NATIONAL ELECTRIC CODE CHANGES 2020
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Colorado and New Jersey Master Electrician

1

What symbols mean before section numbers.

△ If before a section number indicates that words within that section were deleted.

△ If to the left of a Table or figure number indicates a revision to an existing Table or figure.

- If a black bullet appears, one or more sections were deleted.

N Chapters, annexes, sections, figures, and Tables that are new are indicated like this.

(CMP) Following text stands for Code Making Panel that designed or changed the code. In the front of the NEC Code Book, there is a list of all 18 Code Making Panels and their members' names, job titles and State they reside in.

2

Article 90 Major Changes 2020

- 90.2 Covered.
  - (5) Installations supplying shore power to ships and watercraft in marinas and boatyards, including monitoring of leakage current.
  - (6) Installations used to export electric power from vehicles to premises wiring or for bidirectional current flow.

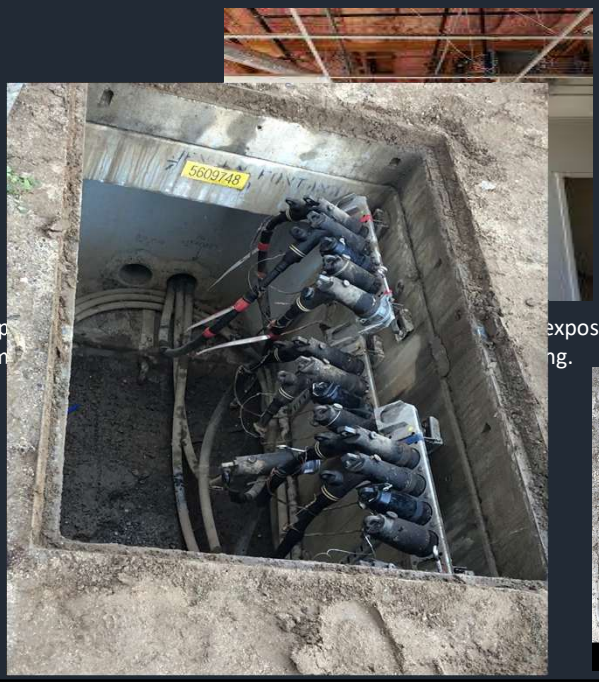
Article 100 Definitions

Before 2020 Code all definitions were in alphabetical order and in the beginning of the chapter or if specific to an Article they would be right at the front of the Article. Now the Code has broken down the definitions to three parts.

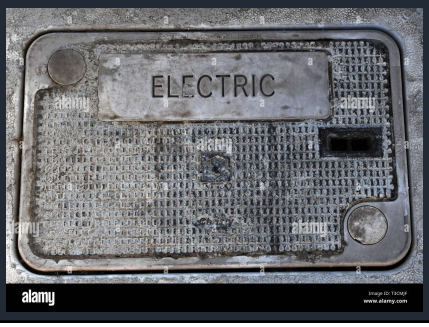
- Part 1 of this article contains definitions intended to apply wherever the terms are used throughout this Code.
- Part 2 of this article contains definitions applicable to installations and equipment operating at over 1kV, nominal.
- Part 3 of this article contains definitions applicable to hazardous locations.
  - (2023 Code has done away with this silliness and went back to pre-2020 code.

3

Accessible (as applied to equipment). Capable of being reached for operation, renewal, and inspection (CMP-1)

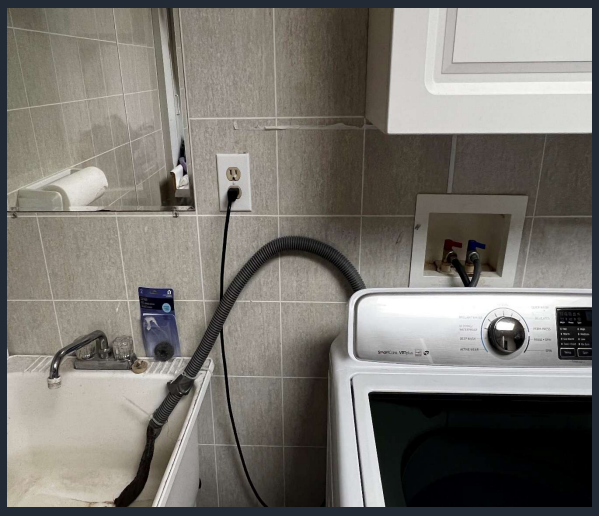


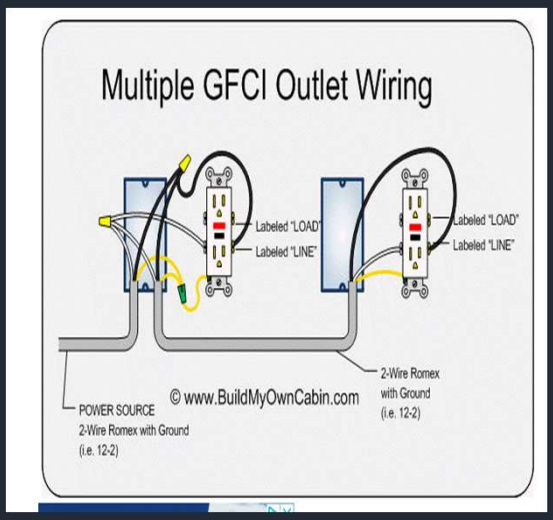
Accessible (as app exposed without damaging the building or structure or finish or not perm ng.



4

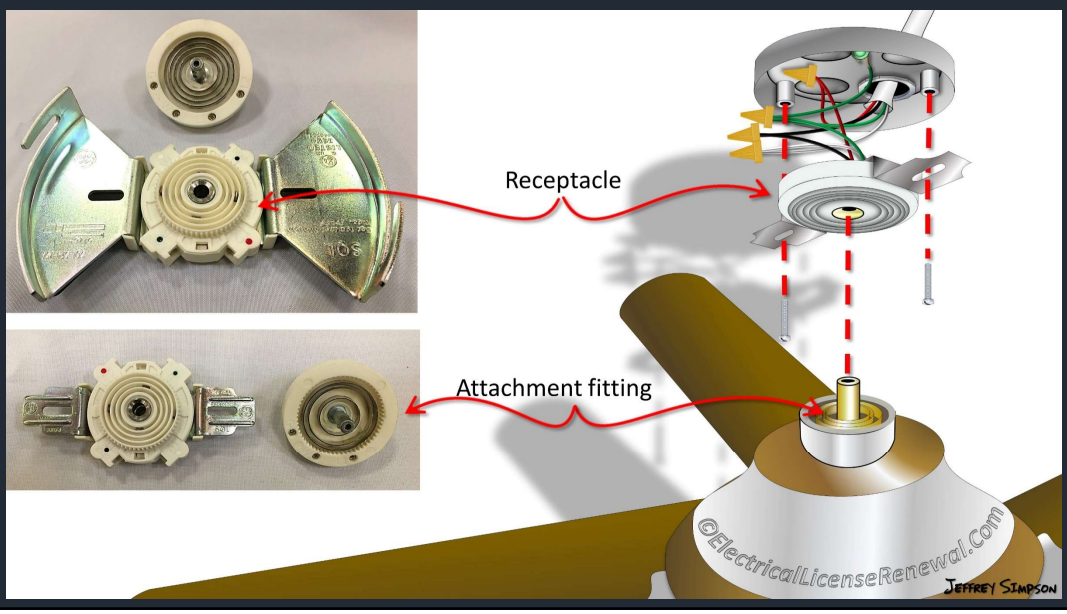
Accessible, Readily (Readily Accessible). Capable of being reached quickly for operation, renewal, or inspections without requiring those to whom ready access is requisite to take actions such as to use tools (other than keys), to climb over or under, to remove obstacles, or to resort to portable ladders, and so forth.





5

Attachment Fitting. A device that, by insertion into a locking support and mounting receptacle, establishes a connection between the conductors of the attached utilization equipment and the branch-circuit conductors connected to the locking support and mounting receptacle. Differs from an attachment plug because no cord is associated with the fitting.



6

Bonding Jumper, Supply-Side. A conductor installed on the supply side of a service or within a service equipment enclosure, or for a separately derived system, that ensures the required electrical conductivity between metal parts required to be electrically connected. (CMP 5)

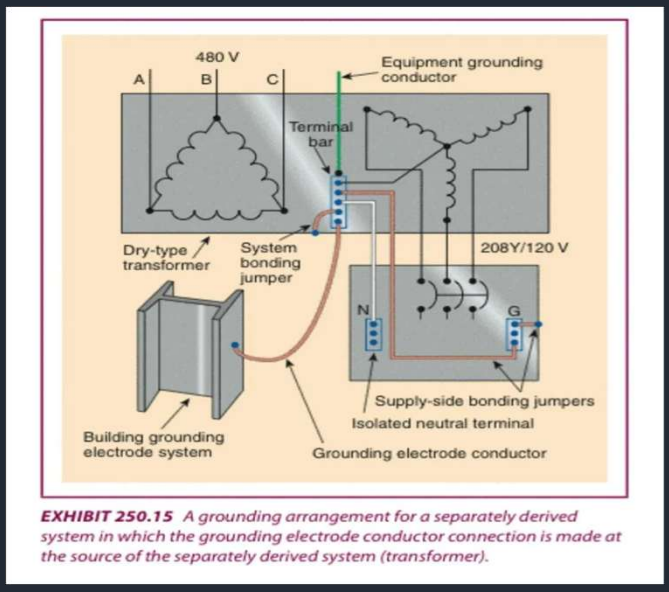
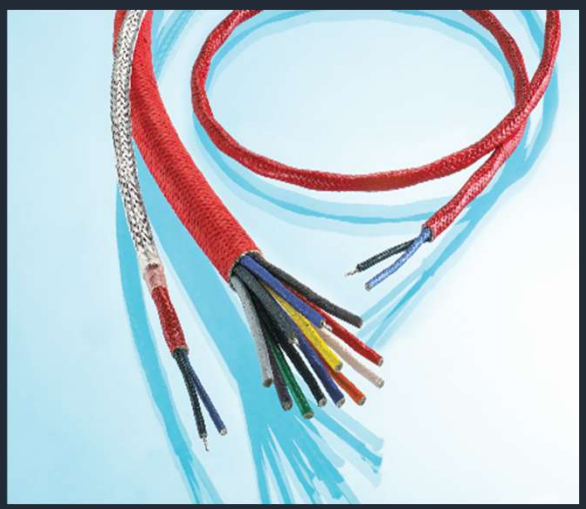
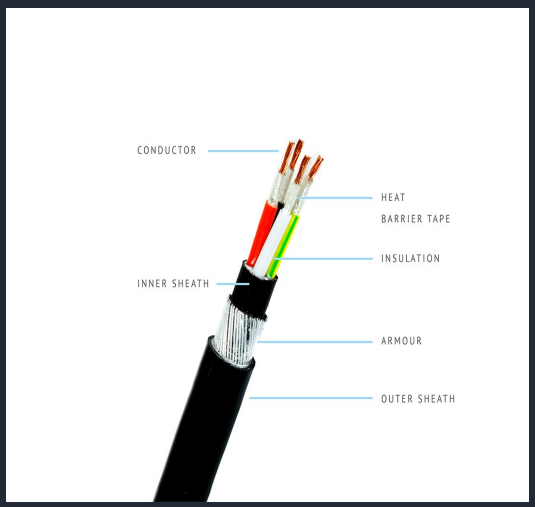


EXHIBIT 250.15 *A grounding arrangement for a separately derived system in which the grounding electrode conductor connection is made at the source of the separately derived system (transformer).*

7

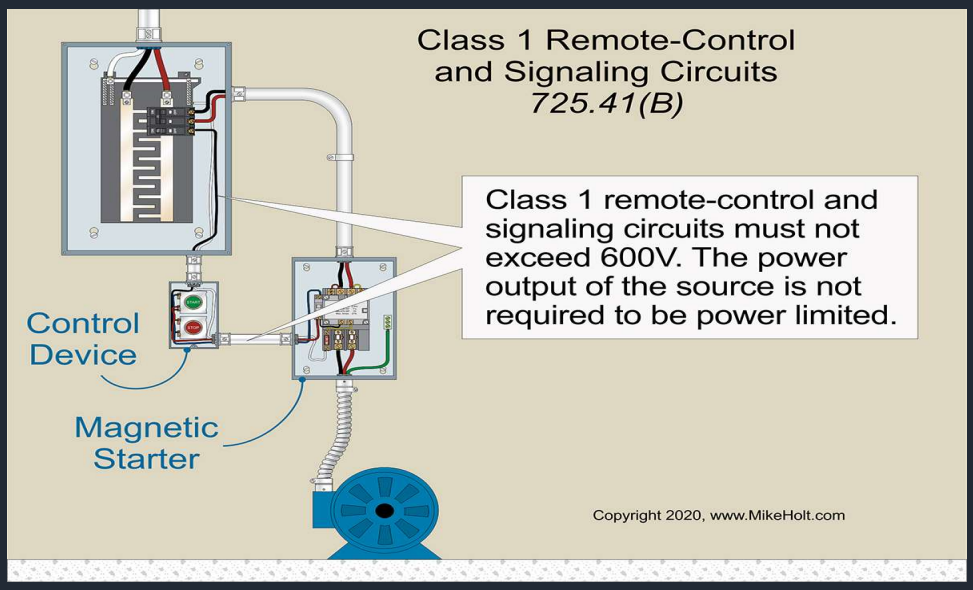
Circuit Integrity Cable (CI). Cable used for remote-control, signaling, or power-limited systems that supply critical circuits to ensure survivability for continued circuit operation for a specified time under fire conditions. (CMP-3)





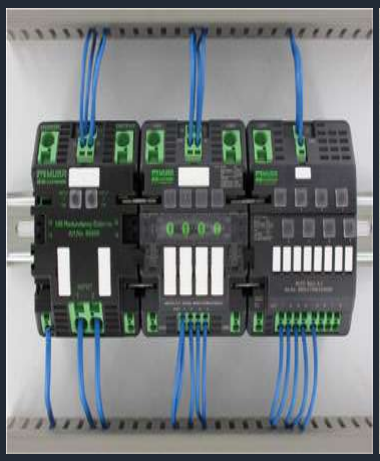
8

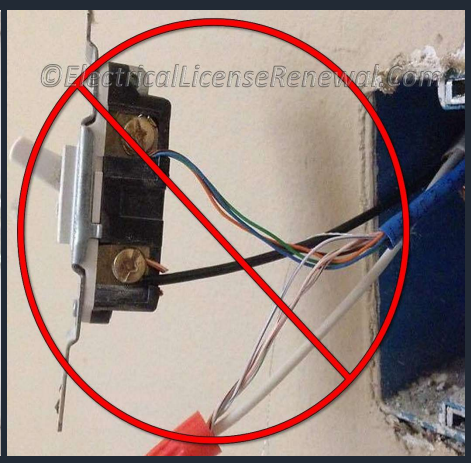
Class 1 Circuit. The portion of the wiring system between the load side of the overcurrent device or power-limited supply and the connected equipment.



9

Class 2 Circuit. That portion of the wiring system between the load side of a Class 2 power source and the connected equipment. Due to its power limitations, a Class 2 circuit considers safety from a fire initiation standpoint and provides acceptable protection from electric shock. 150 volt max.





10

Class 3 Circuit. That portion of the wiring system between the load side of a class 3 power source and the connected equipment. Due to its power limitations, a Class 3 Circuit considers safety from a fire initiation standpoint. Since higher levels of voltage and current than for Class 2 are permitted, additional safeguards are specified to provide protection from an electric shock hazard that could be encountered. Class 3 cables 300 volt max.

11

Electrical Datum Plane. A specified distance above a water level, above which electrical equipment can be installed and electrical connections can be made.

Fixed Piers. For a fixed pier, electrical connections must be located not less than 12 in. above the deck, and never below the electrical datum plane. Figure 555–10

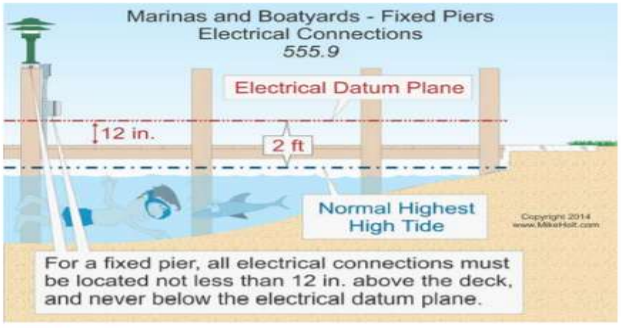
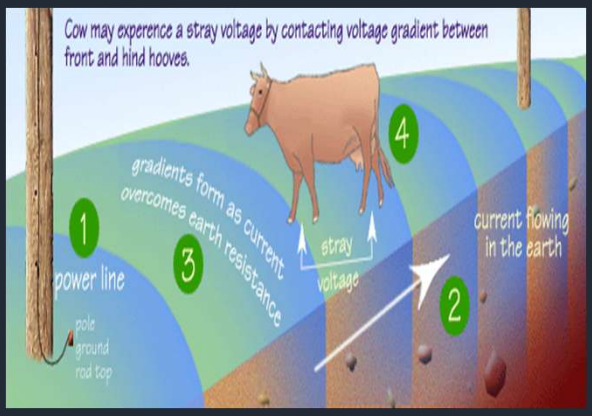


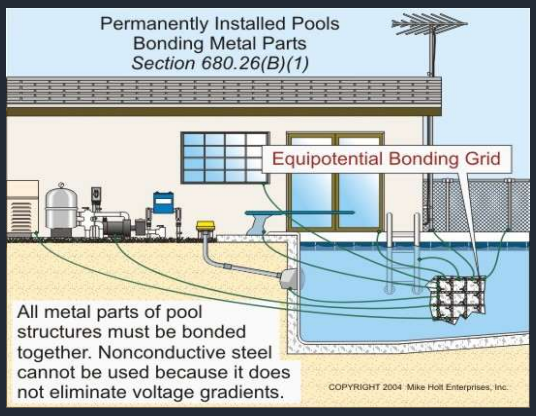
Figure 555–10

12

Equipotential Plane. Accessible conductive parts bonded together to reduce voltage gradients in a designated area. (CMP-17)

Voltage Gradients. A voltage gradient is the rate at which voltage changes over a distance. It's essentially the "steepness" of the voltage change, and is often measured in volts per meter (V/m). Voltage gradients are important in understanding how electrical potential varies in space, particularly in the context of electric fields and potential differences.

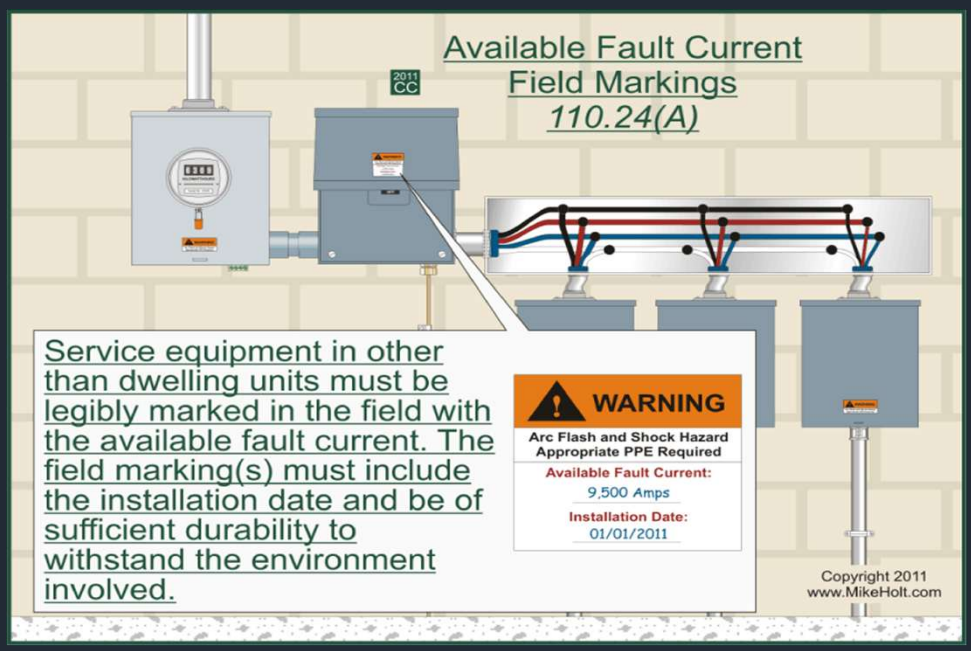




Note: Electricity wants voltage to be the same around it. If you are stepping at one potential and encounter another potential while one leg is still on the other you will get shocked.

13

Fault Current. The current delivered at a point on the system during a short-circuit condition. (CMP-10)



14

Habitable Room. A room in a building for living, sleeping, eating, or cooking, but excluding bathrooms, toilet rooms, closets, hallways, storage or utility spaces, and similar areas.

Laundry Area. An area containing or designed to contain a laundry tray, clothes washer, or clothes dryer.

Photovoltaic (PV) System. The total components, circuits and equipment up to and including the PV system disconnecting means that, in combination, convert solar energy into electric energy. (CMP-4)

Pier. A structure extending over the water and supported on a fixed foundation (fixed pier), or a flotation (floating pier), that provides access to the water.

Pier, fixed. Pier constructed on a permanent, fixed foundation, such as on piles, that permanently establishes the elevation of the structure deck with respect to land.

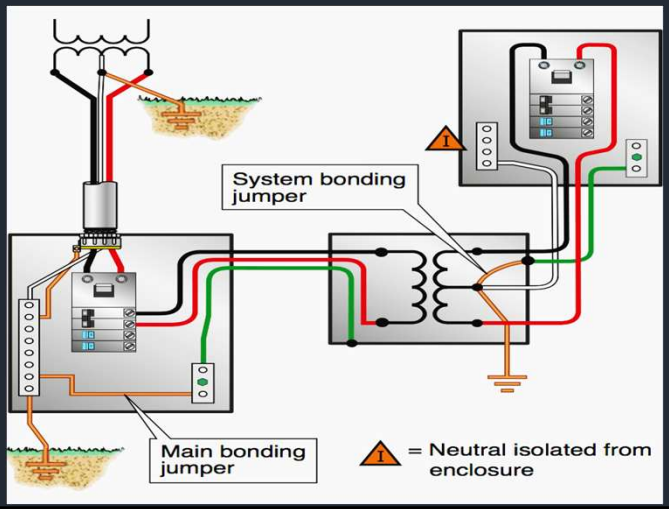
Pier, floating. Pier designed with inherent floatation capability that allows the structure to float on the water surface and rise and fall with the water level.

Service Equipment. The necessary equipment, consisting of a circuit breaker or switches and fuses and their accessories, connected to the serving utility and intended to constitute the main control and disconnect of the serving utility.

15

110.5 Conductors. Conductors used to carry current shall be of copper, aluminum or copper-clad aluminum unless otherwise provided in this Code. Where the conductor material is not specified in this Code, copper shall be assumed. Copper minimum size for dwelling units is 14 AWG and must use 60 degree C column to size wire, aluminum 12 AWG minimum size.

200.3 Connection to Grounded System. Grounded conductors of premises wiring systems shall be electrically connected to the supply system grounded conductor to ensure a common, continuous grounded system. For the purpose of this section, electrically continuous shall mean making a direct electrical connection capable of carrying current, as distinguished from induced voltage.



16

210.8 Ground-Fault Circuit-Interrupter Protection for Personnel. GFCI protection for personnel shall be provided as required in 210.8(A) through (F). The GFCI shall be installed in a READILY ACCESSIBLE LOCATION.

FPN: See 215.9 for GFCI protection for personnel on feeders
FPN: See 422.5(A) for GFCI requirements for appliances
FPN: See 555.9 for GFCI requirements for boat hoist
FPN: Additional GFCI requirements for specific circuits and equipment are contained in Chapters 4, 5 and 6.

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

(A) Dwelling Units. All 125-volt through 250-volt receptacles installed in the locations specified in 210.8(A)(1) through (A)(11) and supplied bysingle-phase branch circuits rated 150-volts or less to ground shall have GFCI protection for personnel.

- Bathrooms
- Garages and also 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.
- Outdoors – Exception for dedicated ice melting equipment that are not readily accessible
- Crawl spaces – at or below grade
- Basements – Exception: a single receptacle for a permanently installed fire or burglar alarm
- Kitchens – where the receptacles are installed to serve the countertop surfaces
- Sinks- where receptacles are installed within 6 feet from the top inside edge of the bowl of the sink.
- Boathouses
- Bathtubs or shower stalls – where the receptacles are installed within 6 feet of the outside edge of the bathtub or shower stall.
- Laundry areas
- Indoor damp and wet locations
  - Exception to everyone of these except Crawl spaces and Bathtub/shower. Listed locking support and mounting receptacles utilized in combination with compatible attachment fittings installed for the purpose of servicing a ceiling fan or luminaire shall not be required to be GFCI protected. If a general purpose convenience receptacle is integral to the ceiling fan or luminaire, GFCI protection shall be provided.

17

Accessible, Readily (Readily Accessible). Capable of being reached quickly for operation, renewal, or inspections without requiring those to whom ready access is requisite to take actions such as to use tools (other than keys), to climb over or under, to remove obstacles, or to resort to portable ladders, and so forth.

Two ways by code to wire a bathroom. The electrician can run a dedicated 20-Amp circuit and put all electric in the bathroom on that circuit or they can run a dedicated 20-A circuit to one bathroom and only feed the receptacles near the sinks and then go on to other bathrooms receptacles near the sink as long as nothing else besides the sink receptacles are on that dedicated circuit.

Question. If a bathroom doesn't have the reset device in that bathroom and it is in the upstairs bathroom with someone occupying that bathroom, is the reset device readily accessible to the person in the other bathroom? This is a decision that the Code allows individual inspectors to make. I look at this as the electrician has two options:
First is to put a GFCI circuit breaker in that is Accessibly as related to equipment, or, if the electrician decides to put the GFCI receptacles in, each individual bathroom needs to be Readily Accessible.

Is it safe for someone who is taking a shower to have to leave a shower with wet feet and walk across tile to reset the GFCI receptacle?

The whole purpose of this Code is the Practical safeguarding of lives and property.

18

(B) Other Than Dwelling Units. All **125-volt through 250-volt receptacles supplied** by single-phase branch circuits rated 150 volts or less to ground, 50 amperes or less, and all receptacles supplied by three-phase branch circuits rated 150-volts or less to ground, 100 amperes or less, installed in the locations specified in 210.8(B)(1) through (B)(12) shall have GFCI protection.

- Bathrooms
- Kitchens or areas with a sink and permanent provisions for either food preparation or cooking (all receptacles)
- Rooftops – rooftop receptacles need to be resettable from the rooftop.
- Outdoors- Exception to rooftops and outdoors deicing equipment, Exception to 4, industrial establishments only qualified
- Sinks – 6 feet rule, Exception, industrial labs where removal of power creates a greater hazard, healthcare see Article 517.
- Indoor damp and wet locations
- Locker rooms with associated showers
- Garages, accessory buildings, service bays, and similar areas other than vehicle halls and showrooms
- Crawl spaces
- Unfinished areas of basements
- Laundry areas
- Bathtubs and shower stalls where installed within 6 feet of outside edge of the tub or shower.

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

(D) Specific Appliances.

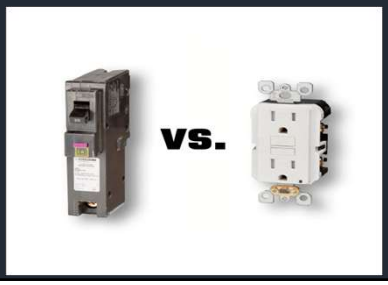
422.5 GFCI protection for Personnel. Appliances identified in 422.5(A)(1) through (A)(7) rated 150 volts or less to ground and 60 amperes or less single- or 3-phase, shall be provided with a Class A GFCI protection for Personnel. Multiple Class A GFCI protective devices shall be permitted but shall not be required. Class A will trip between 4 and 6 mA.

19

- Automotive vacuum machines
- Drinking water coolers and bottle fill stations
- Cord-and-plug-connected high-pressure spray washing machines
- Tire inflation machines
- Vending machines
- Sump pumps
- Dishwashers

(B) Type and Location. The GFCI shall be readily accessible, listed, and located in one or more of the following locations:

- Within the branch circuit overcurrent device
- A device or outlet within the supply circuit
- An integral part of the attachment plug
- Within the supply cord not more than 12-inches from the attachment plug
- Factory installed within the appliance



20

(E) Equipment Requiring Services. GFCI protection shall be provided for the receptacles required by 210.63. (AC condenser)

(F) Outdoor Outlets. All outdoor outlets for dwellings, other than those covered in 210.83(A)(3), Exception to (3), that are supplied by single-phase branch circuits rated 150 volts to ground or less, 50 Amps or less, shall have GFCI protection for personnel.

210.63(B) Other Electrical Equipment. In other than one- and two-family dwellings, a receptacle outlet shall be located as specified in 210.63(B)(1) and (B)(2).

(B)(1) Indoor Service Equipment. The required receptacle outlet shall be located within the same room or area as the service equipment.

(B)(2) Indoor Equipment Requiring Dedicated Equipment Spaces. Where equipment, other than service equipment, requires dedicated equipment space as specified in 100.26(E), the required receptacle outlet shall be located within the same room or area as the electrical equipment and shall not be connected to the load side of the equipment's branch-circuit disconnecting means.

230.46 Spliced and Tapped Conductors.

Service-entrance conductors shall be permitted to be spliced or tapped in accordance with 110.14, 300.5(E), 300.13 and 300.15. Power distribution blocks, pressure connectors, and devices for splices and taps shall be listed. Power distribution blocks installed on service conductors shall be marked "suitable for use on the line side of the service equipment" or equipment. Effective January 1, 2023, Pressure connectors and devices for splices and taps installed on service conductors shall be marked "suitable for use on the line side of service equipment" or equipment.

21

230.66 Marking.

Service equipment rated 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 evaluated. Meter sockets shall not be considered service equipment but shall be listed and rated for the voltage and current rating of the service.

230.67 Surge Protection.

(A) Surge-Protection Device. All services supplying dwelling units shall be provided with a surge-protective device (SPD).

(B) Location. The SPD shall be an integral part of the service equipment or shall be located immediately adjacent thereto.

Exception: The SPD can be placed in the service equipment as required in (B) if located at each next level distribution equipment downstream towards the load.

(C) Type. The SPD shall be Type 1 or Type 2 SPD.

(D) Replacement. Where service equipment is replaced, all of the requirements of this section shall apply.

22

230.85 Emergency Service Disconnect. For one- and Two-Family dwelling units, all service conductors shall terminate in disconnecting means having a short-circuit current rating equal to or greater than the available fault current, installed in a readily accessible outdoor location. If more than one disconnect is provided, they shall be grouped. Each disconnect shall be one of the following:

- (1) Service disconnects marked as follows:
  - EMERGENCY DISCONNECT, SERVICE DISCONNECT
- (2) Meter disconnects installed per 230.82(3) and marked as follows:
  - EMERGENCY DISCONNECT, METER DISCONNECT, NOT SERVICE EQUIPMENT
- (3) Other listed disconnect switches or circuit breakers on the supply side of each service disconnect that are suitable for use as service equipment and marked as follows:
  - EMERGENCY DISCONNECT, NOT SERVICE EQUIPMENT
- MARKINGS SHALL COMPLY WITH 110.21(B)

23

240.4 Protection of conductors. Conductors other than flexible cords, flexible cables, and fixture wires, shall be protected against overcurrent in accord uired in 240.4 (A) – (G).

240.4(D) Sn protection shall not exceed that ature and number of conductors

(1) 18 AWG
(1
(2

AWG copper wire.
er wire.

310.3 Cond
(A) Minimu d including 2000 volts
shall be 14 elsewhere in this code.

24

New Article and Device

Article 242 Overvoltage Protection – Surge protection Device

242.12 Type 1 SPDs shall be installed in accordance with 242.12(A) and (B).

(A) Installation. Type 1 SPDs shall be permitted to be connected in accordance with one of the following:

1) To the supply side of the service disconnect as permitted in 230.82(4)
2) As specified in 242.14

(B) At the Service. When installed at services, Type 1 SPDs shall be connected to one of the following:

1) Grounded service conductor
2) Grounding electrode conductor
3) Grounding electrode for the service
4) Equipment grounding terminal in the service equipment

Type 1 SPDs are installed at the service entrance, handling large, external surges like those from lightning strikes.

Type 2 SPDs are installed downstream, typically at distribution panels, and protect against smaller, internal surges from equipment or residual external surges. Both work together to provide comprehensive surge protection.

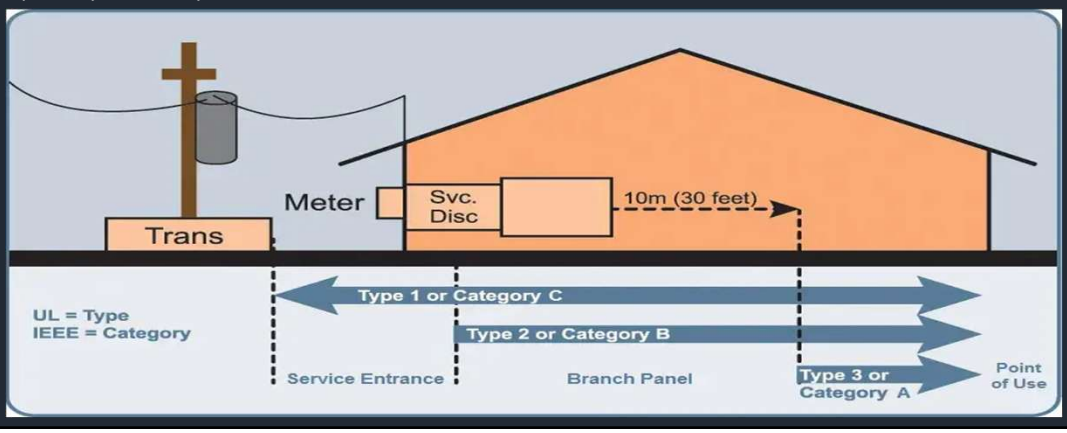
25

Type 2 SPDs. Type 2 SPDs shall be installed in accordance with 242.14 (A) through (C).

(A) Service-Supplied Building or Structure. Type 2 SPDs shall be connected anywhere on the load side of a service disconnect overcurrent device required in 230.91 unless installed in accordance with 230.82(8).

(B) Feeder-Supplied building or Structure. Type 2 SPDs shall be connected at the building or structure anywhere on the load side of the first overcurrent device at the building or structure.

(C) Separately Derived System. The SPD shall be connected on the load side of the first overcurrent device in a separately derived system.



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Type 3 can only be installed on the load side of a branch circuit overcurrent protection device up to the equipment served.

- Number Required. Where used at a point on a circuit, the SPD shall be connected to each ungrounded conductor.
- Location. SPDs shall be permitted to be located indoors or outdoors and shall be made inaccessible to unqualified persons unless listed for the installation in accessible locations.
- Routing of Conductors. The conductors used to connect the SPD to the line or bus and to ground shall not be any longer than necessary and shall avoid unnecessary bends.

27

250.121 Restricted Use of Equipment Grounding Conductors

(A) Grounding Electrode Conductor. An Equipment Grounding Conductor shall not be used as a grounding Electrode Conductor.

(B) Metal Frame of Building or Structure. The structural metal frame of a building or structure shall not be used as an equipment grounding conductor.

250.122 Size of Equipment Grounding Conductors

(A) General. Copper, aluminum, or copper-clad aluminum equipment grounding conductors of the wire type shall not be smaller than shown in Table 250.122. The equipment grounding conductor shall not be required to be larger than the circuit conductors supplying the equipment. If a cable tray, a raceway, or a cable armor or sheath is used as the equipment grounding conductor, as provided in 250.118 and 250.134(1), it shall comply with 250.4(A)(5) or (B)(4).

(B) Increased in Size. If ungrounded conductors are increased in size for any reason other than as required in 310.15(B) (temp) or 310.15(C)(# of conductors), wire-type equipment grounding conductors, if installed, shall be increased in size proportionately to the increase in circular mil area of the ungrounded conductors. (Voltage Drop).

28

250.104(B) Other Metal Piping. If installed in or attached to a building or structure, a metal piping system, including gas piping, that is likely to become energized shall be bonded to any of the following:

- 1) Equipment grounding conductor for the circuit that is likely to energize the piping system
- 2) Service equipment enclosure
- 3) Grounded conductor at the service
- 4) Grounding electrode conductor, if of sufficient size
- 5) One or more grounding electrodes used, if the grounding electrode conductor or bonding jumper to the grounding electrode is of sufficient size.

- International Fuel Gas Code:

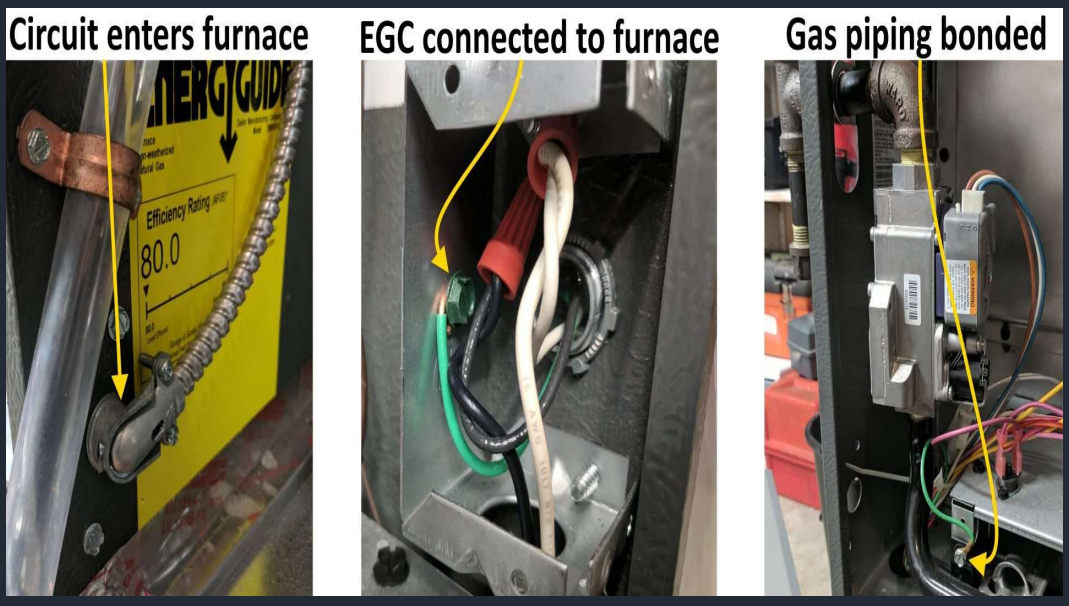
- 309.1 Grounding. Gas piping shall not be used as a grounding electrode.

- 309.2 Connections. Electrical connections between appliances and the building wiring, including the grounding of the appliances, shall conform to NFPA 70.

- 310.1 Pipe and Tubing other than CSST. Each above ground portion of a gas piping system other than corrugated stainless steel tubing (CSST) that is likely to become energized shall be electrically continuous and bonded to an effective ground-fault current path. Gas piping other than CSST shall be considered to be bonded where it is connected to an appliance that is connected to the equipment grounding conductor of the circuit that supplies that appliance.

29

BONDING OF GAS FURNANCE NON CSST



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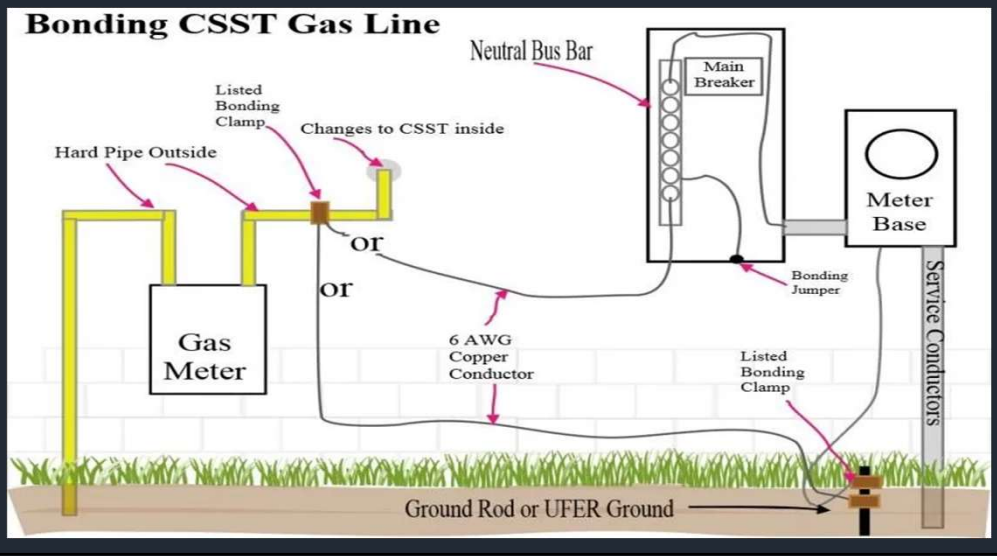
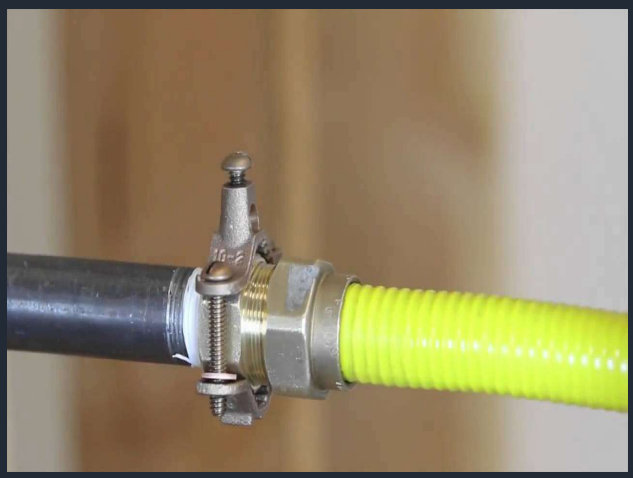
310.2 CSST. This section applies to corrugated stainless steel tubing (CSST) that is not listed with an arc-resistant jacket or coating system in accordance with ANSI LC 1/CSA 6.26.

CSST gas piping systems and piping systems shall be electrically continuous and bonded to the electrical service grounding electrode system or, where provided, the lightning protection grounding electrode system.



31

CSST



ARC-RESISTANT

32

300.25 Exit Enclosures (Stair Towers)

Where an exit enclosure is required to be separated from the building, only electrical wiring methods serving equipment permitted by the authority having jurisdiction in the exit enclosure shall be installed within the exit enclosure.

Table 310.12 Shall be allowed as long as no adjustment factors apply.

Table 310.12 Single-Phase Dwelling Services and Feeders

Service or Feeder Rating (Amperes)	Conductor (AWG or kcmil) Copper	Conductor (AWG or kcmil) Aluminum or Copper-Clad Aluminum
100	4	2
110	3	1
125	2	1/0
150	1	2/0
175	1/0	3/0
200	2/0	4/0
225	30/	250
250	4/0	300
300	250	350
350	350	500
400	400	600

Jeffrey Simpson

Note: If no adjustment or correction factors are required, this table shall be permitted to be applied.

33

310.15

Table 310.15(B)(1) Ambient Temperature Correction Factors Based on 30°C (86°F)

For ambient temperatures other than 30°C (86°F), multiply the allowable ampacities specified in the ampacity tables by the appropriate correction factor shown below.

Ambient Temp (°C)	Temperature Rating of Conductor 60°C	75°C	90°C	Ambient Temp (°F)
10 or less	1.29	1.20	1.15	50 or less
11-15	1.22	1.15	1.12	51–59
16-20	1.15	1.11	1.08	60–68
21-25	1.08	1.05	1.04	69–77
26-30	1.00	1.00	1.00	78–86
31-35	0.91	0.94	0.96	87–95
36-40	0.82	0.88	0.91	96–104
41-45	0.71	0.82	0.87	105–113
46-50	0.58	0.75	0.82	114–122
51-55	0.41	0.67	0.76	123–131
56-60	—	0.58	0.71	132–140
61-65	—	0.47	0.65	141–149
66-70	—	0.33	0.58	150–158
71-75	—	—	0.50	159–167
76-80	—	—	0.41	168–176
81–85	—	—	0.29	177–185

34

310.15 (B)(2) Rooftop. For raceways or cables exposed to direct sunlight on or above rooftops where the distance above the roof to the bottom of the raceway or cable is less than 7/8-inch, a temperature adder of 60^0F shall be added to the outdoor temperature to determine the applicable ambient temperature for application of the correction factors in Table 310.15(B)(1) or Table 310.15(B)(2)

35

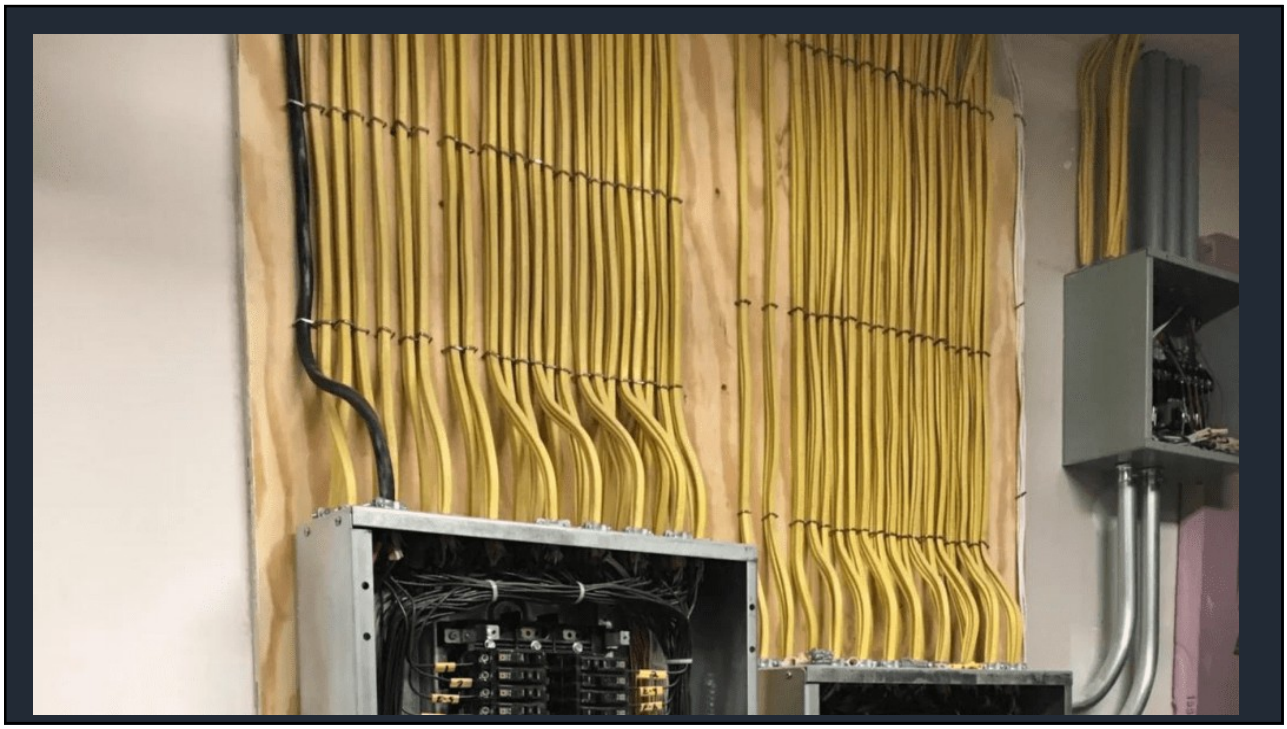
310.15(C)(1) More than 3 Current-Carrying Conductors.

The ampacity of each conductor shall be reduced as shown in Table 310.15(C)(1) where the number of current-carrying conductors in a raceway or cable exceeds three, or where single conductors or multi-conductor cables not installed in raceways are installed without maintaining spacing for a continuous length longer than 24-inches. This rule doesn't apply to nipples 24-inches or less or underground conductors entering or leaving a trench if those conductors have physical protection (conduit) and max length 10 foot and no more than 4 conductors in conduit.

Table 310.15(B)(16) (formerly Table 310.16) Allowable Ampacities of Insulated Conductors Rated Up to and Including 2000 Volts, 60°C Through 90°C, Not More Than Three Current-Carrying Conductors in Raceway, Cable, or Earth (Directly Buried), Based on Ambient Temperature of 30°C (86°F)*

Temperature Rating of Conductor [See Table 310.104(A).]			
Size AWG or kcmil	Temperature Rating of Conductor		
	60°C Types TW, UF	75°C Types RHW, THHW, THW, THWN, XHHW, USE, ZW	90°C Types TBS, SA, SIS, FEP, FEPB, MI, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE-2, XHH, XHHW, XHHW-2, ZW-2
	COPPER CONDUCTORS ONLY. ALUMINUM PORTION OF TABLE NOT SHOWN		
18**	—	—	14
16**	—	—	18
14**	15	20	25
12**	20	25	30
10**	30	35	40
8	40	50	55
6	55	65	75
4	70	85	95
3	85	100	115
2	95	115	130
1	110	130	145

36



37

310.15(C)(1) More than three-current carrying conductors.

The ampacity of each conductor shall be reduced as shown in table 310.15(C)(1) where the number of current-carrying conductors in a raceway or cable exceeds three, or where single conductors or multi-conductor cables not installed in raceways are installed without maintaining spacing for a continuous length longer than 24-inches. Each current-carrying conductor of a paralleled set of conductors shall be counted as a current carrying conductor.

(a) Where conductors are installed in cable trays, the provisions of 392.80 shall apply.
(b) Adjustment factors shall not apply to conductors in raceways having a length not exceeding 24-inches.

Table 310.15(C)(1) Adjustment Factors for More Than Three Current-Carrying Conductors

Number of Conductors*	Percent of Values in Table 310.16 through Table 310.19 as Adjusted for Ambient Temperature if Necessary
4-6	80
7-9	70
10-20	50
21-30	45
31-40	40
41 and above	35

*Number of conductors is the total number of conductors in the raceway or cable, including spare conductors. The count shall be adjusted in accordance with 310.15(E) and (F). The count shall not include conductors that are connected to electrical components but that cannot be simultaneously energized.

Step 1. Determine number of current carrying conductors

Step 2. Table 310.15(C)(1) Find factor according to number of current carrying conductors

Step 3. For this example we will say 7. Look at Table 310.15(1) 7 – 9 conductors is 70-percent

Step 4. Find wire insulation. If Romex THHN, look at 90 degree column for ampacity, if #12, ampacity is 30 amps.
30 X .70 = 21 Amps for a 20 amp circuit still meets code.

Table 310.16 Ampacities of Insulated Conductors with Not More Than Three Current-Carrying Conductors in Raceway, Cable, or Earth (Directly Buried)

Size AWG or kcmil	Temperature Rating of Conductor [See Table 310.4(A).]		
	Temperature Rating of Conductor		
	60°C Types TW, UF	75°C Types RHW, THHW, THW, THWN, XHHW, USE, ZW	90°C Types TBS, SA, SIS, FEP, FEPB, MI, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE-2, XHH, XHHW, XHHW-2, ZW-2
	COPPER CONDUCTORS ONLY. ALUMINUM PORTION OF TABLE NOT SHOWN		
18*	—	—	14
16*	—	—	18
14*	15	20	25
12*	20	25	30
10*	30	35	40
8	40	50	55
6	55	65	75
4	70	85	95
3	85	100	115
2	95	115	130
1	110	130	145

38

406.4 (G) Receptacle Orientation.

1) Countertop and Work Surfaces. Receptacles shall not be installed in a face-up position in or on countertop surfaces or work surfaces unless listed for countertop or work surface applications.

2) Under Sinks. Receptacles shall not be installed in a face-up position in the area below a sink.

406.9 (C) Bathtub and Shower Space.

Receptacles shall not be installed within a zone measured 3 foot horizontally and 8 foot vertically from the top of the bathtub rim or shower stall threshold. The identified zone shall be all-encompassing and shall include the space directly over the tub or shower stall.

Exception 1. In bathrooms with less than the required zone the receptacles shall be permitted to be installed opposite the bathtub rim or shower stall threshold on the farthest wall within the room.

Exception 2. In a dwelling unit, a single receptacle shall be permitted for an electronic toilet or personal hygiene device such as an electronic bidet seat. The receptacle shall be readily accessible and located on one of the following:

(1) The wall behind the toilet but not behind the tank

(2) The opposite side of the toilet from the bathtub or shower.

39

406.12 Tamper-Resistant Receptacles. All 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles in the areas specified in 406.12(1) through (8) shall be listed tamper-resistant receptacles.

(1) Dwelling units, including attached and detached garages and accessory buildings to dwelling units, and common areas of multifamily dwellings specified in 210.52 and 550.13

(2) Guest rooms and guest suites of hotels, motels, and their common areas.

(3) Child care facilities

(4) Preschools and educational facilities

(5) Business offices, corridors, waiting rooms and the like in clinics, medical and dental offices and outpatient facilities.

(6) Subset of assembly occupancies described in 518.2 to include places of awaiting transportation, gymnasiums, skating rinks, and auditoriums.

(7) Dormitory units

(8) Assisted Living Facilities

40

410.10 Luminaires in Specific Locations

D) Bathtub and Shower Areas. A luminaire installed in a bathtub or shower area shall meet all of the following requirements:

(1) No parts of cord-connected luminaires, chain-, cable-, or cord-suspended luminaires, lighting track, pendants, or ceiling-suspended (paddle) fans shall be located within a zone measuring 3 foot horizontally and 8 foot vertically from the top of the bathtub rim or shower stall threshold. This zone is all-encompassing and includes the space directly over the tub or shower stall.

(2) Luminaires located within the actual outside dimension of the bathtub or shower to a height of 8 feet vertically from the top of the bathtub rim or shower threshold shall be marked suitable for damp locations or marked suitable for wet locations. Luminaires located where subject to shower spray shall be marked suitable for wet locations.

422.5 Ground-Fault Circuit-Interrupter (GFCI) protection for personnel.

(A) General. Appliances identified in 422.5(A)(1) through (A)(7) rated 150 volts or less to ground and 60 amperes or less, single- or 3-phase, shall be provided with a Class A GFCI protection for personnel. Multiple Class A GFCI protective devices shall be permitted but shall not be required.

Automotive Vacuum machines
Cord and plug connected high-pressure spray washing machines
Vending Machines
Dishwashers
Drinking water coolers and bottle fill stations
Tire Inflation Machines
Sump Pumps

41