

SDEC 2025 Q&A

Watertown, SD

1. Can a three-phase GFCI device be used to provide GFCI protection for a single-phase circuit?

Answer: *You can not use a 3 phase GFCI hard wire units on single phase.*

When installed on a single phase circuit the device is monitoring all phases for current. The 3 phase GFCI device is adding all three phases of amperage up and then monitoring the neutral or grounded conductor's ampacity to determine if there is 5 ma or more difference of current and will then trip out the GFCI device.

2. I have just installed a new branch circuit and ran the conductors through the cabinet of a different panel board from where the branch circuits originated. My inspector insists I need to provide a warning label that identifies the closest disconnecting means for the feed through type branch conductors. Is this correct?

REF: 312.8 (A) **ANSWER:** *The inspector is correct.*

3. I have installed a Surge Protective Device (SPD) in the meter main on the outside of the house. The inspector told me I also am required to have one in the panel inside. Is this correct?

Answer: *NEC 215.18 requires an SPD located on the load side of a feeder that supplies a dwelling unit. Surge protection is most effective when closest to the branch circuit. Surges can be generated from multiple sources including, but not limited to, lightning, the electric utility, or utilization equipment. However, if you move the SPD from the meter main to the feeder panel inside, you may still get by with only having one SPD. NEC 230.67(B) Exception: The SPD shall not be required to be located at the service equipment as required in 230.67(B) if located at each next level distribution equipment downstream toward the load.*

4. I was recently asked if the NEC covers the conversion of a RV to a food truck. Does it? My friend is anxious to start serving tacos during his trip across North America.

Answer: *The NEC would not apply to the installation of any electrical equipment within the food truck since the food truck is an automotive vehicle, and Section 90.2(D)(1) clearly states that the NEC does not apply. But if the wheels were removed and the truck frame was anchored to a foundation, then it becomes a permanent installation. The OSHA 1910 Subpart S Electrical Requirements for electrical safety in the workplace would apply to the taco truck.*

The NEC would apply for any temporary installation of a temporary power source for the taco truck in Article 590, especially if a portable generator was used. Sections 250.30 and 250.34 would apply to any portable generator used as a separately derived system to provide power to the taco truck.

5. I recently installed a disconnect switch for a mobile home, the switch enclosure was located 13" above finished grade and my inspector said this violates the minimum required height of the enclosure but could not cite any NEC Section. Is this true and where does it reside in the NEC?

This is true, 550.32(F) states that an outdoor mobile home disconnecting means shall be installed so the bottom of the enclosure containing the disconnecting means is not less than 2 feet above finished grade or working platform. Also, the disconnecting means shall be installed so that the center of the grip of the operating handle, when in the highest position, is not more than 6 ft 7 in. above the finished grade or working platform.

6. I am supplying a detached garage sub-panel with outside feeders supplied from a 50-ampere breaker, the sub-panel supplies a single 15-ampere lighting branch circuit and two-twenty ampere receptacle outlet circuits. The electrical inspector handed me a correction report stating, "code requires a 60-amp minimum", can you translate please?

REF. 225.39(D) *Inspector is correct.*

7. I have installed a self-contained hot tub for aboveground use; the top rim of the hot tub is 1' above an adjacent concrete patio. The inspector has failed me for never having a perimeter surface bonding inspection per 680.26(B)(2) for the adjacent concrete patio. Is the inspector correct?

Answer: *Inspector is correct based on 680.42(B)(4). The equipotential bonding of perimeter surfaces in accordance with 680.26(B)(2) is not required to be provided for spas and hot tubs where the top rim of the spa or hot tub shall be at least 28 in. above all perimeter surfaces that are within 30 in., measured horizontally from the spa or hot tub.*

8. I was failed for installing a standard resistance type room heater in a pool equipment room. The inspector stated it needed to be listed for the now recognized corrosive environment. Is he correct?

Yes, electrical equipment installed in corrosive environments shall be suitable for use in corrosive environments or installed in identified corrosion-resistant enclosures. Electrical equipment listed for pool and spa use shall be considered suitable for use per 680.14(B).

9. Per the 2023 NEC, are tamper resistant receptacles required in restaurants

Answer: No – NEC 406.12(1)-(10) does not have restaurants listed as an occupancy required to have tamper resistant receptacles located. CMP 18 has added additional locations such as petting zoos, agricultural areas accessible to the public, assisted living facilities and similar facilities. The areas where children or other people who may be unaware of the hazard of electricity.

10. Are standard interior wall receptacles allowed to be located behind sliding barn doors?

REF: None. But I would not recommend it.

There are no prohibitions for locating a receptacle behind a barn door. This would be no different than a receptacle installed to meet the requirements of section 210.52(A) where there are times when you may have a receptacle located on a short wall behind the bedroom door.

11. Are there currently any product standard evaluations or testing methods for the grounding and bonding performance of concentric and eccentric knockouts for cabinets, cutout boxes and meter socket enclosures?

No, not for cabinets, cutout boxes and meter socket enclosures. You would have to bond around them in accordance with NEC 250.92 for services or 250.97 over 250V application or 250.96 for other enclosures.

Only Listed Metallic Outlet Boxes (QCIT) concentric and eccentric knockouts have been evaluated for bonding over and under 250V and may be marked as such. See UL Product iQ. www.ul.com/piq enter QCIT at the search field.

12. I am installing a new 3-phase 208 VAC branch circuit in a corrosive environment and have some left-over wiring from a previous job. Would the code allow me to mix

3 aluminum phase conductors with the NEC section 680.7 required EGC copper conductor?

Answer: Yes

References: 680.7, 110.5

- 680.7(A) requires feeders and branch circuits installed in a corrosive environment or wet location to have an EGC that is an insulated copper conductor sized in accordance with Table 250.122, but not smaller than 12 AWG.
- Per the question, an insulated EGC is being installed, so compliance is achieved.
- 110.5 requires conductors used to carry current to be of copper, aluminum, or copper-clad aluminum unless otherwise provided in this Code. If the conductor material is not specified, the sizes given in this Code apply to copper conductors. If other materials are used, the size must be changed accordingly.
 - So, aluminum phase conductors are permitted.

13. What is the minimum distance the NEC requires a luminaire to be located from a fuel dispenser? The dispenser is not located on the property of a repair garage.

Reference: 514.3(B)(1) The minimum distance for a luminaire to be installed from a fuel dispenser is 18" horizontally in all directions from any edge of the pump, plus, 18" above the ground, so it would be outside of the classified area. The NEC does not vertically set a minimum distance from the fuel dispenser.

14. Can parallel feeders be tapped? If so, do I need to tap each individual set of the parallel feeders?

REF: 320.10(G) Answers Yes & Yes

Paralleled conductors are required to be electrically joined at both ends and be terminated in the same manner. The load would need to be distributed to both conductors.

15. I just completed an industrial process installation and noticed the equipment nameplate data was located inside the primary control cabinet, is the installer allowed to simply duplicate a 110.21 compliant machine nameplate data label to the outside of the control equipment enclosure that is visible after installation, or would it have to come from the manufacturer?

Answer: I would say that should be left to the manufacturer. And if it is Listed equipment, modifying the nameplate would most likely require a field inspection or field evaluation to verify compliance with their Listing file.

16. My inspector failed me for terminating Type 2 SPD line conductors ahead of the service disconnecting means and is requiring me to install the conductors to a circuit breaker within the service equipment bus bars. Is this a requirement in the NEC?

UL Lists/Certifies SPD's under the product category Surge-protective Devices (VZCA). You can locate the guide information and certifications for this category on UL Product iQ at www.ul.com/piq and enter the category code VZCA at the search field. The VZCA guide information details the definition of each type of SPD as follows:

Type 1 — Permanently connected SPDs intended for installation between the secondary of the service transformer and the line side of the service equipment overcurrent device, as well as the load side, including watt-hour meter socket enclosures and intended to be installed without an external overcurrent-protective device.

Type 2 — Permanently connected SPDs intended for installation on the load side of the service equipment overcurrent device, including SPDs located at the branch panel.

Type 3 — Point-of-utilization SPDs, installed at a minimum conductor length of 10 m (30 ft) from the electrical service panel to the point of utilization, e.g., cord-connected, direct-plug-in, receptacle-type and SPDs installed at the utilization equipment being protected. The distance (10 m) is exclusive of conductors provided with or used to attach SPDs.

17. I have a two-gang box with different circuits installed, one for the sink light switch and the other for the countertop receptacle. Do I have to connect all the equipment grounds in the switch box together? Or can I just group the equipment grounds from the circuits together?

Yes, 250.148(A) simply states that all equipment grounding conductors spliced or terminated within the box shall be connected together. Keeping the equipment grounding conductors from two different circuits isolated from each other within the same box would not be compliant.

18. I have found a supplier of Rigid Polyvinyl Chloride Conduit (PVC) online, but it does not appear the conduits are listed or have any markings. Does the NEC have listing

and marking requirements for PVC conduit? Are there any specific markings we should look for on PVC conduit?

Answer: Yes – Yes

PVC is required to be listed in section 352.6. The marking requirements would be part of the product standard.

19. An electrical panel has been damaged by fire, products of combustion, or water. The insurance company and building owner want the electrical contractor to clean the panel with soap and water and say that is sufficient to be reenergized. Can it just be re-energized and put into service? Who makes this call? How is this determined?

Answer: No

The AHJ will require the panel and/or breakers that got wet or damaged to be replaced. The manufacturer's listings will determine this. The cleaning of the busbars will

20. I have installed a 1000 amp, 480/277 service with my GFPE. Can you help me understand the testing requirements referenced in this code?

230.95(C) states that the ground-fault protection system's performance test must happen when the equipment is first installed on-site using a test process of primary current injection, in accordance with the installation instructions that shall be provided with the equipment. This test needs to be conducted by a qualified person(s), and a written record of this testing shall be available to the authority having jurisdiction to ensure compliance.

Primary Injection Testing:

- For primary injection testing, current is injected through the primary side of the overcurrent device or current transformer.*
- This testing can only be performed on a de-energized system.*

The entire system, including current transformers, connection points, trip unit, and circuit breaker operation, is covered by the test.

21. Is it OK to have the concrete encased grounding electrode rebar extension located outside of the structure exposed to the elements?

REF: 250.68(C)(3) 250.68(C)(3) Does not permitted to be stubbed up on the outside of the building.

22. A swimming pool installed within 4 feet of a chain-link metal fence. Do I bond the poles? Do I bond every link of the chain fence? How do I go about doing this?

680.26(B)(7) Will tell you that metal fences located within (5ft) horizontally from the inside wall of the pool need to be bonded, but the code text does not guide you on how to properly bond metal fences as it does in 250.194 for metal fences around substations. Remember, the intent of equipotential bonding around pools is to reduce voltage gradients in the pool area. Are you achieving that?

23. Would a sewage ejector be considered a sump pump? I have wired a receptacle for an ejector located in an area where the receptacle is not required to be GFCI protected, however my lovely inspector is telling me the ejector requires GFCI protection per Section 210.8(D)(6). Who is correct?

...Well first we need to look at definitions of each and there are not any in the NEC. A 'sump' pump is generally for clear water of the foundation, where 'sewage' would be for waste water. IF either of these are for a receptacle in a residential basement or other than residential unfinished basement, or any of the other locations in 210.8(A) or (B) they would need to be on a GFCI. Since the question states it is an area NOT needing GFCI protection, then we look in the new "Specific Appliance" list in 210.8(D)6 and 422.5 where they both mention 'Sump' but not 'Sewerage' so I do not believe GFCI is the required, unless of course the pump itself requires it in the installation instructions.

24. I failed an inspection for securing 12 AWG NM cables directly to the lower edge of the floor joists. Why on earth is this an issue? It is a crawlspace for crying out loud! Please tell me there is a Section in the NEC that will help straighten out this inspector.

Answer: 334.15 "it shall be permissible to secure cables not smaller than two #6 or three #8 conductors directly to the lower edge of the joist Smaller cables shall be run either thru bored holes in joists or on running boards"

25. I am installing a new panel to serve a new Tennant Finish from an existing service located 35 ft away. The inspector failed my service inspection and stated I would need to provide him with an updated available fault current calculation to determine if the new equipment SCCR was adequate. I told him that I only installed the

Tennant finish panel equipment and there weren't any existing fault current labels, does the NEC still require this on existing installations?

Answer: Yes

Code Ref: 110.9 and 408.6

The 2023 NEC 110.9 requires all overcurrent protective devices to have an interrupting rating equal to or greater than the available fault current at the line terminals of the equipment. So, in other words, we must verify that the fuses or circuit breaker have adequate interrupting ratings.

Then we must check the panel short circuit current rating or withstand rating to verify the panel can handle the available fault current. Per NEC 408.6 Panelboards shall have a SCCR not less than the available fault current. The available fault current will have to be field marked on the panel except if this is a dwelling unit.

The Bussmann FC² is a great app to use when calculating available fault current in the field.

26. I just failed my inspection, and oh boy am I angry about this one. I have installed a new branch circuit from an existing panelboard located in a Wendy's restaurant. The inspector has the nerve to tell me, the installation is gorgeous, and then hands me a correction notice which reads, "branch-circuit OCPD's cannot be in the bathroom, see Section 240.24(E) of the 2023 NEC." Is this for real?

2023 NEC Yes Change from the 2020

240.24(E) Not located in Bathrooms, Overcurrent protective devices, other than supplementary overcurrent protection, shall not be located in bathrooms, showering facilities, or locker rooms with showering facilities.

27. Are Surge protective devices required for fire alarm control panels? And if so where specifically can they be installed?

Answer: Yes. Location on the supply side of fire alarm control panel.

760.33 Supply-Side Overvoltage Protection.

A listed surge-protective device (SPD) shall be installed on the supply side of a fire alarm control panel in accordance with Part II of Article 242.

First Revision No. 9524

Committee Statement: Fire alarm control panels contain electronics that can be damaged by surges appearing on the supply side of the equipment. Providing overvoltage protection can increase the reliability of an installation. The panel added the new section after 760.32 as new 760.33. 760.32 covers NPLFA and PLFA circuits that leave the building, including overvoltage protection for these circuits. Having these requirements in sequence adds to the usability of the Code.

28. Where a GEC is installed in aluminum EMT, is bonding required at both ends of the raceway?

No, it is not a ferrous metal (it is nonmagnetic) and thus would not provide an inductive choke on the GEC. See 250.64(E)

250.64(E) Raceways, Cable Armor, and Enclosures for Grounding Electrode Conductors. (1) General. Ferrous metal raceways, enclosures, and cable armor for grounding electrode conductors shall be electrically continuous from the point of attachment to cabinets or equipment to the grounding electrode and shall be securely fastened to the ground clamp or fitting. Ferrous metal raceways, enclosures, and cable armor shall be bonded at each end of the raceway or enclosure to the grounding electrode or grounding electrode conductor to create an electrically parallel path. Nonferrous metal raceways, enclosures, and cable armor shall not be required to be electrically continuous.

An inductive choke, also known as an inductor, is a passive electronic component that blocks high-frequency alternating current (AC) while allowing direct current (DC) and lower-frequency AC to pass through an electrical circuit. The name comes from the way it "chokes" high frequencies while passing low frequencies.

29. When sizing a generator for optional backed up loads for a home, would I utilize NEC Article 702 or 710? Does the generator really need to be sized for the **total** calculated standby loads?

By definition in Article 100, we have an Optional Standby System as the system will supply on-site generated or stored power to selected loads either automatically or manually. Article 710 covers systems that are "off-grid" where the production sources are not connected to the utility. Section 702.4(A) covers the system capacity requirements and how the loads get applied to the optional source will determine the sizing requirements. If the loads will be applied to the source through a manual or nonautomatic load connection in accordance with 702.4(A)(1), the system user is permitted to select the load connected to the system.

If the loads will be applied to the source automatically in accordance with 702.4(A)(2), a load calculation in accordance with Parts I through IV of Article 220 or by another approved method is required. If the entire load is being automatically connected in accordance with 702.4(A)(2)(a), the source is required to have a minimum capacity equal or greater than the calculated load. If an EMS is used to reduce the required minimum capacity of the source through load management in accordance with 702.4(A)(2)(b), the source is required to have a minimum capacity equal or greater than the maximum load that will be connected by the EMS.

30. Can the neutral conductors that feed the power pedestals for an RV site be reduced in size?

No, 551.72(D)

31. I installed an optional standby generator for the local ice cream shop, so they do not lose their freezers if the power goes out. The generator came equipped from the manufacturer with a "Generator Emergency Shutdown" device. My AHJ is claiming that I need to install a remote emergency stop switch or "red mushroom pushbutton" either on the generator or on the building. I thought the generator has this factory provided, so what is the issue here?

Answer: 445.19 (B) Yes, The inspector is correct. See the following 2023 NEC (B) Remote Emergency Shutdown.

For other than one- and two-family dwelling units, generators with greater than 15 kW rating shall be provided with a remote emergency stop switch to shut down the prime mover. The remote emergency stop switch shall be located outside the equipment room or generator enclosure at a readily accessible location and shall also meet the The remote emergency stop switch shall be permitted to be mounted on the exterior of the generator enclosure. The remote emergency stop switch shall be labeled Generator Emergency Shutdown, and the label shall meet the requirements of 110.21(B).

32. Do I have to use "Noalox" or some other type of anti-oxidant compound on aluminum conductor terminations? I say no, but the old journeyman electrician at our shop says yes. Who is correct?

Noalox is not required by the Code but is acceptable to use especially in corrosive atmospheres.

33. I installed a direct buried feeder from the house to a new detached structure. In addition to the direct buried feeder conductors, I installed a green insulated type THHN/THWN copper conductor in the trench to serve as the equipment grounding conductor for the feeder. My AHJ failed the installation, is this a violation?

Answer: Yes. *Even though an EGC is not a current carrying conductor, the installation of the conductor must meet all applicable NEC requirements. Section 250.118(A) list item (1) permits the EGC to be solid or stranded; insulated, covered, or bare, and THHN/THWN meets that requirement. However, 310.10(E) Direct-Burial Conductors is what creates the Code violation as conductors used for direct-burial applications shall be of a type identified for such use. The THHN/THWN conductor would be required to have the words "Direct-Burial" or equivalent on the conductor that identifies that it is rated for direct burial without a raceway. The "W" designation on the conductor means it's suitable for wet locations, and the interior of a direct buried raceway is a wet location per 300.5(B).*

34. Am I required to upsize the equipment grounding conductor when upsizing for voltage drop? If so, what size EGC would be required for a 100A feeder where the ungrounded conductors were increased in size from #3 AWG CU to #1 AWG CU conductors?

Answer: Yes, you are required to upsize the equipment grounding conductor when upsizing for voltage drop. My calculations using the conductor properties in Table 8 go as follows: (#1)0.087 divided by (#3)0.053 equals 1.64. Then multiply 1.64 times (#8)0.017 equals 0.028 which would require a #4 AWG CU.

Jeff Larus	1, 7, 13, 19, 25, 31
Aaron Stroud	2, 8, 14, 20, 26, 32
John Smallbrock	3, 9, 15, 21, 27, 33
Dan Schoenfelder	4,10, 16, 22, 28, 34
Nathan Meiners	5,11,17, 23, 29
Seth Warner	6,12,18, 24, 30
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