South Dakota 2017 NEC Changes Chapters 1 -7 (8 hours credit)

Instructor:

Class Schedule

7:30 - 8:00:	Registration/Sign-in
8:00 – 8:30:	New Articles, Article 90.2, 90.3, Chapter 1 Articles
8:30 – 10:30:	Chapter 2:
10:30 – 10:45:	15 Minute Break
10:45 – 11:45:	Chapter 3 Articles
11:45 -12:15:	Lunch
12:15 – 1:45:	Chapter 4 Articles
1:45 – 2:15:	Chapter 5 Articles
2:30 – 3:30:	Chapter 6 Articles
3:30 -4:00:	Chapter 7 Articles

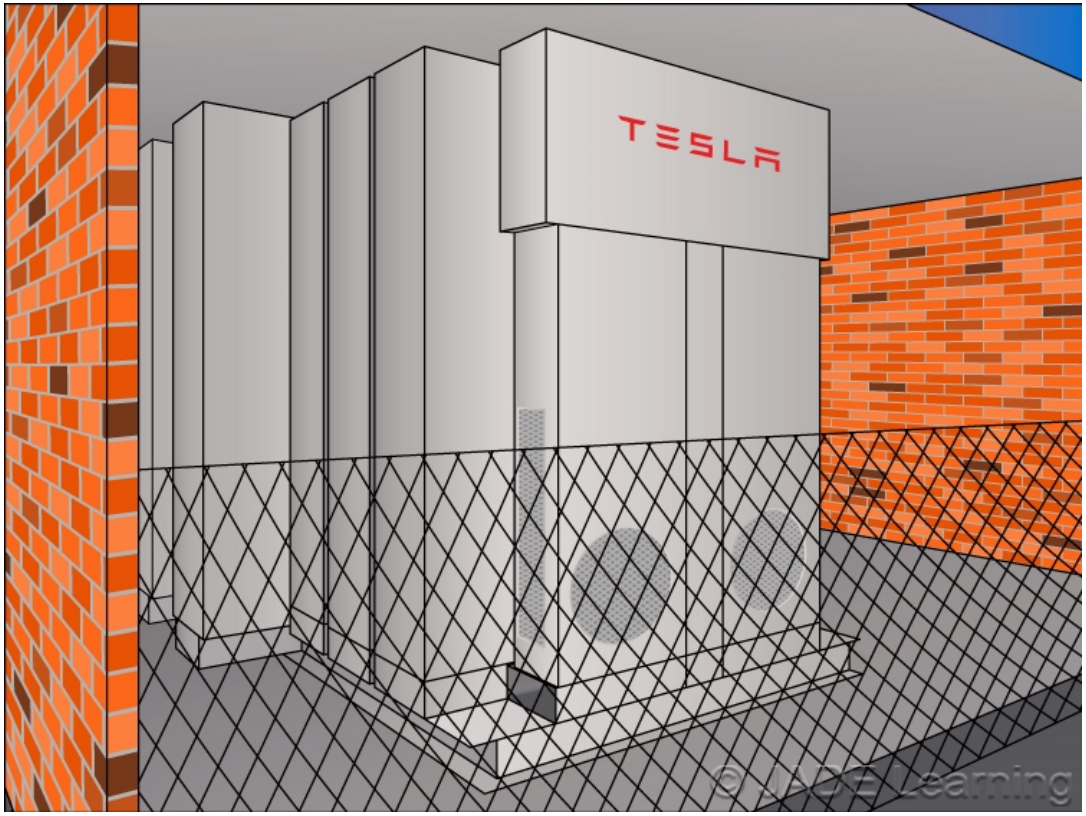
- This course is worth 8 hours of continuing education.
- You will be emailed a copy of your certificate within 2 business days.

Questions? Concerns?
Call the office at 1-800-443-5233

New Articles 425 and 691

- New Article 691 covers Large-Scale Photovoltaic (PV) Electric Supply Stations.
- New Article 425 covers Fixed Resistance and Electrode Industrial Process Heating Equipment.

New Articles 706, 710, 712

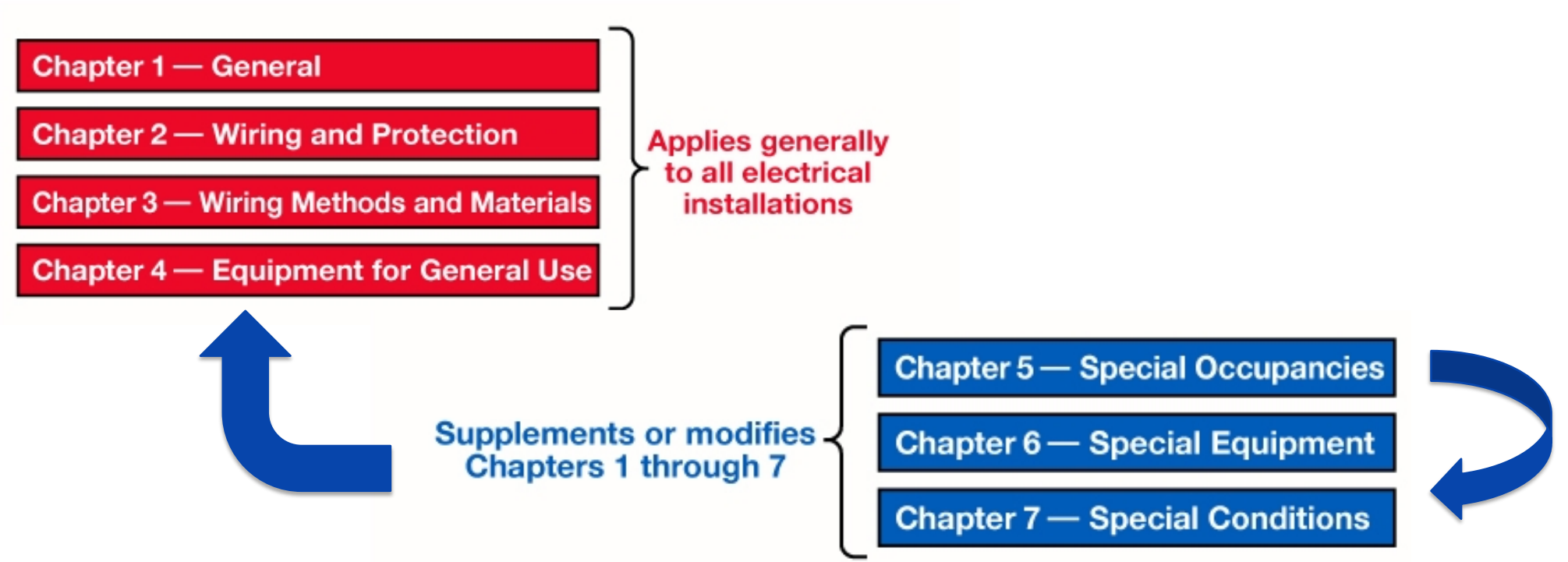


- Articles 706: Energy Storage Systems (ESS)
- Article 710: Stand-Alone Systems
- Article 712: Direct Current Microgrids

90.2(A) Scope - Covered

The removal of conductors, as well as the installation of conductors, is covered in the 2017 NEC.

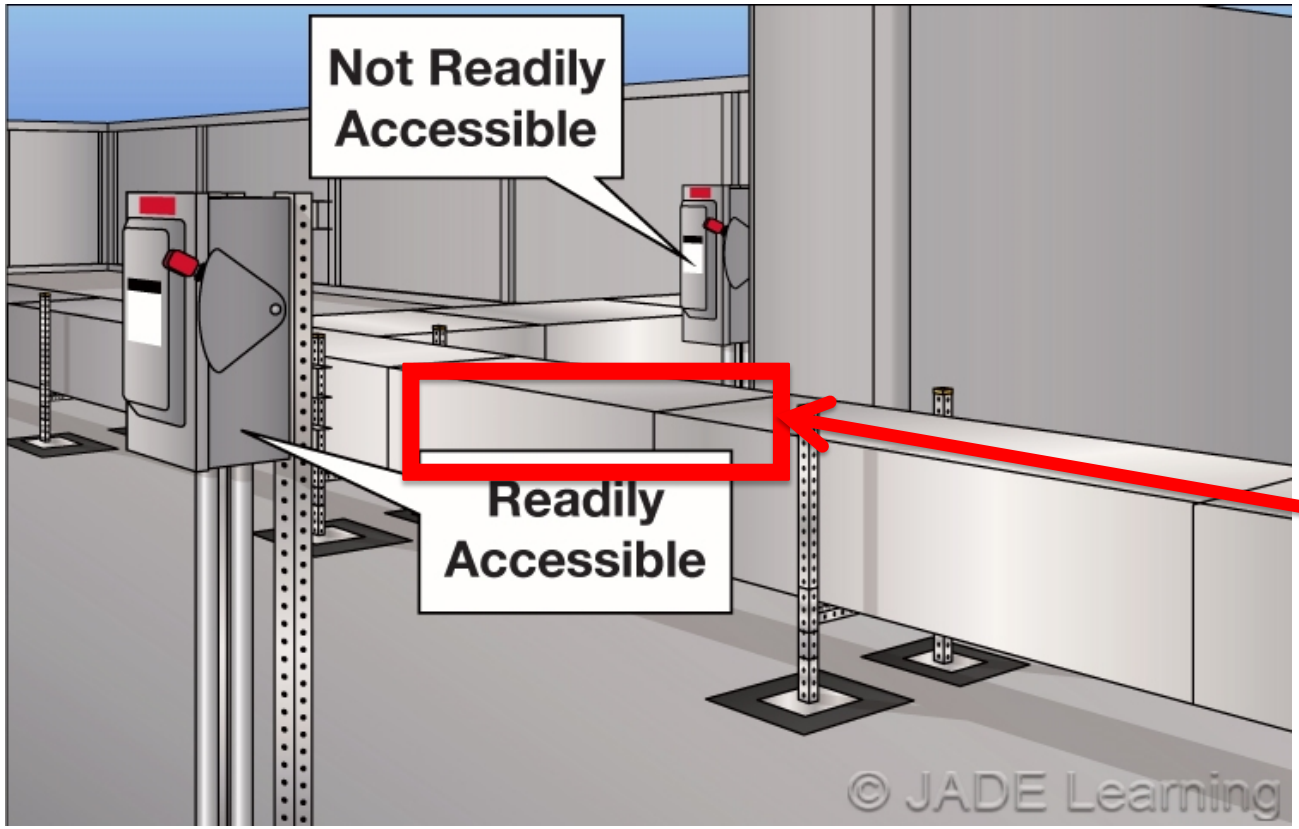
Figure 90.3 - Code Arrangement



Chapter 5, Chapter 6, and Chapter 7 can supplement and modify each other, as well as supplement or modify Chapters 1-4.

2017 NEC Changes Chapter 1

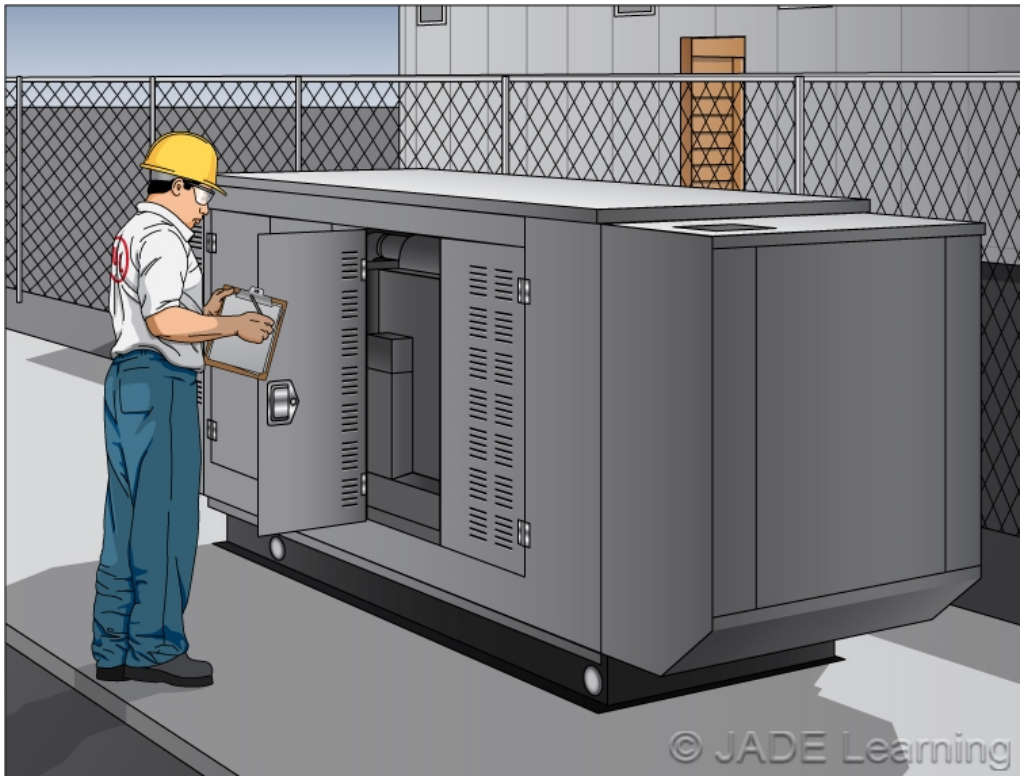
100 Accessible: Readily (Readily Accessible)



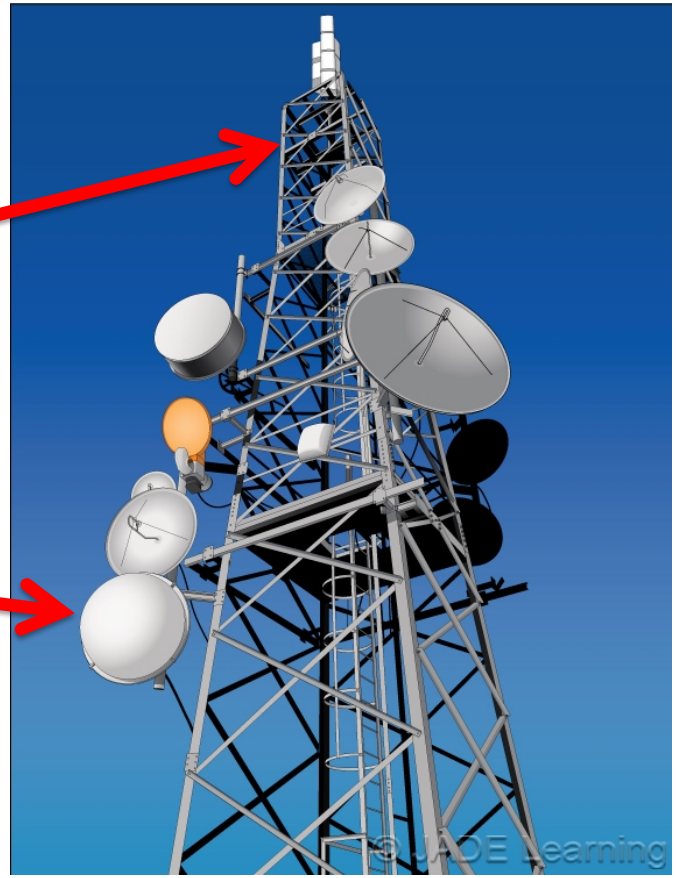
Equipment is not readily accessible if a person must climb over or under an obstacle to reach the equipment.

100 Field Labeled

Equipment can be field labeled by personnel from a Field Evaluation Body (FEB).

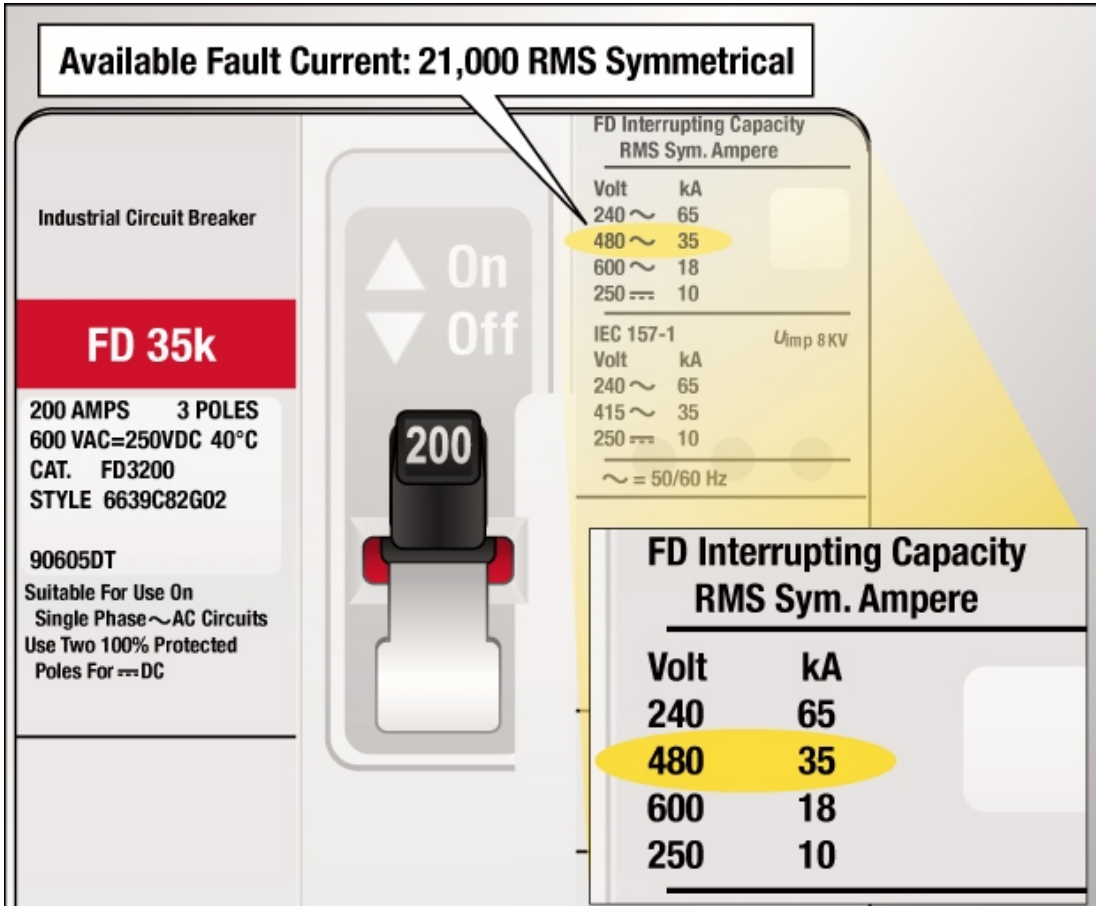


100 Structure



A structure is:
"That which is built or constructed, other than equipment."

110.9 - Interrupting Rating



The interrupting rating must be at least equal to the current that is available at the line terminals of the equipment.

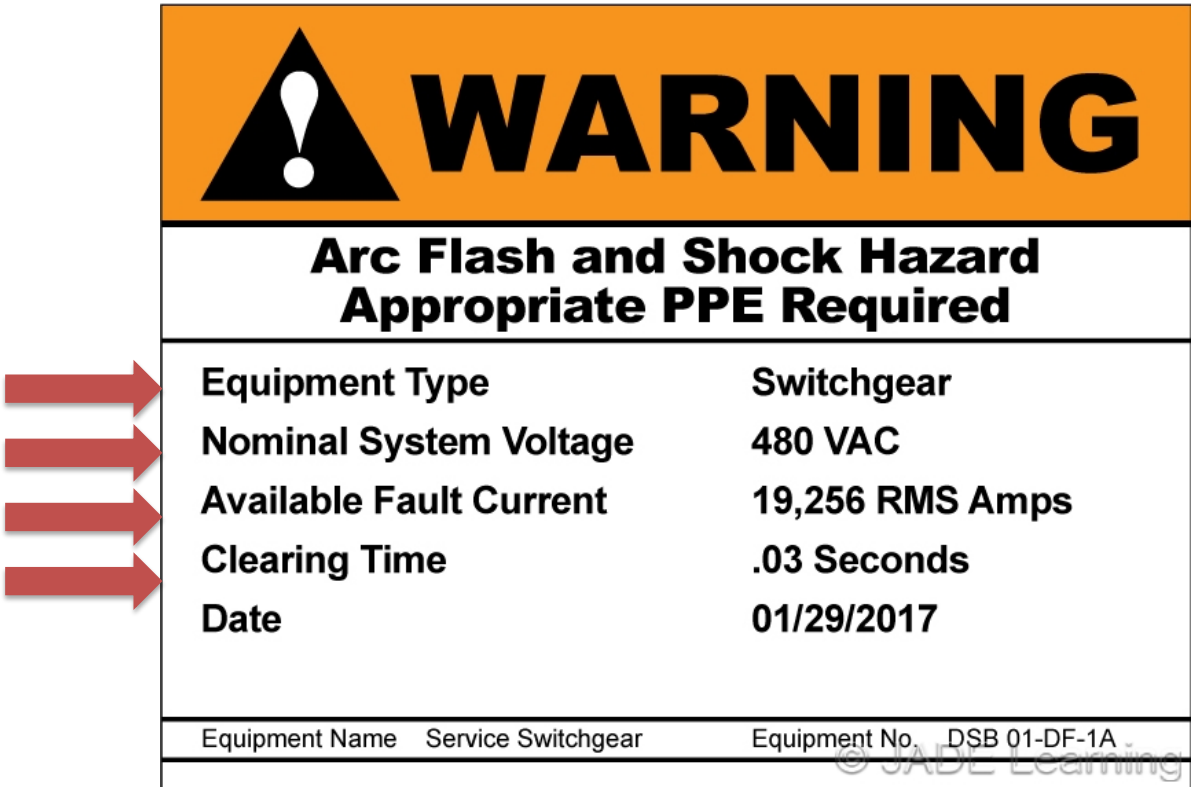
110.14(D) - Electrical Connections: Installation

A calibrated torque tool is now required to tighten electrical connections to the manufacturer's specifications.

JADE Top 20

110.16(B) - Arc-Flash Hazard Warning: Service Equipment

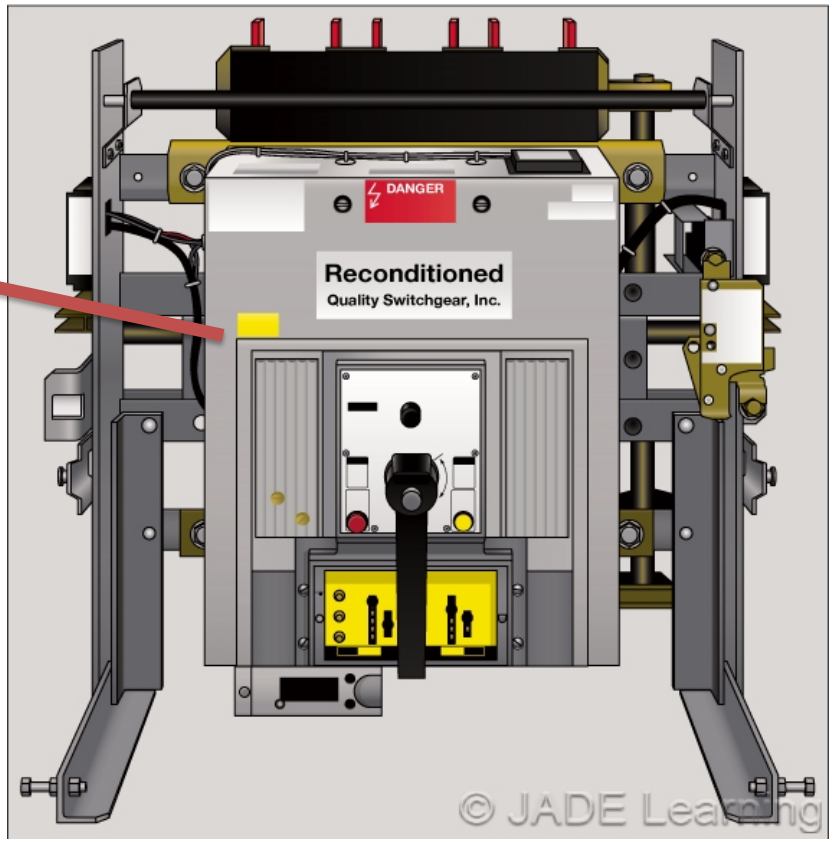
There are new requirements for arc-flash labels for equipment rated 1200 amps or more in other than dwelling units.



110.21(A)(2) - Equipment Markings: Reconditioned Equipment

Reconditioned
Quality Switchgear, Inc.

Reconditioned equipment must be labeled to identify the company or organization that did the reconditioning.



110.24(A) - Available Fault Current - Field Marking

The calculation that results in the available fault current value must be documented and made available to interested parties.

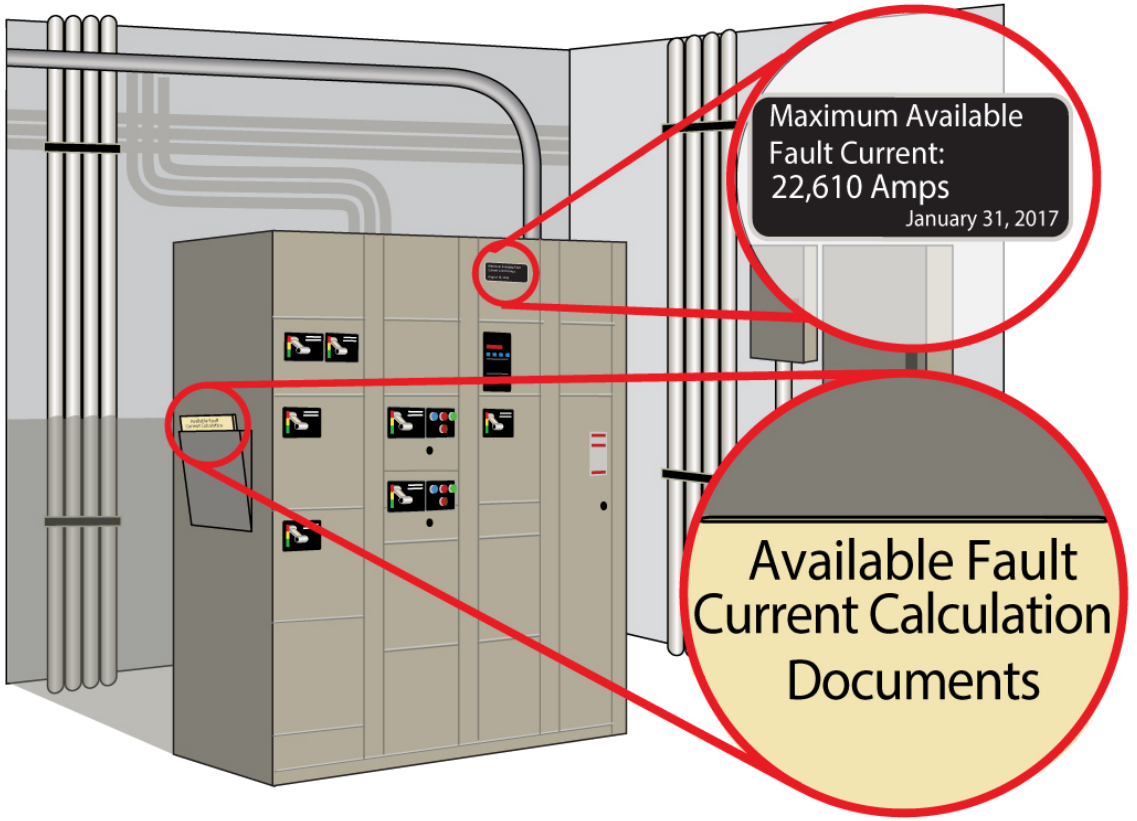
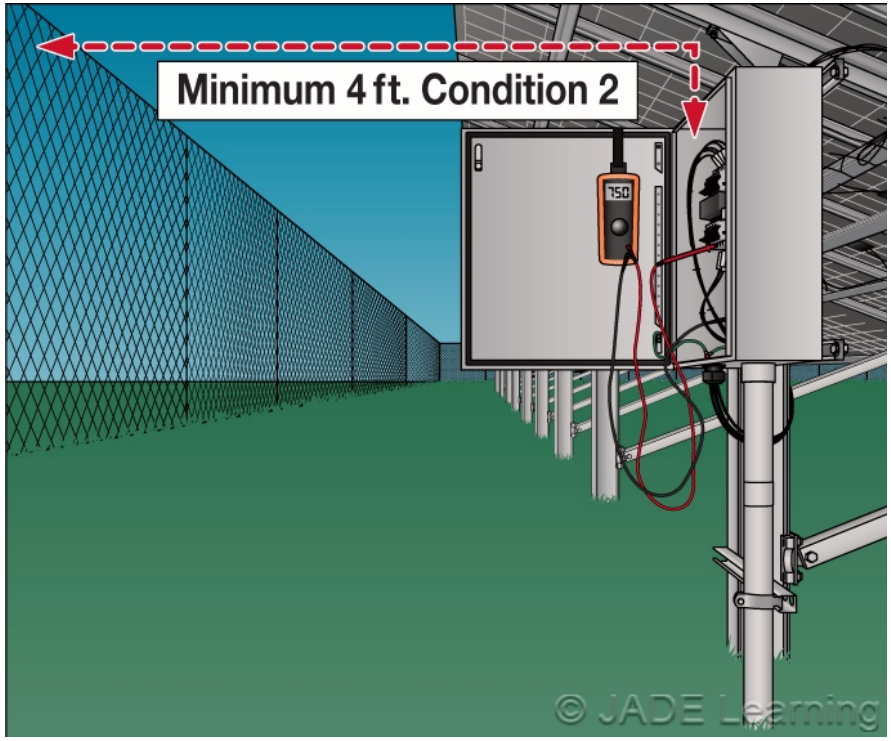


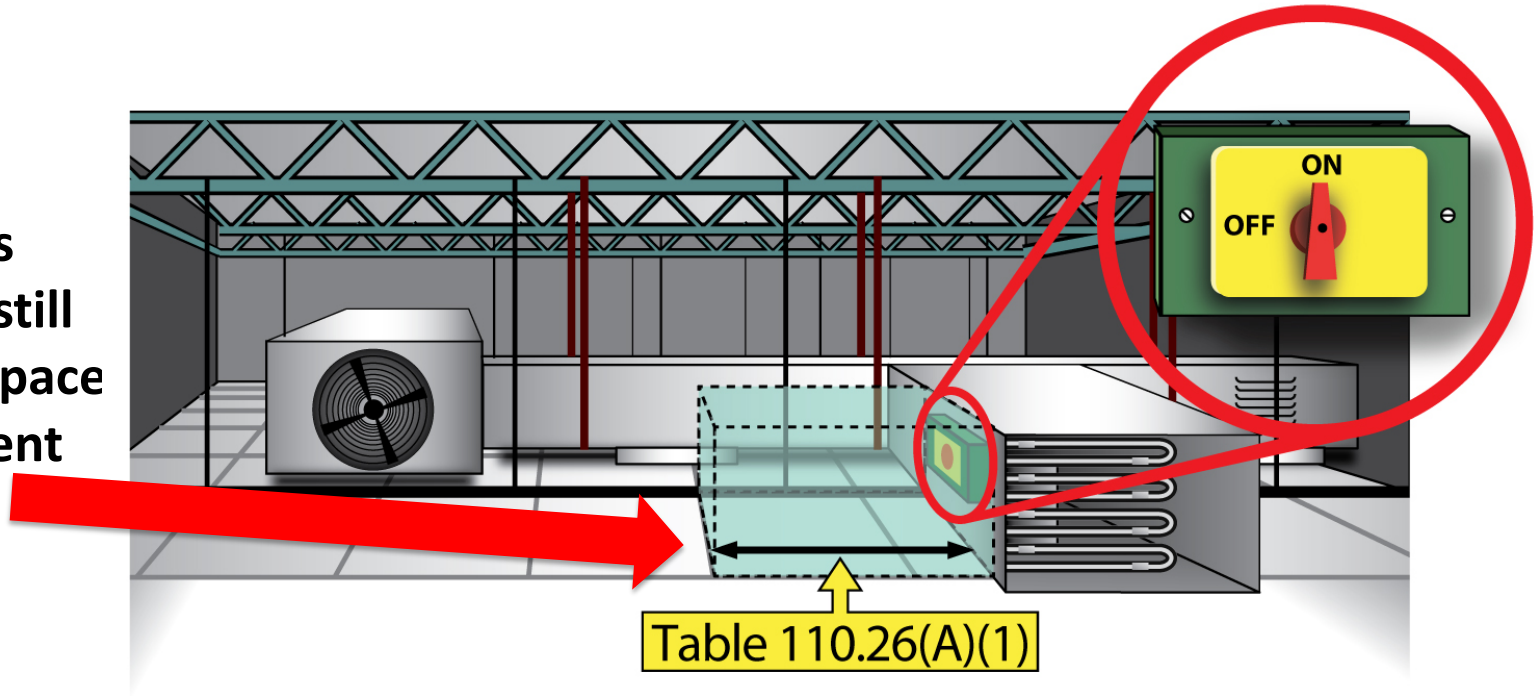
Table 110.26(A)(1) - Working Spaces



Voltages levels between 601 - 1000 volts have been added to Table 110.26(A)(1) Working Spaces.

110.26(A)(4) - Working Space Limited Access

Equipment in spaces with limited access still require clear work space around the equipment



JADE Top 20

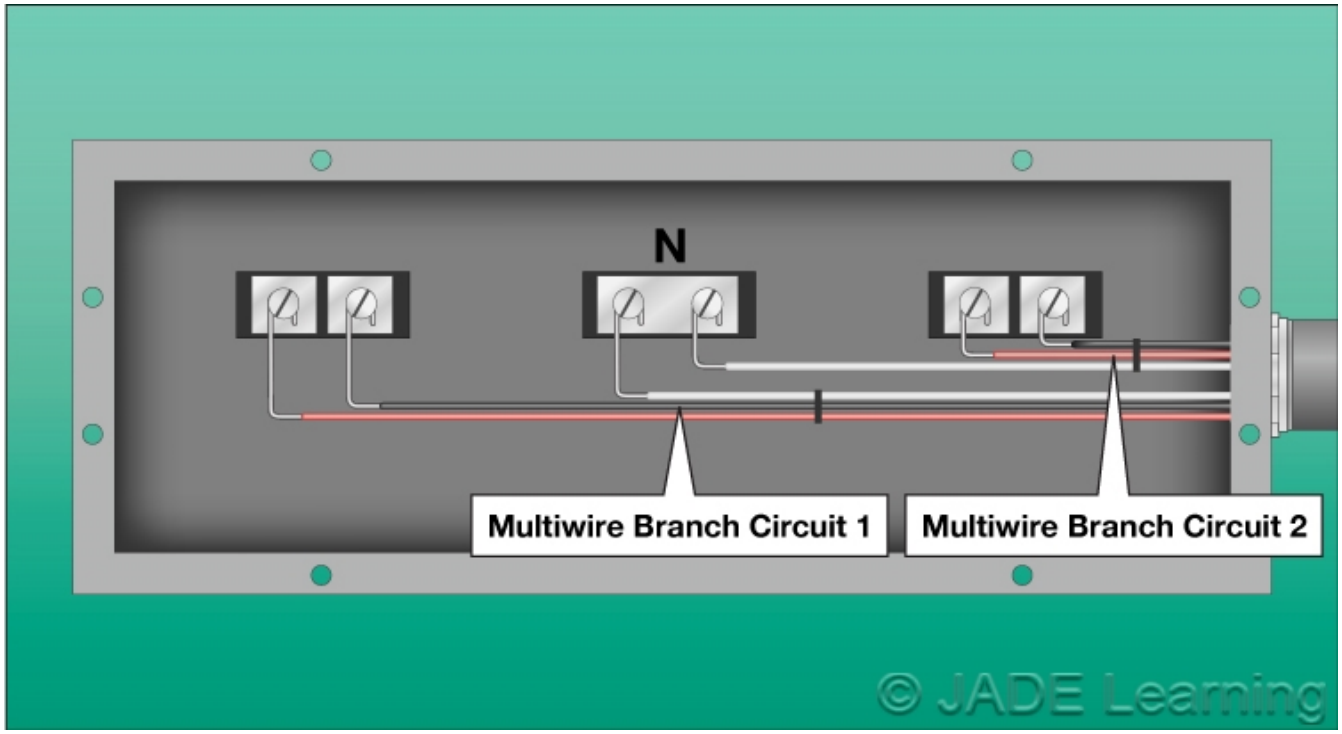
110.41 - Inspections and Tests

Electrical systems operating at over 1000 volts:

- Must be tested before being put in operation.
- The test report must be made available to the AHJ.

2017 NEC Changes Chapter 2

210.4(D) - Multiwire Branch Circuits: Grouping



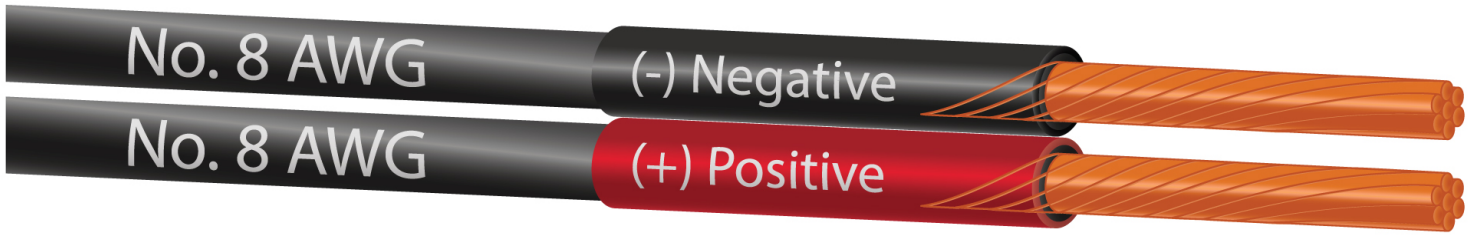
Ungrounded and grounded circuit conductors of each multiwire branch circuit must be grouped in every type of enclosure.

210.5(C)(1) - Identification of Ungrounded Conductors: Branch Circuits Supplied from More Than One Nominal Voltage System

480/227 VOLT
A – BROWN
B – ORANGE
C -- YELLOW

Each ungrounded branch circuit conductor must be identified at all termination, connection, and splice points.

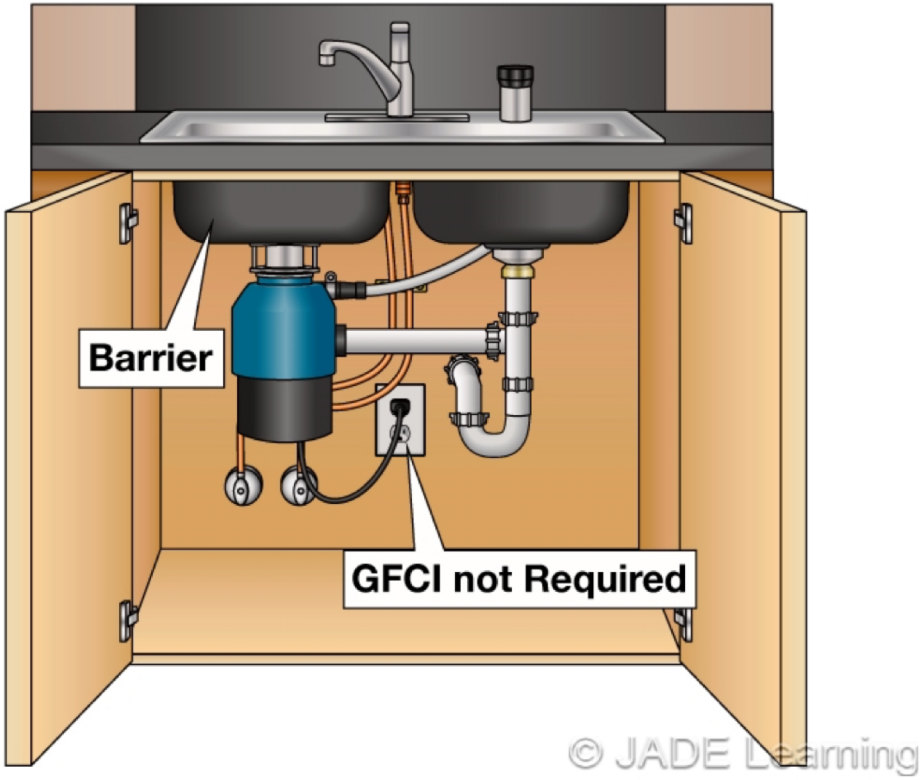
210.5(C)(2) - Identification of Ungrounded Conductors: Branch Circuits Supplied from Direct-Current Systems



No. 6 AWG and smaller DC conductors can be identified at terminations and splice points.

210.8 - GFCI Protection for Personnel

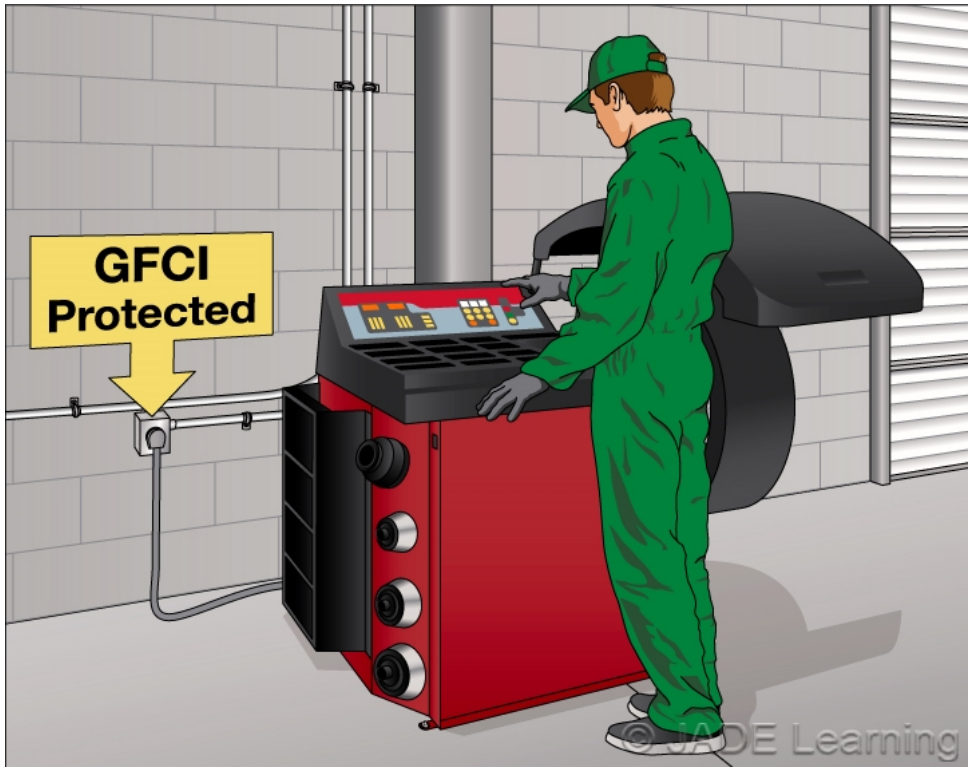
The required 6 ft. distance from a GFCI receptacle to a sink, bathtub, or shower stall is measured as the shortest path the cord of an appliance would follow without piercing a floor, wall, ceiling, doorway or window.



210.8(B) - GFCI Protection for Personnel: Other Than Dwelling Units

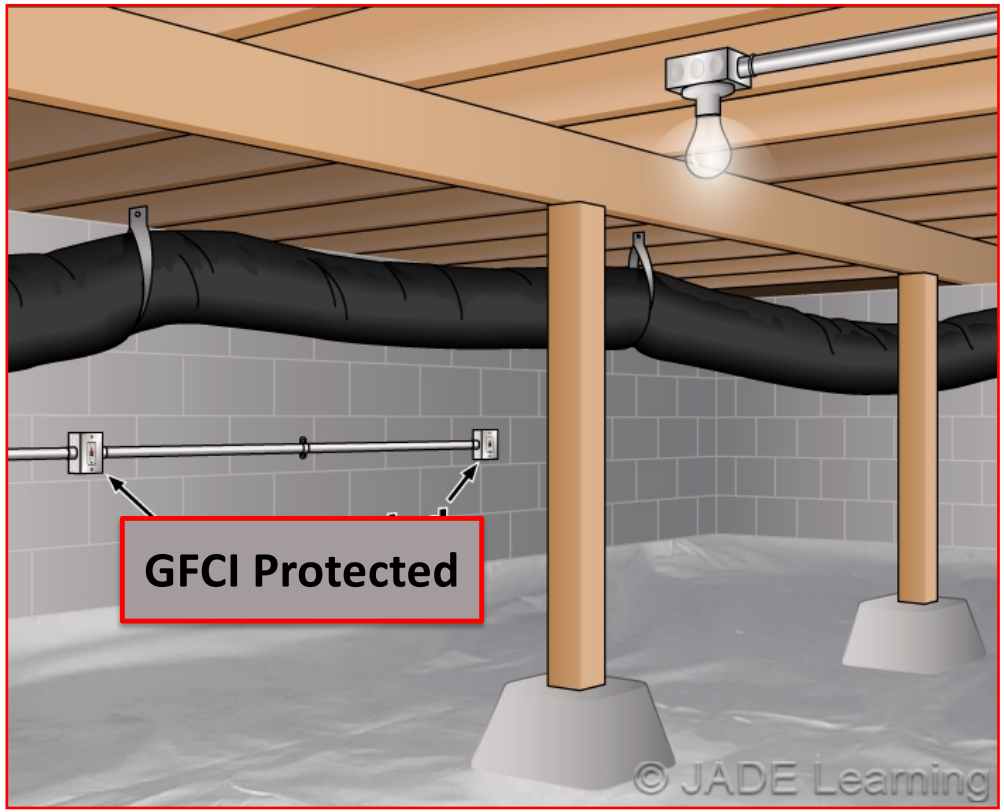
Require GFCI protection:

- **Single-phase receptacles rated 150 volts to ground or less, 50 amps or less**
- **Three-phase receptacles rated 150 volts to ground or less and 100 amps or less**



JADE Top 20

210.8(B)(10) - GFCI Protection for Personnel: Other Than Dwelling Units - Basements

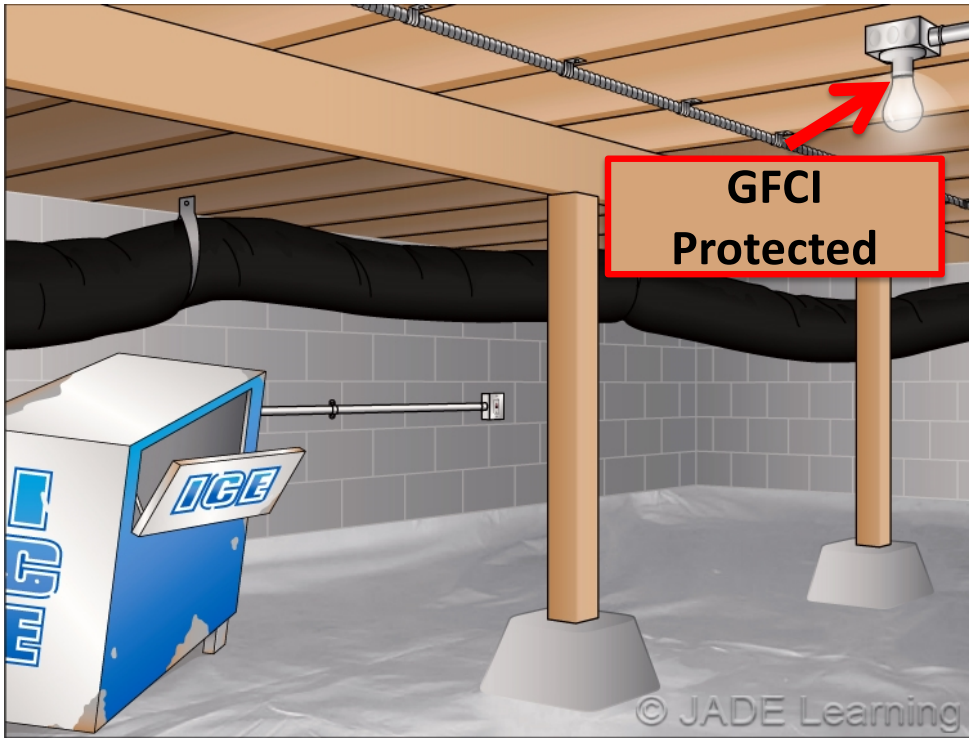


Receptacles in unfinished basements in other than dwelling units require GFCI protection.

JADE Top 20

210.8(E) - GFCI Protection for Personnel: Crawl Space Lighting Outlets

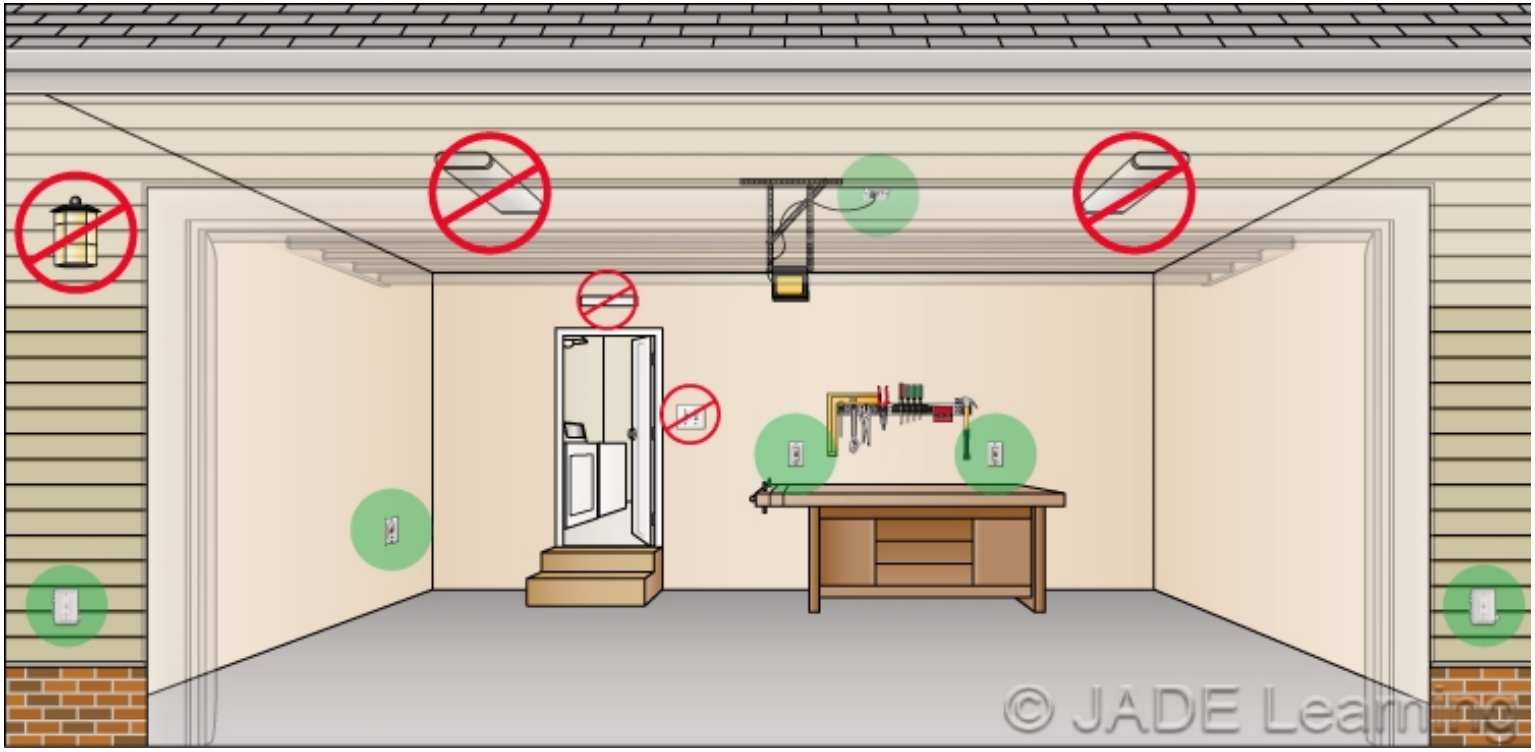
Lighting outlets not exceeding 120 volts in dwelling units and in other than dwelling units require GFCI protection.



JADE Top 20

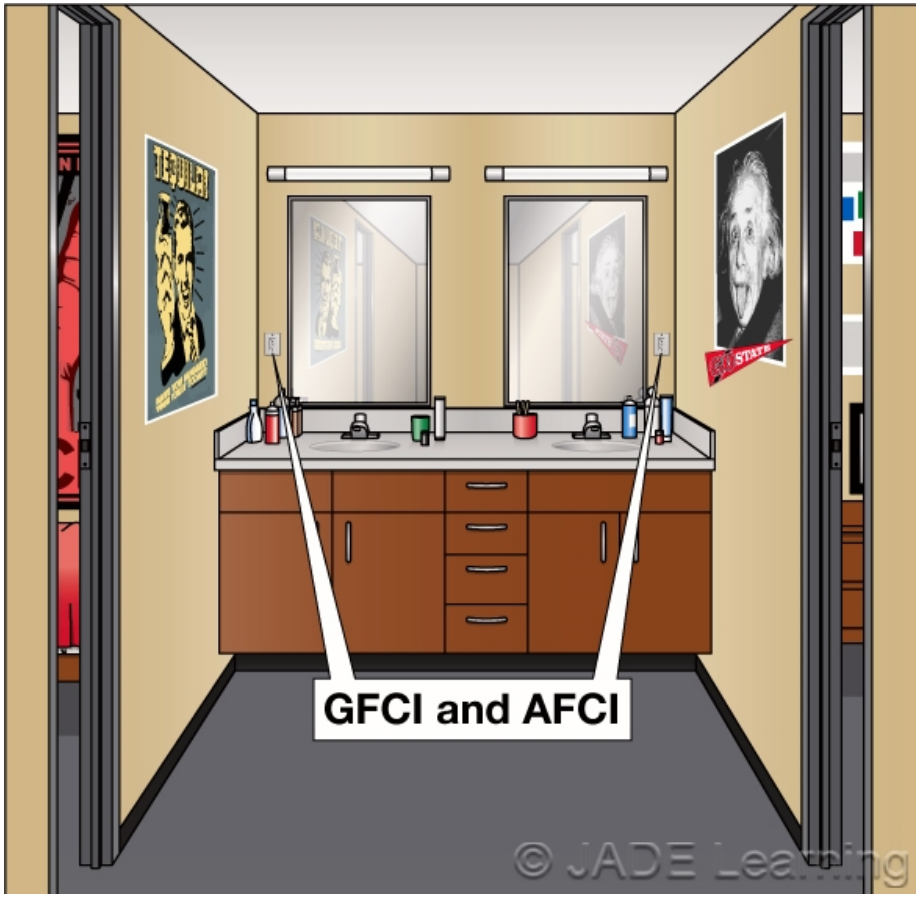
210.11(C)(4) - Dwelling Units: Garage Branch Circuits

A 20-ampere branch circuit is required in the garage. In addition to receptacle outlets in the garage this branch circuit may supply readily accessible outdoor receptacle outlets.



JADE Top 20

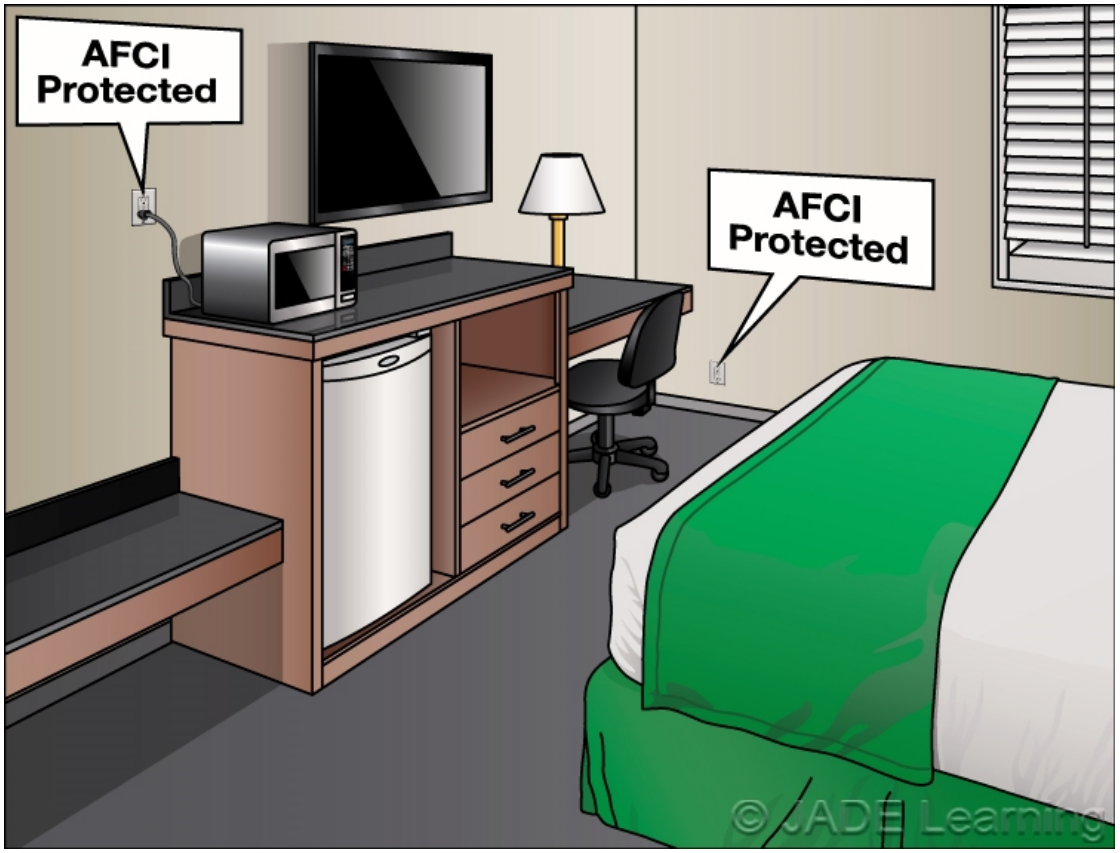
210.12(B) - AFCI Protection: Dormitory Units



Receptacle outlets in dormitory bathrooms must be AFCI protected.

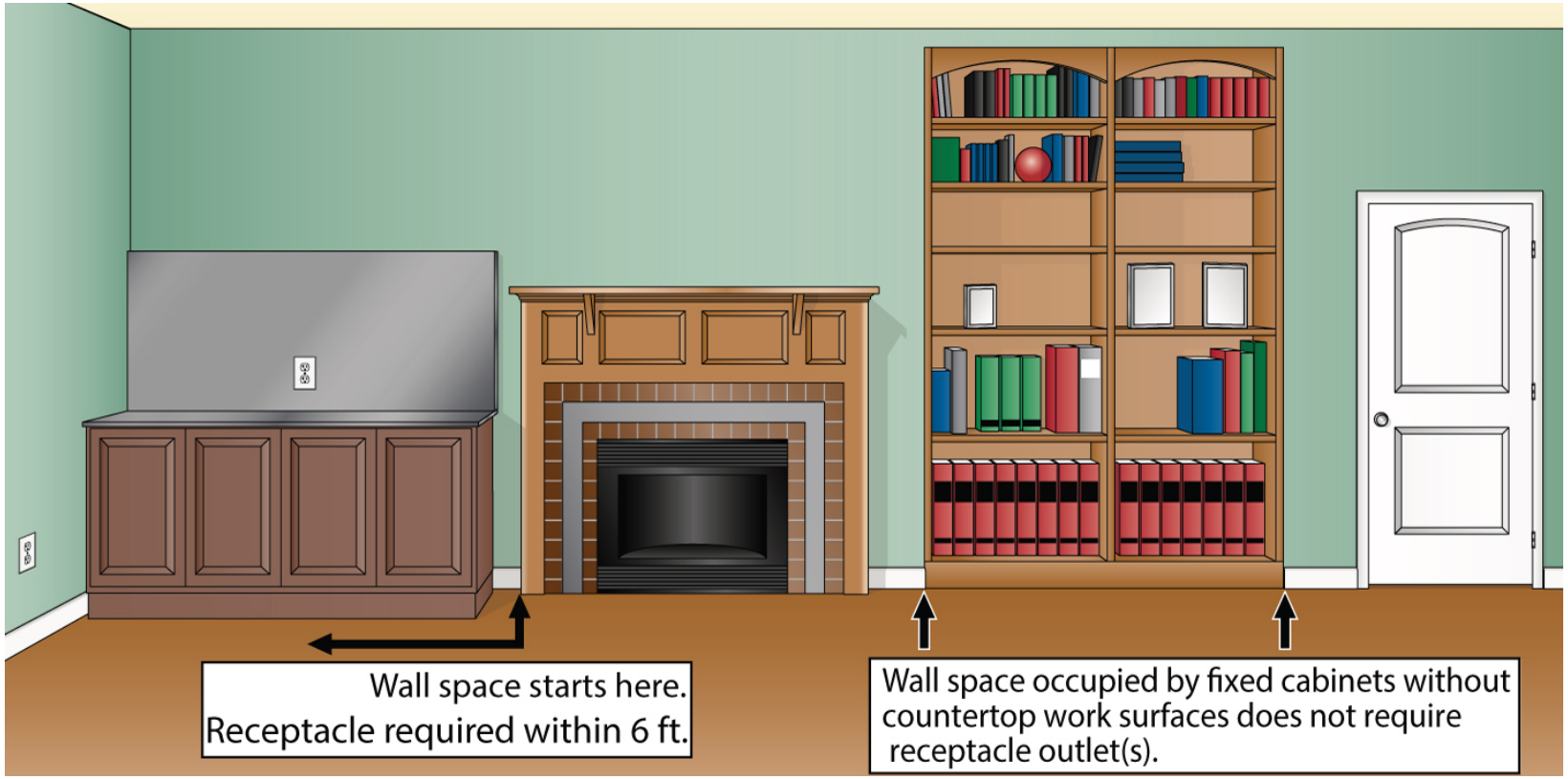
210.12(C) - AFCI Protection: Guest Rooms and Guest Suites

All 15 and 20-amp rated branch circuits supplying hotel and motel guest rooms and guest suites are required to have AFCI protection.



JADE Top 20

210.52(A)(2) - Dwelling Unit Receptacle Outlets: General Provisions - Wall Space

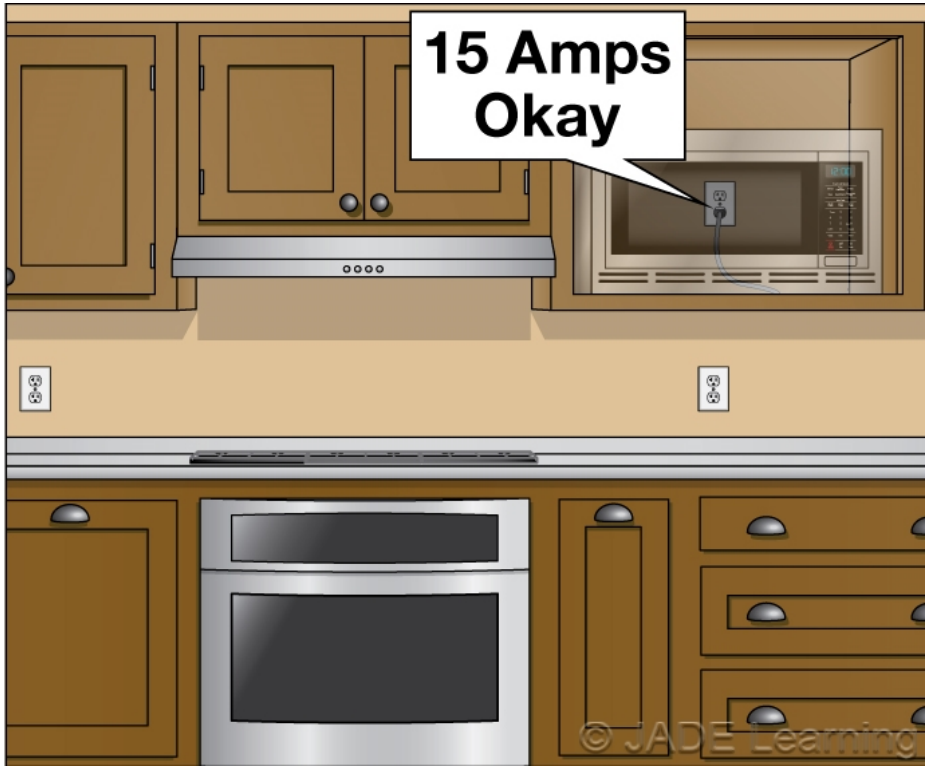


A fixed cabinet with countertop or work surface is considered wall space and must be included in the measurements to determine receptacle placement.

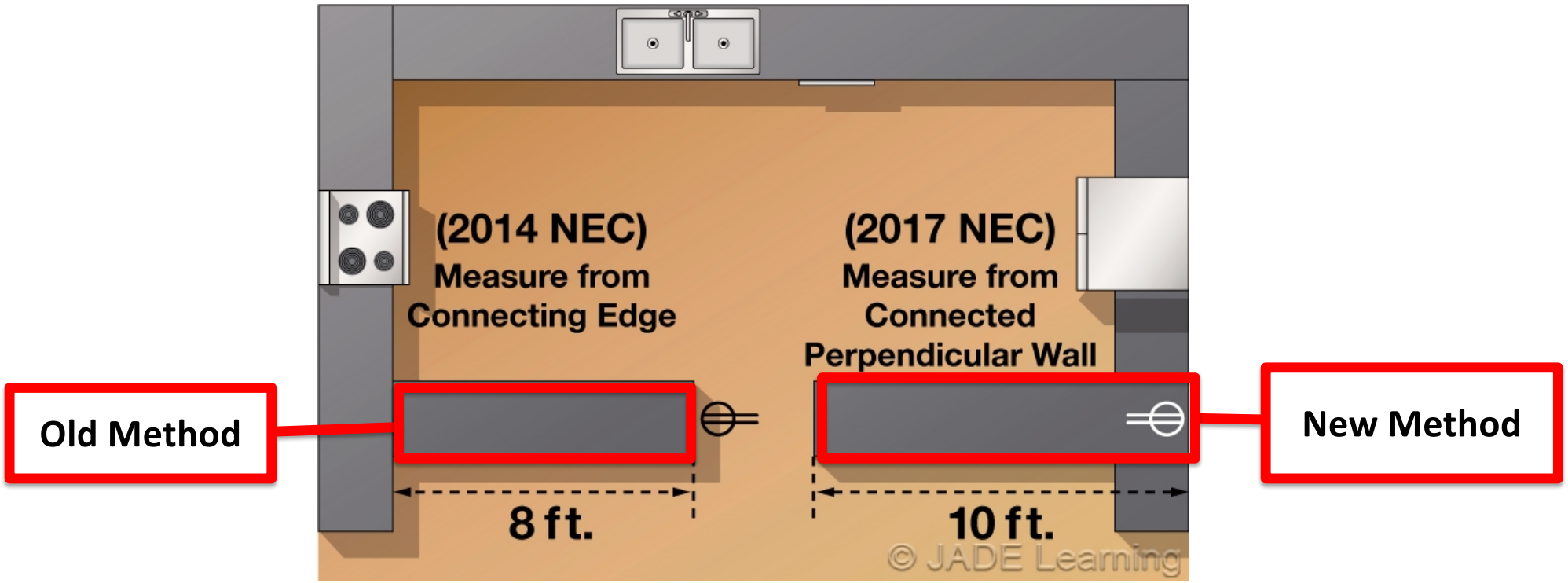
JADE Top 20

210.52(B)(1) - Ex. No. 2. Dwelling Unit Receptacle Outlets
Small Appliances: Receptacle Outlets Served

A 15-ampere branch circuit to serve a specific appliance in a dwelling unit kitchen, in addition to refrigeration equipment, is now permitted.



210.52(C)(3) - Countertops and Work Surfaces: Peninsular Countertop Spaces



A wall receptacle can count as the required receptacle for peninsular countertops.

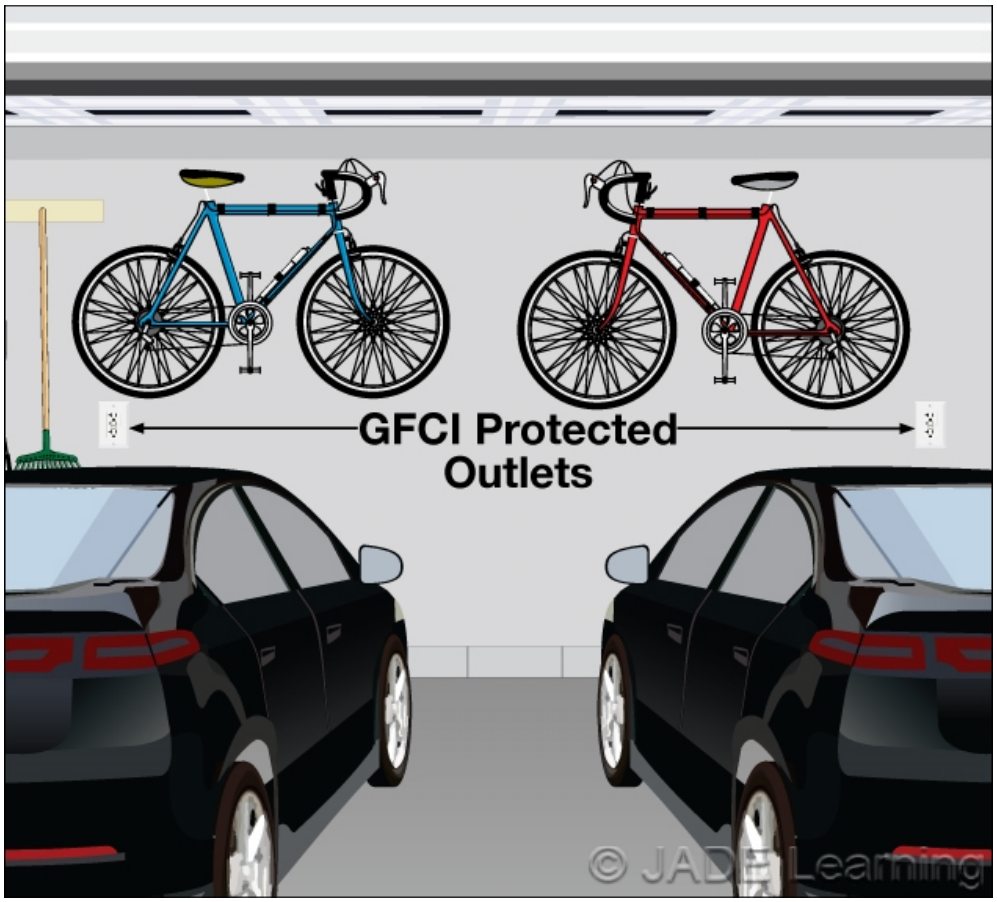
JADE Top 20

210.52(D) - Dwelling Unit Receptacle Outlets: Bathrooms

A receptacle in a dwelling unit bathroom must be located not more than 12 inches below the top of the basin or the basin countertop.

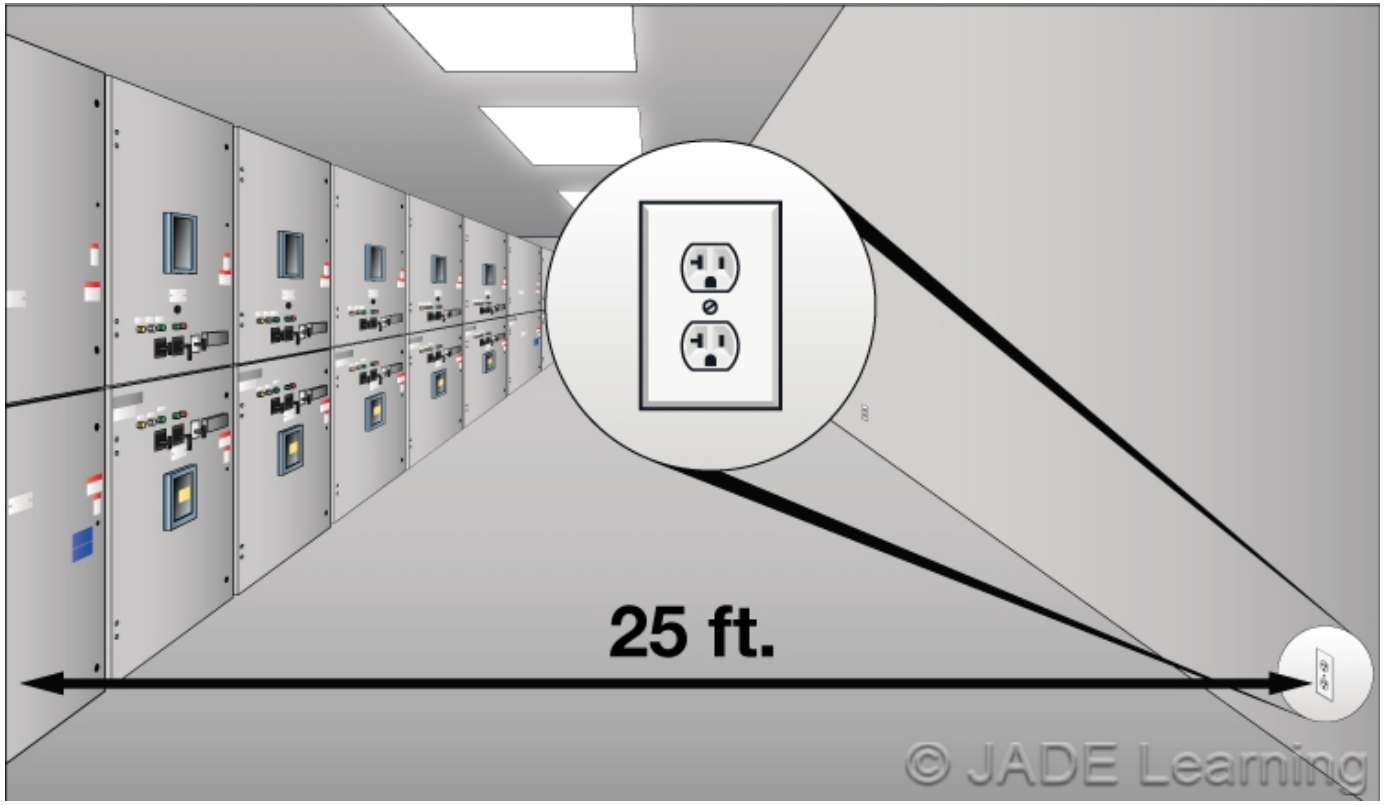
210.52(G)(1) - Dwelling Unit Receptacle Outlets: Garages

At least one receptacle outlet is required in each vehicle bay in a dwelling unit garage.



JADE Top 20

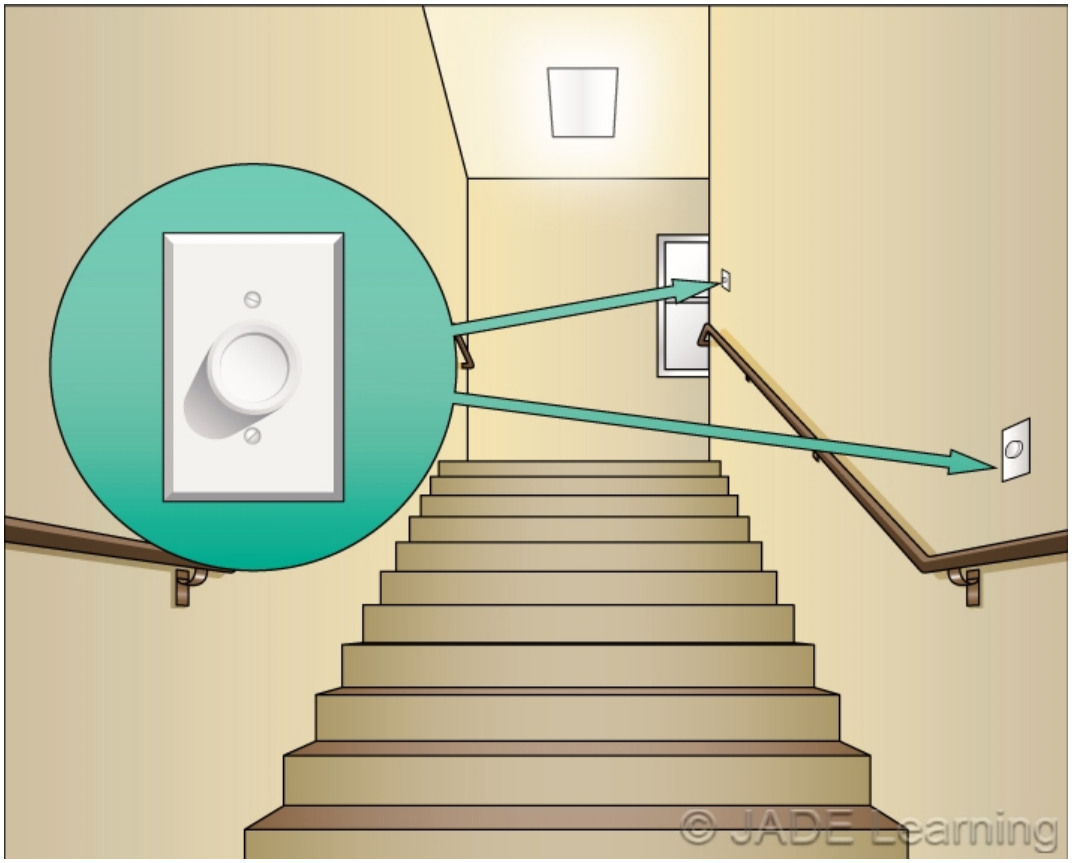
210.64 - Electrical Service Areas



A 15 or 20-ampere receptacle outlet is required within 25 ft. of indoor electric service areas.

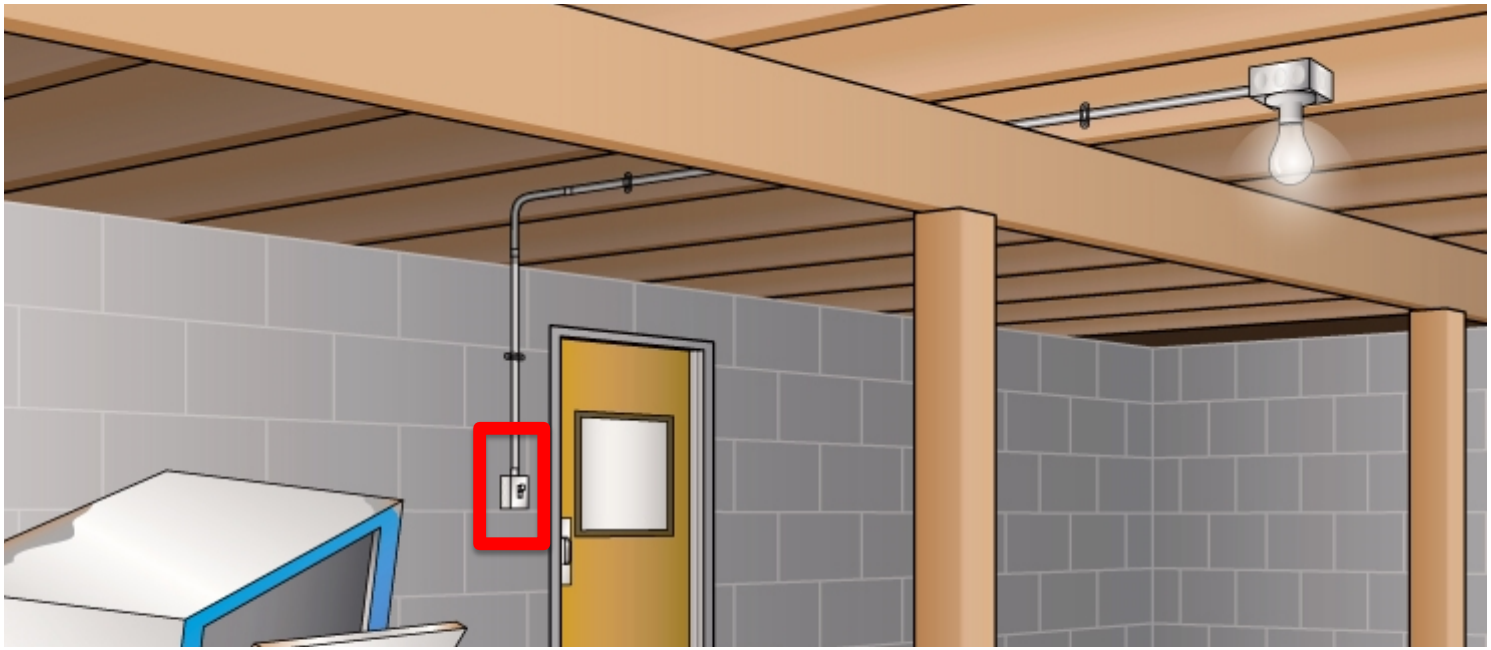
210.70(A)(2) - Lighting Outlets Required: Dwelling Units - Additional Locations

If a dimmer switch is used for interior stairways or exterior entrances, each switch location must have the full range of dimming control.

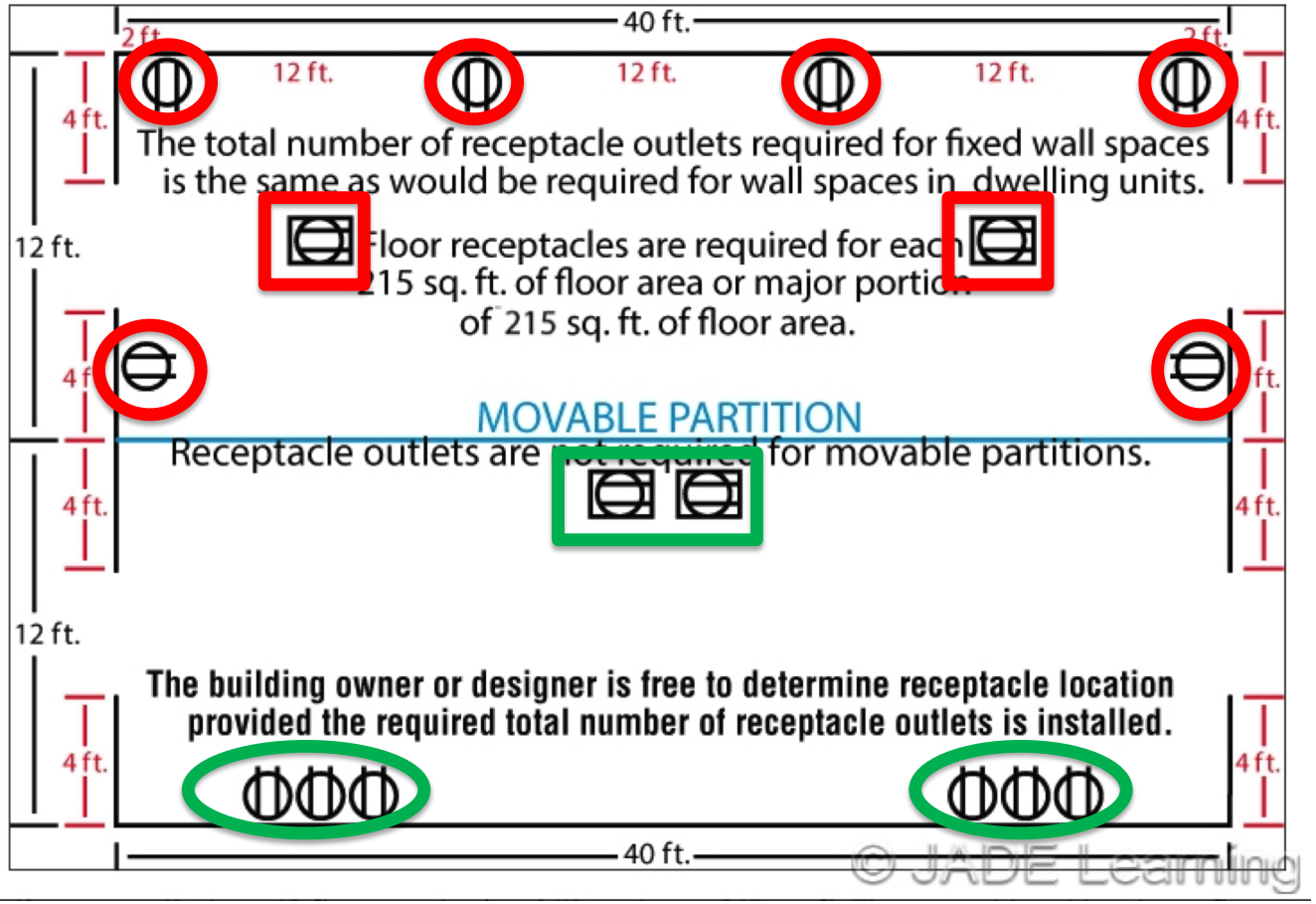


210.70(C) - Lighting Outlets Required: All Occupancies

Utility rooms and basements in all occupancies that are used for storage or contain equipment that requires servicing require a switch controlled lighting outlet.



210.71 - Meeting Rooms

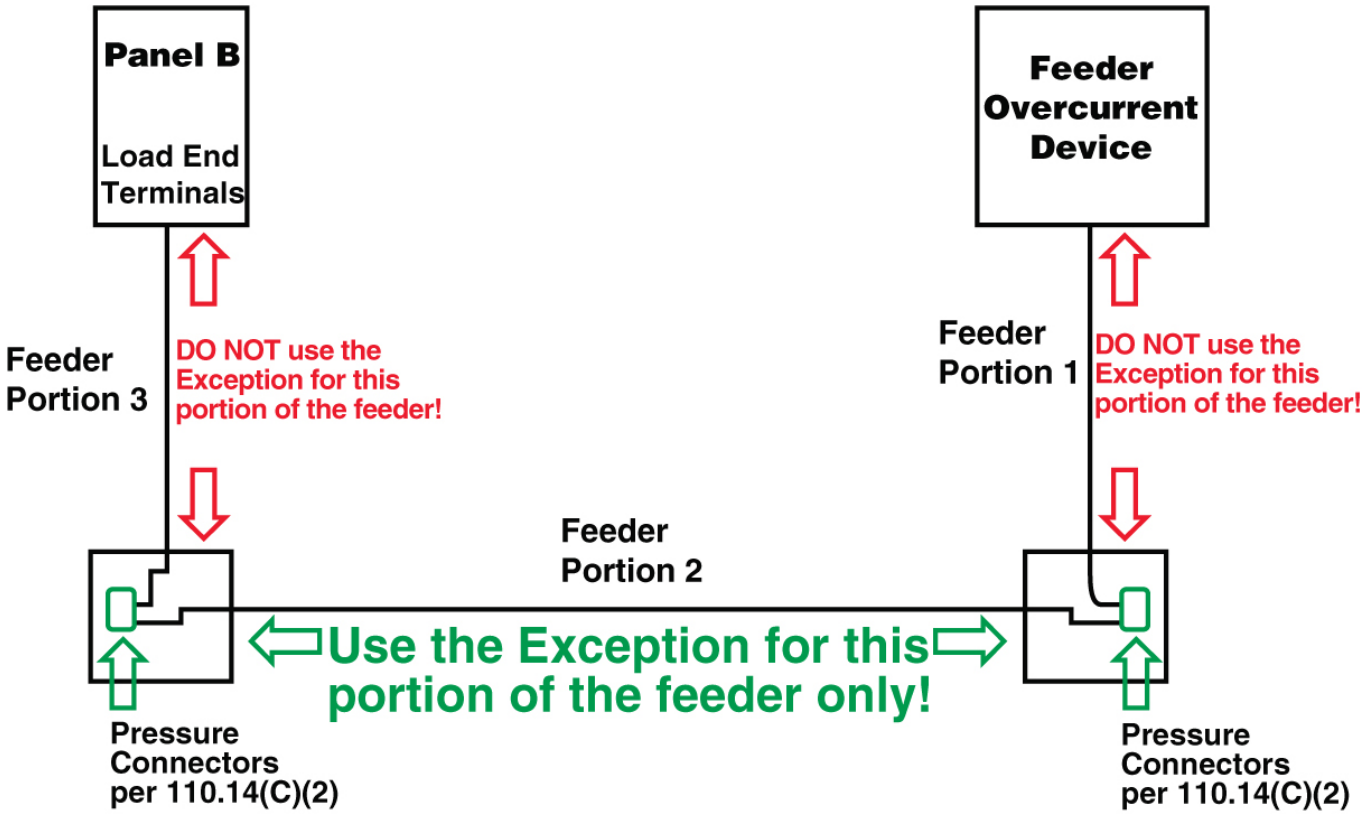


Fixed walls in meeting rooms require the same number of receptacle outlets as would be required by section 210.52(A) for wall spaces in a dwelling unit.

JADE Top 20

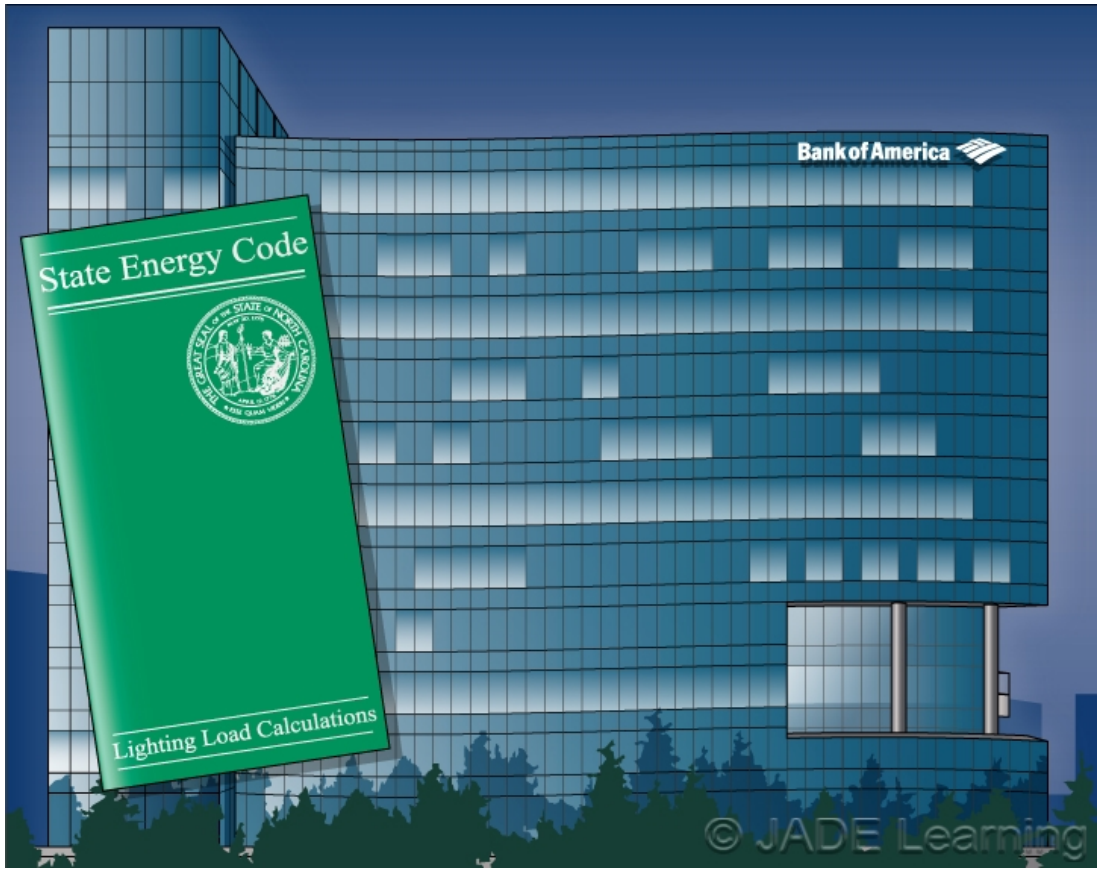
215.2(A)(1)(a) - Exception No. 2. Minimum Rating and Size - Feeders Not More Than 600 Volts - General

Depending on the layout, some sections of a feeder can be reduced in size.



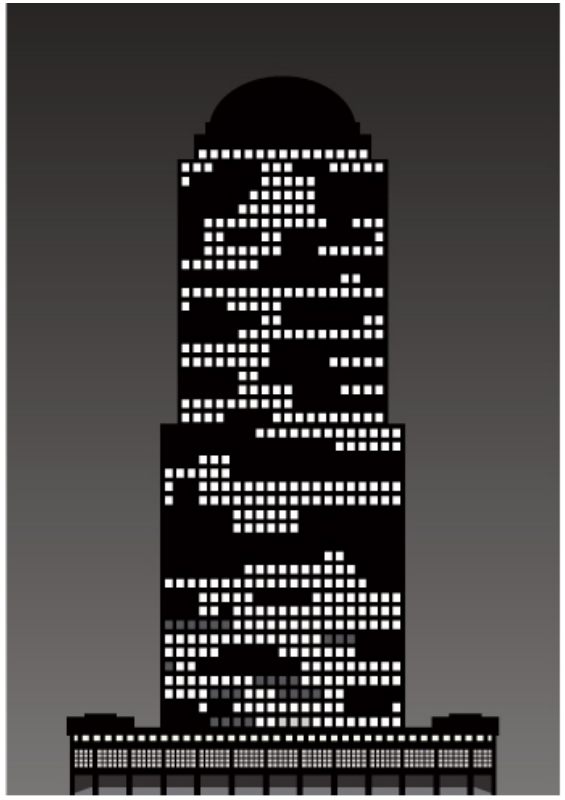
220.12 - Exception No. 2. Lighting Load for Specified Occupancies

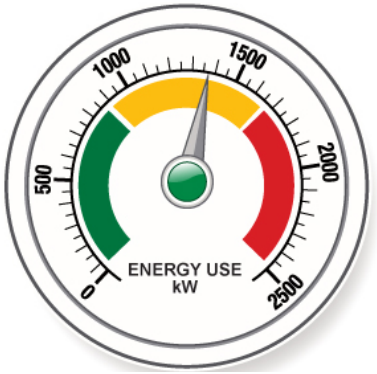
The lighting load for banks and offices can be reduced if the entire building complies with current energy code requirements.

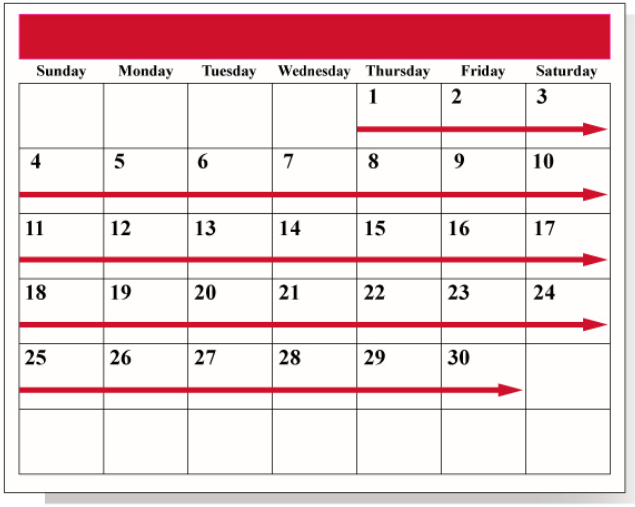


220.87 - Determining Existing Loads

The maximum demand for an existing building can be determined by taking continuous readings from a power meter or ammeter for 30 days.

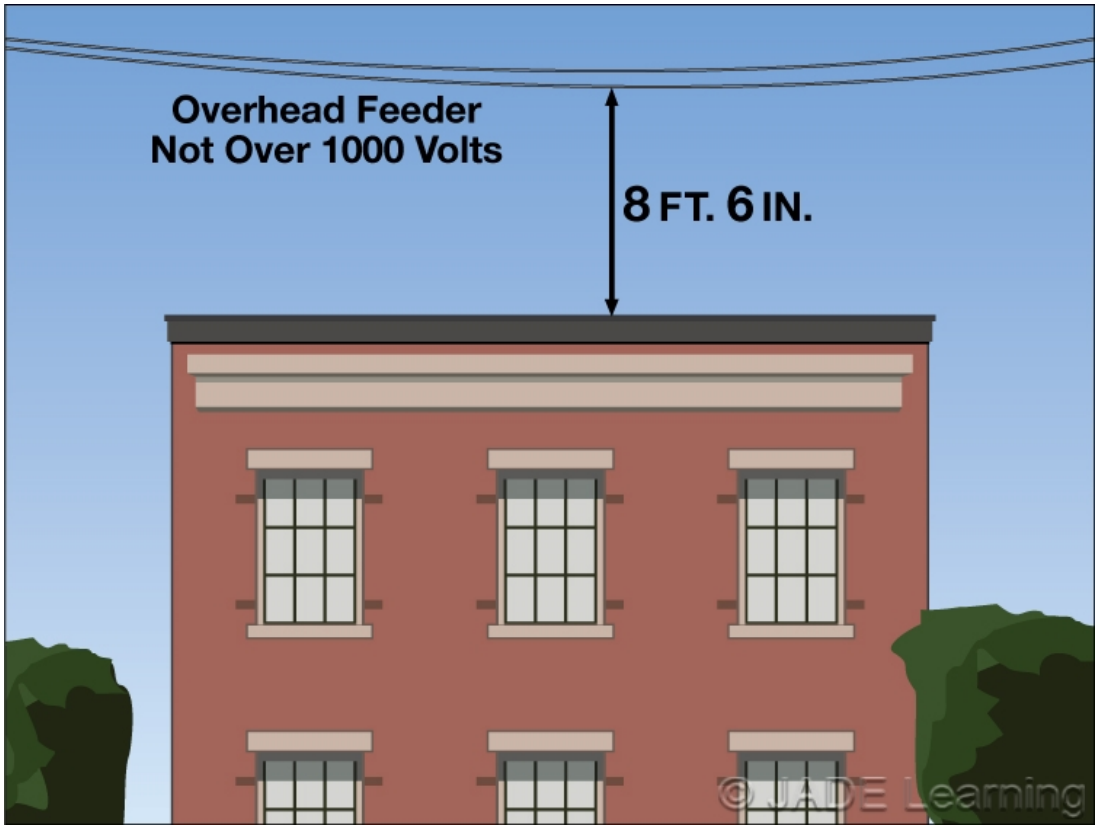




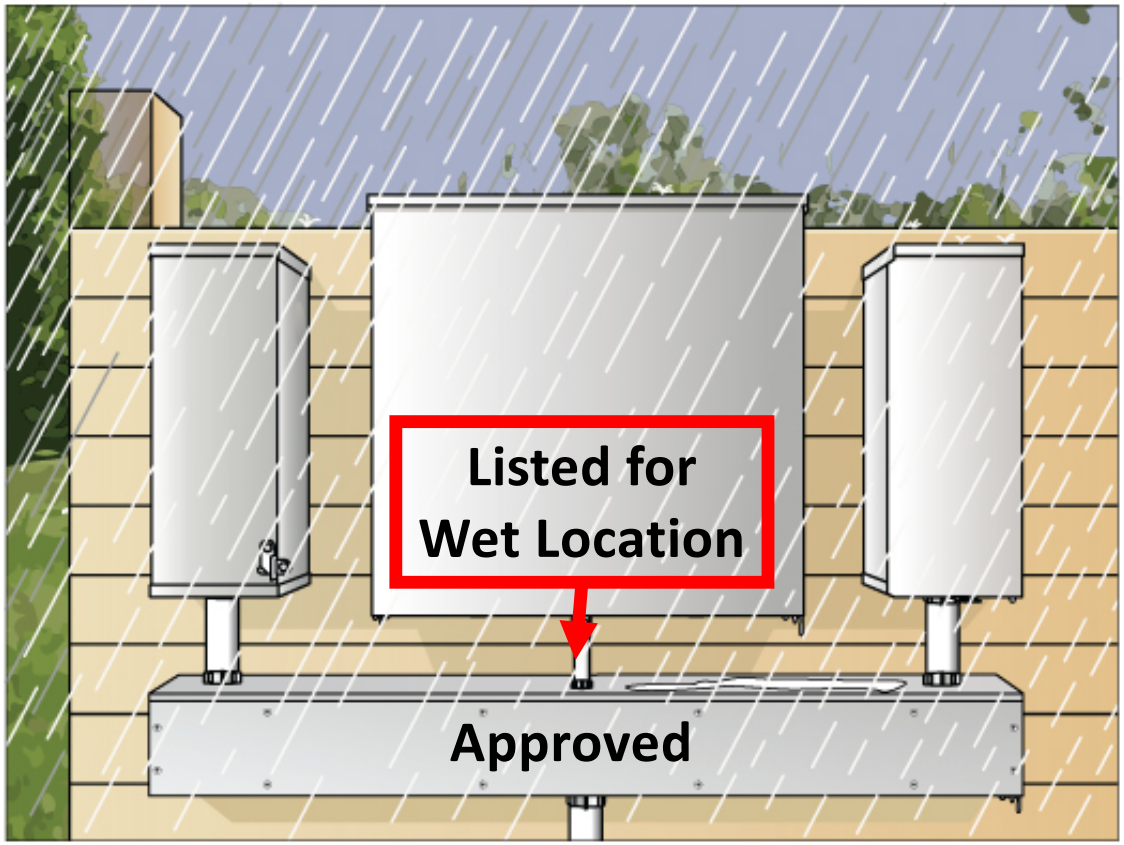


225.19(A) - Conductors of Not Over 1000 Volts: Nominal - Above Roofs

The minimum clearance above roofs for conductors up to 1000 volts has been increased.



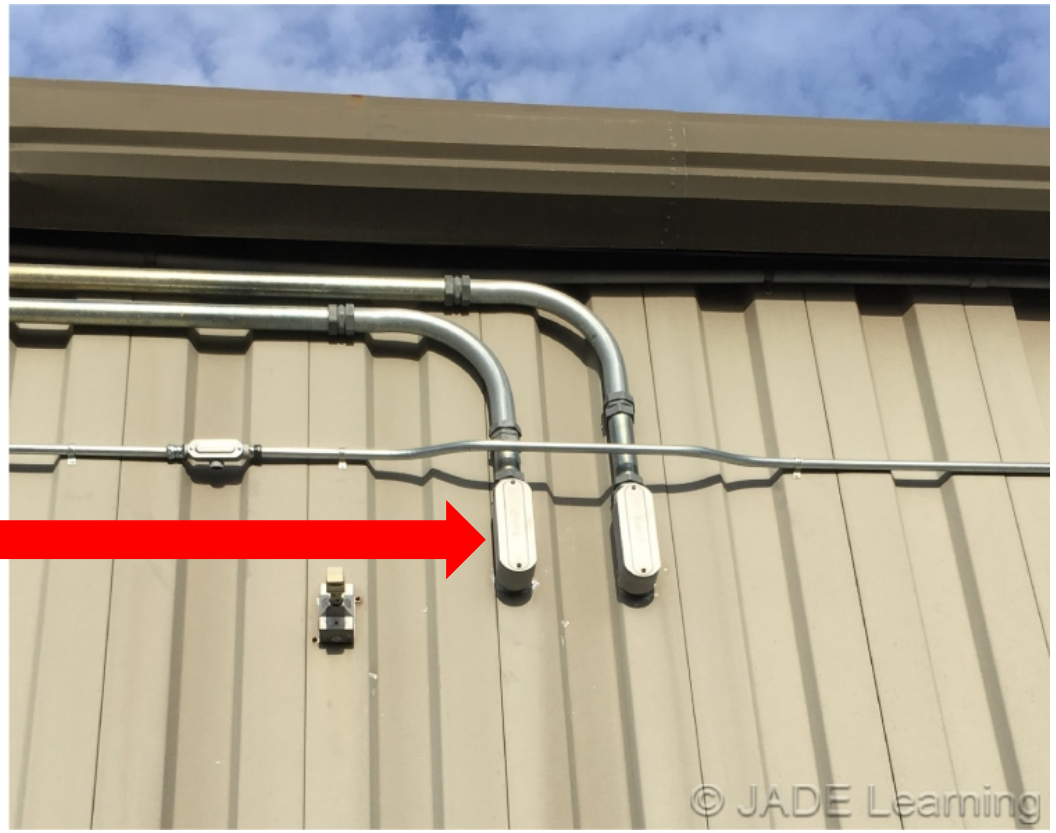
225.22 - Raceways on Exterior Surfaces of Buildings or Other Structures



Raceways on the exterior of buildings must be listed or approved for wet locations.

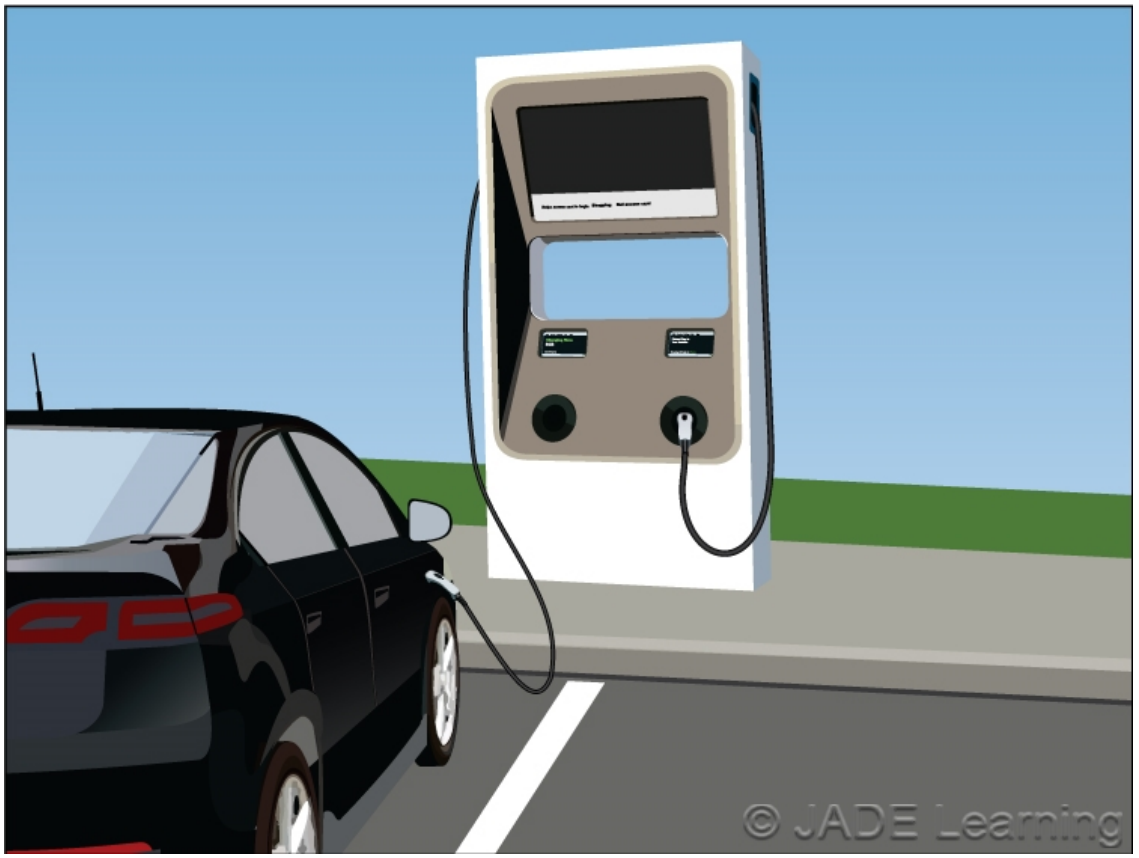
225.27 - Raceway Seal

Raceways entering a building from outside must be sealed.



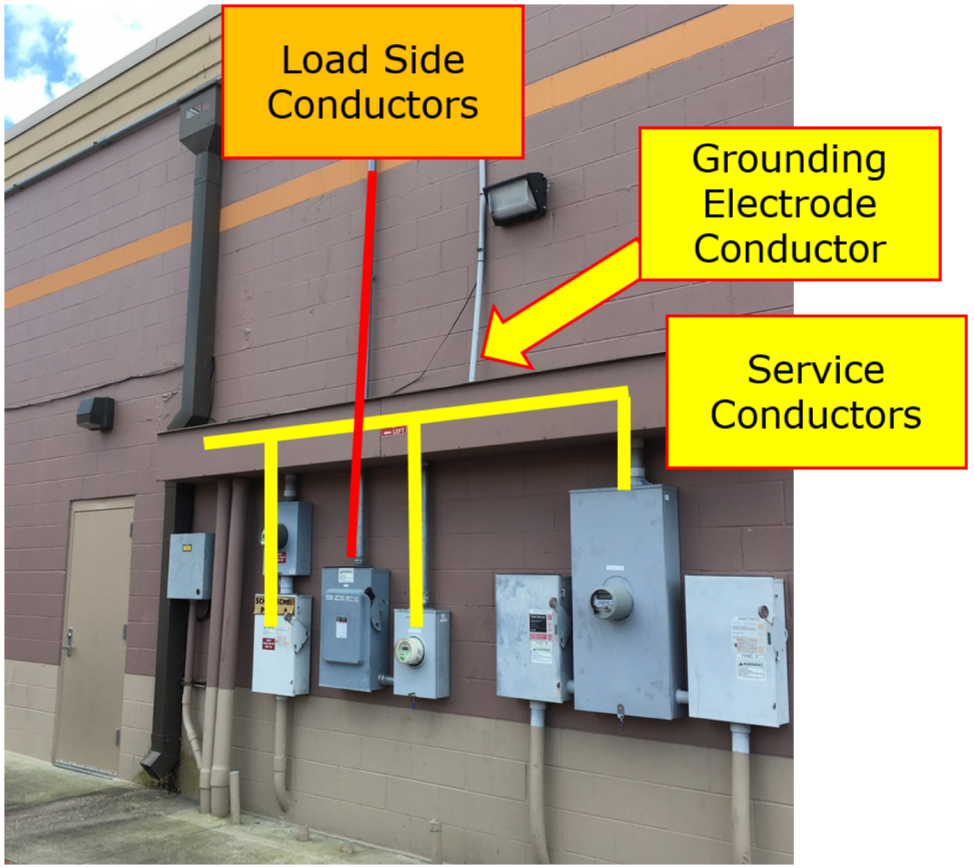
225.30(A)(7) - Number of Supplies: Special Conditions

Electric vehicle charging systems are permitted to be supplied by more than one branch circuit or feeder when they are listed, labeled, and identified for more than a single branch circuit or feeder.

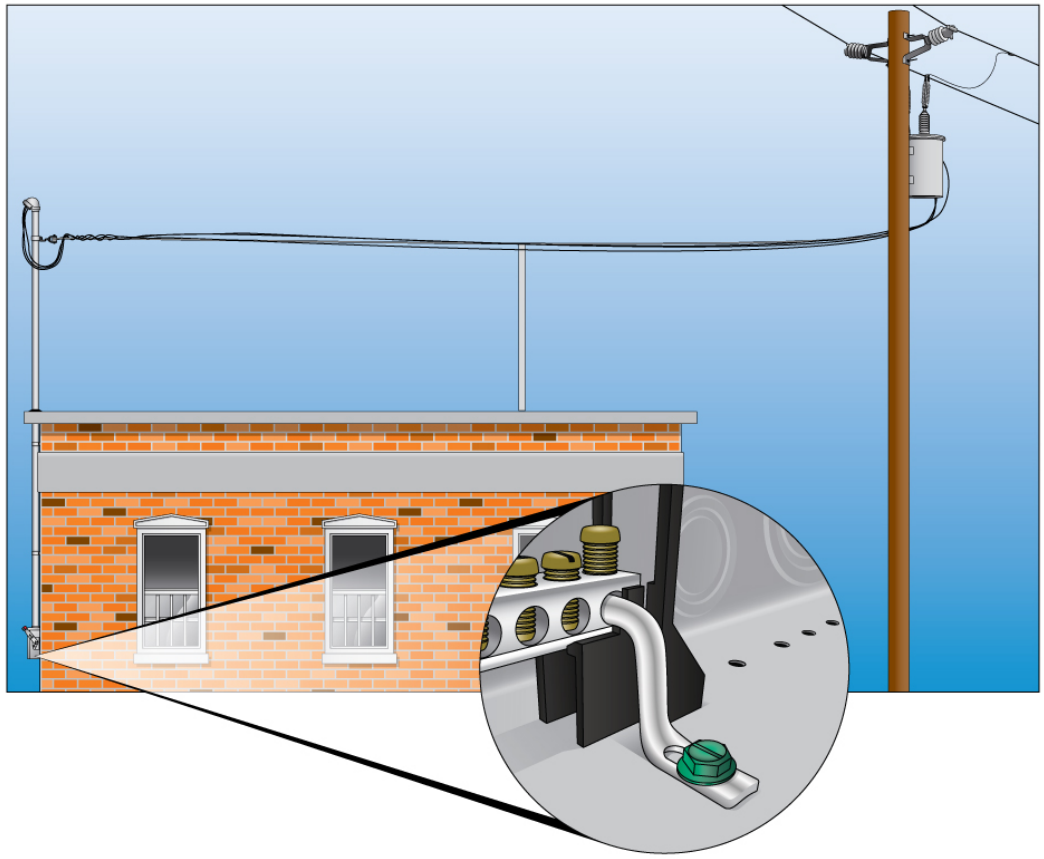


230.7 - Other Conductors in Raceway or Cable

Service conductors and conductors that are not service conductors cannot be installed in the same raceway.



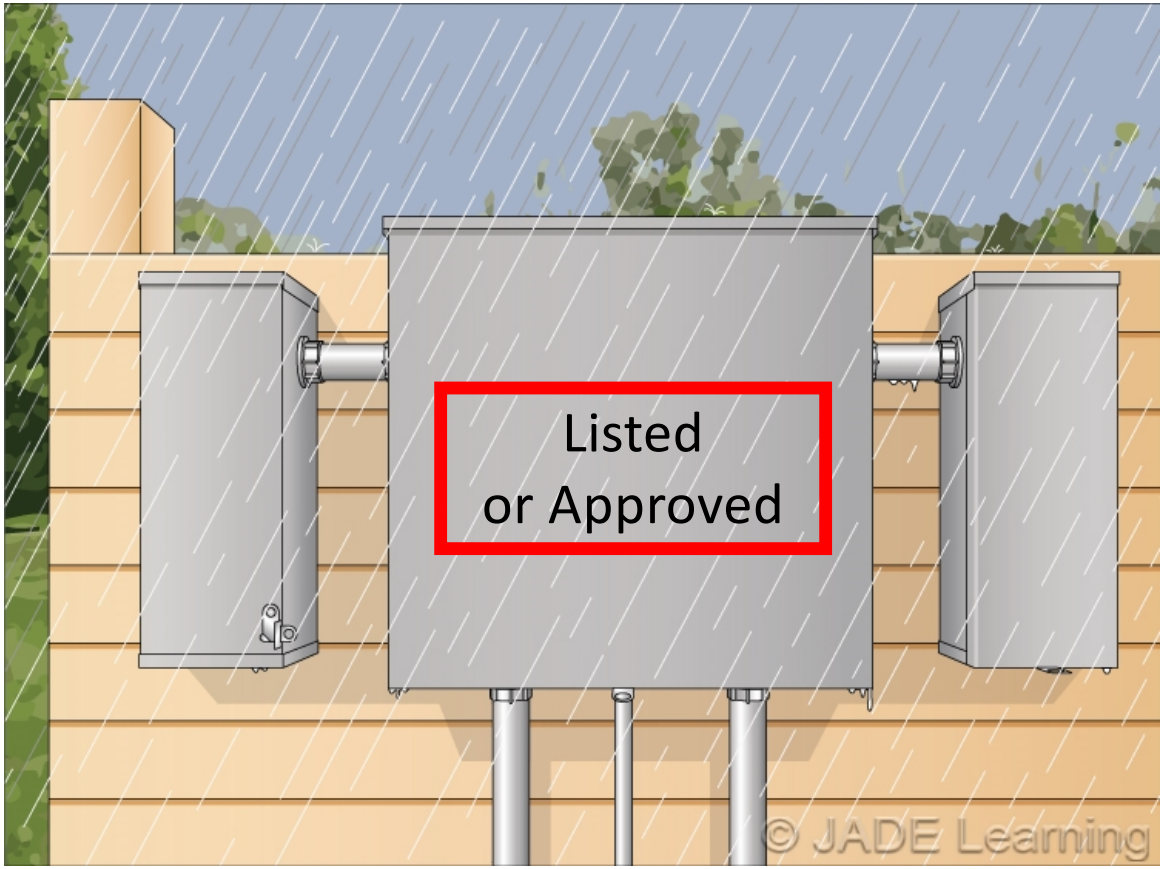
230.29 - Supports Over Buildings.



Any metal structure that is used to support service conductors, such as a service mast, must be bonded to the grounded overhead service conductor.

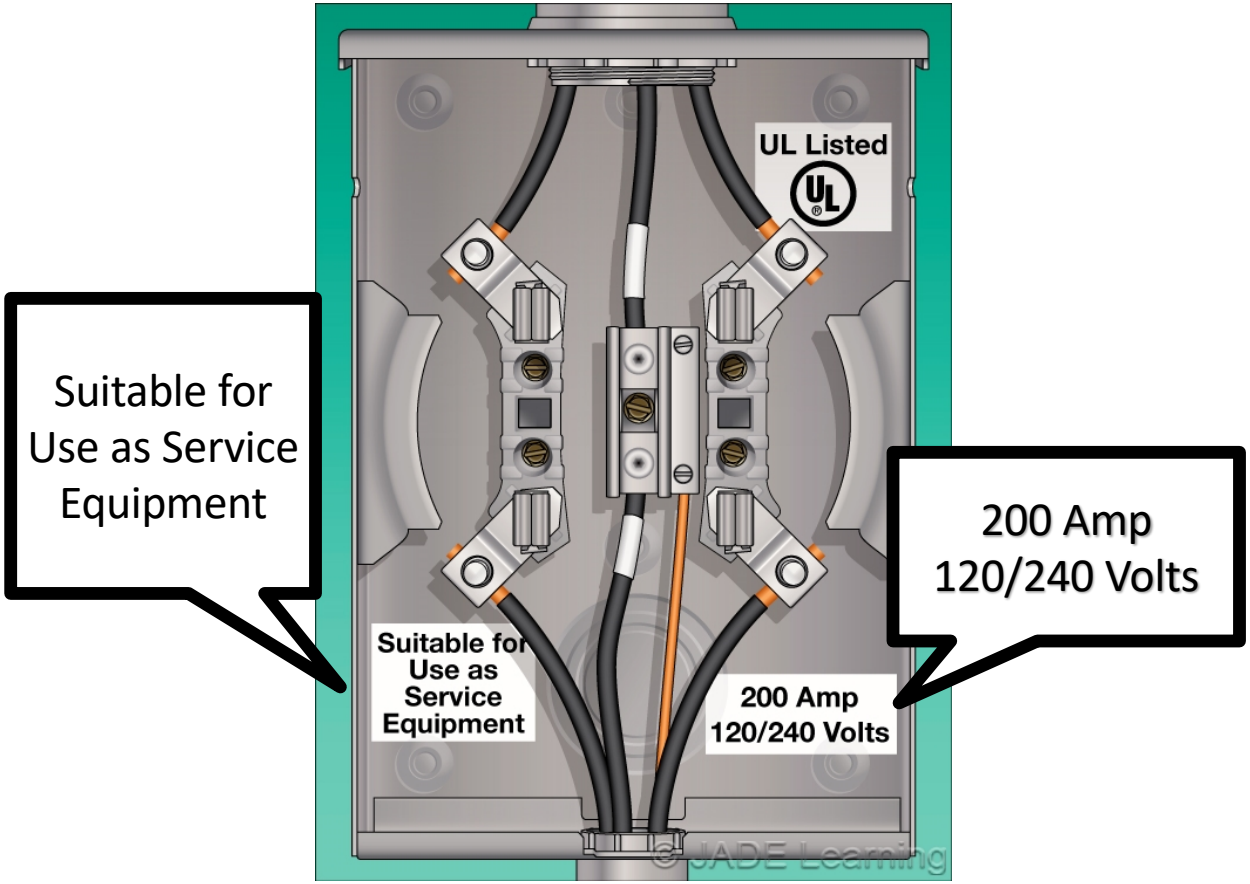
230.53 - Raceways to Drain

Raceways installed outdoors must be listed or approved for wet locations.



230.66 - Marking

Service equipment must be listed or field labeled and marked to identify it as being suitable for use as service equipment. Meter socket enclosures must be listed and rated for the ampacity and voltage of the system.

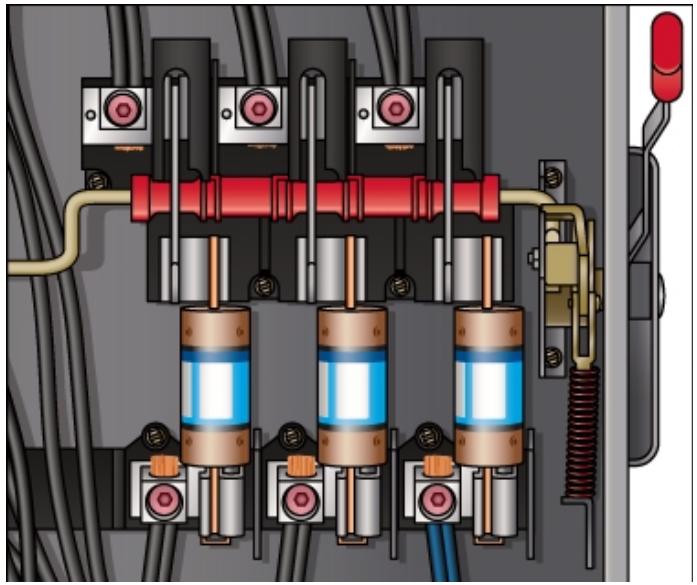


230.82 - Equipment Connected to the Supply Side of Service Disconnect

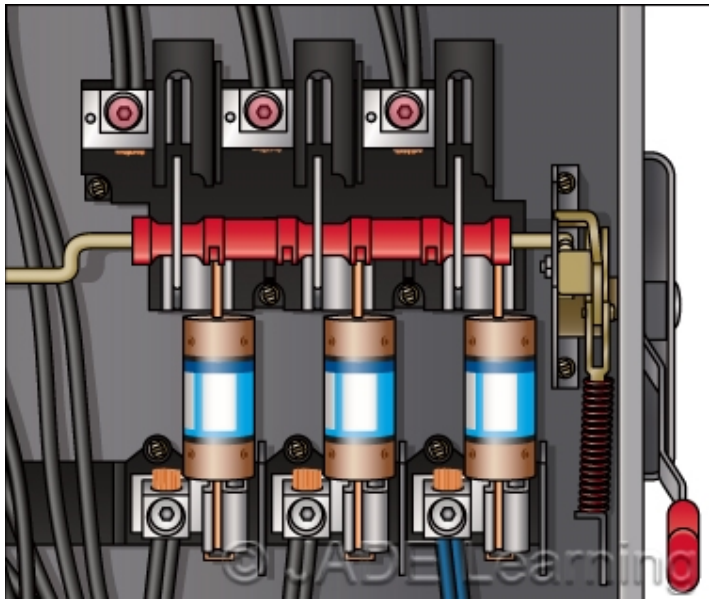
Solar photovoltaic, fuel cell, energy storage, and wind electric systems can be installed on the supply side of the service.

230.91 - Location

In the off position the fuses for a service disconnecting means are de-energized.



On, Energized



Off, De-energized

240.6(A) - Standard Ampere Ratings.

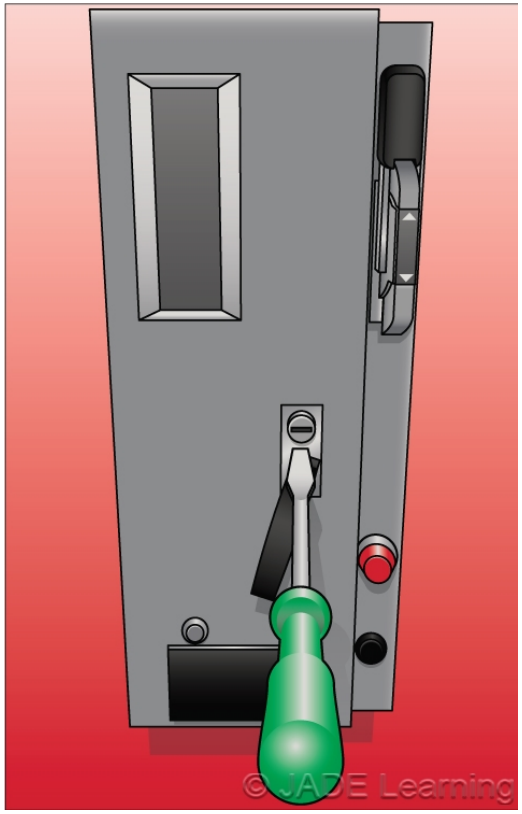
Table 240.6(A) Standard Ampere Ratings for Fuses and Inverse Time Circuit Breakers

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	—	—	—

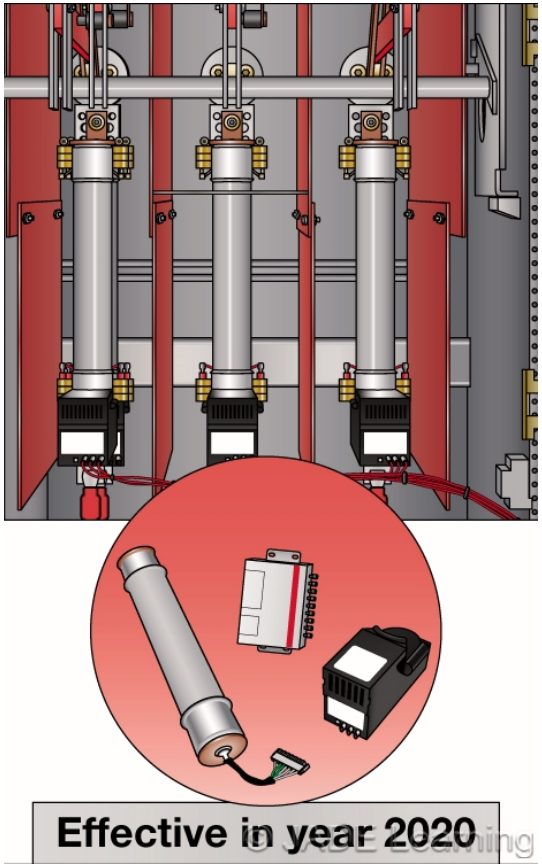
New Table 240.6(A)

240.24(A) - Location In or On Premises: Accessibility

A tool can be used to access overcurrent devices located in listed industrial control panels or similar enclosures.



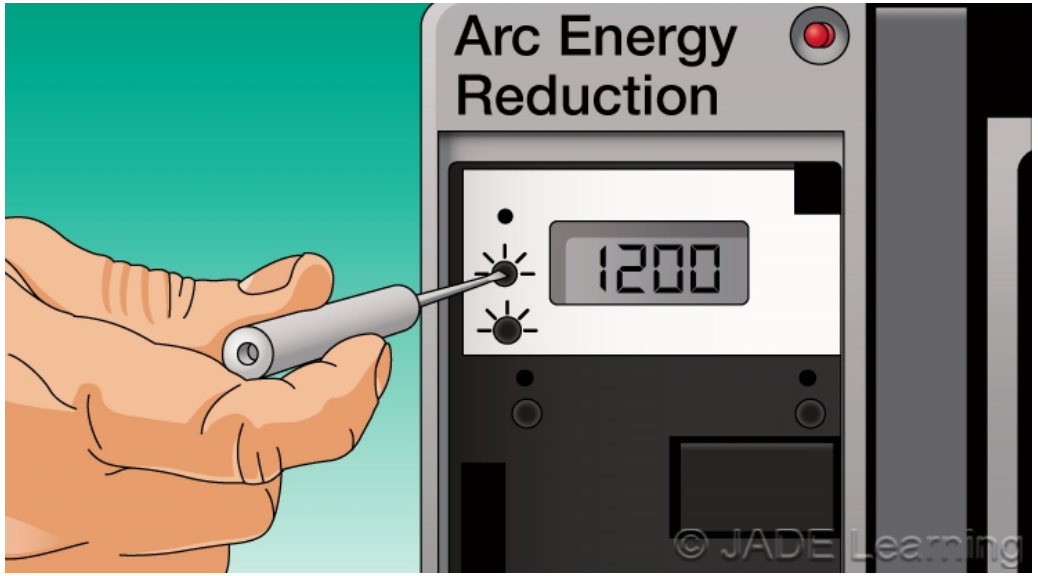
240.67 - Arc Energy Reduction



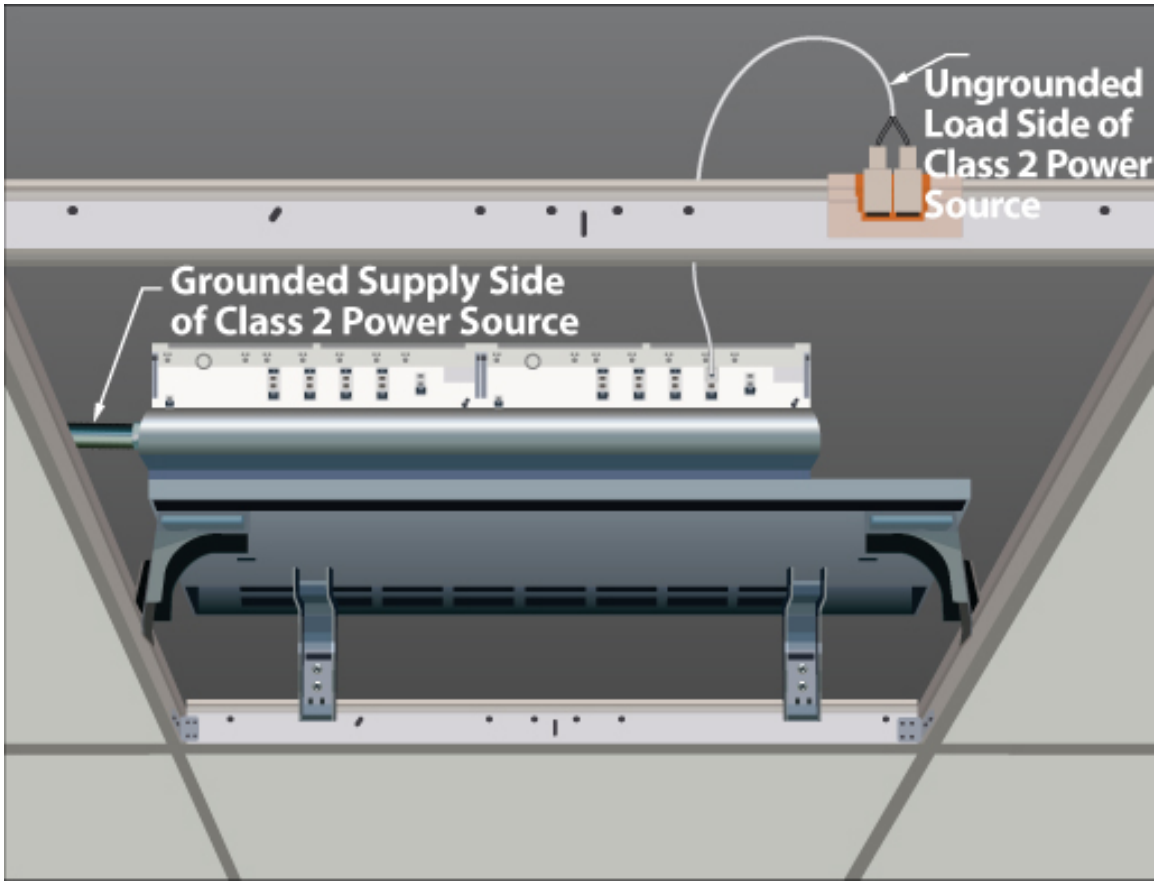
By the year 2020 arc energy reduction will be required for fuses with certain characteristics.

240.87 - Arc Energy Reduction

Setting the instantaneous trip setting of a circuit breaker below the available arcing current is a way to provide arc energy reduction.

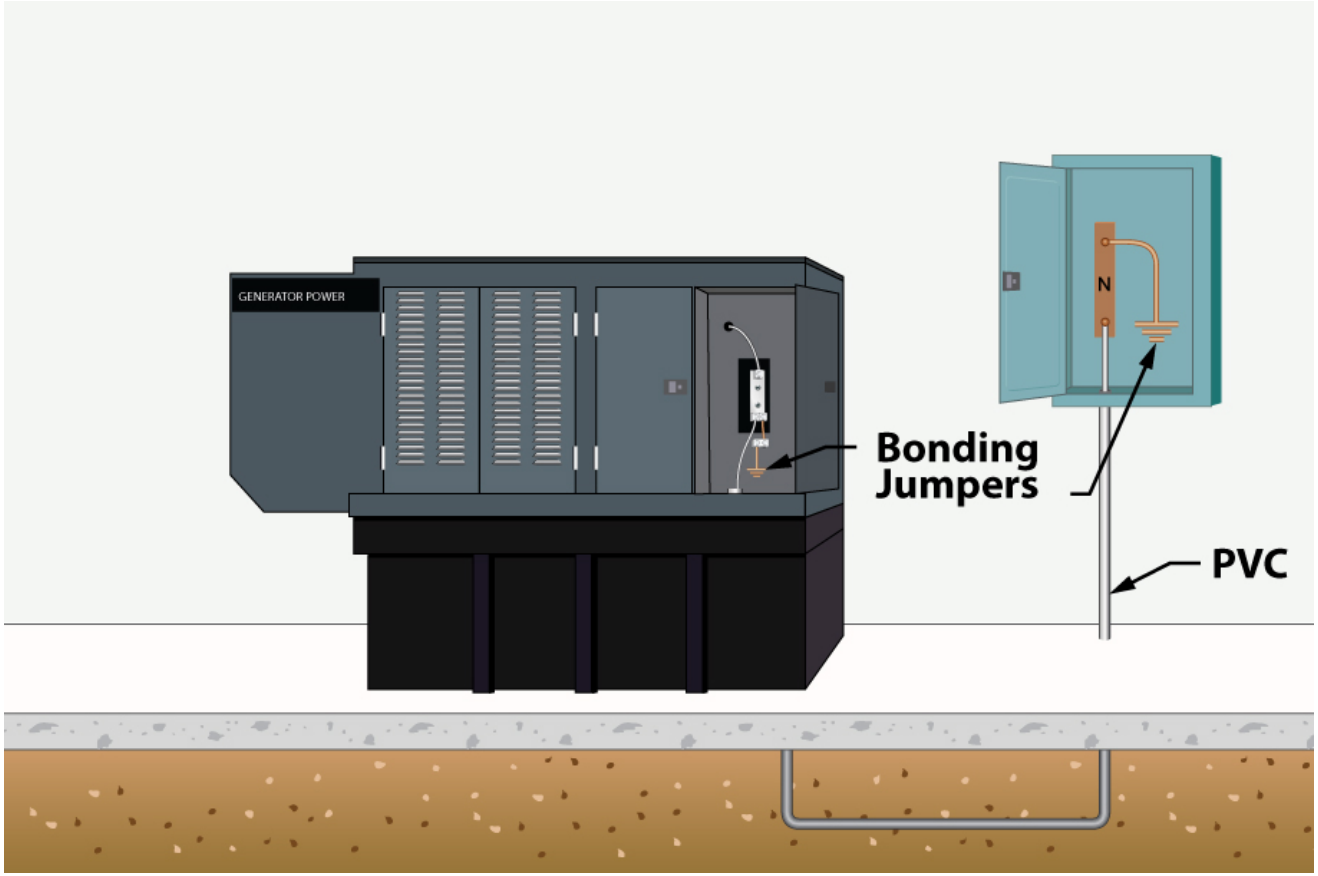


250.22 - Circuits Not to Be Grounded



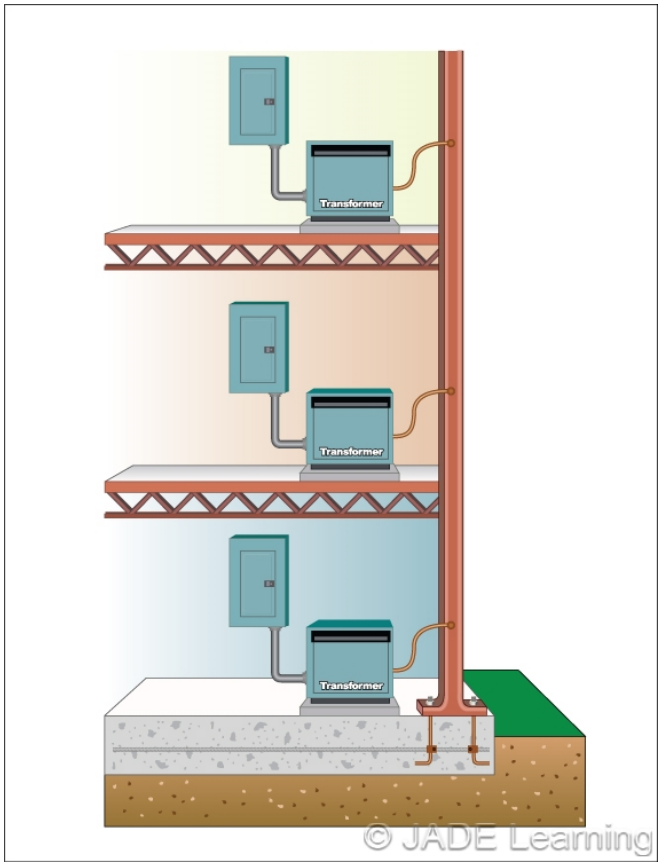
Circuits on the load side of a Class 2 power supply used for low-voltage power grid distribution systems are not to be grounded.

250.30(A)(1) Ex. No. 2. - Grounded Systems: System Bonding Jumper



A main bonding jumper can be installed at the source of a separately derived system, and at the first disconnecting means if it does not create a parallel path for normal neutral current.

250.30(A)(4) - Grounded Systems: Grounding Electrode



The grounding electrode system that is used for separately derived systems in a building must be the same grounding electrode system used for the building service.

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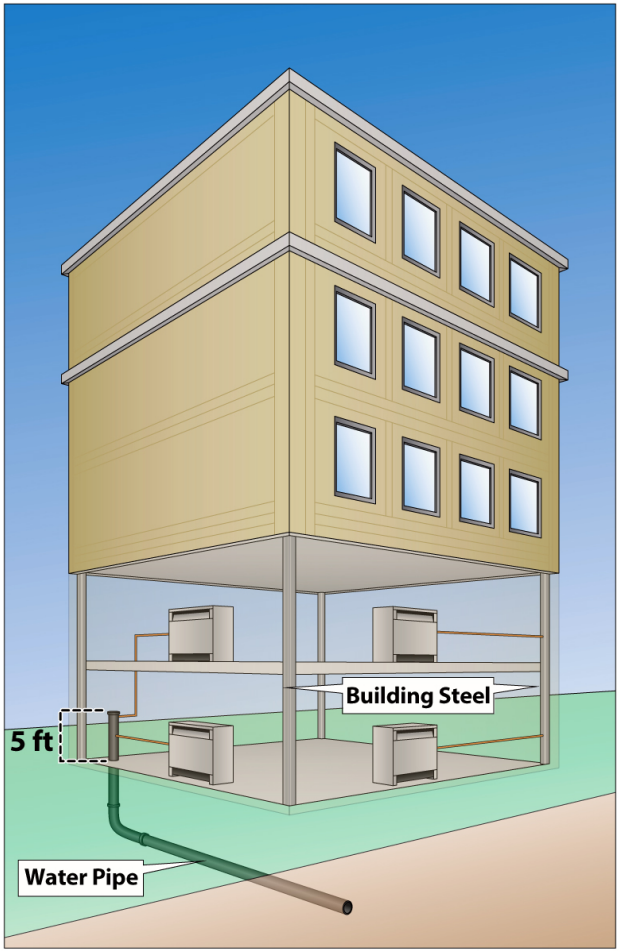
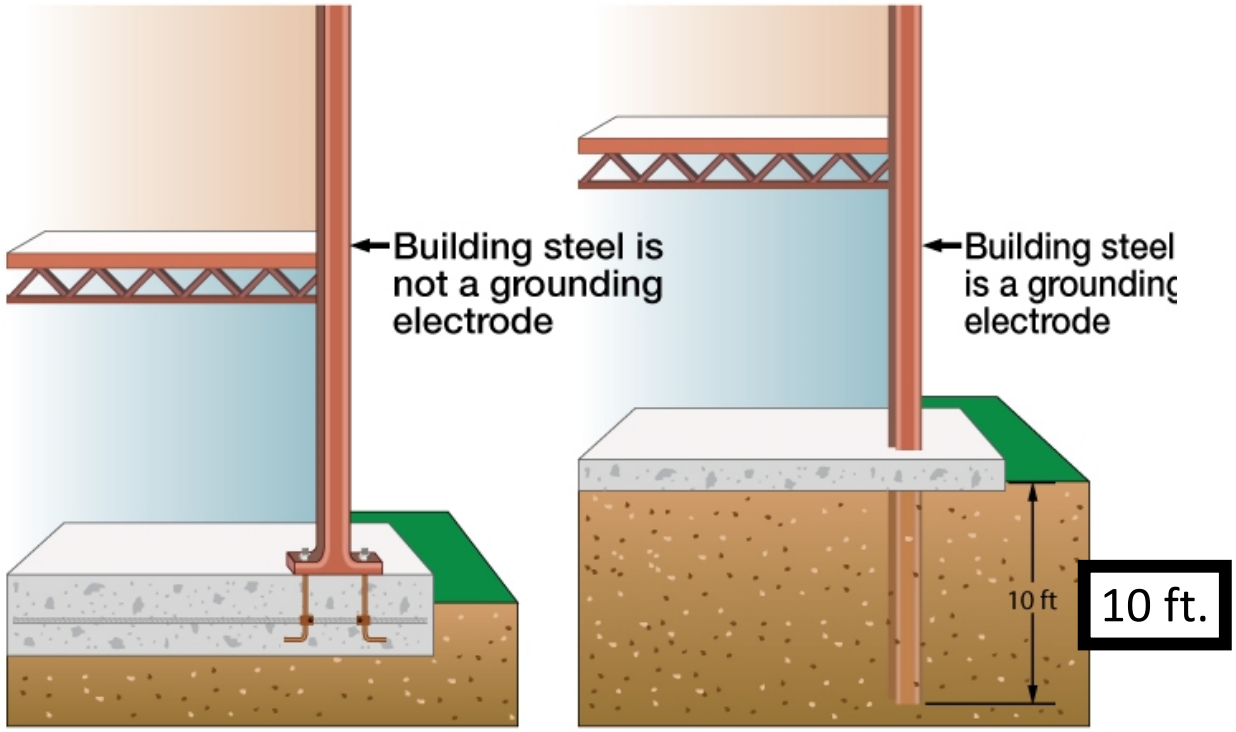
250.30(A)(6) - Grounded Systems: Grounding Electrode Conductor, Multiple Separately Derived Systems

A metal underground water pipe may be used as a grounding electrode conductor if connected within the first 5 ft. of where the water pipe enters the building.



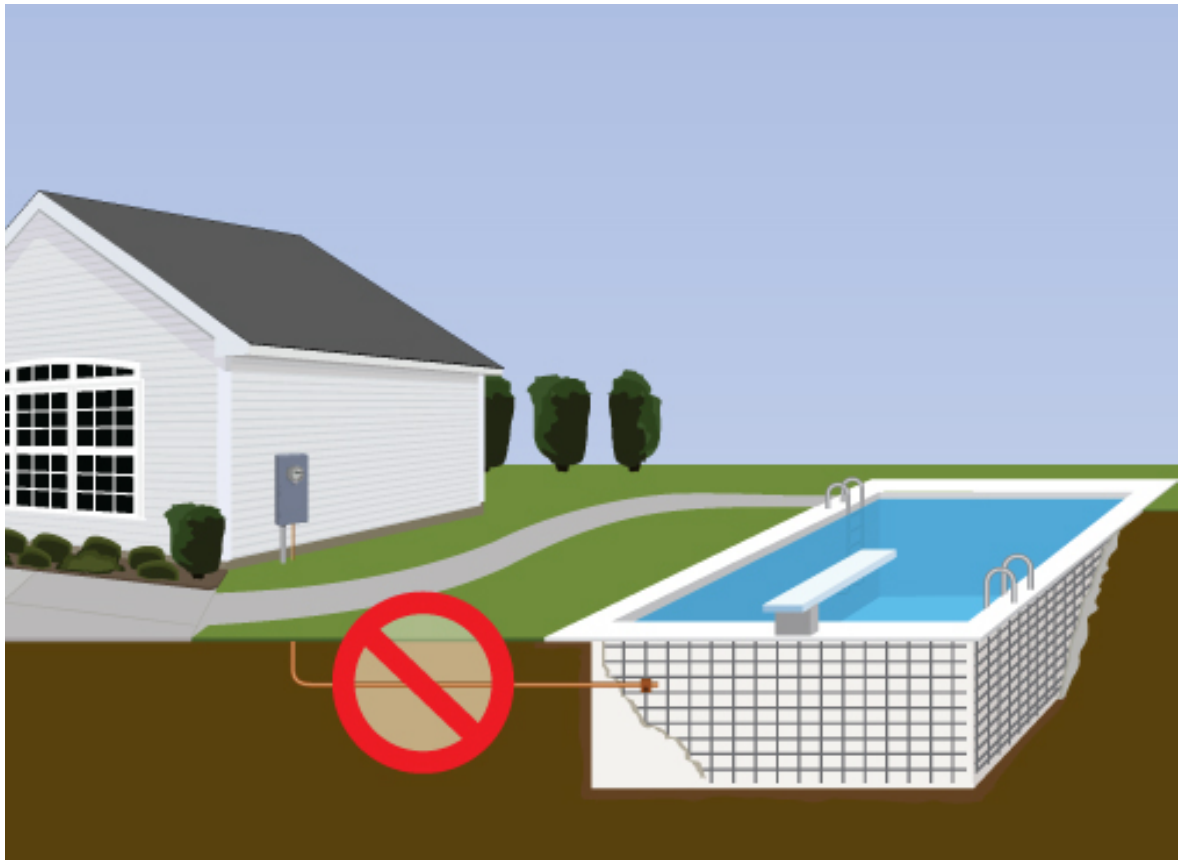
250.52(A)(2) - Electrodes Permitted for Grounding: Metal In-ground Support Structure(s)

A metal piling that is in contact with the earth for 10 ft. or more can be used as a grounding electrode.



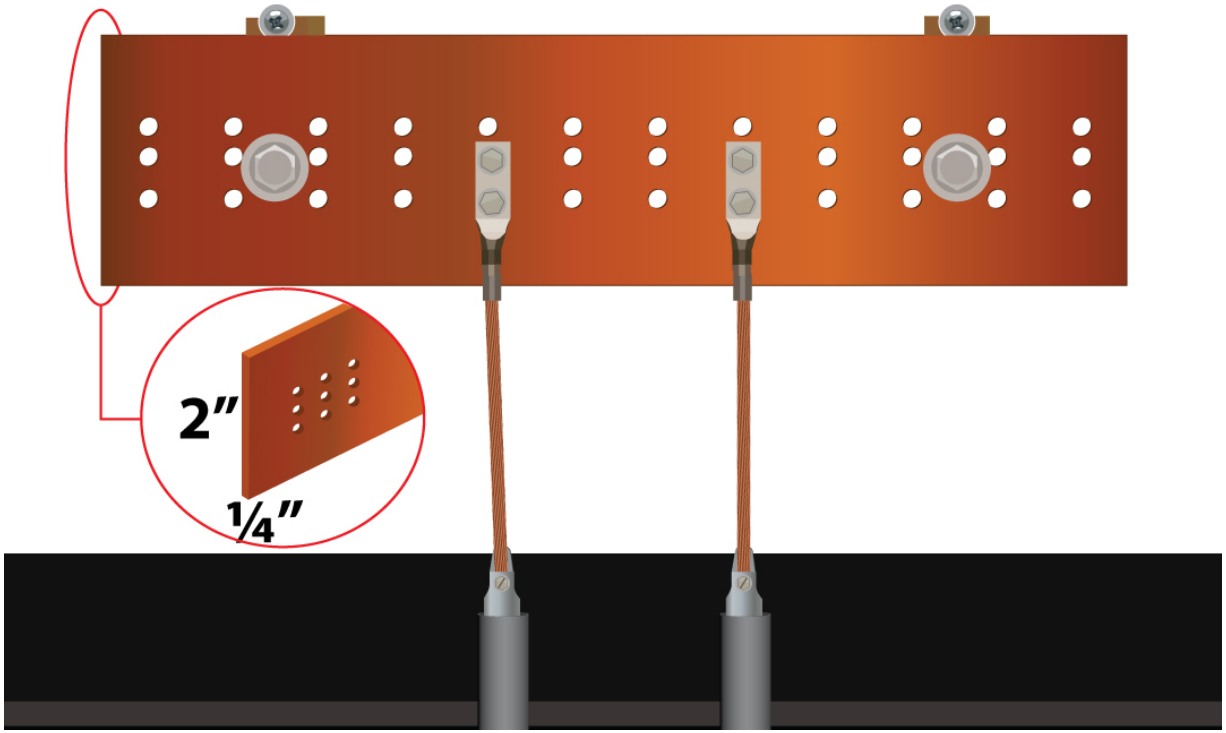
250.52(B)(3) - Grounding Electrodes: Not Permitted for Use as Grounding Electrodes

The reinforcing steel of a swimming pool cannot be used as a grounding electrode.



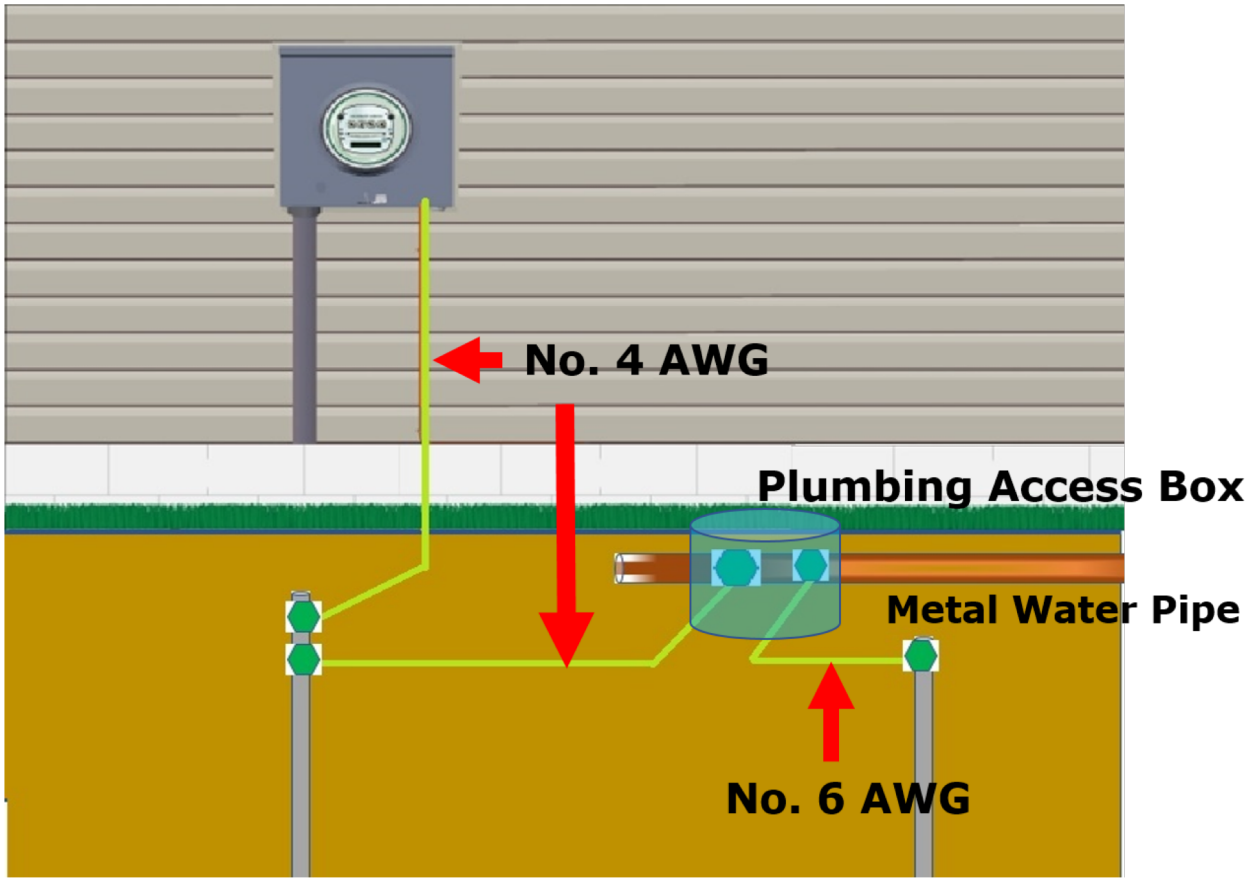
250.64 - Grounding Electrode Conductor Installation

Bonding jumpers from grounding electrodes can be connected to an aluminum or copper busbar.



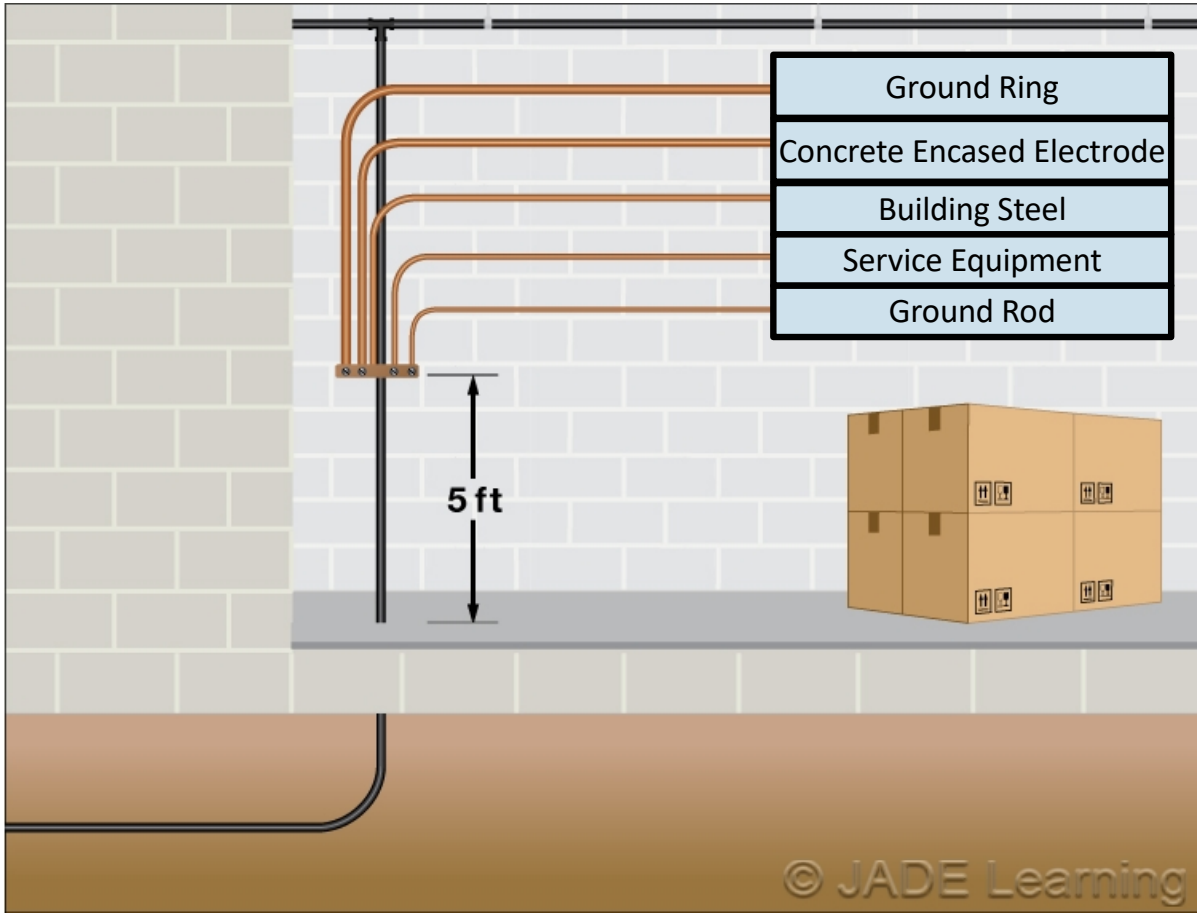
250.66 - Size of Alternating Current Grounding Electrode Conductor

The bonding jumper between two grounding electrodes of the same type does not have to be bigger than the grounding electrode conductor size from Table 250.66.



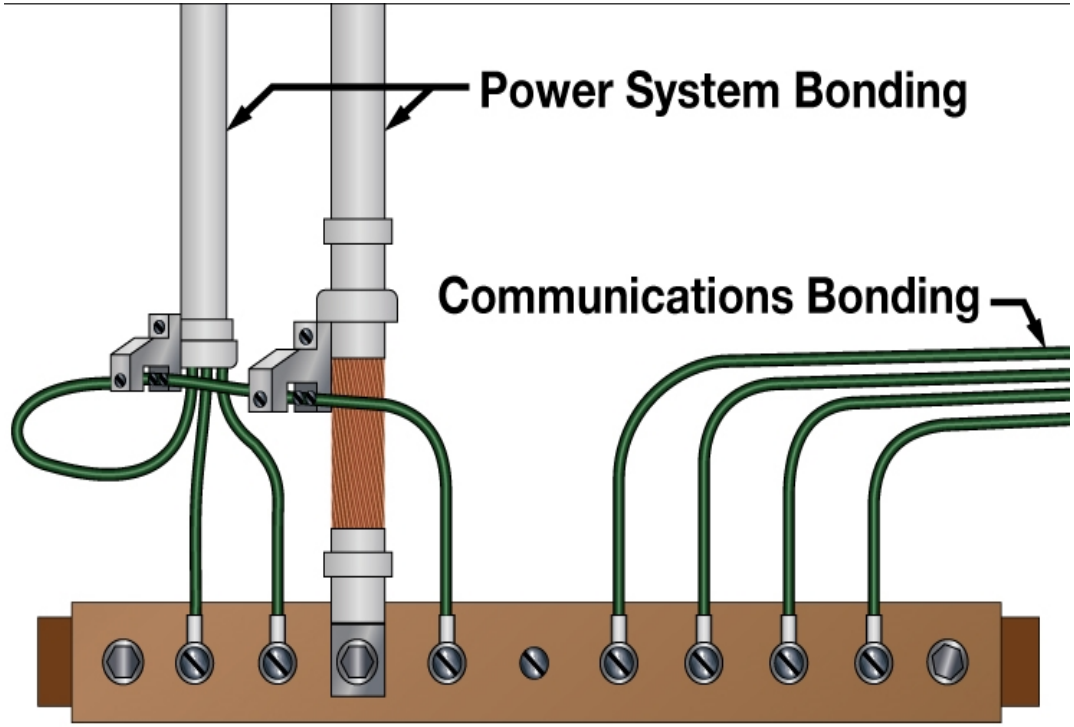
250.68(C) - Grounding Electrode Conductor Connections

The first 5 ft. of metal water piping inside the building may be used to interconnect other electrodes.

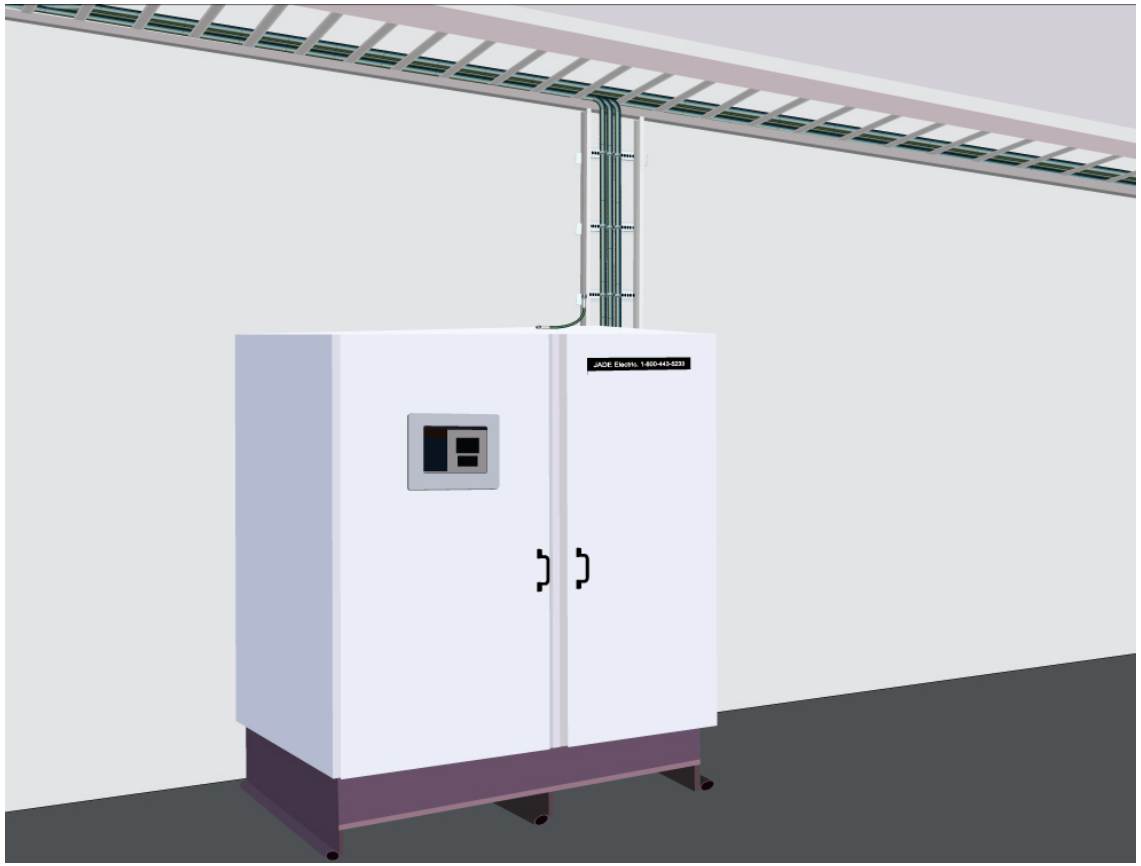


250.94 - Bonding for Communication Systems

The same busbar can be used for power system and communication system bonding.



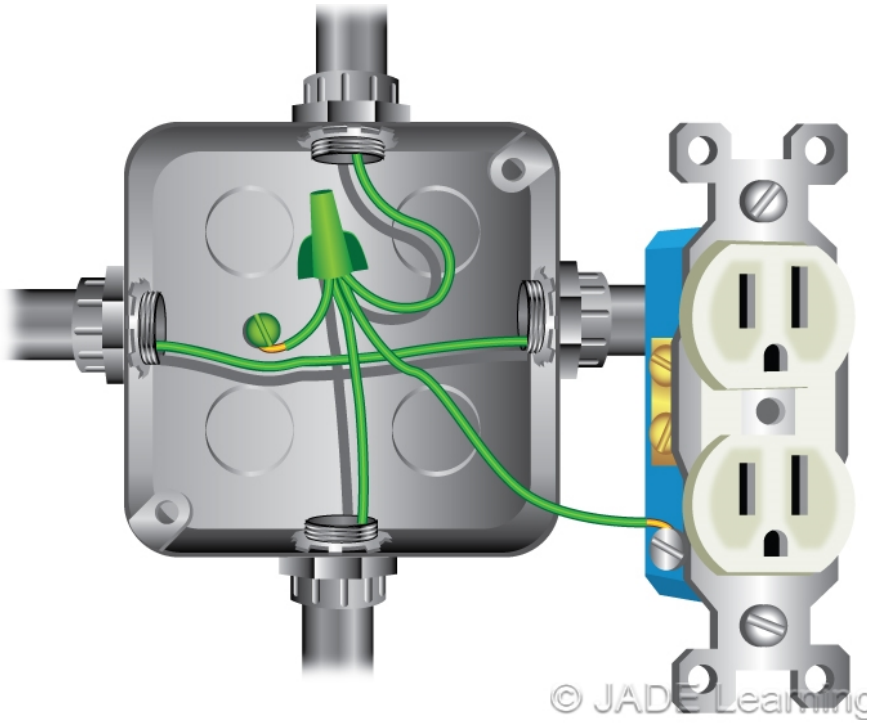
250.122(F) - Size of Equipment Grounding Conductors: Conductors in Parallel



A raceway, gutter, or cable tray can be used as the equipment grounding conductor for multiconductor cables installed in parallel. This eliminates the need to install a wire-type equipment grounding conductor.

250.148 - Continuity and Attachment to Equipment Grounding Conductors to Boxes

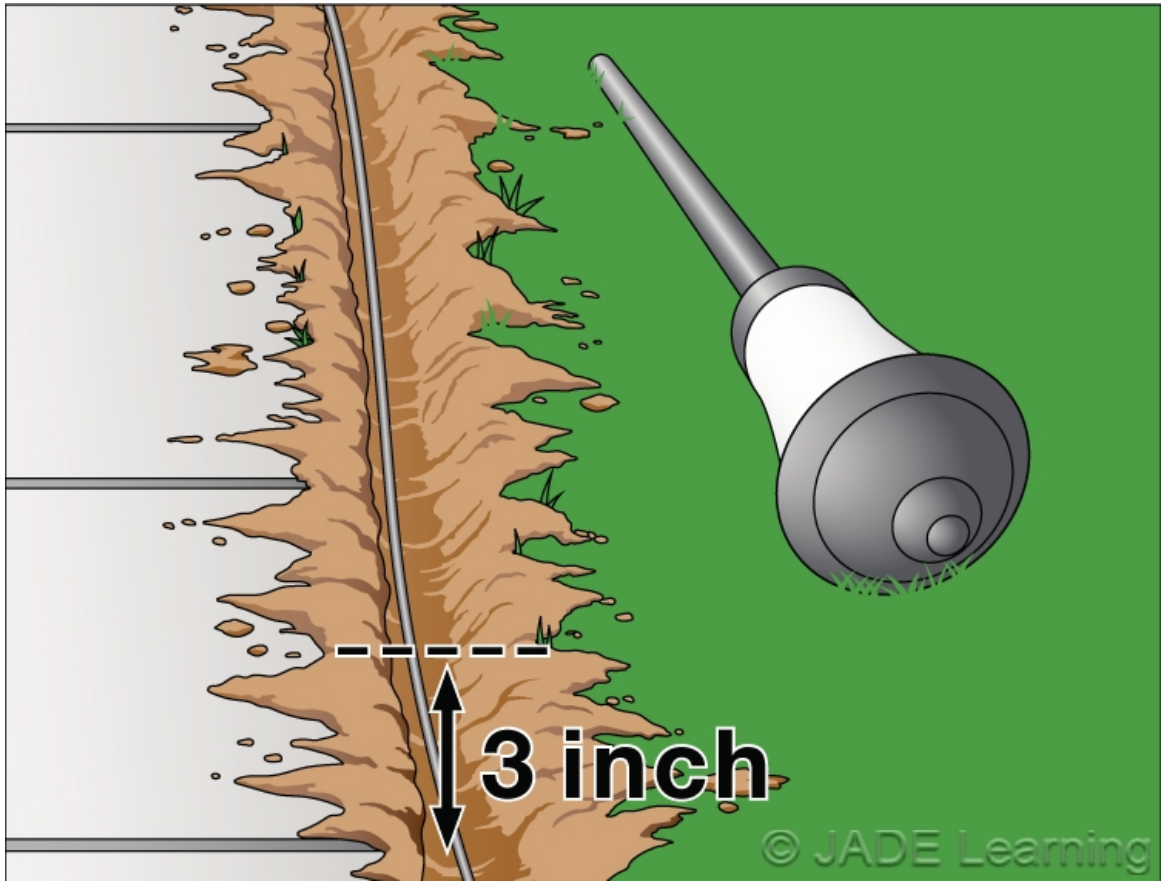
All equipment grounding conductors must be bonded together with devices that are suitable for the use.



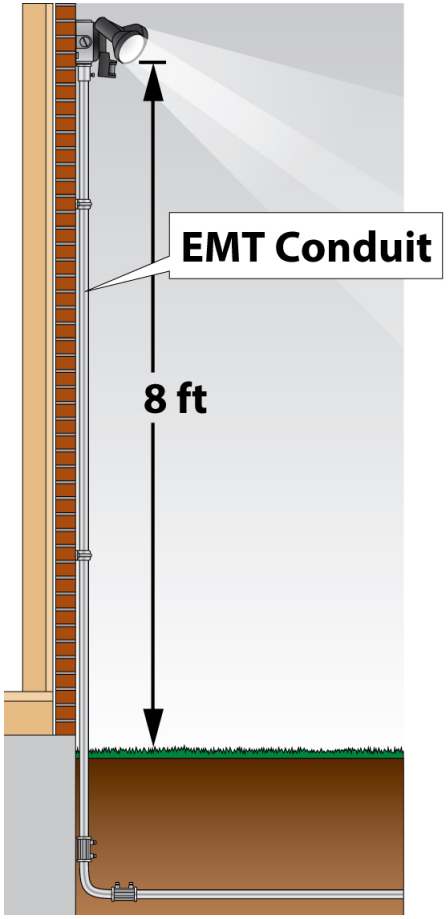
2017 NEC Changes Chapter 3

Table 300.5 Minimum Cover Requirements

The wiring for low-voltage lighting systems can be buried less than 6 inches deep if a lower depth is specified by the manufacturer of the low-voltage lighting system.

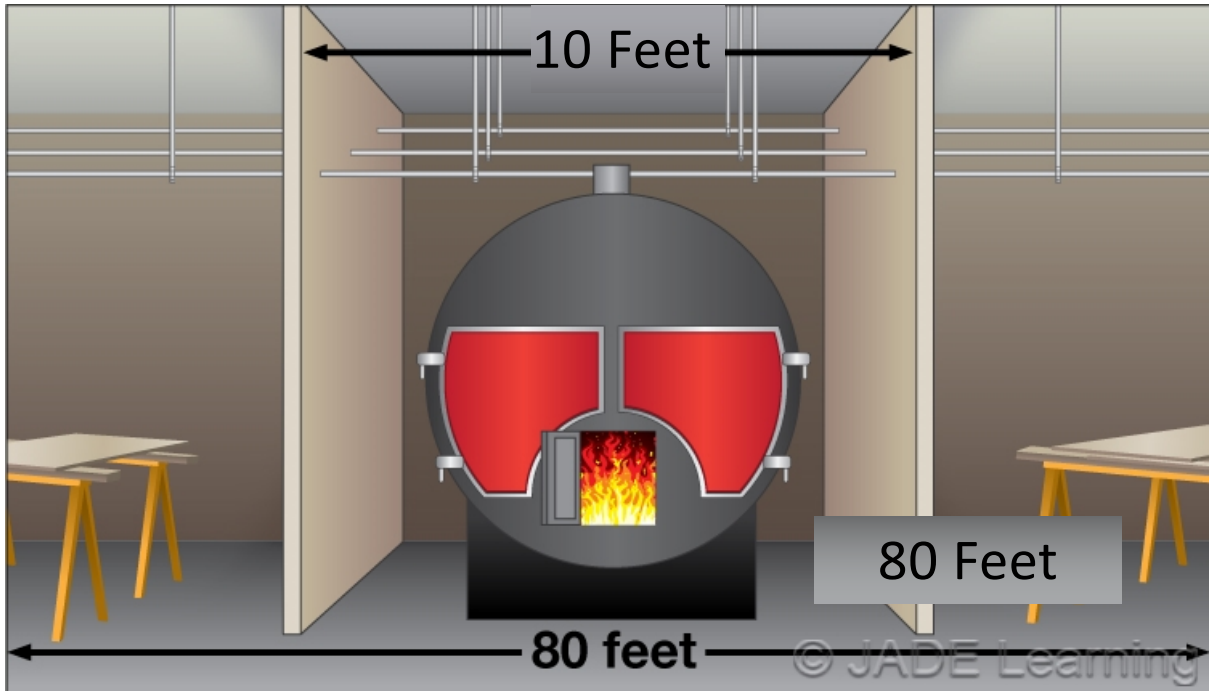


300.5(D)(4) Protection from Damage



EMT can now be used to protect conductors from physical damage.

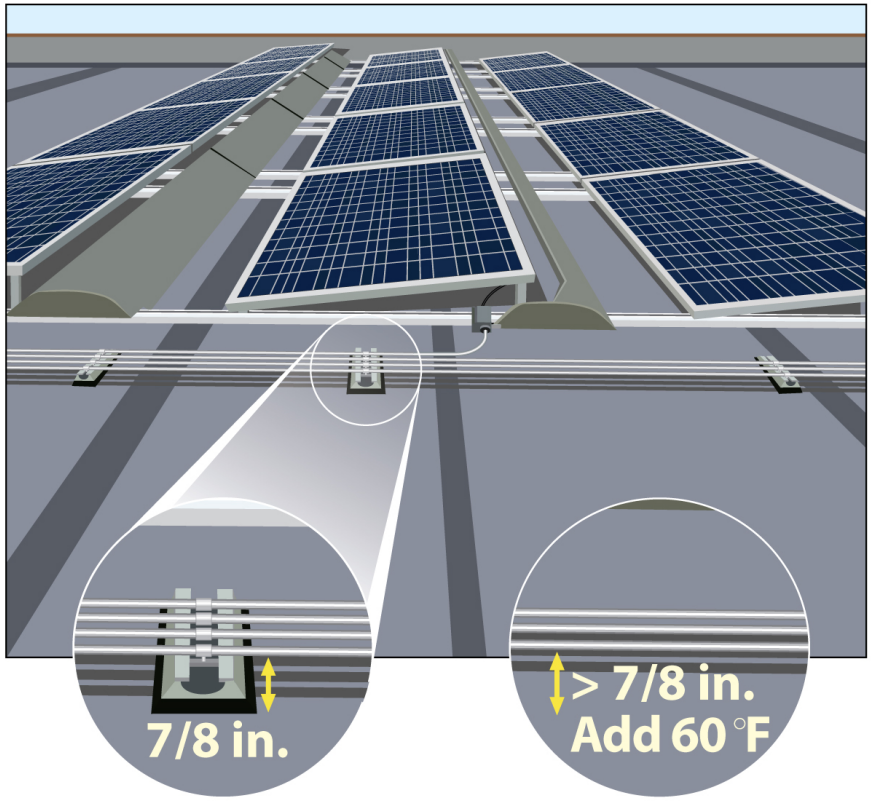
310.15(A)(2) Ex. Ampacities For Conductors Rated 0 - 2000 Volts. Selection of Ampacity



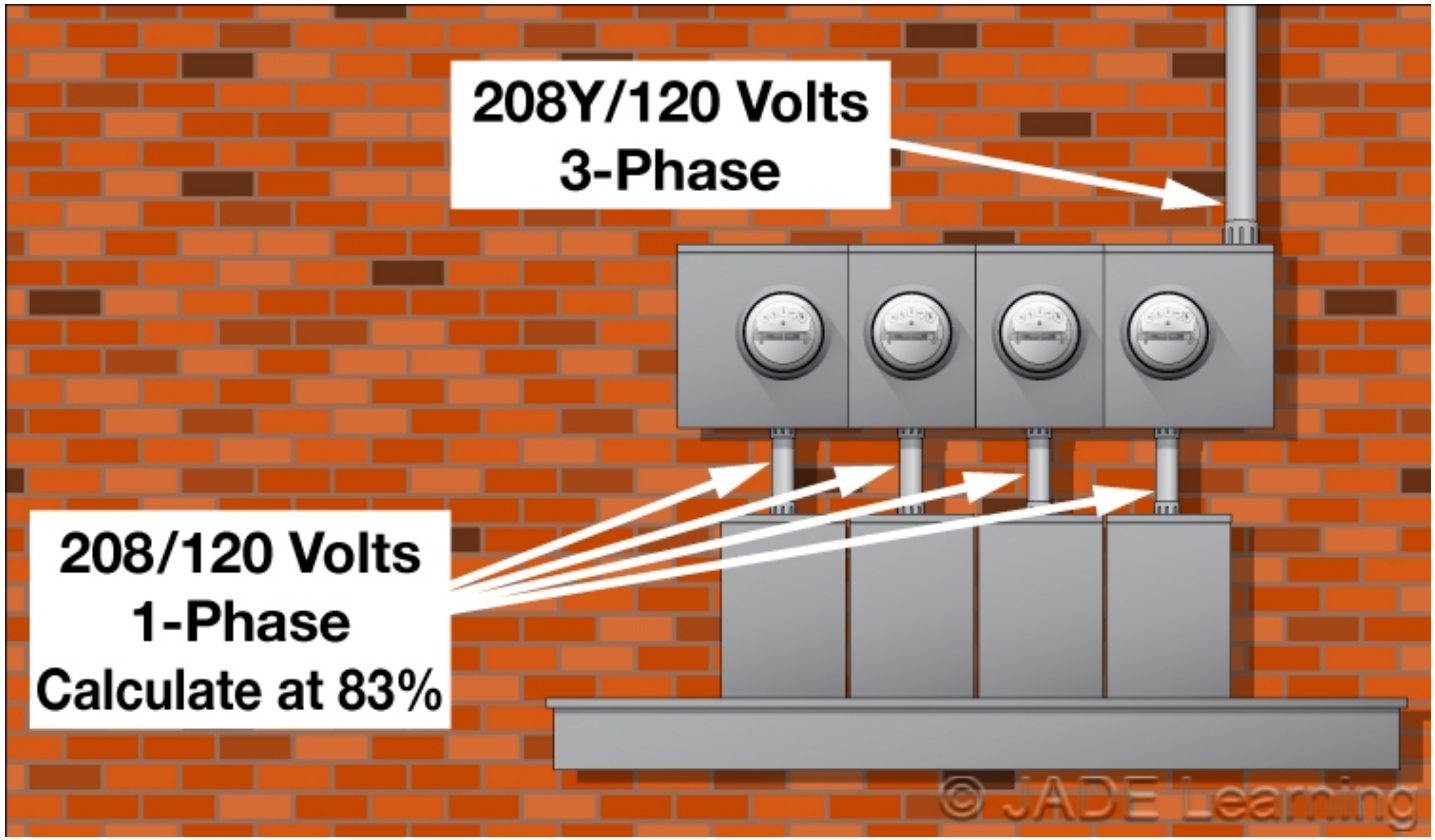
No adjustment required if maximum of 10 feet or 10% of circuit length

310.15(B)(3)(c) Tables. Adjustment Factors - Raceways and Cables Exposed to Sunlight on Rooftops.

The method used to make a temperature correction adjustment to the ampacity of conductors installed on a rooftop has been changed.



310.15(B)(7) Dwelling Services and Feeders

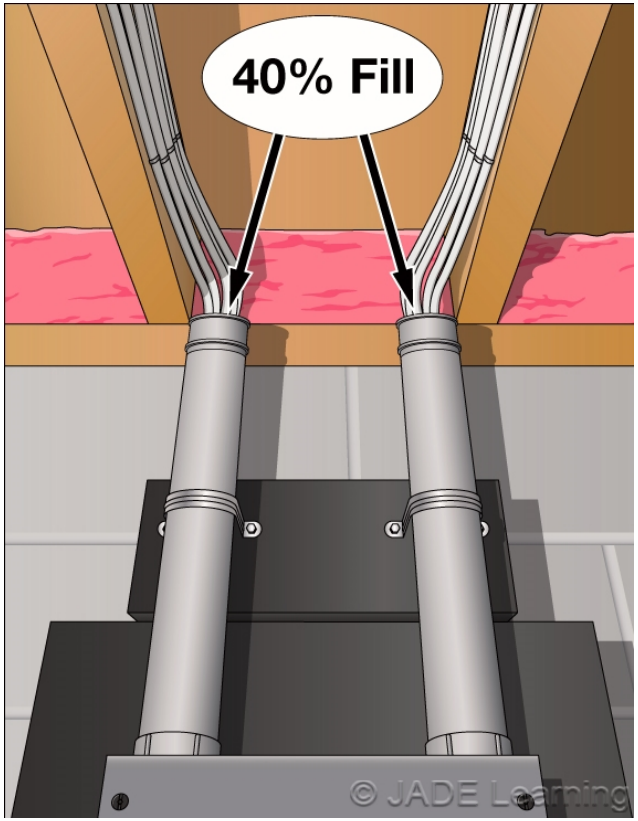


208 volt 1-phase feeders are now included in 310.15(B)(7).

312.5(C) Exception. Cabinets, Cutout Boxes, and Meter Socket Enclosures - Cables

Table 1 of Chapter 9

40%	More than 2 conductors
31%	2 conductors
53%	1 conductor



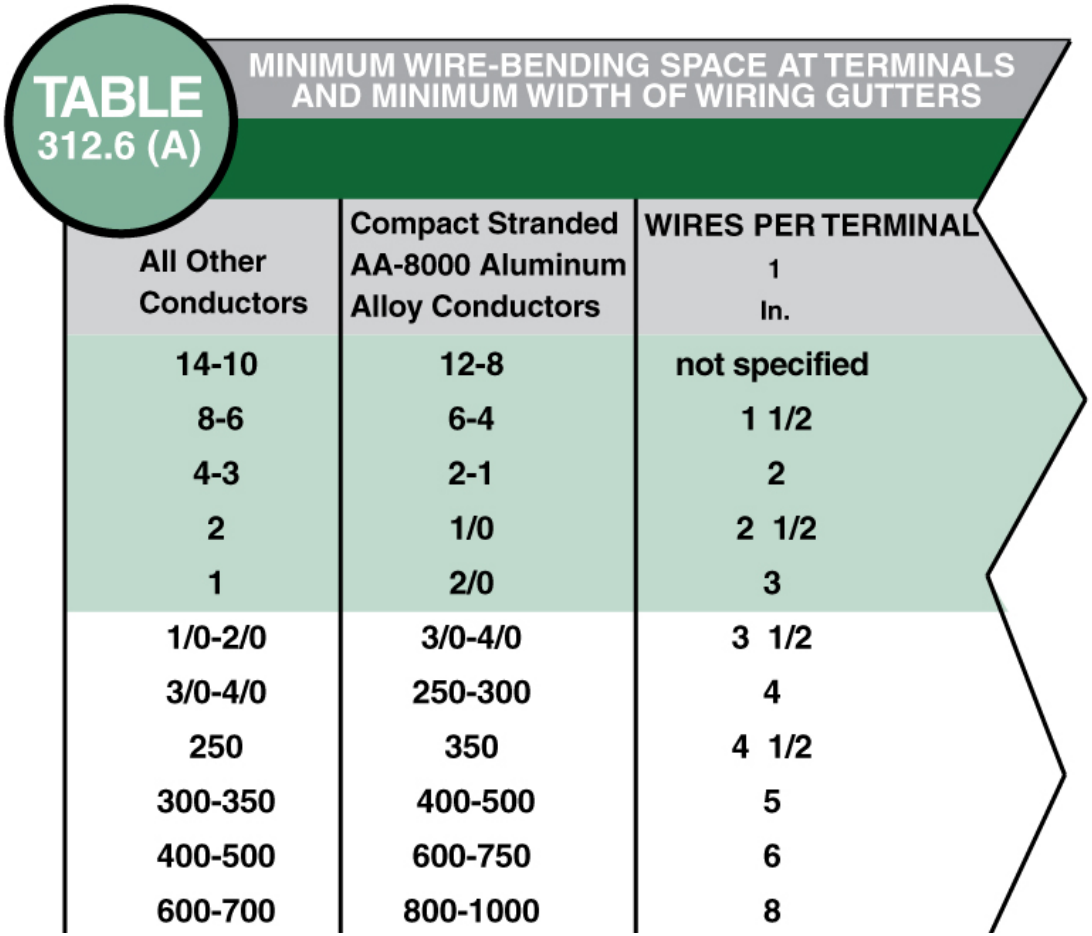


TABLE 312.6 (A)

MINIMUM WIRE-BENDING SPACE AT TERMINALS AND MINIMUM WIDTH OF WIRING GUTTERS

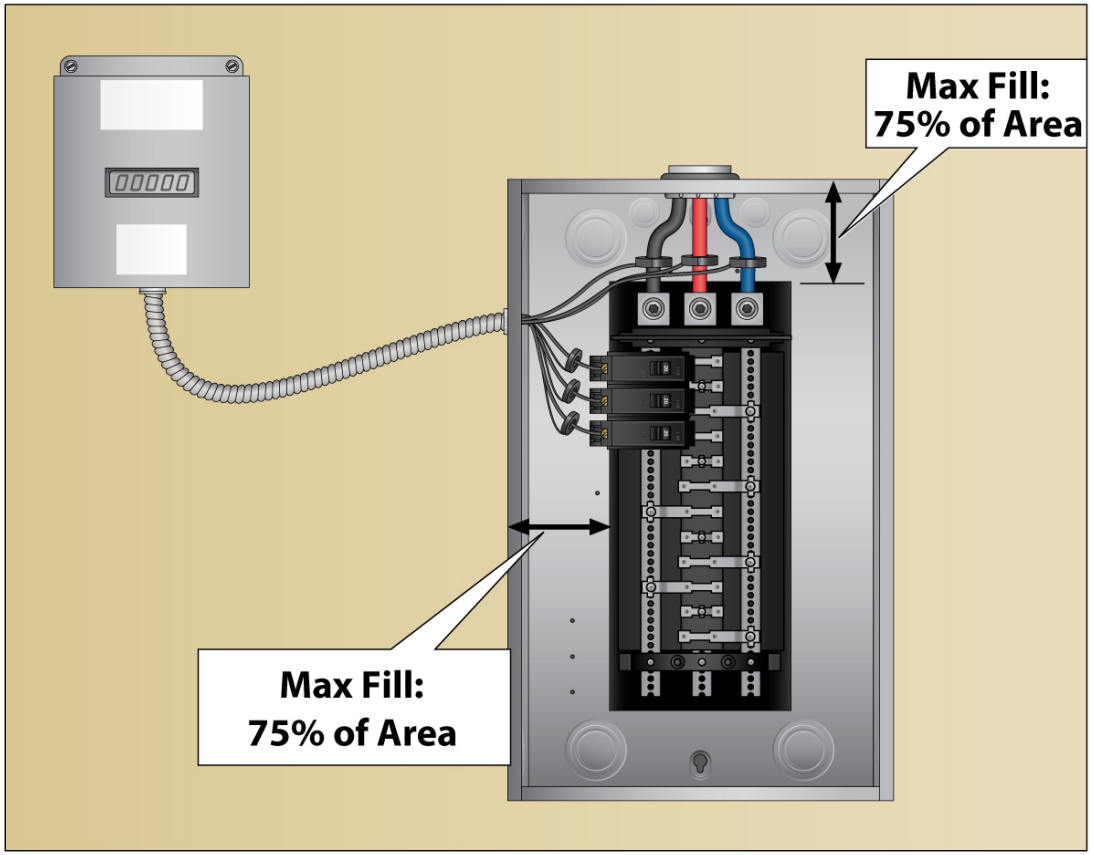
All Other Conductors	Compact Stranded AA-8000 Aluminum Alloy Conductors	WIRES PER TERMINAL 1 In.
14-10	12-8	not specified
8-6	6-4	1 1/2
4-3	2-1	2
2	1/0	2 1/2
1	2/0	3
1/0-2/0	3/0-4/0	3 1/2
3/0-4/0	250-300	4
250	350	4 1/2
300-350	400-500	5
400-500	600-750	6
600-700	800-1000	8

Table 312.6(A) Minimum Wire-Bending Space at Terminals and Minimum Width of Wiring Gutters

Table 312.6(A) includes wire bending space for compact stranded aluminum conductors.

312.8 Switch and Overcurrent Device Enclosures

Conductors, splices, taps, and power monitoring equipment cannot take up more than 75% of the wiring space.



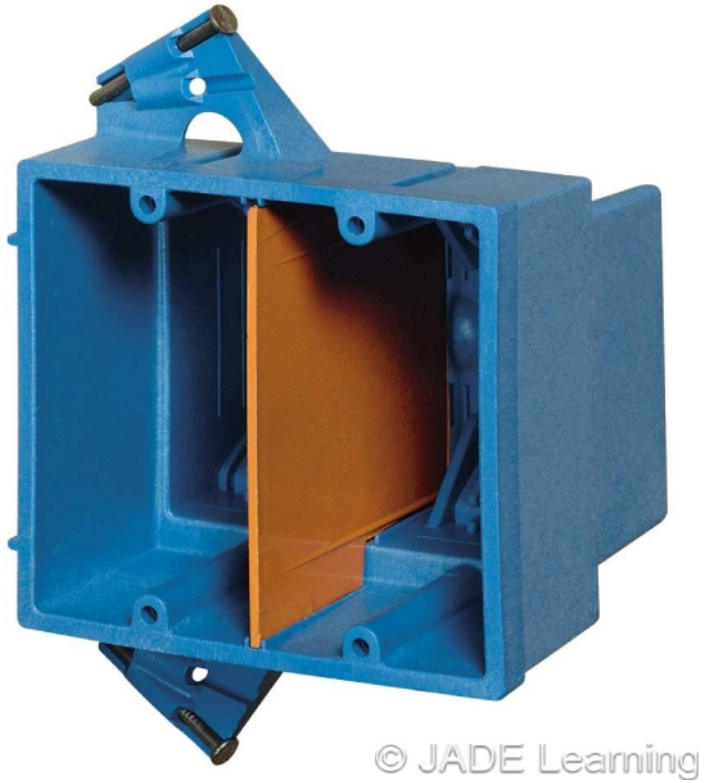
314.16(A) Box Volume Calculations

A square box has a volume of 30.3 in^3. A metal barrier inserted into the box creates two equal separate spaces

30.3 in^3 ÷ 2 = 15.15in^3

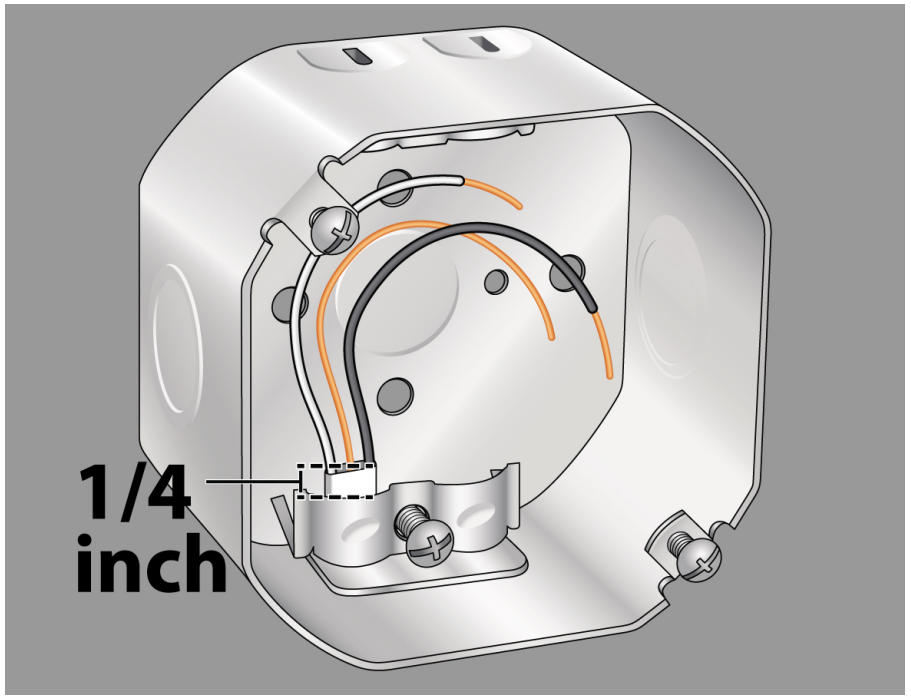
The volume of each space would be one half of the original 30.3 in^3 minus one half of the ½ in^3 volume taken up by the barrier.

15.15 in^3 - .25 in^3 = **14.9 in^3**

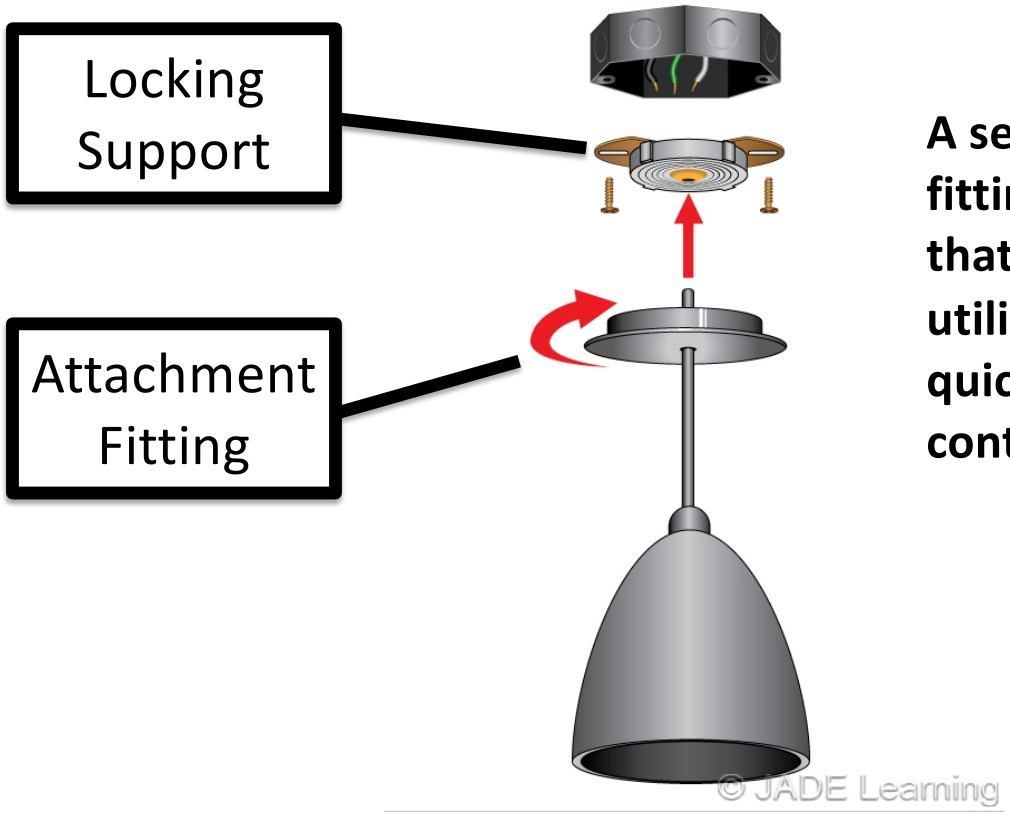


314.17(B) Metal Boxes and Conduit Bodies

The sheaths of nonmetallic cable must extend at least 1/4 inch into a metal box and at least 1/4 inch beyond any cable clamp.



314.27(E) Outlet Boxes. Separable Attachment Fittings



A separable attachment fitting is a listed assembly that allows electrical utilization equipment to quickly connect to a contact device.

314.28(A)(3) Boxes and Conduit Bodies. Minimum Size. Smaller Dimensions

From Table 5 Ch. 9 – a 4/0 THHN has an area of .3237 in^2.

3 x .3237 = .9711 in^2.

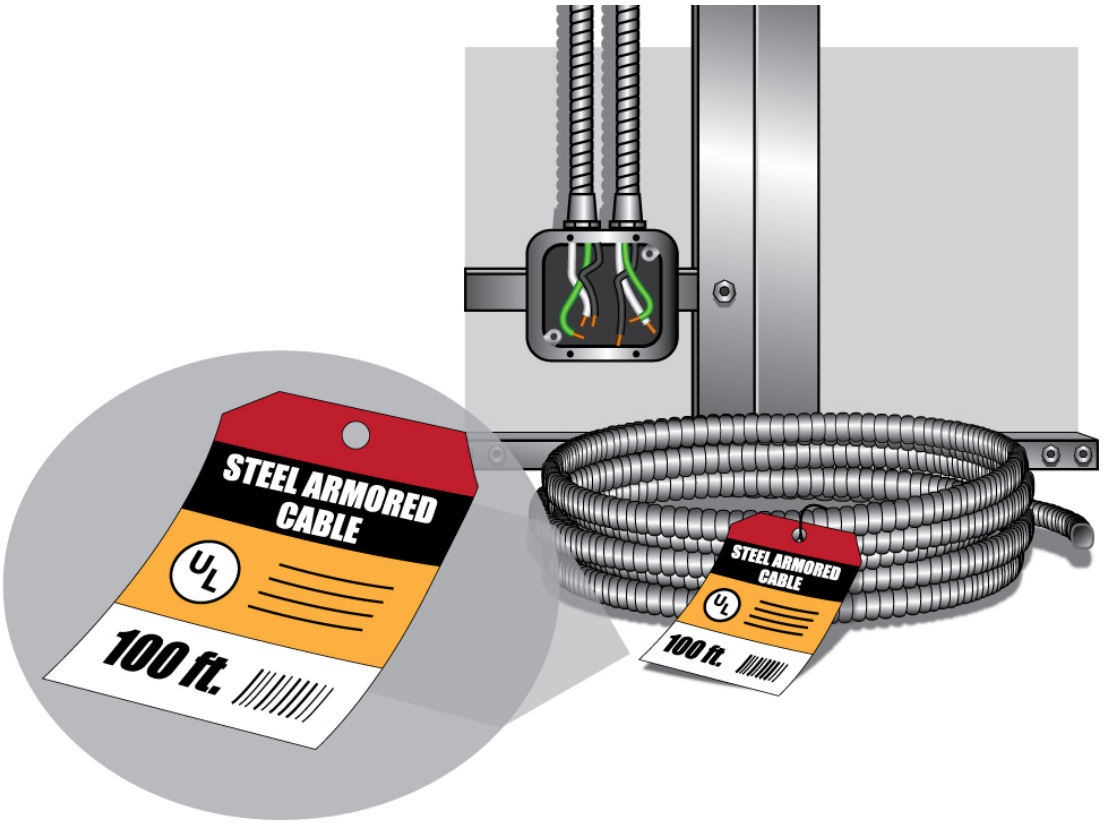
From Table 5 Ch. 9 - a 2/0 THHN has an area of .2223 in^2.

4 x .2223 = .8892 in^2.

The conduit body could be used for three, 4/0 XHHW or four, 2/0 THHN conductors.

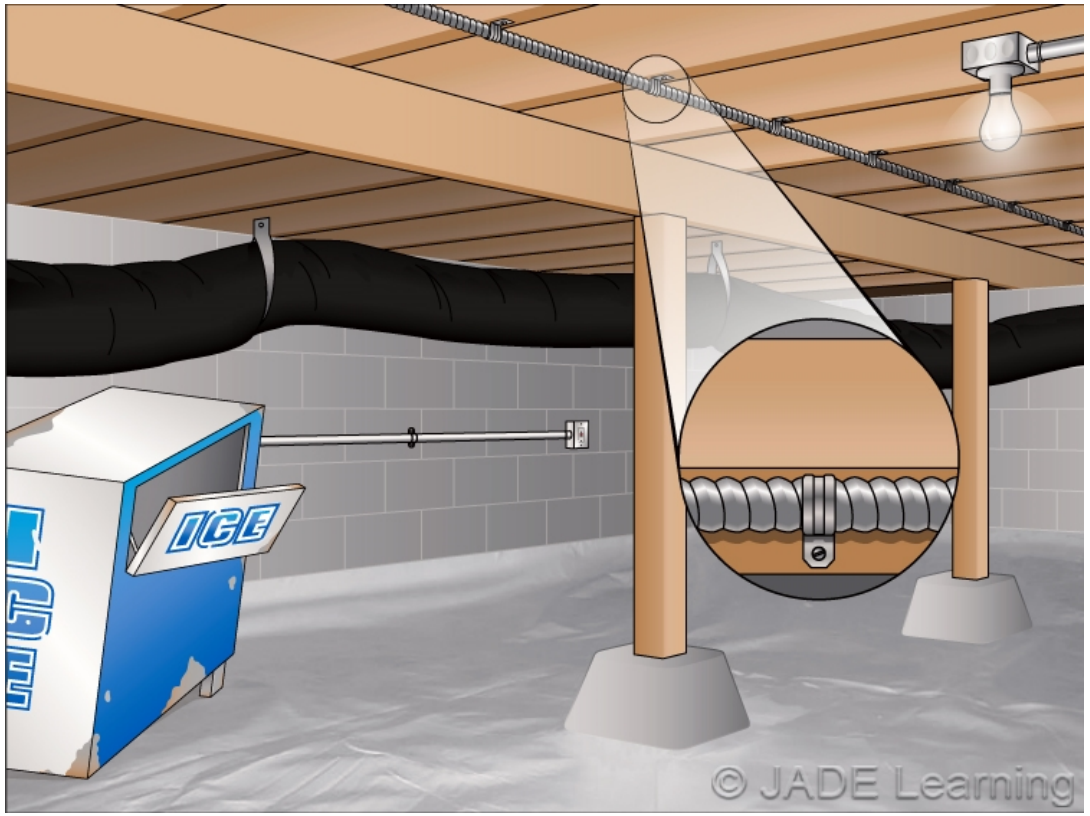
320.6 Armored Cable: Type AC - Listing Requirements

Type AC cable and the fittings for AC cable must be listed. Similar listing requirements have been added for MC Cable, NM Cable, SE Cable and UF Cable.



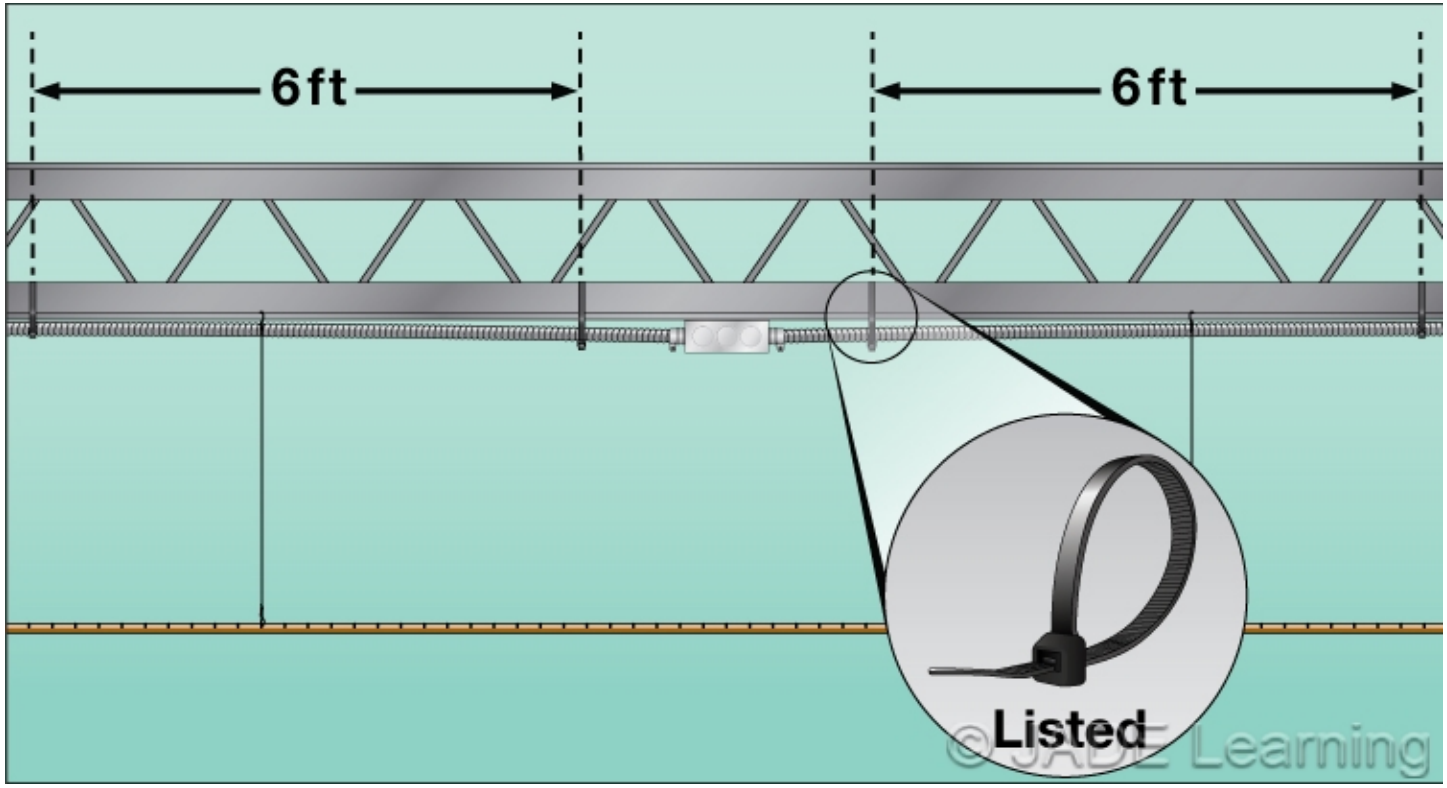
330.15 Metal-Clad Cable: Type MC. Exposed Work

Exposed runs of MC Cable must closely follow the surface of the building finish or of running boards.



330.30(A) Type MC - Securing & Supporting

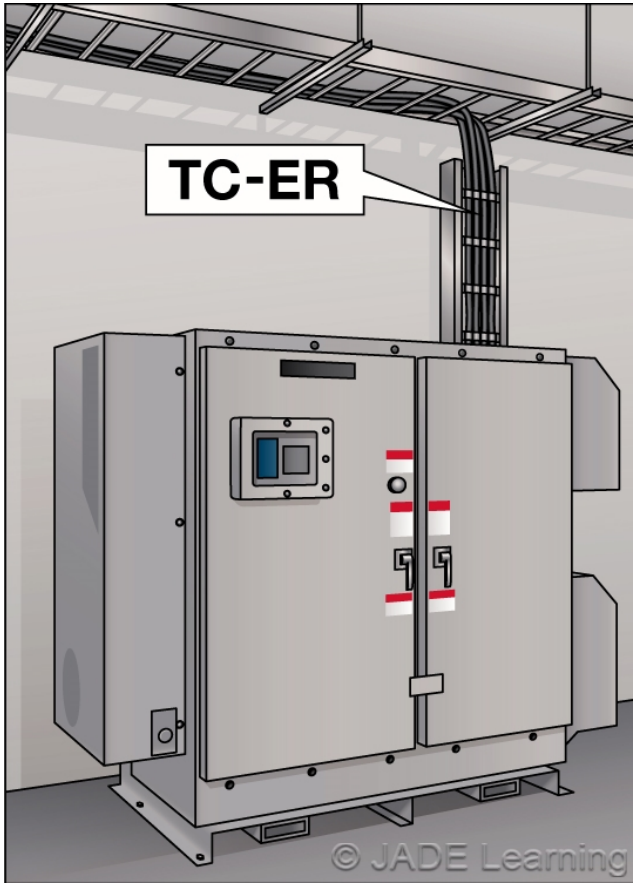
Cable ties used to support MC cable must be listed and identified for securement and support.



336.10 Type TC. Uses Permitted

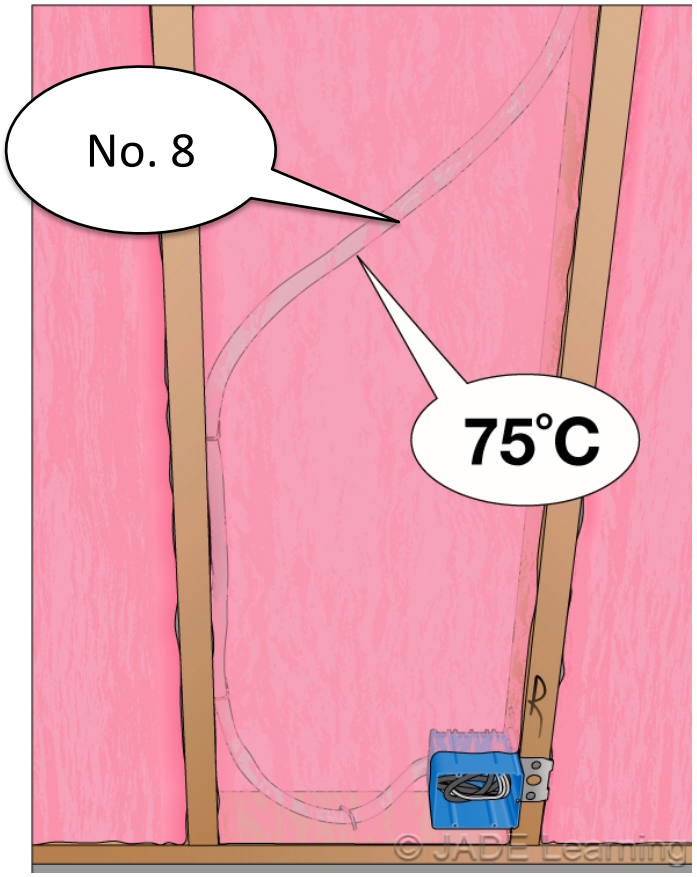
The permitted uses for Type TC cable have been revised:

- Cable Trays less than or equal to 1 foot gap
- Type TC-ER (exposed run) with equipment ground secured every six feet
- Type TC-ER unsupported up to 6 feet if mechanically supported at cable tray
- Type TC-ER permitted in one- and two-family dwellings if identified for the purpose
- Type TC cable can be direct buried where identified for such use
- Type TC cable can be used in hazardous locations where permitted



338.10(B)(4) Type SE Cable Branch Circuit or Feeder Installation Methods

Conductors sized No. 8 AWG and larger can be used at the 75°C rating, even when installed in thermal insulation.



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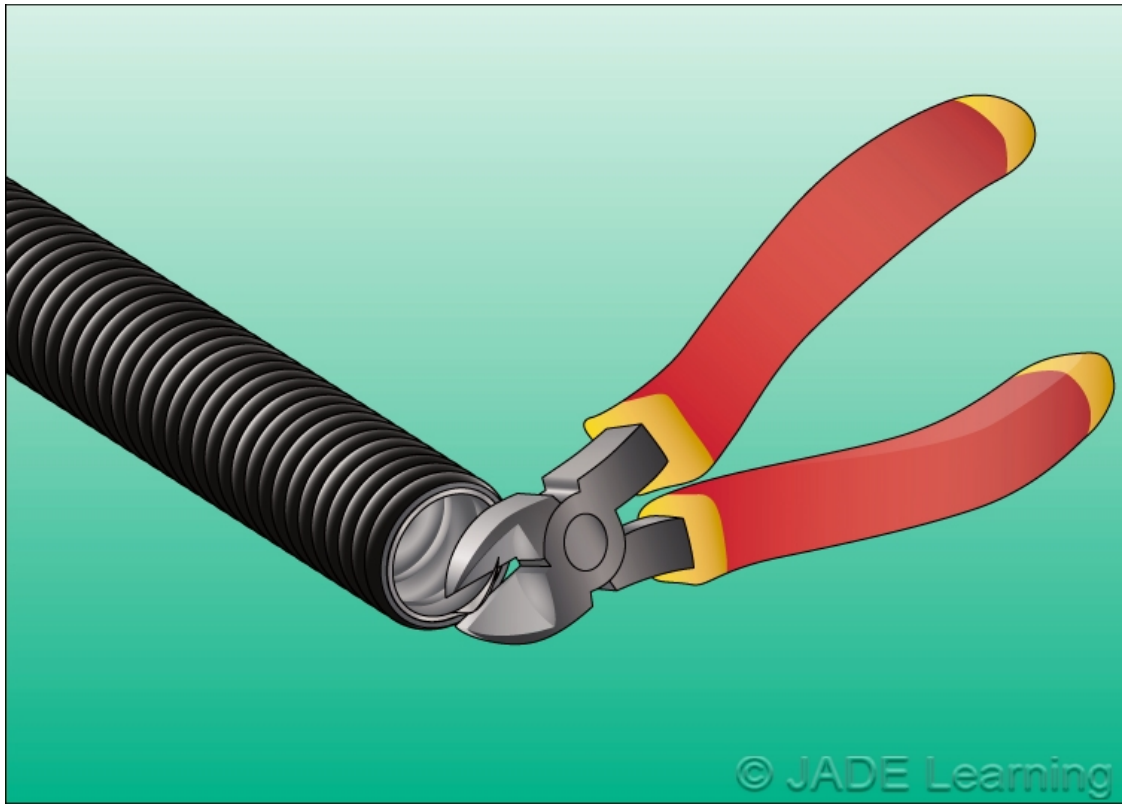
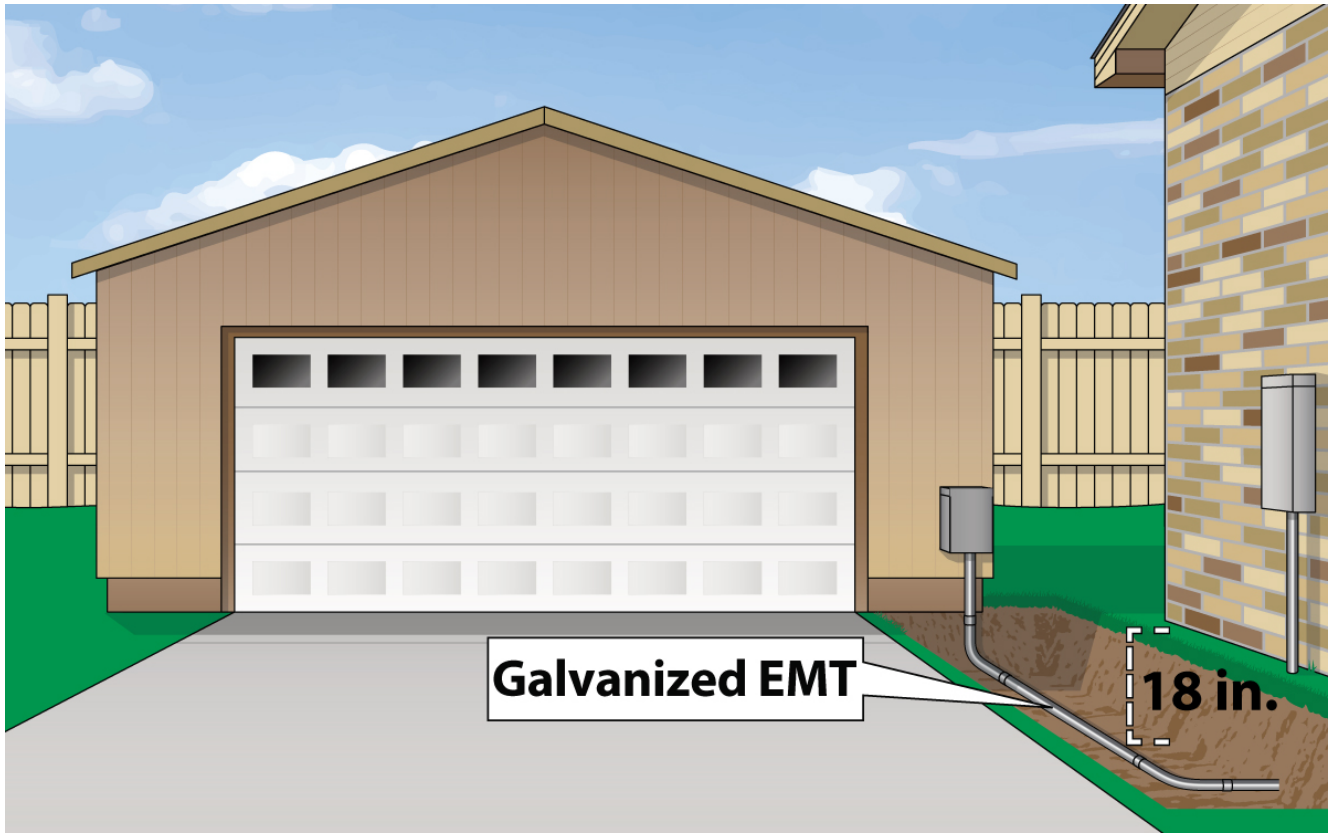
350.28 - Liquidtight Flexible Metal Conduit - Type LFMC; Trimming

The cut ends of LFMC must be trimmed on both the inside and the outside to remove the rough edges.



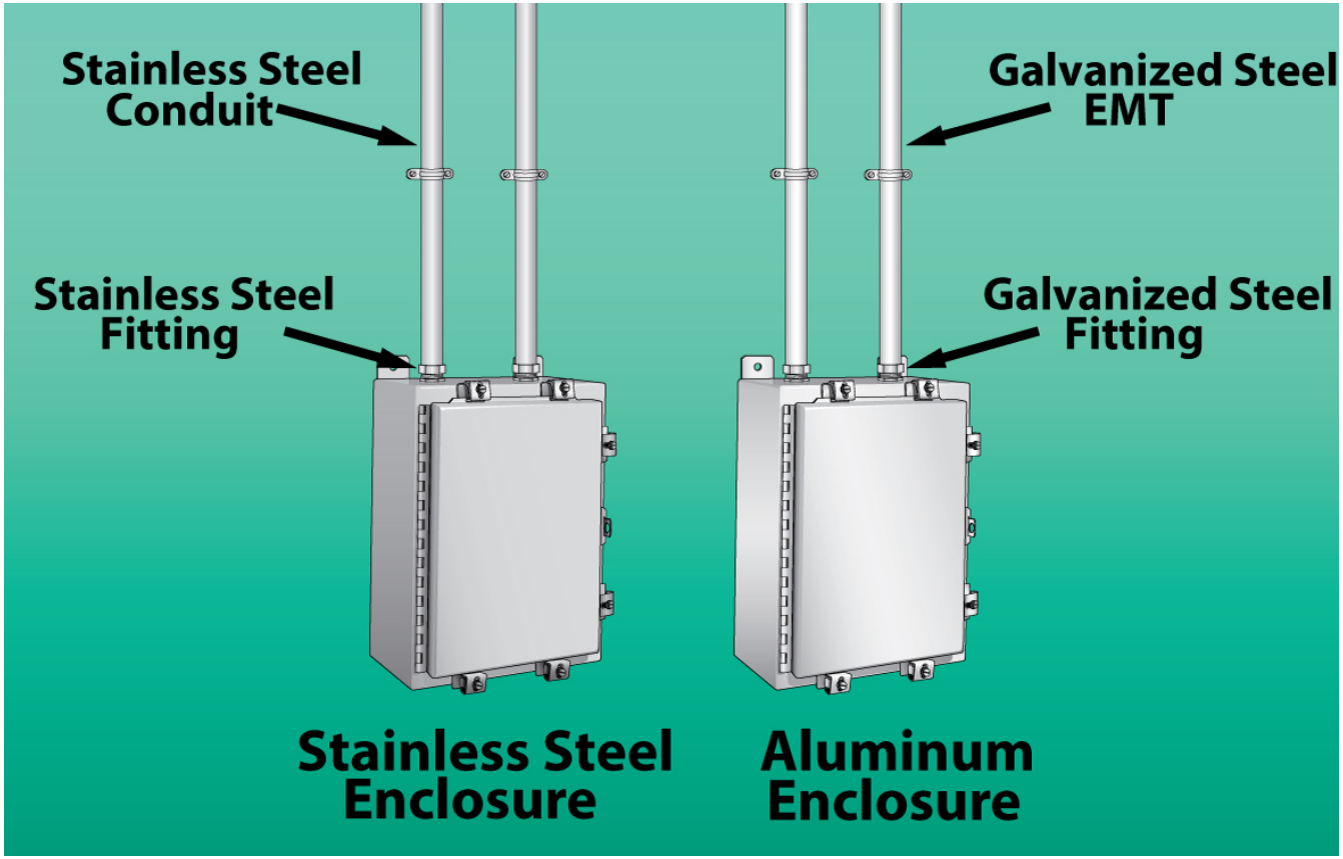
358.10 - Electrical Metallic Tubing - Type EMT; Uses Permitted



EMT must be protected from corrosion when installed in direct contact with the earth.

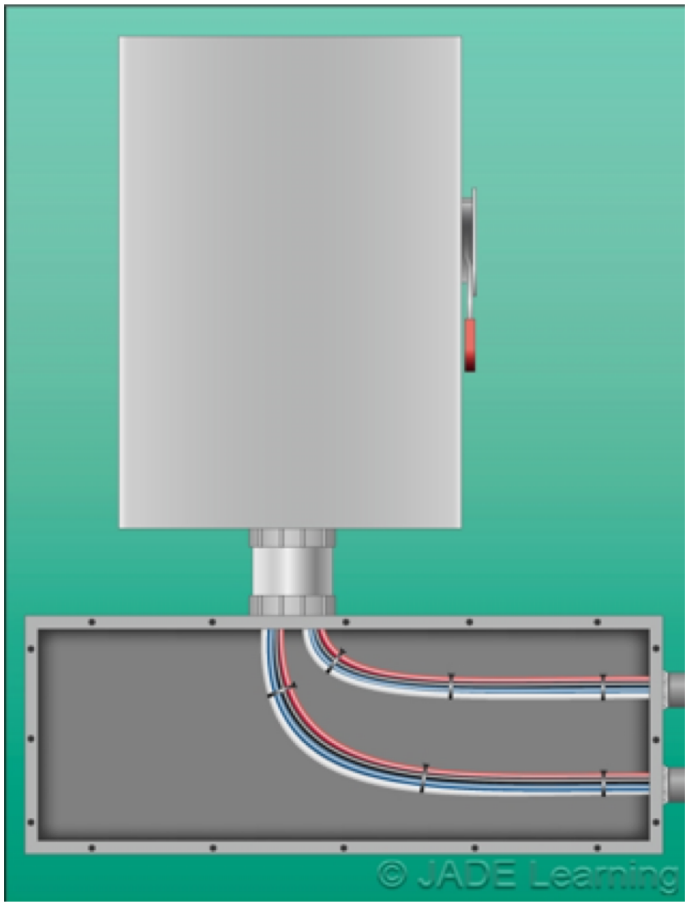
358.14 - Electrical Metallic Tubing - Type EM; Dissimilar Metal

Stainless steel EMT can only be used with stainless steel fittings and enclosures. Galvanized steel EMT can be used with aluminum fittings and enclosures.

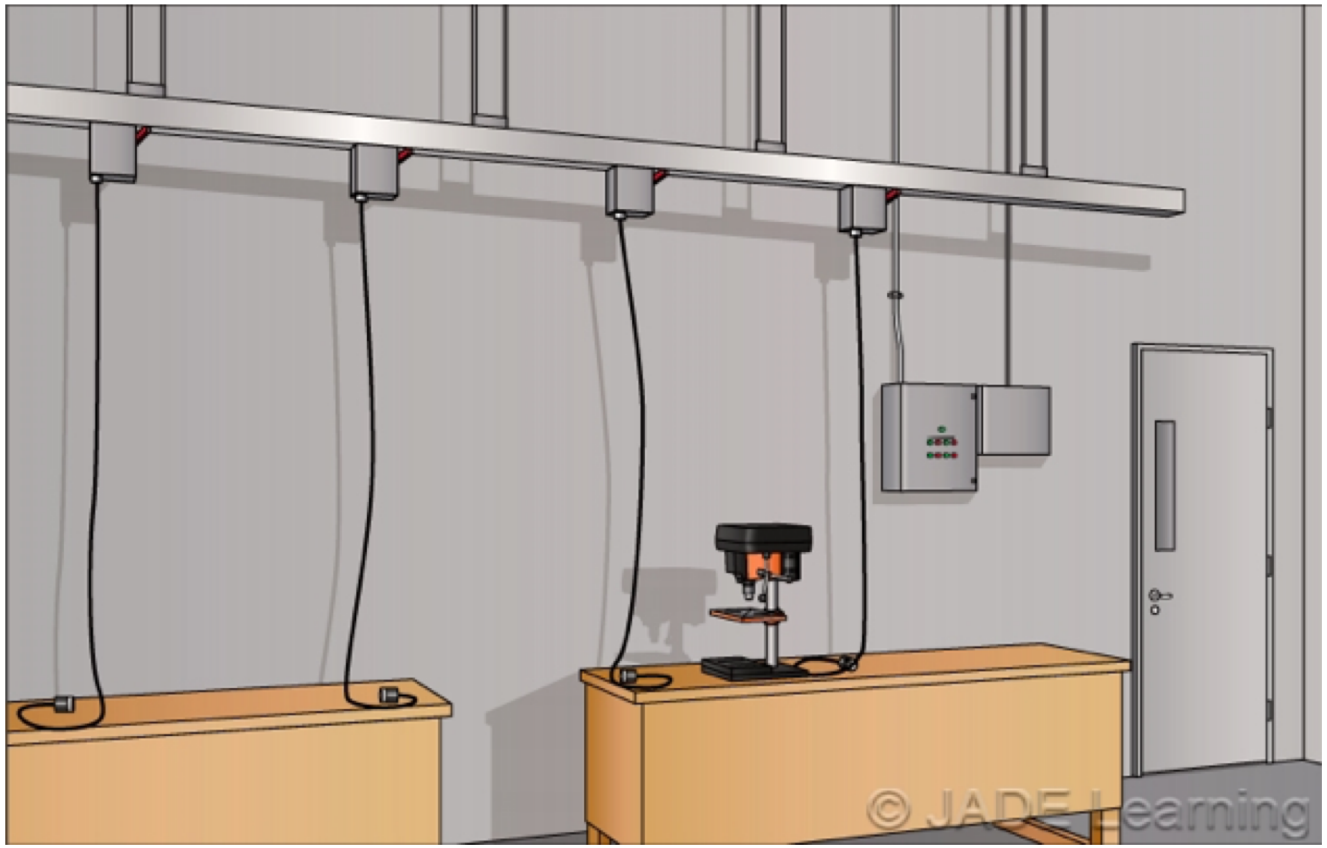


366.20 - Auxiliary Gutters - Conductors Connected in Parallel

Parallel conductors installed in auxiliary gutters (366.20) or metal wireways (376.20) must be grouped.



368.17(C) - Ex. No. 4 Busways - Overcurrent Protection: Feeder or Branch Circuits



Where the branch circuit overcurrent plug-in device is directly supplying a readily accessible disconnect, a method of floor operation shall not be required.

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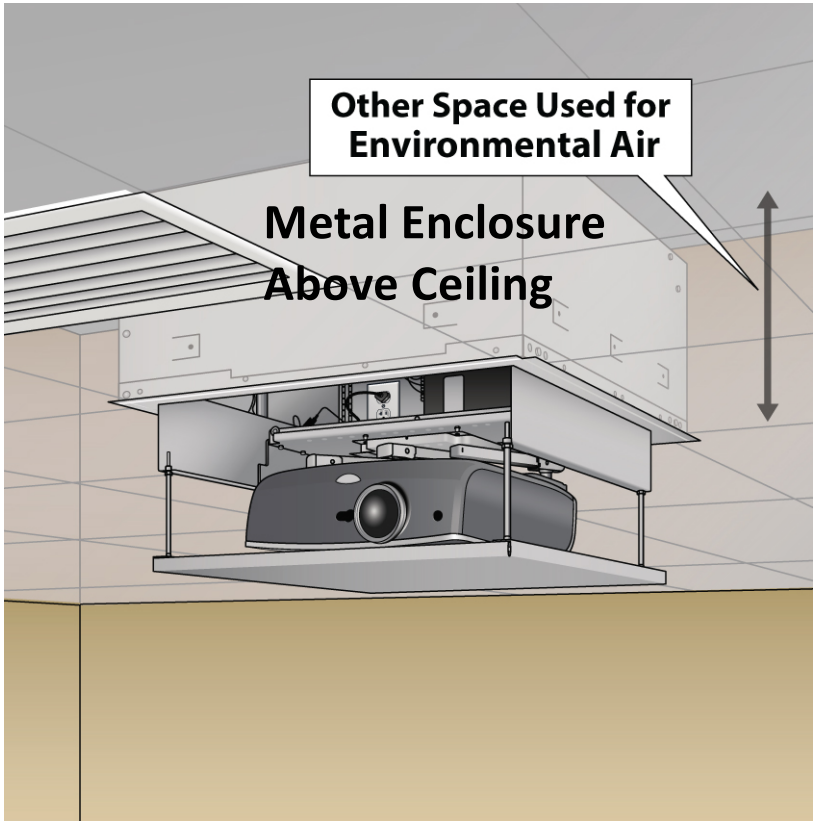
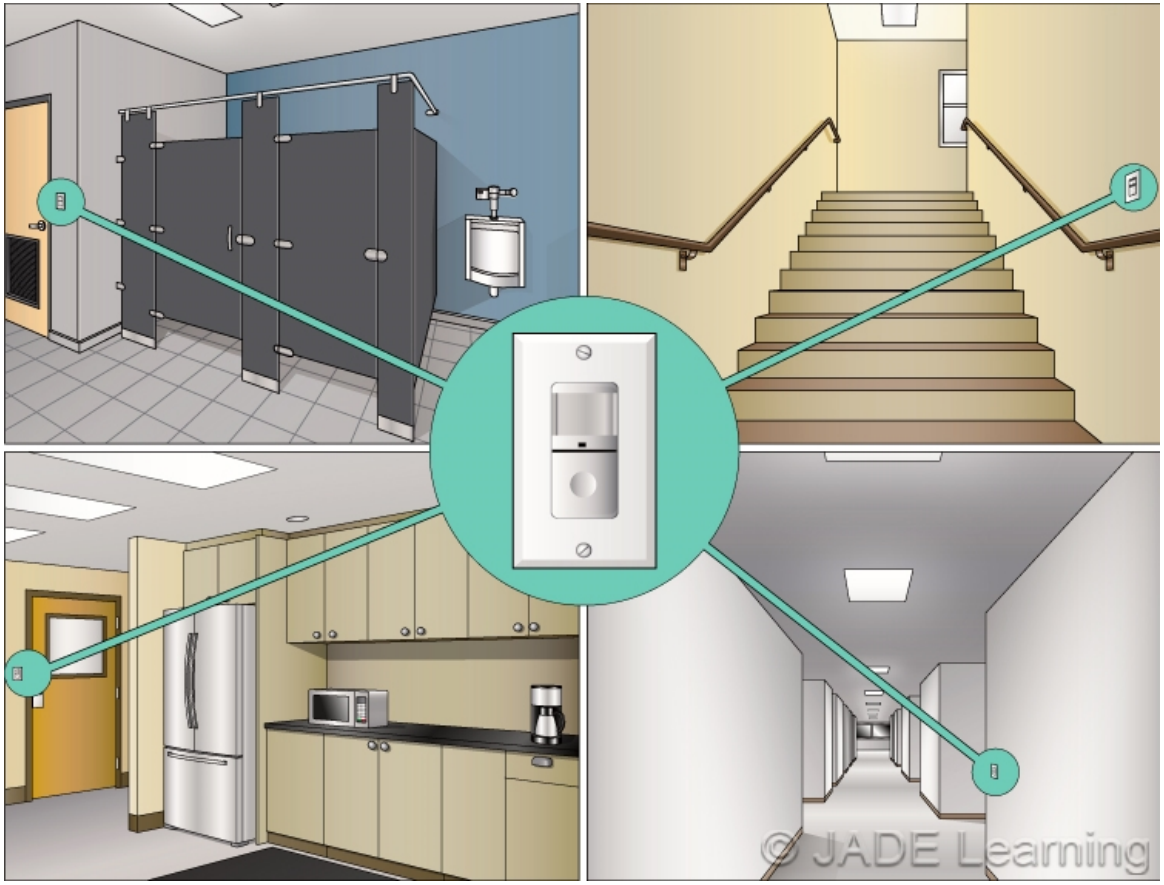
400.10 & 400.12 - Flexible Cords and Cables – Uses Permitted and Uses Not Permitted

A flexible cord is permitted to be located above a suspended or dropped ceiling if it is contained within an enclosure for use in Other Spaces Used for Environmental Air.



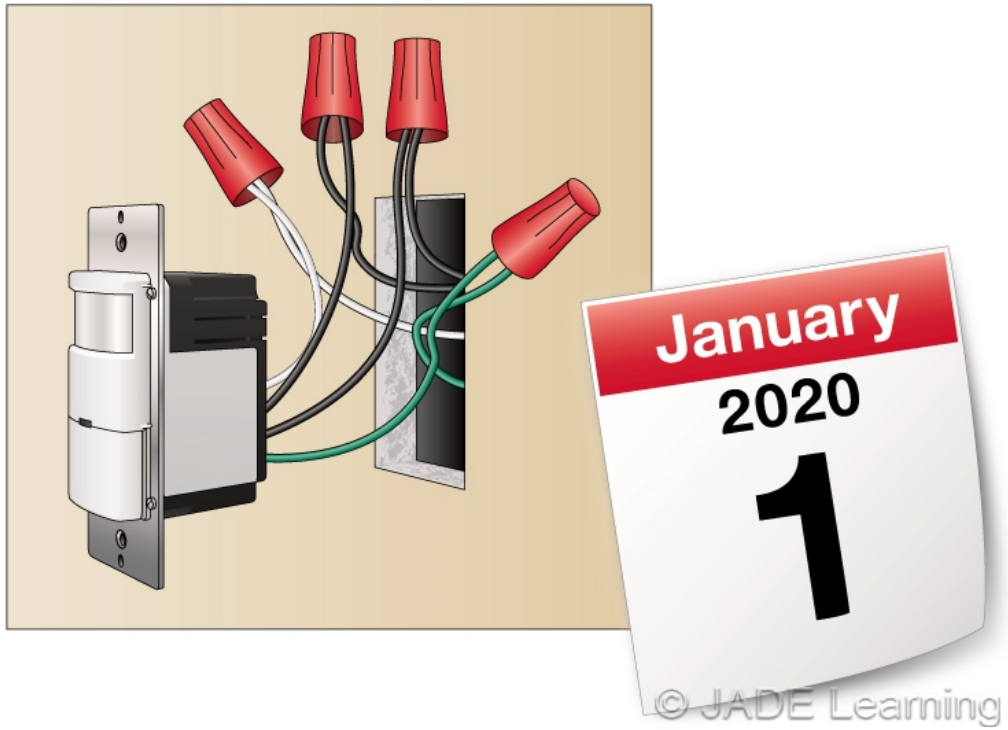
404.2(C) Switches Controlling Lighting Loads.



The grounded conductor must be installed at switch locations in bathrooms, hallways, stairways and rooms suitable for human occupancy.

404.22 - Electronic Lighting Control Switches

After January 1, 2020 an equipment grounding conductor cannot be used to power the electronic light switch.

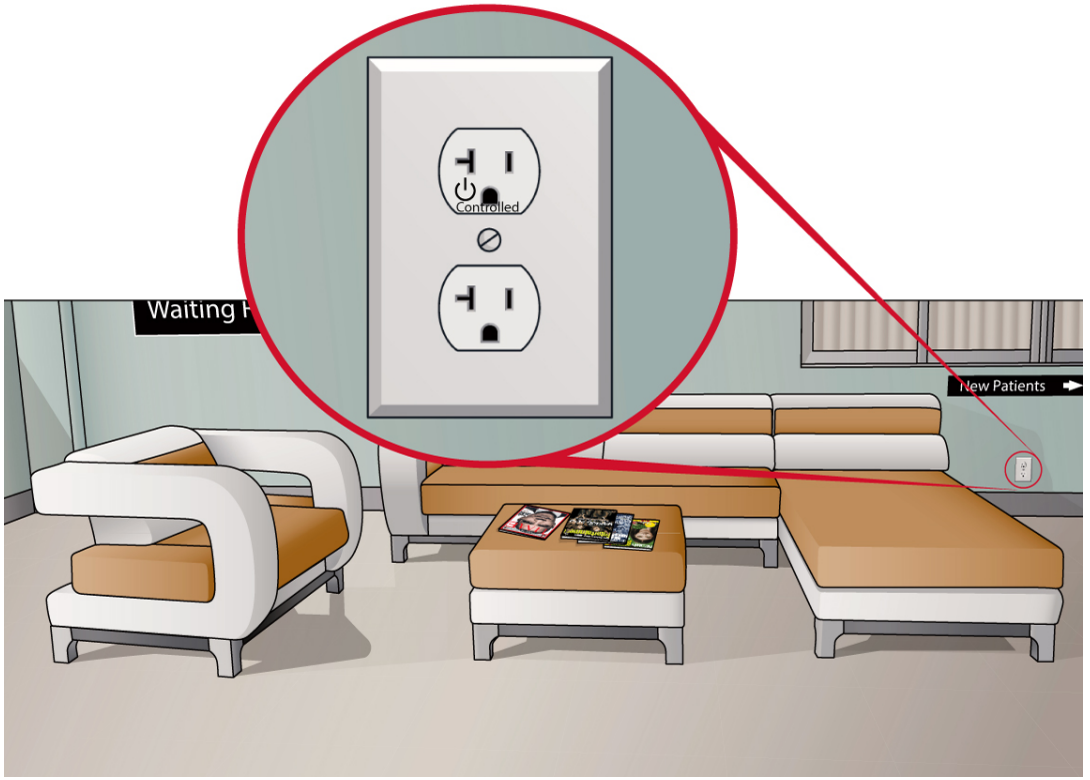


406.2 - Definitions - Outlet Box Hood

An outlet box hood is a housing shield intended to fit over a faceplate for flush-mounted wiring devices, or an integral component of an outlet box or of a faceplate for flush-mounted wiring devices.

406.3(E) - Receptacle Rating and Type - Controlled Receptacle Marking

Receptacles that are controlled by an energy management system must be marked with the power symbol and the word "controlled."



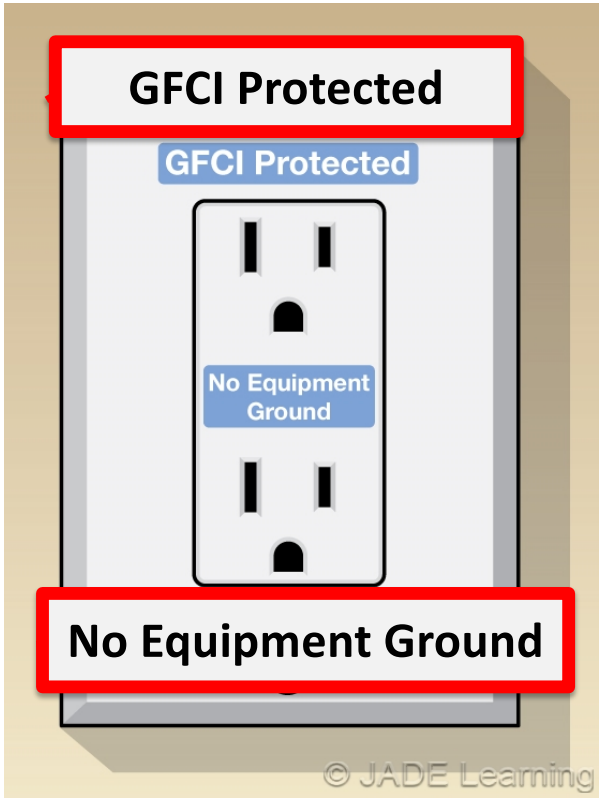
406.3(F) - Receptacle Rating and Type - Receptacle with USB Charger

Receptacles with built in USB chargers must be listed.

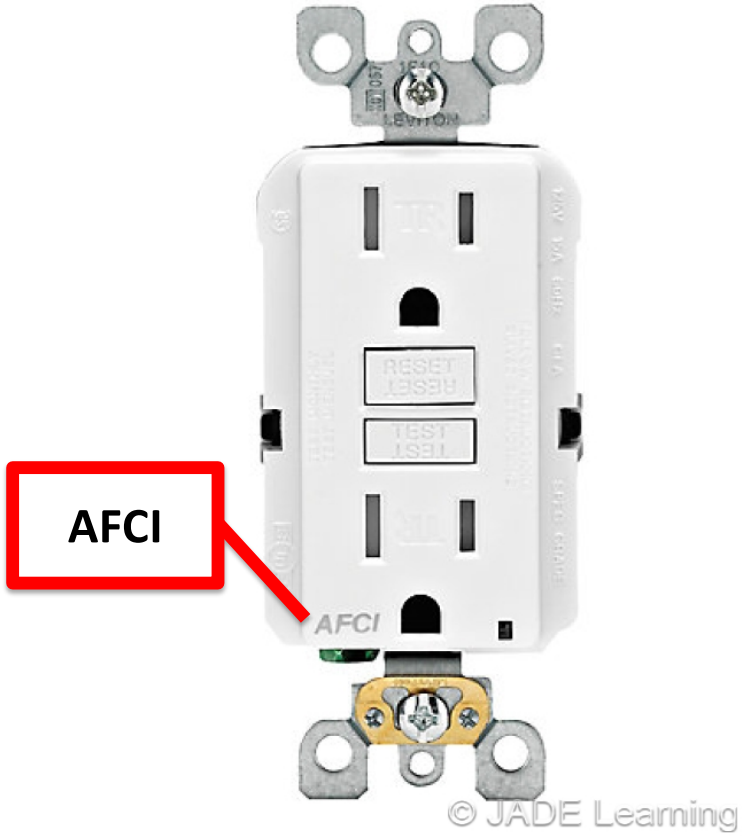
406.4(D)(2) - General Installation Requirements - Replacements Non-Grounding-Type Receptacles

Not all non-grounding type receptacles can be replaced with a GFCI receptacle.

Some manufacturers require an equipment ground for their equipment or appliance.



406.4(D)(4) General Installation Requirements - Replacements - AFCI Protection



Replacing a non-grounding type receptacle with another non-grounding type receptacle in an area that requires AFCI protection is not permitted.

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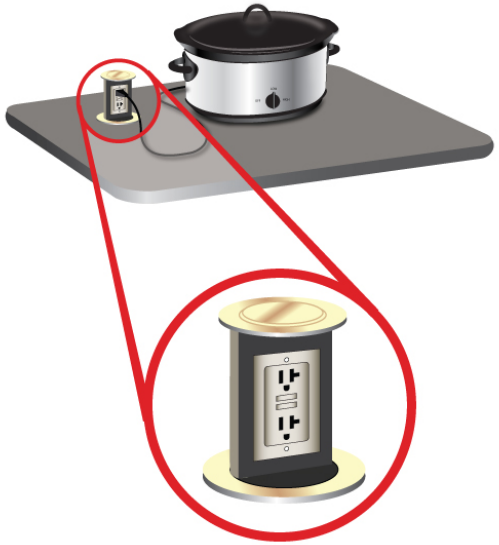
406.4(D)(5) - General Installation Requirements – Replacements - Tamper-Resistant Receptacles

A non-grounding receptacle is permitted to replace a non-grounding receptacle without providing tamper-resistant protection.

406.5(E), (F), (G), (H) - Receptacle Mounting - Receptacles in Countertops, Work Surfaces, Orientation, in Seating Areas

Receptacles listed for installation in countertops may be installed in work surfaces. Receptacles that are listed for installation in work surfaces only cannot be installed in countertops.



Listed for Countertop Applicatons

Listed for Work Surface Applicatons Only

406.6(D) - Receptacle Faceplates - Receptacle Faceplate with Integral Night Light and/or USB Charger.

Receptacle cover plates that incorporate a night light and/or a USB connector must be listed.

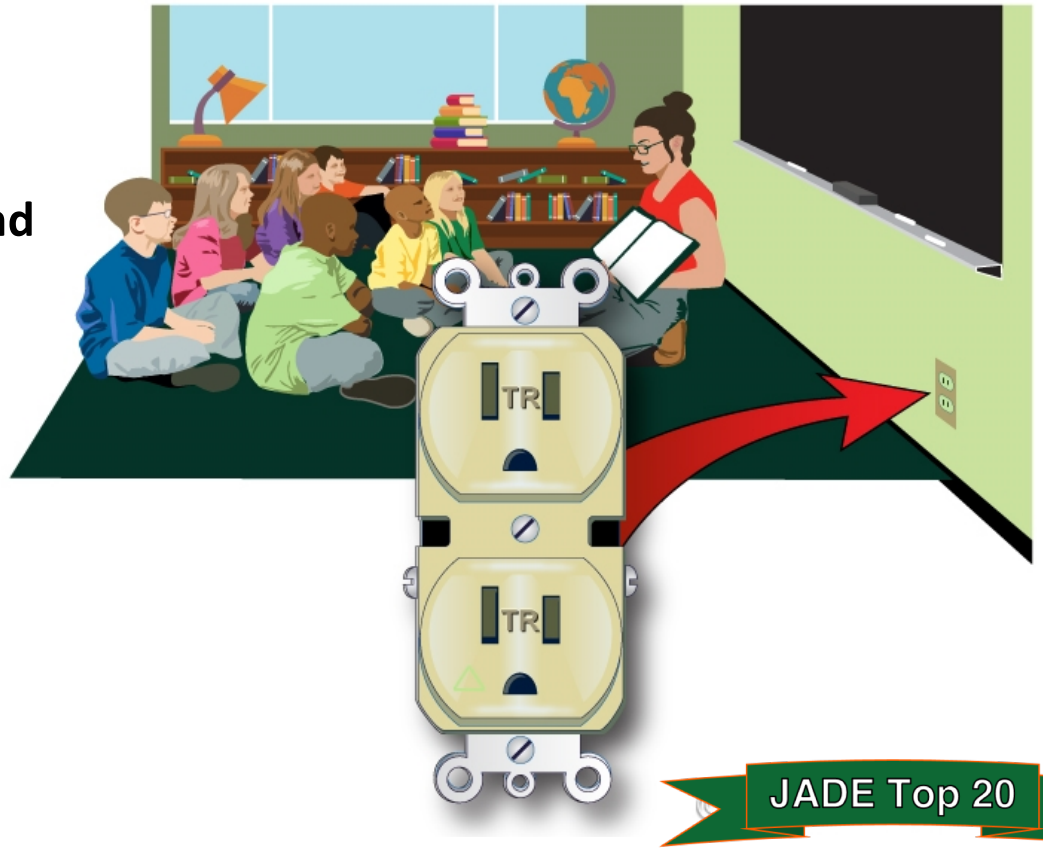
406.9(B)(1) - Wet Locations - Receptacles of 15 and 20 Amperes in a Wet Location

Receptacles in wet locations do not require an extra duty hood where the enclosure is identified for outdoor use without an outlet hood.

406.12 - Tamper-Resistant Receptacles

Also required in:

- **Preschools and elementary schools**
- **Business offices, corridors and waiting rooms in medical facilities**
- **Places of awaiting transportation**
- **Gymnasiums**
- **Skating rinks**
- **Auditoriums**
- **Dormitories.**



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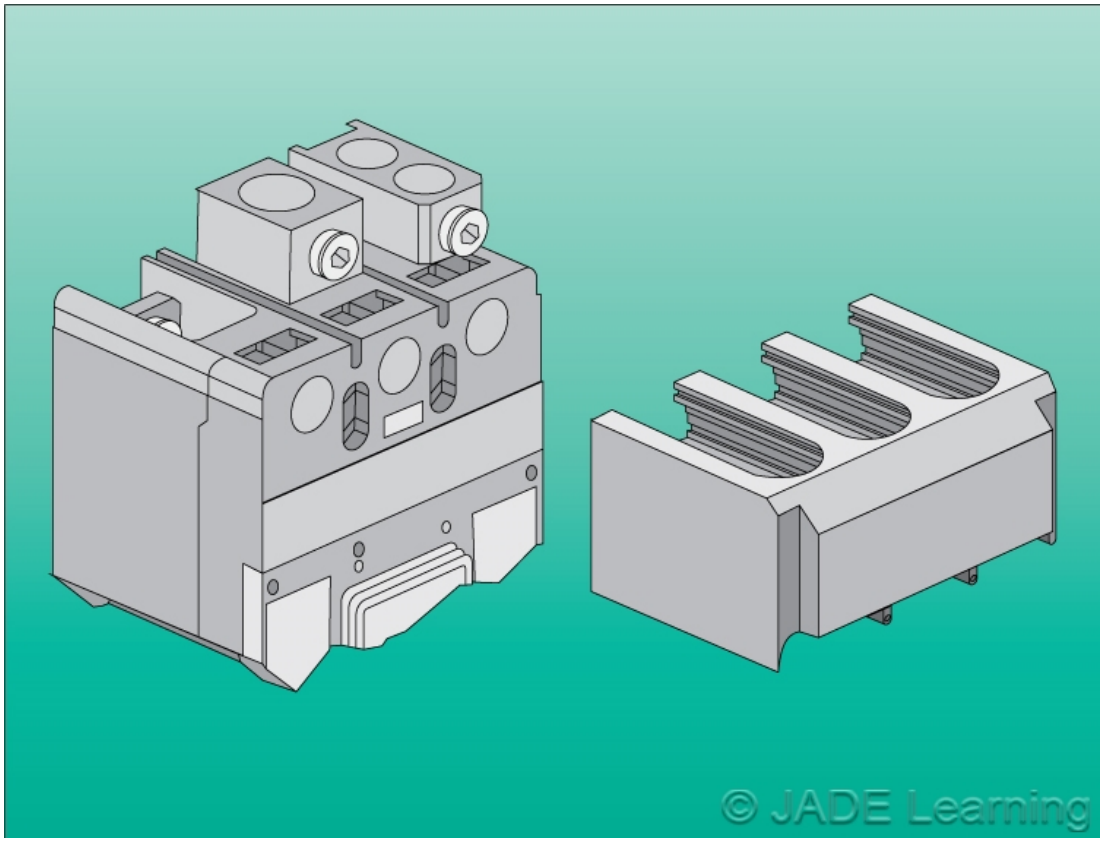
408.3(A)(2) - Service Panelboards, Switchboards, and Switchgear

Barriers are required, which will prevent accidental contact with busbars while servicing load terminations.



408.4(B) - Field Identification Required – Source of Supply

The label must be:

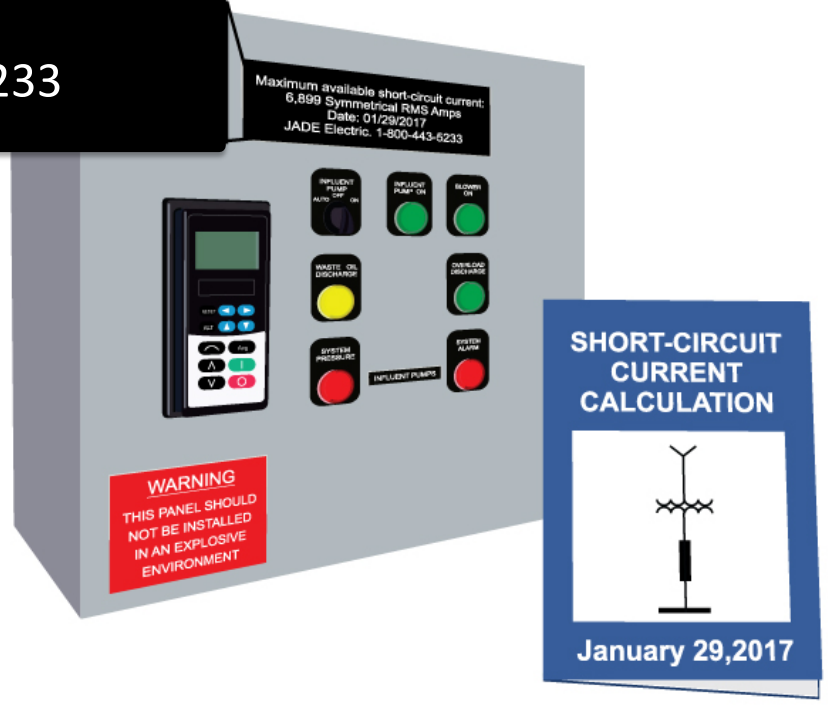
- Permanent
- Durable
- Not handwritten.

Supply Located in MDP1 Main Equipment Room

409.22 - Industrial Control Panels: Short-Circuit Current Rating

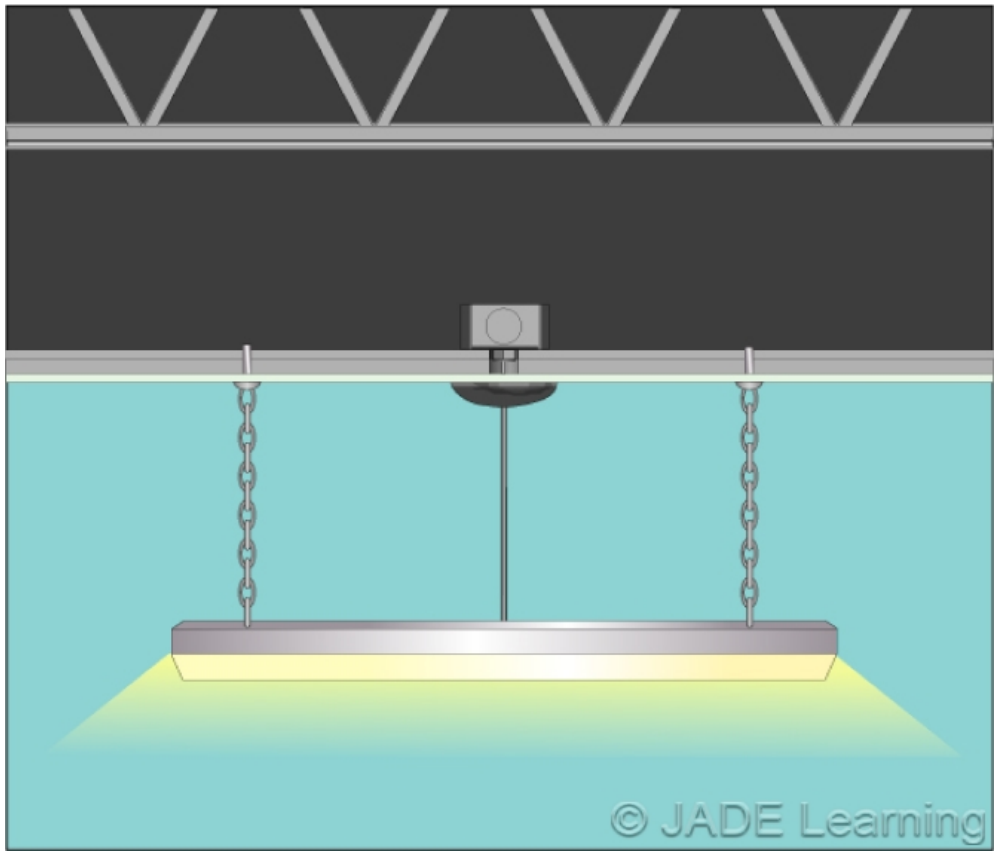
Maximum Available short-circuit current:
6,899 Symmetrical RMS Amps
Date: 01/29/2017
JADE Electric: 1-800-443-5233

A record of the available short-circuit current and the date of the calculation must be kept.



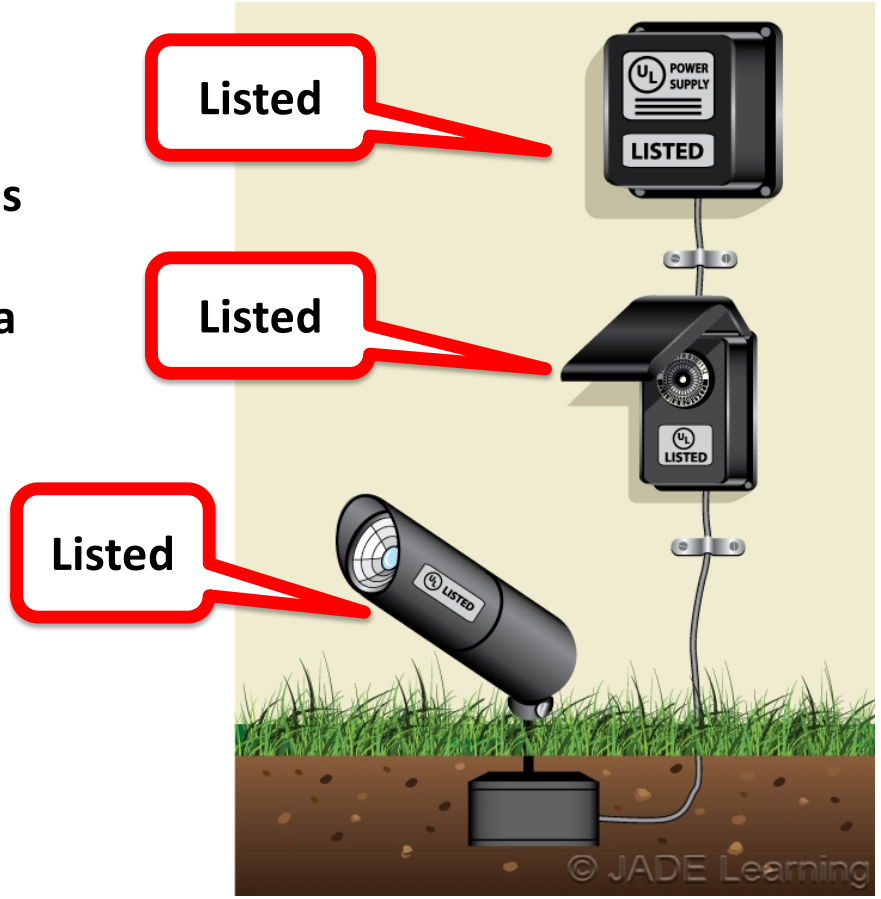
410.62(C) Cord-Connected Electric-Discharge and LED Luminaires.

A luminaire can be cord-and-plug connected using a grounding-type attachment plug. The luminaire must be located directly below the lighting outlet, and the cord must be visible for its entire length.



Article 411 - Low-Voltage Lighting

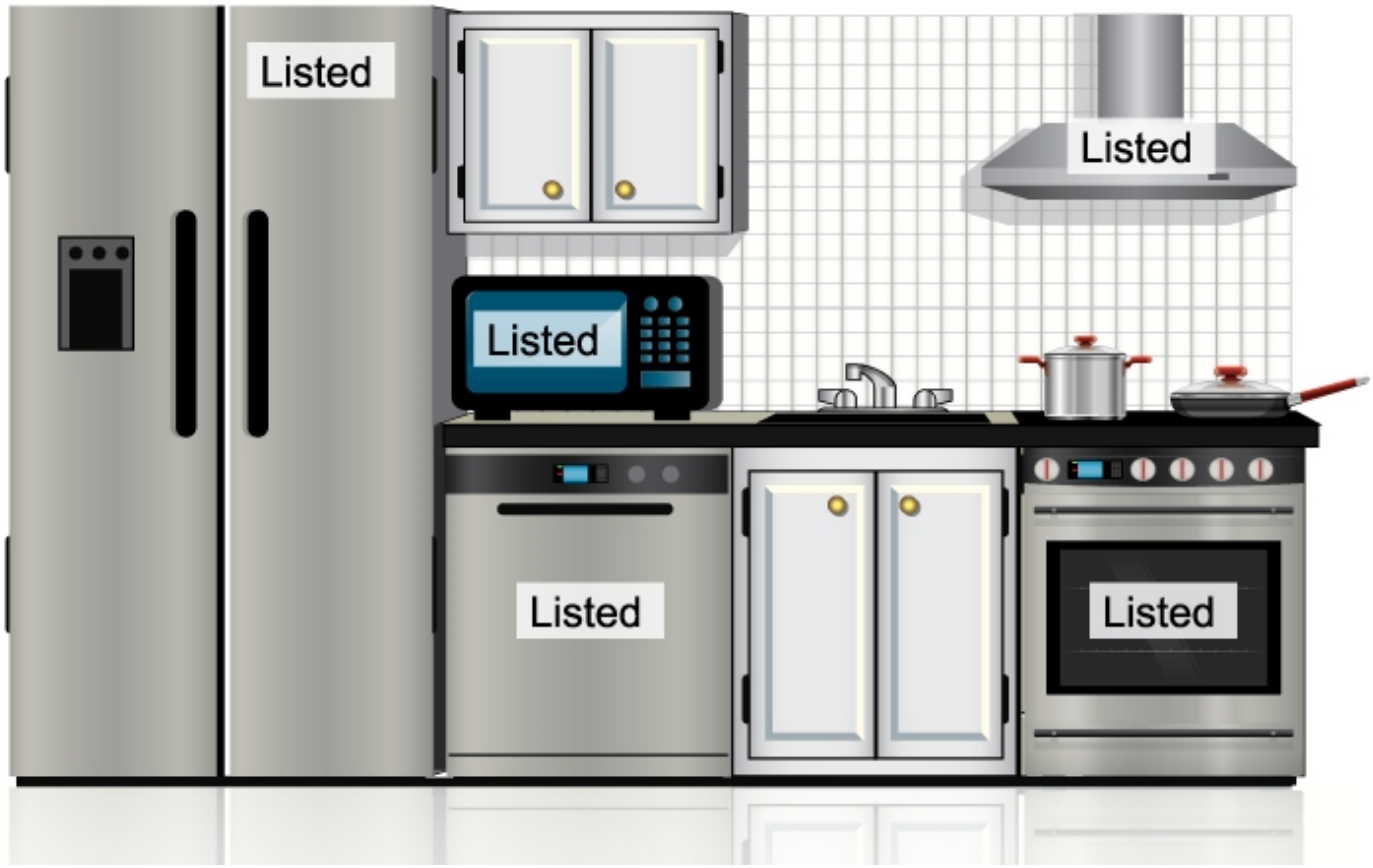
Low voltage lighting systems using insulated conductors do not need to be listed as a complete system as long as each component is listed.



422.5 Appliances - GFCI Protection for Personnel

Single- or 3-phase appliances rated 250 volts or less, and 60 amperes or less, must have GFCI protection for personnel.

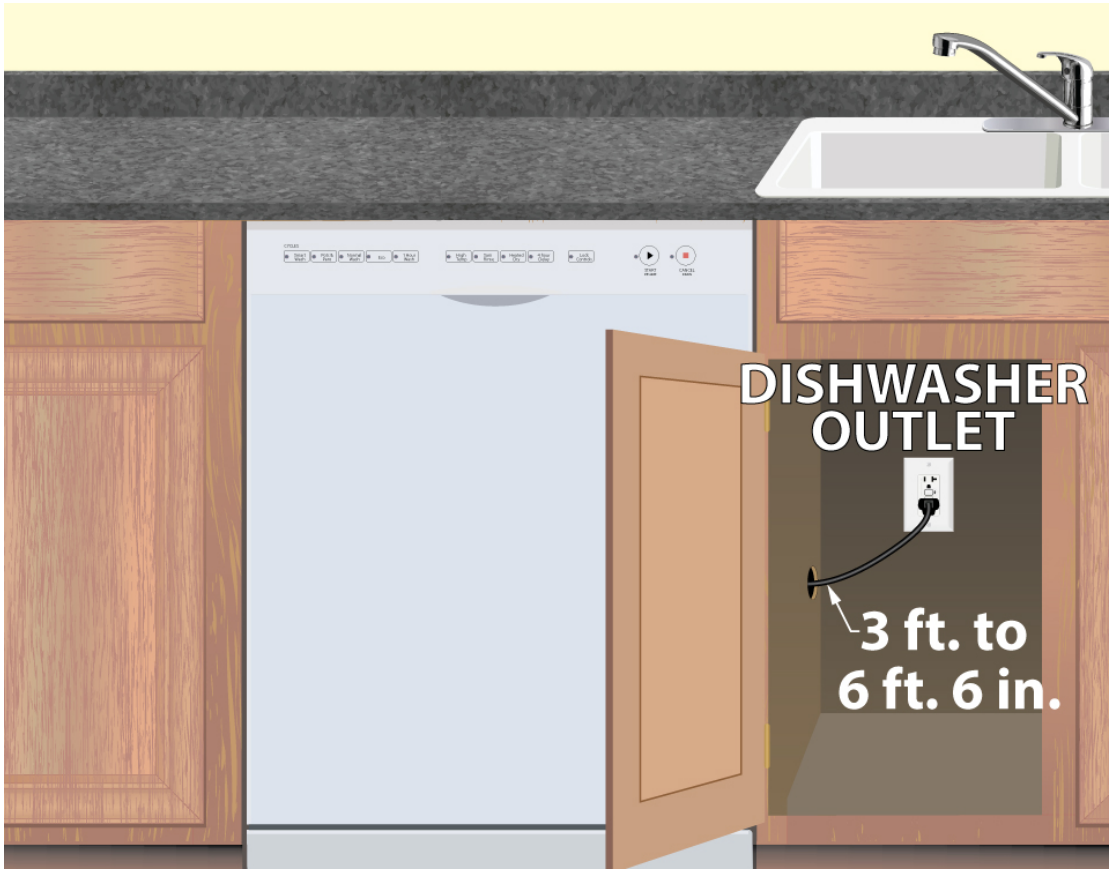
422.6 – Appliances: Listing Required



All appliances operating at 50 volts or more shall be listed.

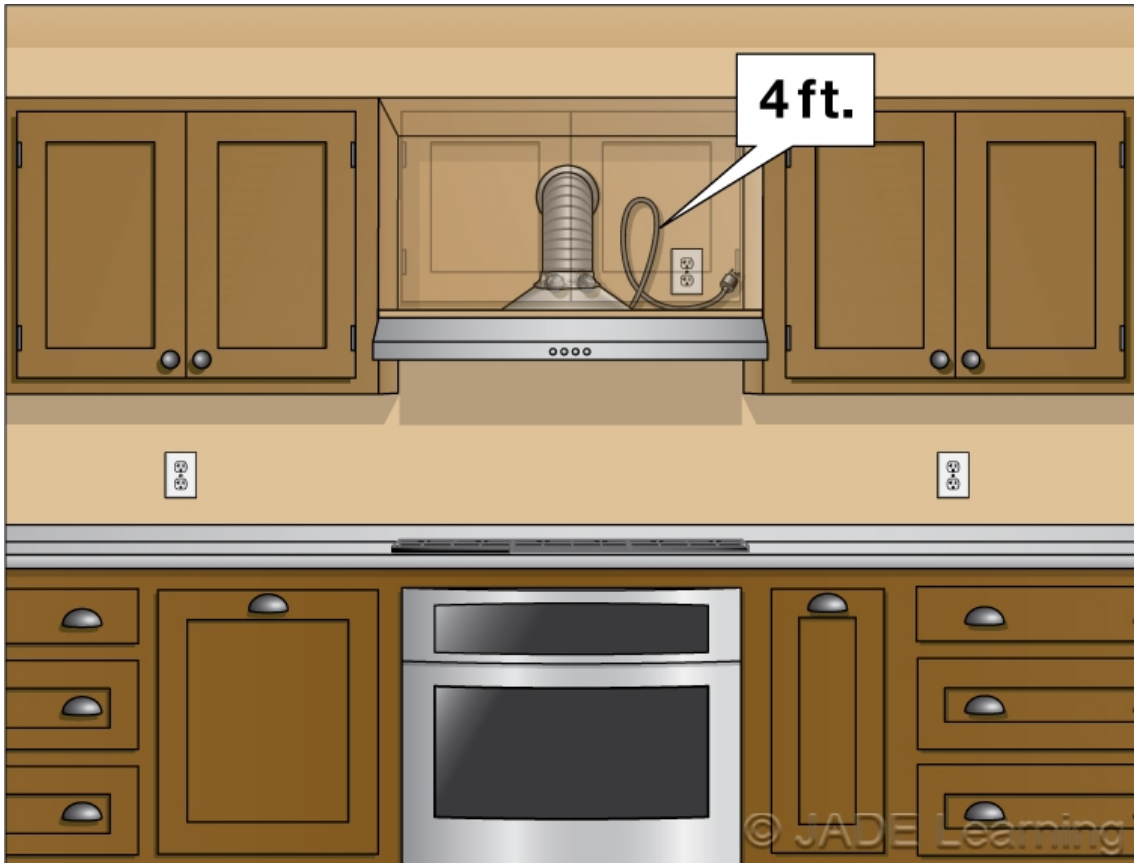
422.16(B)(2) - Built-in Dishwashers & Trash Compactors

A receptacle for the dishwasher is no longer permitted to be installed behind the dishwasher. The receptacle must be accessible.

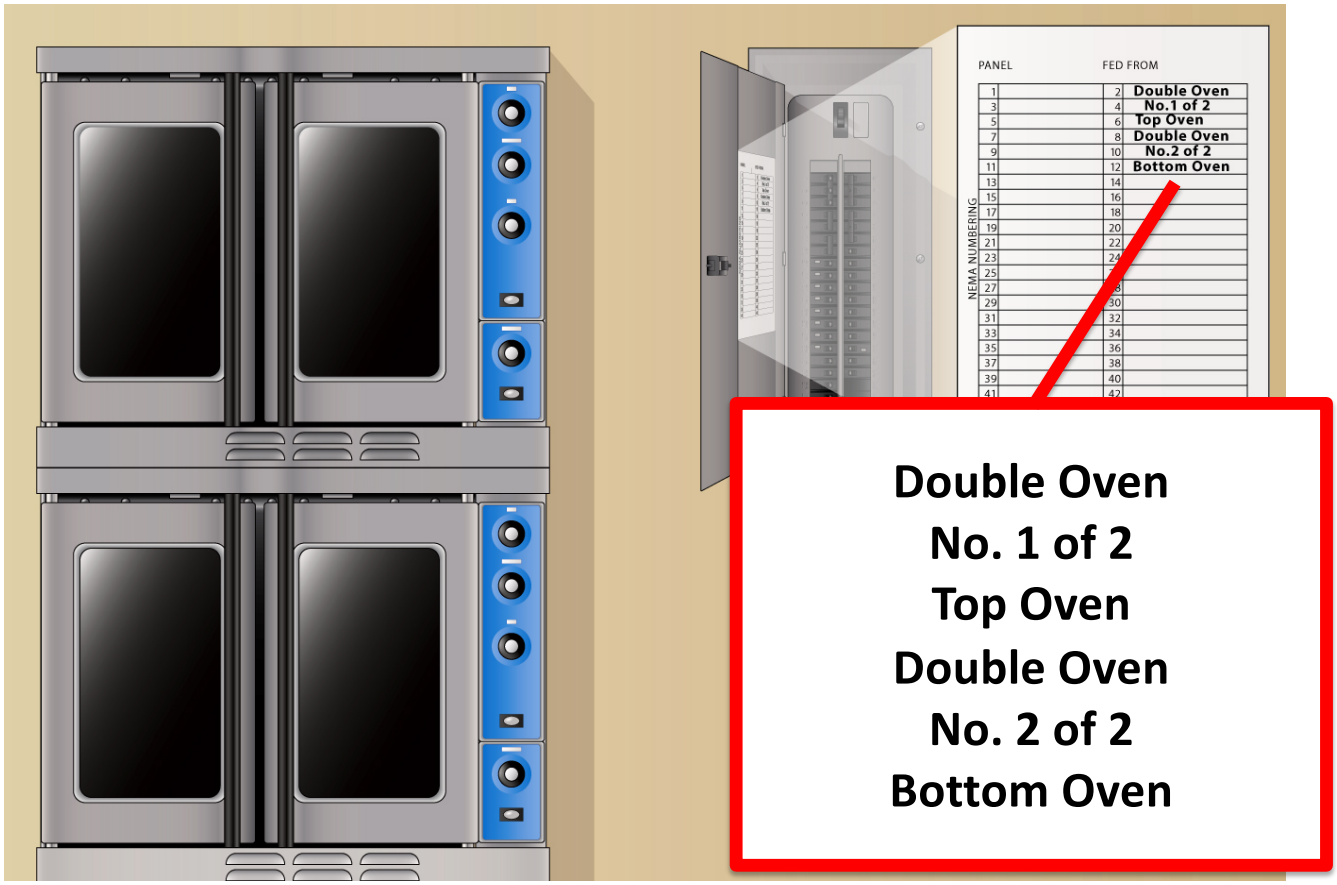


422.16(B)(4) - Flexible Cords: Range Hoods

The maximum length of the cord for a range hood has been increased to 4 feet.



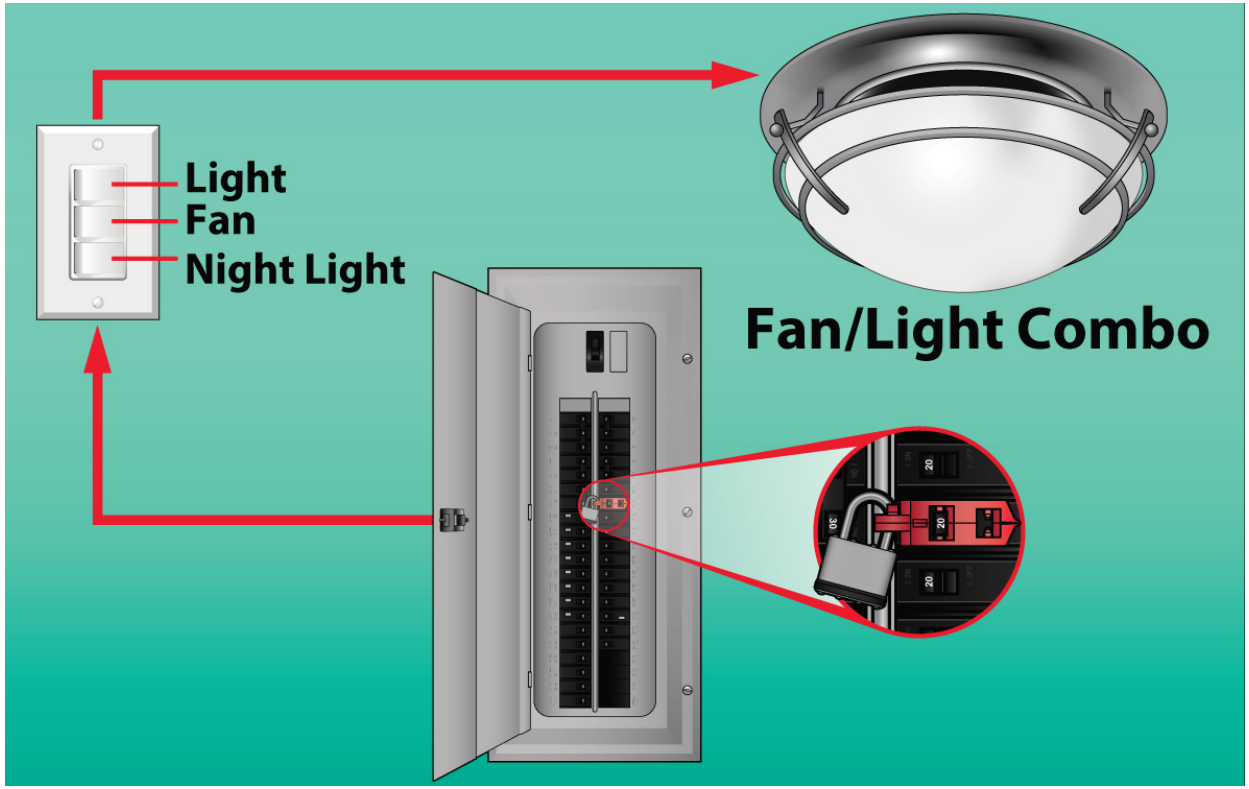
422.30 – Appliances: Disconnecting Means - General



The disconnecting means for an appliance supplied by more than one branch circuit must be grouped and identified as the multiple disconnecting means for the appliance.

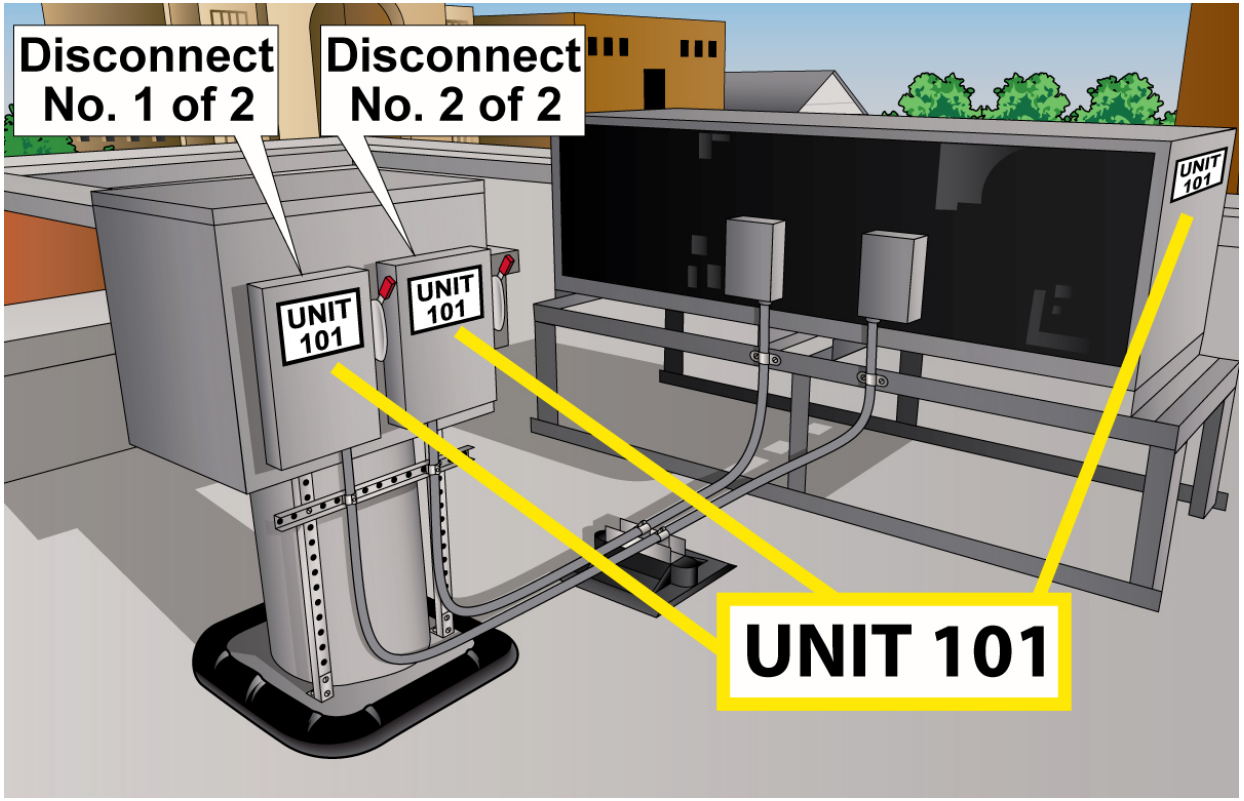
422.31(A) - Disconnection of Permanently Connected Appliances: Rated at Not over 300 Volt-Amperes or 1/8 Horsepower

The disconnecting means for appliances that are rated not more than 300 volt-amperes or 1/8 HP must be within sight of the appliance or have a lockout device on the circuit breaker.



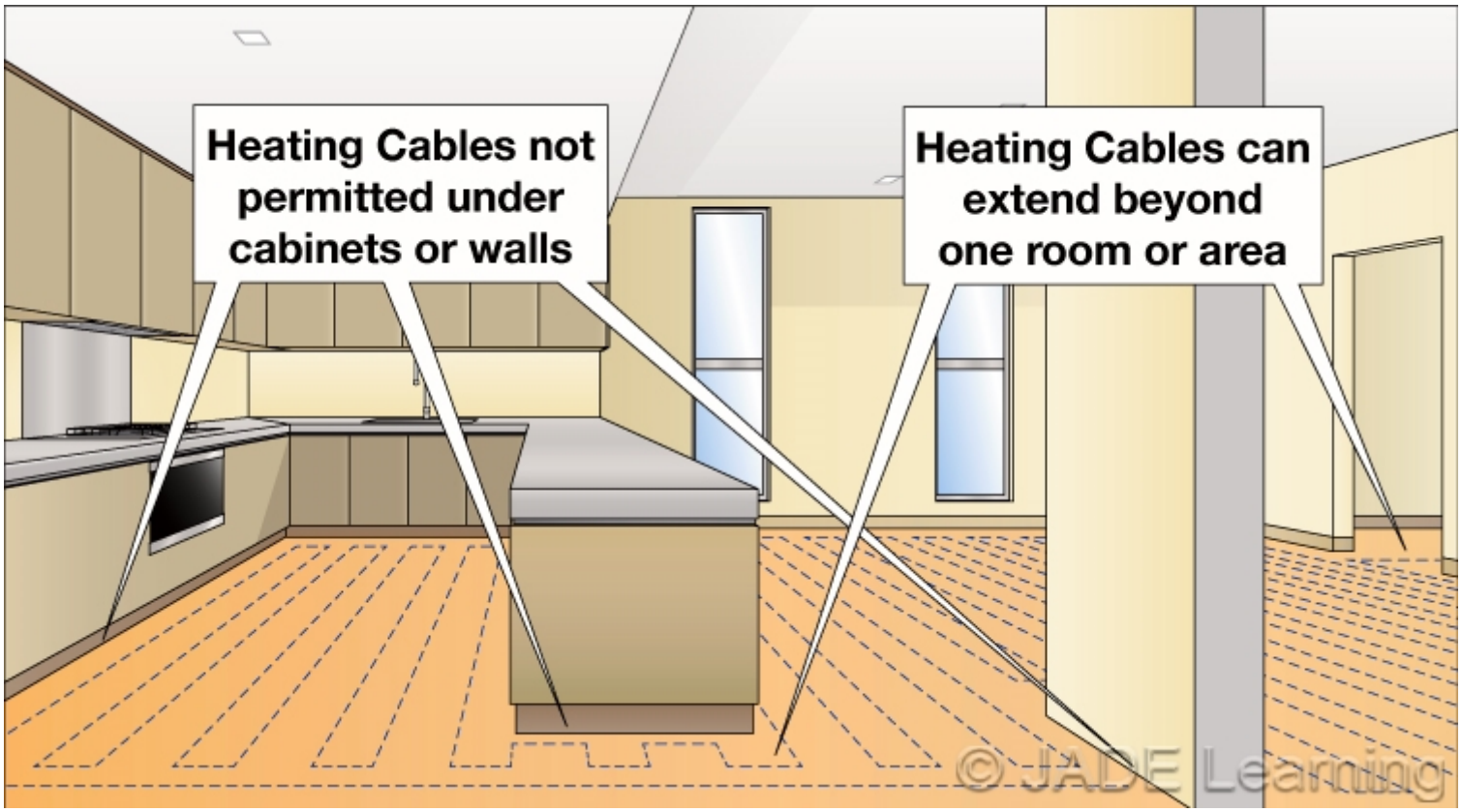
424.19 - Control and Protection of Fixed Electric Space-Heating Equipment: Disconnecting Means

Multiple disconnects for heating equipment must be grouped and identified as being a part of multiple disconnecting means.



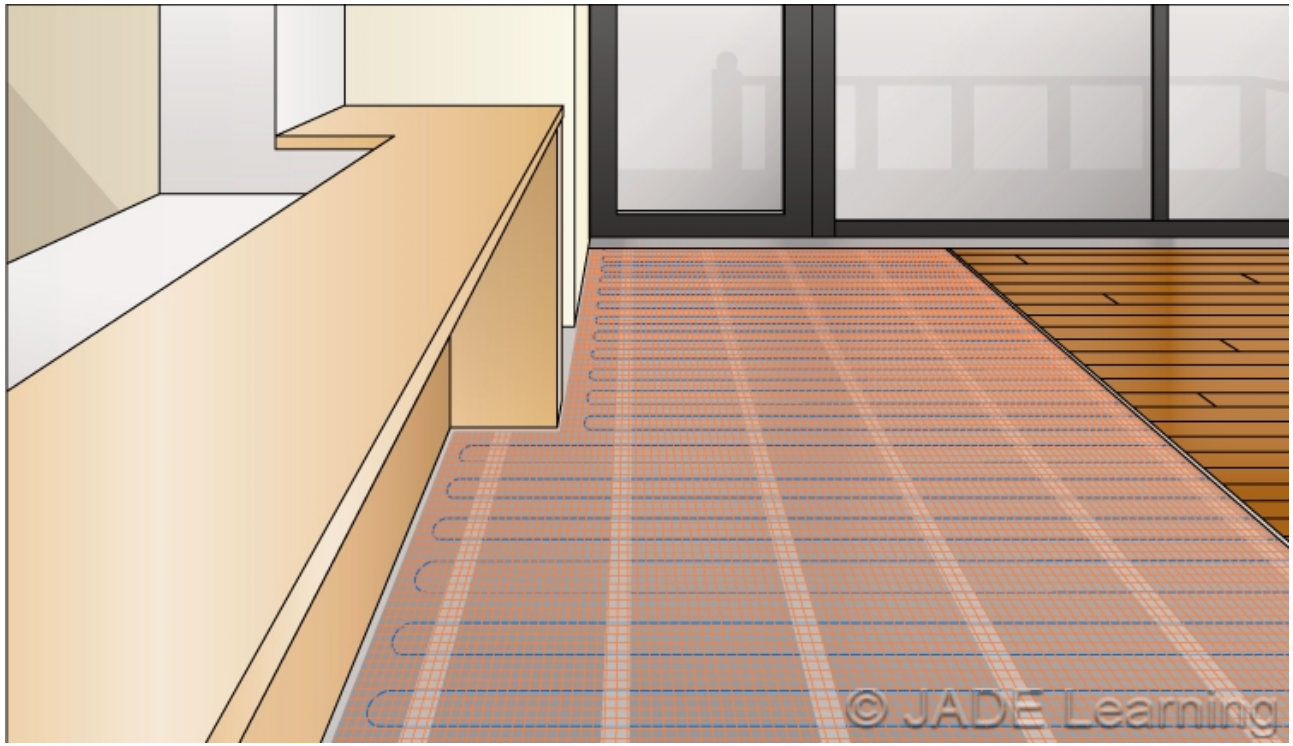
424.38 - Electric Space-Heating Cables - Area Restrictions

Heating cables are now permitted to extend beyond one room or area.



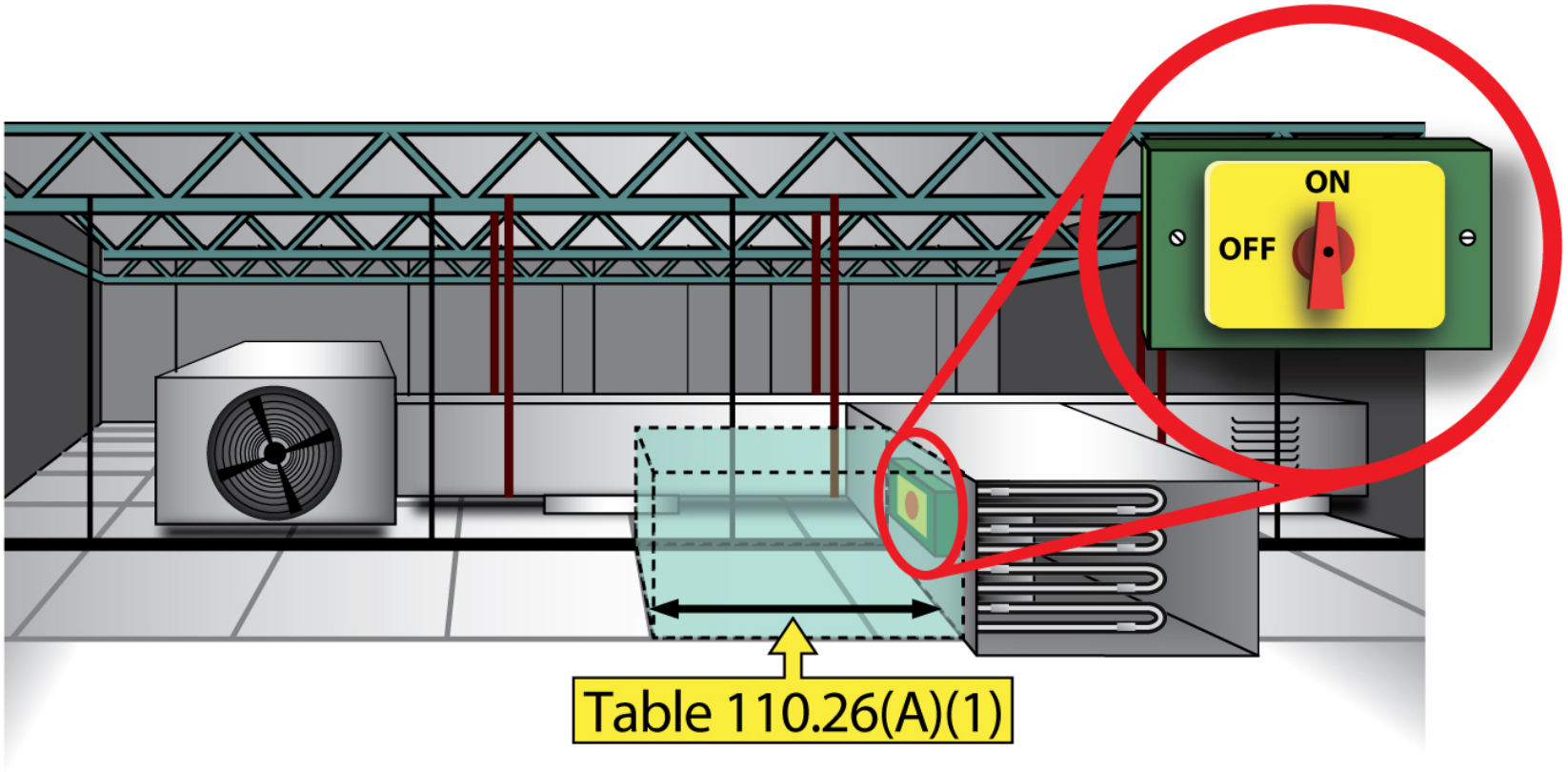
424.45 - Electric Space-Heating Cables: Installation of Cables Under Floor Coverings

Electric space-heating cables can be installed below ceramic tile, hardwood, vinyl floor coverings or even carpet if installed according to the manufacturer's instructions and identified as suitable for use under the floor covering.



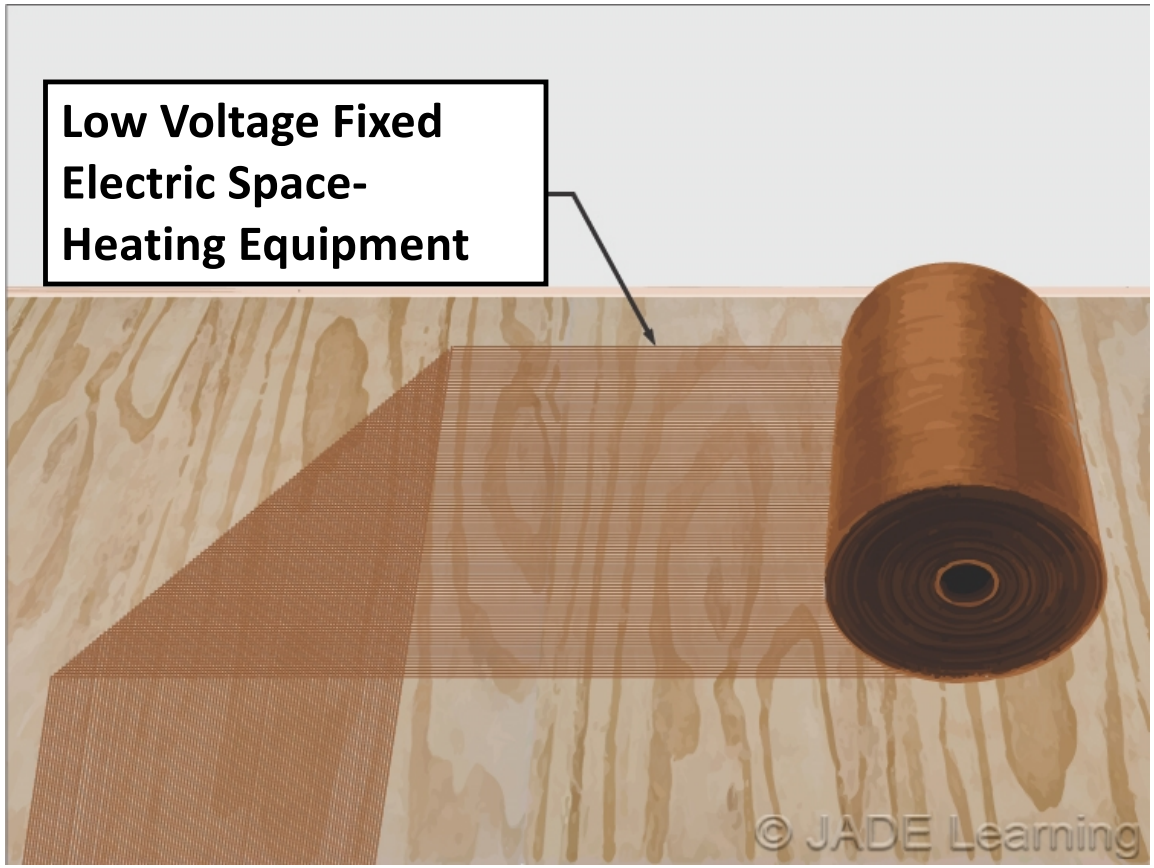
424.66 - Duct Heaters - Installation

Duct heaters require working space in areas with limited access.

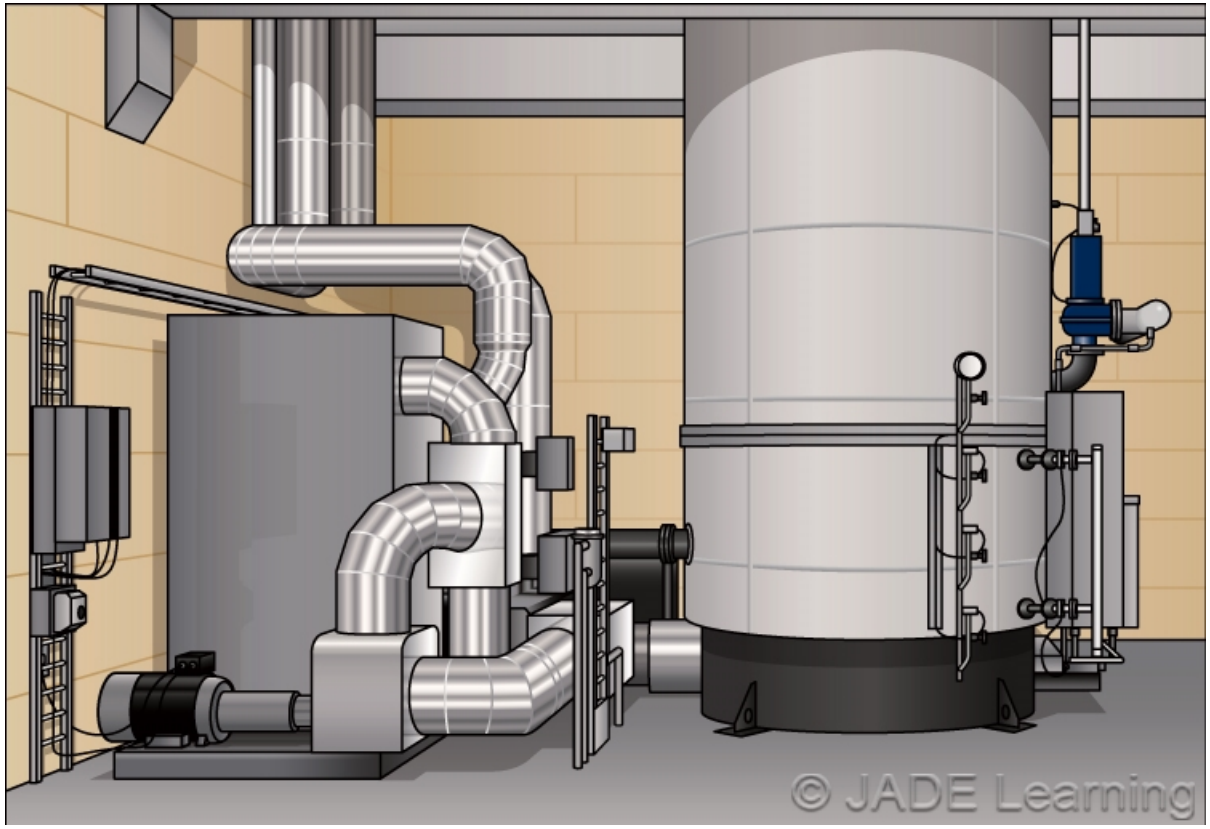


424 - Part X: Low-Voltage Fixed Electric Space-Heating Equipment.

Low-voltage fixed electric space-heating equipment must be listed as a complete system and installed in accordance with the manufacturer's installation instructions.



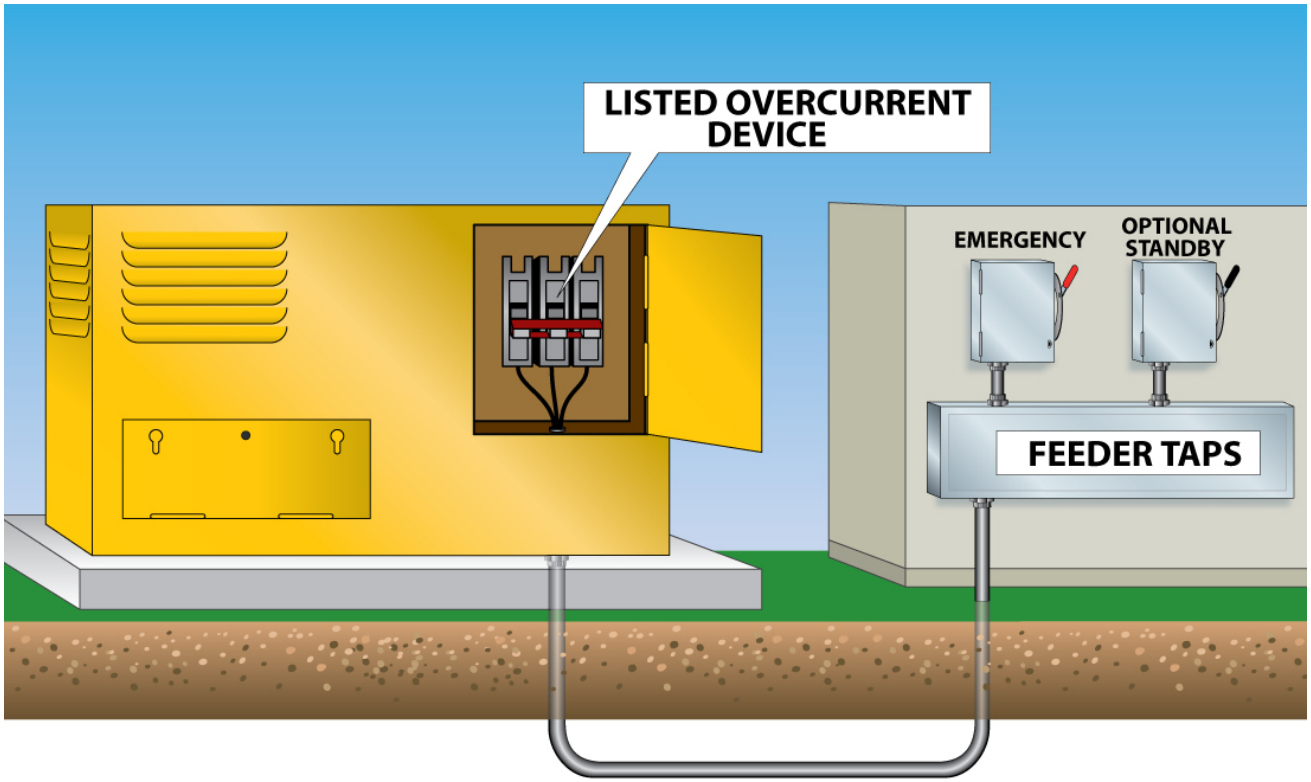
Article 425 - Fixed Resistance and Electrode Industrial Process Heating Equipment.



Article 425 covers fixed industrial process heating equipment that uses resistance or electrode heating technology.

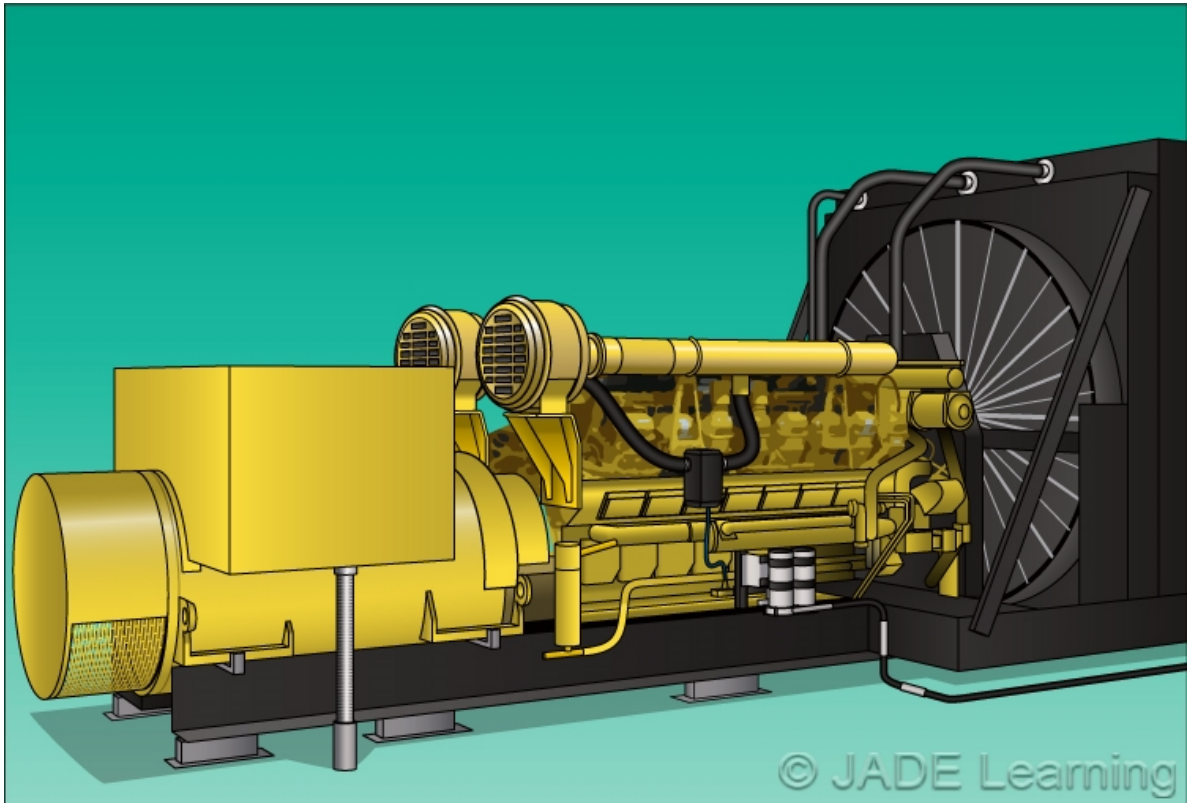
445.13(B) – Generators - Ampacity of Conductors: Overcurrent Protection Provided

If a stationary generator rated 15 kW or more is equipped with a listed overcurrent device, taps to the generator feeder can be made on the load side of a listed overcurrent device.



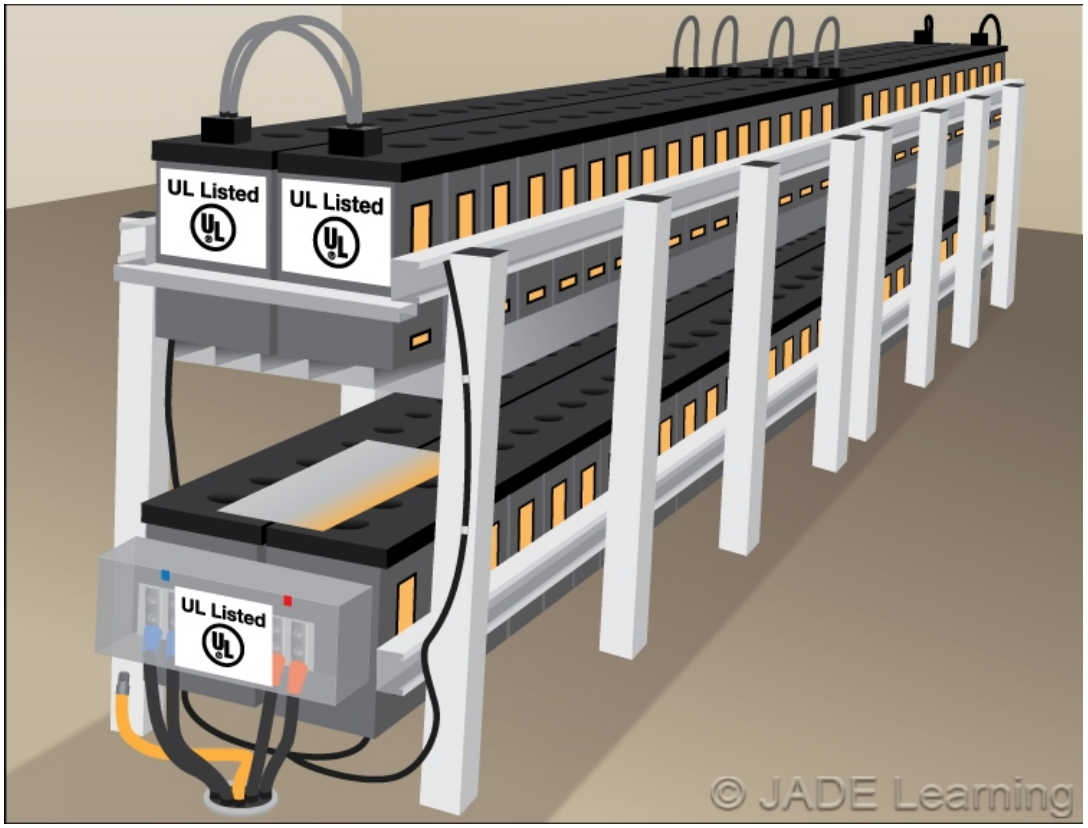
445.18(A), (B) – Generators: Disconnecting Means, Shutdown of Prime Mover

A disconnecting means must be provided for the generator and the prime mover. The disconnecting means must disable start circuits so the generator cannot restart without a manual reset.



480.3 - Storage Batteries - Equipment

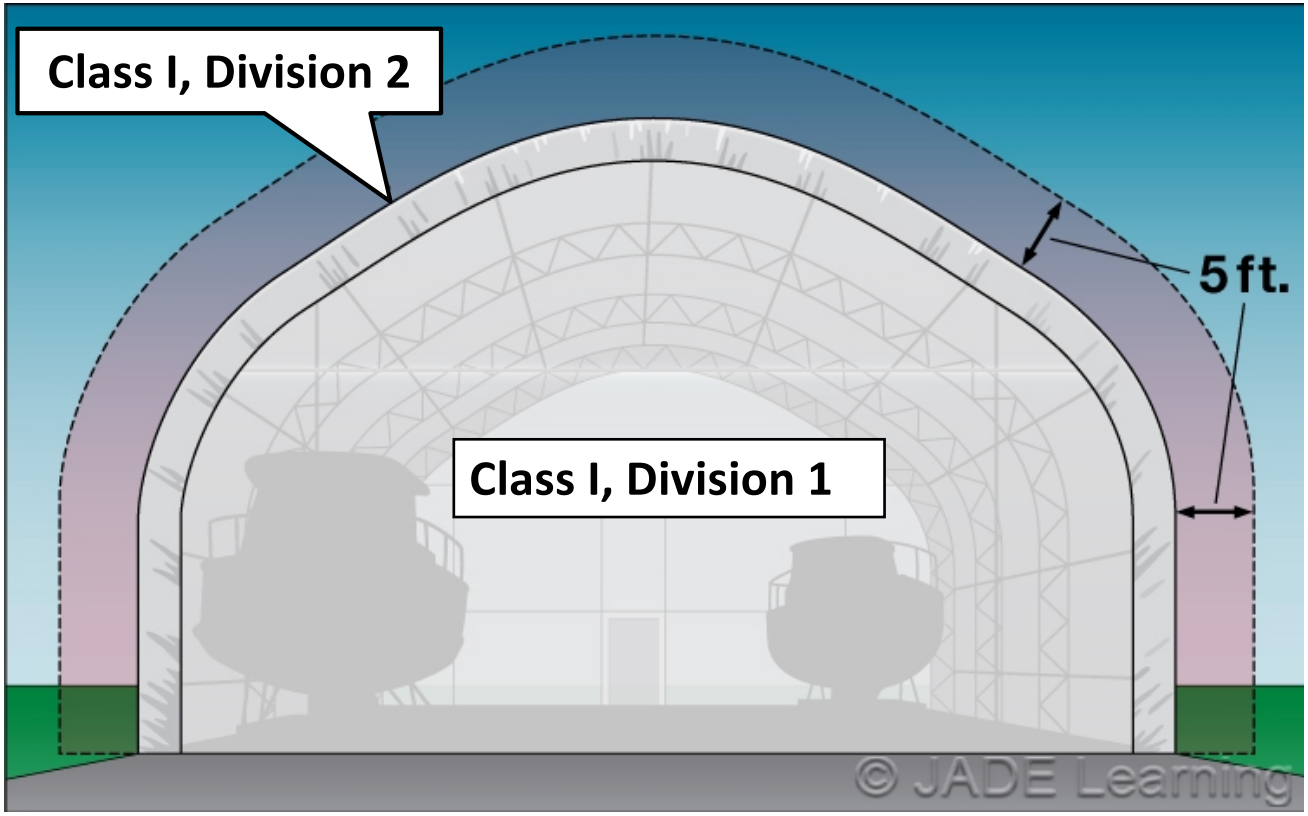
Storage batteries must be listed.



2017 NEC Changes Chapter 5

Article 516 - Spray Application: Dipping, Coating, and Printing Processes Using Flammable or Combustible Materials

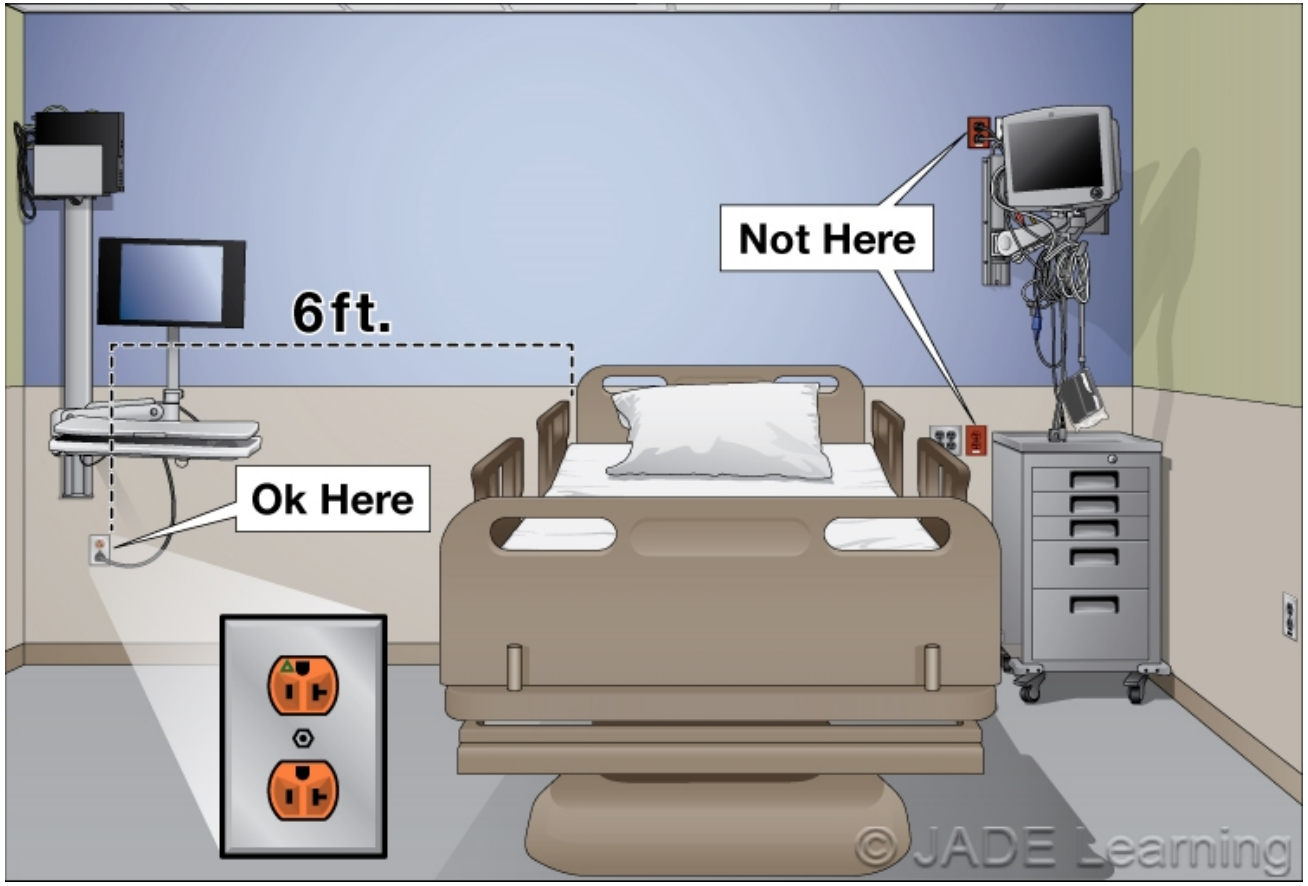
- Class I, Division 1: The area inside a membrane enclosure.
- Class I, Division 2: The area extending 5 feet outside the membrane area.



517.2 - Health Care Facilities: Definitions

There is a new definition of a medical and dental office.

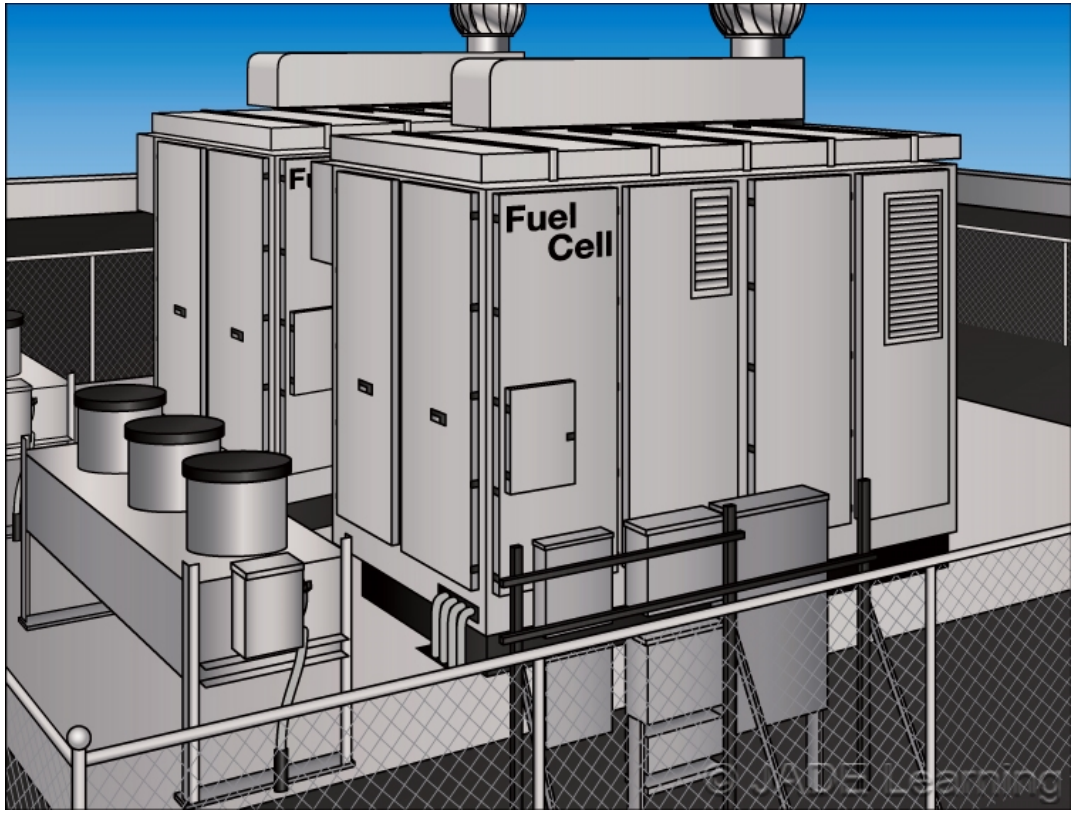
517.16 - Health Care Facilities: Use of Isolated Ground Receptacles



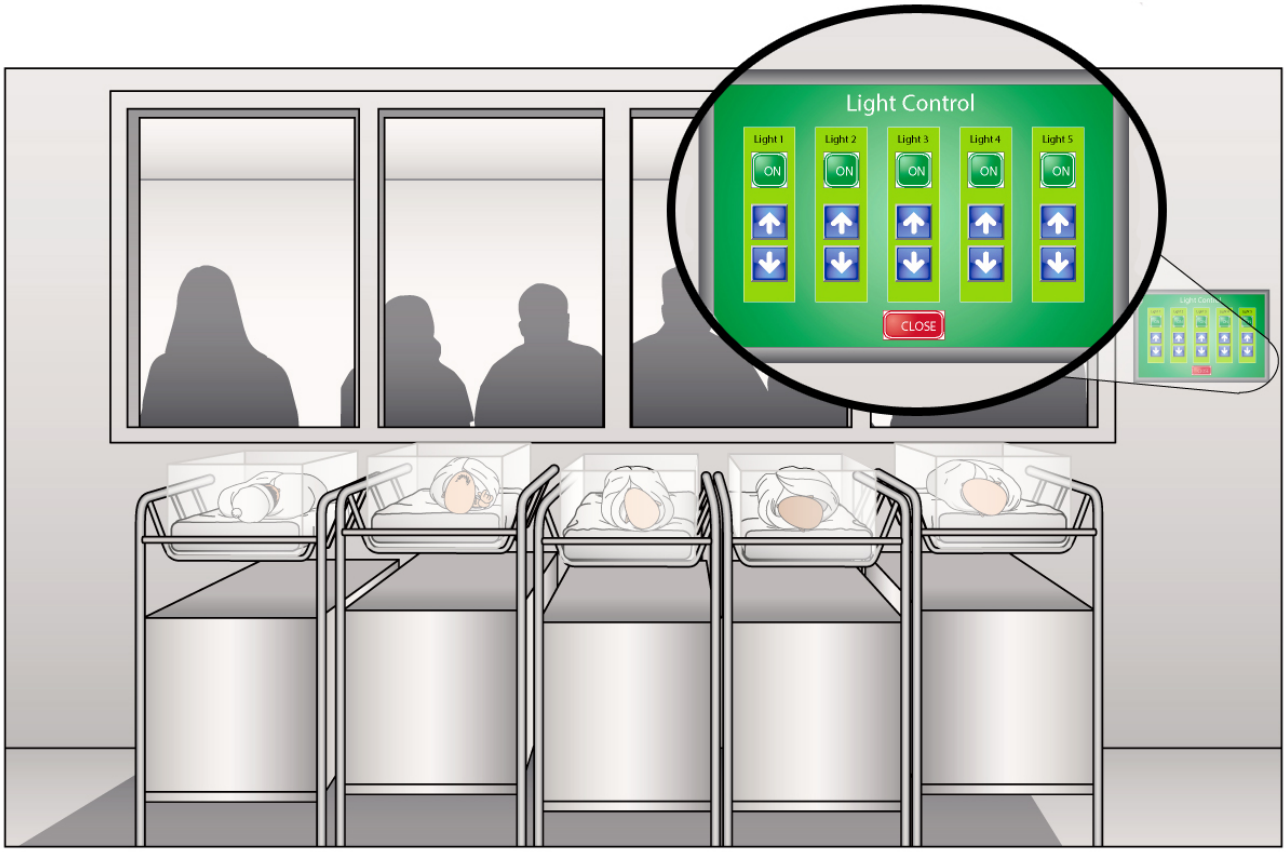
An isolated ground receptacle cannot be installed in the patient care vicinity.

517.30(B)(2) - Health Care Facilities: Types of Power Sources - Fuel Cell Systems

Fuel cells can be used as an emergency source of power for essential electrical systems in hospitals and other health care facilities.

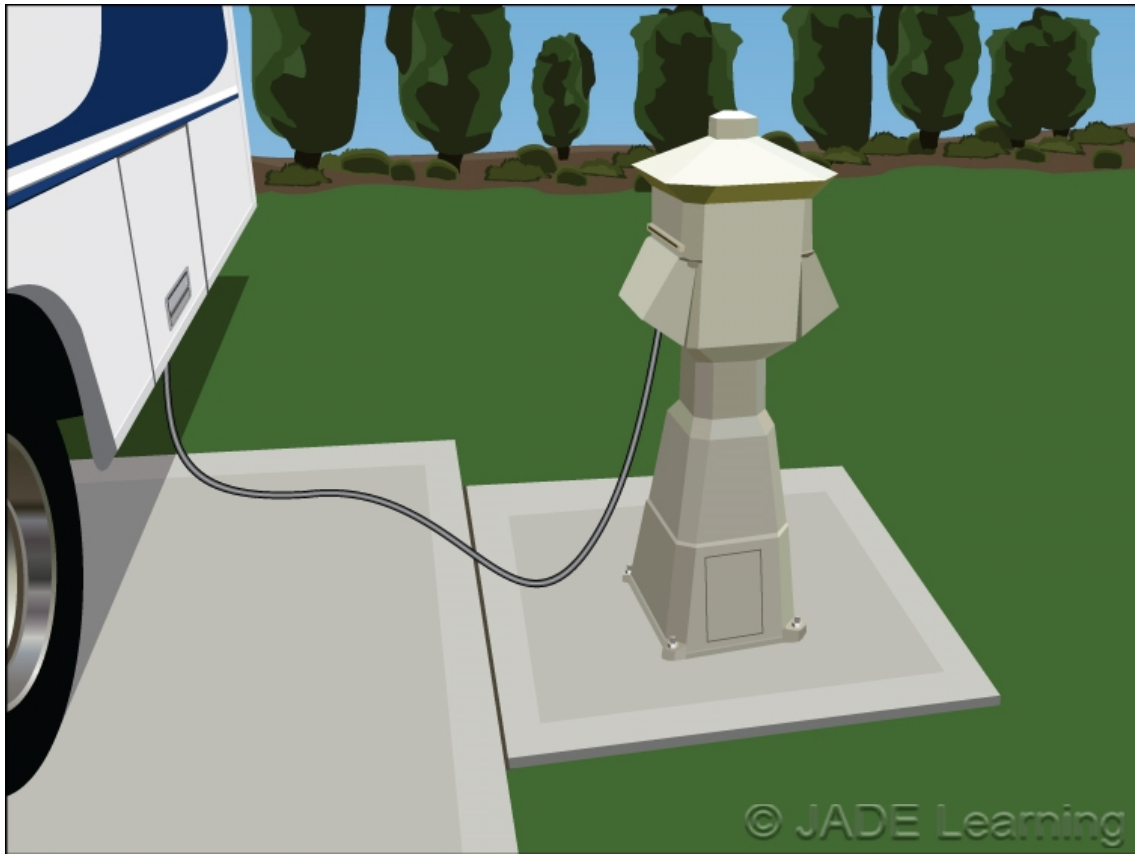


517.34(B) - Health Care Facilities: Critical Branch - Switching



Task lighting on the critical branch of the essential electrical system, such as in an infant nursery, can be controlled by switches or other devices like keypads.

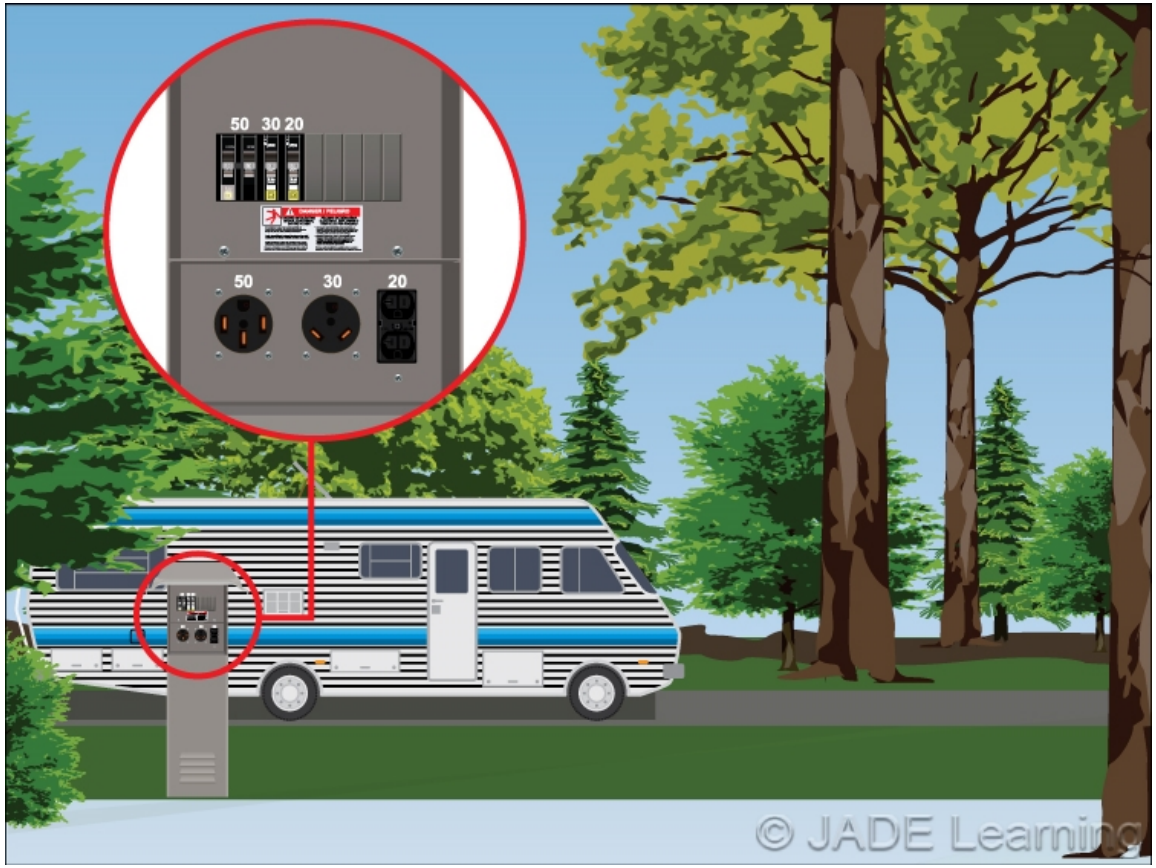
551.71 - Recreational Vehicle Parks: Type Receptacles Provided



- Every RV site with electric power requires at least 1 GFCI protected 20-ampere 125-volt receptacle.
- 70% of RV sites require a single 30-ampere 125-volt receptacle.
- 40% of new RV sites require a single 50-ampere 125/250-volt receptacle.

551.73(A) - RV Parks: Calculated Load - Basis of Calculations

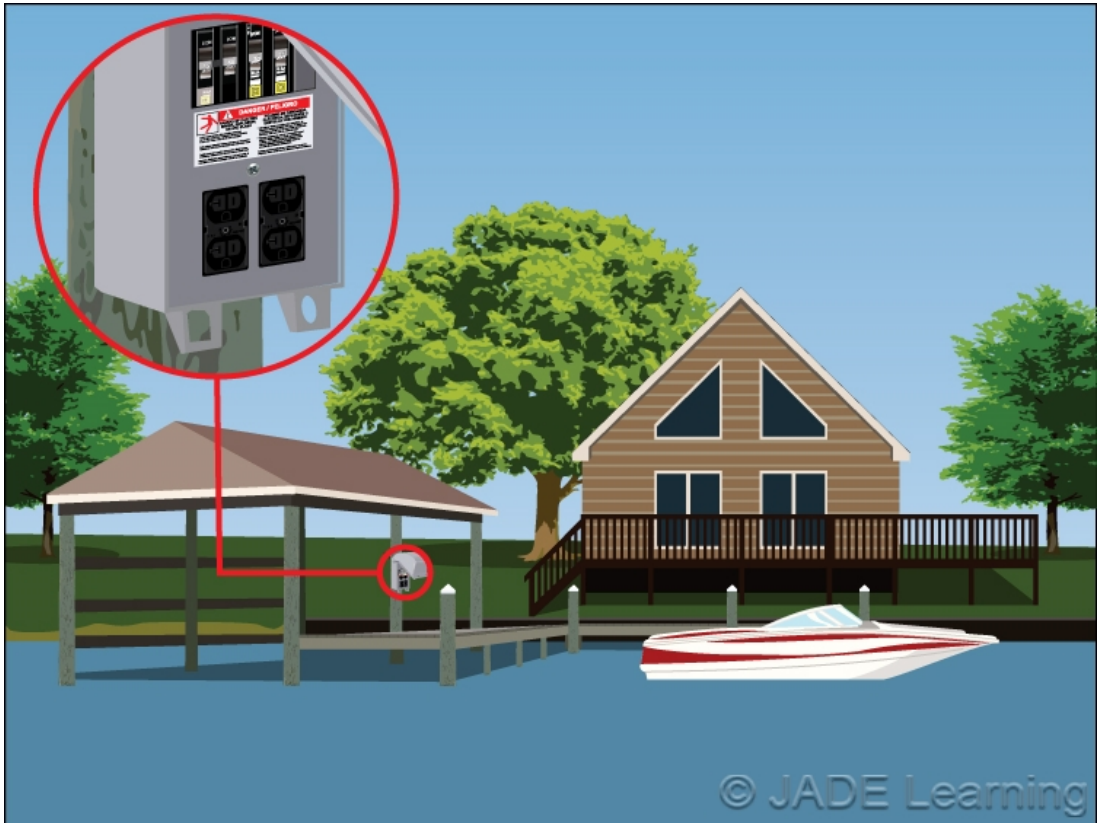
When calculating the load for an entire RV Park, the load per type of receptacle is multiplied by the number of receptacles before the demand factors are applied.



555.1 Marinas, Boatyards, and Commercial and Noncommercial Docking Facilities: Scope

Article 555 now covers docking facilities at:

- One-family dwellings
- Two-family dwellings
- Multifamily dwellings
- Residential condominiums



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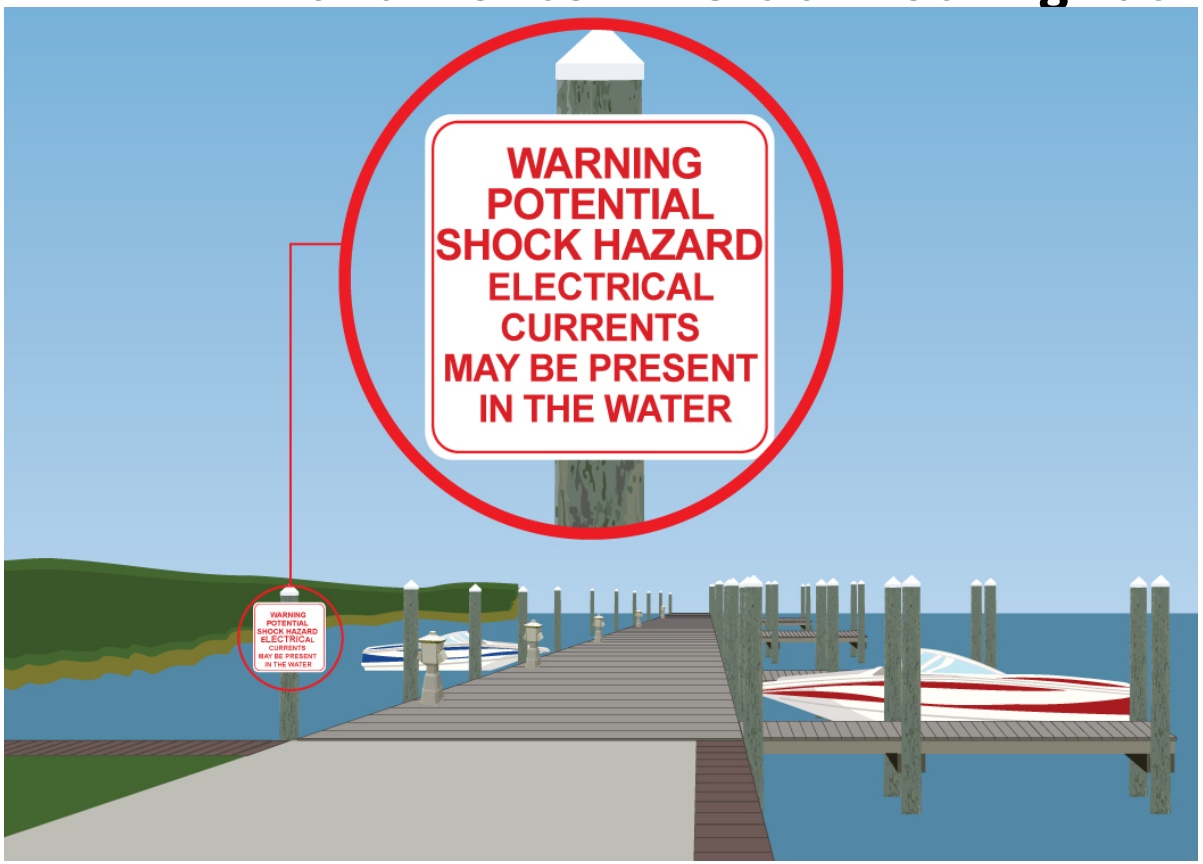
555.3 - Marinas, Boatyards, and Commercial and Noncommercial Docking Facilities: Ground-Fault Protection.

Overcurrent protective devices that supply marinas, boatyards, and commercial and noncommercial docking facilities must now have ground-fault protection not exceeding 30 mA.

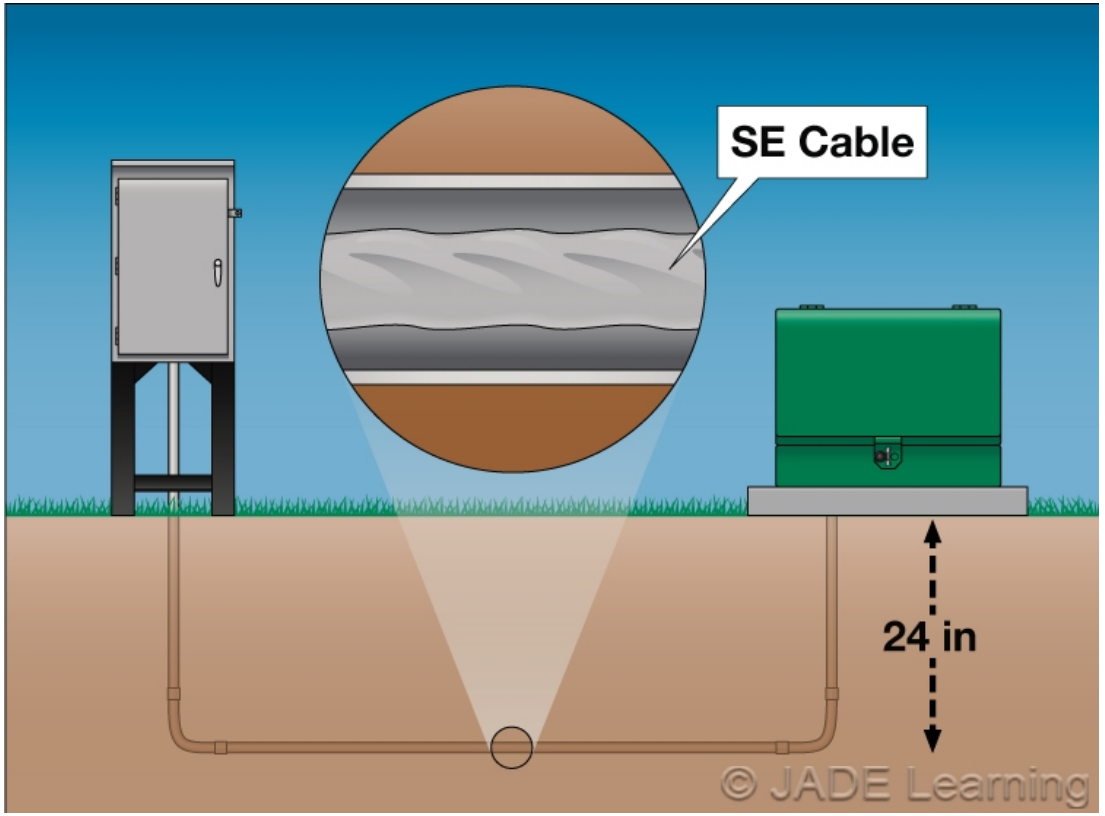
555.24 - Marinas, Boatyards, and Commercial and Noncommercial Docking Facilities: Signage



Signs around a marina or docking facility must warn swimmers that there is a potential shock hazard from electrical currents in the water.

590.4(B),(C) - Temporary Installations: General - Feeders, Branch Circuits

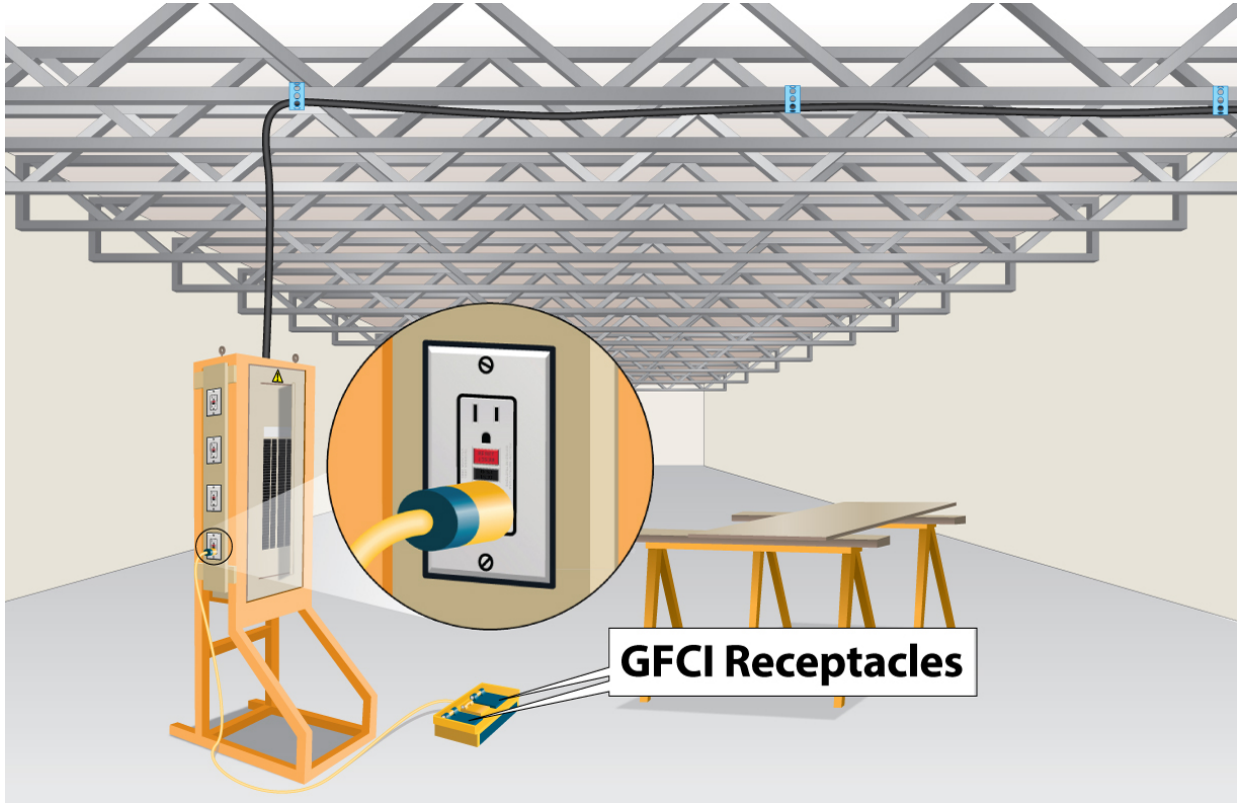
In temporary installations SE cable can be installed in a raceway underground.



590.6(A)(1) - GFCI Protection for Personnel: Receptacle Outlets

Receptacle Outlets Not Part of Permanent Wiring

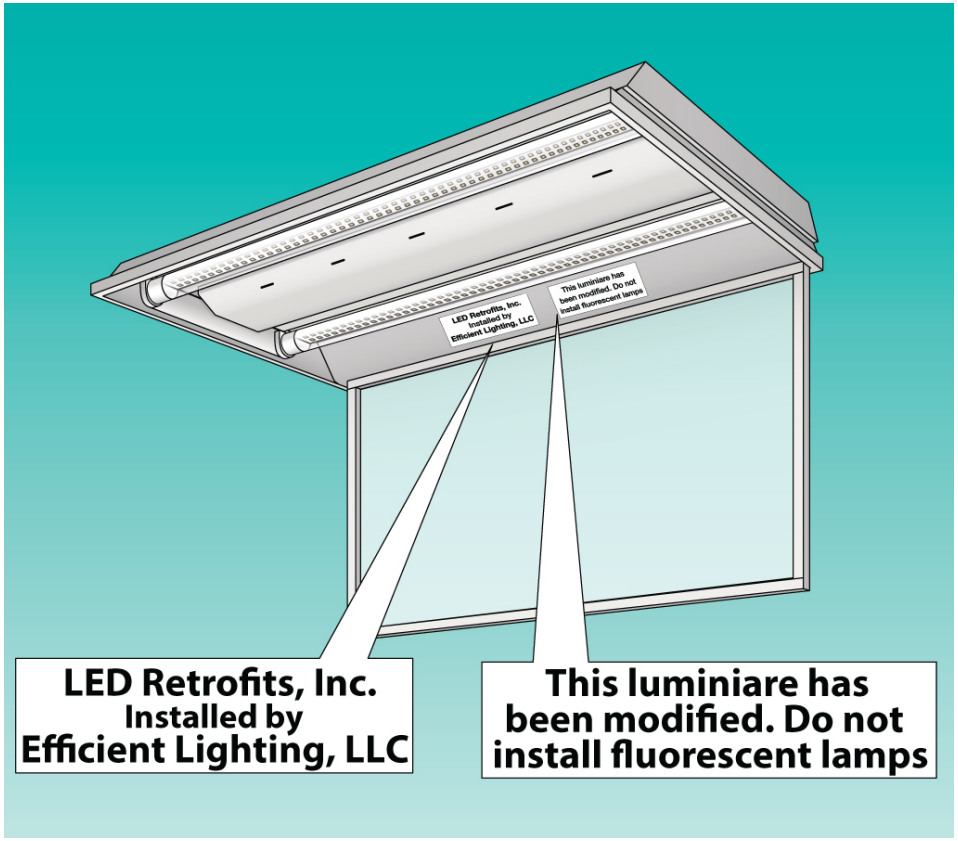
Listed portable cord sets can be used to provide GFCI protection in temporary installations.



2017 NEC Changes Chapter 6

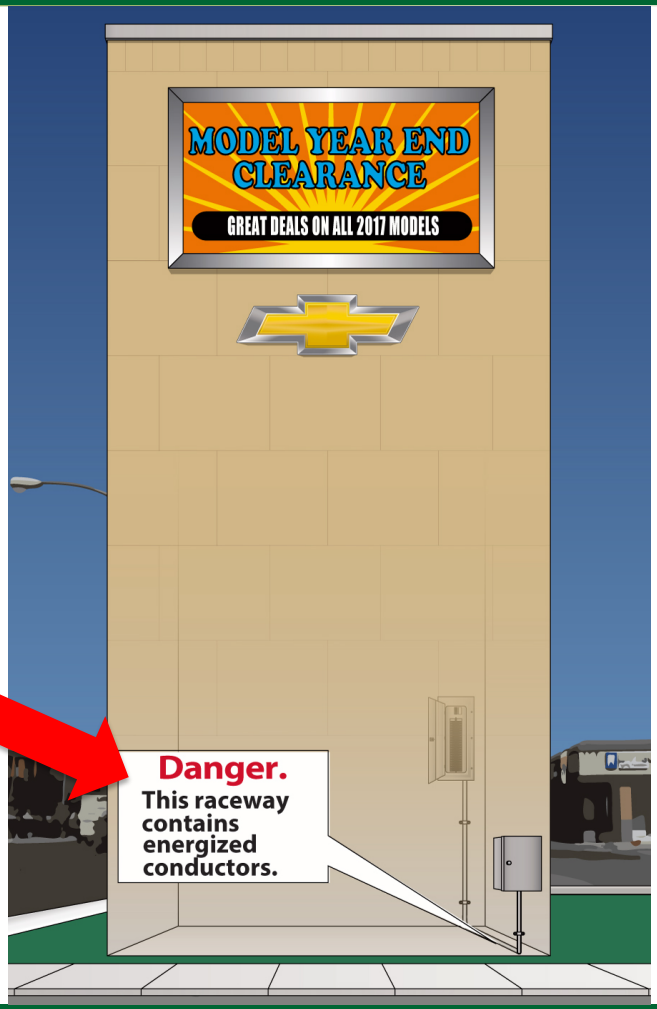
600.4(B) - Electric Signs and Outline Lighting: Markings - Signs with a Retrofitted Illumination System.

Electric signs with a retrofitted illumination systems must be field marked with name of the installer and the warning label.



600.6(A) - Electric Signs and Outline Lighting: Disconnects - Location

If no disconnect at the sign, a warning label is required that says, "Danger. This raceway contains energized conductors."



600.33 - Electric Signs and Outline Lighting: Class 2 Sign Illumination Systems, Secondary Wiring

Table 600.33(A)(1) Applications of Power Limited Cable in Signs and Outline Lighting

Location	CL2	CL3	CL2R	CL3R	CL2P	CL3P	PLTC
Non concealed spaces inside of buildings	Y	Y	Y	Y	Y	Y	Y
Concealed spaces inside of buildings	N	N	Y	Y	Y	Y	Y
Environmental air spaces plenums-risers	N	N	N	N	Y	Y	N
Wet locations	N	N	N	N	N	N	Y

Y = Permitted. N = Not permitted.

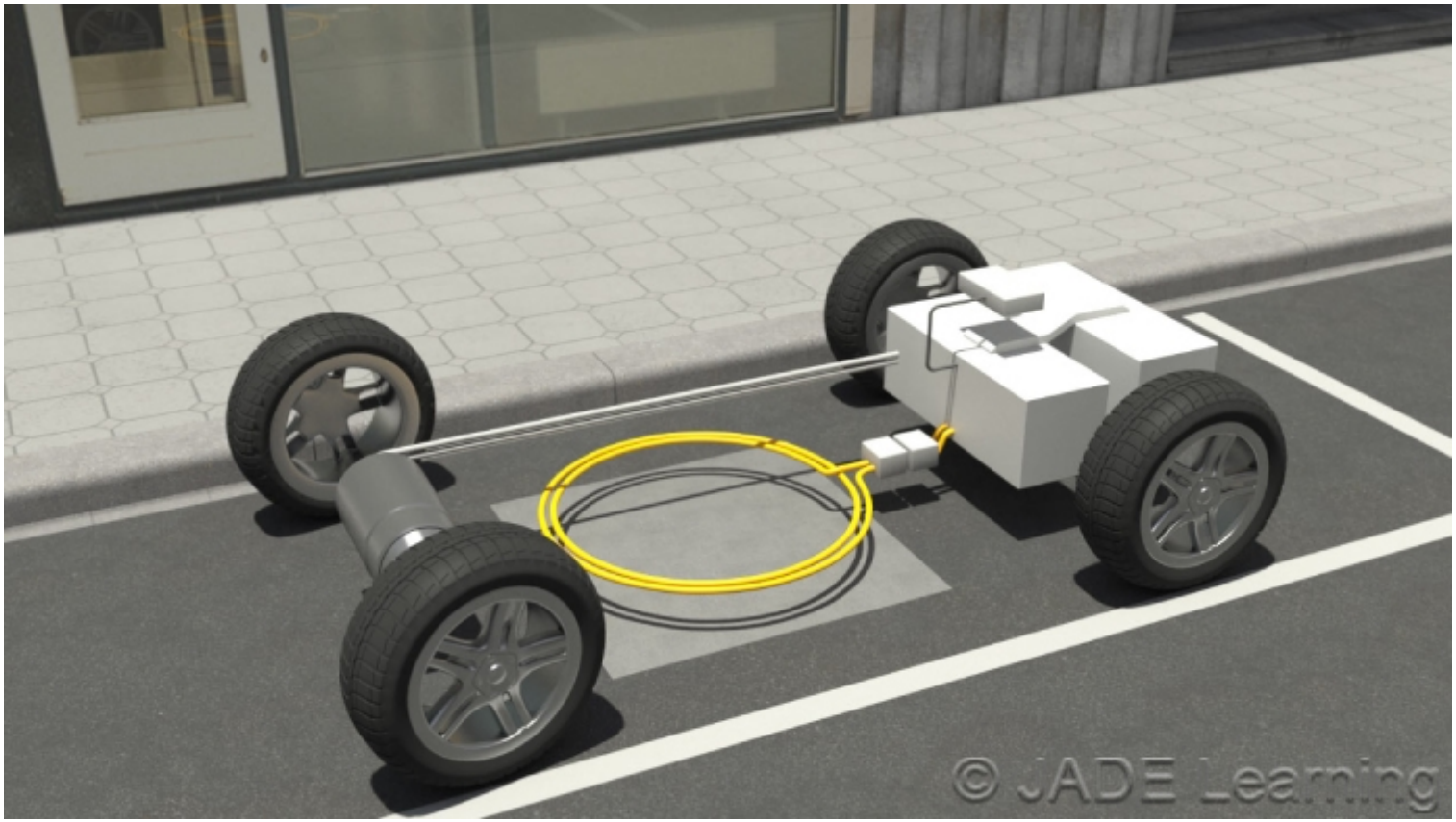
**New Table 600.33(A)(1) covers low voltage cables in signs and outline lighting

600.34 - Electric Signs and Outline Lighting: Photovoltaic (PV) Powered Sign

New rules apply to photovoltaic (PV) powered signs.

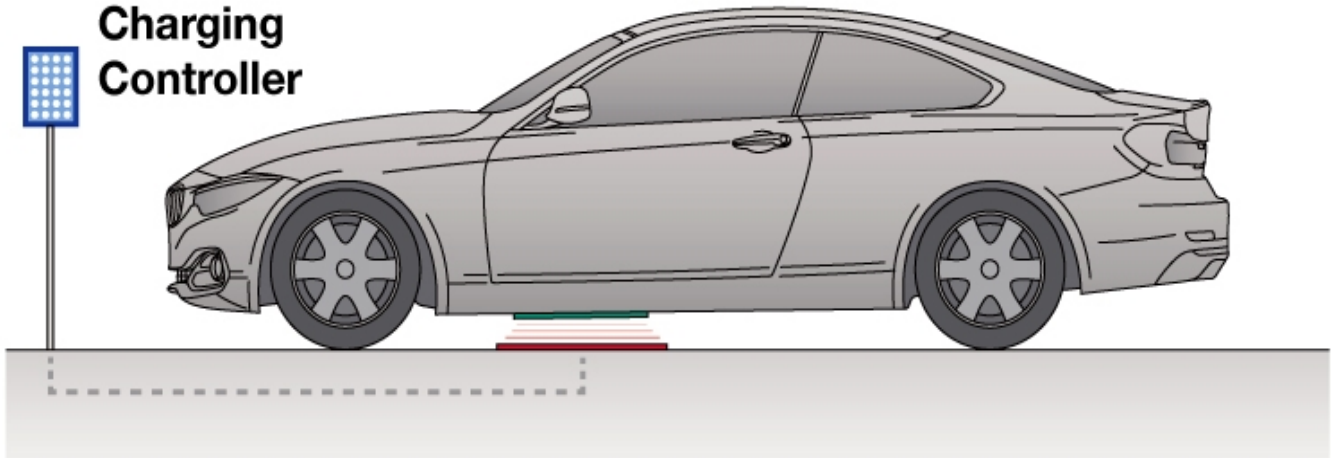
625.1 - Electric Vehicle Charging System: Scope

Electric vehicles can be charged by inductive, or wireless, charging.



625.2 - Electric Vehicle Charging System: Definitions

Wireless Power Transfer and Wireless Power Transfer Equipment are new definitions in Article 625

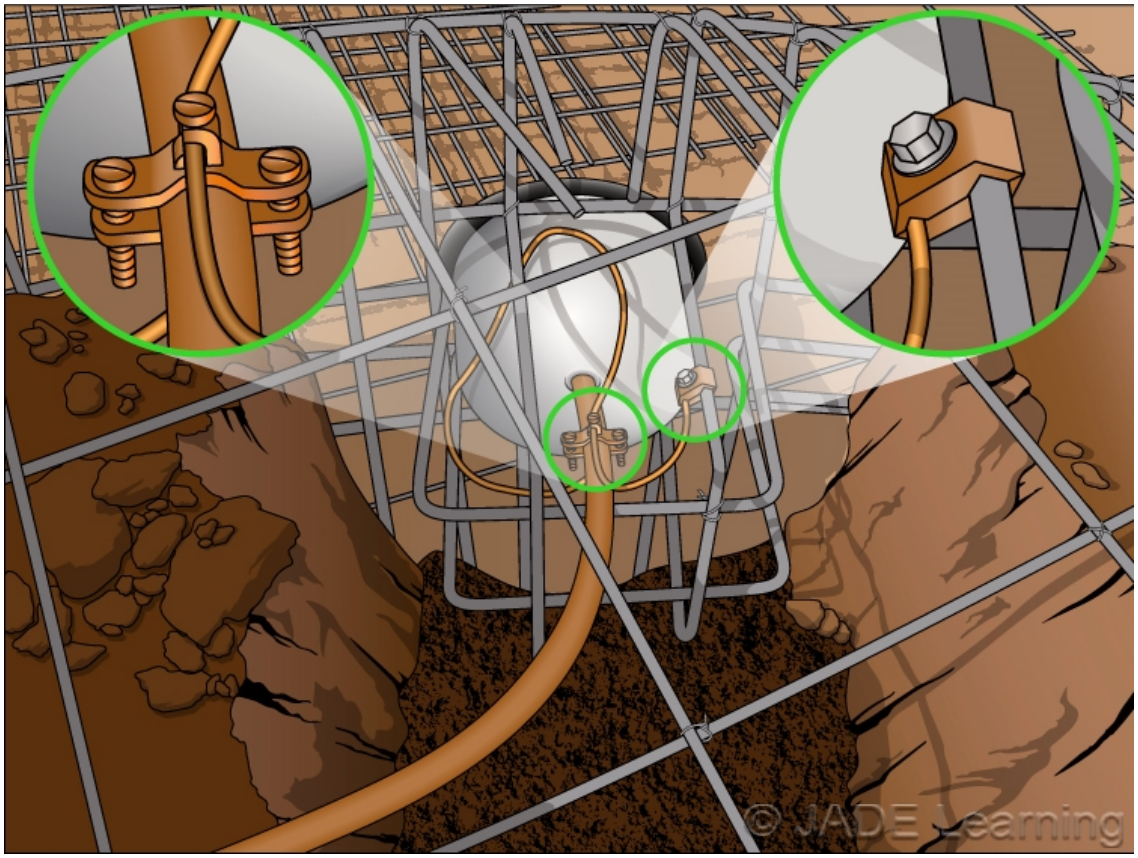


625.40 - Electric Vehicle Charging System: Electric Vehicle Branch Circuit

Each outlet installed for the purpose of charging electric vehicles must be supplied by an individual branch circuit.

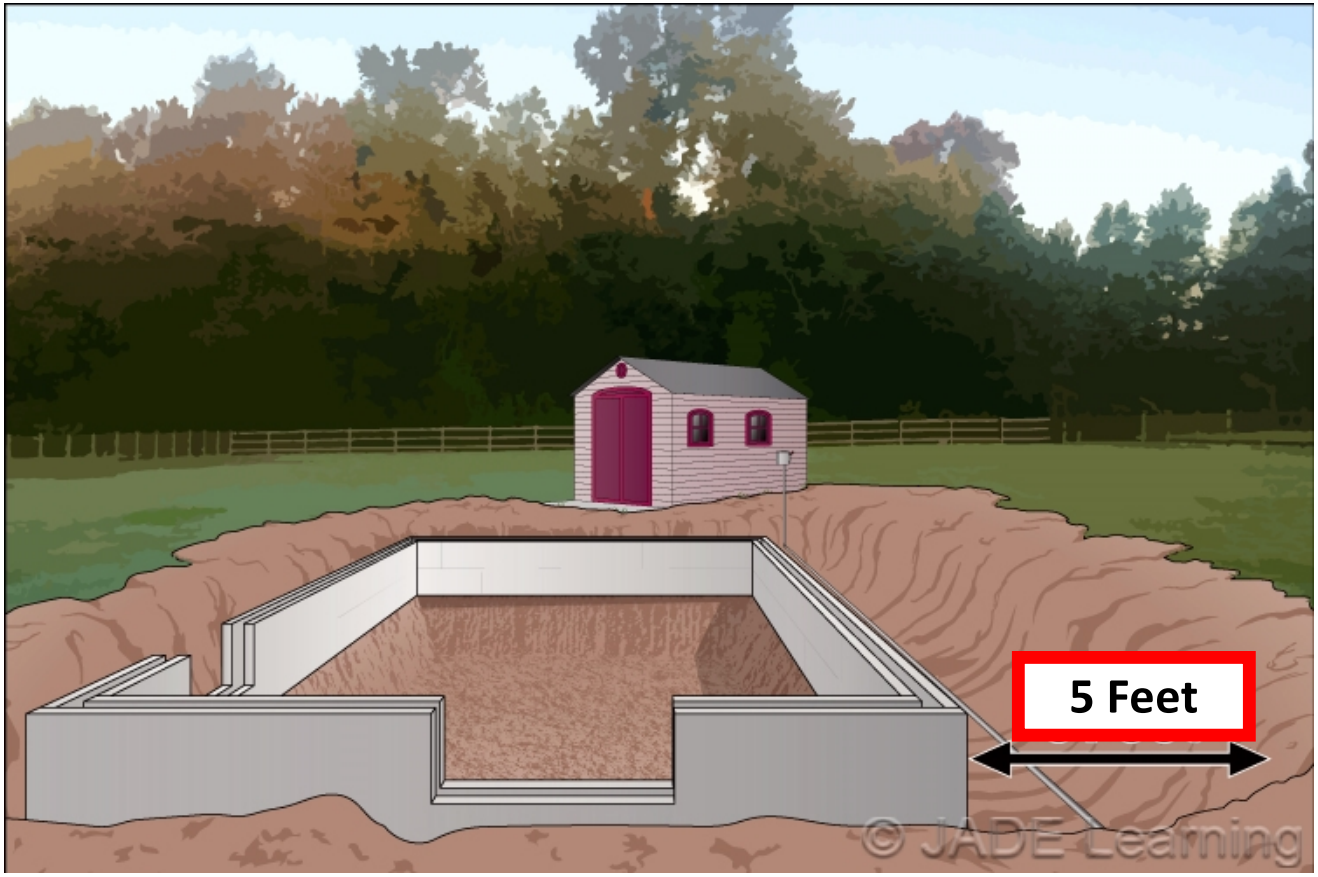
680.7 - Swimming Pools, Fountains: Grounding and Bonding Terminals

Grounding and bonding terminals used in swimming pools must be identified for use in wet and corrosive environments.



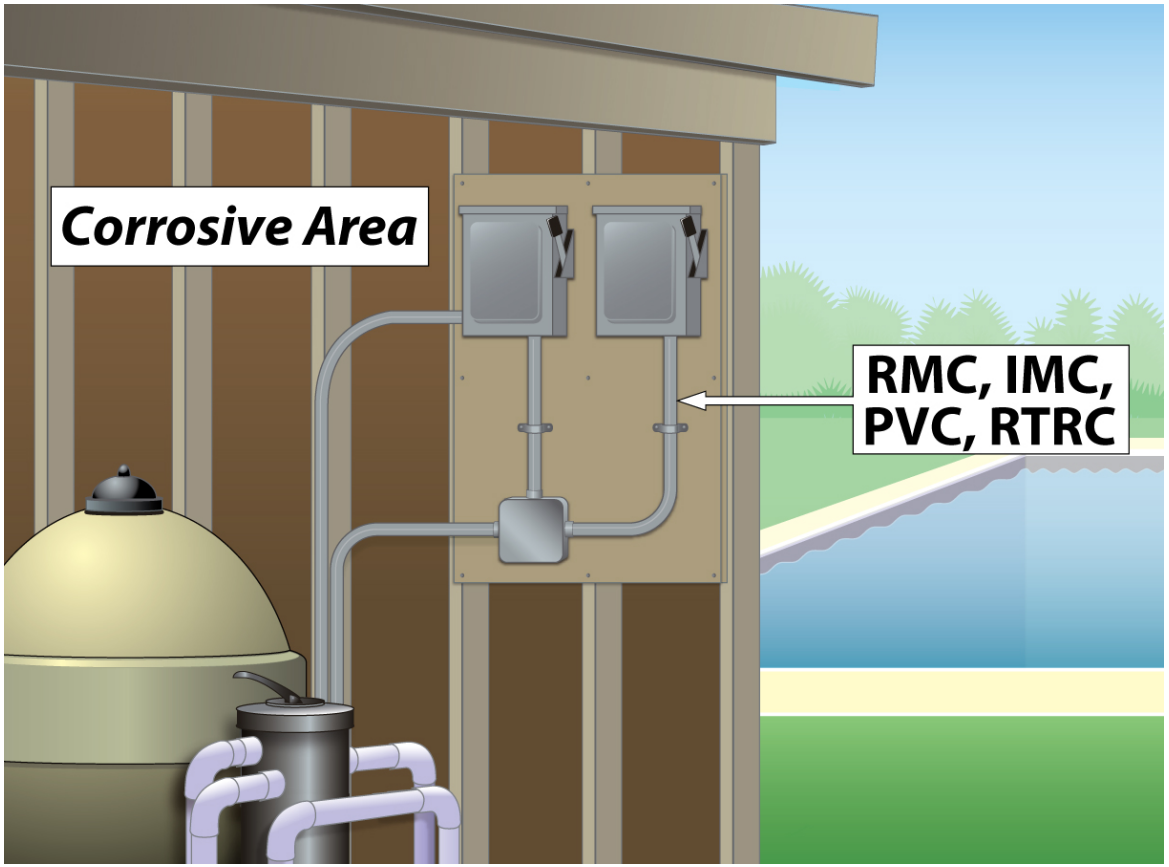
680.11 - Swimming Pools, Fountains: Underground Wiring Location

Wiring is permitted to be installed within 5 ft. of a swimming pool if it is installed in an approved raceway or cable.



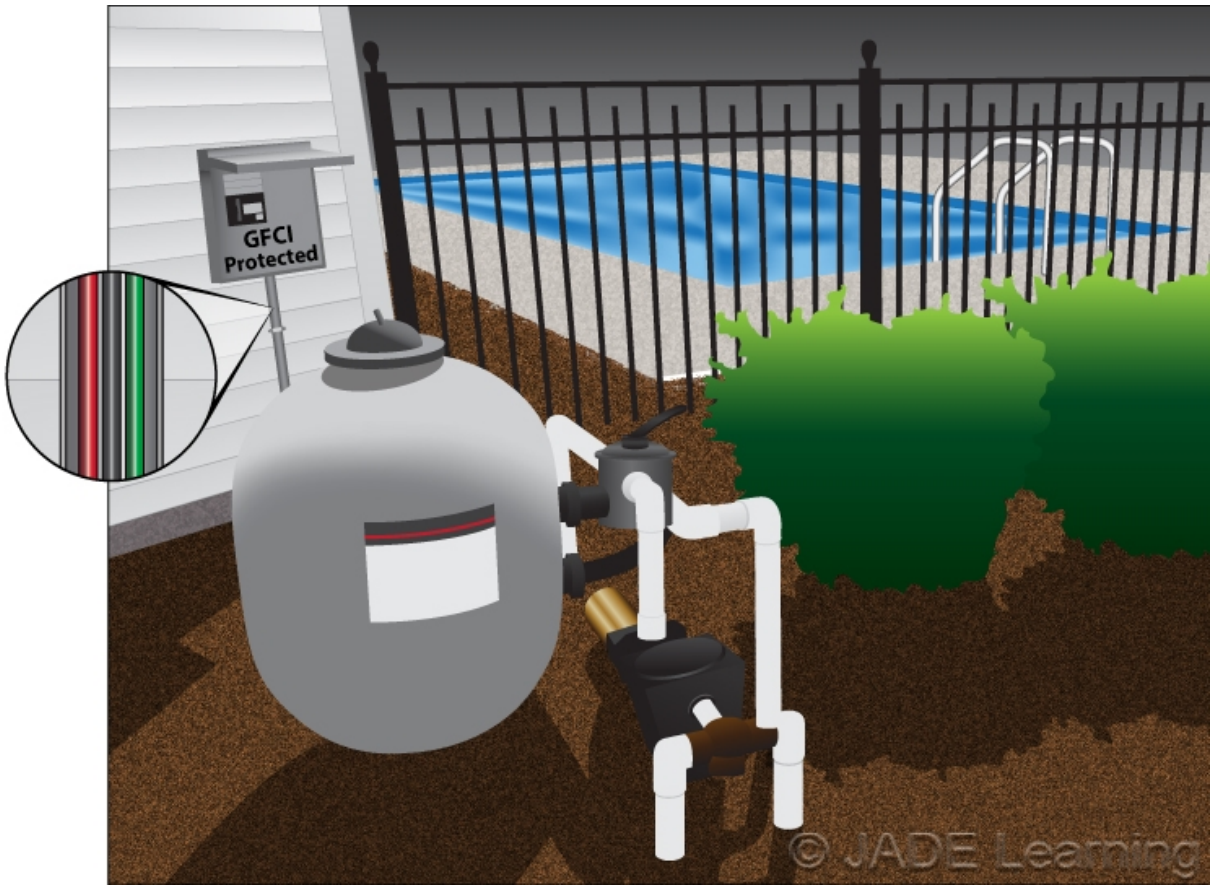
680.14 - Swimming Pools, Fountains: Corrosive Environment

The wiring methods permitted in corrosive areas around swimming pools are restricted to a limited number of raceways.



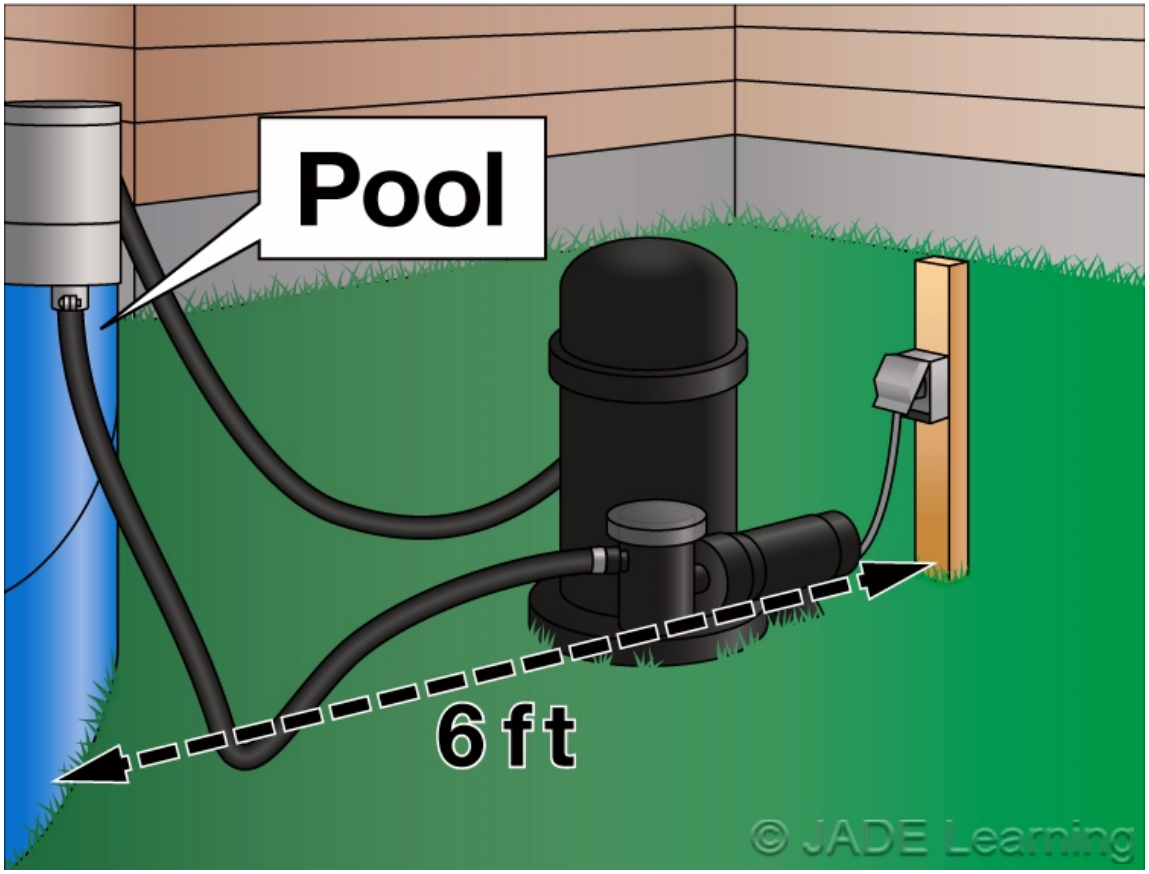
680.21(A) - Swimming Pools, Fountains: Motors, Wiring Methods

Any wiring method used in a corrosive location must contain an insulated copper equipment grounding conductor sized in accordance with Table 250.122, but not smaller than 12 AWG.



680.22(A)(2) – Receptacles: Circulation and Sanitation System, Location

The distance that a receptacle used for water-pump motors can be located from the pool is restricted.

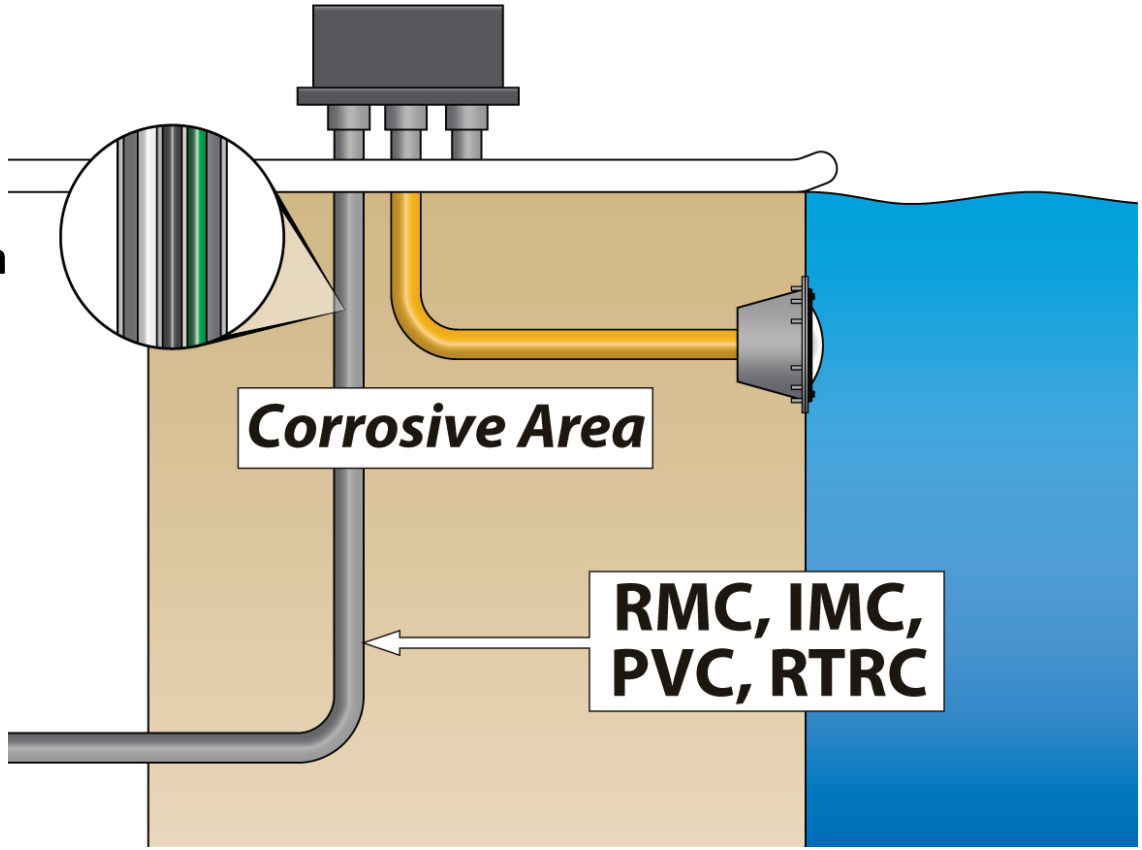


680.22(B)(7) – Lighting Receptacles and Equipment: Low-Voltage Gas-fired Luminaires, Decorative Fireplaces, Fire Pits, and Similar Equipment

Low-voltage gas-fired electronic luminaires are treated like other low-voltage luminaires.

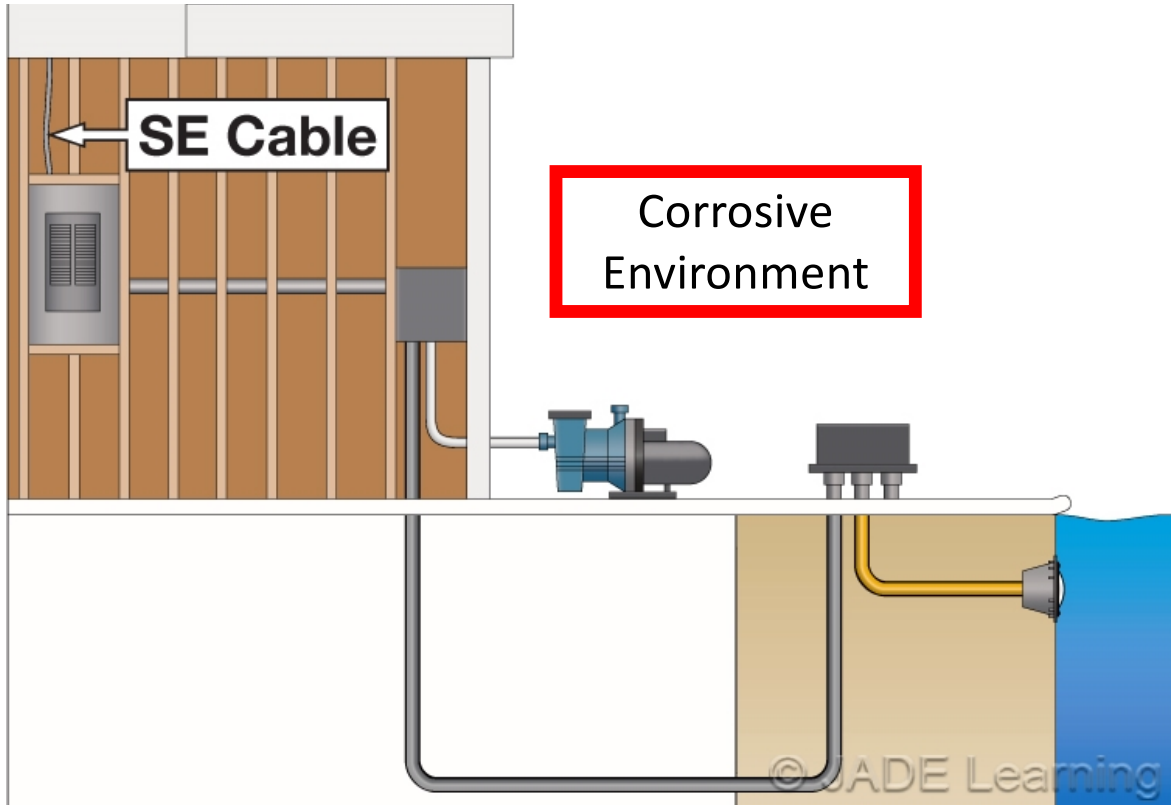
680.23(F)(1) - Underwater Luminaires: Branch-Circuit Wiring - Wiring Methods

Branch circuit wiring in a corrosive area around a swimming pool must be installed in approved raceways and contain a wire-type equipment grounding conductor.



680.25 - Permanently Installed Pools: Feeders

If installed outside of the corrosive environment, any wiring method found in Chapter 3 is acceptable.



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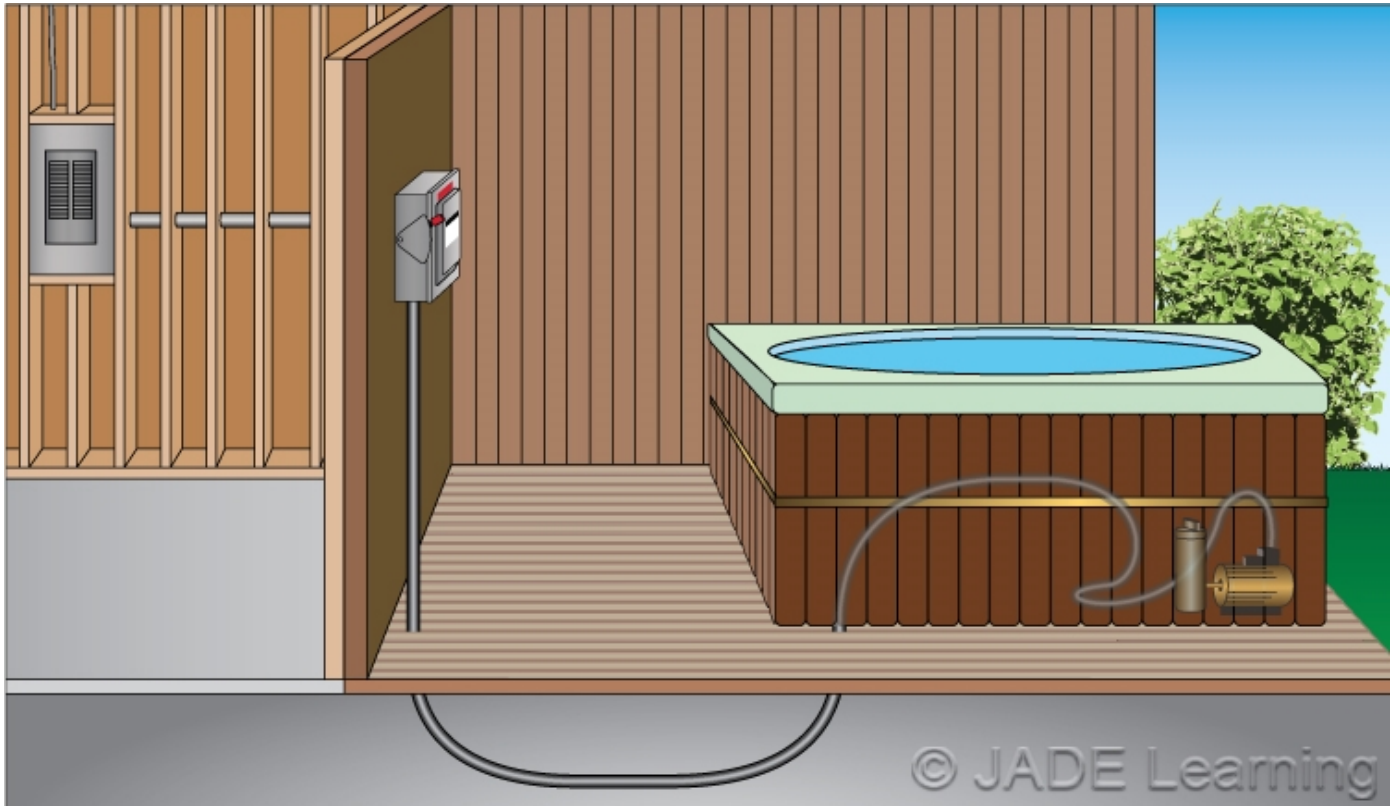
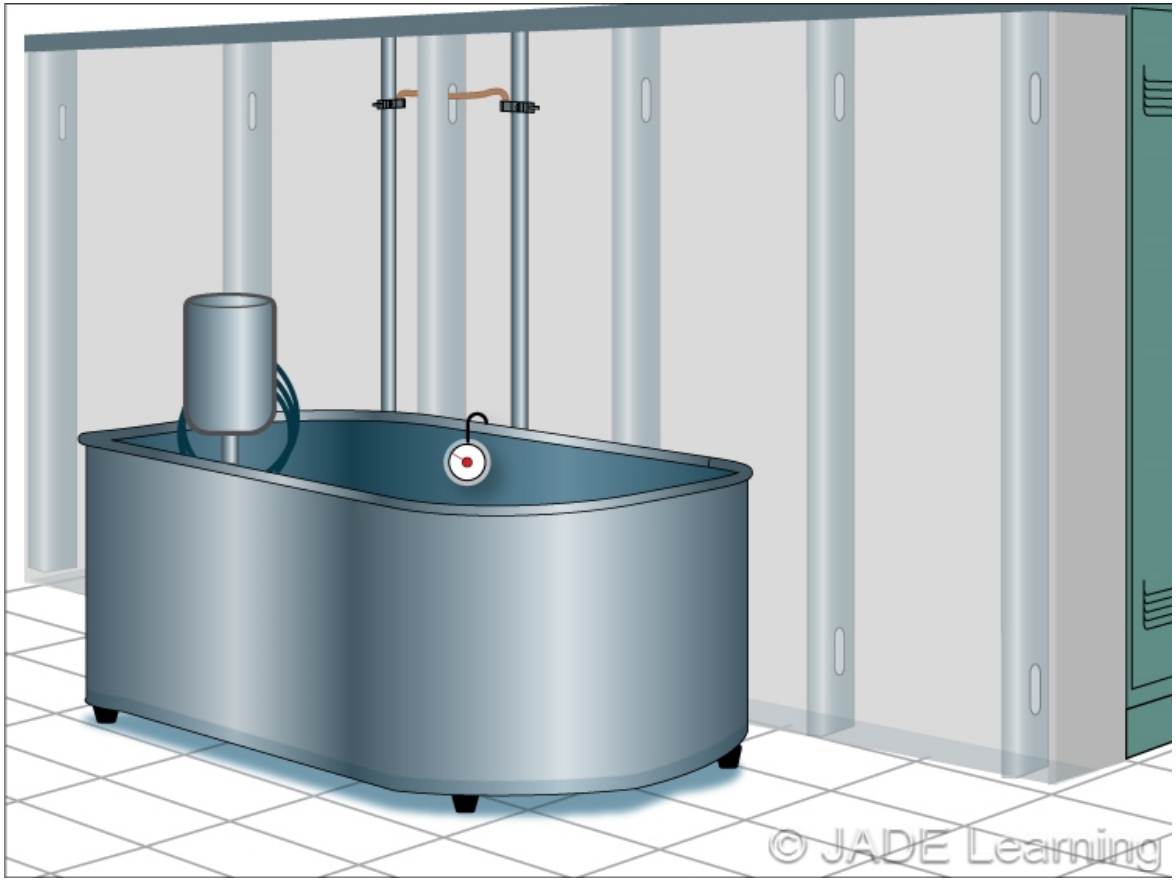
680.42(C) - Spas and Hot Tubs: Interior Wiring to Outdoor Installations

Interior wiring to the disconnected means can be installed using Chapter 3 wiring methods.

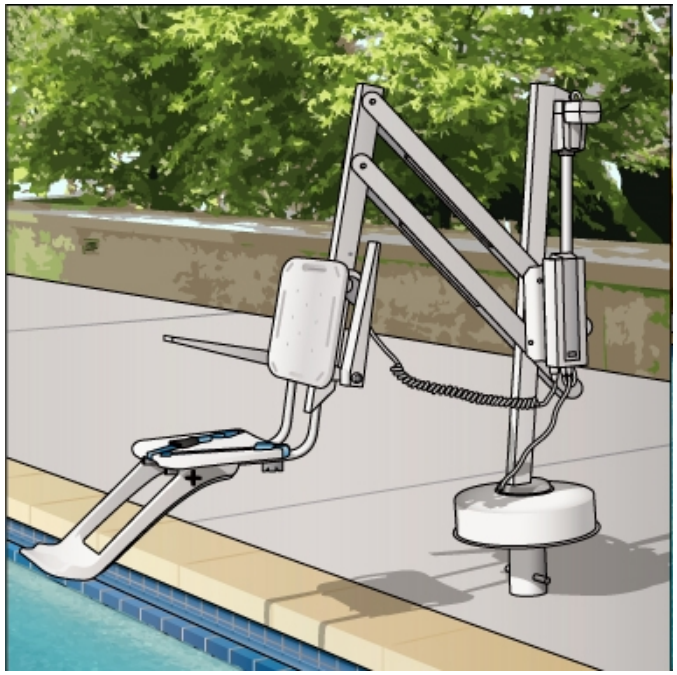


680.74 - Hydromassage Bathtubs: Bonding

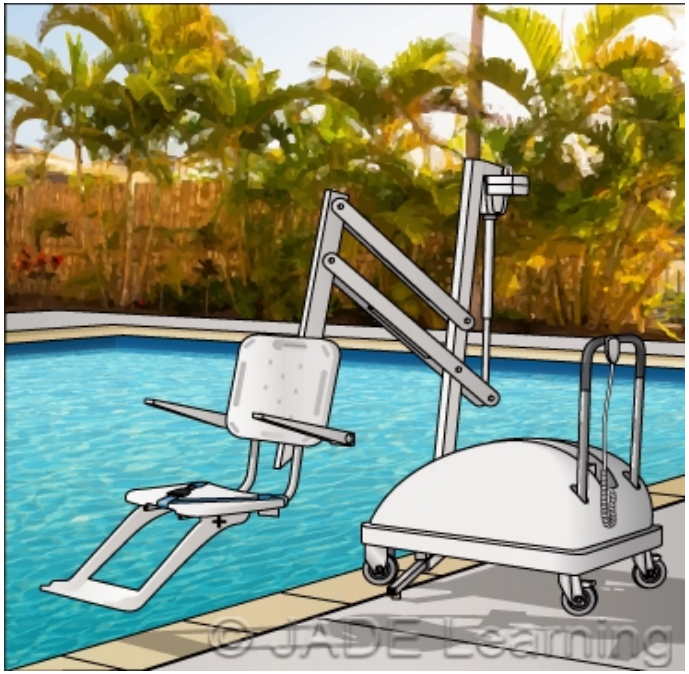
If not separated from the tub by a permanent barrier, metal-sheathed cables, metal raceways, and metal piping within 5 ft. of the inside walls of the tub must be bonded together.



680.82 - Part VIII: Electrically Powered Pool Lifts - Protection



Lifts that are operated at line voltage must be listed, labeled and identified for swimming pool and spa use.



Low voltage and battery powered lifts are not required to be listed or labeled

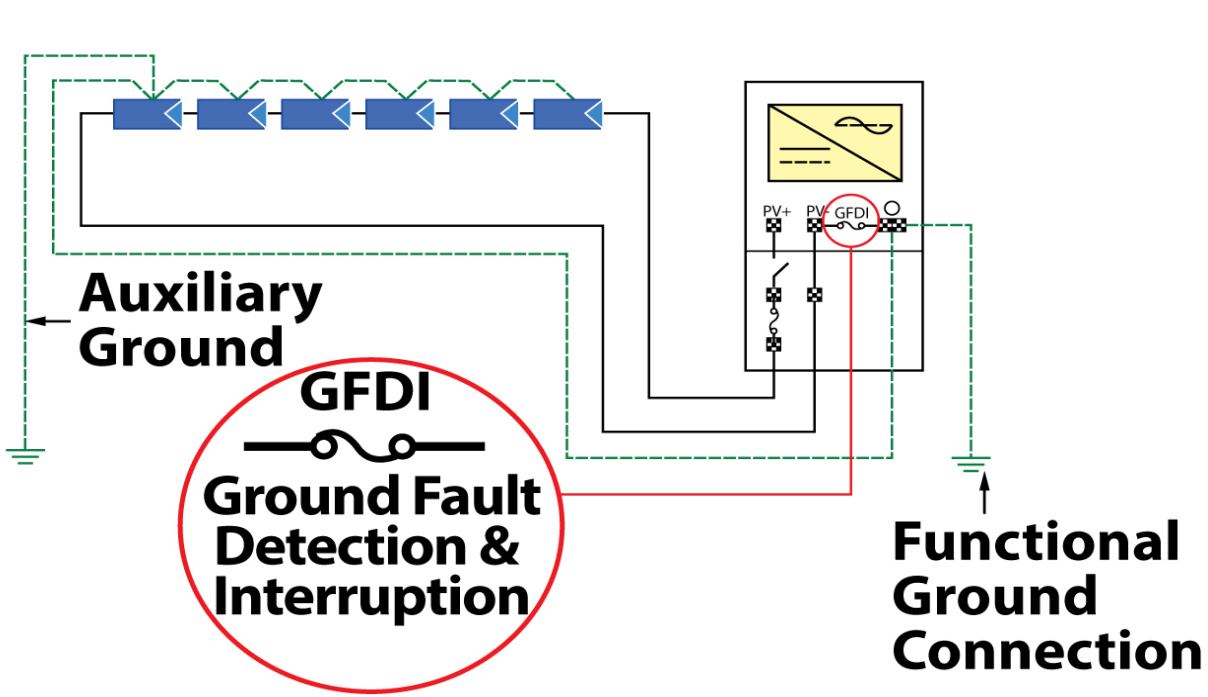
690.1 - Solar Photovoltaic (PV) Systems: Scope

Article 690 covers small scale photovoltaic (PV) installations

Article 691 covers large scale PV installations of 5000 kW and larger.

690.2 - Solar Photovoltaic (PV) Systems: Definitions

Functionally grounded PV systems are connected to ground through a fuse, circuit breaker, resistance device, another grounded circuit, or through a ground-fault protection system.



690.7 - Solar Photovoltaic (PV) System: Maximum Voltage

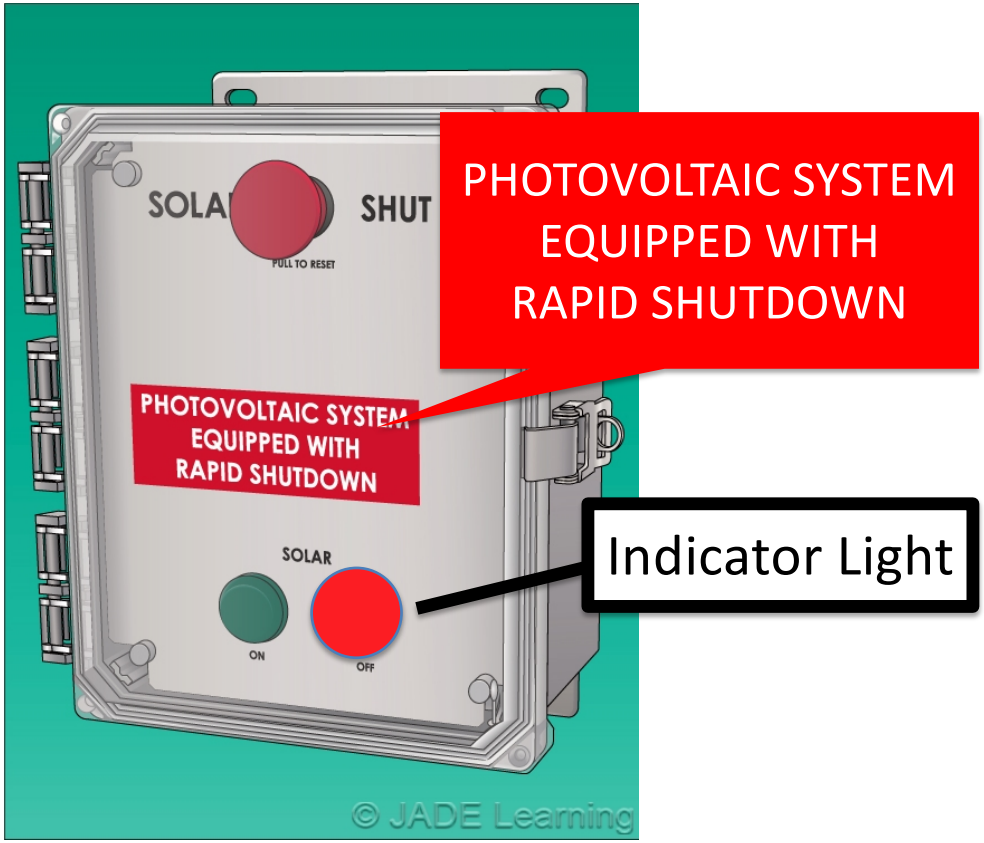
Maximum voltages for PV systems are 600 volts for one- and two-family dwellings.

Maximum voltages for PV systems are 1000 volts for other systems in or on buildings.

690.11 Solar Photovoltaic (PV) Systems: Arc-Fault Circuit Protection (Direct Current)

A new exception permits PV output circuits and dc-dc converter output circuits that are not installed on or in buildings to omit arc-fault protection.

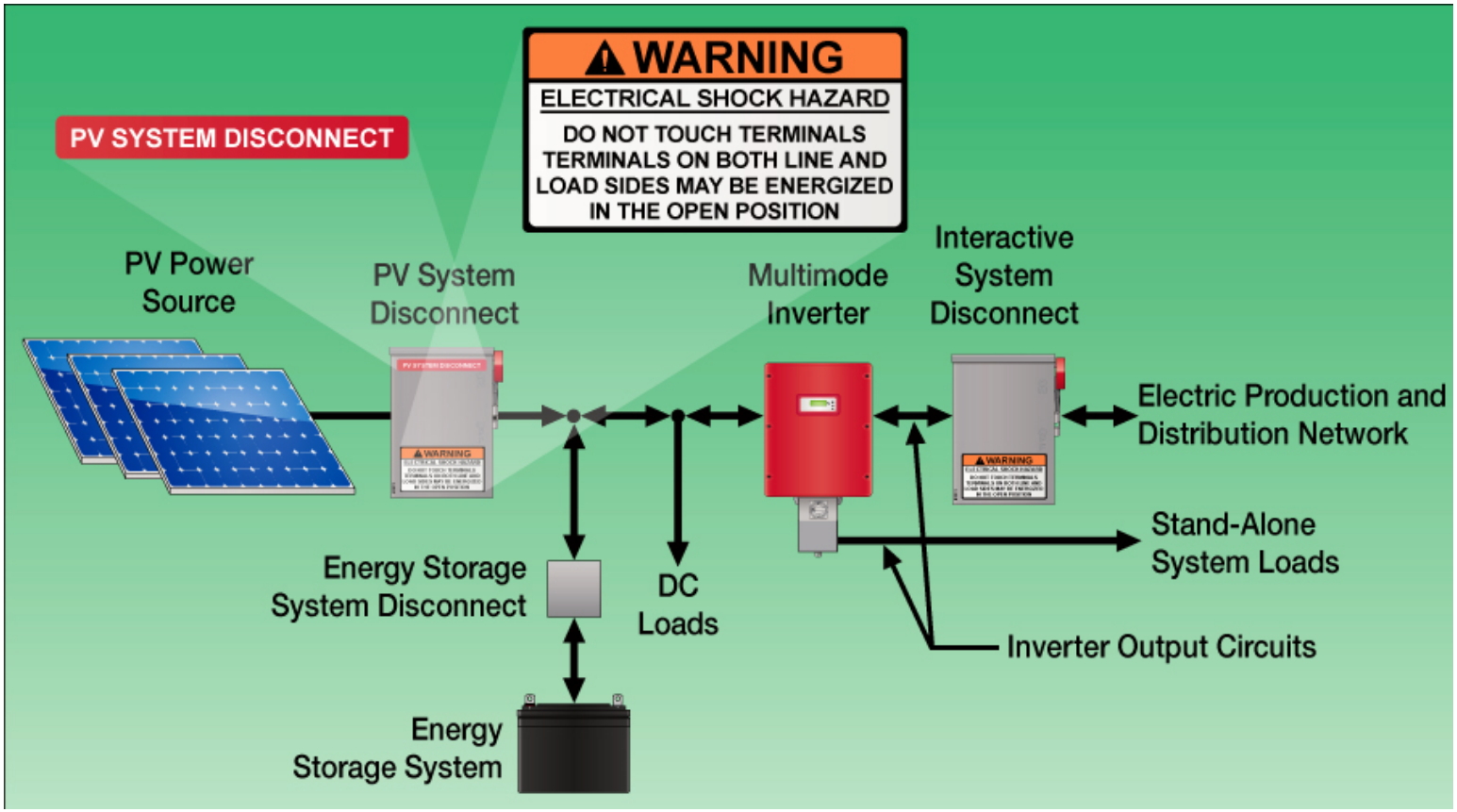
690.12 Solar Photovoltaic (PV) Systems: Rapid Shutdown of PV Systems on Buildings



The rapid shutdown device must clearly indicate whether the device has initiated the rapid shutdown function of the PV system. "Off" means the device has been activated to shutdown the PV system.

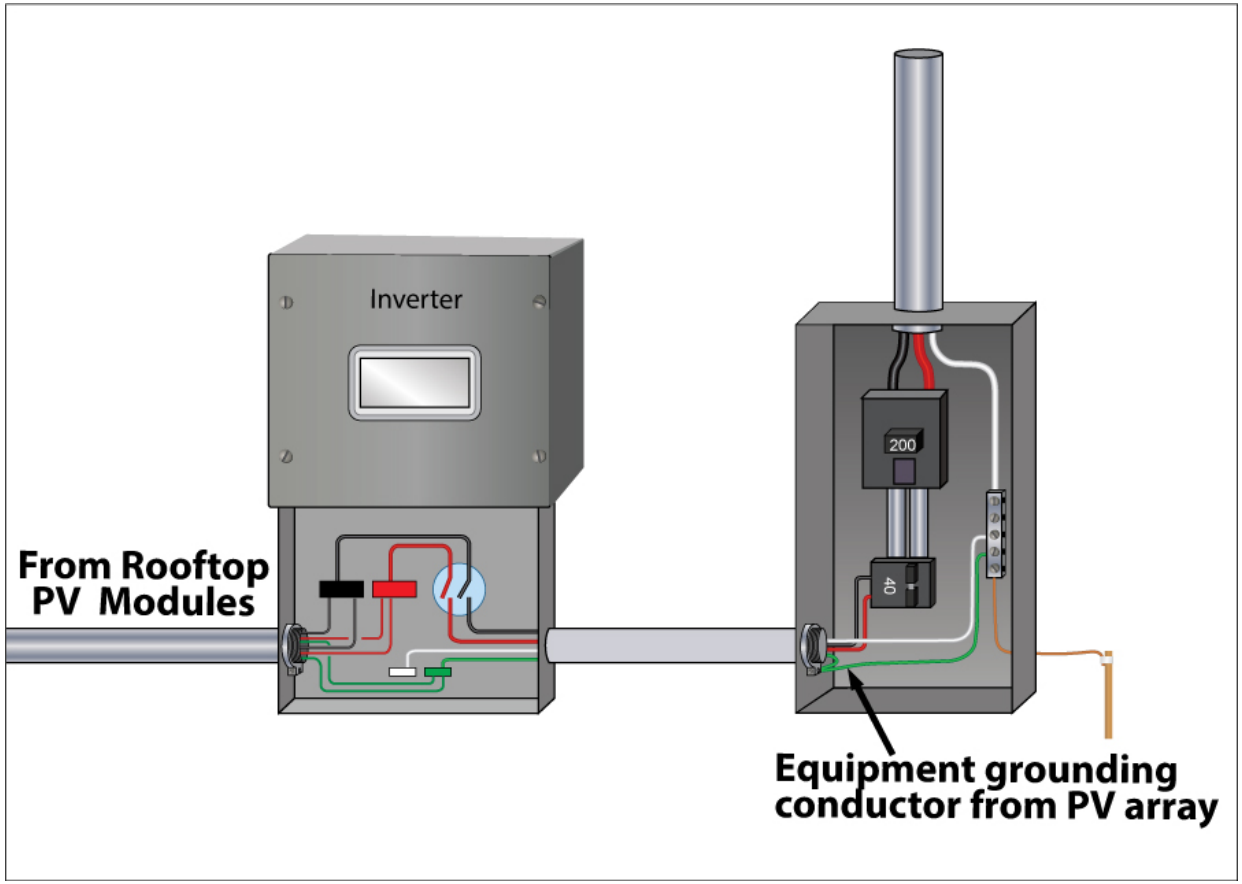
690.13 - Solar Photovoltaic (PV) Systems: PV System Disconnecting Means

The PV system disconnect must be installed at a readily accessible location and be marked with a warning sign about the electrical shock hazard.

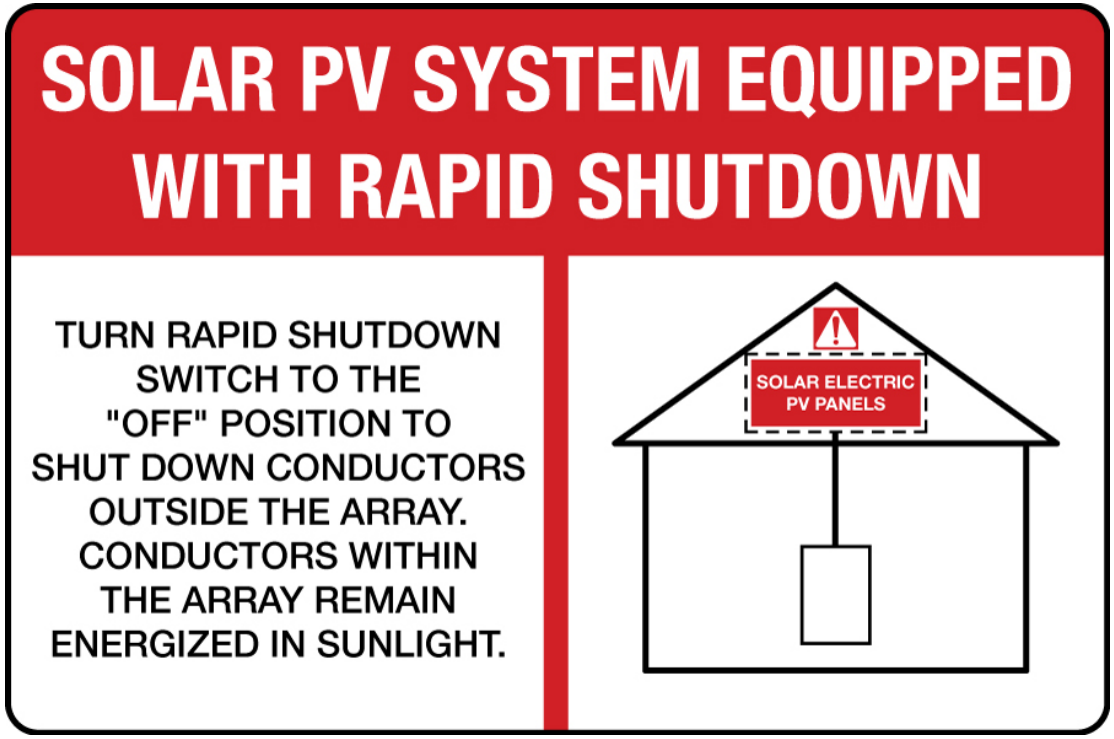


690.47 - Solar Photovoltaic (PV) Systems: Grounding Electrode System

Functional grounded PV systems can make a connection to ground using the equipment grounding conductor for the output of the PV system instead of connecting directly to a grounding electrode.



690.56 - Solar Photovoltaic (PV) Systems: Identification of Power Sources

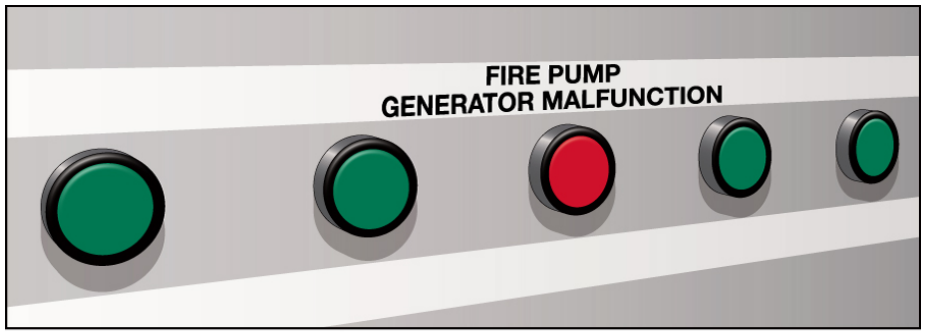


Solar PV systems that are equipped with rapid shutdown must be identified with clear labels that say "Solar PV System is Equipped with Rapid Shutdown."

Article 691 - Large-Scale Photovoltaic (PV) Electric Power Production Facility

New Article 691 covers privately owned large scale PV systems rated 5000kW and larger.

695.14(F) - Fire Pumps: Control Wiring; Generator Control Wiring Methods



Control circuits between a fire pump and the generator transfer switch must be continually monitored so if there is a problem both an audible and visual alarm is initiated.

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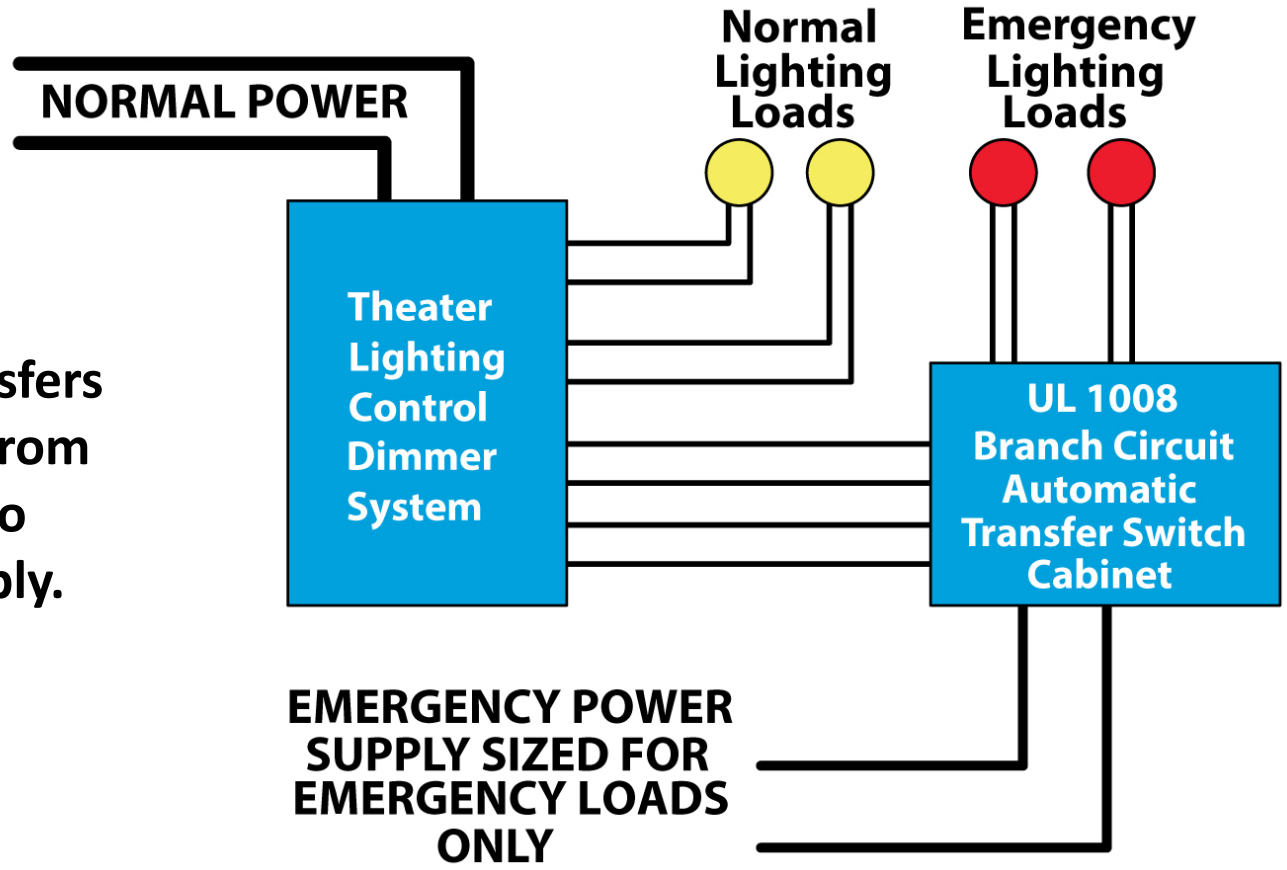
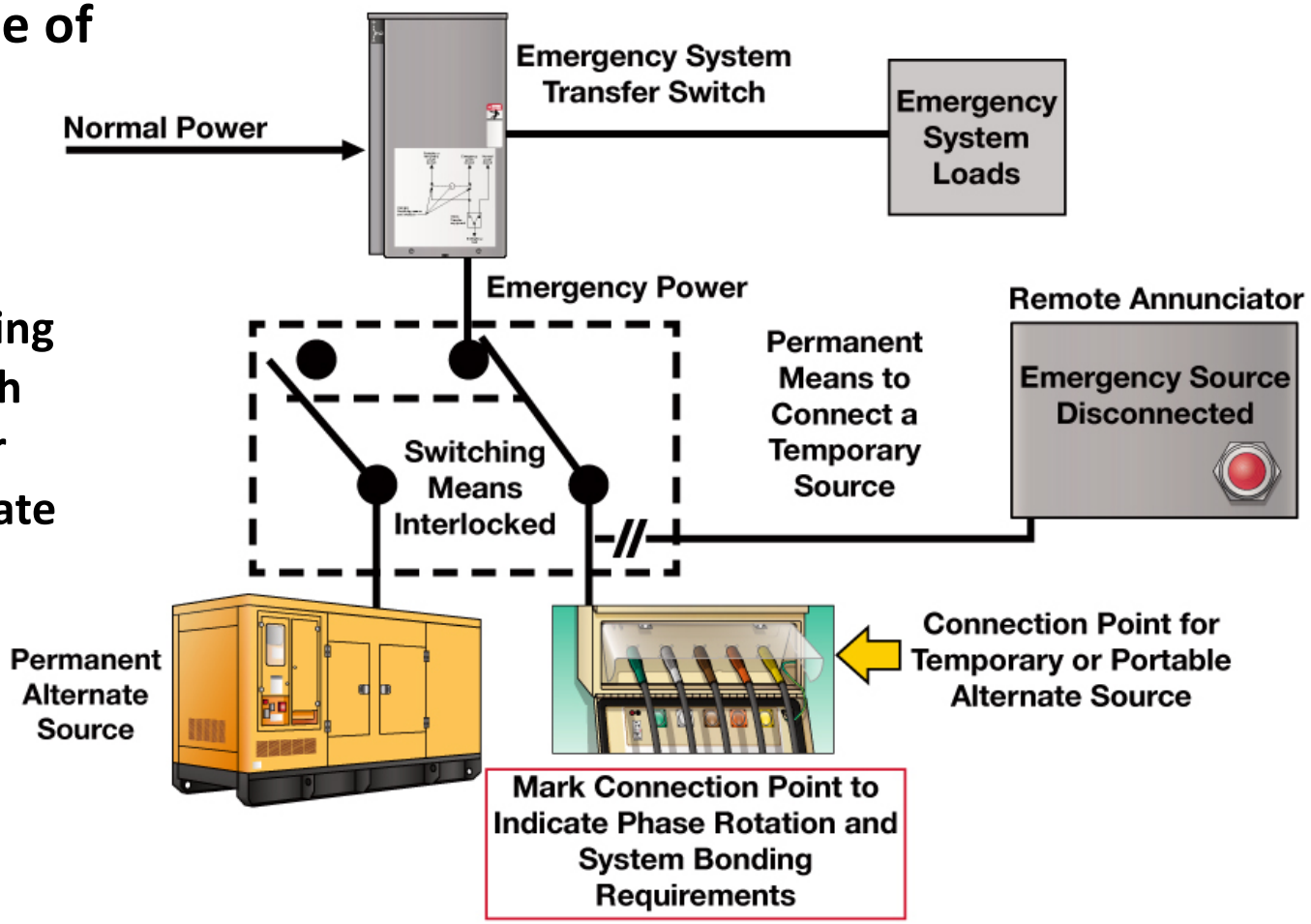
700.2 - Emergency Systems: Definitions

A branch circuit emergency lighting transfer switch transfers only lighting loads from the normal supply to the emergency supply.



700.3(F) - Temporary Source of Power for Maintenance or Repair of the Alternative Source of Power

A permanently installed switching means is now required to switch to a temporary alternate power source when the normal alternate power source is disabled for maintenance or repair.



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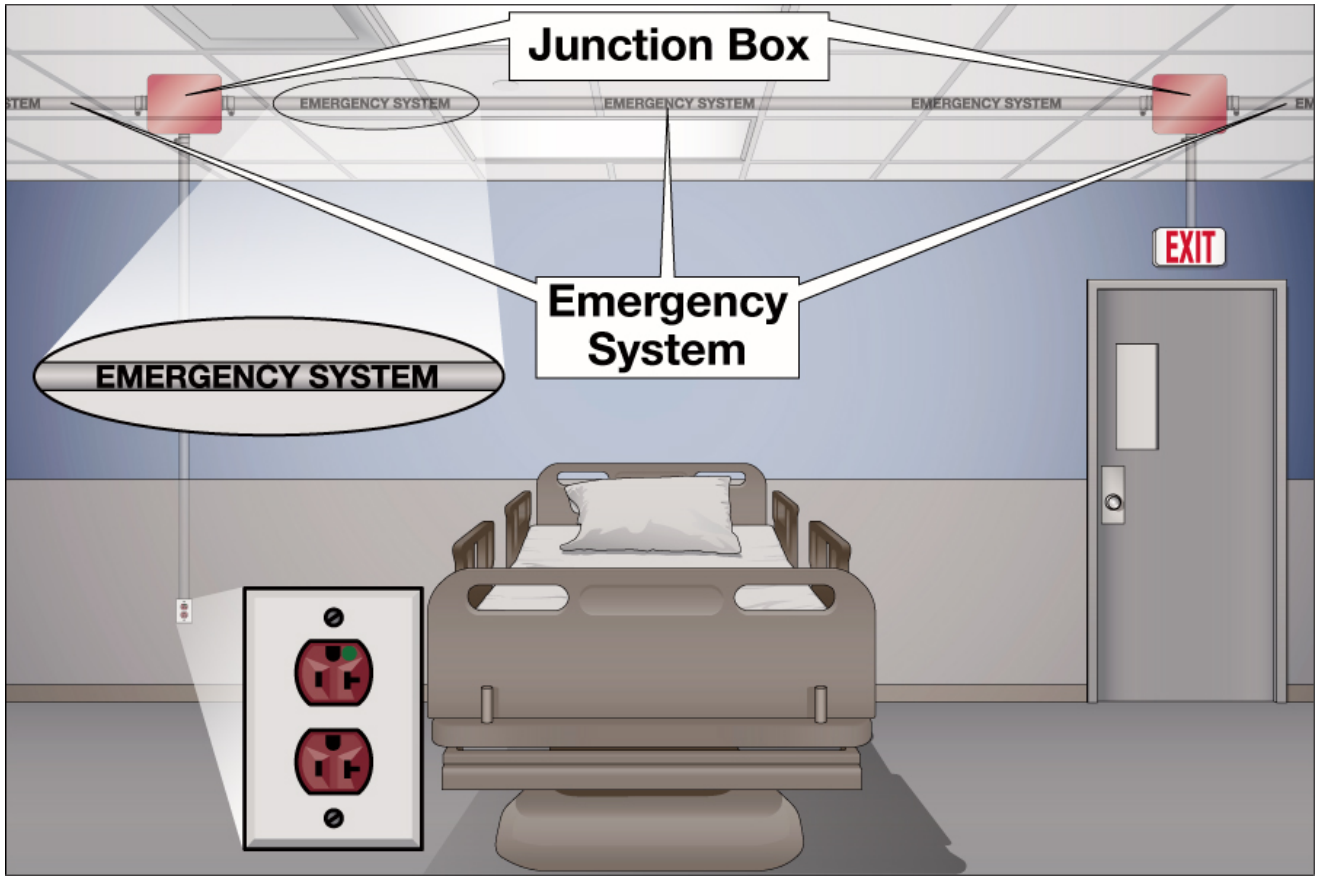
700.5(E) - Emergency Systems: Transfer Equipment Documentation

The short-circuit current rating is based on the the specific overcurrent device protecting the transfer switch.

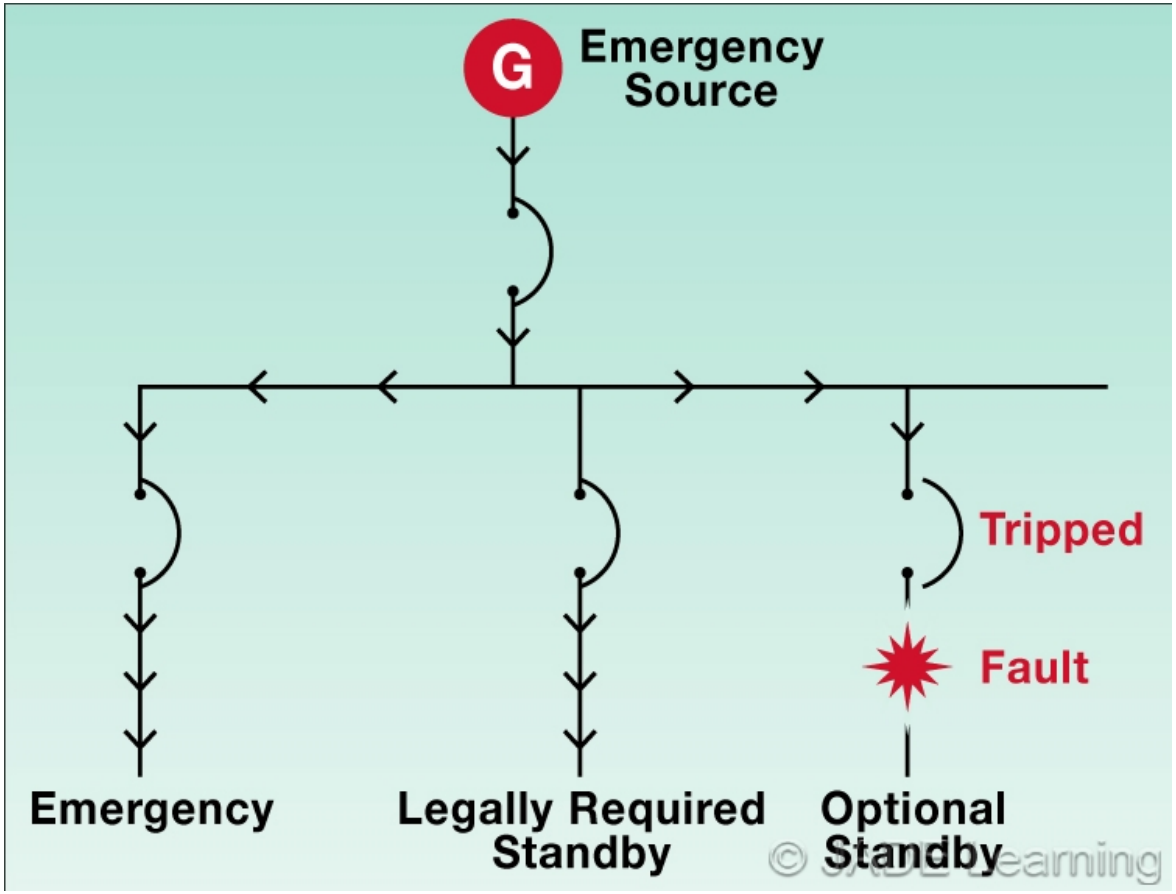
700.10(A) - Emergency Systems: Wiring, Emergency System - Identification



Receptacles, exposed raceway and cables, and junction boxes of the emergency system must be identified.

700.10(B) - Wiring, Emergency System

Where an emergency power source supplies both emergency and nonemergency loads, the feeder overcurrent devices must be selectively coordinated.



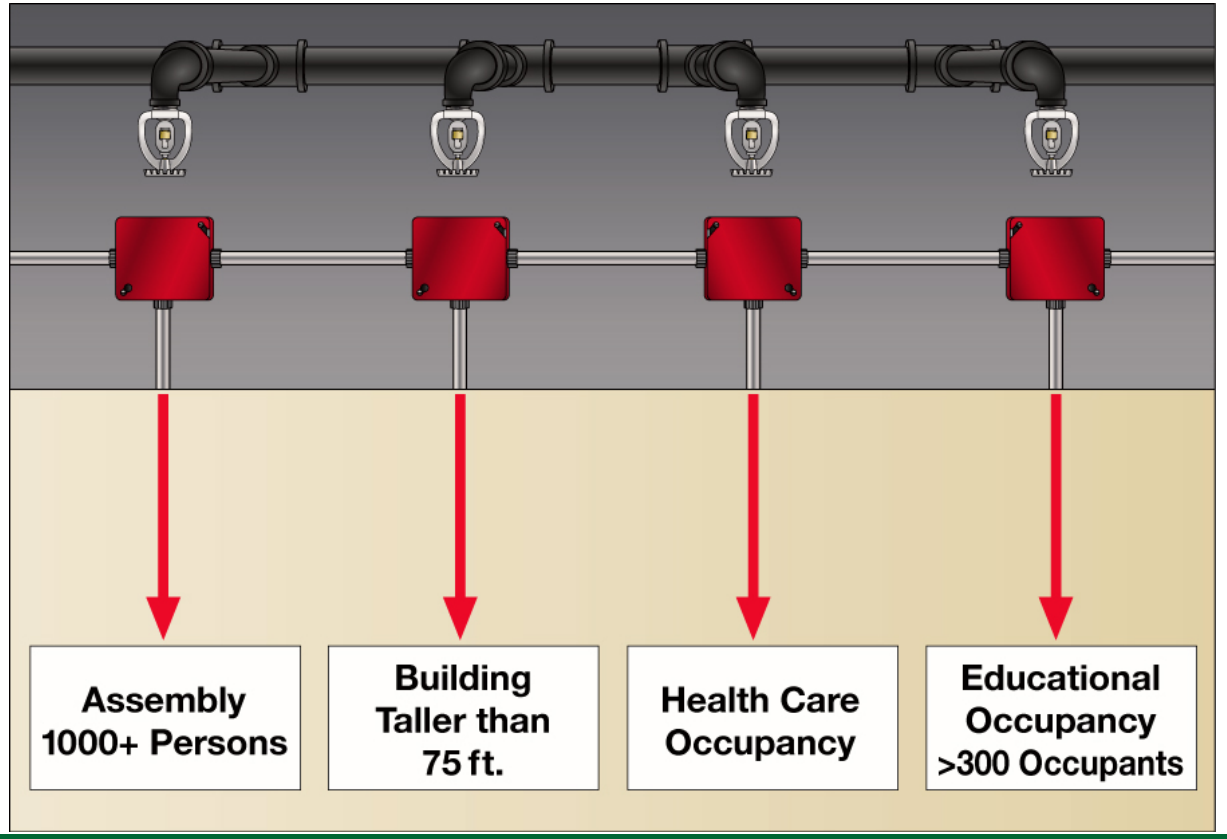
700.10(D) - Wiring, Emergency System: Fire Protection

Emergency system feeder-circuit wiring, equipment, and generator control wiring must be protected from exposure to fire in the following locations:

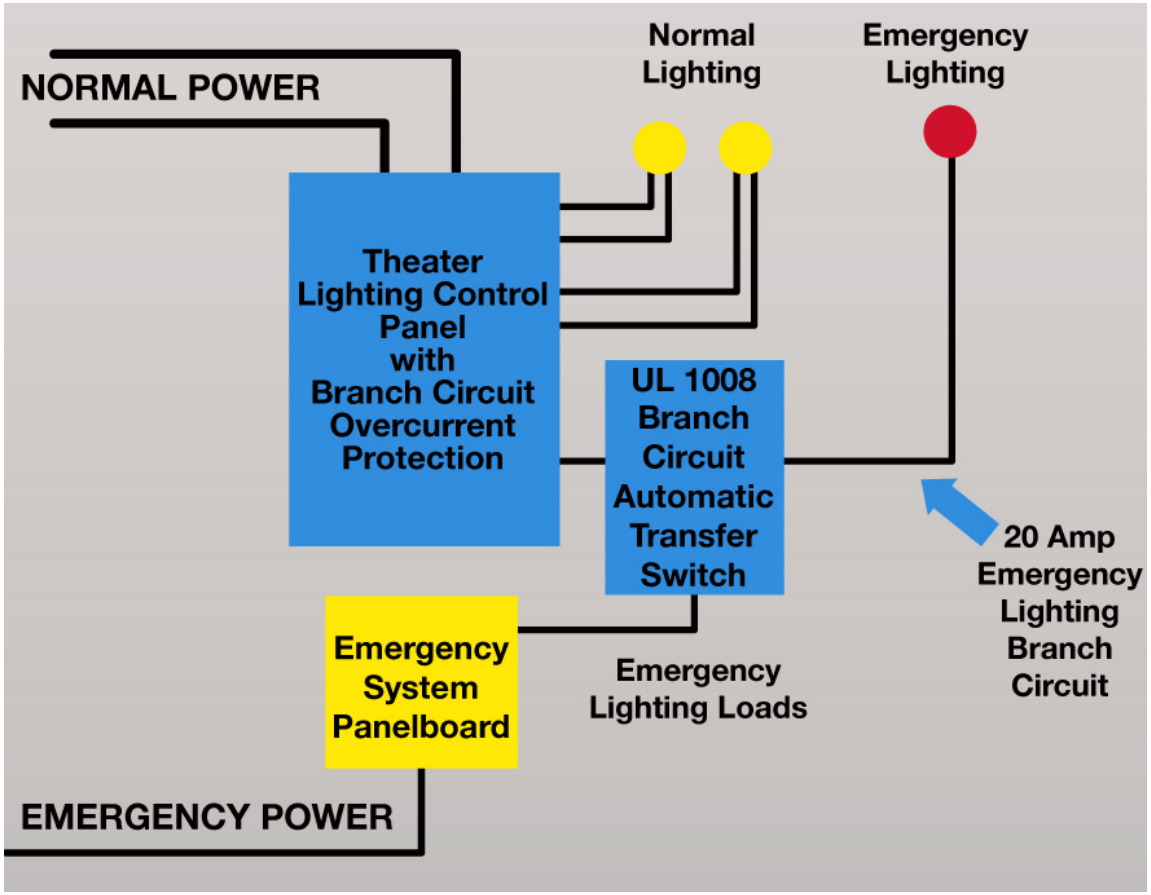
- Assembly occupancies for not less than 1000 persons.
- Buildings above 23 m (75 ft.) in height.
- Health care occupancies where persons are not capable of self-preservation.
- Educational occupancies with more than 300 occupants.

700.10(D)(1) - Wiring, Emergency Systems. Fire Protection: Feeder-Circuit Wiring

One of the ways to provide fire protection for emergency feeder circuit wiring is to install the cable or raceway in spaces or areas that are fully protected by an approved automatic fire suppression system.

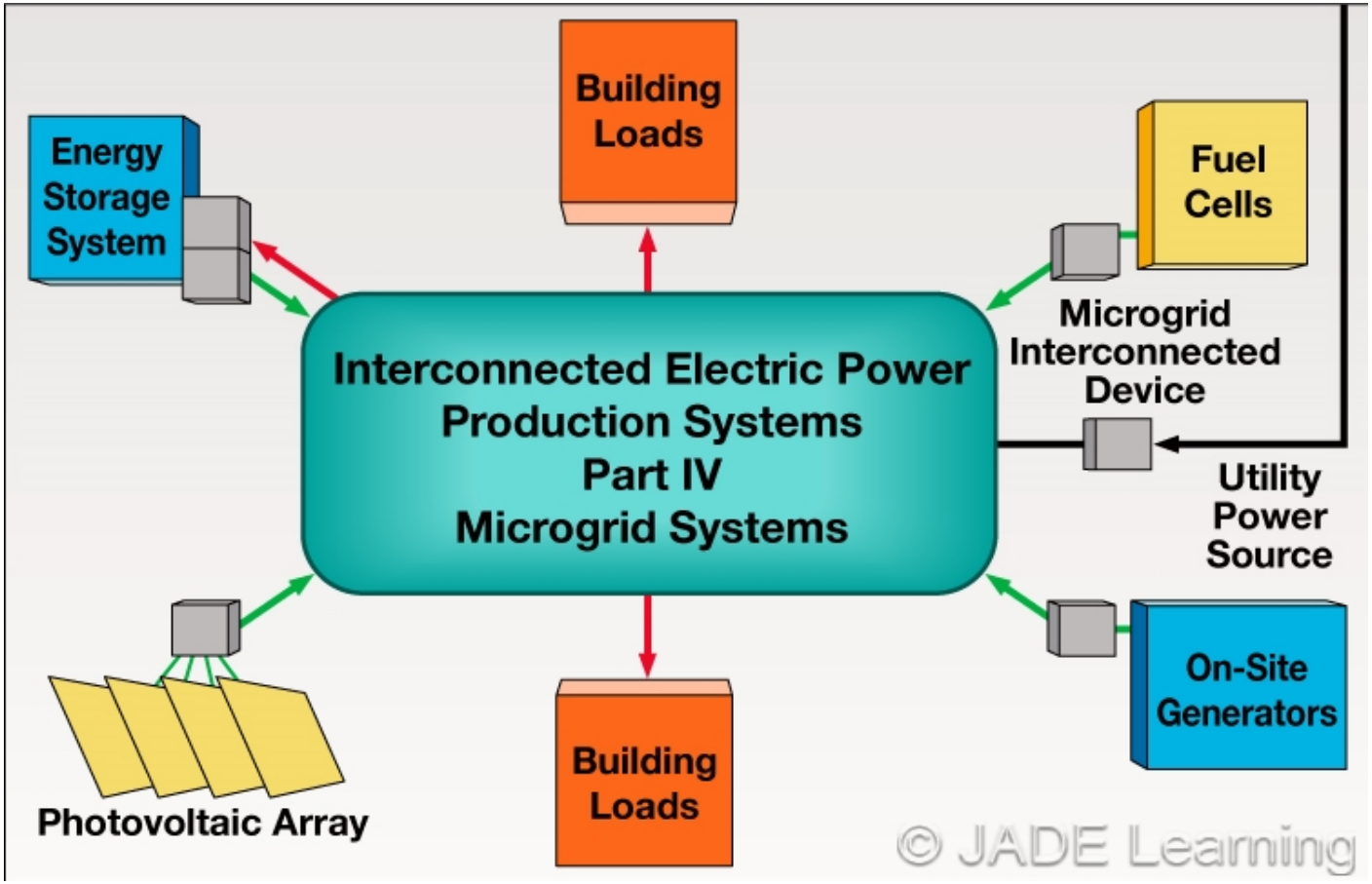


700.25 - Branch Circuit Emergency Lighting Transfer Switch



Emergency lighting must be fully illuminated upon operation of a branch circuit emergency lighting transfer switch.

705 - Part IV: Interconnected Electric Power Production Sources; Microgrid



Microgrid systems can consist of on-site generators, PV arrays, fuel cells, and energy storage systems.

Article 706 - Energy Storage Systems

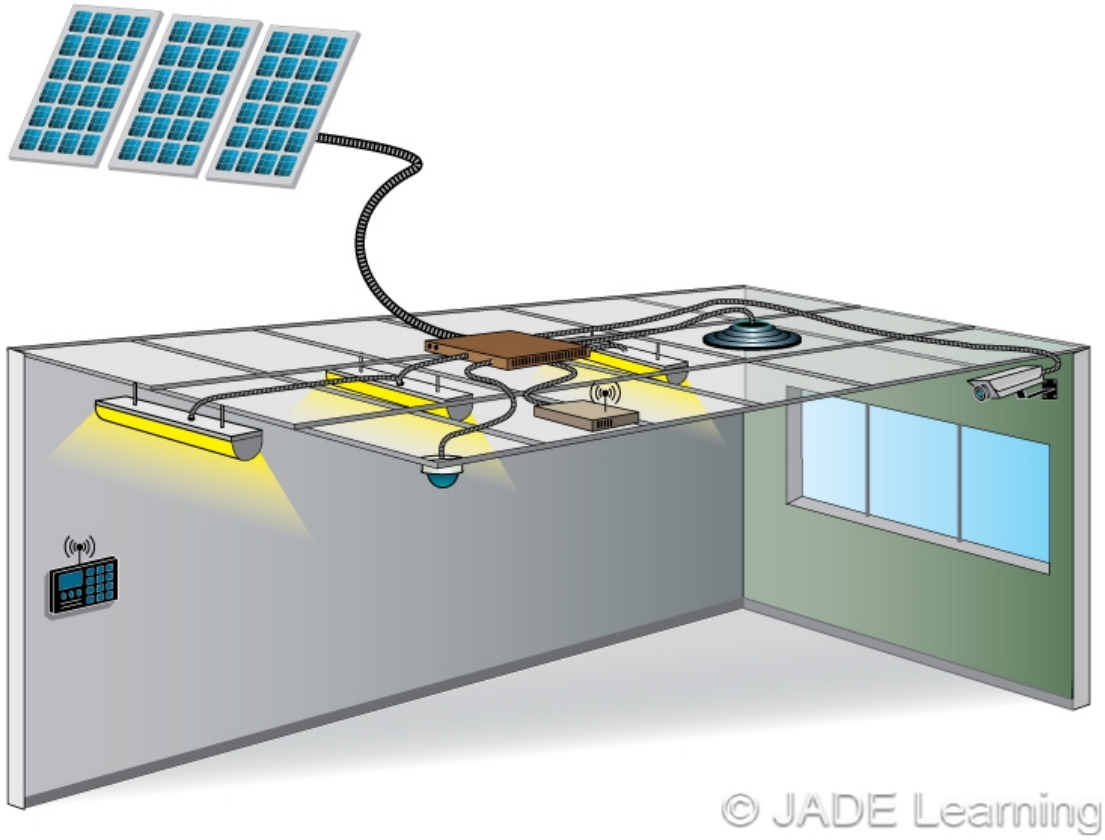
Energy Storage Systems are one or more components assembled together capable of storing energy for use at a future time

Article 710 - Stand-Alone Systems

A stand-alone system operates independently of the utility grid.

Article 712 - Direct Current Microgrids

A Direct Current Microgrid uses onsite dc power sources to supply dc loads.



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