Contra Costa Chapter

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MICHAEL JOHNSTON
NECA EXECUTIVE DIRECTOR
STANDARDS AND SAFETY NECA

General Information

- This presentation reviews various significant changes for the 2014 *NEC*.
  - 3745 Proposals
  - 1625 Comments

Courtesy of NFPA

2014 NEC – New Articles

- Article 393, Low Voltage Suspended Ceiling Power Distribution Systems [ROP 18-10a]
- Article 728, Fire Resistive Cable Systems [ROP 3-170]
- Article 750, Energy Management Systems [ROP 13-180]

General

CHAPTER 1

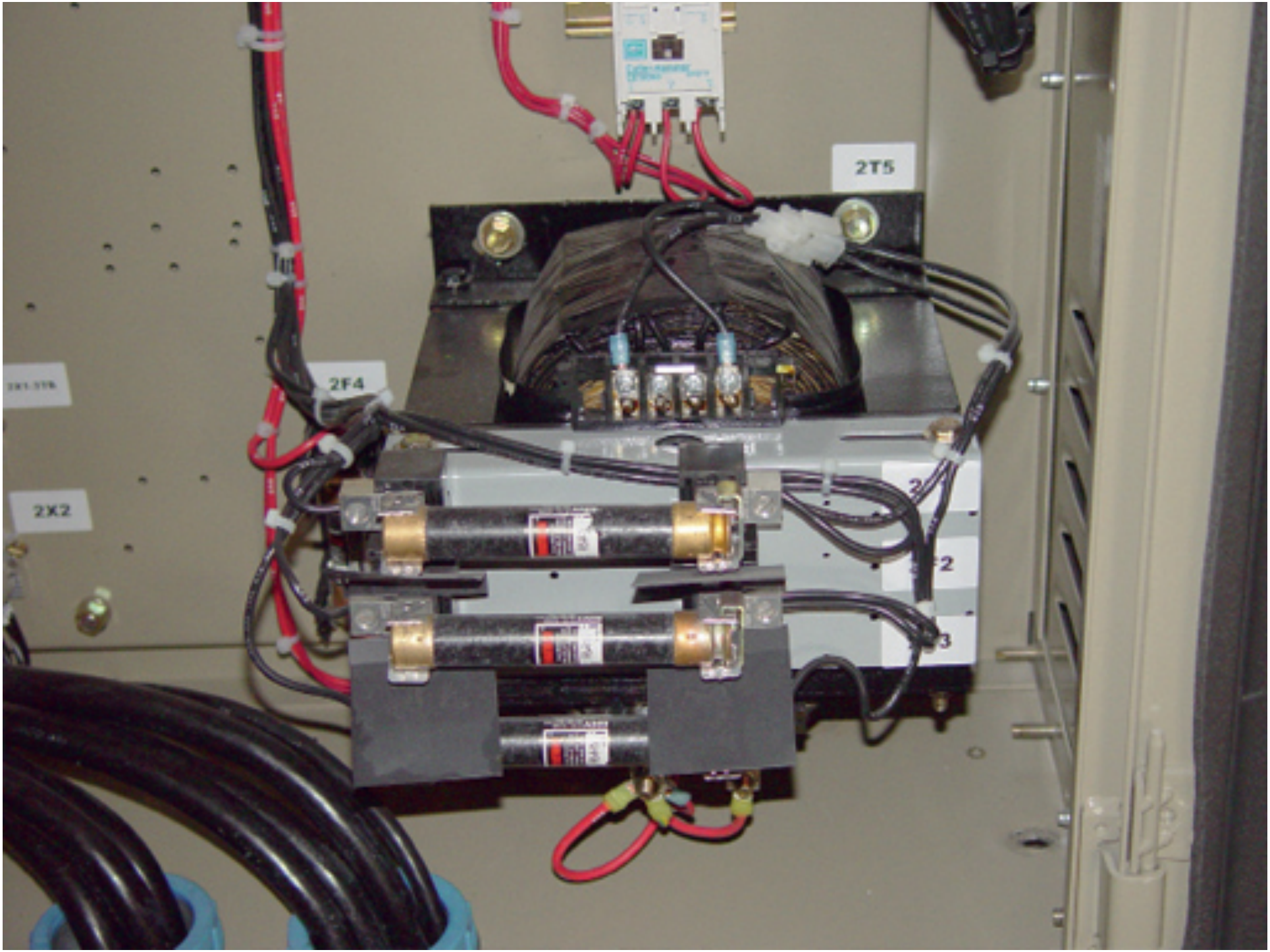
Article 100 Coordination (Selective)

- Proposal 10-5, Comment 10-2
- The word “choice” is replaced by the words “selection and installation” to clarify it is selection and installation of overcurrent protection that achieves selective coordination.
- Selective coordination is across the “full range” of available overcurrents.


24 HOUR

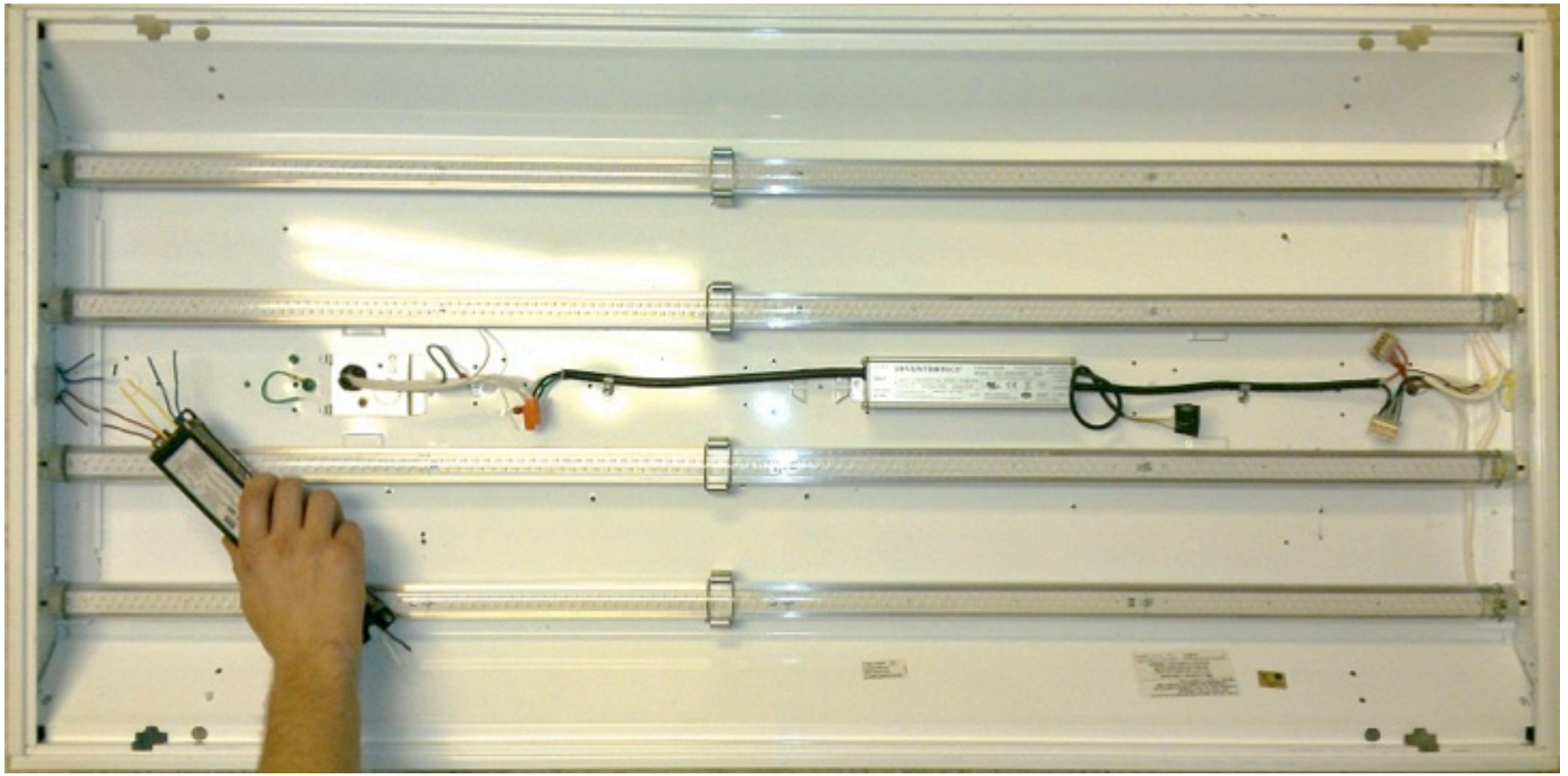
Article 100 Control Circuit

- Proposal 11-8
- Revision and relocation of the definition of the term “motor control circuit”
- The word “motor” is removed from the definition making the term “control circuit” a new definition that applies to all control circuits, not just motor control circuits.


2T5
2F4
2X2

Article 100 Retrofit Kit

- Proposal 18-9, Comment 18-4
- New definition of the term “Retrofit Kit.”
- A general term for a complete subassembly of parts and devices for field conversion of utilization equipment.



Courtesy of Independence LED Lighting, LLC

Applies to LED listed retrofit kits used for luminaires and signs as referenced by requirements in Articles 410 and 600

110.16 Arc-Flash Hazard Warning

- Proposal 1-105, Comments 1-47, 1-52, 1-53, 1-56
- Revision adds the words “or factory” to the rule
- Clarifies that the marking could be applied in the field or at the factory by a manufacturer
- Reference to 110.21(B) has been added to this section


HVL
Load Interrupter Switch
DANGER
HIGH
VOLTAGE
KEEP OUT
DANGER
HIGH
VOLTAGE
KEEP OUT
CLOSED
FERMÉ
OPEN
OUVERT

Section 110.21(B) Field Marking

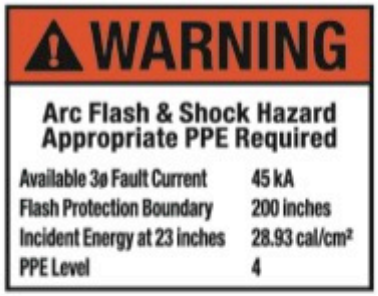
- Proposal 1-114, Comments 1-59, 1-60, 1-61
- New subdivision (B) adds requirements for warning, caution, or danger, markings, labels, or signs required by the *NEC*
- Markings, signs, or labels should meet the requirements in ANSI Z535.4

Section 110.24 Available Fault Current

- Proposals 1-121, 1-124, Comment 1-64, 1-66
- New informational note added
- Clarifies that the available fault current markings required by 110.24 are for equipment rating purposes only and not for arc-flash hazard analysis as required by NFPA 70E

Manufacturer Rating Label

Available Fault Current Label
To comply with NEC 110.9 & 110.10



Personal Protection Equipment Label
To comply with NFPA 70E

110.25 Lockable Disconnecting Means

- Proposal 1-130, Comment 1-76
- New section provides consistent requirements for *Code* rules and exceptions that require a lockable disconnecting means.
- Code-wide proposals to remove text from all sections that provide the specific requirements for lockable disconnecting means.


HAZTEK
ON
OFF
UNDER ARMOUR

Section 110.26(C)(3) Personnel Doors

- Proposal 1-143a
- Revision reduces the ampere value “1200” to “800” amperes.
- Clarifies the requirements for panic hardware are required for large equipment with an 800-ampere rating or greater

Section 110.26(C)(3) Personnel Doors

- Proposal 1-145
- Section revised to include only the term “panic hardware”
- Revision to this section removes the terms “simple pressure plates” and other devices that are normally latched but are released under simple pressure
- Change results in consistency with applicable Building Codes that only use the term “panic hardware”

110.26(E)(2)(a) and (b)

- Proposals 1-154, 1-155
- This section has been restructured into a list format and new list item (b) has been added and is titled “Dedicated Equipment Space.”
- The requirements for dedicated space for equipment installed outside are similar to the dedicated space requirements for equipment located indoors.

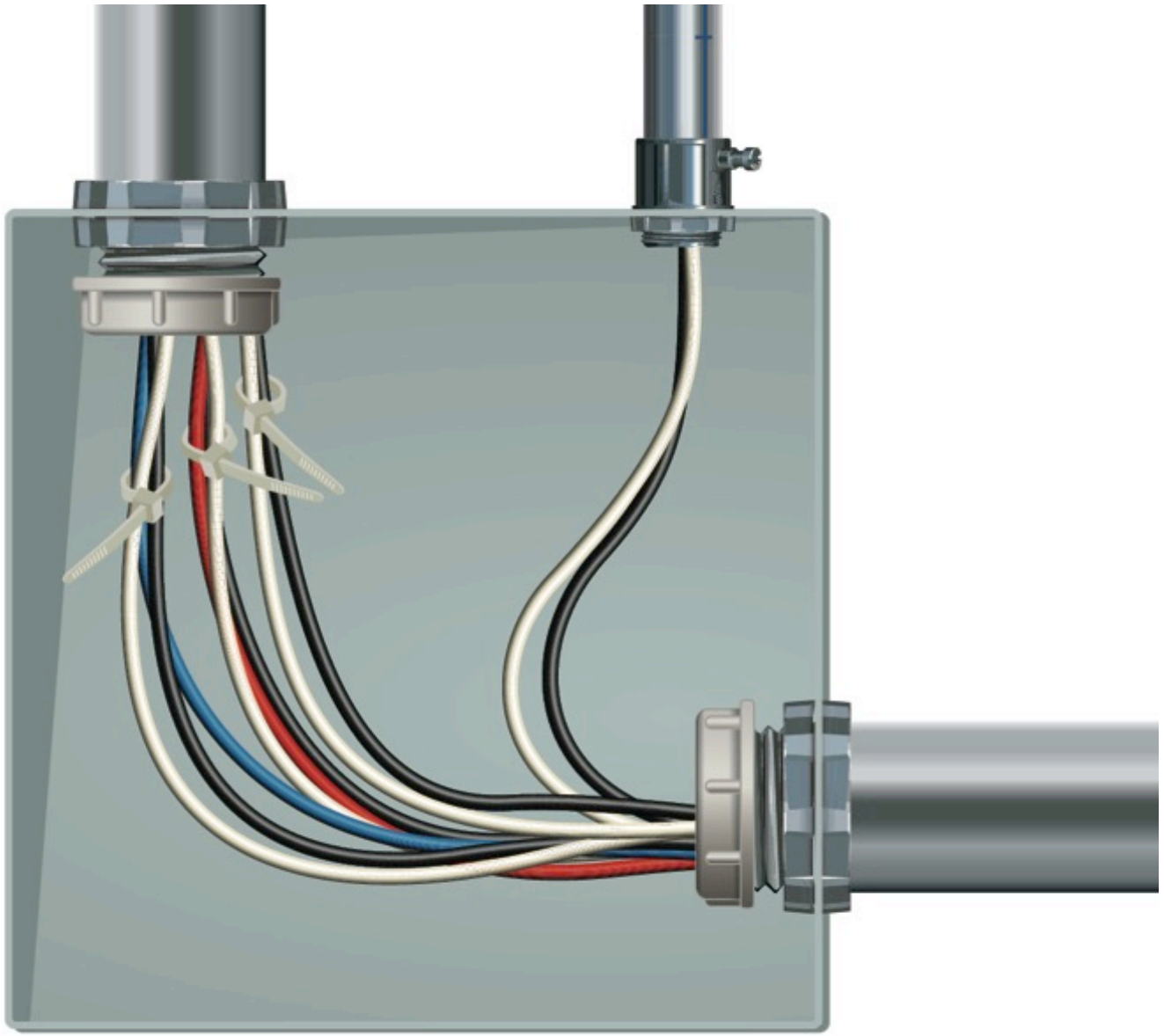

120 VOLTS
480 VOLTS
WARNING
120 VOLTS
480 VOLTS
THREE PHASE
WARNING
FANS
277 VOLTS
480 VOLTS
THREE PHASE
WARNING

Wiring and Protection

CHAPTER 2

200.4(B) Multiple Circuits

- Proposal 5-29
- New subdivision (B) titled “Multiple Circuits” has been added to this section.
- Requires grouping the common neutral conductor with its associated ungrounded conductors when contained in the same enclosure.
- The new exception relaxes the requirement where the grouping is obvious.



Section 210.5(C) Identification of Ungrounded Conductors

- Proposal 2-23
- New list item (2) added and provides branch circuit identification requirements for DC systems
- Applies to conductors in sizes 6 AWG and smaller
- Red for positive conductors and black for negative conductors

Section 210.8(A)(9) Bathtubs or Shower Stalls

- Proposal 2-46
- New list item (9) added to Section 210.8.
- (9) Bathtubs or Shower Stalls - where receptacles are installed within 1.8 m (6 ft) of the inside edge of the bathtub or shower stall.


Courtesy Pass and
Seymour Legrand

Section 210.8(A)(10) Laundry Areas

- Proposal 2-47, Comment 2-23
- New list item (10) added to Section 210.8(A).
- (10) Laundry Areas now required to have GFCI protection for 125-volt, single phase, 15- and 20-ampere receptacles.


STEAM

210.8(D) Kitchen Dishwasher Branch Circuit

- Proposal 2-58, Comment 2-29
- A new subdivision (D) titled “Kitchen Dishwasher Branch Circuit” has been added to 210.8.
- Outlets supplying dishwashers are required to be GFCI protected.


FRIGIDAIRE

210.12 AFCI Protection

- Proposal 2-116, Comment 2-59
- AFCI protective devices are required to be installed in a readily accessible location

Courtesy Eaton Corporation

Courtesy Pass and Seymour Legrand

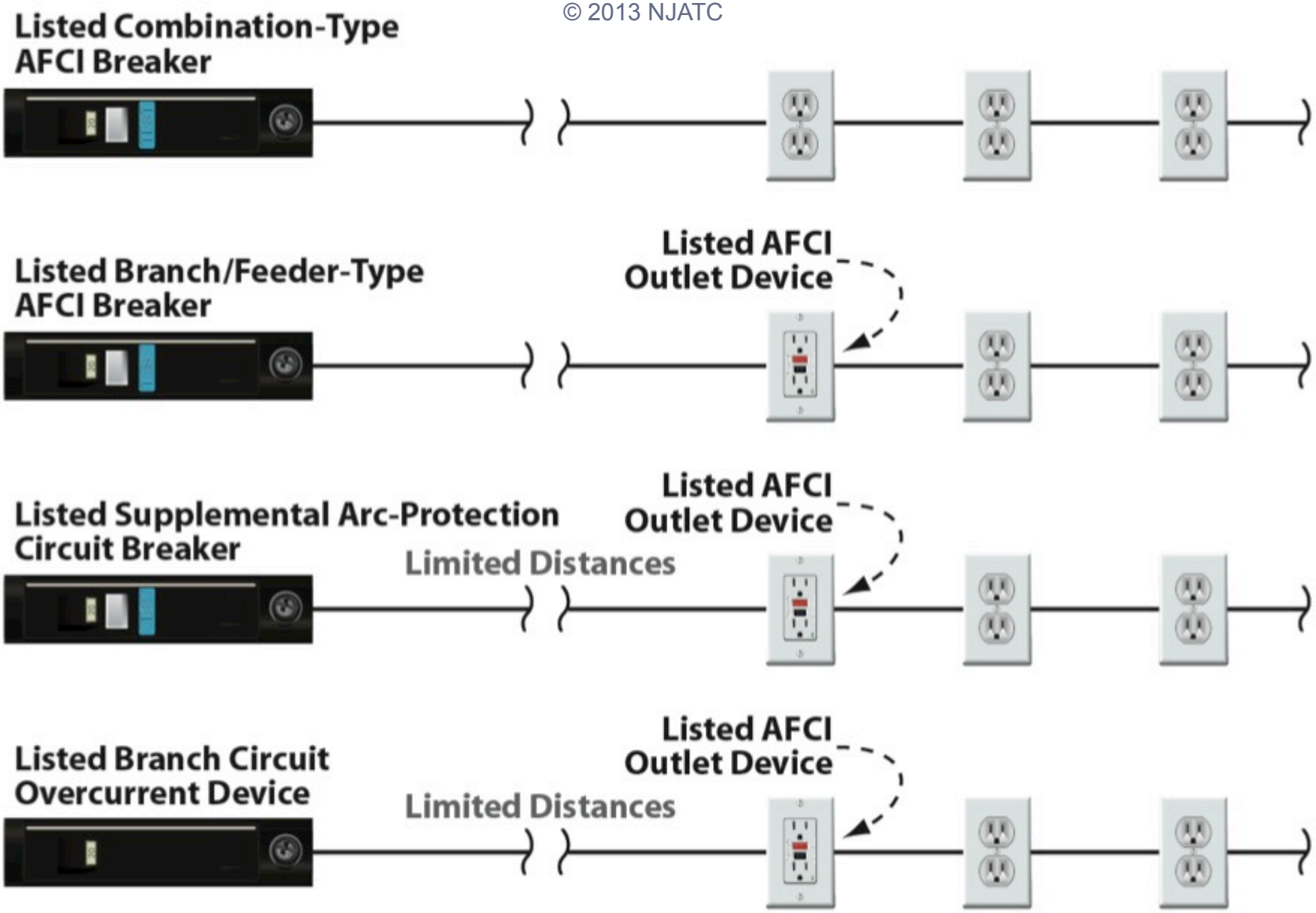
Section 210.12(A) Kitchen and Laundry

- Proposals 2-80 and 2-82a, Comments 2-48 – 2-50
- Change adds laundry areas and kitchen branch circuits and outlets to the AFCI protection requirements
- Continues the progression toward “whole-house” protection originally sought by CPSC in the 1999 NEC development cycle

Section 210.12(A)(1) – (6) AFCI Protection

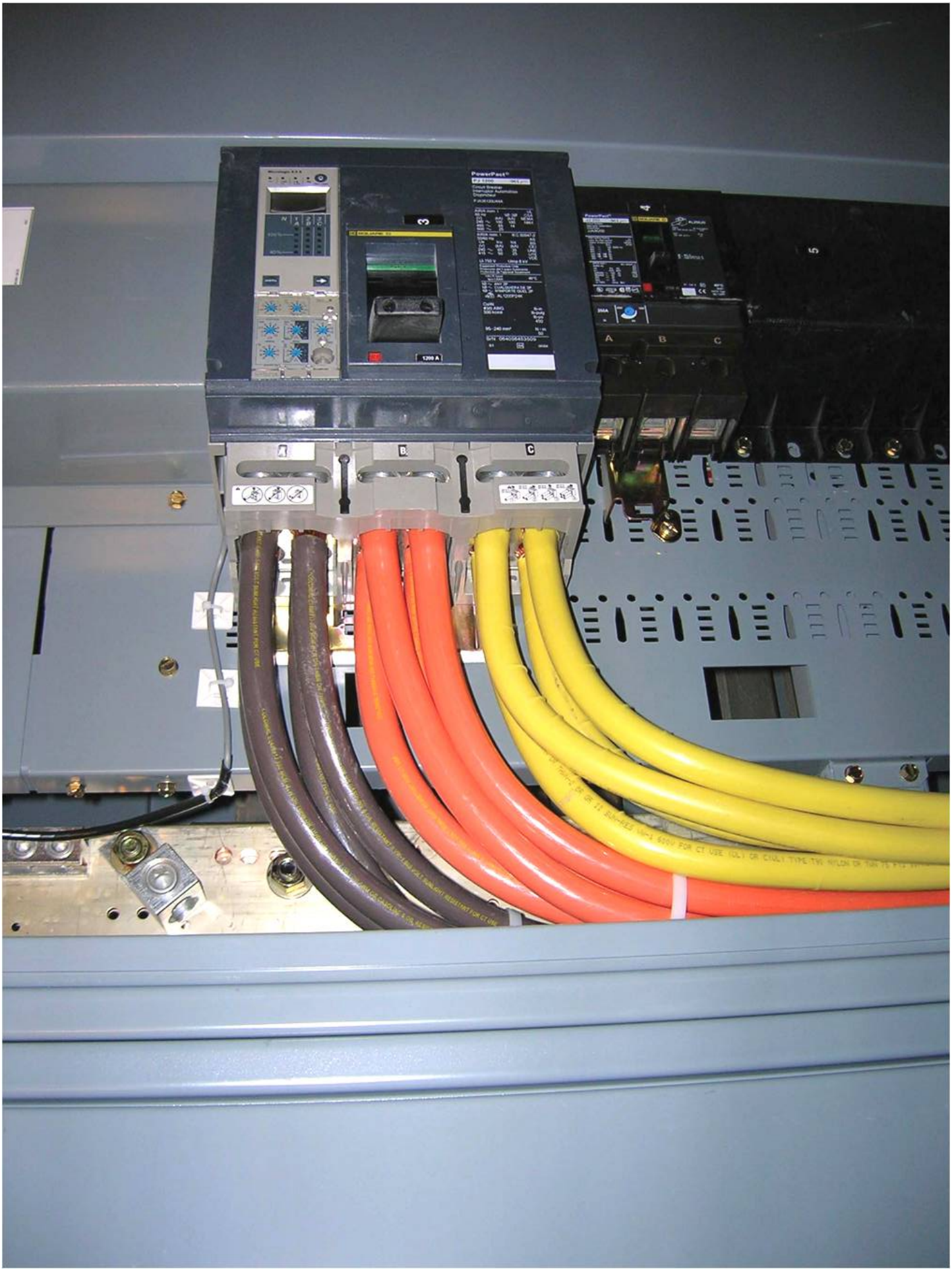
- Proposal 2-92, Comment 2-52
- Revision recognizes use of circuit breakers or outlet devices at the first outlet in the circuit
- Specific conditions must be met to apply for outlet AFCI devices

Courtesy Pass and Seymour Legrand


Listed Combination-Type
AFCI Breaker
Listed Branch/Feeder-Type
AFCI Breaker
Listed AFCI
Outlet Device
Listed Supplemental Arc-Protection
Circuit Breaker
Limited Distances
Listed AFCI
Outlet Device
Listed Branch Circuit
Overcurrent Device
Limited Distances
Listed AFCI
Outlet Device

Section 210.13 GFPE

- Proposal 2-125
- New Section 210.13 Ground-Fault Protection of Equipment
- Branch circuit disconnect rated 1000 amperes or more and installed on solidly grounded wye electrical systems of more than 150 volts to ground, but not exceeding 600 volts phase-to- phase, shall be provided with GFPE in accordance with 230.95


PowerPact
1200 A
A
B
C

Section 210.17 EV Branch Circuit

- Proposal 2-128
- New section 210.17 added to Article 210
- 210.17 Electric Vehicle Branch Circuit. Outlet(s) installed for the purpose of charging electric vehicles shall be supplied by a separate branch circuit. This circuit shall have no other outlets
- Informational Note. See 625.2 for the definition of "Electrical Vehicle"

Courtesy Pass and
Seymour Legrand

Section 210.64 Electrical Service Areas

- Proposal 2-191
- New Section 210.64 added to Article 210 and exception for one- and two-family dwelling units
- At least one 125-volt, single-phase, 15- or 20-ampere receptacle outlet within 15 m (50 ft) of the electrical service equipment

Section 240.87 Arc Energy Reduction

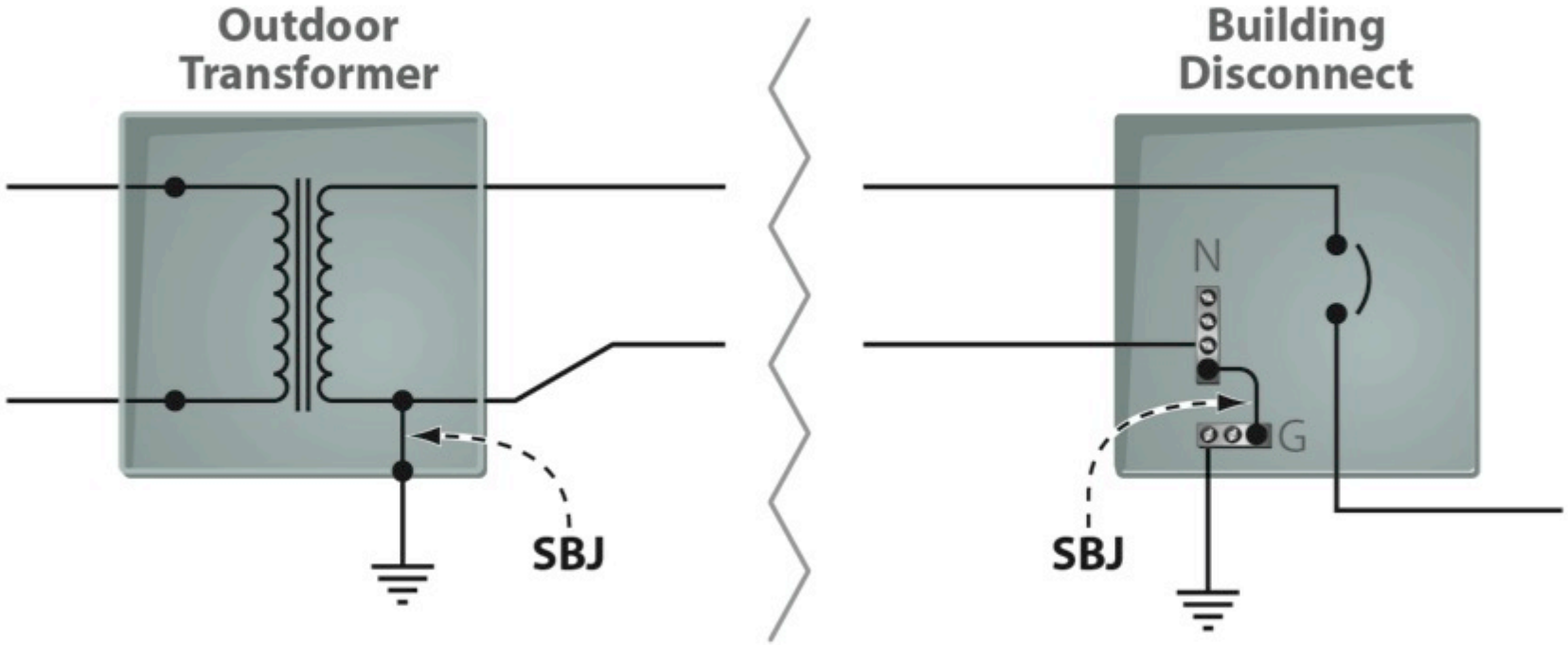
- Proposal 10-53a, Comment 10-24
- This section is now titled “Arc Energy Reduction”
- Applies to circuit breakers with a trip rating of 1200 amperes or greater
- Includes new list items (4), and (5) recognizing other methods of arc energy reduction by a specific system/ equipment other approved means.

Courtesy of GE Arc Vault™ Protection System photography courtesy of GE's Industrial Solutions business

250.30(A)(1) Exception No. 2 (new)

- Proposal 5-85
- A supply-side bonding jumper is not required between enclosures where a system bonding jumper installed at both locations and a parallel path is not created for the system grounded conductor current.
- The new exception is necessary after requirements for supply-side bonding jumper(s) were added in the 2011 NEC.

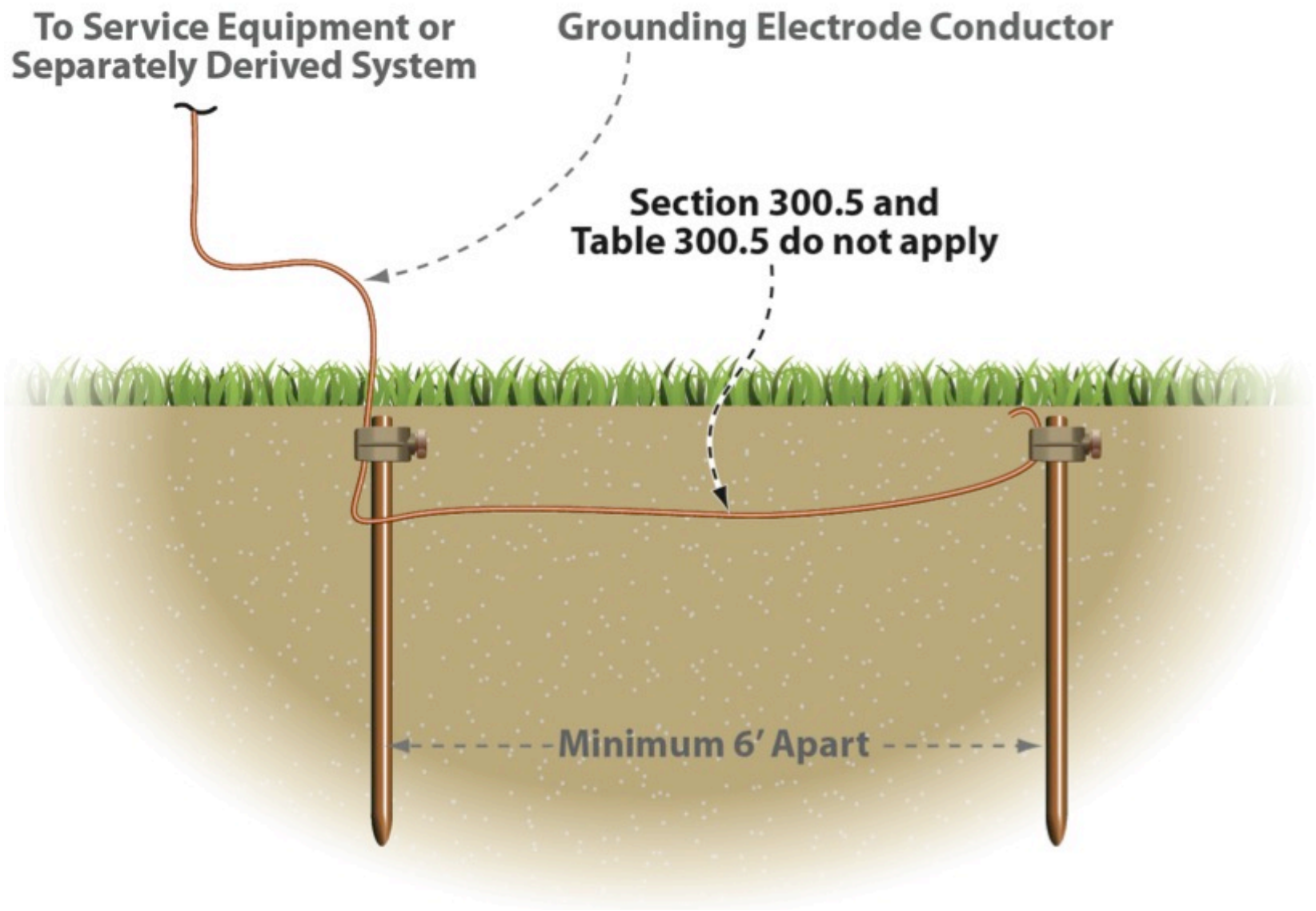
System Bonding Jumper Permitted at Two Locations



No Parallel Paths for Neutral Current

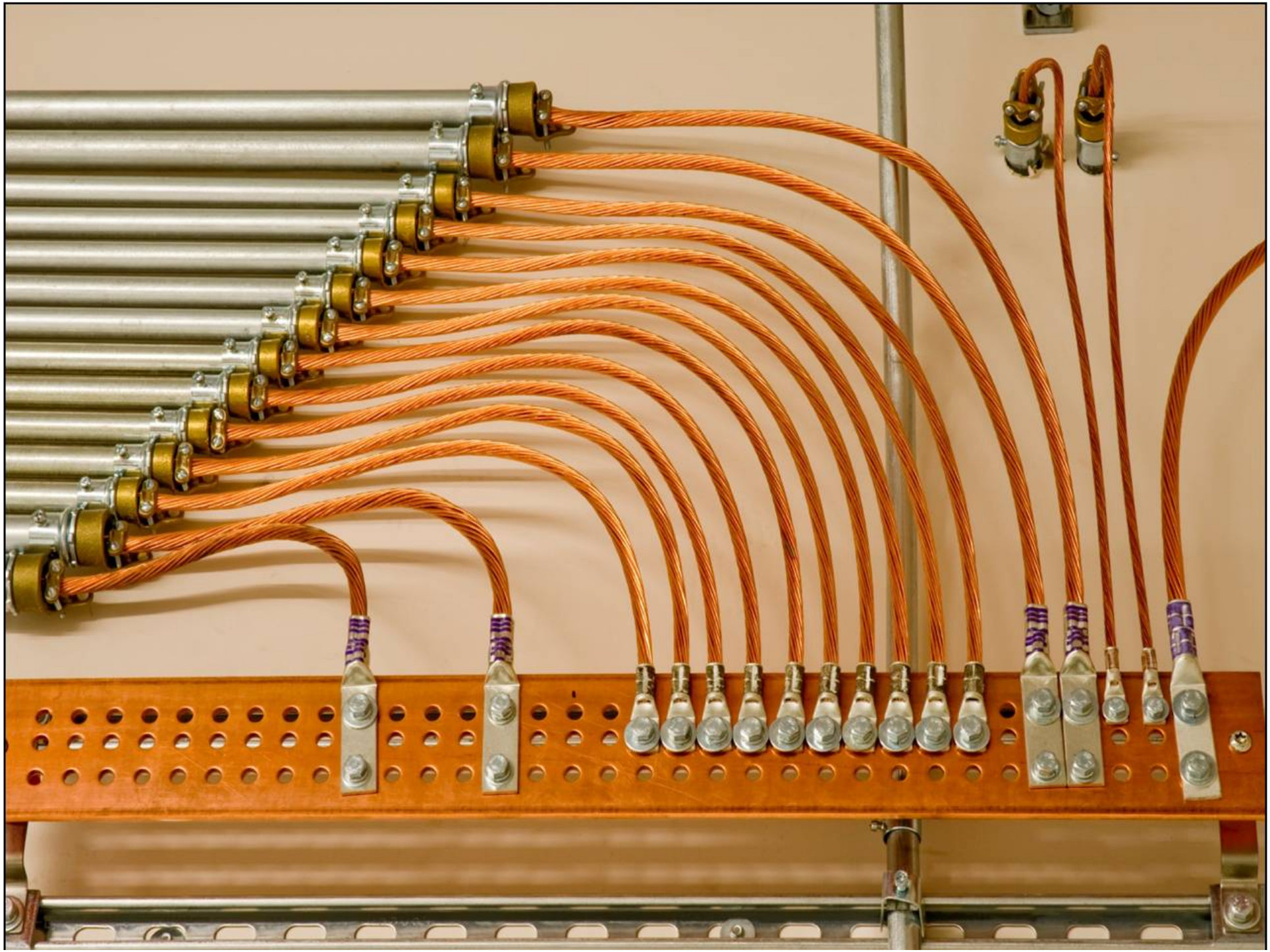
250.64(B) Protection for GEC

- A new last sentence has been added to 250.64(B).
- The requirements in 300.5 for underground installations do not apply to buried grounding electrode conductors or bonding jumpers of the grounding electrode system.
- Chapter 3 wiring methods that contain grounding electrode conductors must comply with 300.5.


To Service Equipment or
Separately Derived System
Grounding Electrode Conductor
Section 300.5 and
Table 300.5 do not apply
Minimum 6' Apart

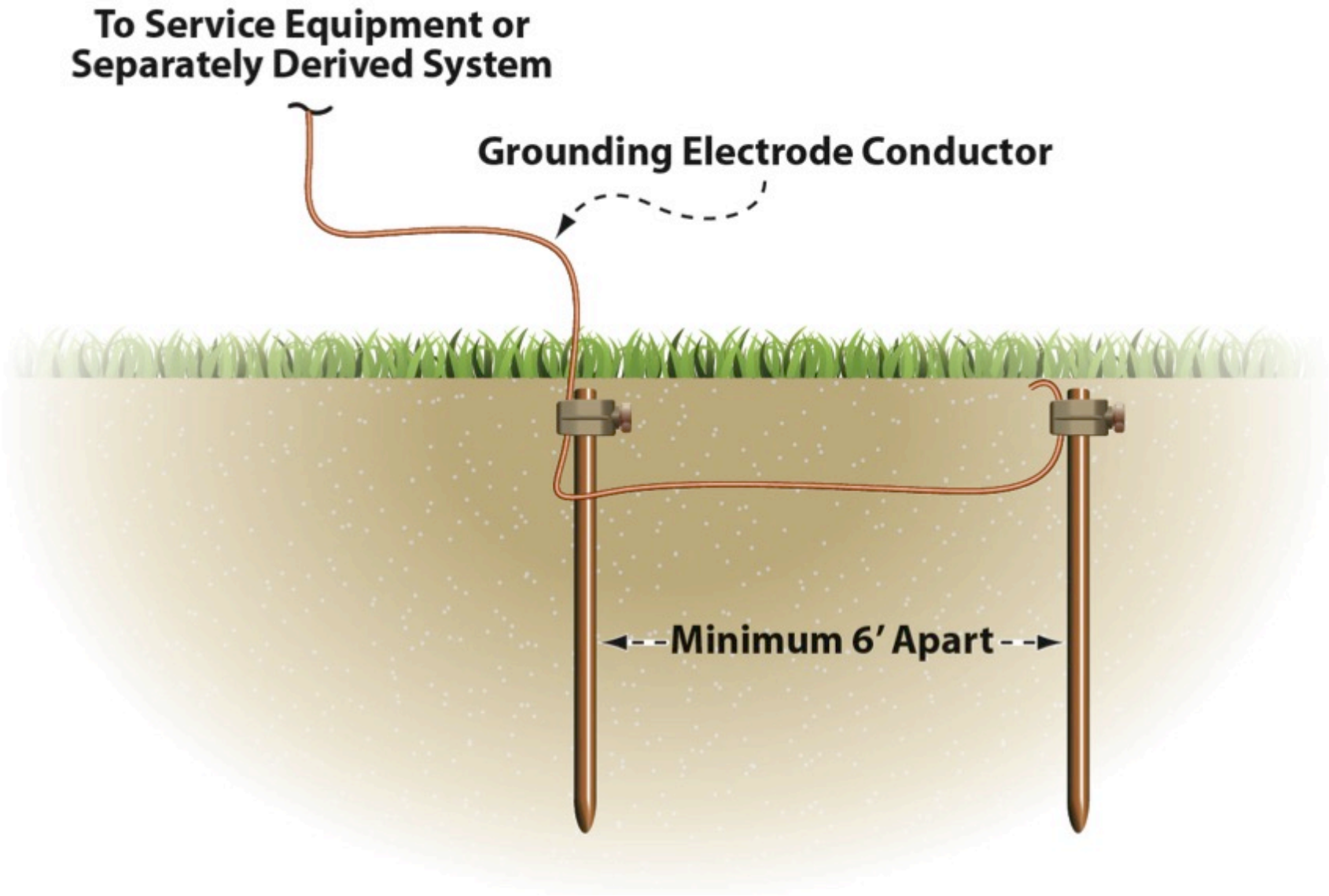
Section 250.64(D)(1)(3)

- Proposal 5-120
- Revised to address busbar lengths.
- Revision adds requirement that the busbar be of sufficient length to connect all grounding electrode conductors and or bonding jumpers or conductors that must be attached.



Sections 250.66(A) and (B) Sole Connections

- Proposals 5-131 and 5-135
- Revised to clarify the intent of the term "sole connection“ as used in this section as it clearly is related to the type of electrodes addressed in this section and not the quantity of electrodes
- Maximum size required applies if more than one electrode of this type is installed.


To Service Equipment or
Separately Derived System
Grounding Electrode Conductor
Minimum 6′ Apart

Section 250.102(C)(1) – New Table

- Proposal 5-42, Comment 5-56
- New table provides minimum sizes for other than grounding electrode conductors bonding jumpers for the grounding electrode system
- Provides minimum sizing of line-side bonding jumpers, grounded conductors, main bonding jumpers, system bonding jumpers.

Table 250.102(C)(1) Grounded Conductor, Main Bonding Jumper, System Bonding Jumper, and Supply-Side Bonding Jumper for Alternating Current Systems (in part without all notes)

Size of Largest Ungrounded Conductor or Equivalent Area for Parallel Conductors (AWG/kcmil)		Size of Grounded Conductor or Bonding Jumper* (AWG/kcmil)	
Copper	**Aluminum or Copper-Clad Aluminum**	**Copper**	**Aluminum or Copper-Clad Aluminum**
2 or smaller	1/0 or smaller	8	6
1 or 1/0	2/0 or 3/0	6	4
2/0 or 3/0	4/0 or 250	4	2
Over 3/0 through 350	Over 250 through 500	2	1/0
Over 350 through 600	Over 500 through 900	1/0	3/0
Over 600 through 1100	Over 900 through 1750	2/0	4/0
Over 1100	Over 1750	See Notes	

Notes (in part):
1. If the ungrounded supply conductors are larger than 1100 kcmil copper or 1750 kcmil aluminum, the grounded conductor or bonding jumper shall have an area not less than 12 ½ percent of the area of the largest ungrounded supply conductor or...

Section 250.167 DC Ground Fault Detection

- Proposal 5-233
- New requirements for ground fault detection on DC systems.
- Requirements address grounded systems, ungrounded systems, and marking rules for each.

Wiring Methods and Materials

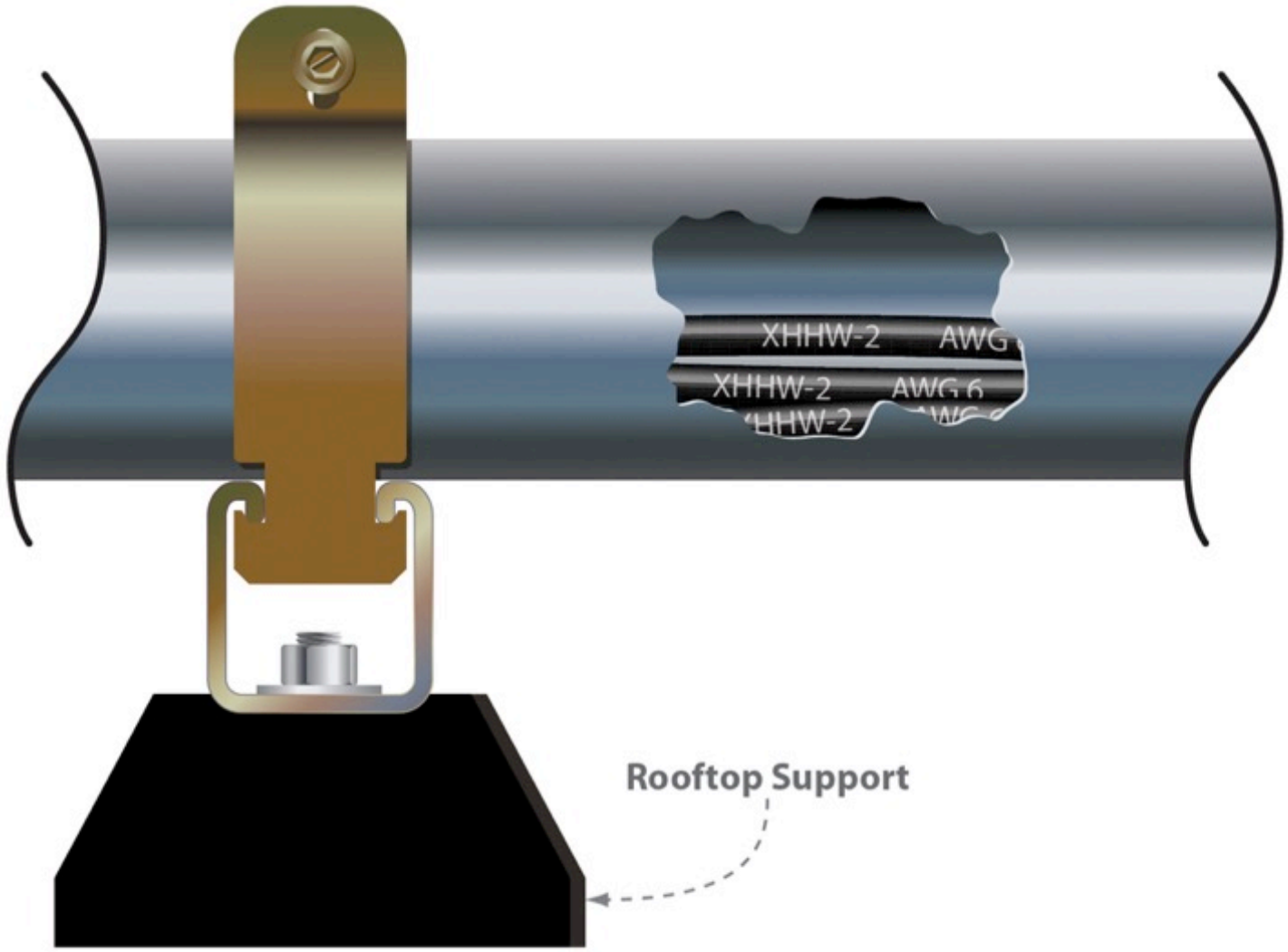
CHAPTER 3

310.15(B)(3)(c) and Table 310.15(B)(3)(c)

- Proposal 6-31, Comment 6-29
- Revised to remove the term “circular raceways” and add the term “cables”
- Where conductors or cables installed in raceways or cables are exposed to direct sunlight on or above rooftops, the adjustments shown in Table 310.15(B)(3)(c) apply

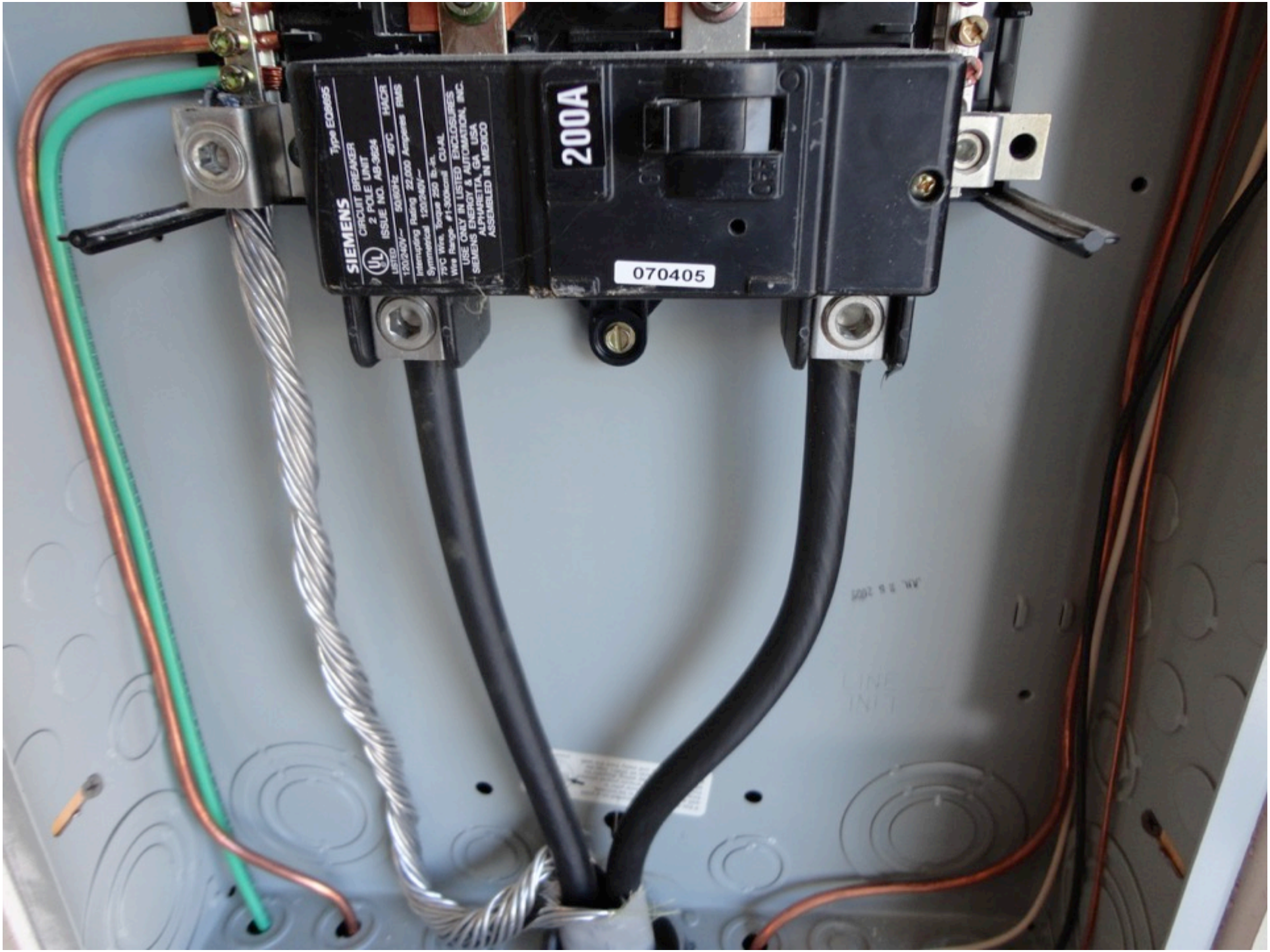
310.15(B)(3)(c) Exception

- Proposal 6-41, Comment 6-37
- Ambient temperature correction factors in Table 310.15(B)(2)(a) or Table 310.15(B)(2)(b) do not apply to XHHW-2 insulated conductors in raceways and cables on or above rooftops and exposed to direct sunlight
- Performance testing by both General Cable and Underwriters Laboratories



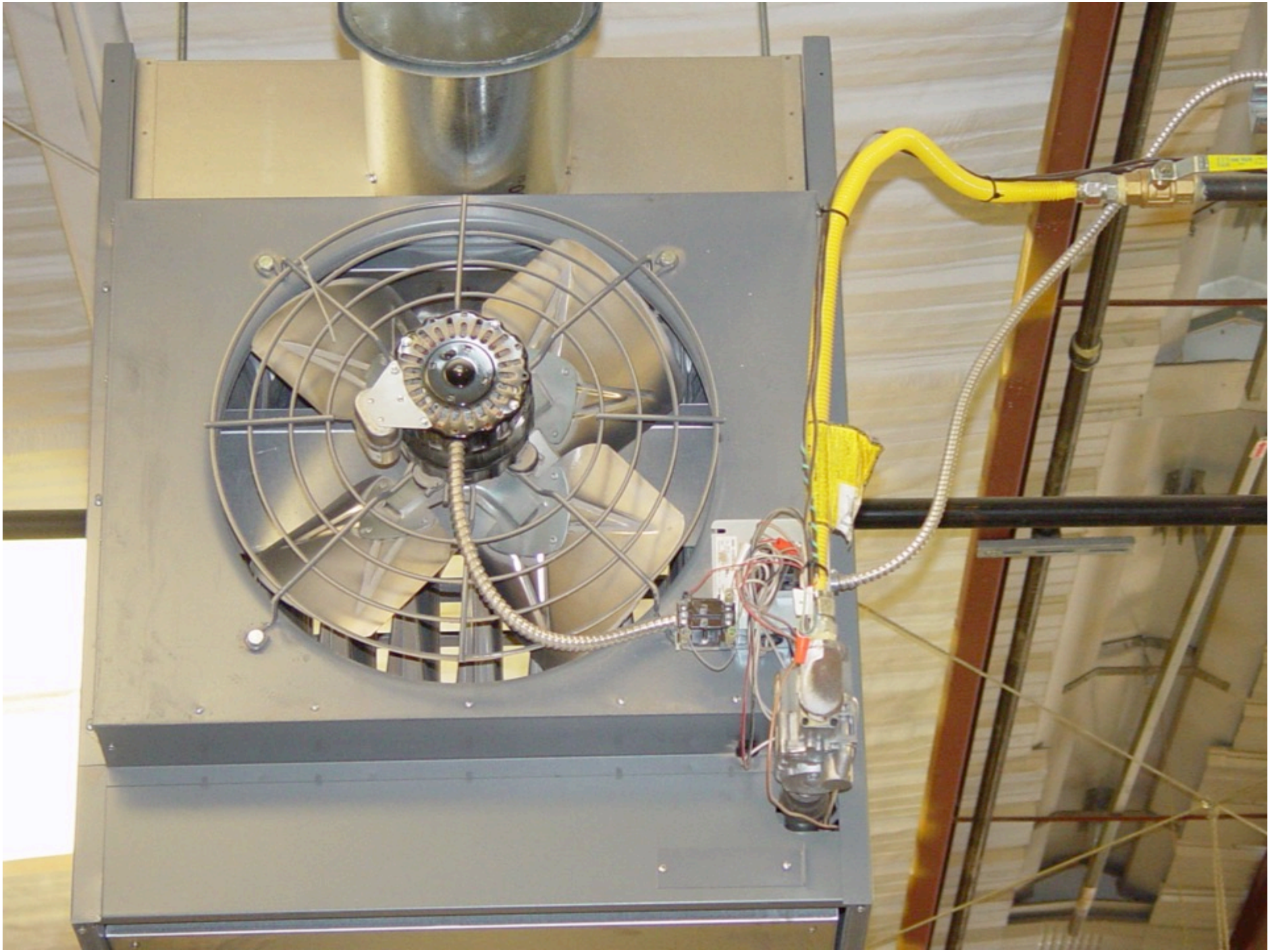
Section and Table 310.15(B)(7)

- Proposal 6-49a
- Deletion of Table 310.15(B)(7) and revision to Section 310.15(B)(7)
- Revision deletes the table and replaces it with a provision allowing a .83 reduction in ampacity for dwelling services and feeder conductors. The reduction is the same as what was permitted by former Table 310.15(B)(7) but presented in a user friendly format


SIEMENS
Type ED6B95
CIRCUIT BREAKER
2 POLE UNIT
ISSUE NO. AB-3804
UR1D
120/240V~ 50/60Hz 42C HACR
Interrupting Rating 22,000 Amperes RMS
Symmetrical 120/240V~
75C Wire Range #1-300kcmil Cu/Al
Wire Range #1-300kcmil Cu/Al
USE ONLY IN LISTED ENCLOSURES
SIEMENS ENERGY & AUTOMATION, INC.
ALPHARETTA, GA USA
ASSEMBLED IN MEXICO
200A
070405

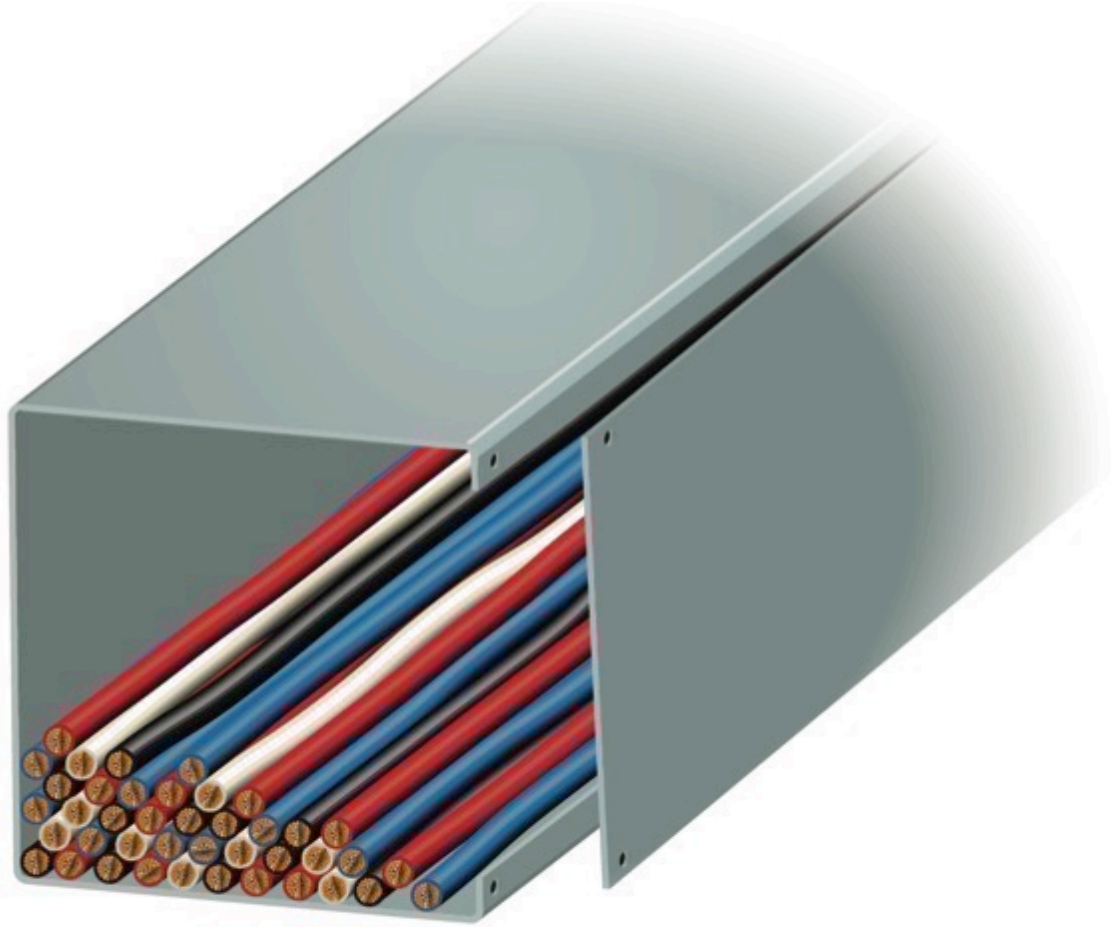
Section 330.30(D) Unsupported Cable

- Proposal 7-31
- New list item (3) added to this section
- New list item (3) permits MC cable to be installed unsupported in lengths not exceeding 3 feet for vibration reasons or flexibility



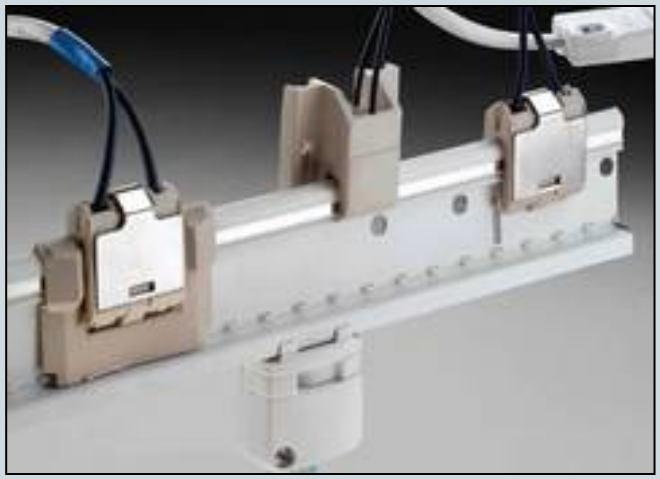
Section 376.22(B) Adjustment Factors

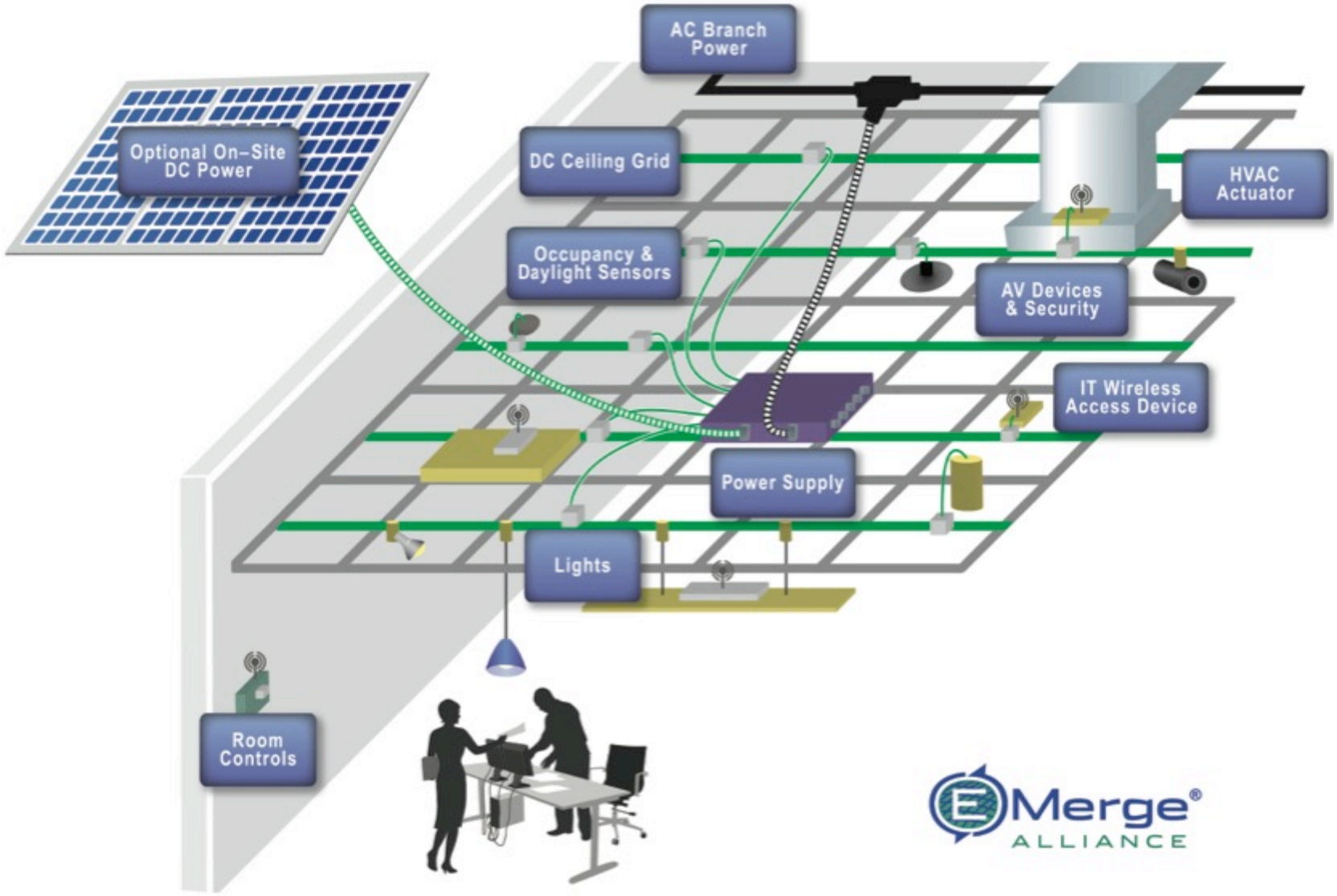
- Proposal 8-137
- Revision addresses the maximum of 30 current-carrying conductors
- Revision clarifies that the 30 conductor maximum before application of correction factors applies at any cross section of the wireway



Article 393 Low Voltage Suspended Ceiling Power Distribution Systems

- Proposal 18-10a
- New Article added to Chapter 3
- New article for low voltage DC equipment (lighting and power) connected to a ceiling grid built for this purpose. Similar characteristics to track lighting



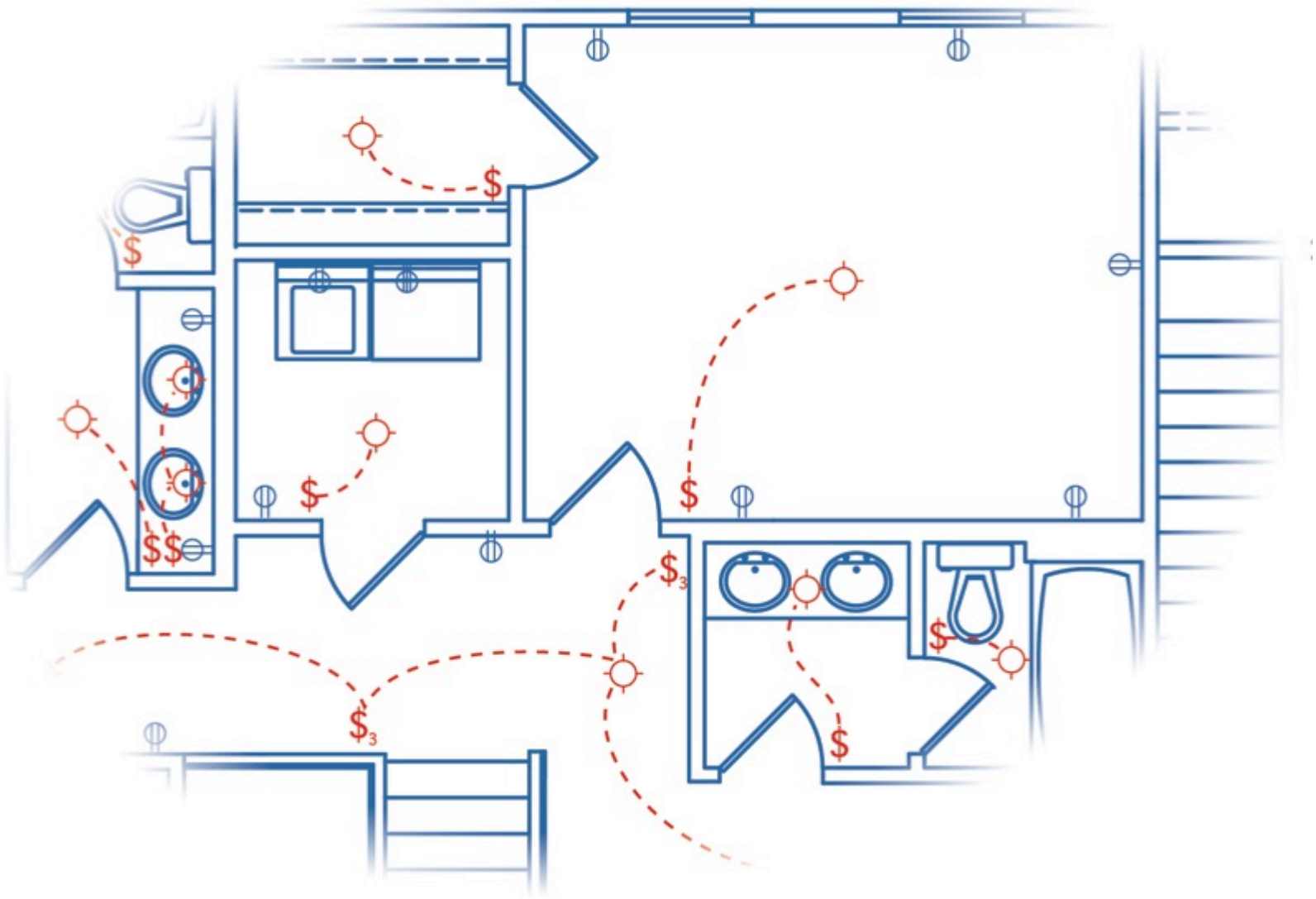


Equipment for General Use

CHAPTER 4

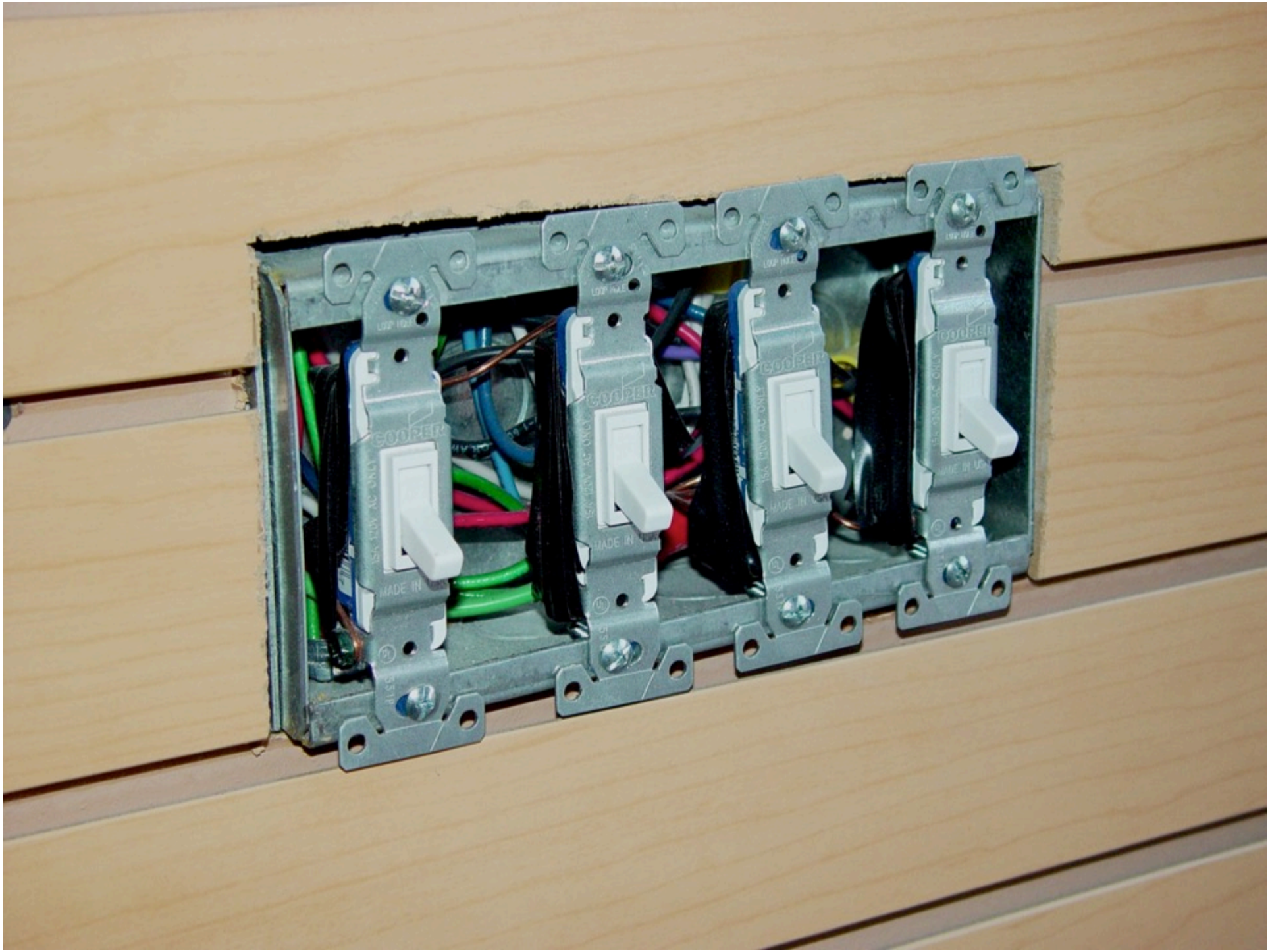
Section 404.2(C) Switches Controlling Lighting Loads

- Proposal 9-89
- As revised this section now relaxes the requirement where multiple switches controlling the same lighting load are installed in in the same area
- The grounded circuit conductor must be installed to only one of those switch box locations by the new exception
- Door jam switches in closets exempted



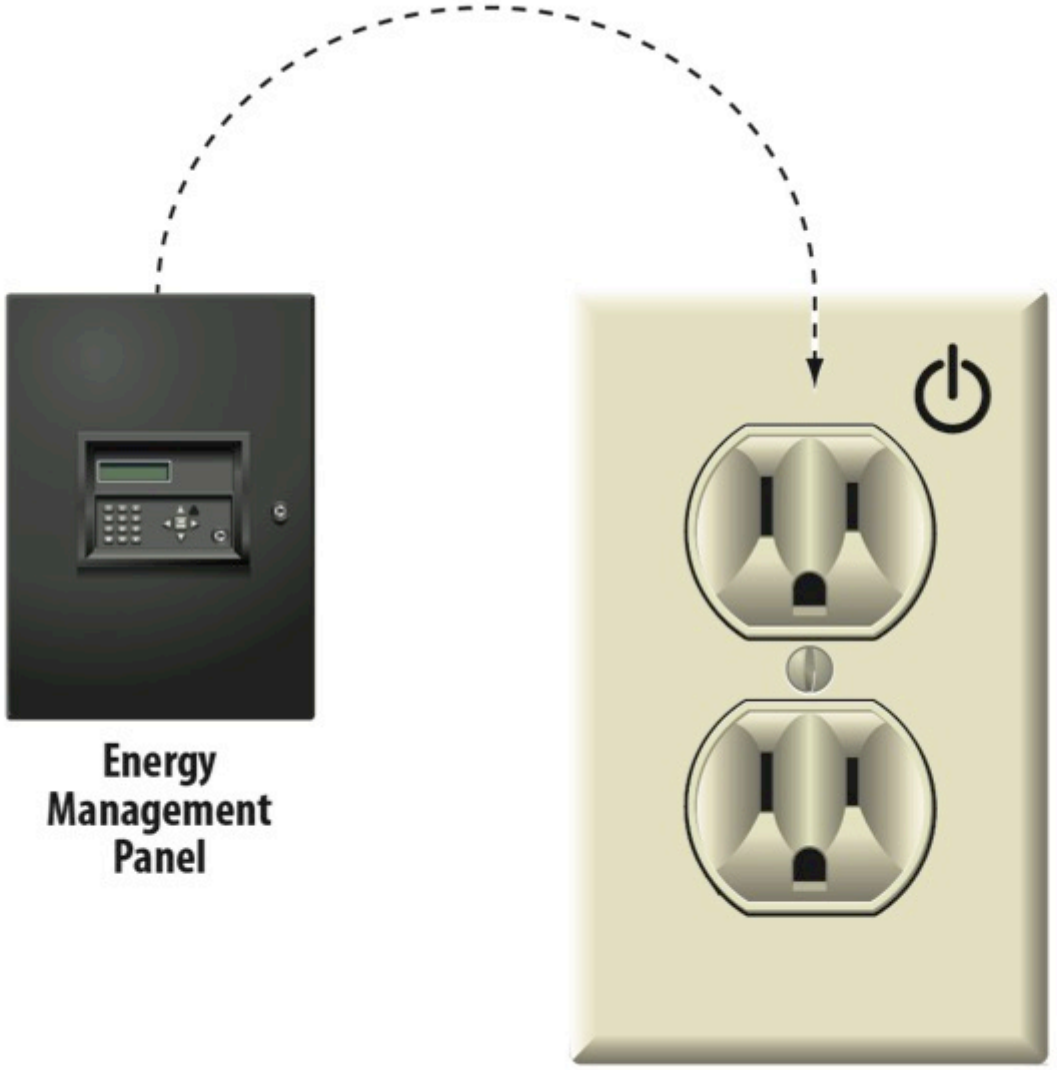
Section 404.10(B) Box Mounted

- Proposal 9-98
- Revision addresses switch mounting requirements.
- Revision clarifies that drywall screws are not permitted for use to fasten snap switches to boxes.


COOPER
COOPER
COOPER
COOPER

Section 406.3(E) Controlled Receptacle Marking

- Proposal 18-15
- New marking symbol *required for receptacles* controlled by an automatic control device or by an automatic energy management system.
- Change includes new Figure 406.3(E):

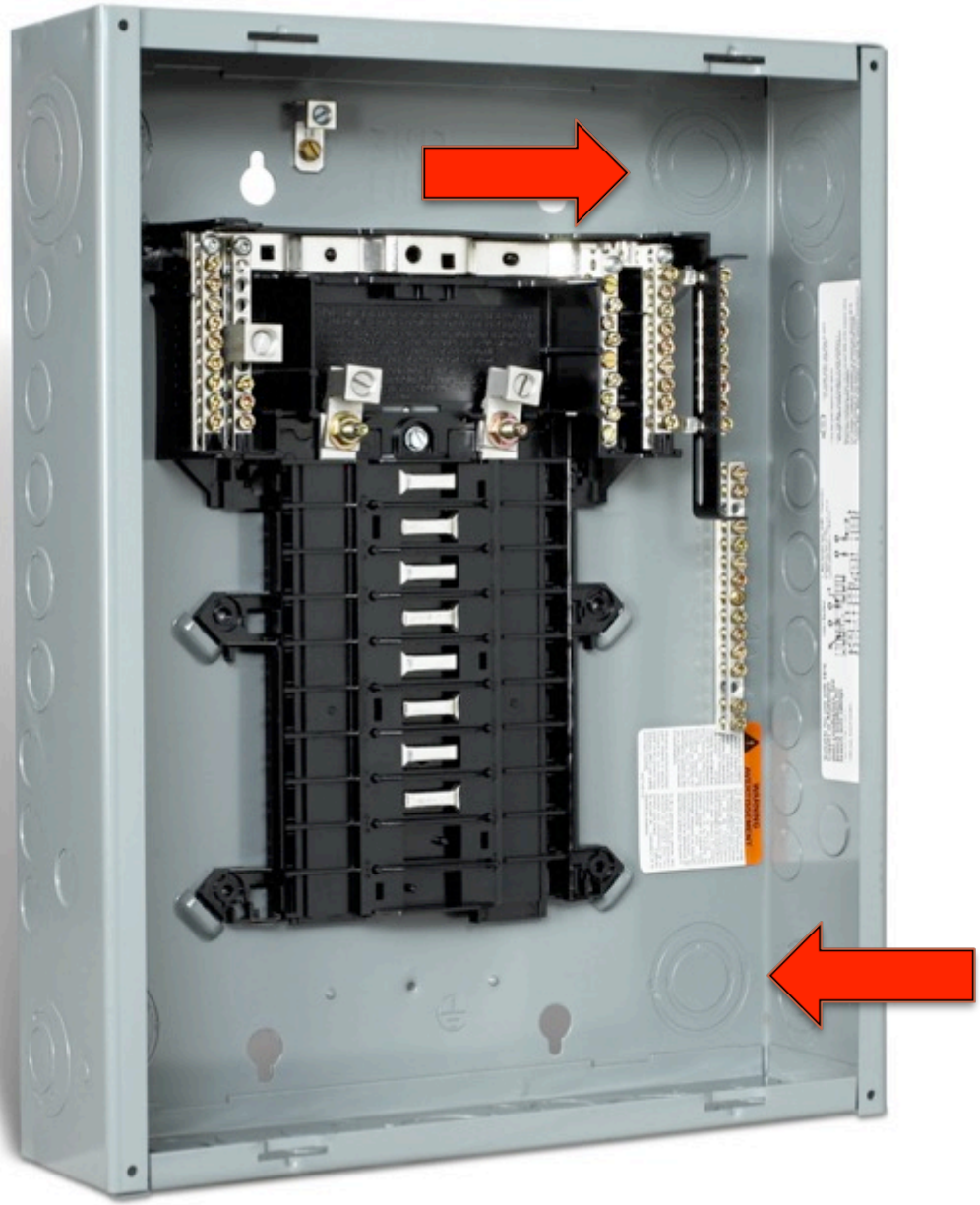


406.4(D) AFCI and GFCI Replacements

- Proposal 18-18
- Replacement AFCI and GFCI devices at outlets are required to be readily accessible.

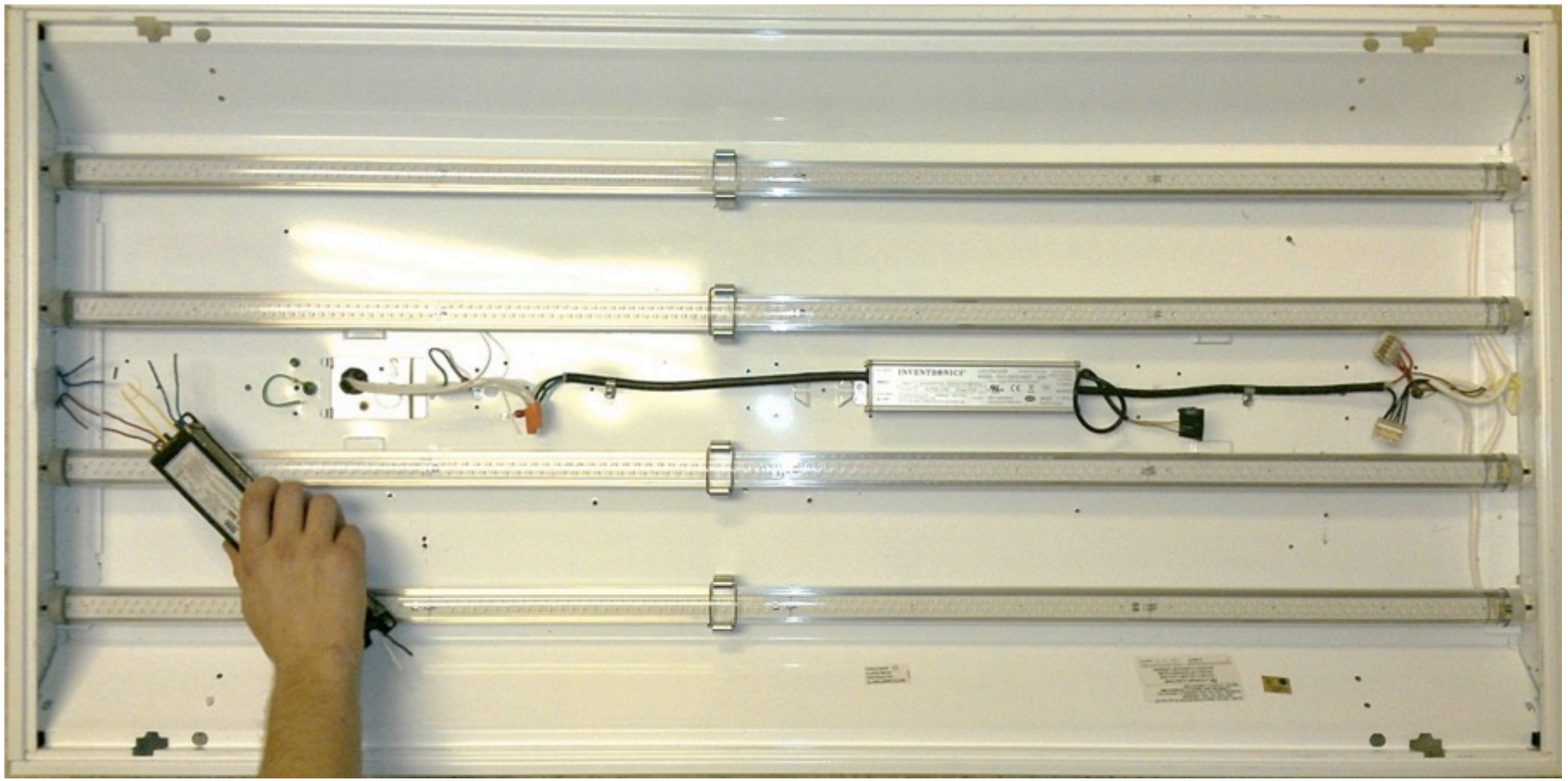
408.55(C) Rear Wire-Bending Space

- Proposals 9-130, 9-131
- The section has been restructured into three subdivisions and expanded to address rear wire-bending space in enclosures.
- Subdivision (C) includes new requirements for rear wire-bending spaces.



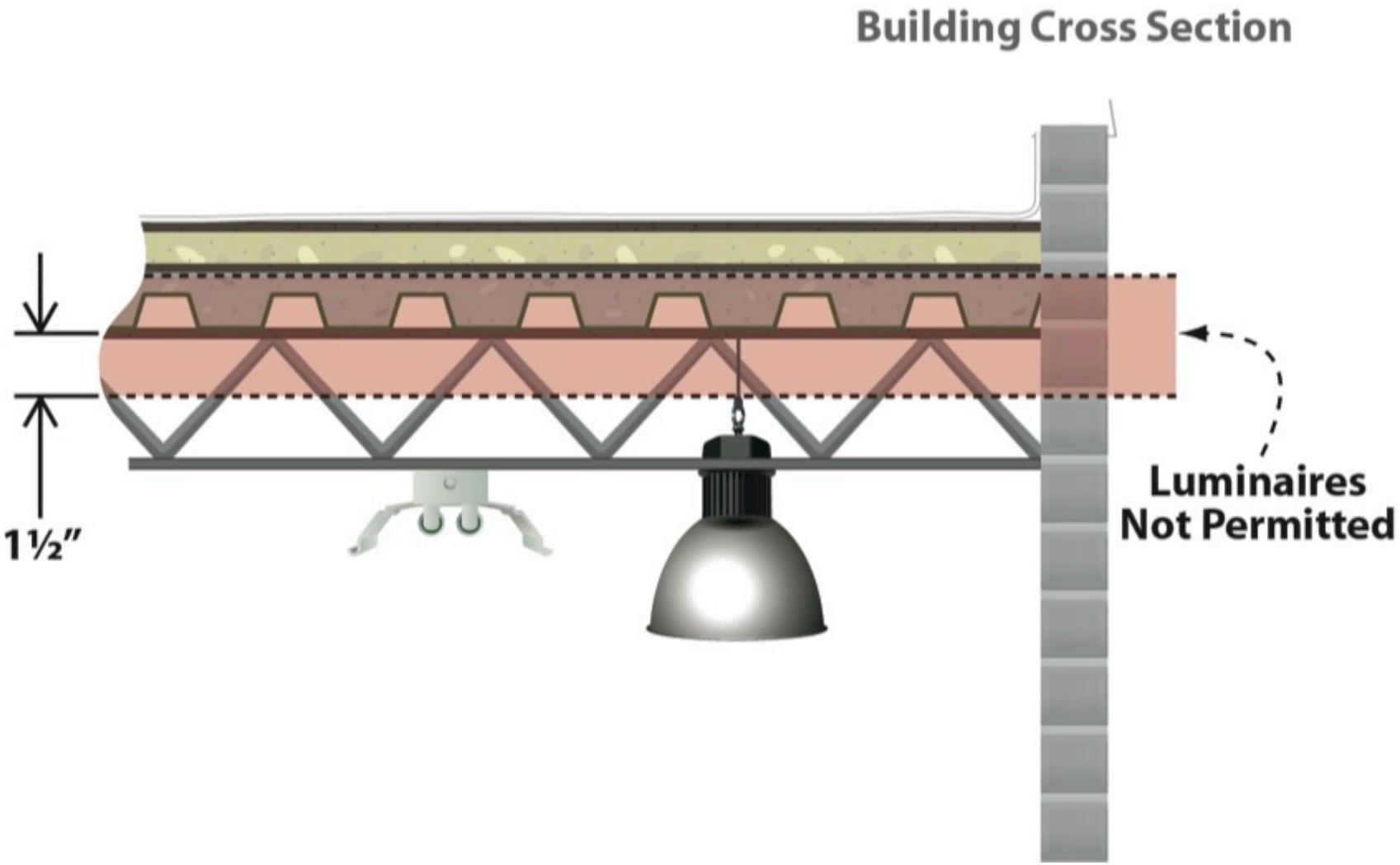
Section 410.6 Listing Required

- Proposal 18-59
- Revision adds new listing requirements.
- Revision expands the listing requirement to retrofit kits for lampholders and luminaires.
- Similar revision to 600.3 covering electric signs and outline lighting systems.


INVENTRONICS

Section 410.10(F) Luminaires Installed in or Under Roof Decking

- Proposal 18-66
- New installation restrictions for luminaires
- New rule addresses protection for luminaires and restricts them from being installed within 1-1/2 inches of the lowest metal deck surface, similar to the rule in 300.4(E)



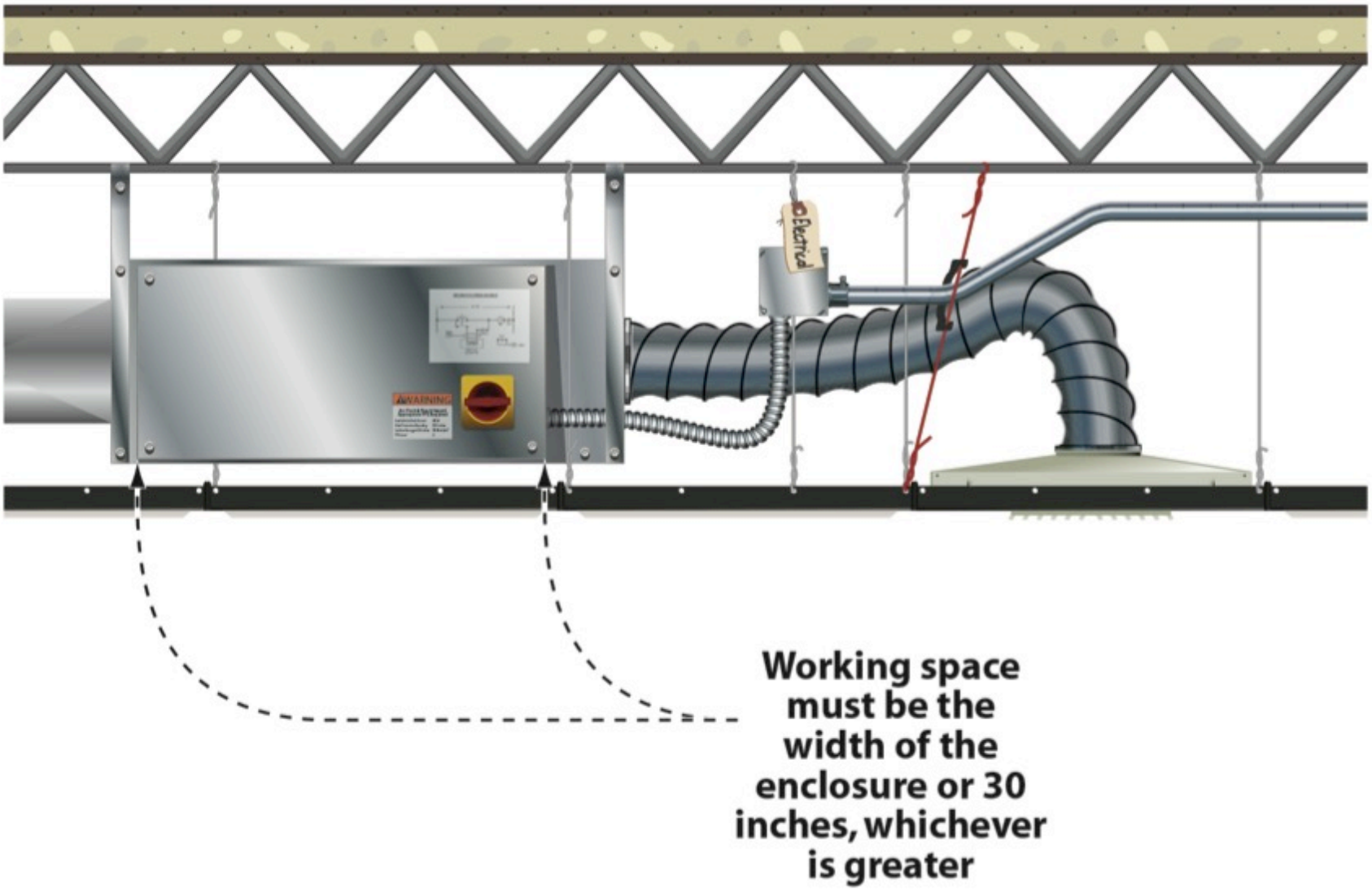
Section 422.23 Tire Inflation and Automotive Vacuum Machines

- Proposal 17-31
- Tire inflation equipment or vacuum machines for public use must be protected by ground-fault circuit-interrupter (GFCI) protection for personnel.
- The GFCI protection (circuit breaker or outlet device) is required to be readily accessible.


VACUUM
VACUUM
AIR

424.66(B) Limited Access

- Proposal 17-75, Comment 17-19
- A new subdivision (B) titled “Limited Access” has been added to 424.66.
- The width and depth of working space in 110.26 is required in front of duct heater enclosures containing equipment that requires servicing while energized.


Working space must be the width of the enclosure or 30 inches, whichever is greater

Section 445.11 Marking

- Proposal 13-10, 13-11
- Revision requires a marking when the neutral of a generator is bonded to the generator frame.
- Revision requires specific information to be included on the generator (more than 15 KW) nameplate. Power factor, impedances, insulation system class, and time ratings.


CAT

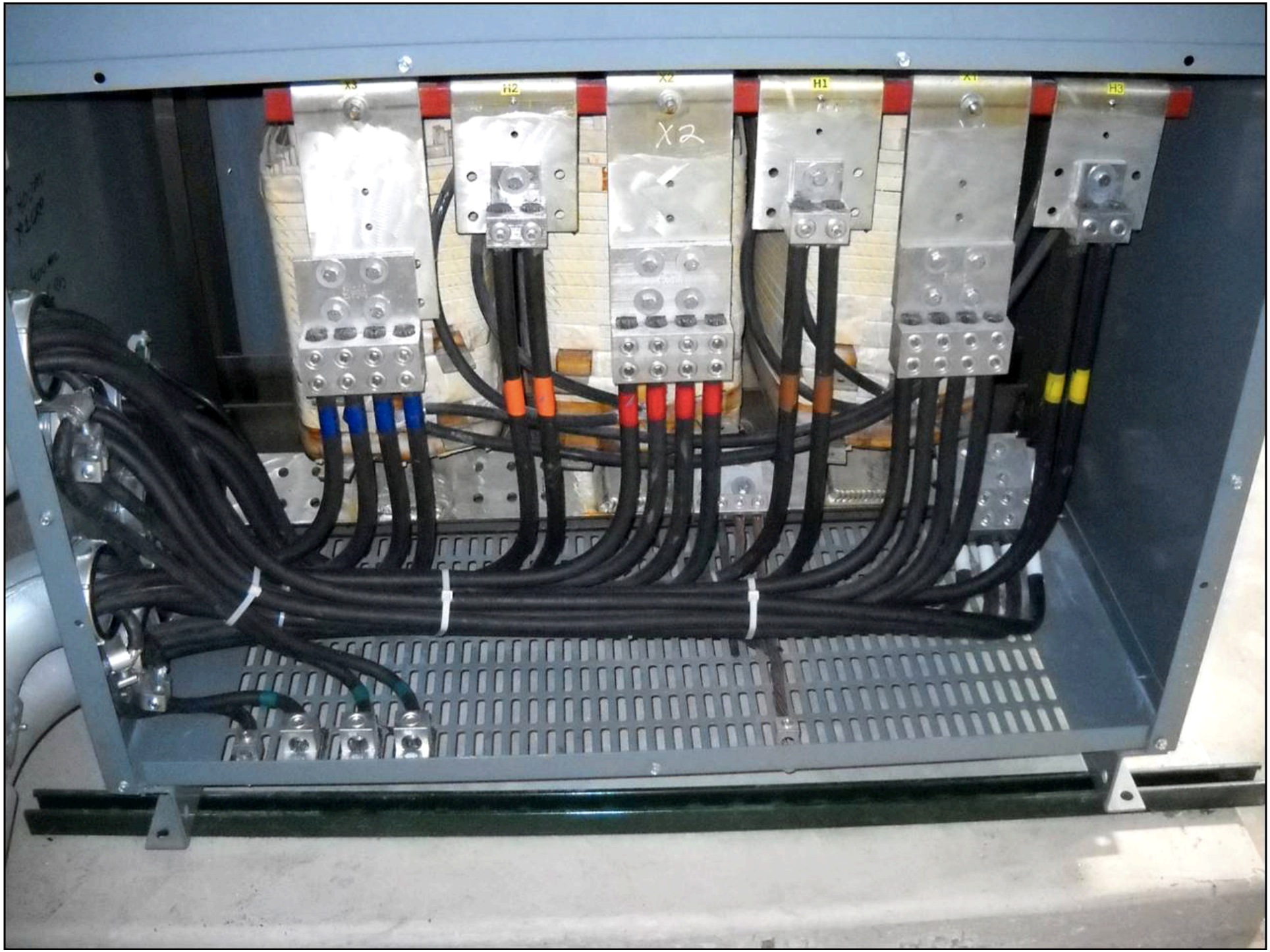
Section 445.20 GFCI Protection for Receptacles on Portable Generators

- Proposal 13-19
- All 125-volt, single-phase, 15- 20-, and 30-ampere receptacle outlets, that are a part of a 15 kW or smaller, portable generator, must have ground-fault circuit interrupter protection for personnel.
- All 125-volt, single-phase, 15- and 20-ampere receptacles must have ground-fault circuit-interrupter (GFCI) protection, or not be usable when the 125/250 V locking receptacle is in use.


120/240VAC
120VAC
120VAC

Section 450.10(A) Grounding

- Proposal 9-144
- New provision incorporates specific requirements for installing an equipment grounding terminal bar in transformer enclosures but not on the vent screen portion.
- An exception addresses transformers with pigtail leads used as the connection means.


X3
H2
X2
X2
H1
X1
H3

Section 480.8(C) Accessibility

- Proposal 13-38
- New rules requiring accessibility
- New section requires terminals and transparent battery containers required to be readily accessible


C&D
110
112
113
114
115
117

Special Occupancies

CHAPTER 5

501.40 Multiwire Branch Circuits

- Proposal 14-59
- The requirements for simultaneous disconnection of all ungrounded conductors of multiwire branch circuits are already provided in 210.4(B)
- Permitted in hazardous locations where ungrounded conductors are provided with a means of simultaneous disconnect as required in 210.4(B)

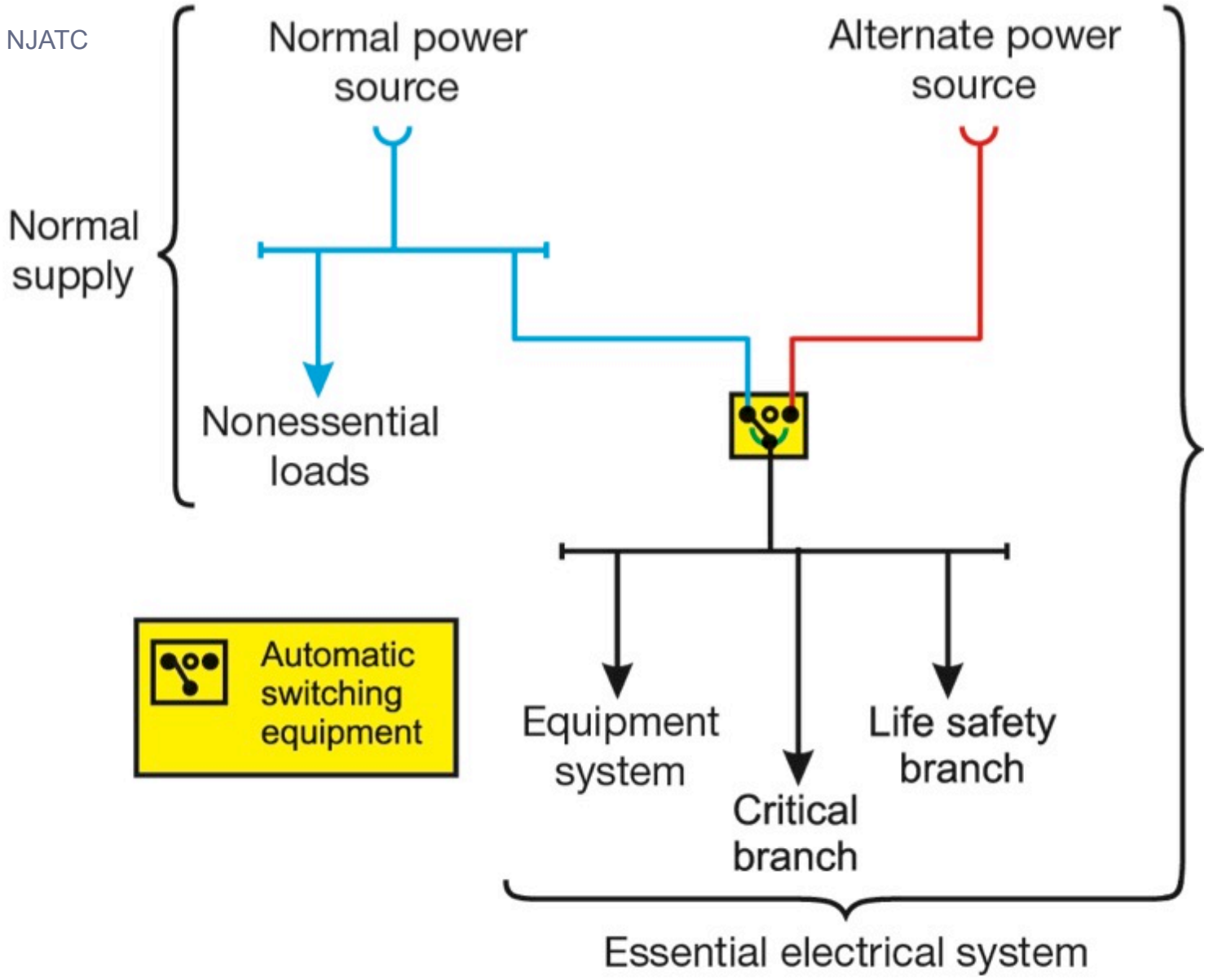
Figures 514.3(a) and 514.3(b)

- Proposal 14-237
- Note 2 following Table 514.3(B)(1) now refers to Figures 514.3(a) and (b).
- The existing Figure 514.3 would be replaced with Figures 8.3.2(a) and 8.2.3(b) from NFPA 30A.
- The revision results in consistency between *NEC* Article 514 and NFPA 30A.


4,540 LITRE
CLEAR DIESEL

517.2 Emergency System (deleted)

- Proposal 15-13
- The term “emergency system” was also removed from provisions in Article 517.
- The term used in NFPA 99 and Article 517 is “Essential Electrical System.”
- The deletion clarifies applicability of Article 700 to the essential electrical system.


Normal power source
Alternate power source
Normal supply
Nonessential loads
Automatic switching equipment
Equipment system
Critical branch
Life safety branch
Essential electrical system

517.2 Wet Procedure Location

- Proposal 15-14, 15-16 Comments 15-5, 15-10
- The definition of “wet procedure locations” formerly under “Patient Care Space” has been deleted.
- A separate definition of “Wet Procedure Location” and associated informational note added to 517.2.
- The definition allows continued application of the term no longer defined in NFPA 99.

517.18(B) Patient Bed Location Receptacles

- Proposal 15-36
- This revision increases the minimum number of receptacles required from four to eight
- Aligns with NFPA 99 relative to the increases in quantity of receptacles and normal care patient bed locations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517.18(C) Designated Pediatric Locations

- Proposal 15-37, Comment 15-26
- Section 517.18(C) has been revised to align with the requirement in NFPA 99, Section 6.3.2.2.6.2(F).
- The revisions clarifies that the tamper-resistant receptacle requirements apply to designated general care pediatric locations and not patient care areas.


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517.19(B) Patient Bed Location Receptacles

- Proposal 15-39
- The revision in subdivision (B) changes the required minimum number of receptacles from six to fourteen.
- List item (2) in Was revised by removing the term “emergency system” and replacing it with the term “critical branch.”
- It aligns with changes in NFPA 99-2012.

517.19(C) Operating Room Receptacles

- Proposal 15-41
- The minimum number of receptacles required in an operating room is thirty-six of which at least twelve of the thirty-six receptacles must be connected to either the normal system branch or the critical system branch.
- The grounding terminal of these receptacles must be connected to the reference grounding point by means of an insulated copper equipment grounding conductor.


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Summary

- Significant changes have been accepted for the 2014 *NEC*.
- There were 3745 proposals and 1625 comments acted on by the NEC technical committees.
- Obtain copies of the 2014 NEC Reports on Proposals and Comments.

Contra Costa Chapter

June 22, 2016

MICHAEL JOHNSTON
NECA EXECUTIVE DIRECTOR
STANDARDS AND SAFETY NECA