

## 2009 WESTERN SECTION CODE PANEL QUESTIONS

1. The local inspector “red-tagged” the temporary wiring for a new store of type III construction because he said Romex wasn’t allowed to be run in the open according to Section 334.10(3). Is he correct?
2. What size ground is needed for an amateur radio tower, and how should it be grounded?
3. What is the difference between a cellular metal floor raceway and an underfloor raceway? How can you identify which wiring method and article apply when you see them installed?
4. Are connections and splices required to be accessible in low-voltage, 12-volt lighting system installations (for example, puck lights for undercabinet lighting)?
5. I am drilling holes in a ceiling joist. It is my understanding that 300.4(A)(1) in the NEC says I must stay 1-1/4” from the edge of that joist, but I also understand that the IRC and the IBC rules R502.8.1 and 2308.10.4.2 state that I must stay at least 2” from the edge of that joist. Which rule do I go with?
6. Can the volume of extension rings be used for box fill calculations?
7. A master bedroom has a fireplace with an electronic starter. Is this electronic starter required to be AFCI protected? If so, will the AFCI sense the arcing of the electronic starter as a fault, resulting in a nuisance-trip?
8. Is it required to have a “bubble-style” “in-use” cover on a receptacle in an indoor car wash?
9. Does the dedicated space in front of a panelboard need to be a flat surface? I have run into outdoor installations where the grade sometimes exceeds 45°degrees. I can’t find anything in the Code to address this problem.
10. Is there a minimum height for mounting a ceiling fan?
11. How deep must the wiring be within 5 ft of an in-ground swimming pool?
12. Cables to be used with directional boring must be approved for the purpose. Can these same cables be continued as direct burial conductors within a trench where the directional boring ends?
13. I neglected to connect to the rebar in the footings of a new building. Can the re-bar in the concrete basement walls be utilized for the UFER electrode instead?
14. I ran a 2-wire w/ground NM cable to feed the four receptacles in a bedroom. I’m being told that I have to splice the neutral and pigtail to the receptacle to prevent opening the neutral if the receptacle is removed. Is this correct?
15. What type of panel can I use in an indoor room where it is subject to hose-down and splashing water?
16. Can SER aluminum cable be installed in an underground conduit from a house to feed a garage panel?
17. Which of the following circuits in a PV System require a disconnecting means? The PV output circuit? The inverter output circuit? The storage battery circuit?
18. What is the ampacity of (6) # 4 AWG THHN cu conductors that have a total length of 150’, of which 12’ pass through a boiler room with an ambient temperature of 125 degree F?
19. I’m working in very rocky soil and can’t drive the ground rod the entire eight feet. Are there other acceptable ways for the installation other than cutting it off?

**20.** Where can I find the smoke characteristic ratings for the different insulations of conductors listed in 310.13(A)?

**21.** A grounding electrode system consists of a cold water pipe, a UFER, and a ground rod. The size of the service entrance conductors is 500kcmil copper. Is it acceptable to install a 1/0 cu grounding electrode conductor to the water pipe, then a # 4 cu conductor from the water pipe to the UFER, then # 6 cu from the UFER to the ground rod?

**22.** Are the traveler conductors for three-way and four-way switches considered part of the switch loops? Can the white wire be used as a traveler conductor if it is permanently re-identified with a hot color?

**23.** Is a main breaker required for a lighting and appliance panelboard that is fed from the secondary of a step-down transformer?

**24.** What is the difference between non-homogenous PVC and homogenous PVC?

**25.** Many jurisdictions have adopted the new energy codes. Will the NEC incorporate these requirements or leave it up to the AHJ since it is not an international requirement?

**26.** Are the receptacles installed on porches and landings counted as the required receptacles for the front and back of the residence if they can't be accessed at grade level? Is a 24" elevation of the deck or landing still at grade level?

**27.** Would NEC 300.15 apply to fittings such as flexible metal to EMT fittings that are installed in a wall for a remodel job where all portions of the installation will be covered?

**28.** What is the difference between tamper-proof and tamper-resistant receptacles?

**29.** I have a service on a concrete commercial building (no structural steel) with a total of 1200 kcmil cu service entrance conductors. The water service is ductile pipe with a bituminous coating, so there is no metal pipe in contact with the earth. The UFER has a # 4 cu grounding electrode conductor connected to it. A ground rod has a # 6 cu grounding electrode conductor connected to it. NEC 250.66 required a 3/0 cu grounding electrode conductor but there is no place to connect it. Am I right in requiring the electrical contractor to install a 3/0 bare copper conductor, 36" deep, for a total minimum length of 20' in the earth to satisfy 250.66?

**30.** The building code requires egress lighting for stairs but does not dictate if it needs to be on an emergency circuit. It is not a requirement of the NEC. Are we required to install and inspect it?

**31.** What is the maximum ambient temperature allowed before de-rating is required?

**32.** An underground feeder is run from the main building service which used the 6-handle rule to another building on the same property. Can I use the 6-handle rule again for the service on the second building?

**33.** Is a receptacle required in all residential garages?

**34.** How many # 12 AWG conductors can be installed in a 3/8" flexible metal conduit?

**35.** Is it permissible for a wireway to contain both 120 volt and 277 volt wires?

**36.** An old house has 2-wire ungrounded circuits in some rooms. Can I replace these with new ungrounded receptacles? Do they have to be tamperproof?

**37.** Is a fire suppression water sprinkler line required to be used as a grounding electrode the same as the metal water service?

**38.** Are the branch circuit conductors supplying power to the baseboard heaters in a residential bedroom required to be AFCI protected?

- 39.** I installed a 150 KVA step-down transformer to supply a 120/208 volt, 400 amp main breaker panelboard. The secondary conductors are 500 kcmil cu THHN/THWN. I failed the inspection. Doesn't 240.4 (B) allow this installation?
- 40.** Is there any additional temperature rise requirement for the conductors in metal conduits versus PVC conduits running across a roof?
- 41.** NEC 400.4 seems to contain a lot of information that is very seldom or never used. Why isn't it in the annex?
- 42.** When are flexible cords, not required to be equipped with attachment plugs, allowed to be energized from a receptacle outlet?
- 43.** How many compact 1/0 AWG XHHW aluminum conductors are permitted in a 620 mm (24.4") long, 41 mm (1 1/2" trade size), IMC nipple?
- 44.** What is the difference between a 15 amp and a 20 amp receptacle?
- 45.** A structure has five 200 amp services, each of which is fed with 4-3/0 THWN cu conductors. I want to run one main grounding electrode conductor to the main ground electrode and tap each 200 amp service to it. What size do my taps and main grounding electrode conductors need to be?
- 46.** What is the maximum number of # 2 AWG RHH conductors that can be installed in a 590 mm (23.25") long, 53 mm (1/2" trade size) schedule 80, PVC raceway?
- 47.** Can the factory-installed neutral wire on an AFCI breaker be shortened to make a neater looking panel installation?
- 48.** Is it permissible to run the power cord for a ceiling-mounted, overhead projector up through the pipe supporting the projector, and to plug it into a receptacle located above the suspended ceiling?
- 49.** What is the minimum ventilation required for a 60 amp, 208 volt, single phase electric vehicle charging system for indoor charging?
- 50.** Can you explain the rationale that requires the overcurrent protective device for a fire pump on normal power to carry the locked-rotor current indefinitely while only requiring short-circuit current protection for the emergency generator OC device for the fire pump?
- 51.** What is the jam ratio for pulling three, 250 kcmil THW compact conductors into a 53 mm (2" trade size), HDPE conduit?
- 52.** In NEC 250.64 (C) (2), numbers (3) & (4) have been deleted from the 2005 NEC. Does this mean that a grounding electrode conductor can be run from a grounding electrode to a grounding bar in a sub panel, with another grounding electrode conductor attached to the same ground bar in the sub panel, and then run to the main disconnect?
- 53.** Is it permissible to install a circuit breaker panelboard in a toilet room when it has the required working clearances if it can only be accessed through the bathroom?
- 54.** What size neutral conductor is required for a three-phase, 4-wire, wye-connected service that feeds electric discharge lighting with ungrounded conductors of 250 kcmil THW copper?
- 55.** The residential furnace room is not listed as a required room that needs AFCI protection. Can this room be on a standard circuit?

- 56.** What is the ampacity of (4) # 8 THHN cu conductors in EMT exposed to direct sunlight in an ambient temperature of 100 degrees F, and located 3" above a roof?
- 57.** A sprinkler pipe has been installed above the meter stack in an eight-unit multi-family dwelling. A 100-Ampere breaker is located beneath each meter. Does the pipe violate the dedicated equipment space requirement of NEC Section 110.26 (F)? What if there were no breakers in the meter stack?
- 58.** Can the bonding for other systems such as telephone & CATV be accomplished by the use of a # 6 pigtail out of the electric panel and the use of split bolts?
- 59.** Is it necessary to install caution tape above a service lateral installed in GRC?
- 60.** There is an ongoing investigation concerning metal, casement window frames that are deteriorating because they are in contact with re-bar which is being utilized as a UFER grounding electrode. Is there any new information concerning this situation?
- 61.** Are grounding electrode conductors permitted to be paralleled? Could two No. 1/0 copper conductors be used in place of a 3/0 for the grounding electrode conductor of a service over 1100 kcmil?
- 62.** The 6-disconnect rule for services requires that the disconnects be grouped. Is there any maximum distance between disconnects?
- 63.** Are meter sockets required to have a fault current withstand rating in accordance with section 110.10 of the NEC? Our utility says inspectors have no jurisdiction over the metering equipment, and it is not an issue.
- 64.** Can a PVC conduit be installed in a slab-on-grade dentist's office for an exam room if it contains a grounding conductor?
- 65.** When installing wiring methods in ducts or plenums used for environmental air, which wiring methods are permitted?
- 66.** How far away from the diesel fuel-dispensing tank must the non-explosion-proof equipment be located?
- 67.** Can I secure signal or communications cables to ceiling-support wires or ceiling grid?
- 68.** If I increase the size of my feeder conductors from #1/0 to #3/0 due to voltage drop, do I have to increase the size of the equipment-grounding conductor?
- 69.** When running feeders in parallel, for example a 2000 ampere motor control center, how do you size the ground in the raceway?
- 70.** With a 90 degree cable, what table column should we start with for derating ampacity with a 75 degree termination?
- 71.** Can a circuit breaker be used to switch fluorescent lighting?
- 72.** Can Romex be installed in outdoor conduit? Does it comply with 334.10(A) when it is normally dry 95% of the time in most geographic locations?
- 73.** How many AC-powered residential smoke detectors are allowed to be interconnected? Most of the instructions I have read say a maximum of 12. I have a residential plan showing 18; is there an approved way to interconnect detectors fed from different circuits?
- 74.** Assuming that a furnace and an air conditioner have exactly the same circuit requirements; can they both be on the same circuit?
- 75.** I have a cord-and-plug connected radon exhaust fan; can I install that in the attic space of a dwelling?

- 76.** The local inspector keeps getting complaints that the refrigerators being used by vendors at the County Fair keep tripping the GFCI-protected receptacles. Is it a requirement that these refrigerators be on a ground-fault? Don't they keep "nuisance tripping" the GFCI?
- 77.** The plans for a new coffee shop show there is skeleton-tube neon installed inside. Is this neon required to be listed?
- 78.** A church we are working on has lighting fixtures that were made in Italy. There does not appear to be a listing mark on the fixtures. Are lighting fixtures required to be listed?
- 79.** In a large box-type store, similar to a Sam's Club or Costco, is it allowable to drop Type SO cord down from the ceiling and terminate it in a suspended outlet box containing a receptacle or cord-cap-type receptacle? Can I hardwire it to an island end cap or display case?
- 80.** In a department store the plans show using a UPS system for powering emergency and backup lights. Additional egress lights have been added to meet the building code. How do I verify the UPS is rated for the additional load?
- 81.** If apartments share a common hallway, is a house panel required?
- 82.** I am reviewing plans for an apartment building. The disconnects for the A/C units are shown behind the outside condensers. Are these disconnects required to meet 110.26? Does it make a difference if they are fused or non-fused?
- 83.** In a five-story building, can I run a new emergency circuit up through the elevator shaft from the basement to the top level?
- 84.** Do the live parts of residential battery systems need isolation protection for accidental contact regardless of battery type or voltage?
- 85.** In a residence we have a sub-panel being fed with a feeder from the main panel. The water line coming into the house is plastic then turns to copper after the meter. There are no copper water lines in contact with the earth for more than 3.0 m (10 ft). Is it acceptable to bond the copper water line in the residence from the feeder panel since we are only bonding the copper lines and not grounding?
- 86.** Does the bare aluminum conductor of AC cable need to be wrapped back around the cable before it is inserted in the AC connector?
- 87.** Is it legal to put a sign disconnecting means by the panel in the mechanical room?
- 88.** An inspector said we couldn't use MC Cable in a non-metallic box even if we drilled out a 1/2 in hole & used a locknut. Is this correct?
- 89.** I have received plans for a retail space with an open girder design. Fire alarm cable is being strung through the exposed ceiling. I have been asked if the cable can be painted. Is this allowed?
- 90.** What is the ampacity of seven, 8 AWG, type FEPB conductors. The seven conductors are energized simultaneously. The equipment in question is a DC crane motor, operating at an ambient of 37 degrees C, and with a thirty-minute rating?
- 91.** Does the NEC require work space in front of the storage batteries for a PV system?
- 92.** NEC 334.80 requires de-rating for NM, NMC & NMS cables when more than 2 cables are run through wood framing and foamed or caulked in place. Does this requirement also need to be enforced when multiple conductors are run into the back of a panel in a 2" nipple and sealed with duct-seal or foam used for a thermal seal from an outside wall panel?

- 93.** Does Section 230.82 allow transfer switches to be connected to the supply side of the service disconnecting means? If so, would a transfer switch then become the service disconnecting means? Would it be required to be marked "suitable for use as service equipment" and to contain the service overcurrent device?
- 94.** Can SER cable be installed as a feeder for a sub-panel serving a residential swimming pool?
- 95.** A hydro-massage tub has its own individual branch circuit. Is it considered a continuous-duty circuit?
- 96.** A residence is located in a rural area surrounded by fields that are plowed and left as raw dirt which can blow and get into the panel & disconnects for the A/C & other outside equipment. Do I need to use type S rated equipment?
- 97.** Is it permissible to daisy-chain one power strip from another power strip? Are power strips addressed in the NEC?
- 98.** Section 511.2 defines an auto body repair shop as a major repair garage. There are acetylene/oxygen torch cutting, MIG, -arc welding, and grinding operations routinely occurring daily. What is gained by classifying the lower floors and upper ceilings of the building as Class I, Division 2 locations?
- 99.** Can a sump pump located in an elevator pit use a cord-and-cap plugged into a receptacle as its disconnecting means?
- 100.** Does flexible metal conduit fulfill the requirements for a metal raceway in 517.13 (B)?
- 101.** Can I use table 310.15 (B) (6) for a #2 SER aluminum cable for my 100 amp sub-panel in the basement?
- 102.** Conductors within outdoor conduits are considered in a wet location. Are the conductors within a rain tight gutter located on the outside of a building considered to be located in a wet location?
- 103.** Does the NEC require a GFCI receptacle in the unfinished furnace room located within a finished basement?
- 104.** In rural areas large structures called "barns" are to be used for storage of tractors, recreation vehicles, and all-terrain vehicles. If they are called "barns", do they need to meet the requirements for an agricultural building if no animals are going to be housed inside them?
- 105.** What is the difference between a standard receptacle and a weather-resistant receptacle besides the cost?
- 106.** Would ground-fault protection be required for a 3-phase, 4-wire, 277/480 volt, 1200 rated service disconnect switch with 800 amp fuses installed?
- 107.** A neon sign transformer is located above a suspended ceiling on the interior of an outside wall. The transformer housing has an external switch to disconnect the supply conductors. The sign is on the exterior of the same wall but does not have an additional disconnect switch. Does this installation satisfy the NEC?
- 108.** NEC 600.8 (B): "Sign and outline lighting system enclosures shall be constructed of metal or shall be listed". Does this imply that non-metal signs do not need to be listed?
- 109.** The foundation of a building was poured without an inspection of the re-bar for the installation of the UFER connection. The superintendent chipped out the concrete to expose the lower horizontal re-bar of the foundation so I could connect my grounding electrode conductor. Would this be sufficient to satisfy the NEC?
- 110.** Can flexible cables be used for interconnection between batteries and cells? Do they need be the hard-usage type?
- 111.** What is the minimum branch required for a single electric range of over  $8\frac{3}{4}$  KW?

- 112.** A pool contractor installed non-metal fiber mesh around the deck of a pool. He claims that it does not need bonding because it is not metal. The inspector is requiring a # 8 bare copper wire to be run around the perimeter of the pool before the concrete can be poured. Is the inspector correct?
- 113.** How are receptacles incorporating an isolated grounding conductor connection identified?
- 114.** Is it permissible to install a circuit breaker panelboard in a toilet room when it has the required working clearances if it can only be accessed through the bathroom?
- 115.** Are the conductors for a roof-top PV system that run from the solar cell modules to the DC combiner box required to be de-rated?
- 116.** What is the spacing requirement, for a nonmetallic conduit containing a neon secondary circuit conductor operating at more than 100 Hz, to a grounded surface?
- 117.** PVC conduit is installed underground with a PVC 90 riser that transitions to rigid metal conduit. Is the GRC required to be bonded? How is this accomplished?
- 118.** The luminaries in a restroom of a commercial building are 277 volts. Can I use a 2-pole switch to control both the lights and the 120 volt exhaust fan?
- 119.** A new house has an unfinished basement with a finished stairway from the main level to the unfinished basement. The light for the stairway is on the circuit for the unfinished basement which does not require AFCI protection until it is finished. Does the stairway require AFCI protection or is it considered part of the unfinished basement?
- 120.** The NEC now requires a disconnecting means in fluorescent fixtures for safety in the changing of ballasts. Why does it not require the same disconnecting means for recessed cans?
- 121.** Why do the appliance manufactures install a 50 amp rated cord on an appliance that draws only 30 amps?
- 122.** How many 3/0 THW cu conductors are allowed in a 6" wide ladder-type cable tray?
- 123.** The EMT across a rooftop is installed on 1 1/2" unistrut secured to the roof. What size conductors and ground are needed for a 100 amp load?
- 124.** I'm using 4/0 URD for an underground lateral 200 amp service for a distance of 185'. Can I use a reduced-neutral conductor?
- 125.** A small maintenance building was built on a concrete foundation 500' away from the main building. The foundation was poured without allowing for a UFER connection. The building has a 150 amp service fed underground from the main building. This feeder contains a grounding conductor. The electrical inspector wanted a grounding electrode at the maintenance building. He wanted me to chip into the foundation for a UFER connection or drill a 20' deep, 6" wide hole with concrete-encased # 4 re-bar for a grounding electrode. Is he correct?
- 126.** Is an in-use receptacle cover required under a porch with a roof?
- 127.** The receptacle enclosed in appliance garages on a kitchen counter does not count as the required receptacle for spacing requirements. If the receptacle above a bathroom counter top is enclosed within a cabinet, does another receptacle need to be installed?
- 128.** An unfinished basement has a GFCI duplex receptacle which serves the sump pump. Can this GFCI receptacle also serve as my required receptacle for the unfinished basement since I am only using 1/2 of it for the sump pump?

**129.** An installation is for a dust collector for cardboard chipper bailer. The bag/filters have been moved outside. Is the hopper area considered to be any kind of hazardous classified location? This machine consists of three blowers to retrieve scrap which drops through a hopper to a bailer. Dust is vented directly outside until a new filter system is purchased. What do I do with this installation?

**130.** Section 690.4(B) on Solar Photovoltaic Systems, talks about “other systems” not being allowed in the same raceway. The question is whether or not a 120VAC feed from the house for the “tracking motor” of the array can be in the same raceway as the 360VDC from the panels to the house? Is this part of the “system”? Some thought the system to be only the DC voltage side and the others thought anything to do with the project would apply.

**131.** I was told that a back-fed breaker needs to be bolted into the panel. Is this correct?

**132.** We use a portable generator to provide power to a construction site trailer that is moved every few days. The generator feeds a panel in the trailer. Do we have to connect the generator to earth even though it is portable and is going to be disconnected every couple days?

**133.** Do the overcurrent devices in the DC portion of a PV power system have to be DC-rated?

**134.** Is there anything in the Code that would prevent you from putting a panelboard in a bedroom?

**135.** Does a receptacle installed on a second floor balcony (6' x 12') off the master bedroom need GFCI protection if it is already AFCI-protected?

**136.** An installation consists of ¾ inch conduit containing 13 conductors, a 4-gang, switch box, and four 3-way switches. Question is how many of these conductors are considered current-carrying? Contractor stated there is only one current carrying wire in this box and raceway!

**137.** I have parallel 4/0 AWG XHHW-2 aluminum conductors, using 2 conduits with no more than 3 conductors in each raceway. My position is that the ampacity equals 360 amperes and that I can use a 400 ampere breaker as per 240.6. Am I reading this wrong?

**138.** Can I install conductors from different panels in the same raceway?

**139.** Can a disconnect switch be located next to equipment installed above an accessible suspended ceiling, or must the switch be installed at a readily-accessible location?

**140.** I have a lay-in ceiling in a family room in a residential basement. The space above the ceiling is used for environmental air. Can I use non-metallic cable above this ceiling?

**141.** Is a metal cover on a concrete hand hole box required to be grounded to the electrical ground system?

**142.** Can I install a range hood in a dwelling unit kitchen to the small appliance circuit?

**143.** I'm in discussion with an electrician who says that he heard that a remote control with mounting bracket located adjacent to the wall switch satisfies the requirement of having a switch control for 210.70(A)(1). I was under the impression that if the switch operates the light regardless of the state of the remote then that is ok, but the remote could not act as the sole lighting control. What is acceptable?

**144.** Does the exception to 210.11(c)(3) allow for the required bathroom 20 amp receptacle circuit to also supply lighting and fans as the “outlets for other equipment” if the circuit only supplies that bathroom?