



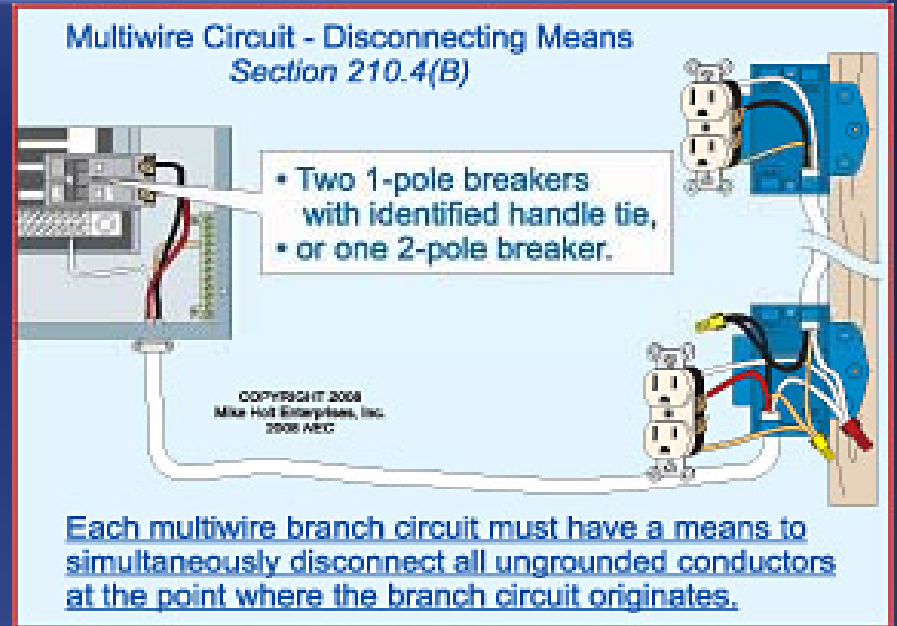
NEC 2008 Code Changes Top 20 Revisions

By: Rafi Wartan, PE, LEED AP



#1

Article 210.4



MULTIWIRE BRANCH CIRCUITS

The rule on “simultaneous disconnecting means” requirements for multiwire branch circuits was expanded.

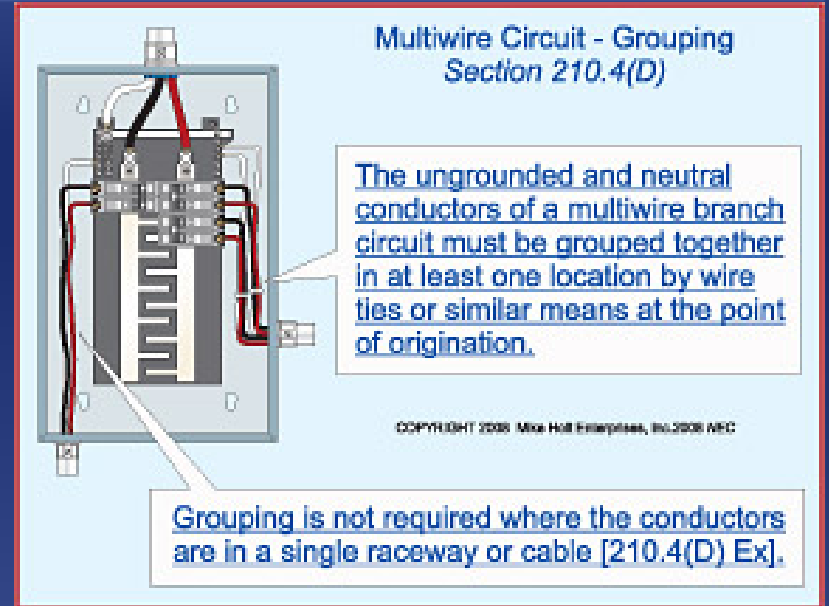
- (B) Disconnecting Means.** Each multiwire branch circuit shall have a means to simultaneously disconnect all ungrounded conductors at the point where the branch circuit originates.

CAUTION: This rule is intended to prevent people from working on energized circuits they believe are disconnected.



#2

Article 210.4



MULTIWIRE BRANCH CIRCUITS

A new subsection requires all conductors associated with a particular multiwire branch circuit to be physically grouped at the point of origin.

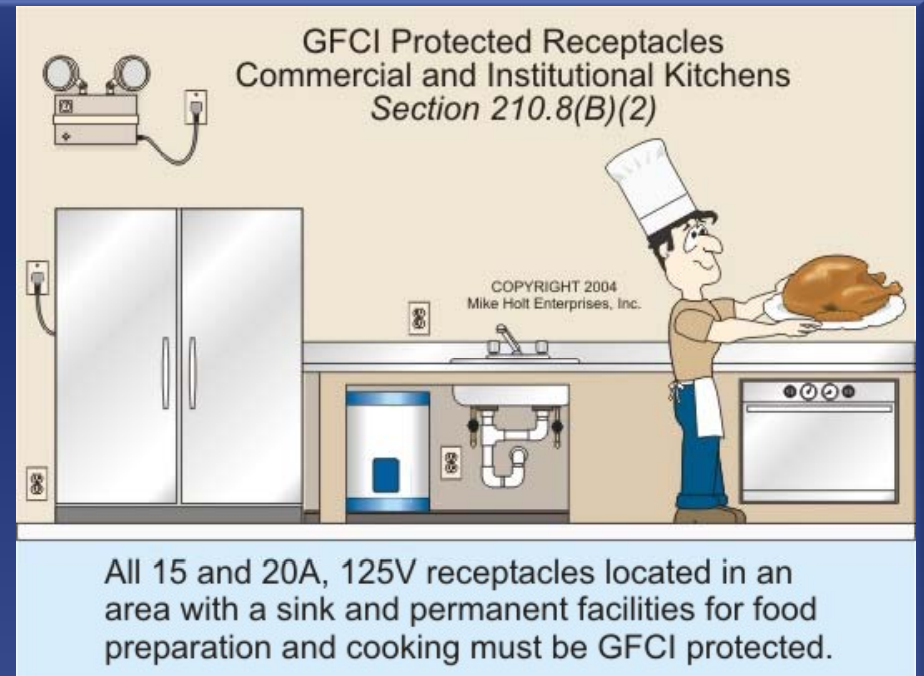
- (D) **Grouping.** The ungrounded and neutral conductors of a multiwire branch circuit shall be grouped together in at least one location by wire ties or similar means at the point of origination.

Exception: Grouping is not required where the circuit conductors are contained in a single raceway or cable that makes the grouping obvious.



#3

Article 210.8



GROUND-FAULT CIRCUIT-INTERRUPTER PROTECTION FOR PERSONNEL (GFCI)

GFCI-protection requirements for 15A and 20A, 125V receptacles located in nondwelling unit kitchens were clarified.

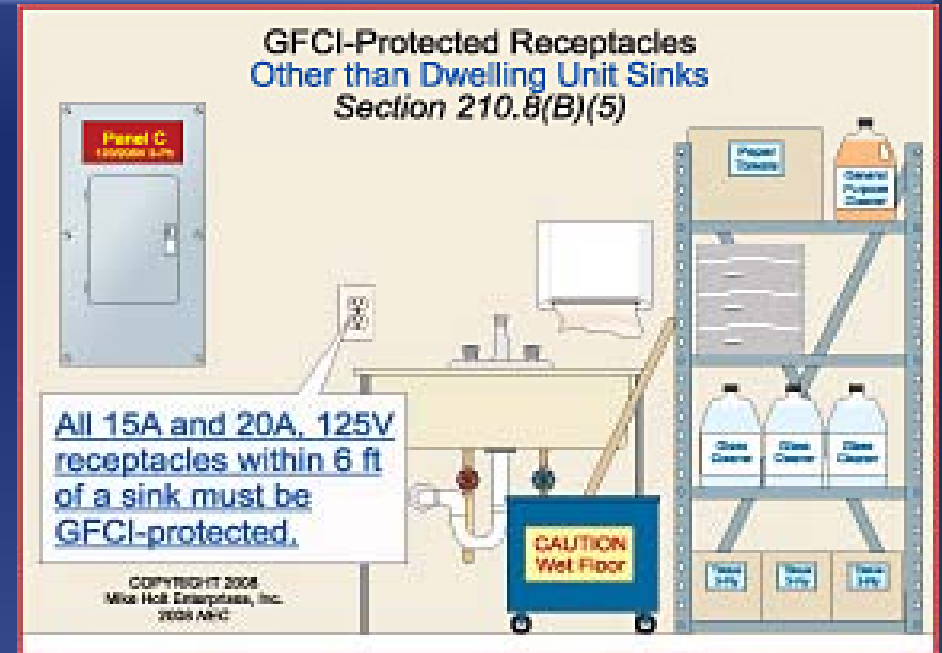
(B) Other Than Dwelling Units

(2) Kitchens. All 15A and 20A, 125V receptacles installed in an area with a sink and permanent facilities for food preparation and cooking [Article 100], even those that do not supply the countertop surface, shall be GFCI-protected.



#4

Article 210.8



GROUND-FAULT CIRCUIT-INTERRUPTER PROTECTION FOR PERSONNEL (GFCI)

A new subsubsection expands GFCI-protection requirements for 15A and 20A, 125V receptacles near sinks in nondwelling unit occupancies.

(B) Other Than Dwelling Units

(5) Sinks. All 15A and 20A, 125V receptacles installed within 6 ft of the outside edge of the sink shall be GFCI-protected.

Exception No. 1: In industrial laboratories, receptacles used to supply equipment where removal of power would introduce a greater hazard can be installed without GFCI protection.

Exception No. 2: For receptacles located in patient care areas of health care facilities, other than those covered under 210.8(B)(1), GFCI protection shall not be required.



#5

Article 210.12

AFCI Protection - Dwelling Units Section 210.12(B)

All 15A and 20A, 120V branch circuits supplying outlets in the following locations require AFCI protection:



- Family Rooms
- Dining Rooms
- Living Rooms
- Parlors
- Libraries
- Dens
- Bedrooms
- Sunrooms
- Rec Rooms
- Closets
- Hallways
- Similar Areas

COPYRIGHT 2005 Mike Holt Enterprises, Inc. 2005 NEC

ARC-FAULT CIRCUIT-INTERRUPTER PROTECTION (AFCI)

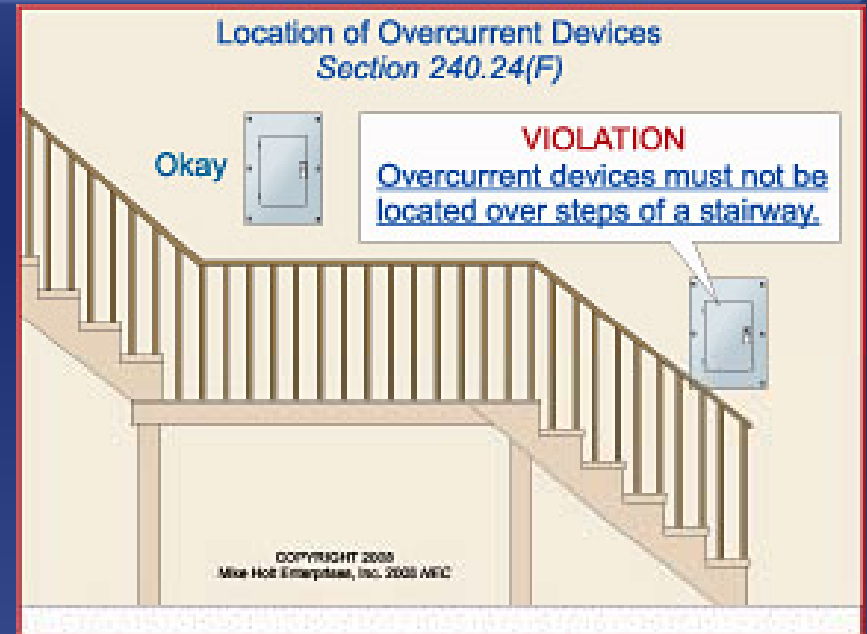
AFCI-protection requirements for 15A and 20A, 120V dwelling unit circuits were expanded again.

- (B) Dwelling Units. All 15A or 20A, 120V branch circuits that supply outlets in dwelling unit family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways or similar areas shall be protected by a listed AFCI device of the combination type.



#6

Article 240.24



LOCATION OF OVERCURRENT DEVICES

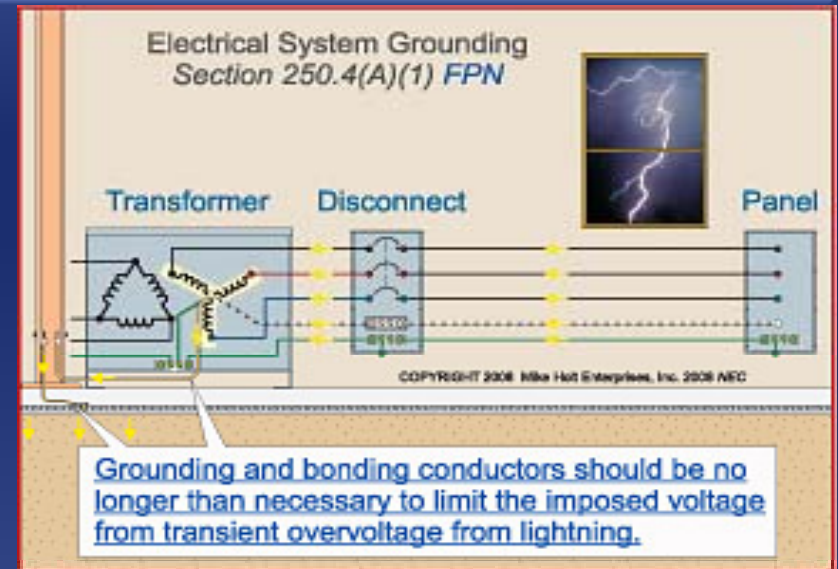
A new subsection addresses the installation of overcurrent devices in stairways.

- (F) **Not Located Over Steps.** Overcurrent devices shall not be located over steps of a stairway.



#7

Article 250.4



GENERAL REQUIREMENTS FOR GROUNDING AND BONDING

A new Fine Print Note alerts Code users to the advantage of reducing the length of the grounding electrode conductor.

(A) Grounded Systems

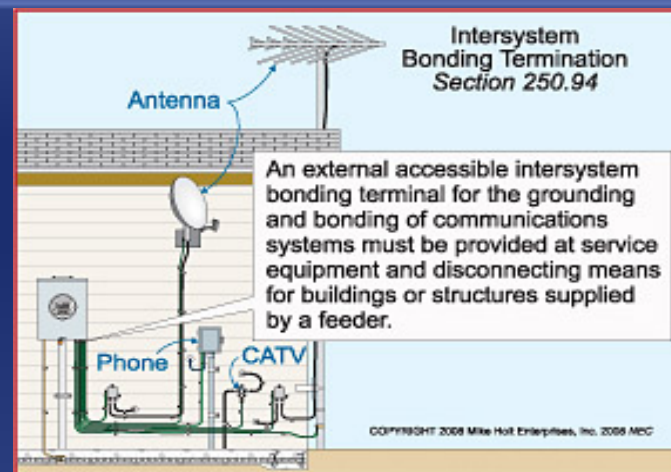
(1) **Electrical System Grounding.** Electrical power systems, such as the secondary winding of a transformer, are grounded to the earth to limit the voltage caused by lightning, line surges, or unintentional contact by higher-voltage lines.

FPN: An important consideration for limiting the imposed voltage is the routing of bonding and grounding conductors so that they are not any longer than necessary to complete the connection without disturbing the permanent parts of the installation and so that unnecessary bends and loops are avoided.



#8

Article 250.94



BONDING FOR OTHER SYSTEMS

A new rule requires an intersystem bonding terminal for communications systems.

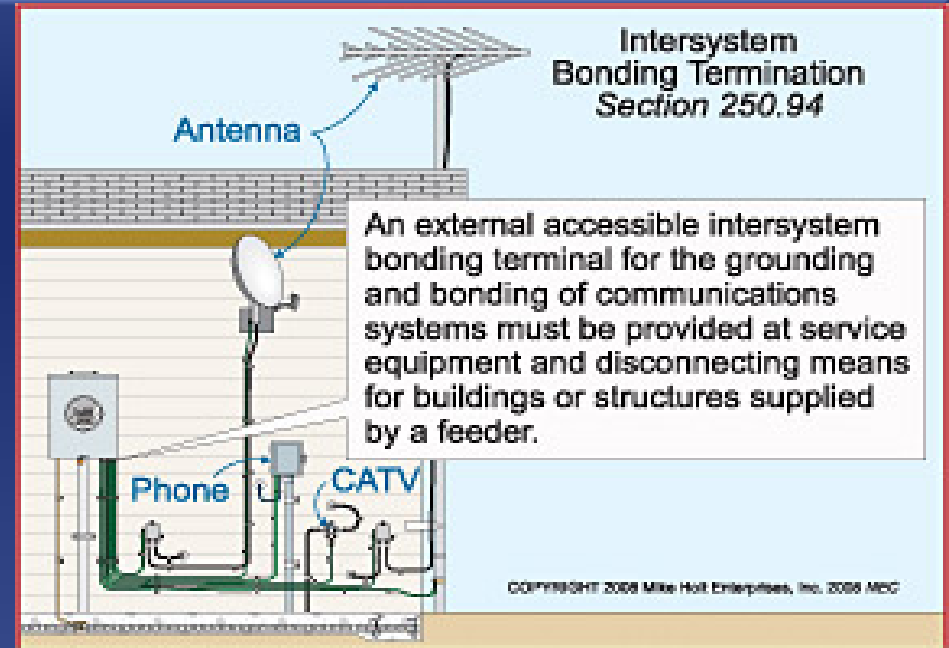
An external accessible intersystem bonding terminal for the grounding and bonding of communications systems shall be provided at service equipment and disconnecting means for buildings or structures supplied by a feeder.

The intersystem bonding terminal shall not interfere with the opening of any equipment enclosure and be one of the following:

1. Terminals listed for grounding and bonding attached to a meter socket enclosure.
2. Bonding bar connected to the equipment grounding conductor with a minimum 6 AWG copper conductor.
3. Bonding bar connected to the grounding electrode conductor with a minimum 6 AWG copper conductor.



#8 (continued) Article 250.94



BONDING FOR OTHER SYSTEMS

A new rule requires an intersystem bonding terminal for communications systems.

Exception: At existing buildings or structures, an external accessible means for bonding communications systems together can be:

1. Nonflexible metallic raceway,
2. Grounding electrode conductor, or
3. Connection approved by the authority having jurisdiction.



#8 (continued)

Article 250.94



BONDING FOR OTHER SYSTEMS

A new rule requires an intersystem bonding terminal for communications systems.

FPN No. 2: Communications systems shall be bonded to the intersystem bonding terminal in accordance with the following:

- **Antennas/Satellite Dishes, 810.15 and 810.21**
- **CATV, 820.100**
- **Telephone Circuits, 800.100**



#9

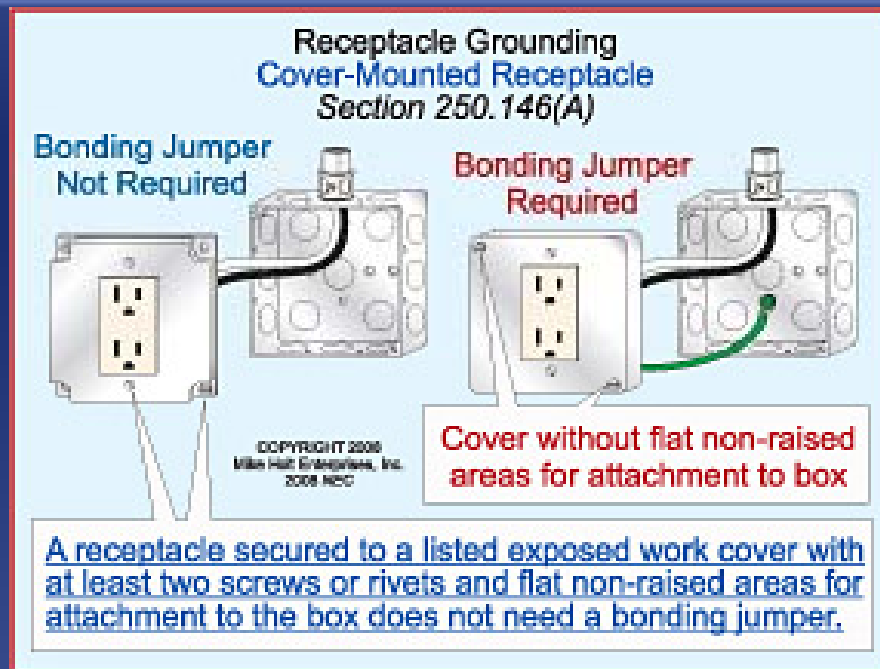
Article 250.146

CONNECTING RECEPTACLE GROUNDING TERMINAL TO BOX

A new sentence adds bonding requirements for receptacles attached to exposed work covers.

(A) Surface-Mounted Box.

An equipment bonding jumper is not required for receptacles attached to listed exposed work covers when the receptacle is attached to the cover with two permanent fasteners (rivets), or have a threaded or screw locking means; and the cover mounting holes are located on a flat non-raised portion of the cover.



#10 Article 285.23



Surge Protective Devices (SPDs), 1 kV or less

This article covers the general requirements, installation requirements, and connection requirements for Surge Protective Devices that are permanently installed on premises wiring systems.

Type 1 SPDs – Line Side of Service Equipment

- (A) **Installation.** Type 1 surge protective devices can be connected as follows:
- (1) Supply side of service equipment
 - (2) Load side of service equipment
- (B) **Grounding.** Type 1 surge protective devices located at service equipment shall be grounded to:
- (1) Neutral service conductor
 - (2) Grounding electrode conductor
 - (3) Grounding electrode for the service
 - (4) Equipment grounding terminal in the service equipment



#10 (continued)

Article 285.24



Surge Protective Devices (SPDs), 1 kV or less

This article covers the general requirements, installation requirements, and connection requirements for Surge Protective Devices that are permanently installed on premises wiring systems.

Type 2 SPDs – Feeders

- (A) **Service Equipment.** Type 2 Surge Protective Devices can be connected to the load side of service equipment.
- (B) **Feeder Supplied Building or Structure.** Type 2 Surge Protective Devices can be connected anywhere on the load side of the building or structure overcurrent protective device.
- (C) **Separately Derived Systems.** Type 2 Surge Protective Devices can be connected anywhere on the load side of the separately derived system.



#10 (continued) Article 285.25



Surge Protective Devices (SPDs), 1 kV or less

This article covers the general requirements, installation requirements, and connection requirements for Surge Protective Devices that are permanently installed on premises wiring systems.

Type 3 SPDs – Branch Circuits

Type 3 Surge Protective Devices can be installed anywhere on the load side of branch circuit overcurrent protection up to the equipment served, provided the connection is a minimum 30 ft of conductor distance from the service or separately derived system disconnect.



#11

Article 310.15



AMPACITIES FOR CONDUCTORS RATED 0-2000 VOLTS

A new subsection adds ambient temperature adjustments for conduits installed on rooftops.

(B) Tables

(2) Adjustment Factors

(c) Raceways Exposed to Sunlight on Rooftops. The ambient temperature adjustment contained in Table 310.15(B)(2)(c) is added to the outdoor ambient temperature for conductors or cables that are installed in raceways exposed to direct sunlight on or above rooftops when applying ampacity adjustment correction factors contained in Table 310.16.

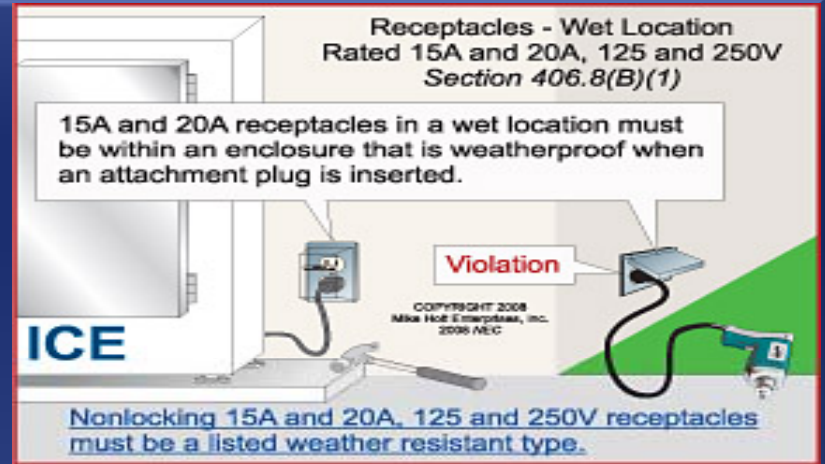
FPN No. 1: See ASHRAE Handbook-Fundamentals (www.ashrae.org) for the average ambient temperatures in various locations.

FPN No. 2: The temperature adders in Table 310.15(B)(2)(c) are based on the results of averaging the ambient temperatures.



#12

Article 406.8



RECEPTACLES IN DAMP OR WET LOCATIONS

Receptacles installed in wet locations are now required to be weather resistant.

(B) Receptacles in Wet Locations.

- (1) **15A and 20A Receptacles.** All 15A and 20A receptacles installed in a wet location shall be within an enclosure that is weatherproof when an attachment plug is inserted, and all nonlocking 15A and 20A, 125V and 250V receptacles in a wet location shall be listed as weather resistant.

Exception: Receptacles subject to routine high-pressure washing spray may have an enclosure that is weatherproof when the attachment plug is removed.



#13

Article 406.11



TAMPER-RESISTANT RECEPTACLES IN DWELLING UNITS

Requirements for tamper-resistant receptacles were added to the 2008 NEC.

In dwelling units, all 15A and 20A, 125V receptacles shall be listed as tamper resistant.



#14

Article 422.51



CORD-AND-PLUG-CONNECTED VENDING MACHINES

GFCI protection requirements for vending machines were revised and a new definition was added.

Cord-and-plug connected vending machines shall include GFCI protection as an integral part of the attachment plug. Vending machines manufactured or remanufactured prior to January 1, 2005 shall be connected to a GFCI-protected outlet.

The term *vending machine* means any self-service device that dispenses products or merchandise without the necessity of replenishing the device between each vending operation and is designed to require insertion of a coin, paper currency, token, card, key or receipt of payment by other means.



#15

Article 422.52



ELECTRIC DRINKING FOUNTAINS

GFCI protection for electric drinking fountains was added.

Electric drinking fountains shall be protected with ground-fault circuit-interrupter protection.



#16

Article 626



ELECTRIFIED TRUCK PARKING SPACES

A new Article addressing Electrified Truck Parking Space Equipment was added.

This new Article covers the 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.

A truck parking space is a location with an electrical system that allows truckers to “plug in” their vehicles while stopped, and use off-board power sources in order to operate onboard systems such as air-conditioning, heating, and appliances, without any engine idling.

An electrified truck parking space may also include dedicated parking areas for heavy-duty trucks at travel plazas, warehouses, shipper and consignee yards, depot facilities, border crossings, etc. It does not include areas such as the 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.



#17

Article 700.9



WIRING, EMERGENCY SYSTEM

The rules on “emergency circuits independent of all other wiring” when a single generator supplies emergency, legally required, and/or optional loads were clarified.

(B) Wiring. To ensure that a fault on the normal wiring circuits will not affect the performance of emergency wiring or equipment, all wiring to emergency loads shall be kept entirely independent of all other wiring, except:

1. Wiring in transfer equipment.
2. Luminaires supplied from two sources of power.
3. Junction box attached to luminaires supplied from two sources of power.
4. Wiring within a common junction box attached to unit equipment, containing only the branch circuit supplying the unit equipment and the emergency circuit supplied by the unit equipment.



#17 (continued)

Article 700.9



WIRING

The rules on “emergency circuits independent of all other wiring” when a single generator supplies emergency, legally required, and/or optional loads were clarified.

5. Wiring from an emergency source is permitted to supply any combination of emergency, legally required, or optional loads in accordance with the following:
 - a. From separate vertical switchboard sections or from individual disconnects mounted in separate enclosures.
 - b. By single or multiple feeders without overcurrent protection at the source.
 - c. Legally required and optional standby circuits shall not originate from the same vertical switchboard section, panelboard enclosure, or disconnect as emergency circuits.



#18

Article 700.27

COORDINATION

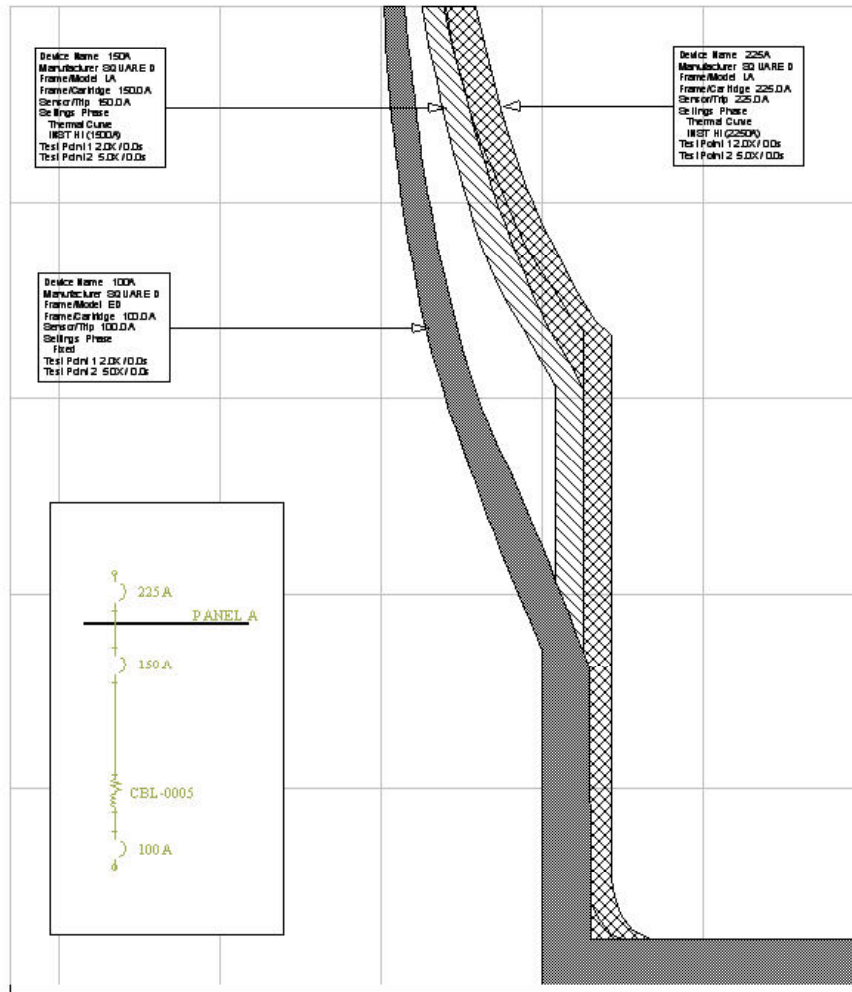
A new exception was added to relax the requirements of selective coordination for emergency power systems.

Emergency system(s) overcurrent devices shall be selectively coordinated with all supply side overcurrent protective devices.

Exception: Selective coordination shall not be required in:

- (1) Between transformer primary and secondary overcurrent protective devices, where only one overcurrent protective device or set of overcurrent protective devices exist on the transformer secondary,
- (2) Between overcurrent protective devices of the same size (ampere rating) in series





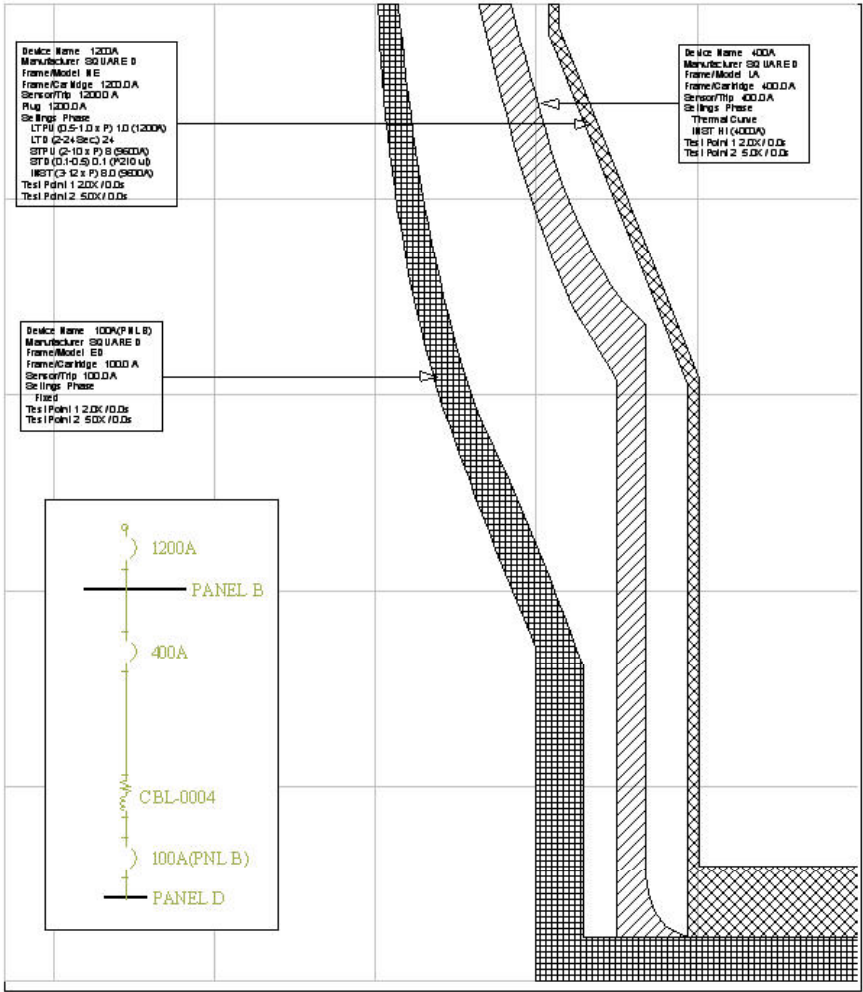
TCC Name: NOT COORDINATED
 Online: NOT COORDINATED
 May 5, 2010 9:21 AM

Current Scale: x1

Reference Voltage: 480

SKM Systems Analysis, Inc.



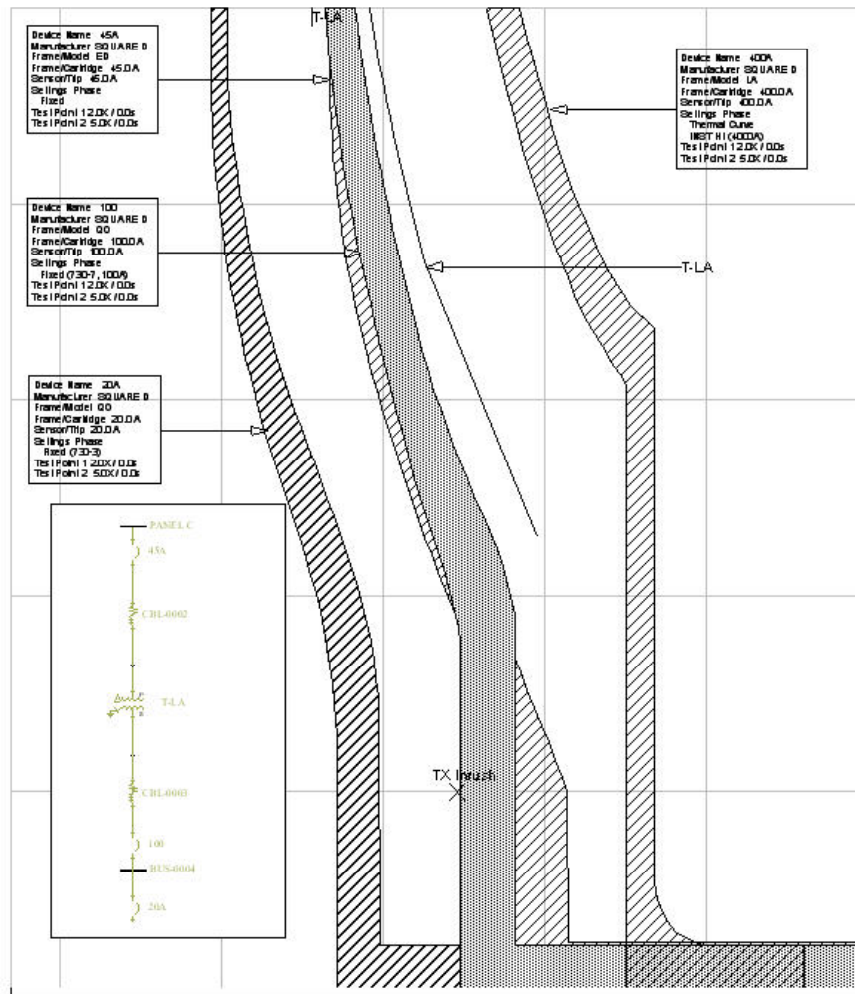


TCC Name: 1200A COORDINATED
 Online: 1200A COORDINATED
 May 5, 2010 9:22 AM

Current Scale: x1

Reference Voltage: 480
 SKM Systems Analysis, Inc.





TCC Name: 400A WXFMR
 Online: 400A W_XFMR
 May 5, 2010 9:23 AM

Current Scale: x1

Reference Voltage: 480

SKM Systems Analysis, Inc.



#19 Article 702.5



CAPACITY AND RATING

The sizing for Optional Standby Power Systems is now based on the type of transfer switch used; manual versus automatic.

- (A) **Available Short-Circuit Current.** Optional standby system equipment shall be rated for the maximum available short-circuit current at its terminals.
- (B) **System Capacity.** The calculated load on the standby source shall be in accordance with Art. 220 or by a method approved by the authority having jurisdiction.
- (1) **Manual Transfer Equipment.** The optional standby power source shall have adequate capacity for all equipment intended to operate at one time. The user of the optional standby system selects the loads to be connected to the system.



#19 (continued) Article 702.5



CAPACITY AND RATING

The sizing for Optional Standby Power Systems is now based on the type of transfer switch used; manual versus automatic.

- (2) Automatic Transfer Equipment.
 - (a) Full Load. The optional standby power source shall have adequate capacity to supply the full load transferred.



#20

Article 708



CRITICAL OPERATIONS POWER SYSTEMS (COPS)

A new article addressing Critical Operations Power Systems was added to the 2008 NEC.

The provisions of this article apply to the installation, operation, monitoring, control, and maintenance of premises wiring intended to supply, distribute, and control electricity to designated critical operations areas 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 alarms, security, communications, and signaling for designated critical operations areas.

Critical Operations Power Systems are generally installed in vital infrastructure facilities that, if destroyed or incapacitated, will disrupt national security, the economy, public health or safety; and where enhanced electrical infrastructure for continuity of operation is deemed necessary by governmental authority.



#20 (continued) Article 708



CRITICAL OPERATIONS POWER SYSTEMS

A new article addressing Critical Operations Power Systems was added to the 2008 NEC.

Threats to facilities that may require transfer of operation to the critical systems include both naturally occurring hazards and human-caused events.

