



NEC QUESTIONS

Minnesota IAEI Spring Meeting

April 15th, 2009 1340 Conway Street St. Paul



The answers given here are the opinion of the inspector, not necessarily those of the individual's employer or the Minnesota Chapter IAEI. If you don't understand or disagree with any answer, feel free to raise the question.

- 1 **QUESTION:** When re-locating a temporary service panel to a different job site, do the receptacle outlets have to be changed to the weather-resistant type? If this panel will be used for construction power at a dwelling unit will the receptacle outlets need to be tamper-resistant type?

ANSWER: No to both questions. The National Electrical Code (NEC) applies to NEW installations. Existing electrical installations that do not comply with the provisions of the current code shall be permitted to be continued in use unless the authority having jurisdiction (AHJ) determines that the lack of conformity presents an imminent danger. An existing temporary service installation that is simply up-rooted and re-located is still an existing installation. A new temporary service, constructed and planted for the first time, would need to comply with all of the applicable rules in the current code. See Annex H (Administration and Enforcement) in the NEC for more information about existing installations and additions, alterations, and repairs. Annex H is not part of the requirements of the NEC. It's meant to be informational only. Annex H is a model set of rules that could be adopted by a jurisdiction for the administration of an electrical inspection program.

- 2 **QUESTION:** Is a spa or hot tub installed at a single-family residence, outdoors on a deck, required to have the disconnecting means specified in NEC 680.12? Is a general-purpose receptacle outlet required between 6 and 20 feet from the spa or hot tub per 680.22(A)(3)? Does the equipotential bonding grid required in 680.26(B)(2) have to be installed around the perimeter of the spa or hot tub?

ANSWER PART 1: Yes, a maintenance disconnecting means is required. NEC 680.42 for outdoor spa and hot installations refers back to Part I and Part II for the rules that would otherwise apply to swimming pools. (NEC 680.42(A) and (B) do provide some exceptions from the main rules in Parts I and II; these exceptions are related to flexible connections and bonding). The disconnecting means mentioned in the question is in 680.12 in Part I and would be applicable to outdoor spas and hot tubs. In summary, the outdoor spa or hot tub in question would be required to be provided with a maintenance disconnecting means in accordance with 690.12.

ANSWER PART 2: Yes, a GFCI-protected receptacle outlet would be required to be installed no closer than 6 feet and no further than 20 feet from the outdoor spa or hot tub.

ANSWER PART 3: Yes, an equipotential bonding grid would be required for an outdoor spa or hot tub. Compliance with the prescriptive rules in the NEC is achievable through proper design, planning, and construction for a new installation. However, if a new packaged spa or hot tub is

located onto an existing deck or an existing grade-level concrete patio, it can be a challenge to meet the prescriptive requirements in the NEC. In summary, when new spas or hot tubs are placed into existing locations, the installer and the AHJ will need to assess each situation and its unique characteristics on a case-by-case basis in order to meet the intent of the NEC and to ensure a safe installation.

- 3 **QUESTION:** When a new outlet (i.e. point on the wiring system at which current is taken to supply equipment) for a receptacle, smoke detector or gas fireplace is extended from an existing branch circuit in a dwelling, is arc-fault circuit-interrupter (AFCI) protection required for the entire branch circuit, per NEC 210.12? What if an AFCI device was not available for the existing electrical panel?

ANSWER: No. The National Electrical Code (NEC) applies to NEW installations. Existing electrical installations that do not comply with the provisions of the current code shall be permitted to be continued in use unless the authority having jurisdiction (AHJ) determines that the lack of conformity presents an imminent danger. See Annex H (Administration and Enforcement) in the NEC for more information about existing installations and additions, alterations, and repairs. Annex H is not part of the requirements of the NEC. Annex H is a model set of rules that could be adopted by a jurisdiction for the administration of an electrical inspection program. It's meant to be informational only.

The 2010 National Electrical Code Committee Report on Proposals (ROP) has been published on the Internet. It is available at:

<http://www.nfpa.org/aboutthecodes/AboutTheCodes.asp?DocNum=70&cookie%5Ftest=1>

The 2010 ROP contains the proposed amendments for the 2011 National Electrical Code. Several proposals for the 2011 NEC dealt with AFCI protection and existing branch circuits. Code-Making Panel No. 2, in their panel statements, have consistently stated that "The decision on applying the new construction AFCI requirements to a circuit modification is that of the authority having jurisdiction."

- 4 **QUESTION:** What working clearance is required for the disconnecting means for an in-duct heater when it's mounted adjacent to the heater above a suspended ceiling and accessible only by a ladder? Does it make a difference if the disconnecting means contains fuses?

ANSWER: NEC 110.26(A) states that working space is required for equipment that is "...likely to require examination, adjustment, servicing, or maintenance while energized..."

As noted in the NEC Handbook commentary, even though the "minimum clearances" are not required for certain types of equipment that can be readily disconnected further upstream, "sufficient" access and working space is required in the opening paragraph of 110.26. Whether or not sufficient access and working space is adequate will need to be determined on a case-by-case basis in the field.

Lacking a definition for "sufficient" in the NEC, Webster's defines it as follows: "As much as is needed or desired; enough".

NEC 240.24(A) generally requires overcurrent protection to be readily accessible, without resorting to portable ladders. However, 240.24(A)(4) allows overcurrent devices to be

accessible by a portable means when they are adjacent to utilization equipment that they supply.

- 5 **QUESTION:** Would a break room in an office be considered a kitchen, as “kitchen” is defined in Article 100? If so, would ground-fault circuit-interrupter (GFCI) protection be required for the receptacle outlets if the kitchen has a countertop with a sink, and a dedicated circuit to the receptacle outlet for the portable microwave oven that is sitting on the counter? What if there was a range plugged into a 50-ampere receptacle?

ANSWER: “Kitchen” is defined in Article 100 as “An area with a sink and permanent facilities for food preparation and cooking.” In NEC 210.8(B)(2) for non-dwelling kitchens, all 125-volt 15- and 20-amp receptacle outlets shall have GFCI protection for personnel. As noted in the NEC Handbook, this requirement applies to all receptacle outlets, not just the ones serving countertop surfaces. Poorly maintained electrical apparatus, damaged electrical cords, wet floors, and employees without proper safety training are all cited as reasons for the rule. The handbook commentary goes to clarify that an area with a sink and a “portable” microwave oven is NOT considered a commercial or institutional kitchen. Kitchens in restaurants, hotels, schools, churches, dining halls, and similar facilities are examples of kitchens that would have to comply with the rule. In reply to the original question, the office break room would not be considered to be a kitchen and GFCI protection for the receptacle outlets would not be required. On the other hand, an electric range would constitute permanent facilities for cooking and the break room would be considered to be a kitchen. In that situation, GFCI protection would be required for the receptacle outlets.

- 6 **QUESTION:** A builder is putting up a limited care facility, classified by the building code as an I-2 occupancy. This is a single story building of wood-frame construction with the walls and ceilings sheet-rocked (no suspended ceilings.) Can Type NM cable be used in this building?

ANSWER: It depends...

The rules in NEC 334.10 and 334.12 are predicated on the "Type of Construction" and the "Type of Occupancy", as determined by the local building inspection department, in accordance with the applicable building code (in rural areas where the building code is not adopted, the plans should provide this required information).

As with any project, there are three questions that you need to ask the local building official:

- 1) Under which building code is the project being constructed? (IRC or IBC?)
- 2) What is the "Type of Construction", as defined in the building code, and determined by the building official?
- 3) What is the "Type of Occupancy", as defined in the building code, and determined by the building official?

An Institutional Group I occupancy is a building or portion thereof in which people are cared for or live in a supervised environment. They have physical limitations due to their health or age and are harbored for medical treatment or other care. An I-2 occupancy is used for medical, surgical, psychiatric, nursing, or custodial care on a 24-hour basis for more than five persons who are not capable of self preservation. An I-2 occupancy includes, hospitals, nursing homes, skilled nursing facilities, mental hospitals, and detoxification facilities (a facility with five or fewer persons is classified as a Group R-3, similar to a one-family home). Wood light-frame construction is classified as Type V construction.

NEC 334.10(3) states that Type NM cable is permitted in Type III, Type IV, and Type V construction, unless prohibited by 334.12. (Wood light frame construction is usually Type V). However, 334.10(3) also states that Type NM cable must be concealed behind a thermal barrier material that has at least a 15-minute finish rating as identified in published listings of fire-rated assemblies. In other words, at no time should the cable be installed where it is exposed in the open (an electrical inspector, at their discretion, could accept limited quantities of exposed cable; for example, home run cables at a surface-mounted panelboard in an equipment room).

Based on comments in the NEC Report on Proposals (ROP) and the Report on Comments (ROC), the basic concept is to protect the cable from fire that is occurring in the occupied space, not to protect the occupied space from the cable. In other words, the cable itself is not inherently dangerous; if the cable is not covered with gypsum wallboard, the cable becomes fuel in a fire situation in the occupied space and the burning cable could contribute dangerous smoke and fumes to the situation.

It's generally recognized that 5/8 inch gypsum wallboard has a fire-resistance rating of 20 minutes, and 1/2 inch gypsum wallboard is good for 15 minutes.

Despite the inclusion of "floors" in 334.10(3), it's not intended that floors be covered with gypsum wallboard. Fire-rated floor-ceiling assemblies as listed in Fire Resistance Directories are often constructed of wood floors, with wood structural framing, and one or more layers of gypsum wallboard on the ceiling side (the exposed, bottom, fire side) of the assembly (assemblies are tested on the bottom, fire side).

NEC 334.12 identifies where Type NM cable is not permitted. There is nothing in 334.12 that would prohibit Type NM cable from being used in the subject I-2 occupancy.

In Article 362 for Electrical Nonmetallic Tubing in the NEC Handbook there is some good information related to this topic and a table of common materials and their fire-resistance ratings.

- 7 **QUESTION:** Are wireways listed for grounding? If one is constructed from 16-gauge steel, can it be used as the equipment grounding conductor?

ANSWER: Article 376 does not require metal wireways to be listed by a nationally recognized testing laboratory (by default they must be approved by the AHJ). However, according to the UL White Book, a manufactured metal wireway that is listed and installed in accordance with the product markings and the manufacturer's instructions is suitable for use as an equipment grounding conductor. NEC 314.40 contains the construction requirements for metal boxes (construction requirements were added to Article 376 for metal wireways in the 2008 NEC, but there is no mention of metal thickness). NEC 314.40 essentially requires that metal boxes have a thickness of .0625 inches for steel boxes that are not over 100 cubic inches and .053 inches for metal boxes that are over 100 cubic inches. 16 gauge metal is .0598 inches. Notwithstanding any other code rules or code violations to the contrary, most inspectors would probably accept a 16 gauge metal wireway as an equipment grounding conductor.