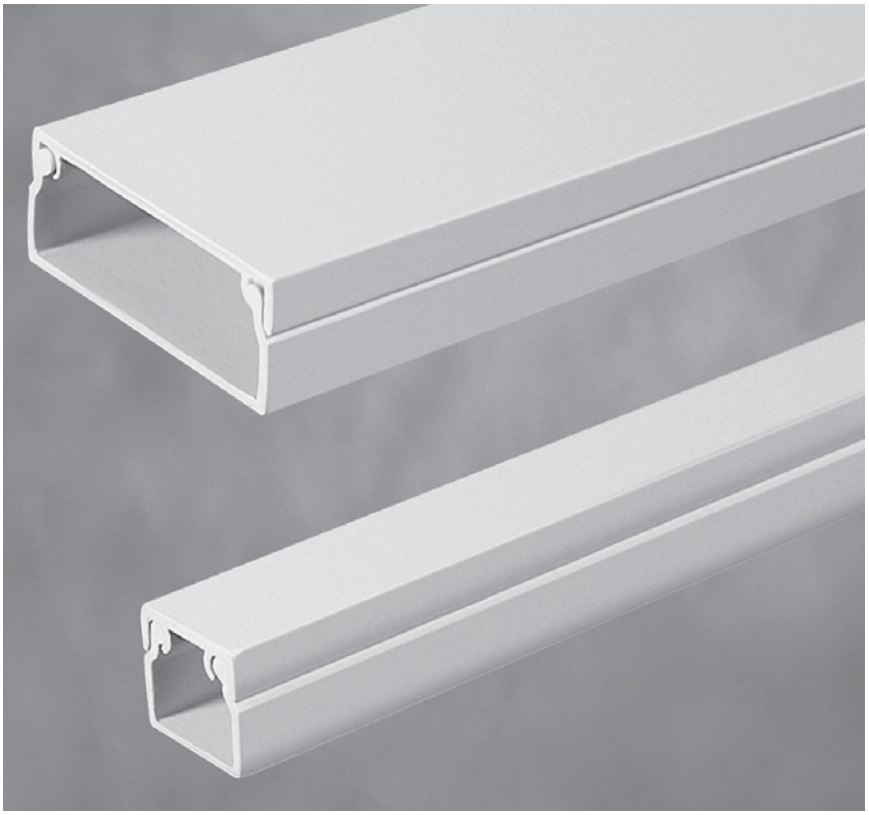
T&B Product:
Information

Revised wording shall read:

"Splices and taps shall be permitted in surface nonmetallic raceways having a cover capable of being opened in place that is accessible after installation. The conductors, including splices and taps, shall not fill the raceway to more than 75 percent of its area at that point. Splices and taps in surface nonmetallic raceways without covers capable of being opened in place shall be made only in boxes. All splices and taps shall be made by approved methods."

Analysis of Change:

The wording in the 2005 Code was unclear. It implied that a hinged cover that could not be removed might not qualify. The new wording provides access where it is required.



Section 392.11(C) Combinations of Multiconductor and Single-Conductor Cables.

T&B Product:
Cable Tray

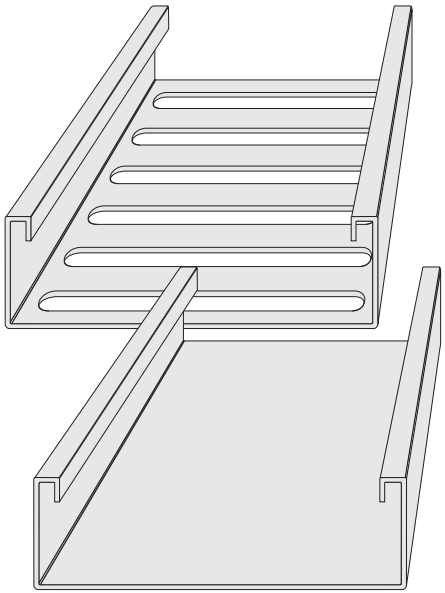
Because the current wording did not cover installations of combinations of multiconductor and single conductor cables, the allowable ampacities shall be as given in 392.11(A) for multiconductor cables and 392.11(B) for single-conductor cables, provided that:

(1) The sum of the multiconductor cable fill area as a percentage of the allowable fill area for the tray calculated per 392.9, and the single-conductor cable fill area as a percentage of the allowable fill area for the tray calculated per 392.10, totals not more than 100%.

(2) Multiconductor cables are installed according to 392.9 and single conductor cables are installed according to 392.10 and 392.8(D) and (E).

Analysis of Change:

Previously the NEC provided no guidance when both single conductor and multiconductor cables were installed in the same tray. This change states that the installation shall not exceed the fill requirements for each type of cable as if installed in its own tray and that all installation requirements and ampacity limits for each cable type apply.



Section 404.4 Damp or Wet Locations

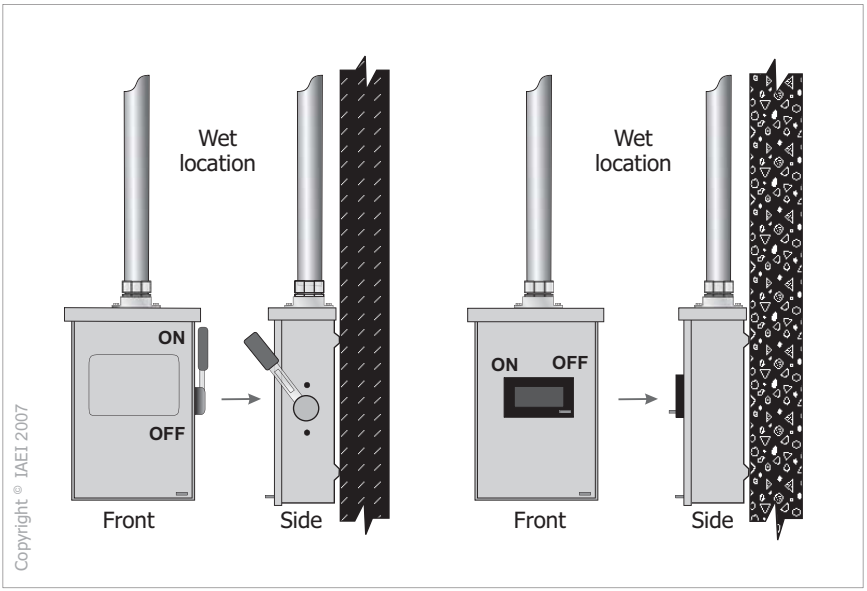
T&B Product:
Weatherproof Covers

Delete the term "or outside a building" from the Section so that it will read:

"Damp or Wet Locations. A surface mounted switch or circuit breaker in a damp or wet location shall be enclosed in a weatherproof enclosure or cabinet that shall comply with 312.2(A). A flush mounted switch or circuit breaker in a damp or wet location shall be equipped with a weatherproof cover. Switches shall not be installed within wet locations in tub or shower spaces unless installed as part of a listed tub or shower assembly."

Analysis of Change:

The change was written because all locations outside a building are not wet locations. This change was done to correlate with other Sections in the Code.



Copyright © IAEI 2007

Section 404.9(B)(1)

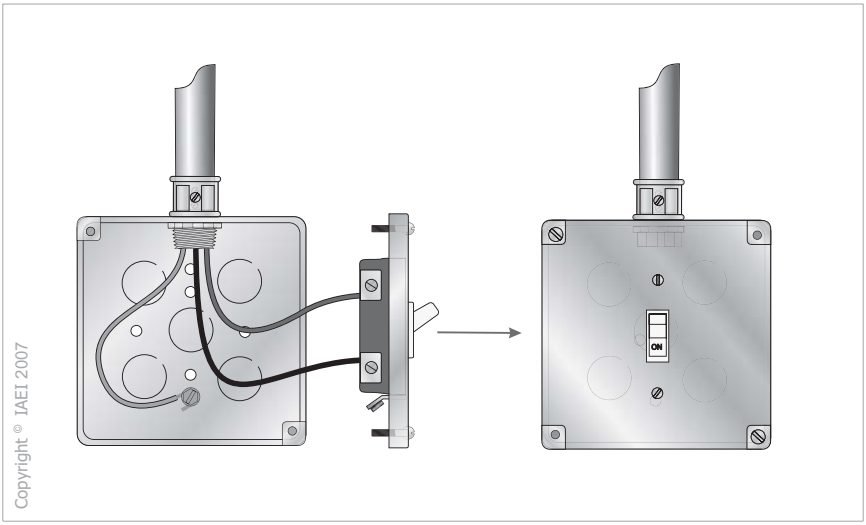
Revise the snap switch section to read:

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

Analysis of Change:

The wording as it appeared in previous Codes did not provide coverage for snap switches mounted in raised covers. The wording for receptacles was added in the 1996 Code and the requirements for snap switches are less severe than for receptacles.

T&B Product: Raised Steel Outlet Box Covers



Copyright © IAEI 2007

Section 406.4(D) Receptacle Mounting; Position of Receptacle Faces. Exception Number 2

T&B Product:
None – Information Only

The exception was deleted:

"Listed nonmetallic faceplates that cover the receptacle face to a maximum thickness of 1mm (0.040 in.) shall be permitted."

Analysis of Change:

This removal no longer allows the decorative receptacle cover that completely covers the face of a receptacle. Technical concerns included a reduction in the insertion of the plug into the receptacle as well as the inability to identify a damaged or worn receptacle that is hidden behind the cover.

Section 406.8(A) Receptacles in Damp or Wet Locations; Damp Locations

This section was revised impacting the last paragraph as follows: A receptacle shall be considered to be in a location protected from the weather where located under roofed open porches, canopies, marquees, and the like, and will not be subjected to a beating rain or water runoff. All nonlocking 15- and 20-ampere, 125- and 250-volt receptacles shall be a listed weather-resistant type.

FPN: The types of receptacles covered by this requirement are identified as 5-15, 5-20, 6-15, and 6-20 in ANSI/NEMA WD 6-2002, National Electrical Manufacturers Association Standard for Dimensions of Attachment Plugs and Receptacles.

Section 406.8(B) Receptacles in Damp or Wet Locations; Wet Locations; 15 and 20 Ampere Receptacles in a Wet Location.

This section was revised to add the requirement: The receptacles conforming to the configurations shown in Figure 406.8(B) shall be Listed weather-resistant type.

FPN: Complete details of the configurations can be found in ANSI/NEMA WD6, National Electrical Manufacturers Association Standard for Dimensions of Attachment Plugs and Receptacles.

Analysis of Change:

This change adds new requirements for receptacles installed in damp and wet locations. Receptacles installed in these areas must be listed as “weather-resistant” type. This is a new listing requirement for receptacles.

T&B Product:
Outlet Boxes and Covers

Receptacles, Cord Connectors, and Attachment Plugs (Caps) (continued)

Section 406.8B(1) Receptacles in Damp or Wet Locations; Wet Locations; 15 and 20 Ampere Receptacles in a Wet Location

T&B Product:
Outlet Boxes and Covers

The section was revised to add an exception:

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

Analysis of Change:

This change continues the allowance of flip-cap style receptacle covers to be used in a wet location. The substantiation was that in spray washing areas, the weatherproof while in use cover may not be suitable to provide adequate sealing.

Section 406.11 (NEW) Tamper Resistant Receptacles in Dwelling Units.

In all areas specified in 210.52, all 125-volt, 15- and 20-ampere receptacles shall be listed tamper resistant receptacles. This is a new section for the 2008 NEC.

Analysis of Change:

A new requirement was added to use listed tamper-resistant receptacles in dwelling unit receptacle outlets as described in 210.52. This includes floor boxes for use in dwellings.

T&B Product: Outlet Boxes, Covers, and Floor Boxes

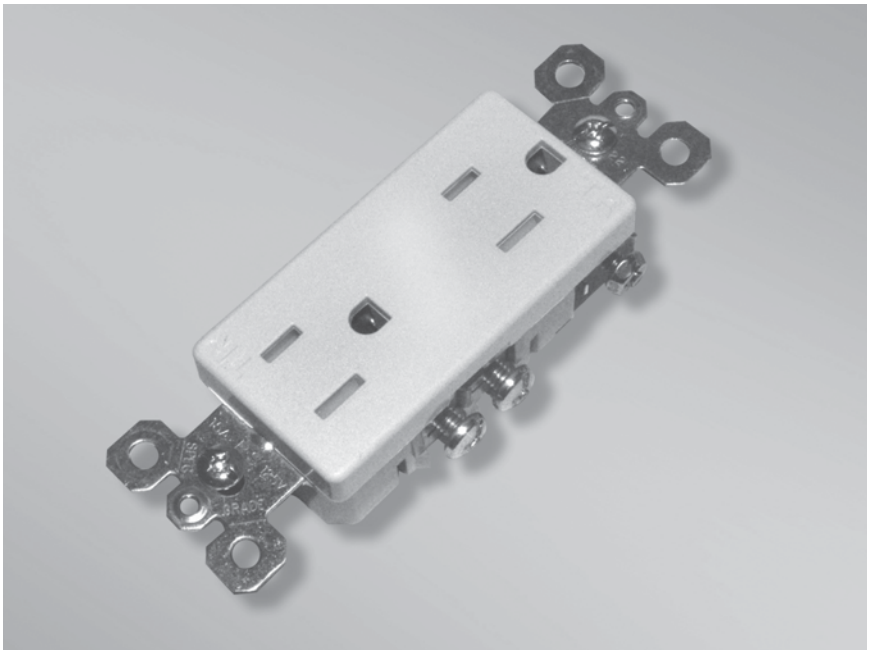


Photo courtesy of IAEI.

Section 409.2 Definitions Industrial Control Panel.

An assembly of two or more components consisting of

(a) power circuit components only, such as motor controllers, overload relays, fused disconnect switches, and circuit breakers, or

(b) control circuit components only, such as pushbuttons, pilot lights, selector switches, timers, switches, control relays, or

(c) a combination of power and control circuit components.

These components, with associated wiring and terminals, are mounted on or contained within an enclosure or mounted on a sub-panel. The industrial control panel does not include the controlled equipment.

Analysis of Change:

This change clarifies that some panels may be constructed solely of control components. This change correlates with changes to 409.110(3), which clarifies that short circuit current rating markings are not required for industrial control panels containing only control circuit components.

T&B Product: Power Distribution Blocks

Article 410 Luminaires, Lampholders and Lamps

The article was revised to move the definitions to 410.2 and re-number the article to accommodate this change as well as provide for future additional sections. In addition the luminaire (lighting fixture) term was revised to drop the (lighting fixture) portion.

T&B Product:
Landscape Lighting

Analysis of Change:

The article was re-numbered to match the format of other sections. The term (lighting fixture) was removed throughout the NEC because the code making panels felt that two cycles was long enough to transition to the term luminaire.

Section 410.6 Listing Requirements.

The section requires all luminaires and lampholders shall be listed.

Analysis of Change:

This is a new requirement for article 410. Previously, there were a few specific items that required listing, such as luminaires installed in a closet.

T&B Product: Landscape Lighting

Section 410.130(G) Special Provisions for Electric Discharge Lighting Systems of 1,000 Volts or Less; General; Disconnecting Means

T&B Product:
Luminaire Disconnect

The section was revised to include the disconnecting means requirement, originally in 410.73(G). The grounded conductor must be disconnected on multi-wire branch circuits. When the disconnecting means is external to the luminaire, it shall be in sight of the luminaire. Exceptions to the requirement include hazardous locations, emergency lighting, cord/plug connected luminaires, and in industrial establishments with qualified supervision.

Analysis of Change:

This requirement provides a safety mechanism for electricians, where shutting off the branch circuit is not an option. The requirement acknowledges the practice of working on energized luminaires. The most popular method of complying with this requirement will be the use of an internal plug/receptacle type disconnect. A new safety standard, UL2459, was developed for this application. Products listed as a luminaire disconnect (multi-pole splicing wire connector), are limited to ten cycles of making and breaking under load.

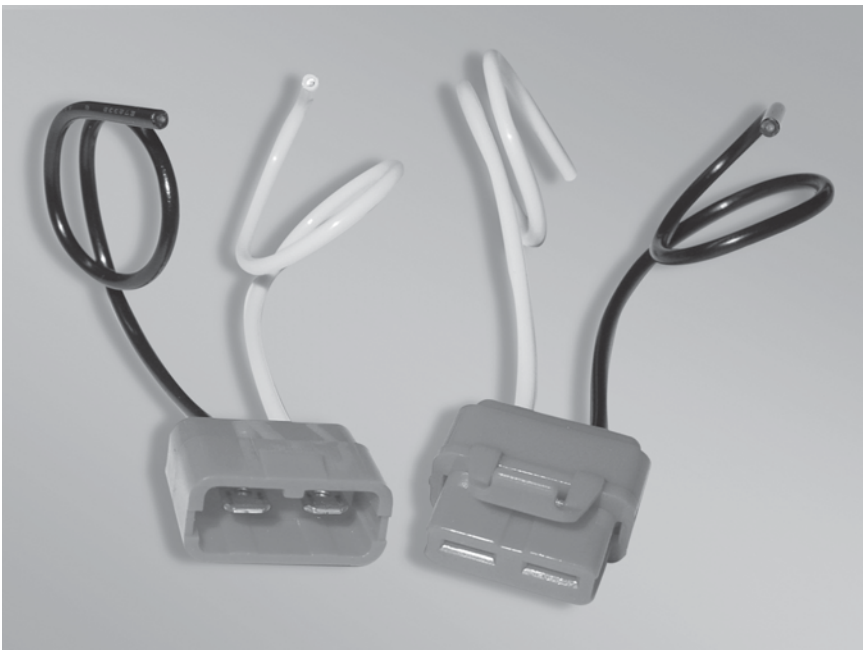


Photo courtesy of IAEI.

Section 424.19 Disconnecting Means

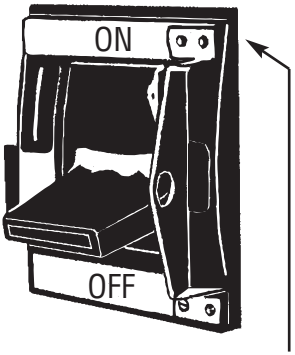
T&B Product:
Identification Means

Add a sentence to the end of the Section to read:

"The provision for locking or adding a lock to the disconnecting means shall be installed on or at the switch or circuit breaker used as the disconnecting means and shall remain in place with or without the lock installed."

Analysis of Change:

This change clarified that the locking means must be permanently installed and portable type locking devices, which can be removed when the lock is removed are not allowed as a means for locking the disconnecting means not within sight of the fixed electric space heating equipment.



The Lock-Off Device to be Permanently Mounted to the Switch or Circuit Breaker

Section 427.13 Identification.

T&B Product:
Caution Signs

In order to identify electrically heated pipelines, the panel changed the wording in the Section to read:

"The presence of electrically heated pipelines, vessels, or both shall be evident by the posting of appropriate caution signs or markings at intervals not exceeding 6 m (20 ft.) along the pipeline or vessel."

Analysis of Change:

This change adds the intervals with which the signs are to be displayed. Previous text was subjective and markings may have not been effective. The new prescriptive requirement now mandates markings not exceeding 6 m (20 ft.) apart.

Section 500.8 (A) Equipment; Suitability.

The section was revised as follows:

(A) Suitability. Suitability of identified equipment shall be determined by one of the following:

(1) Equipment listing or labeling

(2) Evidence of equipment evaluation from a qualified testing laboratory or inspection agency concerned with product evaluation

(3) Evidence acceptable to the authority having jurisdiction such as a manufacturer's self-evaluation or an owner's engineering judgment.

Analysis of Change:

The revisions add consistency with the same requirements in 505.9(A) and 506.9(A).

T&B Product: All hazardous locations equipment

Section 501.10(B)(1)(7) Wiring Methods; Class 1 Division 2; General.

T&B Product:
Hazardous Locations Products

New subsection (7) was added as follows:

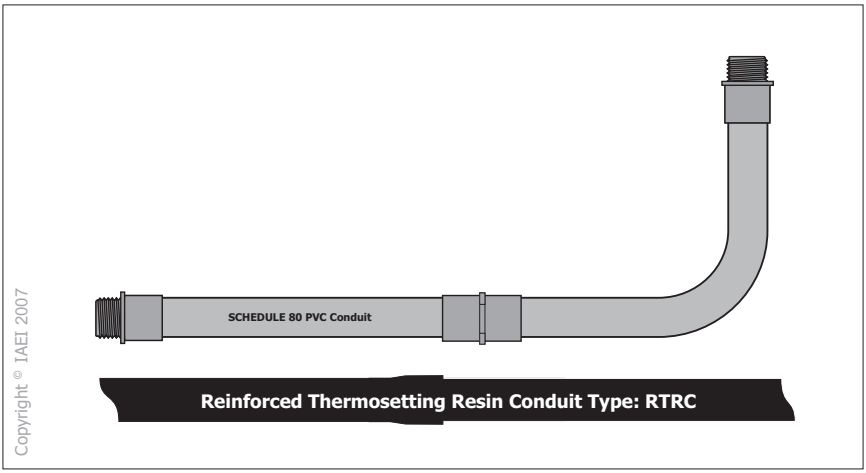
In industrial establishments with restricted public access where the conditions of maintenance and supervision ensure that only qualified persons service the installation and where metallic conduit does not provide sufficient corrosion resistance, Reinforced Thermosetting Resin Conduit (RTRC), factory elbows, and associated fittings all marked with suffix –XW, and Schedule 80 PVC Conduit, factory elbows, and associated fittings shall be permitted.

Where seals are required for boundary conditions as defined in 501.15(A)(4), the Division 1 wiring method shall extend into the Division 2 area to the seal, which shall be located on the Division 2 side of the Division 1 – Division 2 boundary.

FPN: For additional information on RTRC-XW, see ANSI/UL 1684A. Supplemental Requirements for Extra Heavy Wall Reinforced Thermosetting Resin Conduit (RTRC) and Fittings.

Analysis of Change:

This change accepts RTRC and Schedule 80 PVC conduit, elbows and associated fittings into Class 1 Division 2 areas. It is restricted to areas where metallic conduit does not provide sufficient corrosion protection as well as other restrictions as noted. The fine print note was added to provide guidance for more information about RTRC-XW conduit.



Copyright© IAEI 2007

Section 501.15 FPN No. 3 and No. 4 Sealing and Draining

T&B Product:
Sealing Fittings

These fine print notes were added as follows:

FPN No. 3: For further information on construction, testing and marking requirements for conduit sealing fittings, see ANSI/UL 1203, Explosionproof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations.

FPN No. 4: For further information on construction, testing and marking requirements for Type MC-HL cable and Type MC-HL cable sealing fittings, see ANSI/UL 2225, Cables and Cable Fittings for Use in Hazardous (Classified) Locations.

Analysis of Change:

The two fine print notes were added to clarify the correct UL standard that is used in the equipment evaluation. UL Standard 886 was previously used, but has been replaced. UL1203 and UL2225 are the standards now used for the equipment listing.

Section 505.15(C)(1) Wiring Methods; Class 1 Zone 2; General

T&B Product:
Hazardous Locations Products

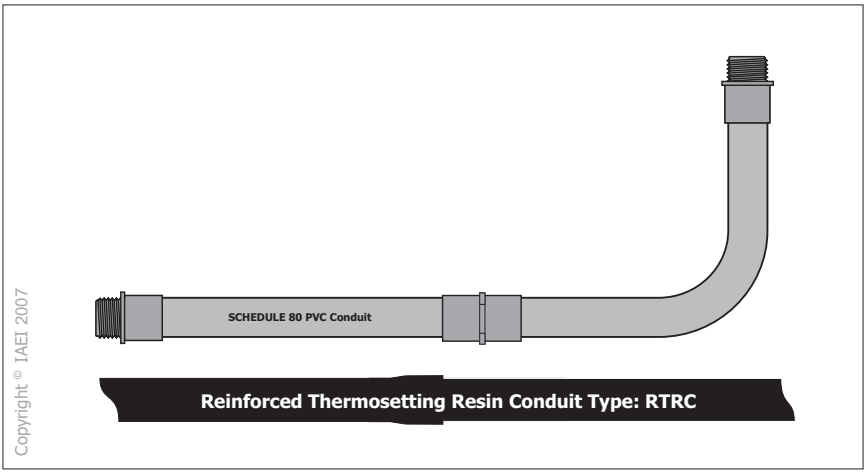
A new section was added as follows:

(g) In industrial establishments with restricted public access where the conditions of maintenance and supervision ensure that only qualified persons service the installation and where metallic conduit does not provide sufficient corrosion resistance, Reinforced Thermosetting Resin Conduit (RTRC), factory elbows, and associated fittings all marked with suffix -XW and Schedule 80 PVC Conduit, factory elbows, and associated fittings shall be permitted. Where seals are required for boundary conditions as defined in 505.16(C)(1)(b), the Zone 1 wiring method shall extend into the Zone 2 area to the seal, which shall be located on the Zone 2 side of the Zone 1 – Zone 2 boundary.

FPN: For additional information on RTRC-XW, see ANSI/UL 1684A. Supplemental Requirements for Extra Heavy Wall Reinforced Thermosetting Resin Conduit (RTRC) and Fittings.

Analysis of Change:

This change accepts RTRC and Schedule 80 PVC conduit, elbows and associated fittings into Class 1 Zone 2 areas. It is restricted to areas where metallic conduit does not provide sufficient corrosion protection as well as other restrictions as noted. The fine print note was added to provide guidance for more information about RTRC-XW conduit. The previous section (g) was moved to section (h).



Copyright © IAEI 2007

Article 522 (NEW) Control Systems for Permanent Amusement Attractions.

This article was added with a scope as follows:

Scope

This article covers the installation of electrical equipment and wiring that are an integral part of a permanent amusement attraction including associated control wiring, where the conditions of maintenance and supervision ensure that qualified persons service the systems.

Control circuits and equipment associated with permanent amusement attractions, herein referred to as permanent amusement control circuits, shall comply with Article 522. Only those sections of Article 725 referenced in this article shall apply to permanent amusement control circuits.

Analysis of Change:

This new article was added by the amusement industry to clarify rules for permanent amusement park installations as opposed to the fairs and carnivals which are transitory installations. There are many wiring options needed by the industry that the NEC did not allow.

T&B Product: Outlet Boxes, Conduit Fittings, Electrical Connectors

Photo courtesy of IAEI.

Section 547.5(D) Wiring Methods; Flexible Connections.

The text was revised to read:

T&B Product:
Liquidtight Conduit Fittings

"Where necessary to employ flexible connections, dust-tight flexible connectors, liquidtight flexible metallic conduit, liquidtight flexible nonmetallic conduit, or flexible cord listed and identified for hard usage shall be used. All connectors and fittings shall be listed and identified for the purpose."

Analysis of Change:

This revision was to add clarity to the requirement.

Section 547.5(G) Wiring Methods; Receptacles.

The following new text has been added at the end of 547.5 (G). "GFCI protection shall not be required for an accessible receptacle supplying a dedicated load where a GFCI protected receptacle is located within 3 feet of the non-GFCI protected receptacle."

Analysis of Change:

The Code-making panel intends to provide GFCI protection for personnel in need of a general use receptacle when in these areas. This change responds to the concerns for the well being of livestock who depend on unattended life supporting equipment such as drinking water heaters, connected to receptacles that are dedicated to such equipment which might become inoperative should a GFCI inadvertently trip.

T&B Product:
Outlet and Device Boxes

Section 547.10(A) Equipotential Planes and Bonding of Equipotential Planes; Where Required.

T&B Product:
Information

The text has been editorially revised as follows to indicate where an equipotential plane is required:

"(1) Indoors. Equipotential planes shall be installed in confinement areas with concrete floors where metallic equipment is located that may become energized and is accessible to livestock.

(2) Outdoors. Equipotential planes shall be installed in confinement areas with concrete slabs where metallic equipment is located that may become energized and is accessible to livestock."

Analysis of Change:

This important change to the 2005 NEC requirement makes clear that an equipotential plane is only required in indoor and outdoor confinement areas "where metallic equipment is located that may become energized and is accessible to livestock".

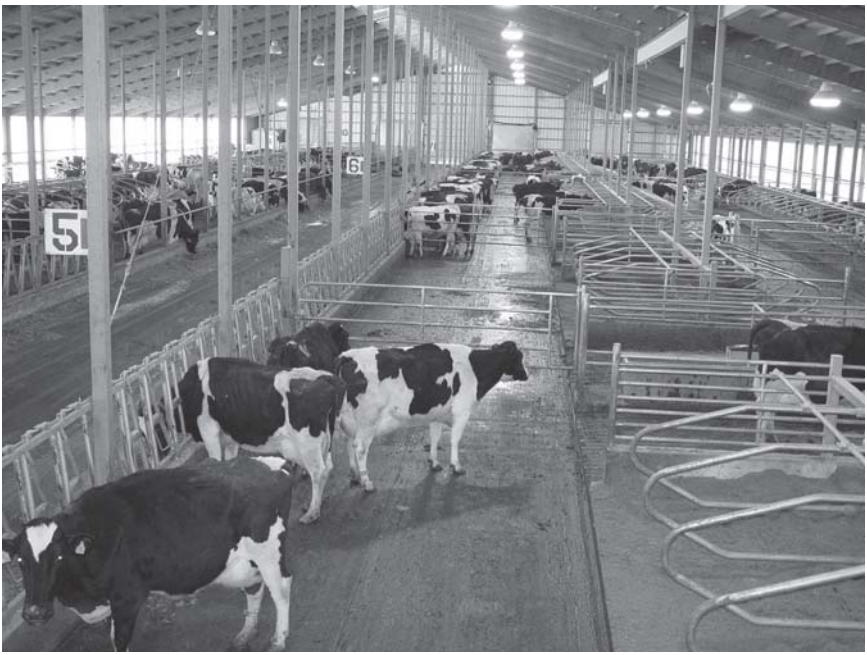


Photo courtesy of IAEI.

Section 555.9 Electrical Connections.

The following new text has been added for electrical connections on floating piers:

"Conductor splices, within approved junction boxes, utilizing sealed wire connector systems listed and identified for submersion shall be permitted where located above the waterline, but below the electrical datum field for floating piers."

Analysis of Change:

This change recognizes the availability and wide use of sealed wire connector systems. Such systems, listed and identified for submersion, installed in approved junction boxes, provide the necessary degree of safety and also complies with 110.14 (B).

T&B Product:
Splicing Wire Connectors

Photo courtesy of IAEI.

Section 555.21 Motor Fuel Dispensing Stations - Hazardous (Classified) Locations.

New and expanded text replaces the 2005 requirements as follows:

(A) General.

Electrical wiring and equipment located at or serving motor fuel dispensing stations locations shall comply with Article 514 in addition to the requirements of this article. All electrical wiring for power and lighting shall be installed on the side of the wharf, pier, or dock opposite from the liquid piping system.

FPN: For additional information,
see NFPA 303-2000, *Fire Protection Standard for Marinas and Boatyards*, and NFPA 30A-2003, *Motor Fuel Dispensing Facilities and Repair Garages*.

(B) Classification of Class I, Division 1 and 2 Areas.

The following criteria shall be used for the purposes of applying Tables 514.3(B)(1) and 514.3(B)(2) to motor fuel dispensing equipment on floating or fixed piers, wharfs or docks.

(1) Closed Construction. Where the construction of floating docks, piers, or wharfs is closed so that there is no space between the bottom of the dock, pier, or wharf and the water, such as concrete enclosed expanded foam or similar construction, and having integral service boxes with supply chases:

(a) The space above the surface of the floating dock, pier, or wharf shall be a Class I, Division 2 location with distances as identified in Table 514.3(B)(1) Dispenser and Outdoor.

(b) The space below the surface of the floating dock, pier or wharf having areas or enclosures such as tubs, voids, pits, vaults, boxes, depressions, fuel piping chases, or similar spaces where flammable liquid or vapor can accumulate shall be a Class I, Division 1 location.

Exception No. 1: Dock, pier, or wharf sections that do not support fuel dispensers and abut but are 6.0m (20 feet) or more from dock sections that support fuel dispenser(s) shall be permitted to be Class I, Division 2 where documented air space is provided between dock sections to permit flammable liquids or vapors to dissipate and not travel to these dock sections. Such documentation shall comply with 500.4(A).

Exception No. 2: Dock, pier, or wharf sections that do not support fuel dispensers and do not directly abut sections that support fuel dispensers shall be permitted to be unclassified where documented air space is provided and where flammable liquids or vapors can not travel to these dock sections. Such documentation shall comply with 500.4(A).

FPN: See 500.4(A) for documentation requirements.

T&B Product: Boxes and Fittings for use in Hazardous (Classified) Locations

Continues on page 94.

Section 555.21 (continued)

(2) Open Construction. Where the construction of piers, wharfs, or docks is open, such as decks built on stringers supported by pilings, floats, pontoons or similar construction:

(a) The area 450 mm (18 in.) above the surface of the dock, pier or wharf and extending 6.0 m (20 ft.) horizontally in all directions from the outside edge of the dispenser and down to the water level shall be Class 1 Division 2.

(b) Enclosures such as tubs, voids, pits, vaults, boxes, depressions, piping chases, or similar spaces where flammable liquids or vapors can accumulate within 6.0 m (20 ft.) of the dispenser shall be a Class I, Division 1 location.

Analysis of Change:

T&B Product: Boxes and Fittings for use in Hazardous (Classified) Locations

These new requirements are the culmination of work over two NEC cycles. They recognize that not all of the NEC requirements for land-based fuel dispensing stations addressed in the Articles in Chapter 5, are applicable or comprehensive with respect to such stations on stationary or floating piers.

Photo courtesy of IAEI.

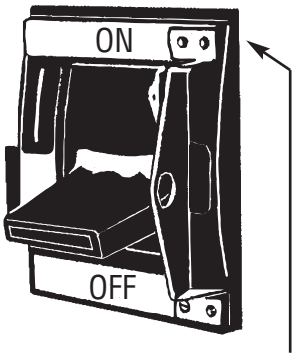
Section 600.6(A)(1) Disconnects; Location; Within Sight of Sign.

The section was revised to include the statement, "The provision for locking or adding a lock to the disconnecting means must remain in place at the switch or circuit breaker whether the lock is installed or not. Portable means for adding a lock to the switch or circuit breaker shall not be permitted."

T&B Product:
Electricians Supplies

Analysis of Change:

This is a further reduction in the use of portable lock-out devices. Where the disconnecting means is not within sight of the outline lighting system that it controls, a permanent locking means must be provided.



The Lock-Off Device to be Permanently Mounted to the Switch or Circuit Breaker

Section 604.6 (A)(1) Construction; Cable and Conduit Types; Cables.

The existing text has been editorially reorganized and new text added:

T&B Product:
Cable Fittings

"a. Listed Type AC containing nominal 600-Volt, 8 to 12 AWG insulated copper conductors with a bare or insulated copper equipment grounding conductor equivalent in size to the ungrounded conductor.

b. Listed Type MC cable containing nominal 600-Volt, 8 to 12 AWG insulated copper conductors with a bare or insulated copper equipment grounding conductor equivalent in size to the ungrounded conductor.

"c. Listed Type MC cable nominal 600 volts, 8 to 12 AWG insulated copper conductors with an aluminum grounding conductor and armor assembly identified as acceptable ground paths. The aluminum ground armor assembly shall have a current-carrying capacity equivalent to the ungrounded copper conductor."

Analysis of Change:

A listed MC cable product is available that complies with this new requirement. This product is covered by 250.118(1)(a).

Images courtesy of Southwire

Section 625.2 Definitions.

The definition for “Electric Vehicle” has been expanded by changing “An automotive-type vehicle for highway use…” to “An automotive-type vehicle for on-road use…”.

T&B Product:
Information

Analysis of Change:

This change is intended to include “Neighborhood Electric Vehicles” which are defined by The National Highway Traffic Administration as “low-speed” vehicles, with a top speed of 25 miles/hour. These vehicles are approved for local roads only, and not on highways.

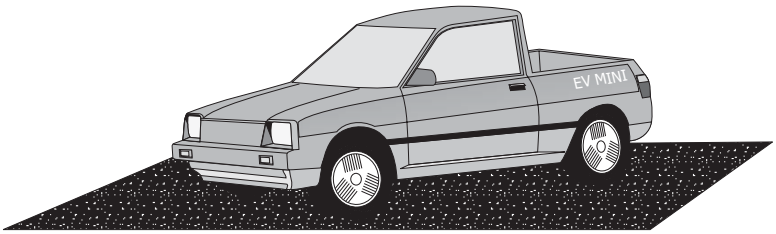
Neighborhood electric vehicles are not intended for use on highways.

Equipped with the following:

- Automotive grade headlights
- Seatbelts
- Windshield
- Brakes
- Other safety equipment

Smaller than traditional cars

- Top speed of 25 mph
- Can only be used on streets posted 35 mph speed limits
- Suitable for on-road use, not on highways



Copyright © IAEI 2007

Article 626 (NEW) Electrified Truck Parking Spaces

T&B Product:
Information

This new NEC Article defines an "Electrified Truck Parking Space" as:

"A truck parking space that has been provided with an electrical system that allows truck operators to connect their vehicles while stopped, and use off-board power sources in order to operate on-board systems such as air-conditioning, heating and appliances, without any engine idling. The scope of the article includes electrical conductors, and equipment external to the truck or transport refrigerated unit that connect trucks and transport refrigerated units to a supply of electricity, and the installation of equipment and devices related to electrical installations within an electrified truck parking space."

Analysis of Change:

The emergence of "Electrified Truck Parking Spaces" has become popular and is seen as a significant step in reducing pollution from exhaust systems of idling trucks. These spaces include: dedicated parking areas for heavy trucks at travel plazas, warehouses, shipper and consignee yards, depot facilities and border crossings. Not included are: shoulders of on and off highway ramps and access roads, camping and recreational vehicle sites, residential and commercial parking areas used for automotive parking or other areas where ac power is provided solely for the purpose of connecting automotive and other light electrical loads, such as engine block heaters, and at private residences.

Photo courtesy of IAEI.

Section 680.21(A)(3) Motors; Wiring Methods; Flexible Connections.

This is an editorial change to add the term "liquidtight flexible" to the requirement. The new Section wording shall read:

"Where necessary to employ flexible connections at or adjacent to the motor, liquidtight flexible metal or liquidtight flexible nonmetallic conduit with approved fittings shall be permitted."

Analysis of Change:

This was an editorial change to clarify the fact that where flexible connections are required, liquidtight flexible nonmetallic conduit is appropriate.

T&B Product: Liquidtight Flexible Nonmetallic Conduit

Section 680.43(D)(3) Indoor Installations; Bonding.

T&B Product:
Conduit Fittings

Editorial change to replace the term "conduit" with "raceway." The new wording will read:

"Metal raceway and metal piping that are within 1.5 m (5 ft.) of the inside walls of the spa or hot tub and that are not separated from the spa or hot tub by a permanent barrier."

Analysis of Change:

Raceway is consistent with Code language and is defined and clarifies that EMT may be used in this application.

Photo courtesy of IAEI.

Section 680.74 Bonding

Revise the wording to read:

T&B Product:
Bonding Clamps

"All metal piping systems and all grounding metal parts in contact with the circulating water shall be bonded together using a solid copper bonding jumper, insulated, covered or bare, not smaller than 8 AWG. The bonding jumper shall be connected to the terminal or the circulating pump motor that is intended for this purpose. The bonding jumper shall not be required to be connected to a double insulated circulating pump motor. The 8 AWG or larger solid copper bonding jumper shall be required for equipotential bonding in the area of the hydromassage bathtub and shall not be required to be extended or attached to any remote panelboard service equipment or any electrode."

Analysis of Change:

The previous wording had the word "solid" at the end of the paragraph which gave the impression that the bonding jumper could be stranded as long as its as big as 8 AWG.

The Section was also rewritten and expanded to use mandatory language in accordance with the style manual.

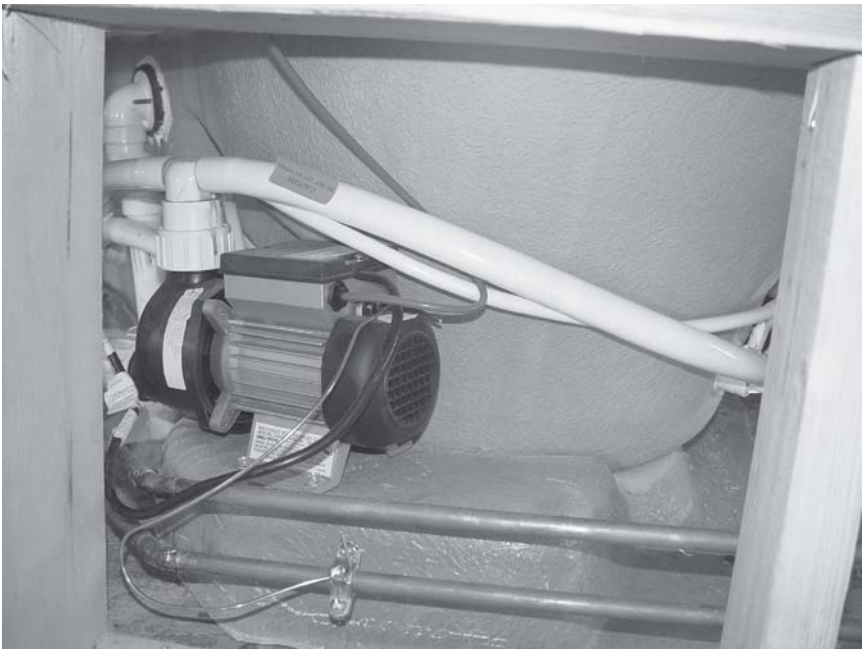


Photo courtesy of IAEI.

Section 682.13 Wiring Methods and Installation.

T&B Product: Liquidtight Flexible Nonmetallic Conduit

The Section wording was expanded to read:

"Liquidtight flexible metal conduit or liquidtight flexible nonmetallic conduit with approved fittings shall be permitted for feeders and where flexible connections are required for services. Extra hard usage portable power cable listed for both wet locations and sunlight resistance shall be permitted for a feeder or a branch circuit where flexibility is required. Other wiring methods, suitable for the location shall be permitted to be installed where flexibility is not required. Temporary wiring in accordance with 590.4 shall be permitted."

Analysis of Change:

This Section was expanded for clarity. The references to whole articles were not in conformance with the direction from the TCC the last Code cycle. Also, the direct references to approved raceways was added.

Section 690.31 (F) (New) Methods Permitted; Flexible, Fine-Stranded Cables.

A new Sub-section was added:

"Flexible, fine-stranded cables shall only be terminated with terminals, lugs, or connectors that are identified and listed for such use."

Analysis of Change:

Because of the relatively few products that have been listed specifically for use with flexible, fine-stranded cables, use of properly listed and identified terminals, lugs, devices or connectors has often been overlooked. This new requirement seeks greater enforcement.

T&B Product:
Electrical Connectors

Section 690.43 Equipment Grounding.

The following additional requirements have been added:

"An equipment grounding conductor is required between a PV array and other equipment as specified in Section 250.110."

T&B Product: Grounding and Bonding Products

"Devices listed and identified for grounding the metallic frames of PV modules are permitted to ground the exposed metallic frames of PV modules to grounded mounting structures. Devices identified and listed for bonding the metallic frames of PV modules are permitted to bond the exposed metallic frames of PV modules to the metallic frames of adjacent PV modules. Equipment grounding conductors for the PV array and structure (when required) 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:

An equipment grounding conductor has always been required between the PV array and other equipment according to 250.110. Auxiliary (supplemental) grounding electrodes that are often provided for lightning protection does not fulfill this requirement.

The new text was also added to accommodate for some listed grounding and bonding devices whose function is not effectively addressed in Sections 250.134 and 250.136.

Section 700.9(D) Fire Protection.

Feeders for essential electrical systems for hospitals and health care facilities have been added to the list of occupancy classes in 700.9(D).

Analysis of Change:

Fire protection according to the requirements in Sections 700.9 (D)(1) and (D)(2) will now also apply to the wiring systems that feed the essential electrical systems in hospitals.

T&B Product: Information

Photo courtesy of IAEI.

Article 708

Critical Operations Power Systems

Section 708.1 Scope

"The provisions of this article apply to the installation, operation, monitoring, control, and maintenance of the portions of the premises wiring system intended to supply, distribute and control electricity to be designated critical operations areas (DCOA) in the event of disruption to elements of the normal system. Critical operations power systems are those systems so classed by municipal, state, federal, or other codes, by any governmental agency having jurisdiction, or by facility engineering documentation establishing the necessity for such a system. These systems include but are not limited to power systems, HVAC, fire alarm, security, communications and signaling for designated critical operations areas."

Analysis of Change:

This is a new Article introduced in the 2008 NEC to cover homeland security. Prior to the ROC, the article number was 585.

T&B Product: Information

Photo courtesy of IAEI.

Section 725.8 Mechanical Execution of Work

Add “cable ties” to the list of supporting methods in class 1, class 2, and class 3 circuits.

Analysis of Change:

Class 1, Class 2, and Class 3 cables are required by this section to be installed in a neat and workmanlike manner. The term “cable ties” has been added to the list of acceptable supporting devices.

T&B Product:
Cable Ties

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

Section 725.26(B)(4) Conductors of Different Circuits in the Cable, Cable Tray, Enclosure or Raceway, Class 1 Circuits with Power Supply Circuits; In Cable Trays.

"Installations in cable trays shall comply with 725.26(B)(4)(1) or 725.26(B)(4)(2).

(1) Class 1 circuit conductors and power-supply conductors not functionally associated with Class 1 circuit conductors shall be separated by a solid fixed barrier of a material compatible with the cable tray.

(2) Class 1 circuit conductors and power-supply conductors not functionally associated with the Class 1 circuit conductors shall be permitted to be installed in a cable tray without barriers where all of the conductors are installed within separate multiconductor Type AC, Type MC, Type MI or Type TC cables and all of the conductors in the cables are insulated at 600 volts."

Analysis of Change:

T&B Product:
Cable Tray

The above verbiage was the result of a Task Group study at the direction of the Technical Correlating Committee to study the issues associated with Section 725.26(B)(4). The study determined that Class 1 circuits installed in cable trays with multiconductor Type TC, Type AC or Type MC cables having a minimum 600 volt insulation, do not require a barrier.

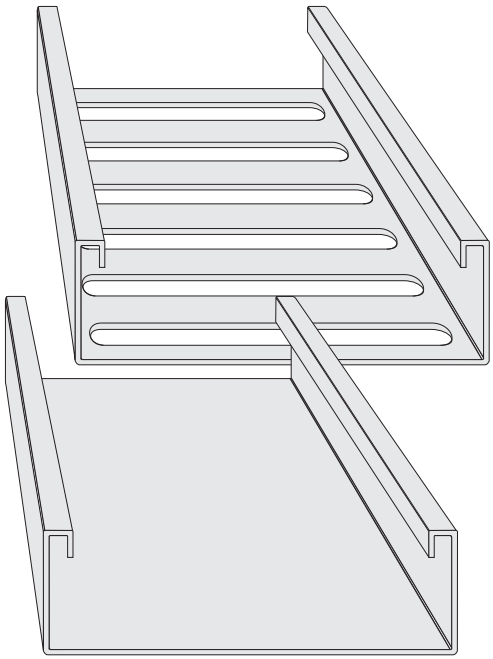
Section 725.56(E) Installation of Conductors of Different Circuits in the Same Cable, Enclosure, or Raceway; Class 2 or Class 3 Cables with Other Circuit Cables.

Include the term “cable tray” with the terms enclosure and raceway where jacketed cables of Class 2 or Class 3 circuits are permitted with jacketed cables covered by Articles 760, 770, 800, 820 and 830.

Analysis of Change:

Jacketed cables of Class 2 or Class 3 circuits are permitted to be supported in the same cable tray as Power-Limited Fire Alarm Systems, nonconductive and conductive Optical Fiber Cables, Communications Circuits, and Community Antenna Television And Radio Distribution Systems.

T&B Product:
Cable Tray



Section 725.61(C) Applications of Listed Class 2, Class 3 and PLTC Cables; Cable Trays.

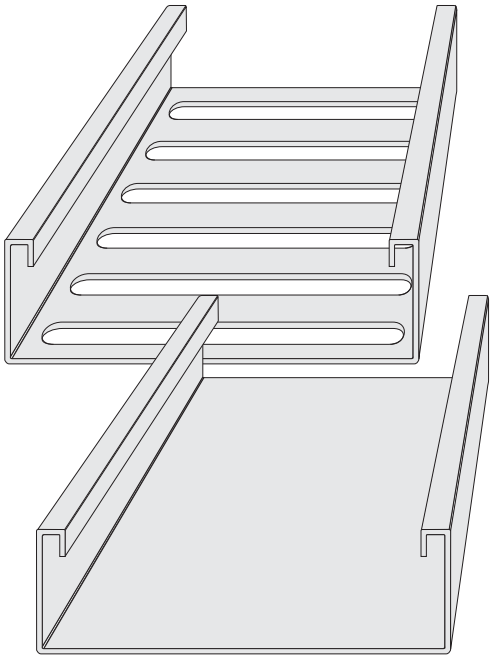
"Cables installed in cable trays outdoors shall be Type PLTC. Cables installed in cable trays indoors shall be Type PLTC, CL3P, CL3, CL2P, and CL2."

"Listed general-purpose signaling raceways, listed riser signaling raceways and listed plenum signaling raceways shall be permitted for use with cable trays."

Analysis of Change:

The new text mentions all the signaling raceways so it's clear that all these raceways are permitted in cable tray.

T&B Product:
Cable Tray



Section 725.61(D)(4) Applications of Listed Class 2, Class 3 and PLTC Cables; Hazardous (Classified) Locations; In Industrial Establishments.

Delete the text that states that PLTC cable must comply with the crush and impact requirements of Type MC Cable and is identified for such use.

Analysis of Change:

Because the cable is continuously supported and protected against physical damage by using mechanical protection such as dedicated struts, angles or channels, there is no need to meet the Type MC crush and impact requirements and PLTC cables shall be permitted to be run between cable tray and utilization equipment.

T&B Product: Cable Tray and Tray Cable Fittings

Section 727.4(6) Uses Permitted

Delete the requirement that ITC cable between cable tray and equipment can not exceed 15 m (50 ft.) in length.

Analysis of Change:

Type ITC cable was the former PLTC cable applied in Article 725 and there were no such cable length restrictions. ITC is permitted to be run on messenger without limitations on length.

T&B Product: Cable Tray

Section 760.8 Mechanical Execution of Work

Add “cable ties” to the list of supporting methods in fire alarm circuits.

Analysis of Change:

Fire alarm circuits are required by this section to be installed in a neat and workmanlike manner. The term “cable ties” has been added to the list of acceptable supporting devices.

T&B Product:
Cable Ties

Section 760.56 Installation of Conductors of Different PLFA Circuits, Class 2, Class 3, and Communications Circuits in the same Cable, Enclosure or Raceway.

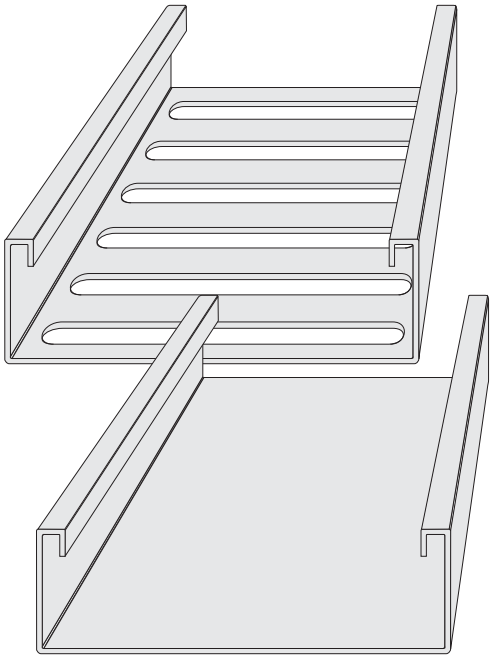
Include the term “cable tray” with the terms enclosure and raceway where cable can be safely installed.

Audio system circuits described in 640.9(C) and installed using Class 2 or Class 3 wiring methods in compliance with 725.54 and 725.61 shall not be permitted to be installed in the same cable, cable tray, or raceway with power limited conductors or cables.

Analysis of Change:

Cables that can be safely installed in the same raceway or enclosure can also be safely installed in the same cable tray.

T&B Product: Cable Tray



Section 770.48 (NEW) Unlisted Cables Entering Buildings.

Revise to read as follows: This new section relocates the two exceptions in Section 770.113 of the 2005 NEC that address the limited use of unlisted, conductive and nonconductive outside plant optical fiber cables and their entry into buildings.

Analysis of Change:

Optical fiber cables used inside of buildings are still required to be listed, according to Section 770.113.

T&B Product:
Information

Section 770.133(A) Exception 5 (NEW) Installation of Optical Fibers And Electrical Conductors: With Conductors For Electric Light, Power, Class 1, Non-Power Limited Fire Alarm, or Medium Power Network – Powered Broadband Communications.

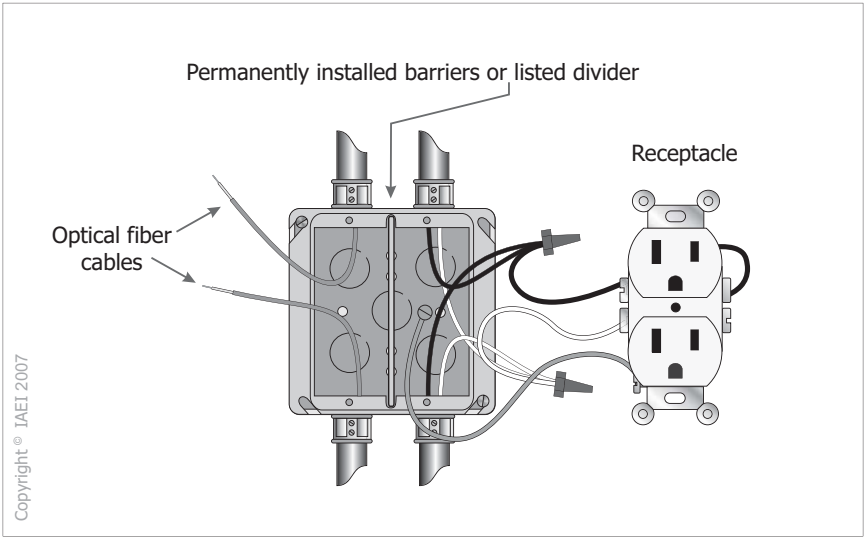
Optical fiber cable is permitted to share the same raceway, outlet box or enclosure…

"Where all of the conductors of electric light, power, Class 1, nonpower-limited fire alarm, and medium power network-powered broadband communications circuits are separated from all of the optical fiber cables by a permanent barrier or listed divider."

Analysis of Change:

This new exception can eliminate the need for discrete raceways, outlet boxes and enclosures for optical fiber cables and their connections where barriers are able to be provided.

T&B Product:
Outlet and Junction Boxes



Section 800.2 Definitions. (NEW)

T&B Product:
Information

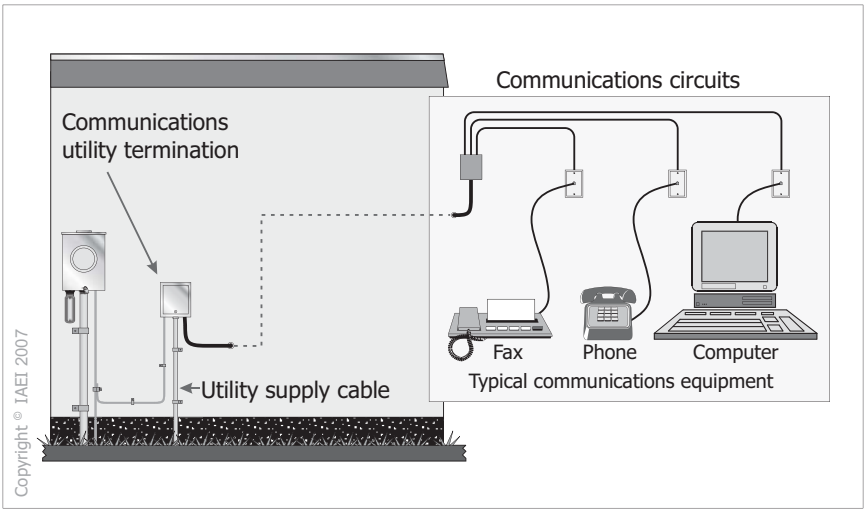
The following new definition has been added:

"Communications Circuit. The circuit that extends voice, audio, video, data, interactive services, telegraph (except radio), outside wiring for fire alarm and burglar alarm from the communications utility to the customer's communications equipment up to and including terminal equipment such as telephone, fax machine or answering machine."

In addition, the definition "Communications Equipment" was moved to Article 100.

Analysis of Change:

This new definition replaces previous text in the scope of Article 800. It effectively expands the scope of Article 800. It is intended to resolve scope and correlation issues between Articles 725 and 800. It reaffirms that the scope of Article 800 is not based upon the wire and cable to be used, but upon the application. This new text makes evident that today's world of telecommunications reaches beyond just telephones.



Section 800.48 (NEW) Unlisted Cables Entering Buildings.

T&B Product:
Information

This new section relocates the two exceptions in Section 800.113 of the 2005 NEC that address the limited use of unlisted, conductive and nonconductive outside plant cables and their entry into buildings.

Analysis of Change:

The panel's action is simply editorial and clarifies the distinction where unlisted cables are permitted to be used.

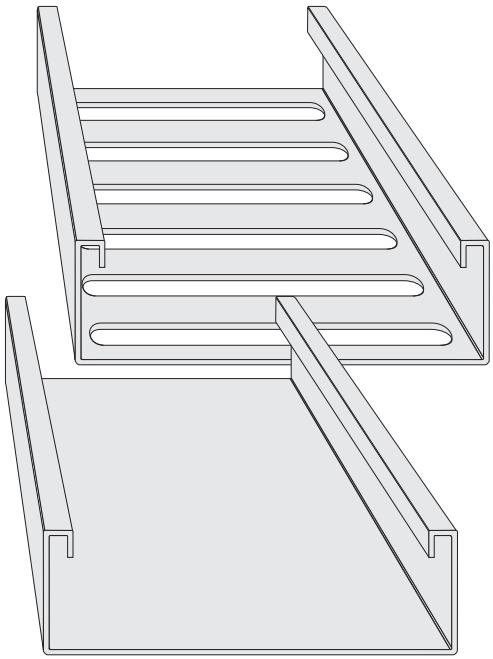
Section 800.133 (A)(1) Installation of Communications Wires, Cables, and Equipment; Separation from Other Conductors; In Raceways, Cable Trays, Boxes, and Cables.

Added the term “Cable Trays” to the title of Sub-section 800.133 (A)(1).

Analysis of Change:

Communications cables in “Other Power-Limited Circuits” identified in Section 800.133 (A) (1) (a) (1) through (5) are now permitted to be installed in the same cable tray, as well as the same raceway or enclosure.

T&B Product:
Cable Tray



Section 800.156 (NEW) Dwelling Unit Communications Outlet.

For new construction, a minimum of one communications outlet shall be installed within the dwelling and cabled to the service provider demarcation point.

Analysis of Change:

This new requirement is intended to ensure access to land based (hard-wired) communications in all dwelling units. Although wireless communications as the principal means of communicating is on the rise, Code-making panel 16 felt it necessary for safety in the event of emergency. The panel did not address the need for the owner/occupant to activate the service through a service contract with the provider in order for the land based communications outlet to be of use in the event of an emergency.

T&B Product:
Information

Copyright © IAEI 2007

Section 810.21(D) Grounding Conductors-Receiving Stations; Mechanical Protection.

The grounding conductor shall be protected where exposed to physical damage.

Analysis of Change:

This change eliminates the option of increasing the size of the grounding conductor proportionately to compensate for lack of protection.

T&B Product:
Conduit & Fittings

Photo courtesy of IAEI.

Section 820.48 (NEW) Unlisted Cables Entering Buildings.

T&B Product:
Information

This new section relocates Exception No. 2 from Section 820.113 of the 2005 NEC that addresses the limited use of unlisted outside plant coaxial cables and their entry into buildings.

"Unlisted outside plant coaxial cables shall be permitted in building spaces other than risers, air ducts, concealed spaces, plenums, and other spaces used for environmental air, where the length of the cable within the building, measured from its point of entrance, does not exceed 15 m (50 ft.) and the cable enters the building from the outside and is terminated at a grounding block.

FPN No. 1: This section limits the length of unlisted outside plant cable to 15 m (50 ft.) while 820.93 requires that the outer conductive shield of the coaxial cable be grounded at the building premises as close to the point of cable entrance or attachment as practicable.

Therefore, the outside plant coaxial cable may be permitted to extend 15 m (50 ft.) into the building if it is practicable to ground the outer conductive shield closer than 15 m (50 ft.) from the entrance point.

FPN No. 2: See 820.2 for the definition of point of entrance.

FPN No. 3: See 820.2 for the definition of air duct.

FPN No. 4: See Article 100 for the definition of plenum.

FPN No. 5: See 300.22 (c) for information on other spaces used for environmental air."

Analysis of Change:

The panel's action is more than editorial in that it establishes limitations on unlisted outside plant coaxial cables that are the same as the restrictions for other communications type cables in Articles 770 and 800.

Community Antenna Television and Radio Distribution Systems (continued)

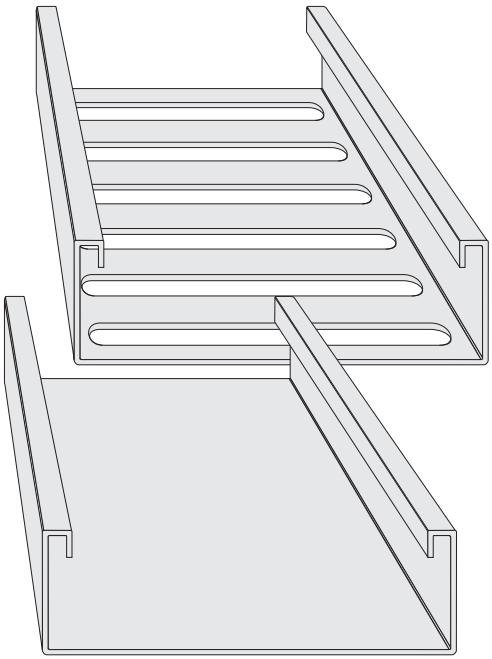
Section 820.133 (A)(1) Installation of Cables and Equipment; In Raceways, Cable Trays and Boxes.

Added the term “Cable Tray” to the title of Sub-section 820.133 (A)(1).

Analysis of Change:

Coaxial cables are now permitted to be installed in the same cable tray, as well as the same raceway or enclosure with jacket cables identified in Section 820.133 (A)(1).

T&B Product: Cable Tray



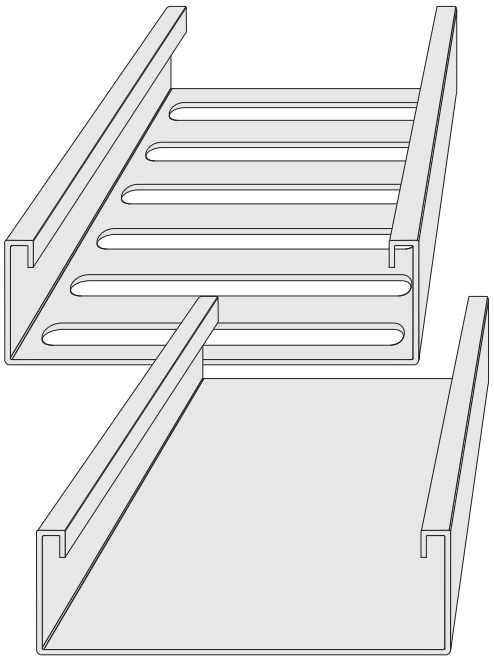
Section 830.133 (A)(1) Installation of Network-Powered Broadband Communications Cables and Equipment; In Raceways, Cable Trays and Enclosures.

Added the term “Cable Trays” to the title of Sub-section 830.133 (A)(1).

Analysis of Change:

Low and Medium Power Network-Powered Broadband Communications Cables are now permitted to be installed in the same cable tray, as well as the same raceway or enclosure with Class 1, 2 and 3 circuits identified in Section 830.133 (A) (1).

T&B Product: Cable Tray



Notes

Notes

Blackburn®

Fast, Easy Grounding to Meet 2008 NEC® Requirements!

Intersystem Bonding Termination Meter Box Ground Clamp

The Blackburn® Intersystem Bonding Termination Meter Box Ground Clamp provides a convenient, reliable grounding for coaxial or telephone drop wire runs to meet new requirements of the 2008 NEC®. Available in two sizes, this versatile, adjustable, two-piece clamp can mount either vertically on the side or horizontally across the top of any meter box in service — without interfering with cover removal.

Meets 2008 NEC® Section 250.94 requirements. **See page 28**

- Single shallow, pointed bolt enables fast and easy installation and positive ground connection
- Dual steel points on slotted bracket penetrate painted surface, also providing a positive ground connection
- Sturdy, reinforced, two-piece construction ensures long and safe service life
- Steel clamp brackets mechanically galvanized to ASTM B695 with stainless steel hardware for superior corrosion resistance
- Accepts the full range of #10 to #6 AWG ground wire commonly used in the CATV and telephone industries
- Meets or exceeds industry requirements, Bellcore standards and 2008 NEC® Section 250.94 requirements
- UL Listed

Please ask your Thomas & Betts sales representative for a complete catalog of quality Thomas & Betts electrical products or visit us at **www.tnb.com**.

www.tnb.com

Thomas&Betts

For U.S. Customer Service and Order Inquiries,
Call 1-800-816-7809 or Fax 1-800-816-7810.

For U.S. Technical Support,
Call 1-888-862-3289 or Fax 901-252-1321.

For Tool Service and Repair,
Call 1-800-284-TOOL (8665).

Thomas&Betts

Thomas & Betts Corporation
Electrical Division
8155 T&B Boulevard
Memphis, Tennessee 38125

$5.00 USD

© 2007 Thomas & Betts Corporation. All rights reserved.
Specifications are subject to change without notice.
Printed in U.S.A. 09/07/30M Order No. GM-201

United States
Tel: 901.252.8000
800.816.7809
Fax: 901.252.1354

Technical Services
Tel: 888.862.3289

www.tnb.com