



## **314.23(F) Raceway-Supported Enclosures, with Devices, Luminaires, or Lampholders.**

An enclosure that contains a device(s), other than splicing devices, or supports a luminaire(s), lampholder, or other equipment and is supported by entering raceways shall not exceed 1650 cm<sup>3</sup> (100 in.<sup>3</sup>) in size. It shall have threaded entries or have hubs identified for the purpose. It shall be supported by two or more conduits threaded wrenchtight into the enclosure or hubs. Each conduit shall be secured within 450 mm (18 in.) of the enclosure.

TABLE 300.5 Minimum Cover Requirements, 0 to 600 Volts, Nominal, Burial in Millimeters (Inches)

Type of Wiring Method or Circuit										
Location of Wiring Method or Circuit	Column 1 Direct Burial Cables or Conductors		Column 2 Rigid Metal Conduit or Intermediate Metal Conduit		Column 3 Nonmetallic Raceways Listed for Direct Burial Without Concrete Encasement or Other Approved Raceways		Column 4 Residential Branch Circuits Rated 120 Volts or Less with GFCI Protection and Maximum Overcurrent Protection of 20 Amperes		Column 5 Circuits for Control of Irrigation and Landscape Lighting Limited to Not More Than 30 Volts and Installed with Type UF or in Other Identified Cable or Raceway	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
All locations not specified below	600	24	150	6	430	18	300	12	150	6
In trench below 50-mm (2-in.) thick concrete or equivalent	430	18	150	6	300	12	150	6	150	6
Under a building	0	0 (in raceway or Type MC or Type MI cable identified for direct burial)	0	0	0	0	0	0 (in raceway or Type MC or Type MI cable identified for direct burial)	0	0 (in raceway or Type MC or Type MI cable identified for direct burial)
Under minimum of 102-mm (4-in.) thick concrete exterior slab with no vehicular traffic and the slab extending not less than 152 mm (6 in.) beyond the underground installation	430	18	100	4	100	4	150 (direct burial) 100 (in raceway)	6  4	150 (direct burial) 100 (in raceway)	6  4
Under streets, highways, roads, alleys, driveways, and parking lots	600	24	600	24	600	24	600	24	600	24
One- and two-family dwelling driveways and outdoor parking areas, and used only for dwelling-related purposes	430	18	430	18	430	18	300	12	430	18
In or under airport runways, including adjacent areas where trespassing prohibited	430	18	430	18	430	18	430	18	430	18

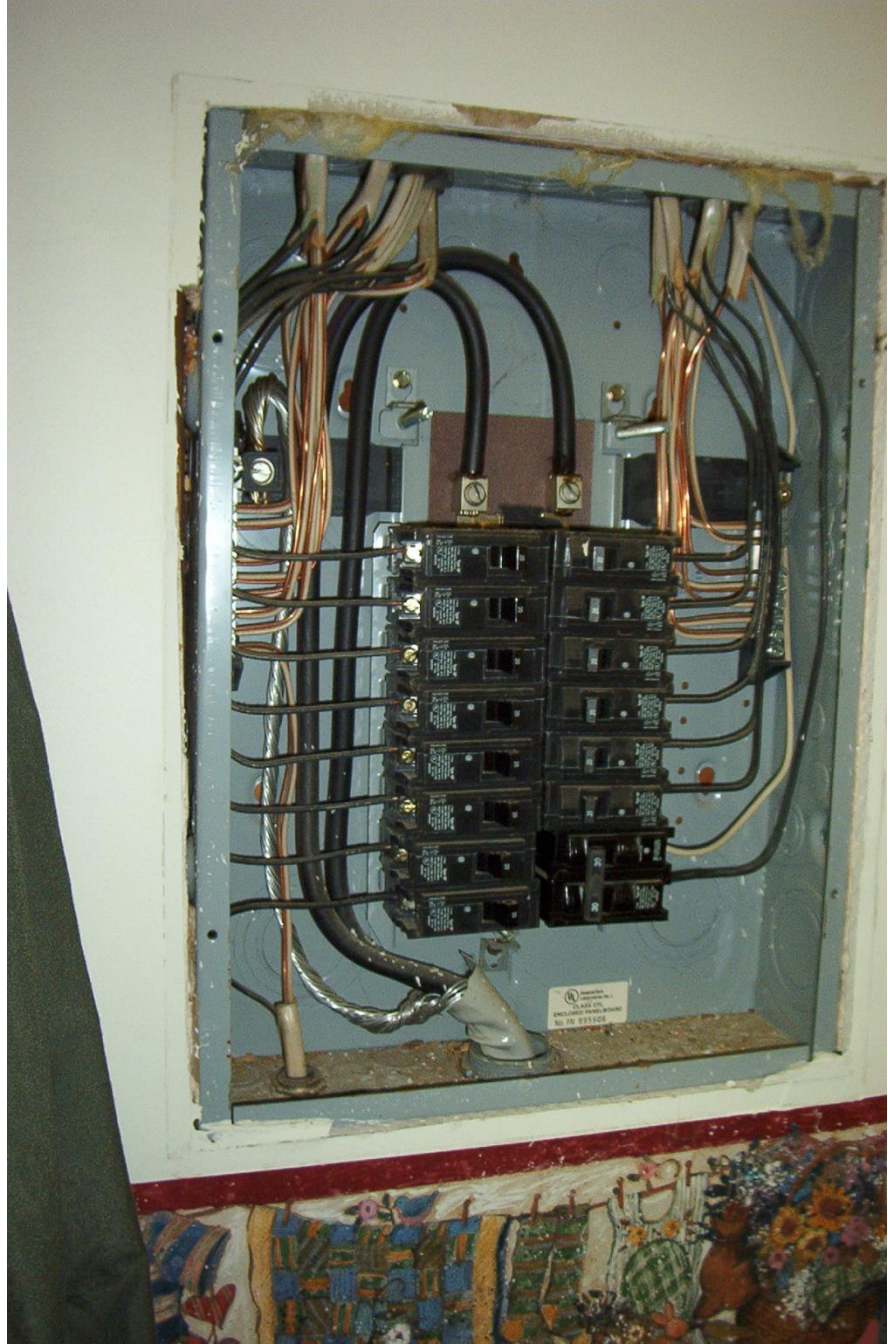
Notes:

1. Cover is defined as the shortest distance in millimeters (inches) measured between a point on the top surface of any direct-buried conductor, cable, conduit, or other raceway and the top surface of finished grade, concrete, or similar cover.
2. Raceways approved for burial only where concrete encased shall require concrete envelope not less than 50 mm (2 in.) thick.
3. Lesser depths shall be permitted where cables and conductors rise for terminations or splices or where access is otherwise required.
4. Where one of the wiring method types listed in Columns 1–3 is used for one of the circuit types in Columns 4 and 5, the shallowest depth of burial shall be permitted.
5. Where solid rock prevents compliance with the cover depths specified in this table, the wiring shall be installed in metal or nonmetallic raceway permitted for direct burial. The raceways shall be covered by a minimum of 50 mm (2 in.) of concrete extending down to rock.

## **314.23 (B) Structural Mounting.**

An enclosure supported from a structural member of a building or from grade shall be rigidly supported either directly or by using a metal, polymeric, or wood brace.





## 250.24(C) Grounded Conductor Brought to Service Equipment

- Where an ac system operating at less than 1000 volts is grounded at any point, the grounded conductor(s) shall be run to each service disconnecting means and shall be Connected to each disconnecting means grounded conductor(s) terminal or bus. A main bonding jumper shall connect the grounded conductor(s) to each service disconnecting means enclosure. The grounded conductors shall be installed in accordance with 250.24(C)(1) through (C)(3).

## 408.41 Grounded Conductor Terminations.

Each grounded conductor shall terminate within the panelboard in an individual terminal that is not also used for another conductor.







# 300.15 (C) Protection.

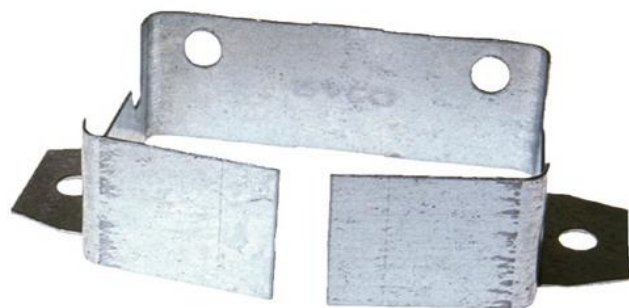
A box or conduit body shall not be required where cables enter or exit from conduit or tubing that is used to provide cable support or protection against physical damage. A fitting shall be provided on the end(s) of the conduit or tubing to protect the cable from abrasion.



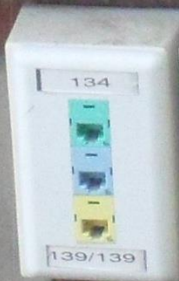
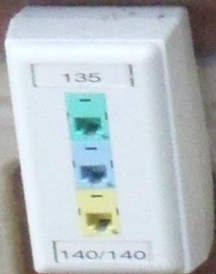
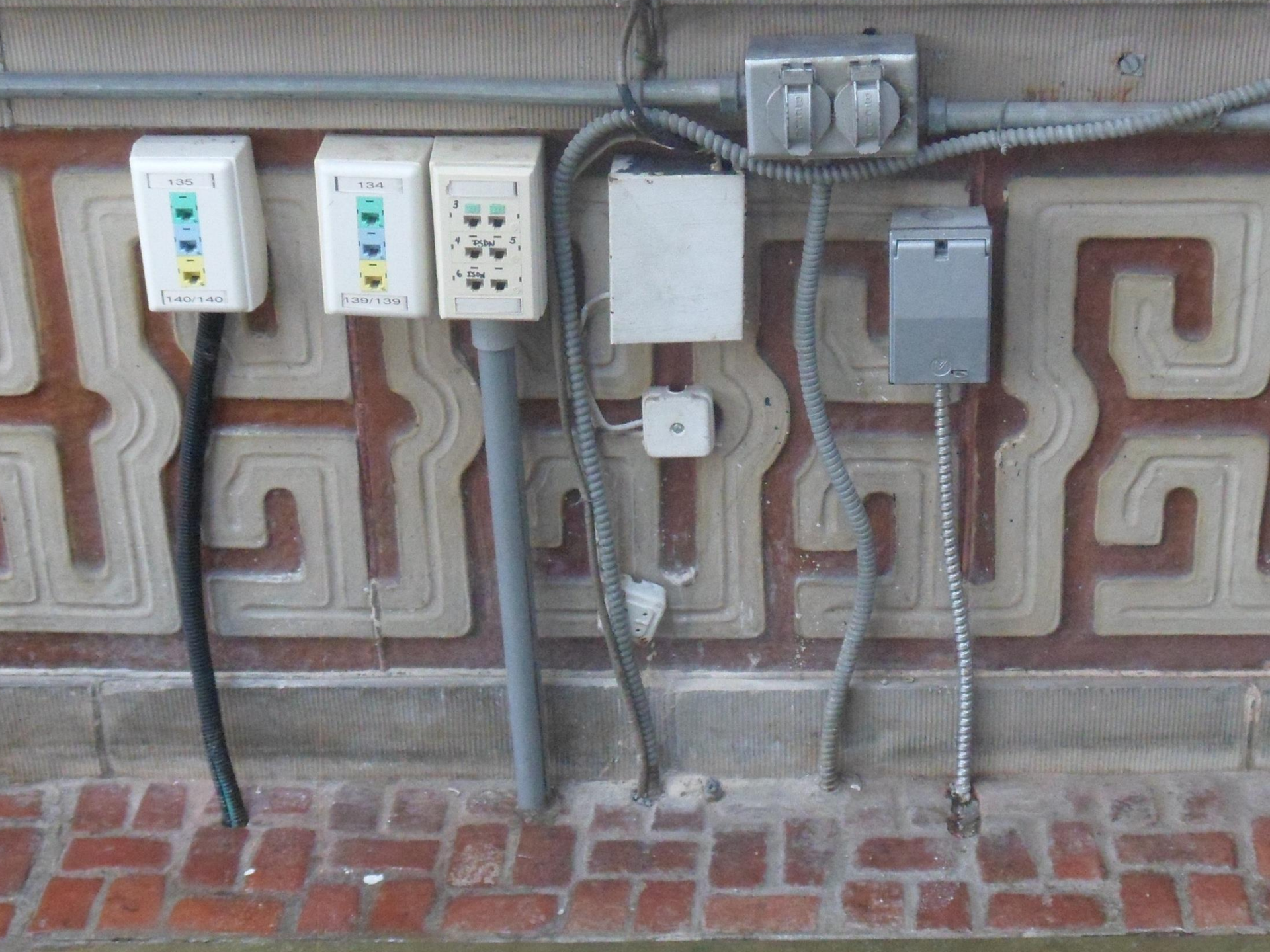


## **314.20 In Wall or Ceiling**

In walls or ceilings with a surface of concrete, tile, gypsum, plaster, or other noncombustible material, boxes employing a flush-type cover or faceplate shall be installed so that the front edge of the box, plaster ring, extension ring, or listed extender will not be set back of the finished surface more than 6 mm (1/4 in.).





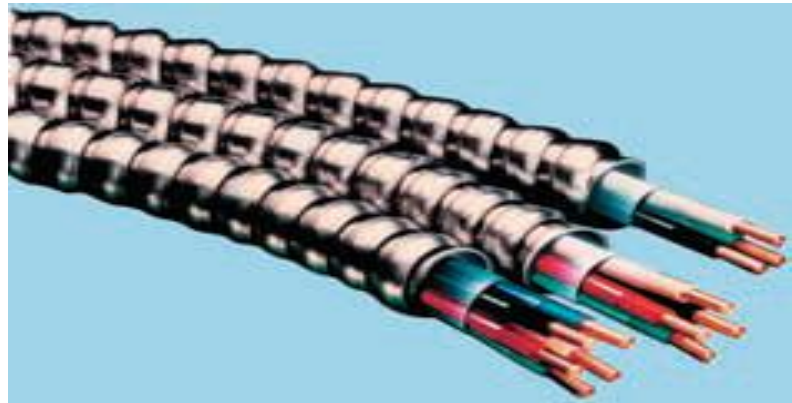


# 330.10 Uses Permitted

## (A) General Uses.

Type MC cable shall be permitted as follows:

- (1) For services, feeders, and branch circuits.
- (2) For power, lighting, control, and signal circuits.
- (3) Indoors or outdoors.
- (4) Exposed or concealed.
- (5) To be direct buried where identified for such use.
- (6) In cable tray where identified for such use.
- (7) In any raceway.



# 320.12 Uses Not Permitted

Type AC cable shall not be used as follows:

- (1) Where subject to physical damage
- (2) In damp or wet locations
- (3) In air voids of masonry block or tile walls where such walls are exposed or subject to excessive moisture or dampness
- (4) Where exposed to corrosive conditions
- (5) Embedded in plaster finish on brick or other masonry in damp or wet locations









# **110.26 Spaces About Electrical Equipment**

Access and working space shall be provided and maintained about all electrical equipment to permit ready and safe operation and maintenance of such equipment.

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Access and working space shall be provided and maintained about all electrical equipment to permit ready and safe operation and maintenance of such equipment.

## **(A) Working Space.**

Working space for equipment operating at 600 volts, nominal, or less to ground and likely to require examination, adjustment, servicing, or maintenance while energized shall comply with the dimensions of 110.26(A)(1), (A)(2), and (A)(3)...

## **440.14 Location**

Disconnecting means shall be located within sight from and readily accessible from the air-conditioning or refrigerating equipment. The disconnecting means shall be permitted to be installed on or within the air-conditioning or refrigerating Equipment. The disconnecting means shall not be located on panels that are designed to allow access to the air-conditioning or refrigeration equipment or to obscure the equipment nameplate(s).

# ARTICLE 100 - DEFINITIONS

## **Accessible, Readily (Readily Accessible)**

Capable of being reached quickly for operation, renewal, or inspections without requiring those to whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders, and so forth.





# **406.4 General Installation Requirements**

## **(A) Grounding Type.**

Receptacles installed on 15- and 20-ampere branch circuits shall be of the grounding type.

## **210.8(B) Other Than Dwelling Units.**

All 125-volt, singlephase, 15- and 20-ampere receptacles installed in the locations specified in 210.8(B)(1) through (8) shall have ground-fault circuit-interrupter protection for personnel.

(4) Outdoors

## **210.8 Ground-Fault Circuit-Interrupter Protection for Personal(B) Other Than Dwelling Units.**

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



# GFCI Introduced in the 1971 NEC





# 210.8 Ground-Fault Circuit-Interrupter Protection for Personal(B) Other Than Dwelling Units.

## (1) Bathrooms

### Article 100 – Definitions



**Bathroom.** An area including a basin with one or more of the following: a toilet, *a urinal*, a tub, *a shower*, *a bidet*, or *similar plumbing fixtures*.

# 210.8 Ground-Fault Circuit-Interrupter Protection for Personal(B) Other Than Dwelling Units.

## (2) Kitchens

Article 100 “an area with a sink and permanent facilities for food preparation and cooking.”



# 210.8 Ground-Fault Circuit-Interrupter Protection for Personal(B) Other Than Dwelling Units.

(3) Rooftops



# **210.8 Ground-Fault Circuit-Interrupter Protection for Personal(B) Other Than Dwelling Units.**

## **(4) Outdoors**

Electrocution and electrical shock accident data provided by the U.S. Consumer Product Safety Commission indicate that electric shock accidents occur at locations other than dwelling units and construction sites.

## 210.8 Ground-Fault Circuit-Interrupter Protection for Personal(B) Other Than Dwelling Units.

(5) Sinks — where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink.





# 210.8 Ground-Fault Circuit-Interrupter Protection for Personal(B) Other Than Dwelling Units.

(6) Indoor wet locations



# 210.8 Ground-Fault Circuit-Interrupter Protection for Personal(B) Other Than Dwelling Units.

(7) Locker rooms with associated showering facilities



# 210.8 Ground-Fault Circuit-Interrupter Protection for Personal(B) Other Than Dwelling Units.



(8) Garages, service bays, and similar areas where electrical diagnostic equipment, electrical hand tools, or portable lighting equipment are to be used



# 210.8 Ground-Fault Circuit-Interrupter Protection for Personal

Ground-fault circuit-interruption for personnel shall be provided as required in 210.8(A) through (C).

The ground-fault circuit-interrupter shall be installed in a readily accessible location.



# 210.8 Ground-Fault Circuit-Interrupter Protection for Personal

Ground-fault circuit-interruption for personnel shall be provided as required in 210.8(A) through (C).

The ground-fault circuit-interrupter shall be installed in a readily accessible location.



## **Accessible, Readily (Readily Accessible).**

Capable of being reached quickly for operation, renewal, or inspections without requiring those to whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders, and so forth.



## **210.8 Ground-Fault Circuit-Interrupter Protection for Personal(A) Dwelling Units**

All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in 210.8(A)(1) through (8) shall have ground-fault circuit interrupter protection for personnel.

# 210.8 Ground-Fault Circuit-Interrupter Protection for Personal(A) Dwelling Units

All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in 210.8(A)(1) through (8) shall have ground-fault circuit interrupter protection for personnel.

(1) Bathrooms

## Article 100 – Definitions



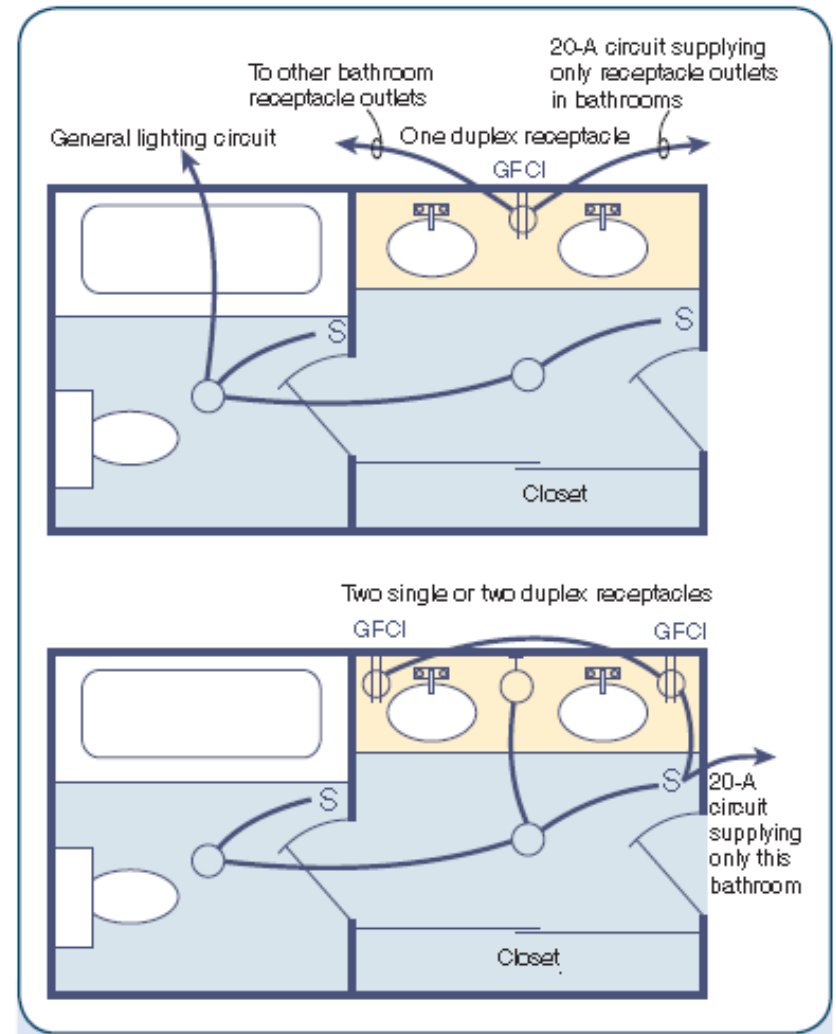
**Bathroom.** An area including a basin with one or more of the following: a toilet, *a urinal*, a tub, *a shower*, *a bidet*, or *similar plumbing fixtures*.

# 210.8 Ground-Fault Circuit-Interrupter Protection for Personal(A) Dwelling Units

## (1) Bathrooms

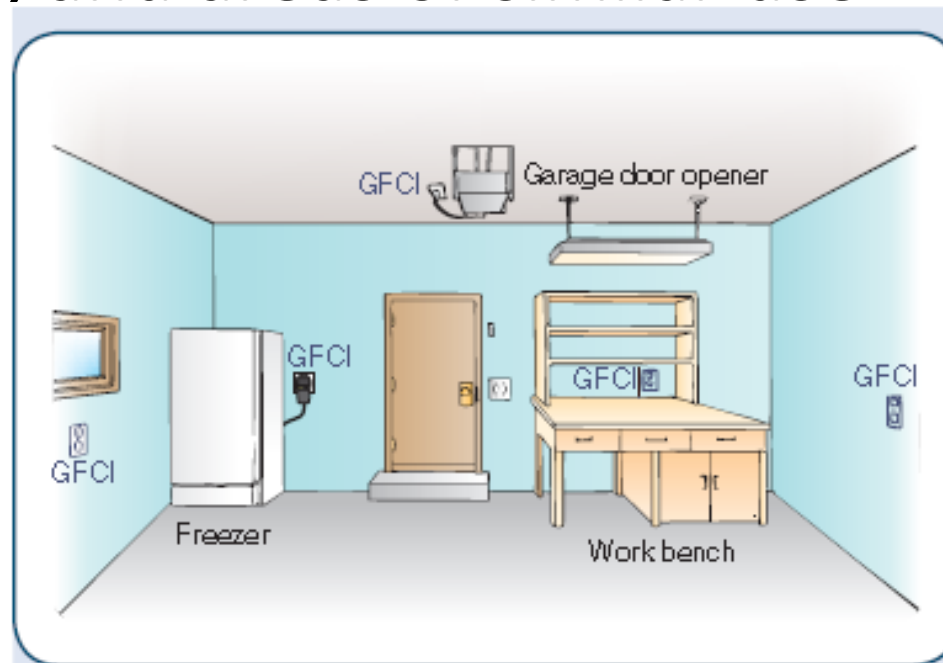


**Article 100 – Definitions**  
**Bathroom.** An area including a basin with one or more of the following: a toilet, *a urinal*, a tub, *a shower*, *a bidet*, or *similar plumbing fixtures*.



# 210.8 Ground-Fault Circuit-Interrupter Protection for Personal(A) Dwelling Units

(2) 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





# 210.8 Ground-Fault Circuit-Interrupter Protection for Personal(A) Dwelling Units

## (3) Outdoors

Exception to (3): Receptacles that are not readily accessible and are supplied by a *branch circuit dedicated* to electric snow-melting, *deicing*, or *pipeline and vessel heating* equipment shall be permitted to be installed in accordance with 426.28 or 427.22, *as applicable*.

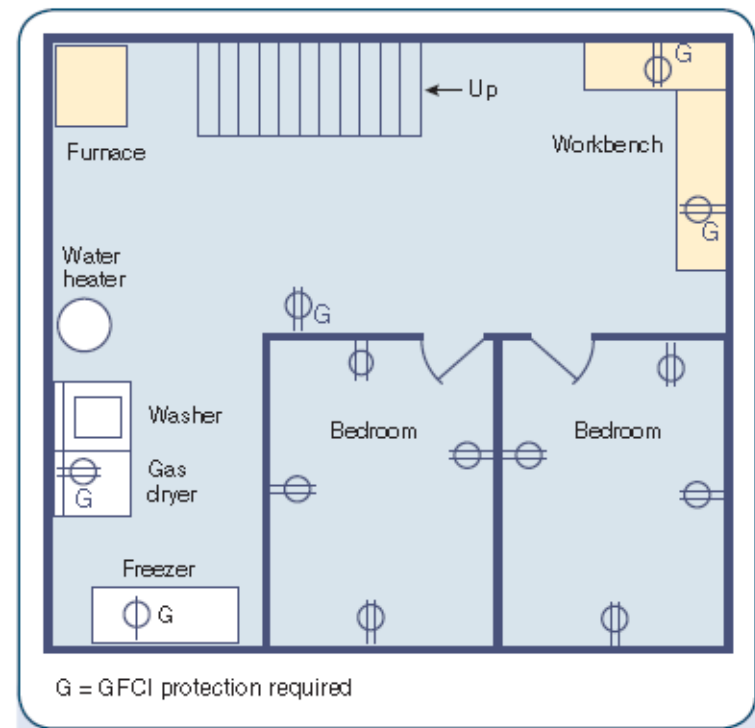
# 210.8 Ground-Fault Circuit-Interrupter Protection for Personal(A) Dwelling Units

(4) Crawl spaces — at or below grade level



# 210.8 Ground-Fault Circuit-Interrupter Protection for Personal(A) Dwelling Units

(5) Unfinished basements — for purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms and limited to storage areas, work areas, and the like



## **210.8 Ground-Fault Circuit-Interrupter Protection for Personal(A) Dwelling Units**

(5) Unfinished basements — for purposes of this section, unfinished basements are defined as portions or areas of the basement not intended as habitable rooms and limited to storage areas, work areas, and the like

*Exception to (5): A receptacle supplying only a permanently installed fire alarm or burglar alarm system shall not be required to have ground-fault circuit-interrupter protection.*



# 760.41 NPLFA Circuit Power Source Requirements

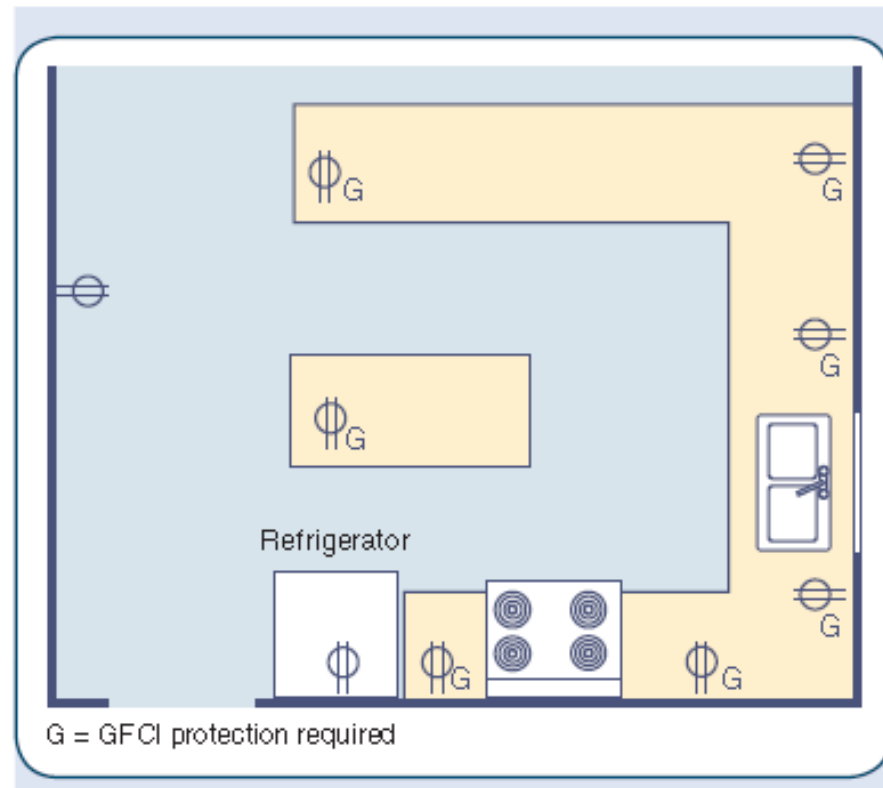
## **(B) Branch Circuit.**

The branch circuit supplying the fire alarm equipment(s) shall supply no other loads. The location of the branch-circuit overcurrent protective device shall be permanently identified at the fire alarm control unit. The circuit disconnecting means shall have red identification, shall be accessible only to qualified personnel, and shall be identified as “FIRE ALARM CIRCUIT.” The red identification shall not damage the overcurrent protective devices or obscure the manufacturer’s markings. This branch circuit shall not be supplied through ground-fault circuit interrupters or arc-fault circuit-interrupters.



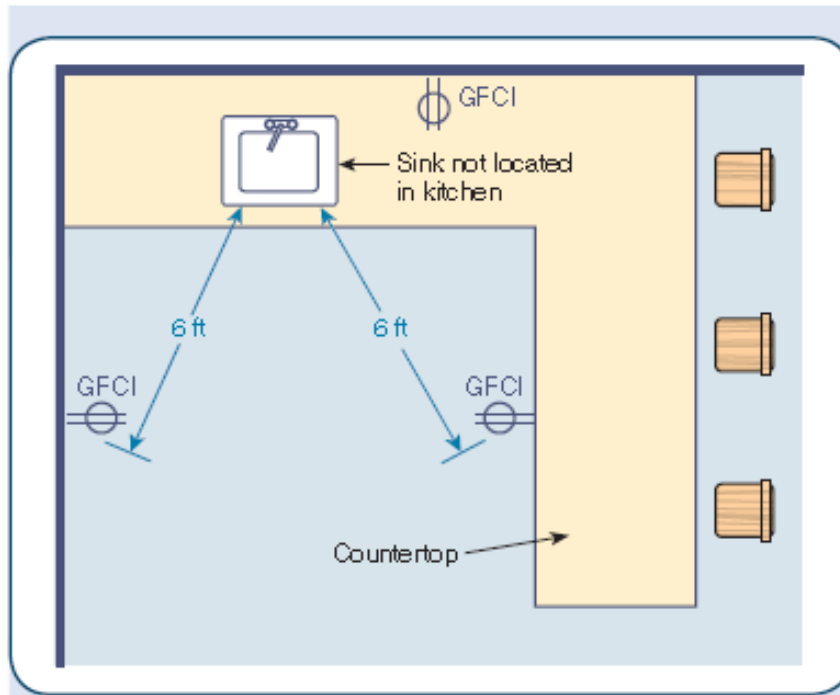
# 210.8 Ground-Fault Circuit-Interrupter Protection for Personal(A) Dwelling Units

(6) Kitchens — where the receptacles are installed to serve the countertop surfaces



# 210.8 Ground-Fault Circuit-Interrupter Protection for Personal(A) Dwelling Units

(7) *Sinks* — located in areas other than *kitchens* where receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink



# 210.8 Ground-Fault Circuit-Interrupter Protection for Personal(A) Dwelling Units

## (8) Boathouses







# **760.136 Separation from Electric Light, Power, Class 1, NPLFA, and Medium-Power Network-Powered Broadband Communications Circuit Conductors**

**(A) General.**

(B) Power-limited fire alarm circuit cables and conductors shall not be placed in any cable, cable tray, compartment, enclosure, manhole, outlet box, device box, raceway, or similar fitting with conductors of electric light, power, Class 1, non-power-limited fire alarm circuits, and medium-power network-powered broadband communications Circuits...



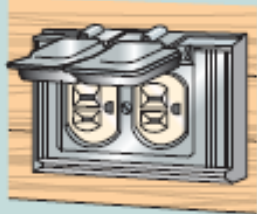
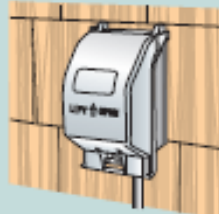


# 406.9(B) Wet Locations.

## **(1) 15- and 20-Ampere Receptacles in a Wet Location.**

15- and 20-ampere, 125- and 250-volt receptacles installed in a wet location shall have an enclosure that is weatherproof whether or not the attachment plug cap is inserted. *For other than one- or two-family dwellings, an outlet box hood installed for this purpose shall be listed, and where installed on an enclosure supported from grade as described in 314.23(B) or as described in 314.23(F) shall be identified as “extra-duty.”* All 15- and 20-ampere, 125- and 250-volt nonlocking- type receptacles shall be listed weather-resistant type.



Damp and Wet Receptacle Locations	Receptacle Cover (Enclosure) Type Requirements	
	Cover that is <i>not</i> weatherproof, with attachment plug cap inserted into receptacle	Cover that is weatherproof, with attachment plug cap inserted into receptacle ("in-use" type)
		
406.9(A): Outdoor damp locations	Minimum type required <i>Note: "In-use" type covers permitted</i>	Permitted
406.9(A): Indoor damp locations	Minimum type required <i>Note: "In-use" type covers permitted</i>	Permitted
406.9(B)(1)&(2): Outdoor wet locations	Required for receptacle types other than those rated 15 and 20 amperes, 125 and 250 volts, where the tool, appliance, or other utilization equipment plugged into the receptacle is attended while in use. <i>Note: "In-use" type covers permitted</i>	(a) Required for receptacles rated 15 and 20 amperes, 125 and 250 volts (b) Required for receptacles other than those rated 15 and 20 amperes, 125 and 250 volts, where the tool, appliance, or other utilization equipment plugged into the receptacle is <i>not</i> attended while in use.
406.9(B)(2): Indoor wet locations	Required for receptacle types other than those rated 15 and 20 amperes, 125 and 250 volts, where the tool, appliance, or other utilization equipment plugged into the receptacle is attended while in use. <i>Note: "In-use" type covers permitted</i>	(a) Required for receptacles rated 15 and 20 amperes, 125 and 250 volts (b) Required for receptacles other than those rated 15 and 20 amperes, 125 and 250 volts, where the tool, appliance, or other utilization equipment plugged into the receptacle is <i>not</i> attended while in use.



## 358.30 Securing and Supporting

- EMT shall be installed as a complete system in accordance with 300.18 and shall be securely fastened in place and supported in accordance with 358.30(A) and (B).
- (A) Securely Fastened EMT shall be securely fastened in place at least every 3 m (10 ft). In addition, each EMT run between termination points shall be securely fastened within 900 mm (3 ft) of each outlet box, junction box, device box, cabinet, conduit body, or other tubing termination.



# 300.15 Boxes, Conduit Bodies, or Fittings - Where Required

- A box shall be installed at each outlet and switch point for concealed knob-and-tube wiring.
- Fittings and connectors shall be used only with the specific wiring methods for which they are designed and listed.
- Where the wiring method is conduit, tubing, Type AC cable, Type MC cable, Type MI cable, nonmetallic-sheathed cable, or other cables, a box or conduit body shall be installed at each conductor splice point, outlet point, switch point, junction point, termination point, or pull point, unless otherwise permitted in 300.15(A) through (M).

# Wiring in Boxes, Conduit Bodies, and Handholes Must be Accessible *Section 314.29*

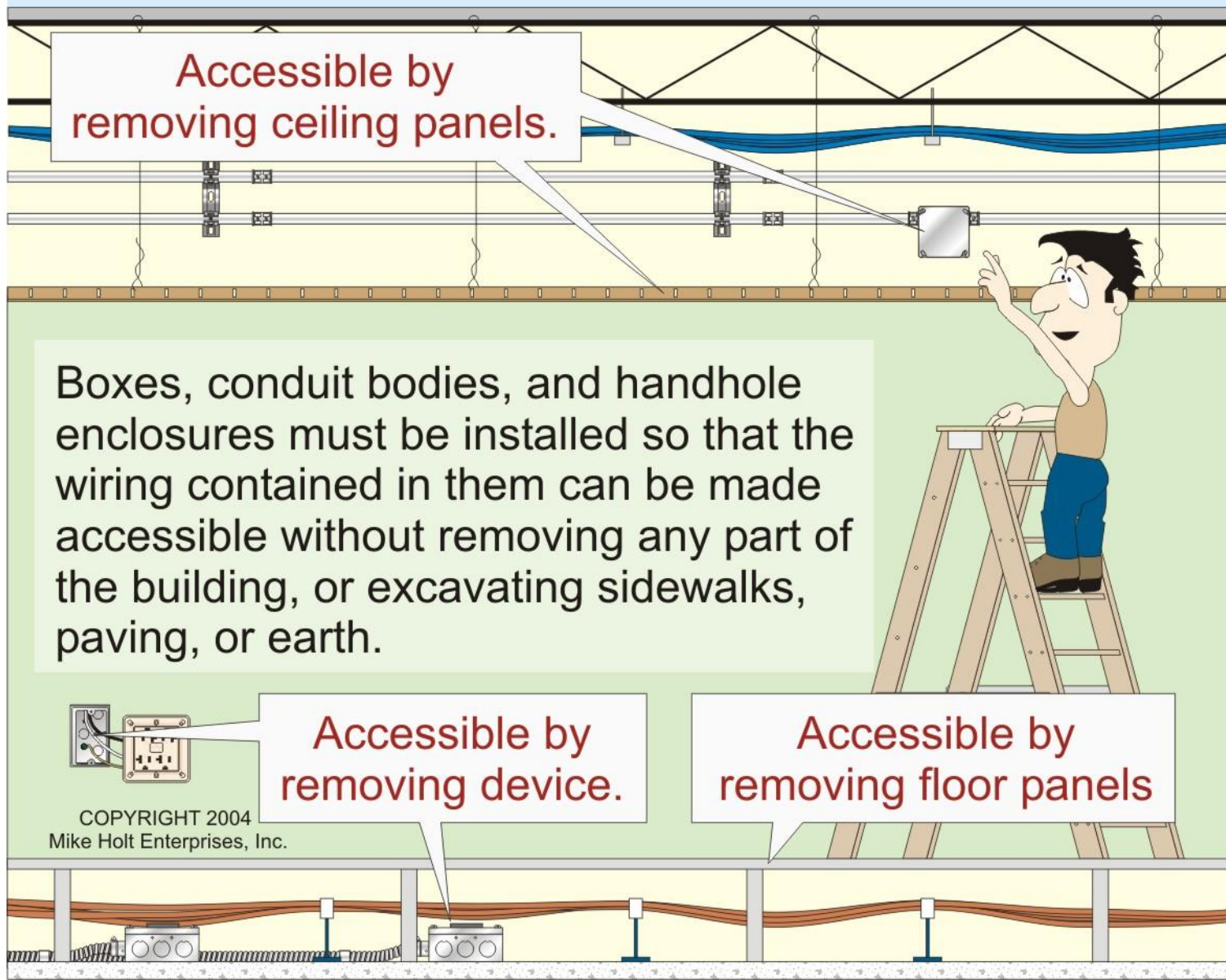
Accessible by  
removing ceiling panels.

Boxes, conduit bodies, and handhole enclosures must be installed so that the wiring contained in them can be made accessible without removing any part of the building, or excavating sidewalks, paving, or earth.

Accessible by  
removing device.

Accessible by  
removing floor panels

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## 358.24 Bends — How Made

- Bends shall be made so that the tubing is not damaged and the internal diameter of the tubing is not effectively reduced. The radius of the curve of any field bend to the centerline of the tubing shall not be less than shown in Table 2, Chapter 9 for one-shot and full shoe benders.

## 358.30 Securing and Supporting

- EMT shall be installed as a complete system in accordance with 300.18 and shall be securely fastened in place and supported in accordance with 358.30(A) and (B) or permitted to be unsupported in accordance with 358.30(C).
- (A) Securely Fastened EMT shall be securely fastened in place at least every 3 m (10 ft). In addition, each EMT run between termination points shall be securely fastened within 900 mm (3 ft) of each outlet box, junction box, device box, cabinet, conduit body, or other tubing termination.





## 240.24 Location in or on Premises

- (A) Accessibility Overcurrent devices shall be readily accessible and shall be installed so that the center of the grip of the operating handle of the switch or circuit breaker, when in its highest position, is not more than 2.0 m (6 ft 7 in.) above the floor or working platform unless one of the following applies:



## 240.24 Location in or on Premises

- (D) Not in Vicinity of Easily Ignitable Material  
Overcurrent devices shall not be located in the vicinity of easily ignitable material, such as in clothes closets.
- *Examples of locations where combustible materials may be stored are linen closets, paper storage closets, and clothes closets.*
- (E) Not Located in Bathrooms In dwelling units and guest rooms or guest suites of hotels and motels, overcurrent devices, other than supplementary overcurrent protection, shall not be located in bathrooms.