



2021 Winter Update Residential (UDC) Electrical Questions and Answers

Question 1

"We talked yesterday about an electrician separating the ground wire and running it separate from the other three wires from his 4 wire conductors coming in from his service out away from the house. He ran (3) conductors in a conduit under the slab and up through the floor -- the equipment ground went up the outside of the garage wall and then through the attic over to the panel location. Is this legal?"

Answer

NEC 300.3(B) All conductors of the same circuit and where used, the grounded conductor and all equipment grounding conductors and bonding conductors shall be contained within the same raceway, auxiliary gutter, cable tray, trench, cable, or cord.

Question 2

"I have an inspector in a house that is telling me I cannot put more than one 14-2 or 12-2 wire under a staple. I believe NEC 334.30 tells me I can use whatever I want to secure the wire however he tells me that I cannot and refers to 110.3 Any clarification on this issue would be appreciated."

Answer

NEC 110.3(B) Look at the instructions on the staple container to see how many wires it can support. Some staples are rated for more than one wire, some are rated for only one wire. Install the correct number of wires under the staple as it is listed. Show the inspector the listing so you both understand how the staple is to be used.

Question 3

"Just have a question, we relocated a 200-amp service on a home and installed a 200-amp meter socket with the built in breaker space and refeed 100-amp feeder to the existing house panel and separated the grounds and neutrals to make it a 4 wire system. From our 200-amp meter panel We took a #4 copper back to the water line where it comes in from the well and bonded it there and installed 2 new ground rods and brought them into the 200-amp meter panel. The owner is putting a new addition on and the inspector is requiring him to turn a rebar out of the concrete for us to bond the new 200-amp meter panel to. Is this required being we are already bonded to the water and ground rods and will need to dig a new wire in about 20 feet to get to this rebar in the footings of the new addition. Let me know what your take is on this."

Answer

If there is rebar in the new footing that qualifies as an electrode per NEC 250.52(A)(3) the department would agree with the inspector. NEC 250.50 only exempts existing buildings from this requirement. The new addition is not an existing building. You would be able to tie the new grounding electrode conductor from the rebar on to the # 4 wire that goes to your water pipe where it comes in from the well if that is closer. We do not want the rebar to be in direct contact with earth, it must be in free air inside the building or protected from the weather, so it does not corrode away. Preferably the connection of the # 4 wire be encased in concrete.

Question 4

"We have received a few requests recently from our cooperative members asking about installing the Generlink transfer switches. These are behind-the-meter devices that allow a portable generator to supply

power to a service during a utility outage. Our understanding is that these are not permitted in Wisconsin since they are installed ahead of the service disconnecting means. Is this correct? Does it make a difference if the utility rather than the property owner owns the device? If these are not permitted, what is the code reference that is used to not allow them?"

Answer

The NEC & SPS 316 are both silent on this question. When you install the Generlink transfer device into the meter socket that must be installed by the Utility and is the sole responsibility of the Utility. This device must be UL listed. Once it is installed ahead of the Main Disconnect it is not inspected by our department because it is part of the meter enclosure and is locked out by the Utility. The department encourages you to reach out direct to the acting utility in your area for further direction on this matter.

Question 5

"I'm bidding a wiring job for a new home. when I attended a code class in Lake Delton last year it was mentioned surge protectors are coming. as you know since COVID-19 we have not been able to attend code classes. is surge protection required on this new home? the building permit for this home would be for 2020."

Answer

NEC 285 Covers Surge-Protection Devices 1000 volts or less. Surge protection is not required for a service on a new home in the 2017 NEC. All new homes shall be wired to the 2017 NEC and SPS 316 as of January 1, 2020.

Question 6

"Just have a quick question? We are mounting a new 320-amp meter socket on a shed and are going to install a 200-amp panel in the shed and a 200-amp disconnect to feed the new house power. Can we mount the 200-amp disconnect on the outside next to the meter socket or does it need to be mounted in the shed next to the 200-amp panel so the disconnects are grouped together."

Answer

NEC 230.72(A) & SPS 316.230(3). The disconnects as permitted in NEC 230.71 shall be grouped. Each disconnect shall be marked to indicate the load served.

Question 7

"In an unattached shed at a residence that has a separate service, we are going to pipe the receptacles and lights, do the receptacles have to be tamper proof?"

Answer

NEC 406.12 Tamper-Resistant Receptacles, refers you to NEC 210.52(G)(2) This is a residential location, Tamper proof receptacles are required in each accessory building with electric power.

Question 8

"A new house has an open railing along a stairway. The electrician wants to place a receptacle up high on the stairway wall to serve the spacing requirement instead of installing a floor receptacle. Although not a floor receptacle, it would be within 18 inches of the floor. Is this acceptable to comply with 210.52(A)(1)?"

Answer

NEC 210.52 (A)(2)(3) Wall Space. The open railing shall be treated as if it were a solid wall. Would you have to reach through the railing to plug a cord into the receptacle? If so, this would be a violation. He would have to install a floor outlet if there is no receptacle within 6 feet of the railing.

Question 9

"We have a home we are wiring. The inspector is saying we have to gfci protect the dishwasher. We never had to do that on any other job before and in SPS 316 it says "do not apply to sinks located in kitchens". Can you please clarify if we need to GFCI protect the dishwasher? Can you also clarify arc fault protection

on the washing machine? I know it needs to be arc faulted if it is in a room "laundry area" but what if the washer is in closet does it still need to be arc fault protected?"

Answer

Yes, for both questions. NEC 210.8(D) Kitchen Dishwasher Branch Circuit. NEC 210.12 (A) Arc-Fault Circuit Interrupter Protection. Regardless where the laundry is it is required to be AFCI protected. This also includes the laundry area in the basement.

Question 10

"Good afternoon, going over NEC 312.5 and wondering if it is permissible for NM Romex cables to enter through the rear of a residential surface mounted panel through a chase nipple or pvc adaptor."

Answer

No. SPS 316.312 & NEC 312.5(C). A terminal adapter or a chase nipple is not designed to secure the wires as required in the code sections listed.

Question 11

"We have a property owner who is replacing an above ground permanent pool which was initially installed in 2005. Since NEC Article 680 has had significant changes since then, would the wiring for the new pool be required to be brought to current electrical code applying SPS 316.003(3)? Please advise."

Answer

Yes, once you removed the existing pool and installed a new one the 2017 NEC requirements would apply.

Question 12

"I have a countertop in a dinette, that does not have a sink, with receptacles above it. My inspector is requiring these to be GFCI protected. I disagree and don't believe GFCI protection is required because a)the countertop is not in the kitchen, and b)the receptacles are not within 6' of a sink."

Answer

NEC 210.8(A)(6,7) No GFCI would be required as this is not serving kitchen countertop receptacles. NEC 210.12 AFCI would be required as this is serving the dinette.

Question 13

"I have a client who wants to put their PV grid tie string inverter in their basement. The panels are located on the roof then piped in EMT into the basement mechanical room to the inverter. From there piped outside with PVC to a non-fused 60A safety switch disconnect and then sent back into the basement to a breaker.

The inverter does have a rapid shutdown on it but does the disconnect on the outside of the house count as an initiation device and qualify for having a rapid shutdown switch on the exterior of the household for emergency responders?"

Answer

NEC 690.12(C) Initiation Device. Yes, the disconnect does qualify.

The device Off position shall indicate that the rapid shut down function has been initiated for all PV systems connected to that device. The rapid shutdown initiation device shall consist of at least one of the following:

1. Service disconnecting means
2. PV System disconnecting means
3. Readily accessible switch that plainly indicates whether it is in the "Off" or "On" position

Question 14

"Would you consider the soffit space of a dwelling above the Recess cans a dry location?"

Answer

Yes, Definitions, Location Dry

A location not normally subject to dampness, A location classified as dry may be temporarily subject to dampness or wetness.

Question 15

"I have a question about PV output conductors sharing a raceway with the service conductors on this home. The question came up can these conductors share that same wireway as the service conductors?"

Answer

NEC 690.31 (B) & NEC 230.7

690.31(B) Identification and Grouping Reads: PV source circuits and PV output circuits shall not be contained in the same raceway, cable tray, cable, outlet box, junction box, or similar fitting as conductors, feeders, branch circuits of other non-PV systems, or inverter output circuits, unless the conductors of the different systems are separated by a partition. PV system circuit conductors shall be identified and grouped as required by 690.31(B)(1) through (2). The means of identification shall be permitted by separate color coding, marking tape, tagging, or other approved means.

Question 16

"I am an apprentice instructor. We are deciding if we should move our teaching from the 2017 NEC to the 2020. Just wondering if you had any insight to when Wisconsin will be adopting the code."

Answer

We have not had any notification of adopting the 2020 NEC.

We are not accepting the 2020 NEC for continuing education at this time as we have no idea if or when it would be adopted in Wisconsin.

Question 17

"Does a receptacle located inside the base cabinet of a sink in a dwelling unit need to be GFCI protected? Does the 6' rule measure through cabinet doors to under the counter inside the cabinet? One receptacle is used for a garbage disposal and one is used for the dishwasher."

Answer

No, the receptacle below the sink that is for the disposal would not be required to be GFCI protected when there is a door on the kitchen sink cabinet. If you had an outlet under a cabinet in other parts of the home that did not have a cabinet door that receptacle would require GFCI protection. The measurement does not penetrate through a door. The 2017 Analysis of changes explains this very well. The dishwasher is required to be GFCI protected. NEC 210.8 (D).

Question 18

"Can you send me the code reference for requiring the rebar ground connection needing to be exposed /accessible I had another rebar ground connection buried behind insulation and wanted to give the code reference but could not find it."

Answer

NEC 250.68[A] Accessibility.

All mechanical elements used to terminate a grounding electrode conductor or bonding jumper to a grounding electrode shall be accessible. Exception #1: An encased or buried connection to a concrete-encased, driven, or buried grounding electrode shall not be required to be accessible.

Question 19

"I have encountered recessed LED "wafer" lights listed by a NRTL (Testing Lab) other than UL that are provided with an integral field wiring box and a cable that connects the box to the wafer light that gets cut into the ceiling. They are provided with installation instructions that indicate for remodel use the box and luminaire can just be attached to the drywall using clips that hold the LED light into the face of the ceiling and not requiring the outlet box of the luminaire to be attached to a framing member. This is not in

compliance with NEC 314.23. Does the Listing standard address the mounting of the wiring box to the structure?"

Answer

Yes. Code reference: NEC 110.3(a)&(b). UL lists these types of luminaires under the product category Light-emitting -diode Recessed Luminaires (IFAO). These luminaires are investigated for compliance with the Standard for Safety for Luminaires, UL 1598. UL 1598 does not address the mounting of the luminaire's field wiring box to the structure of a building. NEC 314.23 addresses boxes used as outlet or junction boxes etc. for premises wiring in general and would not apply to the field wiring compartment of a Certified (Listed) product that is evaluated for compliance with the applicable safety standard. However, if you feel the installation instructions provided with that Listed product by another NRTL do not comply with the NEC, I would suggest you contact the NRTL in question and file a product incident report with that NRTL for them to address that potential NEC non-compliance. UL Certified (Listed) LED recessed luminaires can be located on UL Product IQ at productiq.ul.com and enter IFAO at the keyword search.

Question 20

"I was cited by an inspector for locating a direct vent water heater receptacle higher than 5 ½' off the floor in the basement of a dwelling. The inspector states that all dwelling unit receptacles including the one in question cannot be located higher than 5 ½ feet. Is this correct?"

Answer

No. NEC 210.52(4) requires the receptacles mandated by NEC 210.52 to be located no more than 5 1/2' above the floor. The receptacle installed for the direct vent water heater is not mandated or identified in NEC 210.52.

The inspector cannot use NEC 210.52(4) as a deficiency.

The installation in question is code compliant and shall be approved as installed.

Please note: If using a GFCI receptacle in the basement for this equipment the receptacle shall be readily accessible (NEC 210.8) and meet the Article 100 definition.

Review site conditions with the inspector.

Question 21

"Are the branch circuit wires inside of a dwelling unit electrical panelboard allowed to be zip tied together for wire management? I like my interior panel installations to look professional. Please advise."

Answer

Yes. State of Wisconsin Electrical Code SPS 316.310(2) permits the installation as described in your question. Reads: (2) This is a department rule in addition to the requirements in 2017 NEC 310.15 (B) (3) (a): The derating factors shown in NEC Table 310.15 (B) (3) (a) do not apply to branch circuits supplying an individual dwelling unit.

Question 22

"Do renters of a (2) family residence need ready access to the overcurrent devices/breakers? I do not want my renters accessing the locked area of the basement where the panels are located."

Answer

The general answer is yes, however the following NEC sections have allowances to the main rule: MAIN RULE (Applies In most cases): 2017 NEC 240.24 (B) Occupancy. Each occupant shall have ready access to all overcurrent devices protecting the conductors supplying that occupancy, unless otherwise permitted in 240.24(B)(1) and (B)(2).

Other allowances

(1) Service and Feeder Overcurrent Devices. Where electric service and electrical maintenance are provided by the building management and where these are under continuous building management supervision, the service overcurrent devices and feeder overcurrent devices supplying more than one occupancy shall be permitted to be accessible only to authorized management personnel in the following:

(1) Multiple-occupancy buildings

(2) Guest rooms or guest suites

(2) Branch-Circuit Overcurrent Devices. Where electric service and electrical maintenance are provided by the building management and where these are under continuous building management supervision, the branch-circuit overcurrent devices supplying any guest rooms or guest suites without permanent provisions for cooking shall be permitted to be accessible.

Question 23

"Is GFCI protection required for replacement dishwasher installations in Wisconsin. This could be hardwired, or cord and plug connected for the replacement. Please advise."

Answer

The answer to your question is "no" based on the SPS 316 "grandfathered rules". Dishwashers installed prior to the 2017 NEC adoption were not required to be GFCI protected. As such use SPS 316.003 as a guide for compliance for replacement units:

(3) EXISTING INSTALLATIONS. Existing electrical installations shall conform to the electrical code that applied when the installations were installed. An existing electrical installation may be required to be brought into compliance with the current code's requirements by the department and within the time period determined by the department when a hazard to life, health or property exists or is created by the installation.

Note: Always review the dishwasher installation instructions as the instructions can be more restrictive and may require GFCI protection. See NEC 110.3(B).

Question 24

"I have a finished laundry area that does NOT have a sink. Are all 120 -volt 15 amp or 20- amp receptacles required to have GFCI protection in this area?"

Answer

No NEC 210.8(A)(10) requirement has been deleted in Wisconsin SPS 316.210. If no sink is to be located in the finished laundry room/area, then no GFCI protection is required in the State of Wisconsin. SEE NEC 210.8(a) & SPS 316.210 amendment.

Please note: If the laundry 120-volt receptacle/s are located in an unfinished basement area, GFCI protection is required regardless of the presence of a sink per NEC 210.8(A)(5).

Question 25

"Are we required to install whole home surge protection for 1 and 2 family dwellings, permitted after January 1, 2020. I have an inspector requiring these surge units for new dwellings. Says he heard about the new requirement at a seminar in Minnesota."

Answer

No. The State of Wisconsin is currently enforcing the 2017 NEC with amendments located in State of Wisconsin Electrical code SPS 316. 2020 NEC requirements are not in effect in the State of Wisconsin at this time.

Question 26

"If I have smoke detectors wired and powered by the 120 -volt branch circuits, installed within a single-family home, can the interconnection be completed using wireless technology, instead of the standard 3rd wire for interconnecting the smoke detectors. What about the CO detectors?"

Answer

Yes, in both cases.

Code Reference: SPS 321.09 for Smoke Alarms; SPS 321.097 for CO Detectors

For new construction, or remodel projects that require the installation of CO and Smoke alarms, the units must be hardwired, but the interconnection can be achieved using wireless technology. All alarms must be audible; therefore, each unit must have an audible alarm. All units must be interconnected.

For additions or remodeling projects, it is best to check with the local building inspector to see if the project requires the installation of Co/Smoke detectors.

Question 27

"We are wiring a new house and the customer purchased a toaster from England it is 220/240-volt. Is it legal to use it here in Wisconsin and if so, we would have to install a 20- amp 2 pole GFCI breaker for it?"

Answer

May be permitted with conditions See NEC 422.6 In Wisconsin equipment must comply with the following:

SPS 316.022 Use of approved materials and construction methods. (1) MATERIALS. Materials, equipment, and products that do not comply with the requirements of this chapter shall not be used unless approved in writing by the department in an approval of a petition for variance. Approval of materials, equipment, and products shall be based on sufficient data, tests, and other evidence that prove the material, equipment, or product meets the intent of the requirements of this chapter. Data, tests, and other evidence shall be provided by a qualified independent third party. Note: Examples of a qualified independent third party include a nationally recognized testing laboratory and a professional engineer.

Please also read NEC 110.3(B)&(C) as well as the info note.

We would encourage you to examine the equipment in question to see if compliance with SPS 316.022 is met. GFCI protection generally would not be required as the equipment is rated over 120-volts. Again, the manufactures installation instructions shall be complied with and can be more restrictive.

Question 28

"I have an individual doing wiring in our area for dwellings that only holds an Electrical Contractor license. He holds no other credentials and uses a local Master on permit applications. It is my understanding that since he holds no credentials, he cannot do any electrical work even if the Master is present, which he typically isn't. Am I correct?"

Answer

You are correct.

The requirements are located in State of Wisconsin Statutes 101.862. 101.862 License or registration required. No person may engage in the business of installing, repairing, or maintaining electrical wiring unless the person is licensed as an electrical contractor by the department.

No person may install, repair, or maintain electrical wiring unless the person is licensed as an electrician by the department or unless the person is enrolled as a registered electrician by the department.

No person who is not a master electrician may install, repair, or maintain electrical wiring unless a master electrician is at all times responsible for the person's work.

Question 29

"We have been installing a GFCI receptacle and an unprotected duplex receptacle in the same box for sump pumps in dwellings. The issue is we are not using a single receptacle but a duplex. The reason is we are installing 1 pump and a battery back- up pump for emergency purposes. I know the that SPS 316.210 (1) (d) states that a single receptacle must be used. Is it acceptable that we still use a duplex receptacle for these situations?"

Answer

No. SPS 316 only permits a single receptacle to be installed for the pump with a GFCI receptacle located no more than 3' away. You would be permitted to install the battery back-up unit on the adjacent GFCI required within 3 feet of the pump but not on a non-protected duplex receptacle.

Question 30

"Just confirming that when a panel is being replaced that AFCI breakers do not need to be installed per SPS 316.210(4)."

Answer

You are correct. AFCI protection is not required for panel changes per SPS 316.210(4).

Question 31

"We have a house we are working on in the country and I have a question. We installed a small distribution panel 150' from the house with a 200a breaker in it. Then we go underground to the house and enter directly in. We have 8' of conduit before the main disconnect in the house panel. Are we within code? I know it refers me to the SPS but I'm struggling to understand it. Any help would be great."

Answer

Yes, the installation is code compliant as you have not exceeded 8' into the dwelling. Remember the installation shall be located inside closest the point of entrance if site conditions permit. Per your question, this is a feeder that is supplying the house. NEC 225.31 requires a building disconnect for outside feeders entering the dwelling and SPS 316.225(3) requires the disconnect to be located in accordance with SPS 316.230(3) which limits the feeder conductors to 8 feet inside of the building.

Question 32

"One of my potential customers is looking to have a radon mitigation system installed in his home. We explained that our electrical contractor would need to have an electrical permit pulled and that we would have a licensed electrician install the exterior electrical disconnect. However, one of the estimates he received said he uses a "plug-and-play" fan that doesn't need any electrical permits. We have been in business for 23-years and never heard of such a thing. I have been a bit skeptical because no one else is using this product and also his price is much lower than most other contractors. I just wanted to check that this product is indeed OK to use in Wisconsin as I am not sure who the governing locality may be. I have attached the link below with the product description and the short video shows exactly how it is installed.

<https://www.wholesaleradon.com/product/pre-wired-rn2-radon-system/>"

Answer

The equipment is permitted in Wisconsin as it is listed by a NRTL (Testing Lab). The installation must be installed in accordance with the supplied installation instructions per NEC 110.3(B). As the equipment is cord and plug connected, an electrical permit is not required, and an electrical license would not be required to install the equipment.

Question 33

"I have a bath remodel going on and they put a bath fan on the back wall of the shower at about 6.5 ft above the shower floor. I kindly asked to see if the fan was rated for a wet location and if GFCI protection is required for the fan. Contractor got upset with me asking questions. Do you agree that these are fair questions?"

Answer

Yes, these are fair questions. NEC 110.3(A)(B). The key to this installation is to consult the manufacturer's installation instructions included with the fan. The installer shall provide this information when requested by an AHJ inspector.

The 2017 NEC & SPS 316 do not have any restrictions against installing an exhaust fan in a shower. There are requirements that equipment be approved for the installation.

Most bathroom exhaust fans are listed to be installed in a shower/wet location with conditions. If it is installed per the listing, and manufacturer's instructions there is no problem (See NEC 110.3(B)). Typically, the instructions will require GFCI protection of the fan.

Question 34

"I am reviewing the SPS and have noticed that under 316.300(2)(a) the 2011 NEC is noted. Is that a typo and should it reference the 2017 NEC 300.4(D)? Why are 2011 references still located in SPS 316? Very confusing."

Answer

Thank you for contacting State of Wisconsin DSPS with your electrical code question.

This is not a typo. The 2011 NEC was being enforced for new 1& 2 family dwelling units up until 1/1/2020 Statewide.

NEC 300.4(D) was exempt up until 1/1/2020 as the 2017 NEC is enforced statewide. NEC 300.4(D) is no longer exempted and shall be followed.

All 2011 NEC references in the SPS 316 document are no longer valid.

Sorry for the confusion as we are not permitted to amend/delete these outdated 2011 references without legislative voting & approval.

Question 35

"When wire is buried in a dwelling exterior property trench would we need to have this inspected prior to filling any portion of the trench? Also, with equipment that buries the wire without a trench (directional boring), how would this be inspected?"

Answer

Yes, to your first question. An Inspection is required prior to concealment. See SPS 320.10

For the second question, directional boring of wiring is permitted, however the inspector would need to verify proper burial depths are maintained. He/she can require spot checking of the depth to verify compliance on a case by case basis. Please consult with the local inspector to make sure you are both on the same page.

Question 36

"A single family residential home has knob & tube wiring that will be replaced so the walls can be insulated. The plaster will not be removed, and new wiring will be fished and run concealed inside the walls for a one for one receptacle and switch replacement. My question is when this rewiring occurs is the receptacle spacing in 210.52(A)(1) 6'x 12' required to now be followed in order to bring the room up to current electrical code?"

Answer

No. We would encourage to use State of Wisconsin electrical code SPS 316.003(3) for assistance. It reads: (3) EXISTING INSTALLATIONS. Existing electrical installations shall conform to the electrical code that applied when the installations were installed. An existing electrical installation may be required to be brought into compliance with the current code's requirements by the department and within the time period determined by the department when a hazard to life, health or property exists or is created by the installation.

Removing Knob & Tube for a one for one receptacle and switch replacement does not require/trigger compliance with rules identified in NEC 210.52(A)(1) (Spacing Rules).

The new NEC Chapter 3 wiring installed to replace the one for one replacement of knob & tube shall meet current codes.

Question 37

"Do smoke and CO detectors installed in an existing home built in the 1960's have to be hardwired? I have found conflicting answers and need clarification. Thanks in advance."

Answer

The answer is no, they can be battery powered. The following will assist with compliance:

- 1) The only "retrofitting" of smoke detectors is for one and two family dwellings built before 4-1-92, but the smoke detectors can be battery powered, are not required to be connected to the building electrical power systems or be interconnected, and shall be installed on every floor level.
- 2) 4-1-92- For new homes the UDC required smoke detectors to be installed on every floor level, be powered by the building electrical system, and be interconnected.
- 3) 12-1-95- For new homes the UDC required smoke detectors to be installed on every floor level, outside of each sleeping area, be powered by the building electrical system, have battery backup, and be interconnected.
- 4) 4-1-01- For new homes the UDC required smoke detectors to be installed on every floor level, outside of each sleeping area, in each bedroom, be powered by the building electrical system, have battery backup, and be interconnected

A UDC inspector cannot require the addition of building powered smoke alarms or their interconnection, on one- and two-family dwellings that were built before 4-1-92. A UDC inspector can require that battery powered smoke alarms be installed on every floor level.

Question 38

"We have OmegaFlex Counterstrike CSST installed in a home.

According to the manufacturer spec below it does not require additional bonding which is why we use this exclusively.

Normally I have been able to send the spec to inspectors and it hasn't been an issue, but I have one inspector requiring something from the state in order to forego any additional bonding.

Here is the material spec:

CSST: TracPipe CounterStrike piping by Omegaflex Part #: FGP-CS-500-100 (1/2"), FGP-CS-750-100 (3/4")

Listed to ANSI LC1-2005

- Up to 400 times more resistant to the damaging effects of electrical energy than yellow CSST.*
- Meets ASTM E84 with respect to flame spread and smoke density. This permits installation in return air plenums.*
- No additional manufacturer bonding is required.*
- UL Listed for 1, 2, and 4 hour through penetration fire stop systems without removal of the conductive jacket.*
- The strength of CounterStrike® makes it more crush resistant than competitive brands.*
- CounterStrike® has higher flow ratings compared to competitive brands."*

Answer

The inspector shall accept the product listing. Your question pertaining to bonding CSST tubing does not apply to the National Electrical Code or State of Wisconsin building or electrical codes.

CSST bonding goes above minimum State code requirements and shall be bonded in accordance with the manufacturer's installation requirements that come with the product.

Several CSST tubing manufacturers exist, each with unique required methods for properly grounding the tubing. Some CSST products do not even require bonding.

The manufacturer shall be consulted with regards to the date the bonding requirements began with their product if any. The product shall be installed in accordance with the manufacturer's installation instructions.

The installer of the product is responsible to properly install & bond the tubing.

Our electrical group encourages the installer to verify what CSST manufacturer they are working with and then examine the installation instructions for proper bonding requirements. Our electrical group at DSPS has no additional requirements.

Question 39

"There is discussion between electricians regarding the sharing of neutral conductors. I am understanding it that you can no longer share a single neutral conductor for multi branch circuits without several conditions to be met. Is this correct? What are the conditions and where are they located? I have looked all over NEC article 200 and cannot find anything."

Answer

A shared neutral (grounded conductor) is permitted for a multi-wire branch circuit. If a neutral (grounded conductor) is shared, it shall comply with NEC 210.4(a)-(d). Review Conditions.

In part, each multiwire branch circuit shall be provided with a means that will simultaneously disconnect all ungrounded conductors at the point where the branch circuit originates.

Question 40

"In a laundry area of a dwelling unit there is a dedicated 120V 20A circuit that serves the washing machine. Is the washing machine circuit required to be AFCI protected? Finished and unfinished locations?"

Answer

Yes, AFCI protection is required. Code reference: NEC2 10.12(A). This applies to both finished and unfinished laundry area locations of dwelling units.

Question 41

"I recently had a rough inspection of a kitchen remodeling project. During this inspection, the inspector failed the inspection due to the fact that there are 3 BX cables running in the same joist space as a cast iron stack pipe. These BX cables were run from basement to second floor during the building of the house about 35 years ago. When I asked why this was a fail, he stated those cables cannot be run where water can get to them. Is this true? I see this all the time on older houses being it is a straight open area from top to bottom of the house."

Answer

The installation you describe in your email is common and is permitted as the NEC & SPS 316 is silent on the question. Did the inspector provide a code question? If so, please forward to me the deficiency report to review.

DSPS licensed electrical inspectors are required to provide code sections and references included with all deficiency reports. SPS 305.63(5)(a)1-4 requires the following:

RESPONSIBILITIES. A person who inspects one- and 2-family dwellings as a certified UDC-construction inspector, certified UDC-electrical inspector, certified UDC HVAC inspector, certified UDC-plumbing inspector, or certified soil erosion inspector shall do all of the following:

Maintain a record of the inspections made including the dates and the findings of the inspections.

Document any compliance deficiencies in the inspection report and include the specific code reference or citation relative to the deficiency.

Provide a copy of the inspection report to the property owner or his or her agent.

Make inspection records available to the department upon request.

Similar language exists for DSPS licensed commercial electrical inspectors. See: SPS 305.62(6)(b).

Question 42

"We are having a nationwide issue with a lack of Arc-fault breakers being manufactured. Cutler Hammer and Square D both have shortages, and we cannot get them for at least another month. I have a few homes and condo projects that the owners want to move in to. I am looking for an opinion / ruling from the State to grant temporary occupancy with standard breakers until we receive the Arc-faults. We would obviously schedule a new inspection once we receive and install the Arc-fault breakers. Can you please reply to this email and let me know the State's opinion on this? I appreciate it very much."

Answer

The department has discussed this issue in length and has determined this is non-compliant as it is a life safety hazard. We compare it to allowing vehicles to be put out onto the road without seatbelts installed because there was a shortage or unavailability of them. Market supply factors cannot be used in lieu of the minimum code requirements. AFCI shall be protected by any of the means described in NEC 210.12(A)(1) through (6).

Question 43

"NEC 225.36 identifies several devices that are permitted to be used as a disconnect. A contractor has installed a dead front GFCI identified as a 1.5 hp motor control switch. I have attached the product information for your review. Is this product suitable to use as the garage disconnect?"

Answer

Not permitted. NEC 225.36 defines the types of disconnecting means as follows (reads):

225.36 Type of Disconnecting Means. The disconnecting means specified in 225.31 shall be comprised of a circuit breaker, molded case switch, general-use switch, snap switch, or other approved means.

The Department does not approve of a GFCI as a disconnecting means. The following information will assist you and your teams understanding our decision:

1. A GFCI shall be designed or listed for this use. 110.3-(A)(1) & (B).

2. GFCI's are known to fail (which is why they have the test button and require a monthly test.) Of course, switches and circuit breakers can fail as well, but they have an established track record of success; not so clear with GFCI's. If a GFCI fails, it may not deenergize the circuit. Or it can fail and possibly refuse to re-energize the circuit.

3. The definition of a GFCI reads: "A device intended for the protection of personnel that functions to deenergize a circuit or portion thereof within an established period of time when a current to ground exceeds the values established for a Class A device." The NEC definition doesn't include its use as a disconnecting means.

4. Cannot be manually operated without power. Although not related, Section 225.38 reads "Disconnect Construction. Disconnecting means shall meet the requirements of 225.38(A) through (D).

(A) Manually or Power Operable. The disconnecting means shall consist of either (1) a manually operable switch or a circuit breaker equipped with a handle or other suitable operating means or (2) a power-operable switch or circuit breaker, provided the switch or circuit breaker can be opened by hand in the event of a power failure." A GFCI is not manually operable. And they don't work when the power is off.

5. (D) Indicating. The building or structure disconnecting means shall plainly indicate whether it is in the open or closed position.

Here's one area where the blank-face GFCI fails. There is no clear indicating of "on" and "off". It does state "test" and "reset" but our department does not feel that it's "plainly indicating" which state it's in (without taking a very close look to see if the button is raised).

Question 44

"If I have GFCI protection on a dwelling unit branch circuit do I still need to AFCI protect the circuit. Seems to me that have only (1) means of protection is safe enough."

Answer

Thank you for contacting State of Wisconsin DSPS with your electrical code question.

AFCI protection is required in the State of Wisconsin for all 120-volt 15 & 20-ampere, single-phase branch circuits regardless of GFCI protection in the following locations:

2017 NEC 210.12(A) & SPS 316.210 (A) Dwelling Units. All 120-volt, single-phase, 15- and 20- ampere branch circuits supplying outlets or devices installed in dwelling unit family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, laundry areas, or similar rooms or areas.

The AFCI (Arc Fault Circuit Interrupter) protects against fires caused by arcing faults. Arcing faults often occur in damaged or deteriorated wires and cords. ... The GFCI (Ground Fault Circuit Interrupter) is designed to protect people from severe or fatal electric shocks.

Both devices are required in some locations of a dwelling. See NEC 210.8(a) for additional GFCI location requirements in dwellings.

Question 45

"There is a resident that currently has two 70 amp panels in front of a stairway landing that does not meet the requirements under NEC 110.26 for depth of working space

The property owner wants to upgrade the panels to 100amps

Once they upgrade to 100amps can the new panels stay in the same location even though it does not meet the requirements under NEC 110.26 for depth of working space?"

Answer

Thank you for contacting State of Wisconsin DSPS with your electrical code question.

The installation shall conform to current 2017 & SPS 316 codes when upgraded.

The installation is considered acceptable if the following 2017 NEC sections are complied with. 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.

(1) Depth of Working Space. The depth of the electrical panel working clearance shall be 36"

(2) Width of Working Space. The width of the working space in front of the electrical equipment shall be the width of the equipment or 762 mm (30 in.), whichever is greater.

In all cases, the workspace shall permit at least a 90-degree opening of equipment doors or hinged panels and not located on steps.

Question 46

"I have a situation where an electrician is using an interconnector in a house being remodeled. Not insulated or rocked yet. They are using the interconnector to extend a smoke alarm circuit. I do not want to allow use of this splicing device for this application. I believe splices should generally be made in a box or enclosure that allows future access to the installer or occupant of the structure. If access to the area allows the replacement of the NM cable, nonmetallic-sheathed cable interconnector devices should not be allowed to be used. In instances where repair work is being done, such as after a flood or when NM cable has been damaged due to a screw or nail penetration, they are an acceptable alternative. Please advise."

Answer

Those devices are not allowed to be concealed in new construction or remodeling. They are covered in NEC 334.40(B). They are allowed in new construction where they are not concealed. They are only allowed to be concealed for repairs in an existing building.

Question 47

"I have a question on derating conductors in dwelling units. Since WI is no longer using the 2011 NEC for one- and two-family dwelling units, SPS 310(1) no longer applies. SPS310(2) states that the derating factors in NEC 310.15(B)(3)(a) do not apply to branch circuits supplying an individual dwelling unit. There is no mention of NEC 334.80, however since 334.80 states the adjustments are made according to table 310.15(B)(3)(a) and that table no longer applies to individual dwelling units, I believe the derating is not required."

I had a student tell me that the inspector told him he did not need to derate for bundled cables in dwelling units, but if the cables were installed in insulation, he did need to derate. Please clarify when we need to derate conductors in dwelling units."

Answer

You are correct. Wis. Admin. Code § SPS 316.310(2) applies to dwelling units in all instances. The provisions of 334.80 do not apply to branch circuits supplying individual dwelling units since NEC 334.80 references table 310.15(B)(3)(a). This includes the derating provisions when NM cable is installed in thermal insulation as that provision is also located in 334.80.

Question 48

"If a new hot tub is installed on an existing concrete patio in a residential yard does it need to be installed so it is not located over any existing utility or customer owned underground wiring?"

Answer

Yes. NEC 680.42 states that for hot tubs Parts I and II of Article 680 are to be followed. 680.11 states that a hot tub may not be installed directly over underground wiring. The rules of NEC Table 680.9(A) shall also apply for all overhead conductors.

Question 49

"An electrician wiring a new home wants to know if because he wired the house using mc cable whether or not he has to install arc-fault protection on required circuits?"

Answer

AFCI protection is required. The manner in which it is provided, and the location of the device provided the protection is detailed in 210.12(A)(1) through (6). Normal MC cable would not meet the requirement that the metal sheath qualifies as an equipment ground. Some MC cables would qualify, but an AFCI receptacle would have to be installed at the first outlet.

Question 50

"I am going to wire an air conditioner disconnect that has a GFCI receptacle in it. It will be a 20 amp 240 volt circuit to the disconnect. It is a 20 amp Weather Resistant/Tamper Resistant (WR/TR) GFCI in the disconnect. Can I tap off one of the 20 amp 240 volt lines to the disconnect to feed the GFCI, if I run a neutral to the GFCI?"

Answer

No, in most or all cases. You would need to meet the requirements in 210.23(A)(2). The rating A/C unit could not be more than 50 percent of the branch circuit rating. NEC 110.3(B) installation instructions typically prohibit adding additional electrical loads to the A/C unit.

Question 51

"Would it be acceptable to put a GFCI receptacle inside the sink base where the dishwasher plugs in?"

Answer

The receptacle must be located in the space adjacent to the dishwasher per 422.16(B)(2)(6). The receptacle cannot be located in the same space as the dishwasher.

Question 52

"I have a customer we are wiring a new home for that doesn't want 2 of the code required kitchen counter top outlets in the wall behind the counter top for aesthetic reasons, she wants to put them in the front portion of the drawer just below counter top. A person will have to open (or flip down) a drawer front to access these outlets. I suggested pop up outlets in the countertop - no go because of drawers. There are no upper cabinets to mount/hide outlets below.

Can outlets in drawers be considered to serve the countertop areas?"

Answer

Receptacles installed as you described would not be compliant. 210.52(C)(5) states the receptacles must be "on or above" the countertop.

Question 53

"Has the code changed to eliminate the outlet on peninsula in a kitchen?"

Answer

No, a peninsula still needs a receptacle installed. What changed is the code language that describes where a peninsula starts. A peninsula is measured from the connected perpendicular wall. A receptacle located on the wall can serve the peninsula. NEC 210.52(c)(3).

Question 54

"I was wondering where the state stands regarding a grounding electrode conductor needing protection from physical damage. More specifically a # 4 coming out of the ground running up the outside wall at the rear yard of a dwelling. It has been my feeling it is exposed to physical damage and I have been requiring protection by one of the methods listed in 250.64(B) (2). Several electricians have expressed a #4 does not require protection. Maybe it is interpreted by others differently?"

Answer

The wording in 250.64(B) has changed. All grounding electrode conductors that are exposed to physical damage are required to be protected regardless of size. If you deem the grounding electrode conductor to be subject to physical damage, you can require it to be protected by one of the methods listed.

Question 55

"Do garbage disposals require GFCI protection?"

Answer

GFCI protection is not required for garbage disposals in dwelling unit kitchens. In other than dwelling unit kitchens GFCI protection is required if the receptacle is within 6 feet of a sink and the receptacle is not inside of a cabinet.

Question 56

"We talked a while back about running a 20-amp circuit for the garbage disposal dishwasher instead of two separate 15 amp circuits. Could you remind me of the code article that you referenced?"

Answer

It is allowable if the total load of the two appliances does not exceed 20 amperes. See NEC 210.23(A).

Note: Always review manufacture installation instructions as these may be more restrictive.

Question 57

"We have an 8' island with a sink in the middle, 12" overhang on 2 sides. There is a receptacle on both ends, one is the side with no overhang (to meet the work surface requirements). The other is on the side with the overhang but is more than 6" beyond edge of overhang. I understand this outlet does not meet the "work surface requirements", but they are stating if it is installed, it must meet the requirements. I say that outlet can go anywhere we choose, if the one required to serve the work surface is done to code. Please advise."

Answer

If one receptacle is placed on the island and meets code requirements, other receptacles can be placed elsewhere on the island. The receptacle does not have to be removed.

Question 58

"How long has Wisconsin Code required a service be disconnected no more than 8-feet after entering a building?"

Answer

Before 1971 no distance was mentioned, just "nearest the point of entrance".

The first requirement was found in the 1971 State code Chapter E and it limited underground laterals to 3 feet in a raceway inside a building in E 230.31(a). Service conductors other than underground used the "nearest the point of entrance" language.

Same language in the 1975 State Code Chapter E 90 in 230.32 with an exception. The exception stated that the service lateral could exceed 3 feet inside the building where it entered the outside wall of a substation or service equipment room.

In the 1978 Chapter E 90 it changed to cover all service conductors and the distance was changed to 8 feet.

1984 IHLR 16- Same as 1978 with another exception added. The second exception state that service busway could extend more than 8 feet into the building.

1987 IHLR 16- Same as 1987 with one exception was removed. The only exception was for service busways.

No changes through the 2005 Comm 16.

The 2008 Comm 16 removed the exception for service busways.

Question 59

"Can you clarify the arc fault requirements for residential construction please?"

Answer

The outlets in the places listed in NEC 210.12(A) would need to be AFCI protected using one of the methods in NEC 210.12(A)(1) through (6) is used. NEC 210.12(A)(1) (combination AFCI circuit breaker) is the most common method used. AFCI protection is not required in kitchens per SPS 316.210(3). AFCI protection is not required for branch circuit extensions or modification per SPS 316.210(4).

Question 60

"Today I have a new dwelling with a utility room in the garage area. In the utility room are the normal things, but also there is a toilet and a wash basin.

The 200 amp Service panel is inside this room also, which I am considering a "Bathroom"

Per NEC 230.70(A)(2) the service disconnecting means cannot be located in a bathroom. I know the electrician is going to ask me this, so I am asking you. If the electrician installs a meter socket /breaker box combination outside instead of the meter socket only, and then feed a panelboard in the utility room without a "Main Disconnect" will this be acceptable? I could not find any code reference in Article 312 that precludes this.

My understanding prior to this was that a panel could not be in a bathroom but per code it reads that the "Service disconnect" cannot be."

Answer

You are correct that in all instances the service disconnect cannot be located in the bathroom. In one- and two-family dwellings, overcurrent devices cannot be located in bathrooms per 240.24(E). The panel cannot be installed in the bathroom.

Question 61

"I had discussion with an employee on the importance of bonding metallic gas pipe in all new homes. I have always bonded black pipe closest to entering the home with bare # 6 to main panel. That is what I would like him to do, however two inspectors have told him he does not need to bond the gas pipe. 250.104 explains this but please help me explain to him the importance of bonding all metal gas piping systems. Thank you."

Answer

The NEC allows metallic gas piping to be bonded through the equipment grounding conductor of the circuit that is likely to energize the piping (for example, furnace or water heater circuit) in 250.104(B)(1). The electrical code does not require additional bonding. Many manufacturers require additional bonding for their flexible gas piping, but that is a manufacturers requirement and not an electrical code requirement.

Question 62

"I had my electric inspection on my garage that had a new service on it. The garage never had power so instead of doing a sub panel from the home we decided to get a 100amp service. We also had a "people" door installed and with that we needed a light on the outside next to the door. We wanted to conserve energy, so we put a solar light instead of a hard-wired light. Is that okay? Our city inspector was not sure and wanted us to email you."

Answer

The general rule requires that the lighting outlet for the entrance to be controlled by a wall switch. There is, however, an exception that allows for automatic control of the light. The installation as you describe is compliant. See. NEC 210.70(A)(2).

Question 63

"I am looking at upgrading an existing single-family dwelling which has a 100A main panel to a 200A service. I want to install a new 200A main panel in another location, in this case in a detached garage 50 feet from the house. I then plan to feed the existing house 100A panel from the new 200A panel in the garage. I have been told by the local inspector that I will have to separate the grounding and grounded conductors in the existing 100A panel. Also, since the existing 240V range and dryer branch circuits cables are supplied from the original 100A panel, which will become a sub panel, and they are three wire cables with no equipment grounding conductor, the local inspector says that they will need to be replaced with a four conductor cable. He references condition 3 in 250.140 Exception. Are these existing three wire cable required to be replaced by 4 wire cables in this situation?"

Answer

Yes, the 3 wire circuits to the range and dryer will have to be changed to a 4-wire circuit. Condition #3 in the exception states that the 3-wire circuit must originate at the service equipment. The panel in the house would be a subpanel and the service equipment would now be located at the garage.

Question 64

"Would a dead front GFCI device be an acceptable means for GFI protection and disconnecting means for a hard-wired dishwasher in a dwelling unit? It has a label on/off and would be located in the adjacent cabinet to the dishwasher."

Answer

No. 422.31(C) requires the disconnecting means to also comply with 430.109, which lists the types of acceptable disconnects.

Question 65

"I have a question for you that a colleague brought up today. 210.52(A)(2)(1) now is requiring the fixed cabinets with countertops or similar be counted as wall space for outlet placement. If we install a receptacle inside the cabinet and a grommet thru the top, would that satisfy this requirement?"

Answer

No. Receptacles located in cabinets cannot be counted as the required wall space receptacles per NEC 210.52(3).

Question 66

"Is a receptacle located on a wall within the restricted zone of a bathtub acceptable? The intention is power for a TV. The receptacle of course will be GFCI protected."

Answer

The restricted zone is located directly above the inside edge of the walls of the tub. Receptacles are allowed to be placed where they are not in this area. NEC 406.9(C).

Question 67

"Would the garage subpanel require a main disconnect if there are not more than six circuit breakers installed in the subpanel?"

Answer

No. NEC 225.33 permits up to (6) overcurrent devices grouped in the same location to qualify as the garage disconnect. The reason why most contractors put a main disconnect is the (6) disconnect rule limits the panel to only (6) overcurrent devices. Most homeowners want the option to fully utilize all the openings in the electrical panel.

Question 68

"I am inspecting a new detached garage project. The owner will be running a feeder, rated 60 amps, from the main panel inside the home underground to a subpanel in the detached garage. Does the 60 amp overcurrent device in the main house panel qualify as a disconnect for the subpanel remotely? Or does there need to be a main disconnect at the subpanel? I have been reading NEC 225.31 along with parts of 230. Any NEC language explanation is much appreciated."

Answer

No. The 60- amp overcurrent device in the home does not qualify as the required garage disconnect. NEC 225.31, NEC 225.32 & NEC 225.33 require a disconnect be located at the garage as well as the location of the disconnect at the garage.

Question 69

"I am getting conflicting answers from other contractor friends, and even inspectors. With a single family residence, with a 320-amp service (two 200-amp panels fed with SEU cables from a 320-amp pedestal), is it legal to install two parallel runs of #4 copper to the grounding electrode rod connection (as the grounding electrode conductor), one #4 from each service panelboard (with its OCP service disconnect at 200-amps)?"

Answer

NEC 250.53 (A)(2) You can run a # 4 from one panel to the ground rods and another from the other panel to the ground rods. The bond screw is installed at the panel to bond the equipment.

If this is correct, then you are in compliance with the code.

Question 70

“On a residential project is the Intersystem Bonding Terminal required at a freestanding pedestal (which is the service disconnect) or would it be required at the house where the feeder enters the residence?”

Answer

You can install the IBT (Intersystem bonding terminal) at the residence; I would use the exception in NEC 250.94 for not installing the IBT at the meter pedestal. I do not see the phone or tv installer mounting equipment out at the pedestal location.

Exception to (A) and (B): Means for connecting intersystem bonding conductors are not required where communications systems are not likely to be used.

NEC 250.94(A) The (IBT) can be connected to the following: At the disconnecting means for a building or structure, be securely mounted and electrically connected to the metallic enclosure for the building or structure disconnecting means, or be mounted at the disconnecting means and be connected to the metallic enclosure or to the grounding electrode conductor with a minimum 6 AWG copper conductor. At the service equipment, be securely mounted and electrically connected to an enclosure for the service equipment, to the meter enclosure, or to an exposed nonflexible metallic service raceway, or be mounted at one of these enclosures and be connected to the enclosure or to the grounding electrode conductor with a minimum 6 AWG copper conductor.