

Changes to the 2017 National Electrical Code®

Part 2 – Chapter 2



210.5(C)(1) Branch Circuits Supplied from More than One Nominal Voltage System

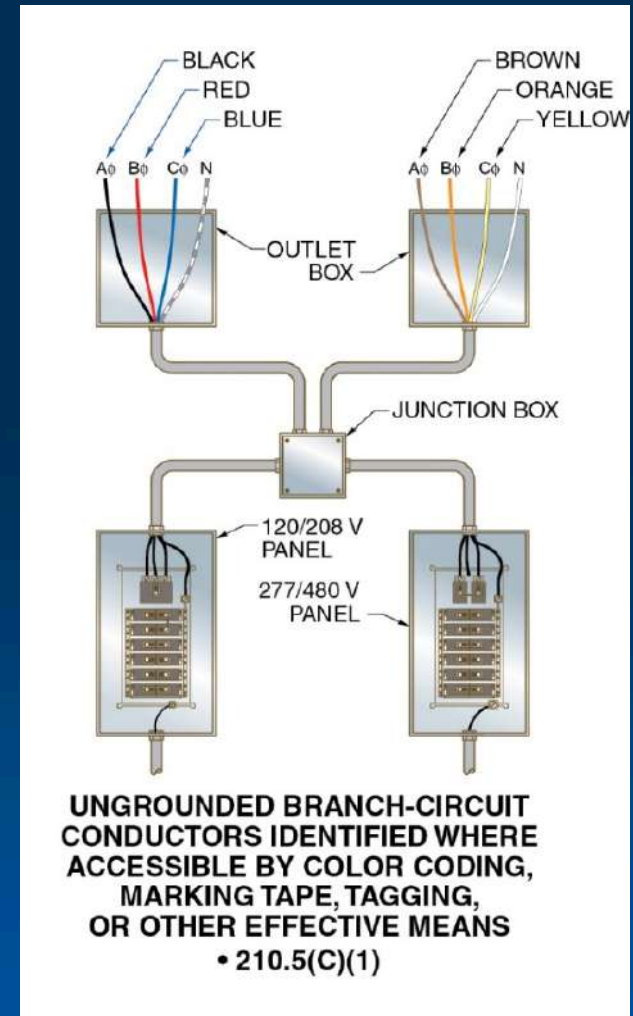
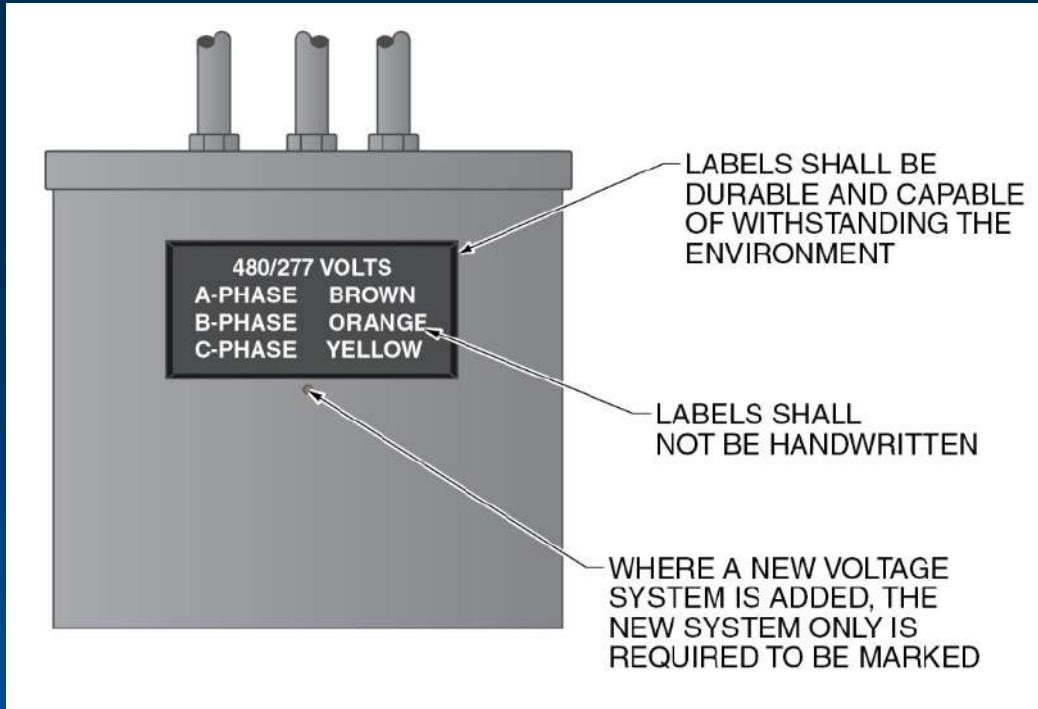
(1) Branch Circuits Supplied from More Than One Nominal Voltage System. Where the premises wiring system has branch circuits supplied from more than one nominal voltage system, each ungrounded conductor of a branch circuit shall be identified by phase or line and system at all termination, connection, and splice points in compliance with 210.5(C)(1)(a) and (b).

(a) *Means of Identification.* The means of identification shall be permitted to be by separate color coding, marking tape, tagging, or other approved means.

210.5(C)(1) – 2017 Revision

Exception: In existing installations where a voltage system(s) already exists and a different voltage system is being added, it shall be permissible to mark only the new system voltage. Existing unidentified systems shall not be required to be identified at each termination, connection, and splice point in compliance with 210.5(C)(1)(a) and (b). Labeling shall be required at each voltage system distribution equipment to identify that only one voltage system has been marked for a new system(s). The new system label(s) shall include the words "other unidentified systems exist on the premises."

210.5(C)(1)



210.5(C)(2) Branch Circuits Supplied from Direct Current Systems

(a) *Positive Polarity, Sizes 6 AWG or Smaller.* Where the positive polarity of a dc system does not serve as the connection point for the grounded conductor, each positive ungrounded conductor shall be identified by one of the following means:

(1) A continuous red outer finish

(2) A continuous red stripe durably marked along the conductor's entire length on insulation of a color other than green, white, gray, or black

(3) Imprinted plus signs (+) or the word POSITIVE or POS durably marked on insulation of a color other than green, white, gray, or black and repeated at intervals not exceeding 610 mm (24 in.) in accordance with 310.120(B)

210.5(C)(2) DC Branch Circuits and 215.12(C)(2) DC Feeders

(4) An approved permanent marking means such as sleeving or shrink-tubing that is suitable for the conductor size, at all termination, connection, and splice points, with imprinted plus signs (+) or the word POSITIVE or POS durably marked on insulation of a color other than green, white, gray, or black

(4) An approved permanent marking means such as sleeving or shrink-tubing that is suitable for the conductor size, at all termination, connection, and splice points, with imprinted minus signs (–) or the word NEGATIVE or NEG durably marked on insulation of a color other than green, white, gray, or red



210.8 Measurements for GFCI Protection

210.8 Ground-Fault Circuit-Interrupter Protection for Personnel.

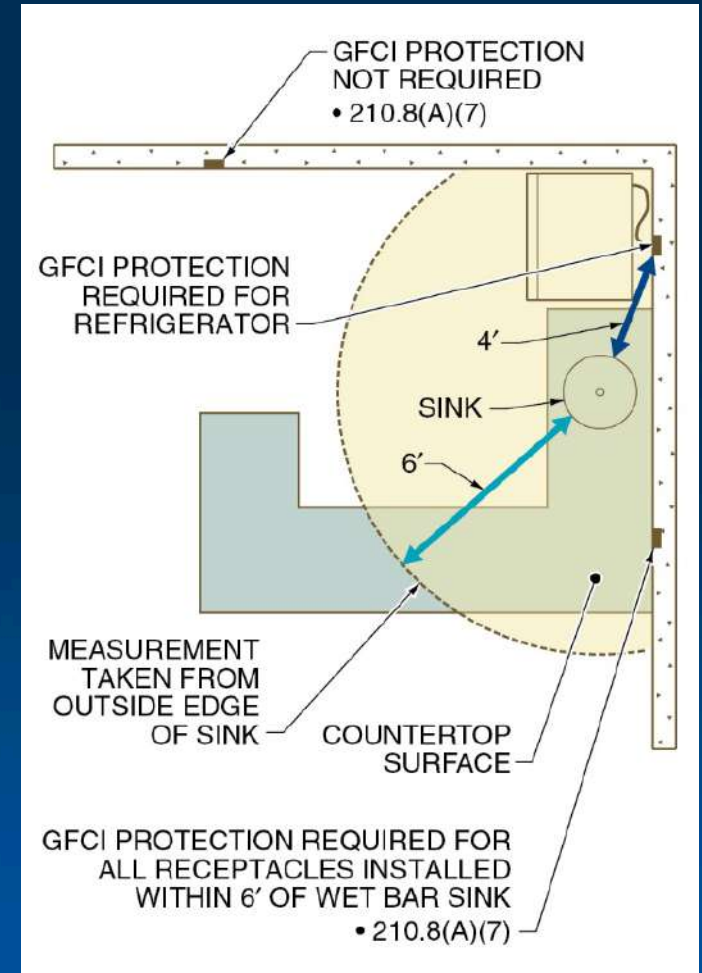
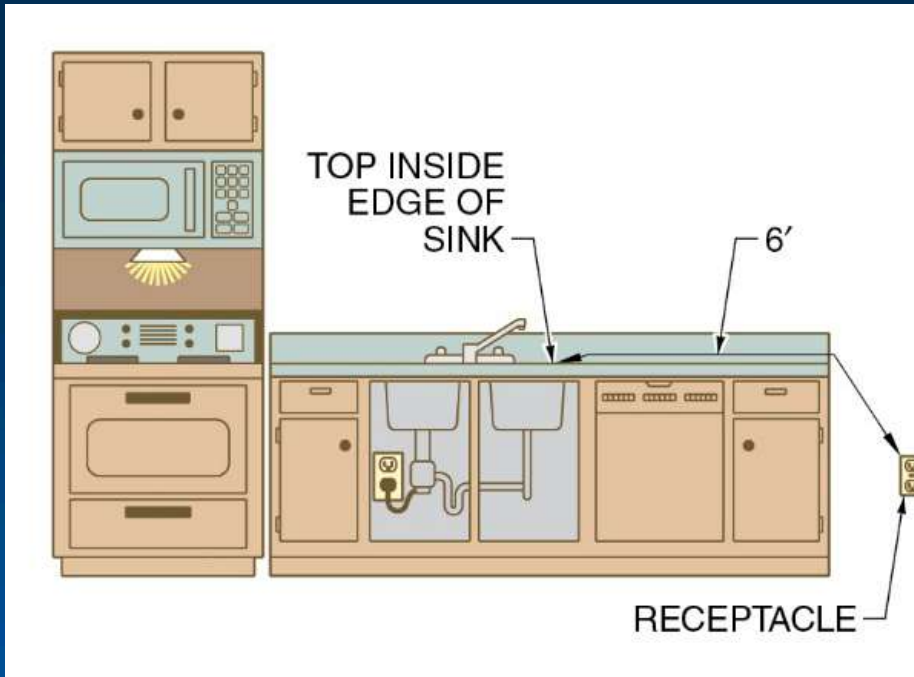
Ground-fault circuit-interrupter protection for personnel shall be provided as required in 210.8(A) through (E). The ground-fault circuit interrupter shall be installed in a readily accessible location.

Informational Note No. 1: See 215.9 for ground-fault circuit-interrupter protection for personnel on feeders.

Informational Note No. 2: See 422.5(A) for GFCI requirements for appliances.

For the purposes of this section, when determining distance from receptacles the distance shall be measured as the shortest path the cord of an appliance connected to the receptacle would follow without piercing a floor, wall, ceiling, or fixed barrier, or passing through a door, doorway, or window.

210.8 Measurements for GFCI Protection




210.8(A)(7) GFCI Protection at Sinks

(A) Dwellings ...

(7) Sinks — where receptacles are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink.....

(B) Other than Dwelling Units....

(5) Sinks — where receptacles are installed within 1.8 m (6 ft) from the top inside edge of the bowl of the sink....



Inside edge
of sink

Section 210.8(B) Other than Dwelling Units

(B) Other Than Dwelling Units. All single-phase receptacles rated 150 volts to ground or less, 50 amperes or less and three-phase receptacles rated 150 volts to ground or less, 100 amperes or less installed in the following locations shall have ground-fault circuit-interrupter protection for personnel.

- (1) Bathrooms
- (2) Kitchens
- (3) Rooftops
- (4) Outdoors
- (5) Sinks
- (6) Indoor wet locations
- (7) Locker rooms w/associated showering facilities
- (8) Garages, service bays and similar areas
- (9) Crawl spaces – at or below grade
- (10) Unfinished portions or areas of the basement not intended as habitable rooms

210.8(B) Other than Dwelling Units

- Class A GFCI (4 to 6ma) cannot be used in certain situations. Example – over 240 volts, three phase systems.
- New GFCI categories have been introduced over the past several years.
 - Class C, D, and E operate greater than 6 ma but trip faster.
- GFCI protection is being expanded in “Other than Dwelling Unit” to cover outdoor receptacles above the standard 15 and 20 amp receptacles, up to 50 amps.
- Covers three phase outlets up to 100 amps.

Section 210.8(A) and (B) Changes to GFCI Requirements

- GFCI protection added for non-dwelling unit crawl spaces
- GFCI required for all single-phase receptacles rated 150 volts to ground or less, 50 amperes or less and three-phase receptacles rated 150 volts to ground or less, 100 amperes or less
- Similar requirements found at 210.8(A)(4) for dwelling units
- Non-dwelling unit crawl space GFCI requirement not limited to 125-volt receptacles



Section 210.8(B)(10) GFCI Protection for Non-Dwelling Unit Unfinished Basements

- GFCI protection for receptacles installed in unfinished basements has been expanded to include non-dwelling unit (commercial/industrial)
- Revisions to the parent text at 210.8(B) has expanded the receptacles involved to those that are single-phase rated 150 volts to ground or less, 50 amperes or less and three-phase receptacles rated 150 volts to ground or less, 100 amperes or less
- Similar requirements found at 210.8(A)(5) for dwelling units
- Same shock hazards exist in an unfinished basement of a commercial building as they do in dwelling units



Non- Dwelling
Unfinished Basement

Section 210.8(E) GFCI Protection for Crawl Space Lighting Outlets

N (E) Crawl Space Lighting Outlets. GFCI protection shall be provided for lighting outlets not exceeding 120 volts installed in crawl spaces.



Applies to **ALL crawl spaces**, BOTH dwelling unit and non-dwelling units alike!

210.11(C)(3)

(3) Bathroom Branch Circuits. In addition to the number of branch circuits required by other parts of this section, at least one 120-volt, 20-ampere branch circuit shall be provided to supply the bathroom(s) receptacle outlet(s). Such circuits shall have no other outlets.

210.11(C)(4) Garage Branch Circuits

N (4) Garage Branch Circuits. In addition to the number of branch circuits required by other parts of this section, at least one 120-volt, 20-ampere branch circuit shall be installed to supply receptacle outlets in attached garages and in detached garages with electric power. This circuit shall have no other outlets.

Exception: This circuit shall be permitted to supply readily accessible outdoor receptacle outlets.



210.12(A) AFCI's

- For 2017, NO changes to AFCI's in dwellings.
- Same AFCI rules as 2014



210.12(C) Guest Rooms and Guest Suites

N (C) **Guest Rooms and Guest Suites.** All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets and devices installed in guest rooms and guest suites of hotels and motels shall be protected by any of the means described in 210.12(A)(1) through (6).





210.12(D) Branch Circuit Extensions or Modifications—Dwelling Units and Dormitory Units

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



210.52(A)(2) Wall Space

(2) Wall Space. As used in this section, a wall space shall include the following:

- (1) Any space 600 mm (2 ft) or more in width (including space measured around corners) and unbroken along the floor line by doorways and similar openings, fireplaces, and fixed cabinets that do not have countertops or similar work surfaces
- (2) The space occupied by fixed panels in walls, excluding sliding panels
- (3) The space afforded by fixed room dividers, such as free-standing bar-type counters or railings

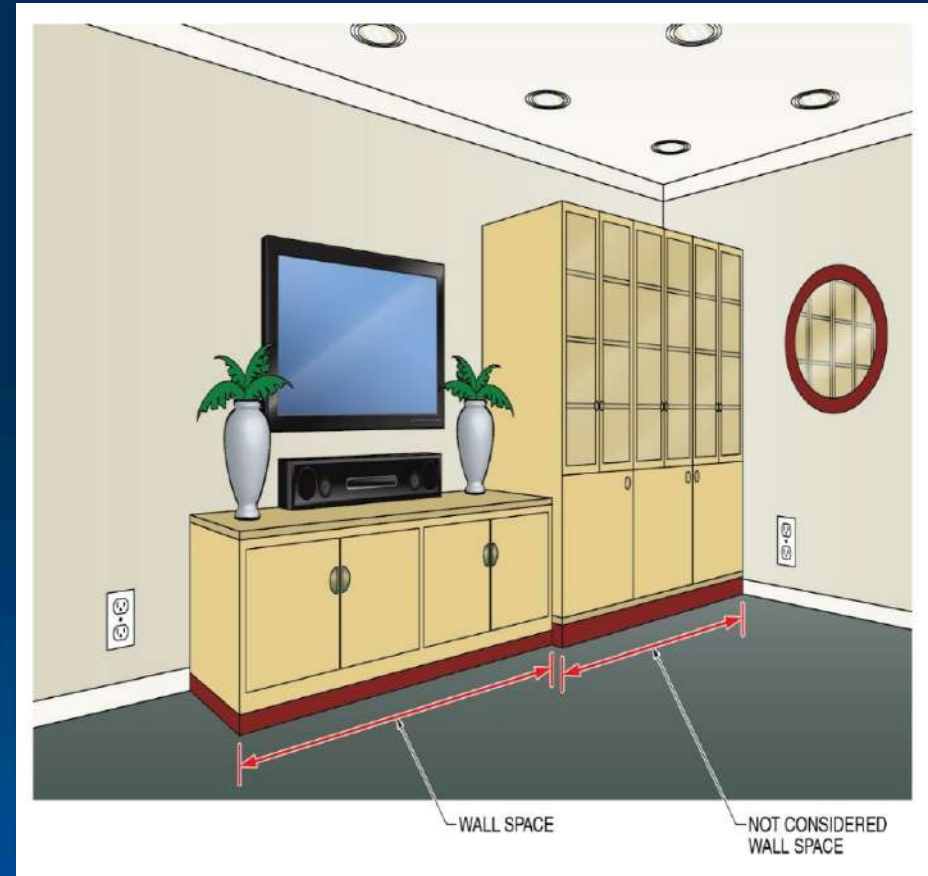
210.52(A)(2)(1) Receptacle Wall Space

Changes have been made to clarify that countertops must be included when calculating wall space.

Kitchen type cabinets, bar area countertops, and home office counters are all considered wall space.

Key term is “fixed cabinets”.

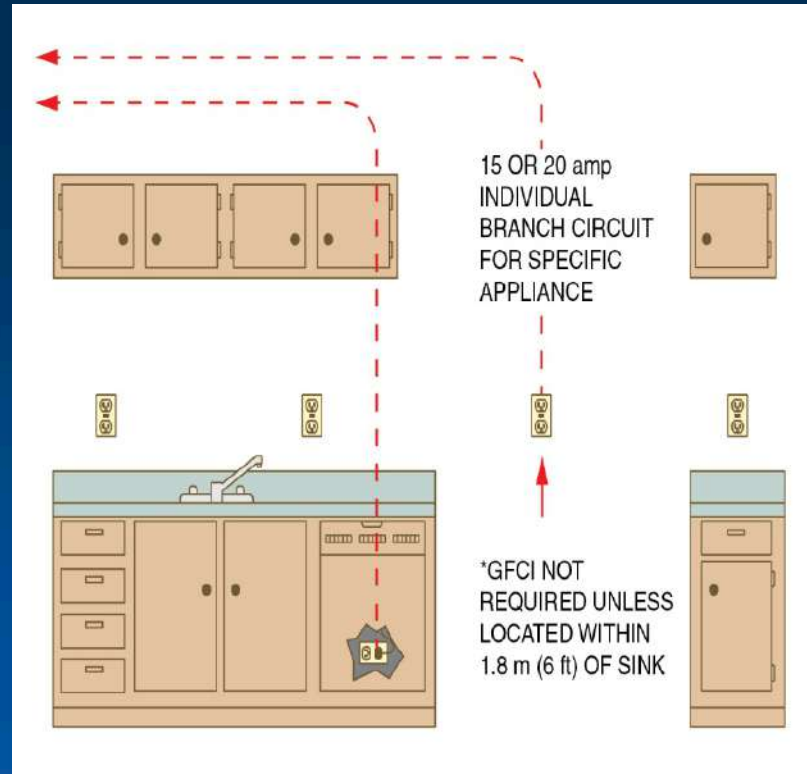
At rough-in inspection, inspector should verify blueprints to see where cabinets are located to clarify areas that are not considered wall space.





210.52(B)(1) Appliance Branch Circuits

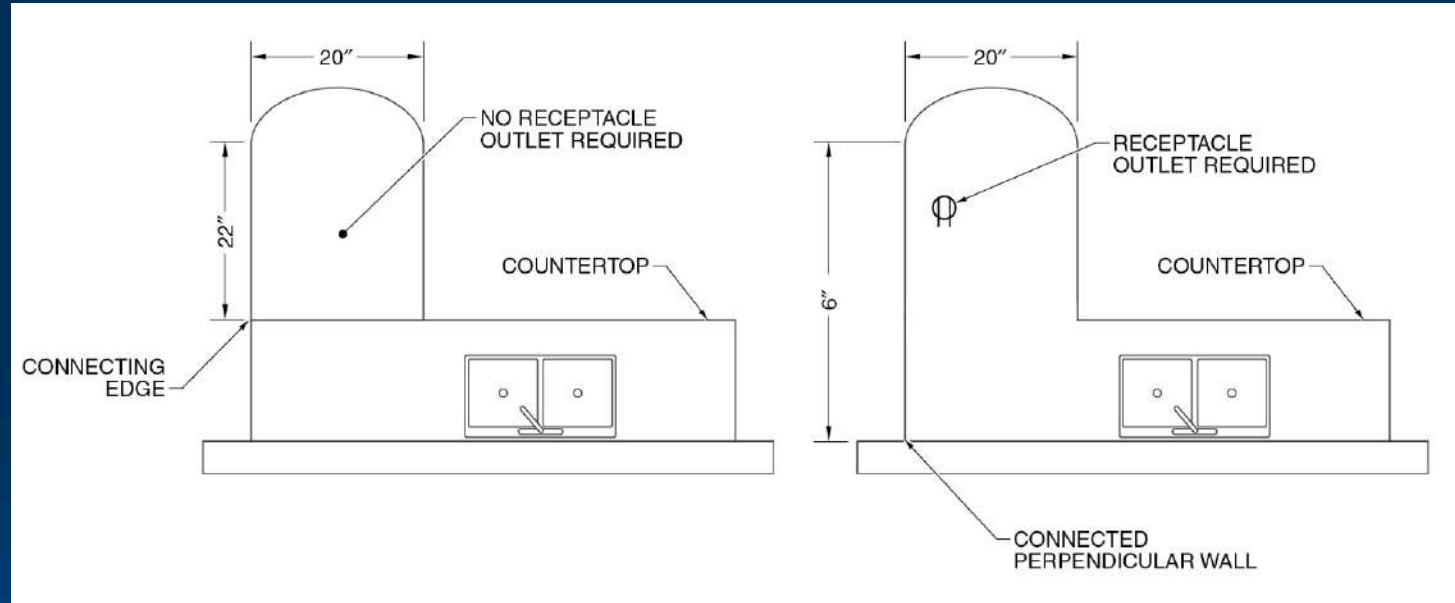
Exception No. 2: In addition to the required receptacles specified by 210.52, a receptacle outlet to serve a specific appliance shall be permitted to be supplied from an individual branch circuit rated 15 amperes or greater.



210.52(C)(3) Peninsular Countertop Spaces

(3) Peninsular Countertop Spaces. At least one receptacle outlet shall be installed at each peninsular countertop long dimension space with a long dimension of 600 mm (24 in.) or greater and a short dimension of 300 mm (12 in.) or greater. A peninsular countertop is measured from the connected perpendicular wall.

210.52(C)(3) Peninsular Countertop Spaces



2014 NEC

Peninsular countertop long dimension is measured from the “connecting edge”

2017 NEC

Peninsular countertop long dimension is measured from the “connected perpendicular wall”

210.52(G)(1) Vehicle Bay Outlets

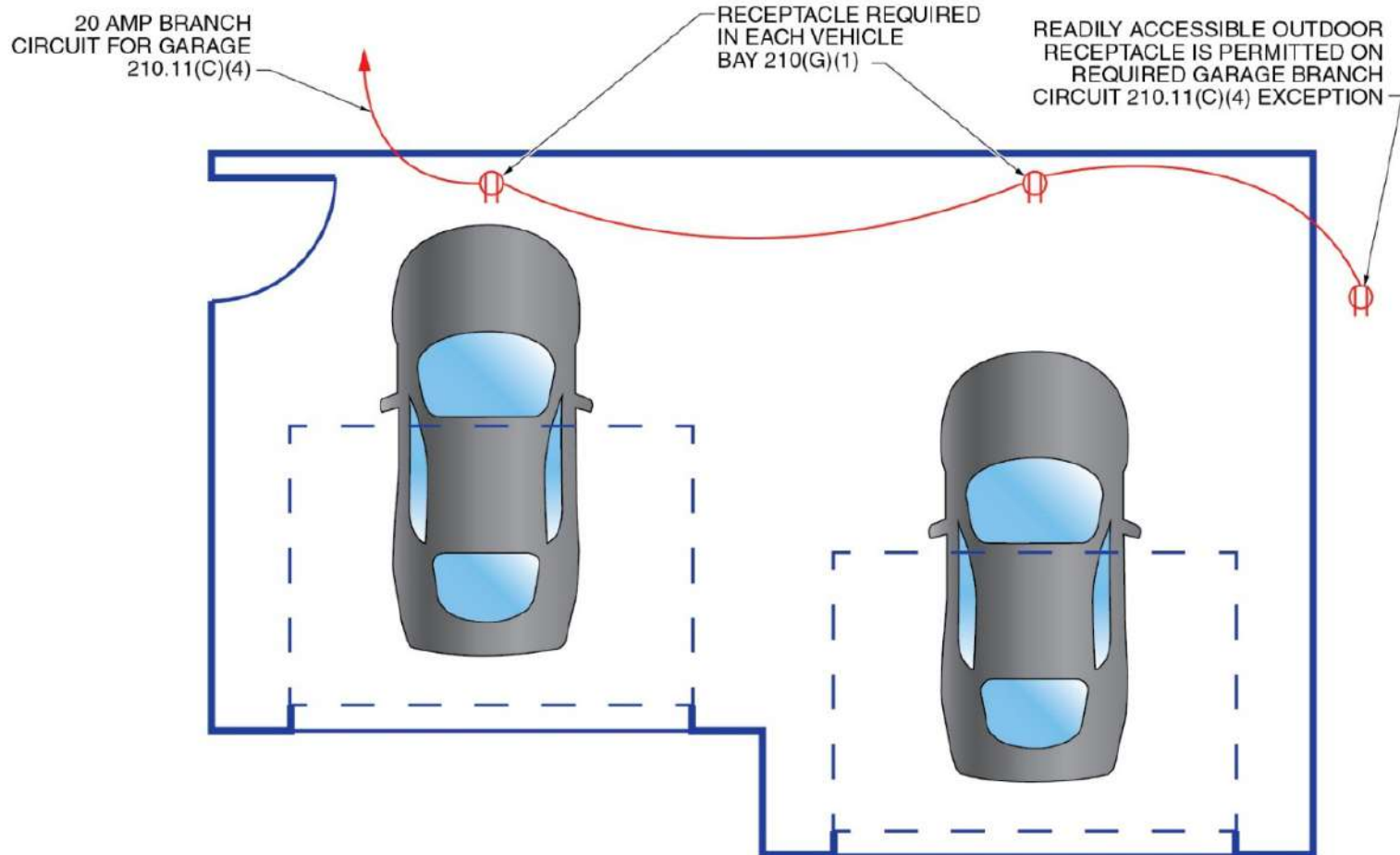
(G) Basements, Garages, and Accessory Buildings. For one- and two- family dwellings, at least one receptacle outlet shall be installed in the areas specified in 210.52(G) (1) through (3). These receptacles required for specific equipment.

(1) Garages. In each attached garage and in each detached garage with electric power, at least one receptacle outlet shall be installed in each vehicle bay and not more than 1.7 m (5-1/2 ft) above the floor.

210.52(G)(1) Vehicle Bay Outlets

- In the 2014 NEC, the required garage branch circuit was for only single-family dwellings. In 2017, this has expanded to include two-family occupancies.
- One outlet shall be installed in each vehicle bay.
- The user of the code should keep in mind that the branch circuits for these outlets cannot serve outlets in other rooms except for readily accessible outdoor receptacles. See 210.11(C)(4).

210.11(C)(4) and 210.52(G)(1)





210.64 Electrical Service Area

210.64 Electrical Service Areas. At least one 125-volt, single-phase, 15- or 20-ampere-rated receptacle outlet shall be installed in an accessible location within 7.5 m (25 ft) of the indoor electrical service equipment. The required receptacle outlet shall be located within the same room or area as the service equipment.

Exception No. 1: The receptacle outlet shall not be required to be installed in one- and two-family dwellings.





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210.64 Electrical Service Area (exception)

Exception No. 2: Where the service voltage is greater than 120 volts to ground, a receptacle outlet shall not be required for services dedicated to equipment covered in Articles 675 and 682.



ARTICLE 675— ELECTRICALLY DRIVEN
OR CONTROLLED IRRIGATION
MACHINES

ARTICLE 682— NATURAL AND
ARTIFICIALLY MADE BODIES OF
WATER



210.70(C) Lighting Outlet(s) Required

(C) **All Occupancies.** For attics and underfloor spaces, utility rooms, and basements, at least one lighting outlet containing a switch or controlled by a wall switch shall be installed where these spaces are used for storage or contain equipment requiring servicing. At least one point of control shall be at the usual point of entry to these spaces. The lighting outlet shall be provided at or near the equipment requiring servicing.



210.71 Meeting Rooms (New)

- In the past meeting rooms have been a source of contention for the number of outlets needed for electronic devices.
- New section has been added to try and resolve this issue.
- This section applies to meeting rooms 1000 ft² or less in non-dwelling type occupancies.
- Outlets to be installed in these rooms similar to the outlet requirements in residential dwellings.
- As long as the total number of outlets is greater than the requirements in 210.71(B) the designer or owner can locate them as they see fit.

210.71 Meeting Rooms (New)

N 210.71 Meeting Rooms.

(A) General. Each meeting room of not more than 93 m² (1000 ft²) in other than dwelling units shall have outlets for nonlocking-type, 125-volt, 15- or 20-ampere receptacles. The outlets shall be installed in accordance with 210.71(B). Where a room or space is provided with movable partition(s), each room size shall be determined with the partition in the position that results in the smallest size meeting room.

Informational Note No. 1: For the purposes of this section, meeting rooms are typically designed or intended for the gathering of seated occupants for such purposes as conferences, deliberations, or similar purposes, where portable electronic equipment such as computers, projectors, or similar equipment is likely to be used.

Informational Note No. 2: Examples of rooms that are **NOT** meeting rooms include auditoriums, schoolrooms, and coffee shops.

210.71 Meeting Rooms



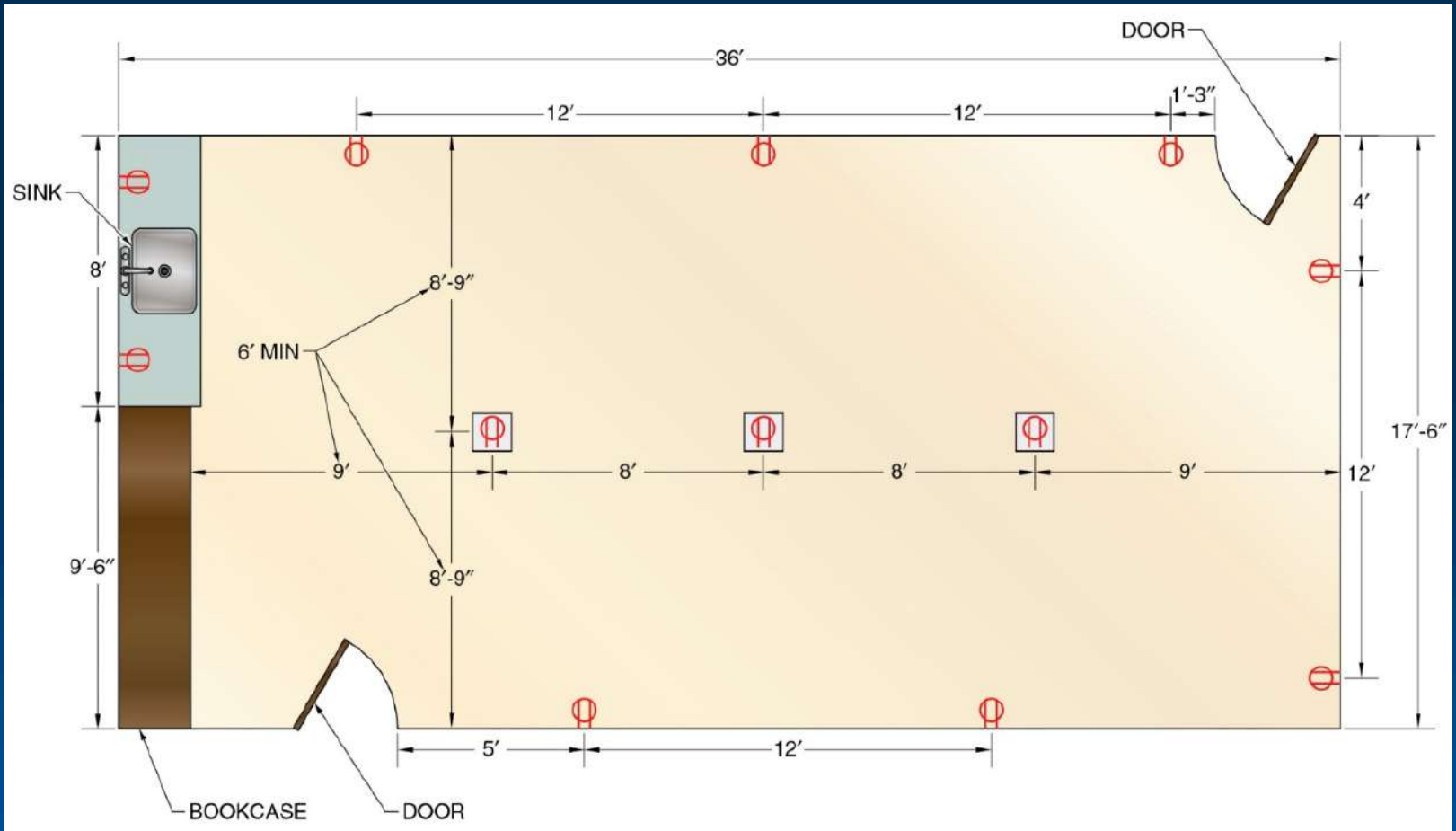
210.71 Meeting Rooms (New)

(B) Receptacle Outlets Required. The total number of receptacle outlets, including floor outlets and receptacle outlets in fixed furniture, shall not be less than as determined in (1) and (2). These receptacle outlets shall be permitted to be located as determined by the designer or building owner.

(1) Receptacle Outlets in Fixed Walls. Receptacle outlets shall be installed in accordance with **210.52(A)(1) through (A)(4)**.

(2) Floor Receptacle Outlets. A meeting room that is at least 3.7 m (12 ft) wide and that has a floor area of at least 20 m² (215 ft²) shall have at least one receptacle outlet located in the floor at a distance not less than 1.8 m (6 ft) from any fixed wall for each 20 m² (215 ft²) or major portion of floor space.

210.71(B)(2) Floor Receptacle Outlets



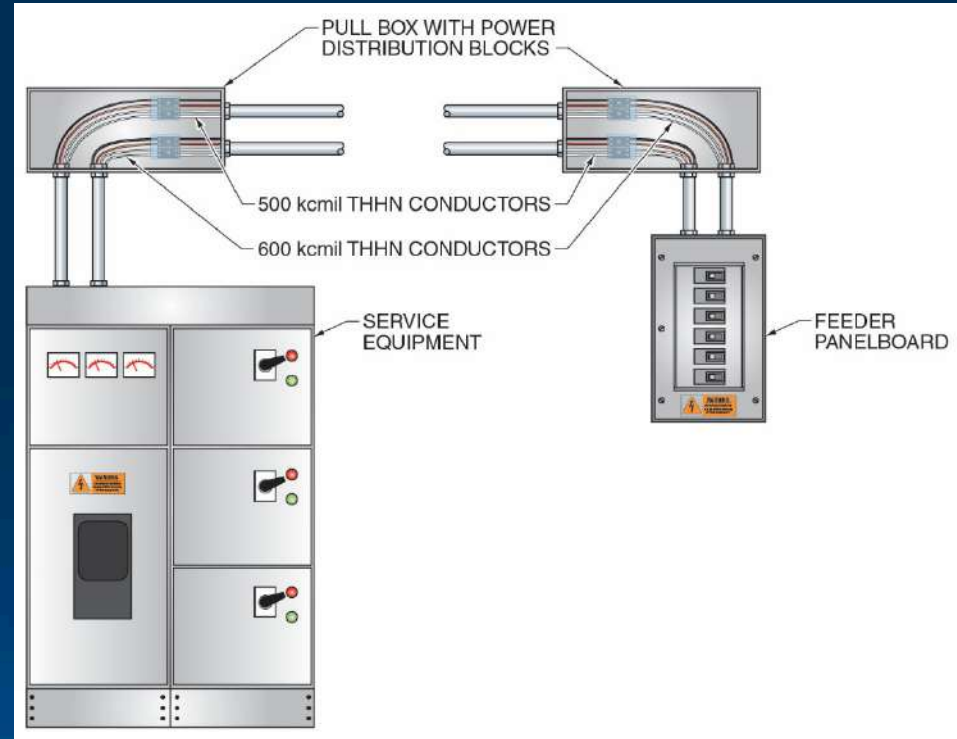
215.2(A)(1)(a) Exception No. 2

Feeder Rating and Size

- New exception has been placed into NEC to clarify that if a feeder is run between two junction boxes and then spliced at the junction boxes with feeders from coming from distribution type equipment at each end, the feeder can have an allowable ampacity of not less than the sum of the continuous load plus the non-continuous load.
- This has always been the case but the language has been placed into the code to better explain this concept.
- Typically feeders installed between equipment must have an allowable ampacity of not less than the non-continuous load plus 125 percent of the continuous load.

215.2(A)(1)(a) Exception No. 2 (con't)

Exception No. 2: Where a portion of a feeder is connected **at both its supply and load ends to separately installed pressure connections** [110.14(C)(2)], it shall be permitted to have an allowable ampacity not less than the sum of the continuous load plus the noncontinuous load. No portion of a feeder installed under the provisions of this exception shall extend into an enclosure containing either the feeder supply or the feeder load terminations, as covered in 110.14(C)(1)



215.9 Ground-Fault Circuit-Interrupter Protection for Personnel

215.9 Ground-Fault Circuit-Interrupter Protection for Personnel. Feeders supplying 15- and 20-ampere receptacle branch circuits shall be permitted to be protected by a ground-fault circuit interrupter installed in a readily accessible location in lieu of the provisions for such interrupters as specified in 210.8 and 590.6(A).

Article 220 and 220.1 Branch-Circuit, Feeder, and Service Load Calculations

- Title of Article 220 was revised to add the word “Load” to clarify that Article 220 specifically covers load calculations.
- The scope of 220 was reworded for better clarity.

Article 220 Branch-Circuit, Feeder, and Service **Load** Calculations

Part I General

Part II Branch-Circuit Load Calculations

Part III
Feeder and
Service Load
Calculations

220.61
Neutral
Loads

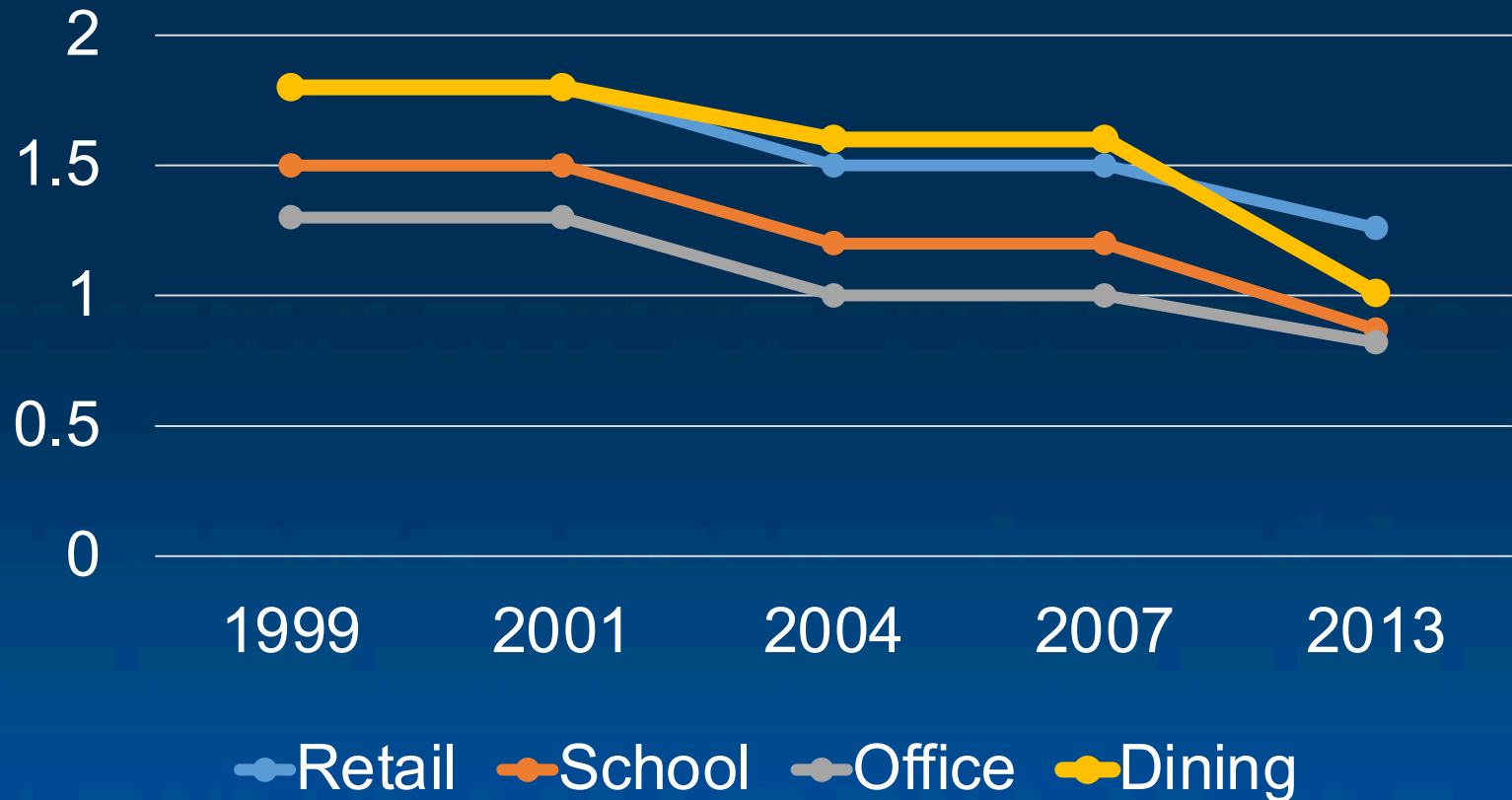
Part IV
Optional
Feeder and
Service Load
Calculations

Farm Dwelling
Only

Farm Dwelling
Only

Part V Farm Load Calculations

Energy Codes from 1999 to Present



220.12 Lighting Loads for Special Occupancies

220.12 Lighting Loads for Special Occupancies. A unit load of not less than that specified in Table 220.12 for occupancies specified shall constitute the minimum lighting load. The floor area for each floor shall be calculated from the outside dimensions of the building, dwelling unit, or other area involved. For dwelling units, the calculated floor area shall not include open porches, garages, or unused or unfinished spaces not adaptable for future use.

Informational Note: ...

Exception No. 1: Where the building is designed and constructed...

Exception No. 2: Where a building is designed and constructed to comply with an energy code adopted by the local authority and specifying an overall lighting density of less than 13.5 volt-amperes/13.5 m² (1.2 volt-amperes/1.2 ft²), the unit lighting loads in Table 220.12 for office and bank areas within the building shall be permitted to be reduced by 11 volt-amperes/11 m² (1 volt-amperes/1 ft²).

220.12 Lighting Loads for Special Occupancies

Table 220.12 General Lighting Loads by Occupancy

Type of Occupancy	Unit Load	
	Volt-amperes/ m ²	Volt-amperes/ ft ²
Armories and auditoriums	11	1
Banks	39 ^b	3½ ^b
Barber shops and beauty parlors	33	3
Churches	11	1
Clubs	22	2
Courtrooms	22	2
Dwelling units ^a	33	3
Garages — commercial (storage)	6	½
Hospitals	22	2
Hotels and motels, including apartment houses without provision for cooking by tenants ^a	22	2
Industrial commercial (loft) buildings	22	2
Lodge rooms	17	1½
Office buildings	39 ^b	3½ ^b
Restaurants	22	2
Schools	33	3

NEC Historical Lighting Allowance

- 1959 Lighting allowance for Offices - 5.0 W / ft²
- 1984 Lighting allowance for Offices reduced to 3.5 W / ft²
- 30 years of significant technology advancement
- 2011 Exception added for lighting designed with energy code but with building automation alarming

225.27 and 300.5(G) Raceway Seal

225.27 Raceway Seal. Where a raceway enters a building or structure from outside, it shall be sealed. Spare or unused raceways shall also be sealed. Sealants shall be identified for use with cable insulation, conductor insulation, bare conductor, shield, or other components.

300.11 (G) Raceway Seals. Conduits or raceways through which moisture may contact live parts shall be sealed or plugged at either or both ends. Spare or unused raceways shall also be sealed. Sealants shall be identified for use with the cable insulation, conductor insulation, bare conductor, shield, or other components.

230.29 Overhead Service Conductors— Supports Over Buildings

230.29 Supports over Buildings. Service conductors passing over a roof shall be securely supported by substantial structures. For a grounded system, where the substantial structure is metal, it shall be bonded by means of a bonding jumper and listed connector to the grounded overhead service conductor. Where practicable, such supports shall be independent of the building.





230.66 Marking

230.66 Marking. Service equipment rated at 1000 volts or less shall be marked to identify it as being suitable for use as service equipment. All service equipment shall be listed or field labeled. Individual meter socket enclosures shall not be considered service equipment but shall be listed and rated for the voltage and ampacity of the service.

Exception: Meter sockets supplied by and under the exclusive control of an electric utility shall not be required to be listed.



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230.91 Location

230.91 Location. The service overcurrent device shall be an integral part of the service disconnecting means or shall be located immediately adjacent thereto. **Where fuses are used as the service overcurrent device, the disconnecting means shall be located ahead of the supply side of the fuses.**



230.95(C) Performance Testing

(C) Performance Testing. The ground-fault protection system shall be performance tested when first installed on site. This testing shall be conducted by a qualified person(s) using a test process of primary current injection, in accordance with instructions that shall be provided with the equipment. A written record of this testing shall be made and shall be available to the authority having jurisdiction.



Table 240.6(A) Standard Ampere Rating

N Table 240.6(A) Standard Ampere Ratings for Fuses and Inverse Time Circuit Breakers

Standard Ampere Ratings				
15	20	25	30	35
40	45	50	60	70
80	90	100	110	125
150	175	200	225	250
300	350	400	450	500
600	700	800	1000	1200
1600	2000	2500	3000	4000
5000	6000	—	—	—

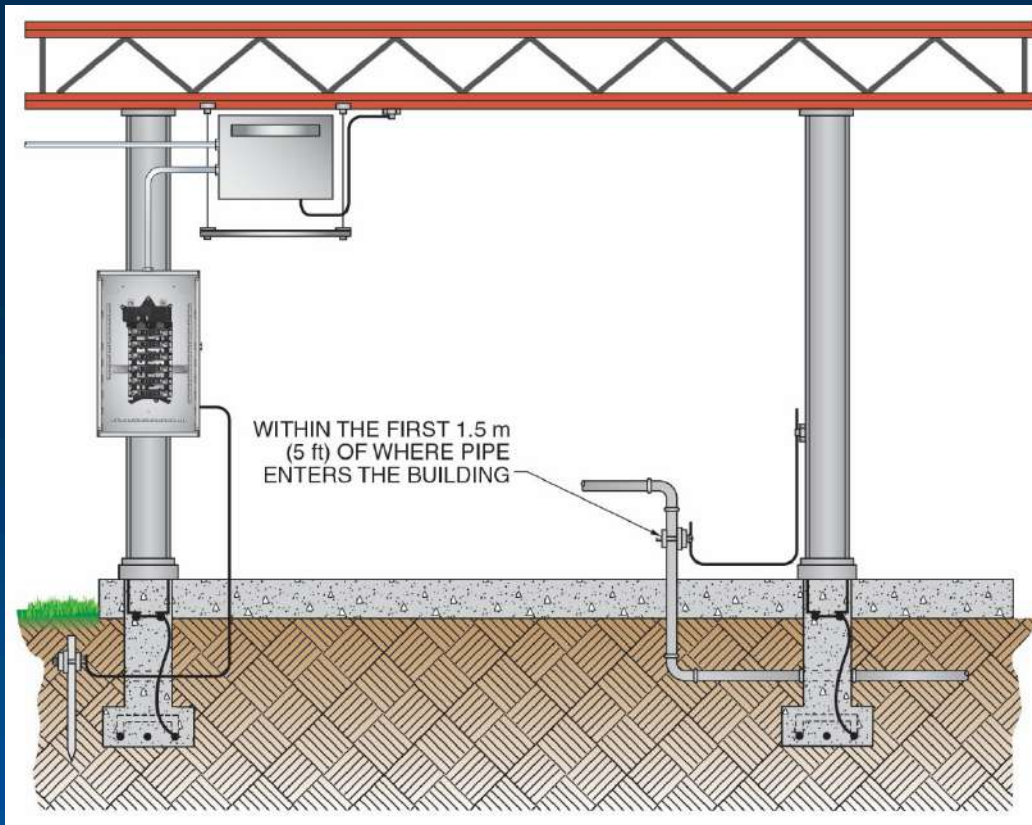
Standard ampere ratings for fuses and inverse time circuit breakers have been revised to be included in a **list format** located at **new Table 240.6(A)**

250.30(A)(4) and (5)

Grounding Separately Derived Systems

- In 2014 the primary method for grounding separately derived systems were the metal water piping or building steel.
- This has been removed.
- Any of the building or structure grounding electrode(s) that are present can now be used grounding for a separately derived system
- The grounding electrode(s) for the separately derived system do not have to be close to the grounding electrode conductor connection
- Metal water piping and the structural metal frame are recognized as conductors to extend the grounding electrode connection.

250.30(A)(4) and (5) Grounding Separately Derived Systems



The building or structure grounding electrode system shall be used as the grounding electrode for a separately derived system (whichever is present and regardless of its nearness)

Building or structure ground shall be used to connect the grounded conductor of the derived system to the grounding electrode

- per 250.30(A)(4),
- or as permitted in 250.68(C)(1) and (2)

Structural metal frame of a building or concrete-encased electrodes permitted as a bonding conductor to interconnect electrodes or as GEC

250.30(A)(6)(a) Common GEC Water pipe

- In 2014 NEC, only common GE conductor for multiple separately derived systems was a 3/0 AWG conductor.
- Metal water pipe [complying with 250.68(C)(1)] was added for 2017 to the allowable methods for a common GE conductor multiple separately derived systems
- For metal water pipe to qualify as a common GE conductor, connection must be made to an interior metal water pipe that is electrically continuous with a metal underground water pipe electrode and made within the first 1.52 m (5 ft) from the point of entrance to the building [see 250.68(C)(1)]

250.30(A)(6)(a) Common GEC - Structural

- Revisions were made to allow metal structural frame of a building or structure to qualify as a common GE conductor for multiple separately derived systems
- The word “structural” was added to metal frame to provide a better description
- Code reference of 250.52(A)(2) was changed to 250.68(C)(2)
- 250.52(A)(2) pertains to the conditions a metal structural framing member must meet in order to qualify as a grounding electrode
- 250.68(C)(2) relates to a metal structural frame of a building or structure being used as a conductor to interconnect electrodes that are part of the grounding electrode system

250.30(A)(6)(a) Common GE Conductor

A common grounding electrode conductor for multiple separately derived systems shall be permitted

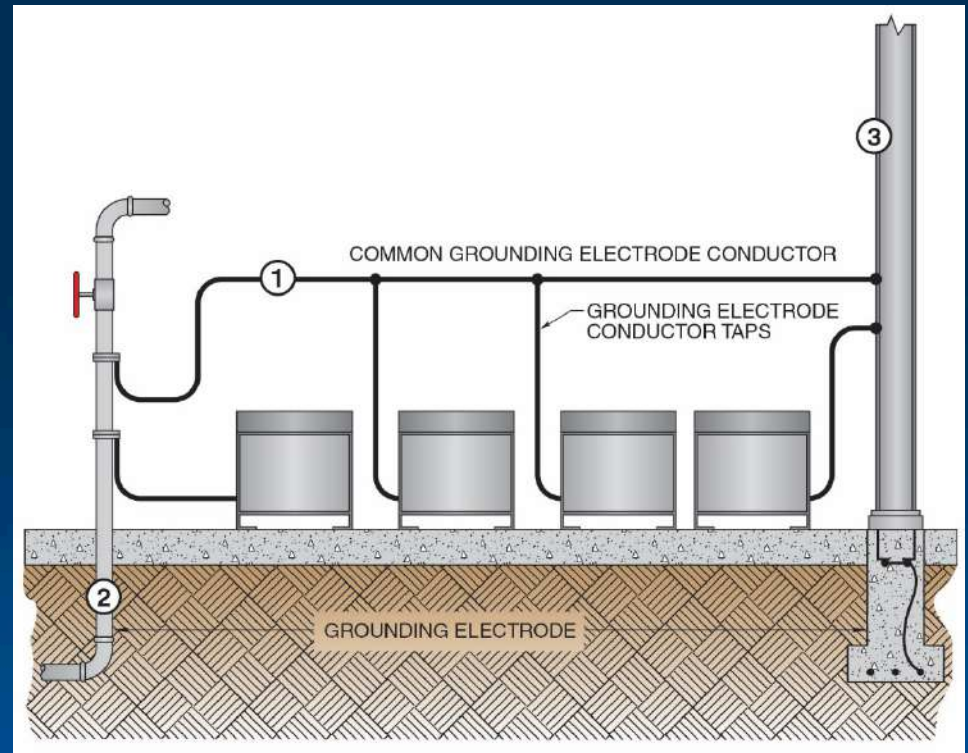
Common grounding electrode conductor permitted to be one of the following:

2014 Existing Text

1. Wire-type conductor (3/0 AWG copper or 250 kcmil aluminum minimum)

2017 New allowed method

1. **Metal water pipe that complies with 250.68(C)(1)** [first 1.52 m (5 ft), etc.]
2. Metal **structural** frame of a building or structure that complies with **250.68(C)(2)** or is connected to the GE system by a conductor



250.52(B)(3) Swimming Pools NOT Permitted for Use as Grounding Electrodes

- Third item added to the list of objects that are prohibited from being used as a grounding electrode at 250.52(B)
- The structures and structural reinforcing steel of an in-ground swimming pool as described in 680.26(B)(1) and (B)(2) are now prohibited from being used as a grounding electrode
- Important clarification to point out the difference between grounding and bonding
- Equipotential bonding requirements of 680.26 are to reduce voltage gradients (difference of voltage potential between two conducting objects), not to create a grounding electrode system for a building or structure
- Continued on next slide...

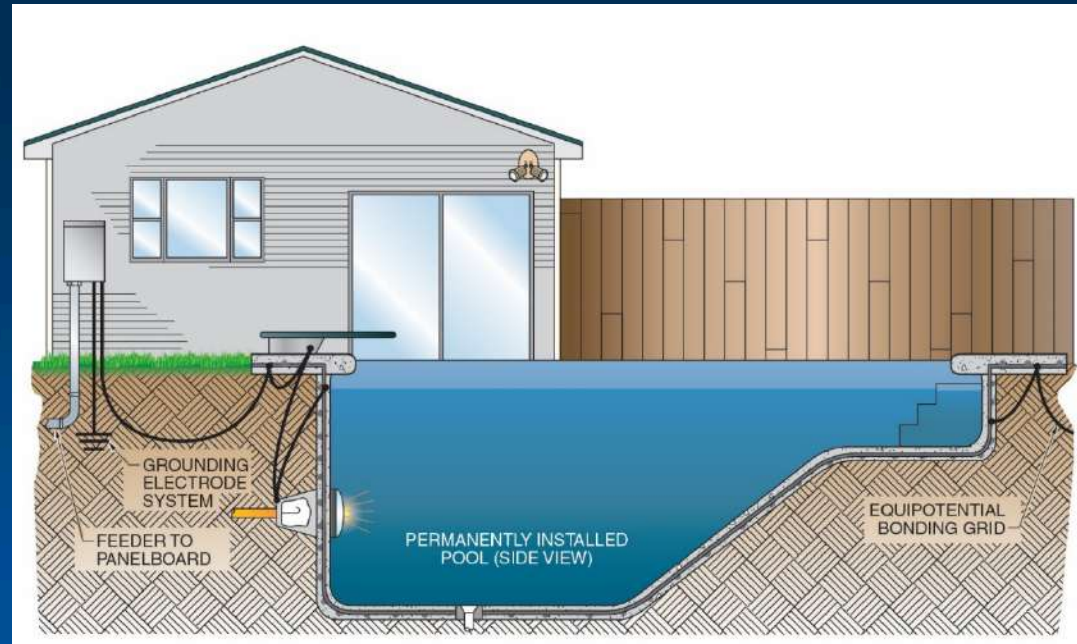
250.52(B)(3) Swimming Pools NOT Permitted for Use as Grounding Electrodes

- Third item added to the list of objects that are prohibited from being used as a grounding electrode at 250.52(B) (cont.)
- Items that shall not be used as a grounding electrode include:
 - Underground gas piping systems
 - An aluminum electrode
 - Structures and structural reinforcing steel of an in-ground swimming pool

250.52(B)(3) Swimming Pools NOT Permitted for Use as Grounding Electrodes

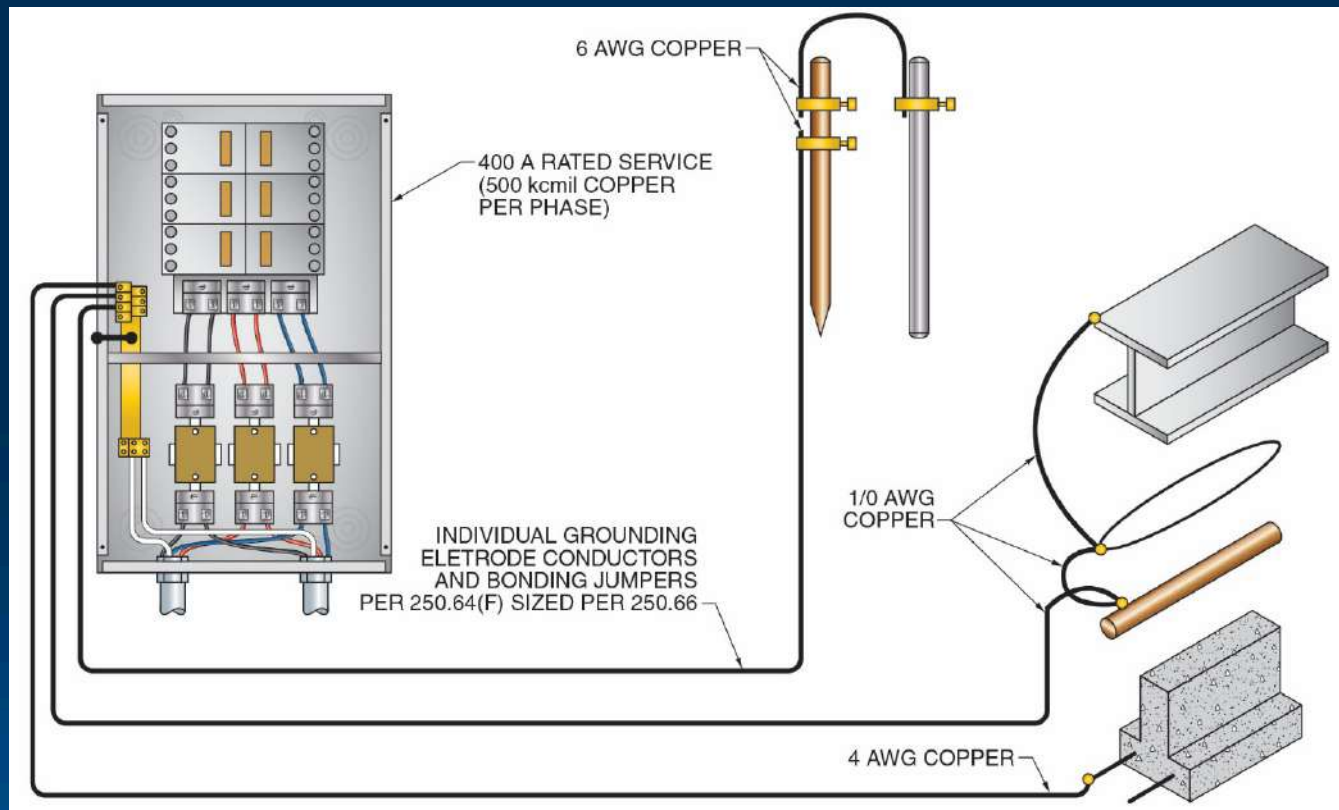
The provisions of 680.26 for equipotential bonding are to reduce voltage gradients (*difference of voltage potential between two conducting objects*), not to establish a grounding electrode system for a building or structure

The structures and structural reinforcing steel of an in-ground swimming pool as described in 680.26(B)(1) and (B)(2) are prohibited from being used as a grounding electrode





250.66(A), (B), and (C) Sizing of GECs



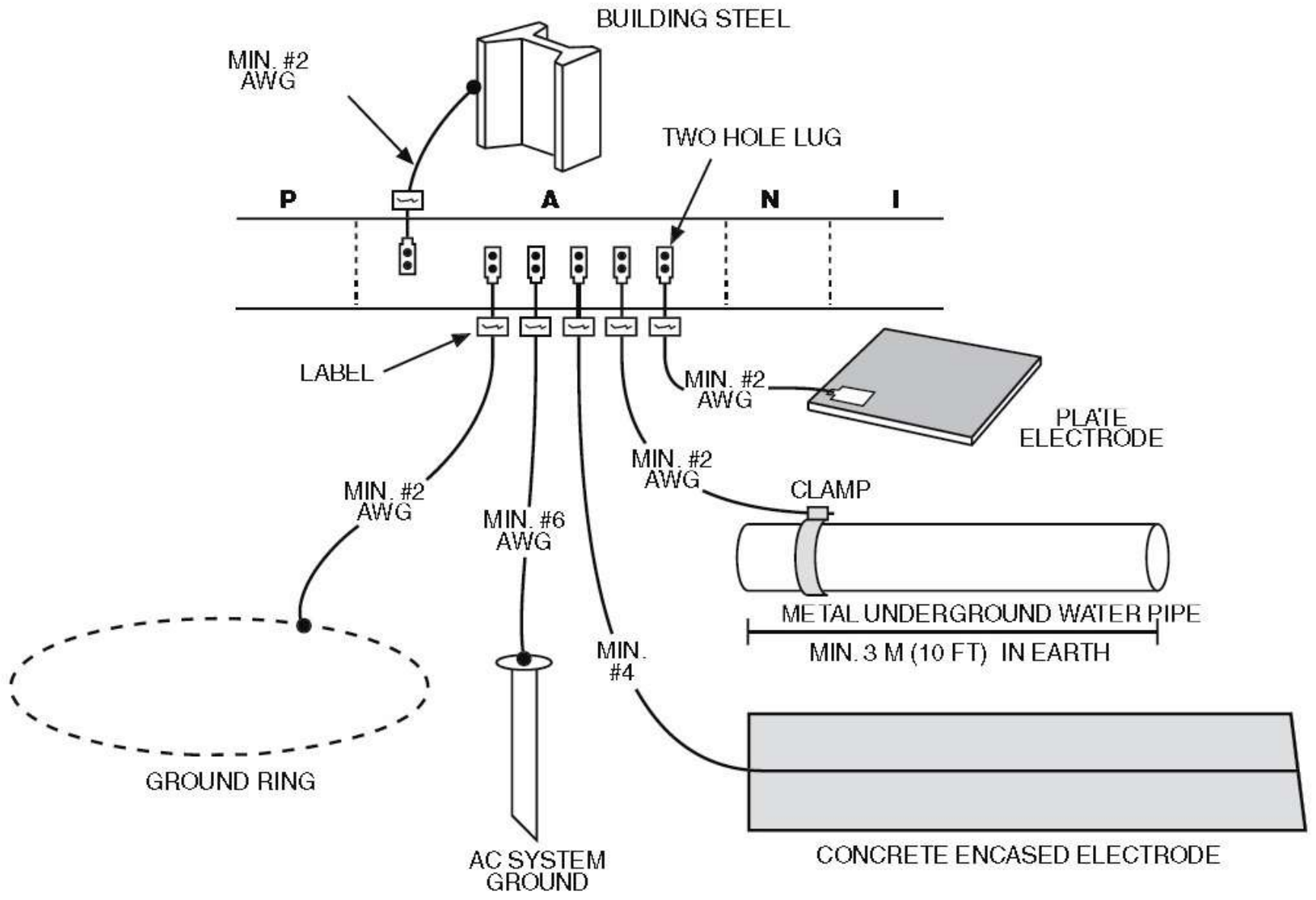
New text was added to 250.66(A), (B), and (C) to clarify that if the grounding electrode conductor or bonding jumper connected to a specific electrode **does not extend on to other types of electrodes that require a larger size conductor**, the grounding electrode conductor(s) shall not be required to be larger than the sizes specified at 250.66(A), (B), and (C)

250.94(A) and (B)

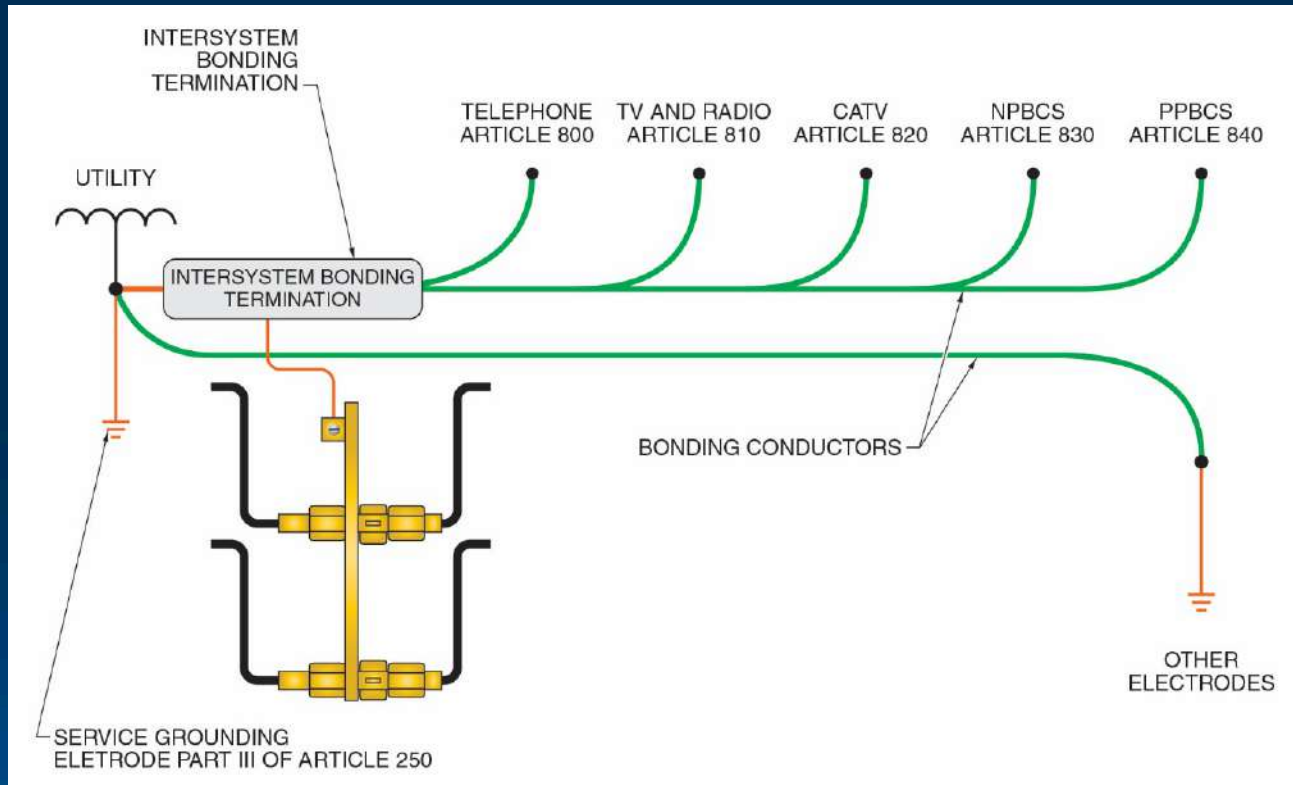
Bonding for Communication Systems

Need to change wording

- Title of 250.94 was changed from “Bonding for Other Systems” to “Bonding for Communication Systems”
- Existing text for the intersystem bonding termination was placed under 250.94(A) and titled, “The Intersystem Bonding Termination Device”
- New 250.94(B) titled, “Other Means” added permitting intersystem bonding connections to an aluminum or copper busbar that will accommodate at least three terminations for communication systems as well as “other connections”
- A new exception was added for both 250.94(A) and (B) offering relief from an intersystem bonding connection means “where communications systems are not likely to be used”

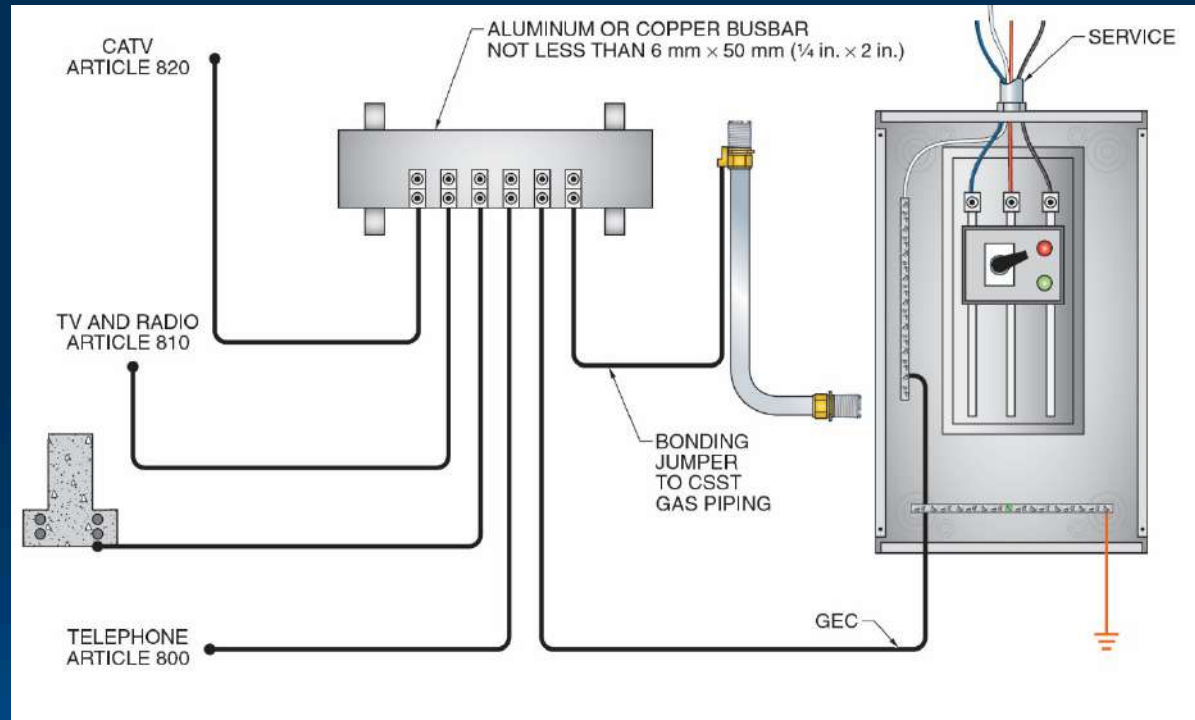


Bonding for ~~Other~~ Communication System

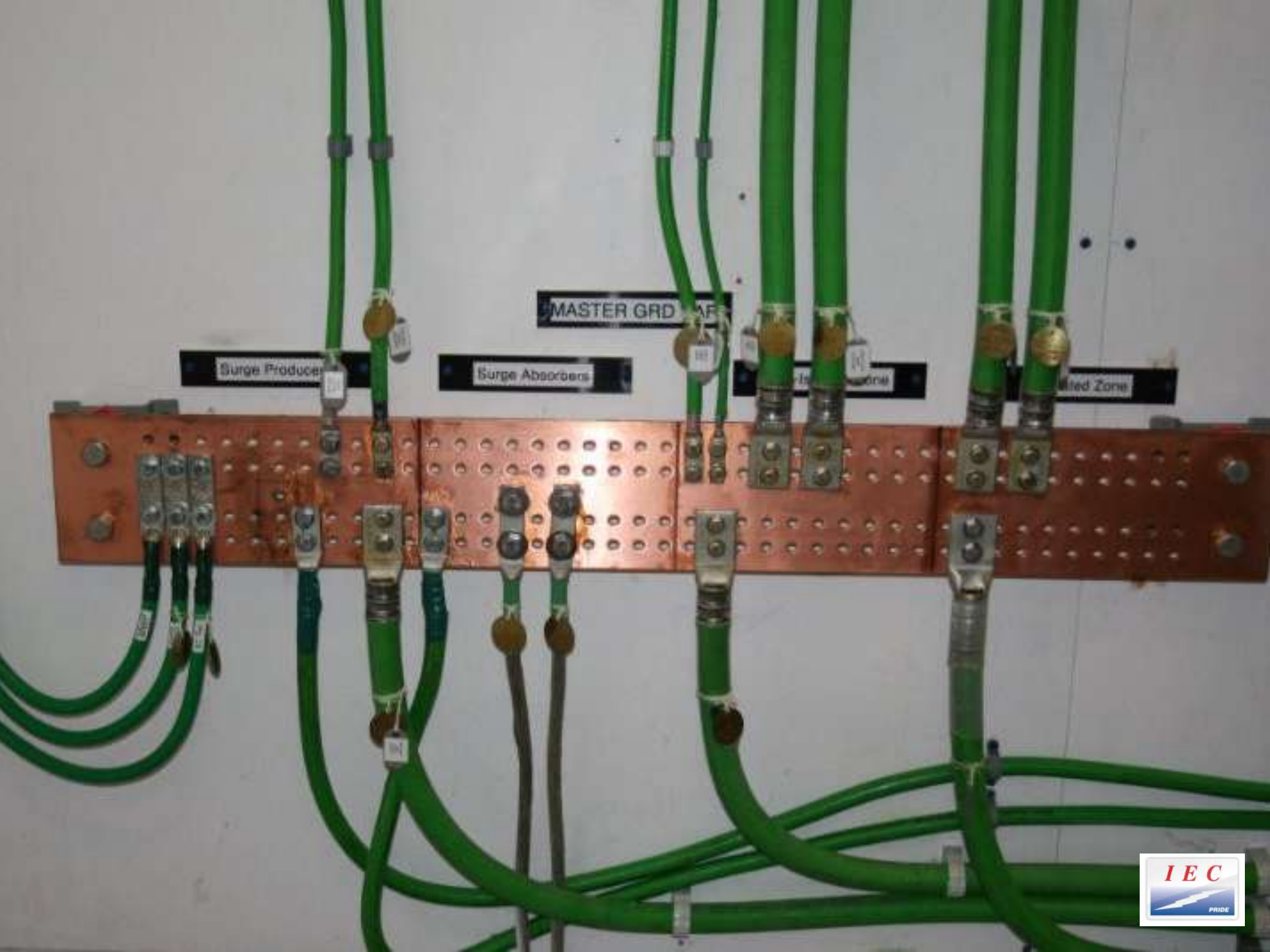


250.94(A) The Intersystem Bonding Termination Device. An intersystem bonding termination (IBT) **for connecting intersystem bonding conductors** shall be provided external to enclosures at the service equipment or metering equipment enclosure and at the disconnecting means for any additional buildings or structures.

Bonding for ~~Other~~ Communication System



250.94(B) Other Means. Connections to an aluminum or copper busbar not less than 6 mm thick × 50 mm wide (1/4 in. thick × 2 in. wide) and of sufficient length to accommodate at least three terminations for communication systems **in addition to other concerns.**



Surge Producer

Surge Absorbers

MASTER GRD BAR

Unprotected Zone

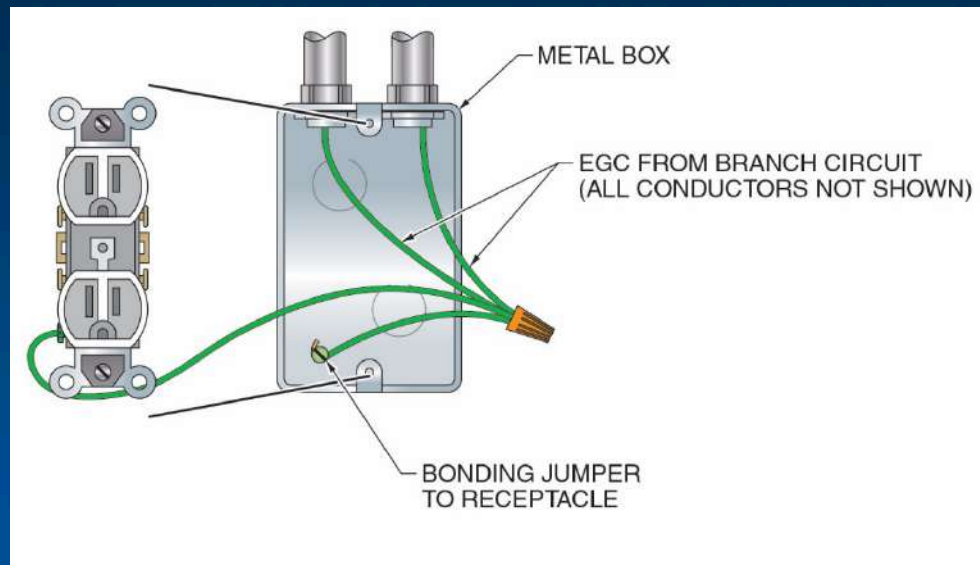
Protected Zone

250.148 Continuity and Attachment of EGC to Boxes

- Revision clarified that all equipment grounding conductors associated with any and all circuits in the box must be connected together and to the box (not just EGCs of each associated circuit)
- Existing exception gives relief to EGCs of an isolated ground circuit (isolated ground receptacle not required to be connected to the other EGCs or to the box)
- Reference to 250.8 (Connection of Grounding and Bonding Equipment) was also added to this section to provide guidance on terminating an EGC or bonding jumper to a metal box or enclosure

250.148 Continuity and Attachment of EGC to Boxes

If circuit conductors are spliced within a box, or terminated on equipment within or supported by a box, all equipment grounding conductor(s) (EGC) associated with any of those circuit conductors shall be connected within the box or to the box with devices suitable for the use.



See exception for isolated ground receptacles at 250.146(D)