

2013 CODE PANEL QUESTIONS

1. A fire alarm detector is installed in a suspended ceiling. Can a plaster ring cut into the ceiling tile be used to support the fire alarm device?

No, see 760.53 (A)(1) for NPLFA circuits and 760.130(B)(1) for PLFA circuits. Both require In Raceways, Exposed on Ceilings or Sidewalls, or Fished in Concealed Spaces. Cable splices or terminations shall be made in listed fittings, boxes, enclosures, fire alarm devices, or utilization equipment.

2. The top of a store display is 10 foot up to the suspended ceiling and 5 foot from the suspended ceiling to the bottom of the ceiling joists. I want to install a branch circuit from the joists to the store display for some receptacles. Do I need to support the conduit from the joists to the store fixture? Can a cord be used for this?

There are really two questions that need to be answered here. First, regarding the conduit support to the display; the securing issue would be addressed in Article 358.30 (A) & Exception #1 which gives you the guidelines to help make this installation. On question #2; It's asking whether cord can be used and the answer to that would be NO. See 400.8 under uses not permitted.

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.

Exception No. 1: Fastening of unbroken lengths shall be permitted to be increased to a distance of 1.5 m (5 ft) where structural members do not readily permit fastening within 900 mm (3 ft).

400.8 Uses Not Permitted. Unless specifically permitted in 400.7, flexible cords and cables shall not be used for the following:

- (1) As a substitute for the fixed wiring of a structure
- (2) Where run through holes in walls, structural ceilings, suspended ceilings, dropped ceilings, or floors.

3. A bank has some LED letters installed on the outside of the structure. The LED drivers are inside the bank in the attic. Where does the sign disconnect get installed? Are there any accessibility requirements?

Code Ref: Signs 600.6 Disconnects

Disconnecting means—shall be controlled by an externally operable switch or circuit breaker.

600.6(A)(1) Within sight of sign—the disconnecting means shall be within sight of the sign. Where it is out of the line of sight from any section that is able to be energized, the disconnecting means shall be capable of being locked in the open position.

I couldn't find any requirements for being accessible.

4. A 6 foot 16-3 SO cord is field installed to the high bay fluorescent fixtures on a 20 amp circuit. Is this correct? If not what is the smallest cord that can be field installed?

Code Ref: 240.5(B)(4)

Flexible cord used in extension cords made with separately listed and installed components shall be permitted to be supplied by a branch circuit in accordance with the following: 20-ampere circuits – 16AWG and larger

5. A 400 amp feed through panel is a service disconnect using the 6 disconnect rule. This is a main lug panel. The panel is fed from the CT cabinet with parallel 250 kcmil conductors. Can the paralleled conductors terminate with 1 set on the top main lugs and 1 set on the bottom feed through lugs?

Code Ref: I would say it is unlikely. There is nothing in the Listing of the panelboard that would prohibit it unless the instructions say no, however, you have to make sure the conductors are the same length and terminate the same way as is required in 310.10(H)(2) depending on where the circuit is coming into the panel it may be difficult to get the conductors the same length.

6. A 10 x 20 foot courtyard is located in the middle of a structure. This use to be an exterior location and with an addition it is now accessible only from the interior. The courtyard contains an underground fed CT cabinet. A new piece of equipment is requiring an increase in the service size and will use a spare conduit for new paralleled service conductors. A new service disconnect will be installed in the courtyard. The CT cabinet will also be changed because of the ampacity increase. Will the new service equipment be considered outside the structure when located in the courtyard?

VI. Service Equipment — Disconnecting Means

230.70 General. Means shall be provided to disconnect all conductors in a building or other structure from the service entrance conductors.

(A) Location. The service disconnecting means shall be installed in accordance with 230.70(A)(1), (A)(2), and (A)(3).

(1) Readily Accessible Location. The service disconnecting means shall be installed at a readily accessible location either outside of a building or structure or inside nearest the point of entrance of the service conductors.

230.6 Conductors Considered Outside the Building.

Conductors shall be considered outside of a building or other structure under any of the following conditions:

- (1) Where installed under not less than 50 mm (2 in.) of concrete beneath a building or other structure
- (2) Where installed within a building or other structure in a raceway that is encased in concrete or brick not less than 50 mm (2 in.) thick
- (3) Where installed in any vault that meets the construction requirements of Article 450, Part III ed in conduit and under not less than 18 in. of earth beneath a building or other structure
- (5) Where installed on overhead service masts on the outside surface of the building traveling through the eave of that building to meet the requirements of 230.24

I would as the contractor work with the building official and the local fire marshal (dept) before job starts.

7. What size of copper bus is required to carry 1200 amps?

This would be a vendor question to get the proper rated size busbar.

110.3(B) might apply here.

Auxiliary Gutters 366.23(A)

This article gives some information about bar copper bars in sheet metal auxiliary gutters.

8. A bunkhouse (no cooking facilities) at a church camp is being rewired. The new wiring in the bunkhouse is being installed using the rules of a dormitory. Is a receptacle required in a hallway or a balcony with the dormitory rules?

Code Ref: 210.60(A)

No. Dormitories shall have receptacle outlets installed in accordance with 210.52(A)&(D). Hallway requirements are in 210.52(H) and balcony requirements are in 210.52(E).

9. A PV installation has 2 inverters with a maximum output of 20 amps each. The output circuit will be back fed with 2-25 amp breakers into an existing 100 amp panel. Is this wiring correct? What labeling is required on this part of the inverter wiring?

This is not correct, see 705.12(D)(2);

Bus or Conductor Rating. The sum of the ampere ratings of overcurrent devices in circuits supplying power to a busbar or conductor shall not exceed 120 percent of the rating of the busbar or conductor.

Only one 20 amp max PV inverter output circuit would be permitted for backfeed a 100 amp buss rated panelboard.

For the marking, see 705.12(D)(4);

Marking. Equipment containing overcurrent devices in circuits supplying power to a busbar or conductor supplied from multiple sources shall be marked to indicate the presence of all sources.

Also the inverter output circuit would be required to be connected to the opposite end of the buss from the main breaker for that panelboard, 705.12(7);

Inverter Output Connection. Unless the panelboard is rated not less than the sum of the ampere ratings of all overcurrent devices supplying it, a connection in a panelboard shall be positioned at the opposite (load) end from the input feeder location or main circuit location. The bus or conductor rating shall be sized for the loads connected in accordance with Article 220. In systems with panelboards connected in series, the rating of the first overcurrent device

directly connected to the output of a utility-interactive inverter(s) shall be used in the calculations for all busbars and conductors. A permanent warning label shall be applied to the distribution equipment with the following or equivalent wording:

WARNING
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE THIS OVERCURRENT DEVICE

10. A residential peninsula has a pullout cabinet below the counter with a receptacle installed in the cabinet for a mixer. Is this receptacle required to be GFCI protected? Can the circuit for the mixer receptacle be on the counter circuit?

Technically No. Nowhere in article 210.8 (A) 1-8 does it specifically address this installation where it would require that receptacle to be GFCI protected but it could be fed on the load side of the circuit that is feeding the countertop receptacles located adjacent. However, keep in mind that this is an appliance that could over time have an issue where the user could be subjected to a shock (due to a faulty cord) while operating the appliance which GFCI protection would have negated the hazard before the occupant was injured. Just remember the code is the minimum. However, it doesn't stop the electrician from putting it on a GFCI as a good wiring practice.

210.8 (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

(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

(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.

(4) Crawl spaces — at or below grade level

(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.

Informational Note: See 760.41(B) and 760.121(B) for power supply requirements for fire alarm systems. Receptacles installed under the exception to 210.8(A)(5) shall not be considered as meeting the requirements of 210.52(G).

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

(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

(8) Boathouses

11. A restaurant is getting a new underground service. There will be 2-200 amp service disconnects installed from the meter socket with 3/0 copper conductors. The contractor is installing the conductors that feed the meter socket. What is the minimum size conductor required to feed the meter socket? What would be the minimum size parallel conductors? If the installation has a 400 amp disconnect installed instead of the 2-200 amp disconnects would the conductors feeding the meter socket be the same minimum size?

Code Ref: 310.15(B)(16)

From **table 310.15(B)(16)** a 400A rating would require a 600kcmil conductor (600kcmil is rated for 420 A). To use parallel conductors, use 2-3/0 conductors that are rated for 200A each in the 75 degree C column of 310.15(B)(16).

12. An overhead service conduit is using the conduit as the support for the service conductors from the utility. Where in the code are the requirements for the conduit to be a rigid metal conduit? If properly supported with a guy wire why can't the conduit be EMT or PVC? Would the requirements be the same for a feeder?

Code Ref: 225.17, 230.27, UL White Book DWTT, DYIX,FKAV

The NEC does not specifically allow or prohibit any type of raceway as a service mast. It states that it must be of adequate strength or be supported by braces or guys to withstand safely the strain imposed by the conductor weight. Because of past experience with bent masts, most utilities will not energize a service supported by other than rigid metal conduit and will require additional support once it gets over 4 feet above the roof. If I had to defend with the NEC I would use the statement: "Where raceway-type service masts are used, all raceway fittings shall be identified for use with service masts". I found no evidence of this requirement in the White Book under EMT fittings. RMC comes with a coupling, therefore it is part of the conduit and not considered a fitting.

It doesn't state in the NEC. If you look in 230.43 it talks about the wiring methods of 600volts or less. In this section of the NEC it provides a list of wiring methods such as, Rigid metal conduit (RMC) and EMT, PVC conduits. This practice of using a 2" RMC conduit system comes from a utility requirement.

13. A new emergency feeder in a hospital is installed to a disconnect, transformer, and panel for some branch circuit wiring. The feeder originates from an existing emergency panelboard. The generator is 480 volt to the existing panelboard and has ground fault protection on the mains. The existing feeder breakers in the panelboard are not ground fault protected. Does the new feeder need to be ground fault protected?

Code Ref: 517.17(B)

No, see 517.17(B) which states The additional levels of ground-fault protection shall not be installed on the load side of an essential electrical system transfer switch.

14. A motor with a factory installed cord is installed above a suspended ceiling. The cord is direct wired to a box with a snap switch that will be the disconnecting means. Is this wiring correct?

Code Ref: NO. **400.8 Uses Not Permitted.** Unless specifically permitted in 400.7, flexible cords and cables shall not be used for the following:

(1) As a substitute for the fixed wiring of a structure

(2) Where run through holes in walls, structural ceilings, suspended ceilings, dropped ceilings, or floors

(3) Where run through doorways, windows, or similar openings

(4) Where attached to building surfaces

Exception to (4): Flexible cord and cable shall be permitted to be attached to building surfaces in accordance with the provisions of 368.56(B)

(5) Where concealed by walls, floors, or ceilings or located above suspended or dropped ceilings

(6) Where installed in raceways, except as otherwise permitted in this Code

(7) Where subject to physical damage

15. A generator and automatic transfer switch is installed at a residence. How is the new generator sized? What labeling will be required? What if the transfer switch is manual?

Add up the loads from appropriate articles in 220 to size the generator. **Article 445.11** gives specifics on the required nameplate information needed on each generator.

Article 445.18 Disconnecting Means Required for Generators is an important article review also.

16. A residential property has a correctly sized generator installed to a 100 amp panel in the garage. This panel has underground wiring installed to a neighboring house as well as the house where the generator is located. Each property is a separate service. A breaker from the generator panel feeds a manual transfer switch at each property. The transfer switches are installed on the feeders to the house only at each property. Are there any special grounding requirements more than the feeder equipment grounds? What kind of labeling will be required at the transfer switches?

This question does not have enough data to provide a response. It is unclear if these properties are under the same ownership? On the same lot? Separately derived system? Any attempt to answer this question at this time would likely be incorrect.

17. A store has a 1 ¼ inch conduit for some cooler receptacles that originates from a 3 phase 208 volt panel. There are 8 ungrounded conductors, 6 neutral conductors (no shared neutrals) and an equipment ground in the conduit. Do the neutrals get counted for derating purposes? What if the wiring is changed so that the neutrals are shared?

With the information provided I would say yes. You have to count them, See 310.15(B)(5)(b), if the neutrals are shared so only the imbalance is on the neutral, then you don't have to count them, see 310.15(B)(5)(a).

18. An installed wall has no studs and all wiring is installed in the Styrofoam. What are the depth requirements for a romex or mc cable cut into a Styrofoam wall? A box is cut into the wall and is anchored with glue. Is this considered securely supported?

Code Ref: Yes. 334.10 (A) – Uses permitted. This would be an AHJ call. This type of wall (Sips Panel) would require the installer to seek out the manufacturer on installation guidelines.

(A) Type NM. Type NM cable shall be permitted as follows:

(1) For both exposed and concealed work in normally dry Locations except as prohibited in 334.10(3)

(2) To be installed or fished in air voids in masonry block or tile walls.

19. After the wall is sheet rocked the decision is made to install ceramic tile. Now all my boxes are flush with what “used” to be the finish wall. With the tile being non-combustible do box extensions need to be installed?

Depends on the thickness of the tile but if the tile is thicker than ¼ inch then yes, an extension will be needed. Article 314.20 says that the box can be set back no more than ¼ in if the material is non-combustible.

If combustible, the box must be flush with the finished surface.

20. Can the range hood in a residential kitchen be installed on the counter receptacle circuit?

Code Ref: 210.52(B)(2)

No. The two or more small-appliance branch circuits shall have no other outlets. The only exceptions are a clock receptacle and the receptacle for supplemental equipment or lighting on a gas-fired range or cooking unit.

21. Where does it say in the code that a receptacle can't be installed above a suspended ceiling?

It doesn't, it can be there, you just can't plug anything into it in accordance with 400.8, cords can't be concealed in or pass through or into a ceilings

22. There is no room above the suspended ceiling for a new conduit run that is needed. Can the conduit run be installed to the bottom of the ceiling grid?

Code Ref: NO. 300.11 Securing and Supporting.

(A) Secured in Place. Raceways, cable assemblies, boxes, cabinets, and fittings shall be securely fastened in place. Support wires that do not provide secure support shall not be permitted as the sole support. Support wires and associated fittings that provide secure support and that are installed in addition to the ceiling grid support wires shall be permitted as the sole support. Where independent support wires are used, they shall be secured at both ends. Cables and raceways shall not be supported by ceiling grids.

23. Can un-fused service conductors be run unprotected inside an aluminum traffic signal controller cabinet to feed a meter socket hung on the outside of the aluminum cabinet?

Code Ref: 230.7

NO Conductors other than service conductors shall not be installed in the same service raceway or service cable.

24. In a Class 2 Division 1 location, what type of plugs and receptacles are to be used? What about Class 2 Division 2 areas?

Code Ref: 502.145

In Class 2 Division 1 the receptacles and plugs shall be identified for Class 2 locations. In Class 2 Division 2 they shall be designed so that connection to the supply circuit cannot be made or broken while live parts are exposed.

25. When you run a 208 Volt single phase circuit to a motor, do you need to run a neutral or only a ground?

Only the ground for a straight 208V motor. 250.110 (C) would require the ground.

26. Why does the 2011 NEC not allow isolated ground receptacles in a hospital?

Code Ref: _____

During the 2011 NEC code cycle, CMP 15 accepted several proposals that would affect the use of Isolated grounding receptacles in patient care areas. In the 2008 NEC 517.16 had a FPN which prescribed caution when installing these receptacles in patient care areas. Apparently, installers were not bonding the "redundant" ground (insulated equipment grounding conductor) to the metal outlet box. CMP-15 concluded that the redundant ground system required in 517.13, Grounding of Receptacles and fixed Electrical Equipment in Patient Care Areas, cannot be adequately maintained while at the same time maintaining an isolated ground system. The main reason for isolated ground-type receptacles is, typically, for the necessity of reduction of electrical noise. Medical equipment is becoming more sophisticated and enhanced, the problem of electrical noise be greatly reduced. The reduction of electrical noise shouldn't take precedence over protecting the patient.

27. Where can flexible non-metallic conduit be used and not used?

Also defined as **Liquidtight Flexible Non-metallic Conduit.**

Uses permitted **356.10**

Uses not permitted **356.20**

28. When you extend a circuit according to the 2011 NEC you must AFCI it. What do you do if it is a 2-wire circuit in an older home? Do you need to also GFCI it? Which comes first if you are using receptacles?

Code Ref: 250.130(C), 406.4

The NEC requires in 406.4 that new receptacles to be of the grounding type and connected to an equipment grounding conductor. An Informational Note refers you to 250.30 for the extension of existing branch circuits. Here it gives you 5 ways to provide an equipment grounding conductor. GFCI protection does not provide an equipment ground and is only allowed on the replacement of existing receptacles.

29. On an outside sign, you need a disconnect. Can this be internal to the sign or does it need to be external? Within sight? What about using the breaker inside the building?

See 600.6 requires the disconnect and it has to be external and (A)(1) requires that it be within sight of the sign. If it is controlled by an electronic or electromechanical controller and the controller is installed in a building, a breaker inside the building could be used if it was in sight of the controller and could be locked out, in accordance with (A)(2).

30. GFCI protection for the hydromassage tub is being installed on the wall by the light switches, should the GFCI be a "dead front" device?

Code Ref: Yes. **680.71 Protection.** Hydromassage bathtubs and their associated electrical components shall be on an individual branch circuit(s) and protected by a readily accessible ground-fault circuit interrupter. All 125-volt, single-phase receptacles not exceeding 30 amperes and located within 1.83 m (6 ft) measured horizontally of the inside walls of a hydromassage tub shall be protected by a ground-fault circuit interrupter.

680.72 Other Electrical Equipment. Luminaires, switches, receptacles, and other electrical equipment located in the same room, and not directly associated with a hydromassage bathtub, shall be installed in accordance with the requirements of Chapters 1 through 4 in this Code covering the installation of that equipment in bathrooms.

680.73 Accessibility. Hydromassage bathtub electrical equipment shall be accessible without damaging the building structure or building finish. Where the hydromassage bathtub is cord- and plug-connected with the supply receptacle accessible only through a service access opening, the receptacle shall be installed so that its face is within direct view and not more than 300 mm (1 ft) of the opening.

680.74 Bonding. All metal piping systems

31. Several questions on Type NM cable? *Question 1*) Where a running board is required to protect Type NM cable within 6' of an attic access, how close to the Type NM is the board to be located? *Question 2*) Does a board need to be installed on both sides of the Type NM cable? *Question 3*) Exactly how much protection from physical damage needs to be established? *Question 4*) How high should the boards be to protect the cable? Would these requirements also apply to SE cable under the same installation conditions?

(1) **334.23 In Accessible Attics** Refers to the requirements of **320.23 for Armored Cable.**

(2) "Shall be protected by substantial guard strips that are at least as high as the cable."

- (3) Both sides of cable? Does not say
- (4) How much physical damage? Does not say
- (5) Apply to SE Cable?

SE Cable 338

338.12(A)(1) uses not permitted Where subject to physical damage unless protected in accordance with:

230.50(B) "Protection Against Physical Damage"

32. An electrician is being asked to provide a 4-wire branch circuit for a new range that is being installed in an older dwelling with an existing 3-wire range branch circuit. The electrician found some help in 250.130 and 250.130(C), but was not sure this would apply to a range receptacle and if a single equipment-grounding conductor would be allowed outside the jacket of the cable wiring method utilized?

Code Ref: 250.130(C), 250.134(B) Ex.2

If he is being asked to provide a 4-wire branch circuit, he will need to install a new circuit that contains an equipment grounding as part of the wiring method. If he is being asked to provide an equipment ground for an existing 3-wire circuit in order to install a 4-wire receptacle than he is allowed to provide the equipment ground by any of the methods provided in 250.130(C). Using exception #2 of 250.134(B) he would be allowed to run the equipment grounding conductor separately from the circuit conductors

33. Can 480 volt metal halide lighting be installed in a steel storage warehouse where the metal halide luminaires are 16 feet above the floor?

No, See 210.6(D)(1) which permits circuits over 277 and not exceeding 600V luminaires only mounted outdoors or in tunnels with specific mounting heights higher than 16ft.

34. Can MC cable be pulled under a slab-on-grade in a sleeve installed when the foundation slab was placed on the site? Each 2" sleeve will contain three 2-wire w/insulated equipment grounding conductor, 12 AWG copper, Type MCAP cable to be used in a dentist's cubicle at a dentist teaching college where student dentists work on actual patients as a part of their training program.

Answer: Maybe. If the MC Cable can be properly terminated to a listed box or assembly at or beneath the dental chair. However, it must comply with 517.13 and the wiring method complies with the requirements of 250.118.

35. I am installing a panelboard in my detached garage. I will be back feeding a plug in breaker. Does the panelboard have to be service rated if I am installing a feeder from the home?

The panelboard must be rated for the application where used. **Article 110.3(A) Examination, Identification, Installation, and use of Equipment A 1-8** give a list of items the AHJ will use to evaluate equipment.

Article 408.36(D) Back-Fed Breakers says that they shall be secured in place by additional fasteners that require other than a pull to release the device from the mounting means on the panel.

36. Can romex be installed inside kitchen cabinets without protection if it is secured up away from the drawers and other kitchen items that might be stored?

Code Ref: 334.15

I could not find any code reference that would specifically prohibit this installation. I would consider it exposed work and require some type of protection where it is installed behind doors or drawers used for storage.

37. I am installing a feeder in PVC conduit to an outbuilding at a business. According to Table 300.5, I could install a PVC conduit 12" deep if I pour a minimum 2" concrete over the conduit. Am I interpreting this correctly?

Code Ref: Yes, see table 300.5, column 3 if the PVC is Listed for direct burial and installed in a trench with 2 in. of concrete on top.

38. Does code allow MC cable to be terminated to a plastic box approved for ENT (electrical non-metallic conduit)?

Code Ref: No, Section 314.3 of the NEC states "Nonmetallic boxes shall be permitted only with open wiring on insulators, concealed knob-and-tube wiring, cabled wiring methods with entirely nonmetallic sheaths, flexible cords, and nonmetallic raceways." Clearly, Type AC (armored cable) or Type MC (metal clad) cables do not meet the requirements. There are two exceptions to this basic rule. The first recognizes the use of nonmetallic boxes with metallic raceways and cables, "Where internal bonding means are provided between all entries." However, this would require the equipment ground path from each cable entering the box to be spliced together, thereby ensuring the required low-impedance path for fault current. The second exception permits application of metallic raceways and cables with nonmetallic boxes where the box itself provides a means for interconnection of the ground-return paths of all cables entering the box. Exception No. 2 states, "Where integral bonding means with a provision for attaching an equipment bonding jumper inside the box are provided between all threaded entries in nonmetallic boxes listed for the purpose, nonmetallic boxes shall be permitted to be used with metal raceways or metal-armored cables." There are a couple of additional violations worth noting. The last sentence in 300.10, which applies to metallic raceways and cables, states "Unless specifically permitted elsewhere in this Code, raceways and cable assemblies shall be mechanically secured to boxes, fittings, cabinets, and other enclosures." This rule requires the use of a box connector. And the requirement of 300.15 calls for connectors to be used "only with the specific wiring methods for which they are designed and listed." So, only a connector listed for use with Type AC is permissible. As noted in 320.40, which applies directly to Type AC terminations, "a fitting shall be provided to protect wires from abrasion, unless the design of the outlet boxes or fittings is such as to afford equivalent protection and, in addition, an insulation bushing or its equivalent protection shall be provided between the conductors and the armor." This requirement calls for the use of an anti-short bushing between the armor and the conductors of Type AC cable

Code Panel

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