



## 2020 National Electrical Code® Code Change Analysis

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### Volume 1, Issue 4 - Changes in the 2020 National Electrical Code®

In the previous issue of this newsletter the topic was about the changes in Article 200 and the beginnings of Article 210. This issue we continue moving into **Article 210 – Branch Circuits**. Our goal is to better understand the changes to help apply them more uniformly; and reduce the probability of installer confusion. We Hope.

#### Article 210 – Branch Circuits (cont.)

##### 210.12 Arc-fault Circuit-Interrupter protection

**(A) Dwelling Units.** There are a few changes in this section that are noteworthy. However, some are only worthy of special mention so I will take care of that up front. The allowance to use steel-armed Type AC Cable was revised in 210.12(A)(5) to remove the reference to “steel-armed” as it really does not matter if it was steel or aluminum armor, much like Type MC Cable. However, it is important to note that the armor itself has to qualify as an equipment grounding conductor (EGC) per section 250.118.

**(C) Guest Rooms, Guest Suites, and Patient Sleeping Rooms in Nursing Homes and Limited-Care Facilities.** As you can see in the title of this subdivision, a few locations we’re added or expanded to the growing list of locations where Arc-fault circuit-interrupters are now required. Now, the additional locations include Guest Suites, Patient Sleeping Rooms in Nursing Homes and Limited-Care Facilities. Prior to the 2020 NEC these locations did not require AFCI Protection.

**(D) Branch Circuit Extensions or Modifications- Dwelling Units, Dormitory Units, Guest Rooms and Guest Suites.** As part of the reorganizing of 210.12, the extension or modification rules that pertain to expansion or modification now apply to the added locations as well. The key to understanding (D) is that

this rule applies to any of the locations listed in 210.12(A), (B), and (C) where such extension or modification takes place. However, there is an exception to this general rule that was clarified in the 2020 NEC.

In the 2017 NEC, the exception to 210.12(D) allowed the absence of AFCI Protection where the extension of the “existing” conductors were not more than 6 feet. It also mandated that no additional outlets or devices were added to the extended or modified branch circuit as well when this exception is utilized. Now, this served installers very well when things like service changes took place and the service equipment cabinet was moved to facilitate an upgrade or design change and was not more than 6 feet. However, debate began to surface as to where the measurements were to begin and what was included. The 2020 NEC has set the record straight on the measurement. The exception now clearly says “branch circuit” and provides for splicing devices, such as wire binding devices (such as WireNuts®) or other listed and ultimately approved splicing devices. It also now states that the “measurement shall not include the conductors inside an enclosure, cabinet, or junction box”. This is very important because the 6 foot is to be measured from the point it leaves the enclosure, cabinet, or junction box and to not include the length of conductor inside those enclosures, cabinet, and junction boxes. This is huge since most people believed that the measurement was the total sum of the “lay of the conductor” itself which was finally made clear is not the intent.

##### 210.15 Reconditioned Equipment.

**210.15 Reconditioned Equipment.** This change is brand new for the 2020 NEC and spawned quite a bit of heated debate at the 2020 NITMAM hearings. In the 2017 NEC, we witnessed the expanded marking language requirements for electrical equipment per 110.21(A)(2). However, there was nothing really

that described the reconditioned issues that frequently takes place with electrical equipment. In fact, there are some things that just can't nor should be reconditioned. 210.15 begins our adventure into those items.

The following must not be reconditioned.

1. *Equipment that provides GFCI protection to personnel.*
2. *Equipment that provides arc-fault circuit-interrupter protection.*
3. *Equipment that provides ground-fault protection of equipment.*

As you can see this would apply to GFCI's utilized in 210.8, 422.5, 555.9, 590.6, Article 680 of course, as well as other sections or articles in the NEC where GFCI protection for personnel is required. This also goes the same for AFCI protection as well in 210.12, as well as for locations where GFP is required, such as 230.95. Long story short – these devices are relied upon to function correctly as intended from the manufacturer so reconditioning them is not an option.

Now, it is also important to say that there were some areas of the 2020 NEC that will allow electrical equipment to be reconditioned so we will break them down for ease of discussion with a (Yes) it can be reconditioned and (No) it cannot be reconditioned.

1. 210.15 Reconditioned Equipment (GFCI's, AFCI's, GFP's) (No)
2. 240.62 Reconditioned Equipment – Low-voltage fuseholders and low-voltage nonrenewable fuses. (No)
3. 240.88(A)(1) Molded-Case Circuit Breakers (No)
4. 240.88(A)(2) Low and Medium Voltage Power Circuit Breakers (Yes)
5. 240.88(A)(3) High-Voltage Circuit Breaker – (Yes)
6. 240.88(B)(1) Low-Voltage Power Circuit Breakers with electronic trip units (No)
7. 240.88(B)(2) Electromechanical protective relays and current transformers (Yes)
8. 240.102 Medium-Voltage fuseholders and medium-voltage nonrenewable fuses (No)
9. 406.3(A) Receptacles (No)

10. 406.7 Attachment plugs, cord connectors, and flange surface devices (No)

Interesting to note, in reviewing the work that went into this topic of reconditioning I did not see anything that prohibits the reconditioning of switches, such as those found in Article 404. Just wanted to mention that in case those folks are reading this newsletter...hint!

11. 408.8(A) Panelboards (No) However, this doesn't prohibit the replacement of the panelboard "guts" within the cabinet or enclosure itself.
12. 408.8(B) Switchboards and Switchgear (Yes)
13. 410.7 Luminaries, lampholders, and Retrofit kits (No). However, regarding the retrofit kits, is installed in a luminaire in accordance with the manufacturers installation instructions then it is not considered reconditioned.
14. 411.4 Listed Low-Voltage Lighting Systems or Lighting Systems that are assembled from listed parts. (No)
15. 490.49 Reconditioned Switchgear-Over 1000V (Yes)
16. 695.10 Fire Pump Controllers and Transfer Switches (No)
17. 700.5(C) Automatic Transfer Switches (No)
18. 701.5(C) Automatic Transfer Switches (No)
19. 702.5 Transfer Switches- Manual or Automatic (No)
20. 708.24 Transfer Equipment – Including the transfer switches as well (No)
21. 800.3(G) Communication Systems (Yes) – As long as compliance with 110.21(A)(2) is applied.

As you can see the debate over the term "Reconditioned" impacted many different code sections, as a result it took the dedicated work of each of the code-making-panels that have control over their respective Articles to make sure which electrical equipment could be reconditioned and which needed to be replaced when the in-use time of that equipment, for whatever reason, has expired.

## 210.19 Conductors- Minimum Ampacity and Size.

**210.19(A)(1) General** – This subdivision has changed only slightly to clarify usability. The phrase *“Branch-circuit conductors shall have an ampacity not less than the maximum load to be served”*. To this educator that statement in the 2017 NEC was a useful and powerful statement to making sure that the conductors, at the least, could carry the load to be served. However, the CMP interpreted, in my opinion, that this should be a “given” and the previous language only served to confuse the Code user. What is important to note is that even with that language gone you still have to ensure the branch-circuit conductor is sized to handle the load as well as being sized in accordance with the larger of 210.19(A)(1)(a) or (A)(1)(b).

There was an exception that was added which applies to 210.19(A)(1)(a) or (A)(1)(b) that is similar to that of 215.2 Exception # 2 that was clarified in the 2017 NEC. This exception allows, when listed pressure connectors, such as Power Distribution Blocks, are utilized for the portion(s) of the branch circuit that is between the supply and load ends of those listed pressure connectors. The portion between the listed pressure connectors shall be permitted to have an ampacity in accordance with 310.15, if it is not less than the sum of the continuous load plus the noncontinuous load. Again,

only applies to the conductors between listed pressure connectors and not to the portions from the listed pressure connectors down to the enclosure containing the branch-circuit supply or load terminations. The illustration below shows feeders, but the same rules apply to branch-circuits as well. The portion between the pressure connectors, such as in this case Power Distribution Blocks, are utilizing this exception.

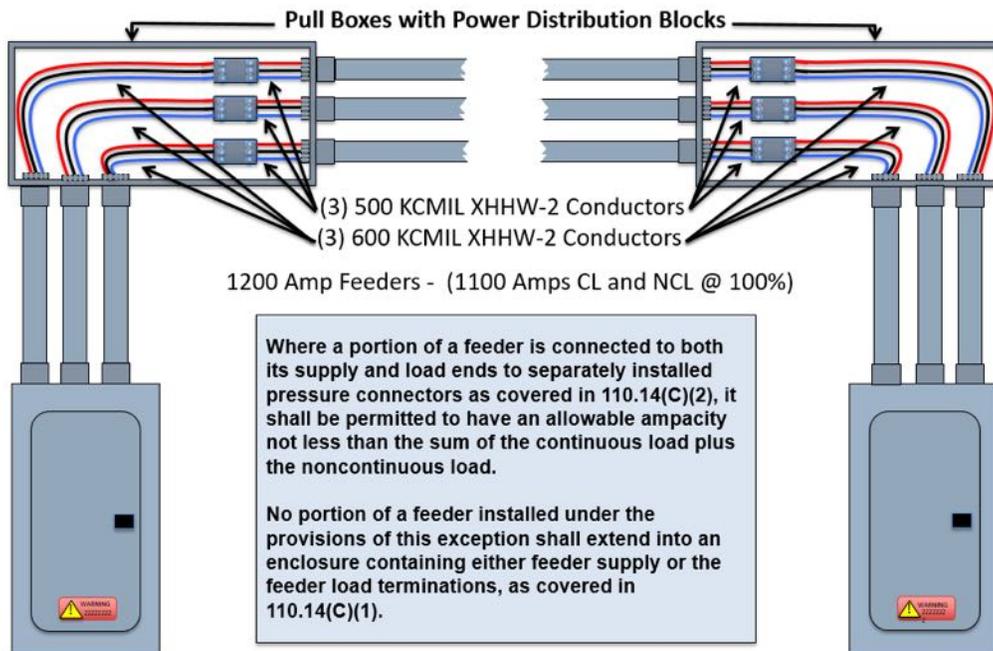
## 210.25 Branch Circuits in Buildings with More Than One Occupancy.

**210.25(B) Common Area Branch Circuits.** While this subdivision did not change it did get the addition of an informational note. The note serves to clear up confusion as to how this rule is applied and provided some necessary examples of that is considered common areas or public spaces. Here is the exception as written to maintain the integrity of the new unenforceable note.

*“Informational Note: Examples of public or common areas include, but are not limited to, lobbies, corridors, stairways, laundry rooms, roofs, elevators, washrooms, store rooms, driveways (parking), and mechanical rooms.”*

Being that in my previous life, that of a municipal administrator, I can appreciate the well-crafted examples given in the informational note when determining when a specific location is considered public or common areas. It goes with saying that I am a big fan of informational notes as guides and clarification points in the NEC and I wish more would be added for clarity in many instances.

### Section 215.2(A)(1) Ex. 2



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## 210.52 Dwelling Unit Receptacle Outlets.

**210.52(C) Countertops and Work Surfaces.** This change is a bit broad so we will have to examine each subdivision to better understand this change. Yes, we will use some illustrations to show these changes because they really need visuals to hammer the changes home.

A particularly important change to 210.52(C) was that the NEC has made it clear that the receptacles

required by 210.52(C)(1), (C)(2) and (C)(3) are not to take the place of the required receptacles discussed in 210.52(A).

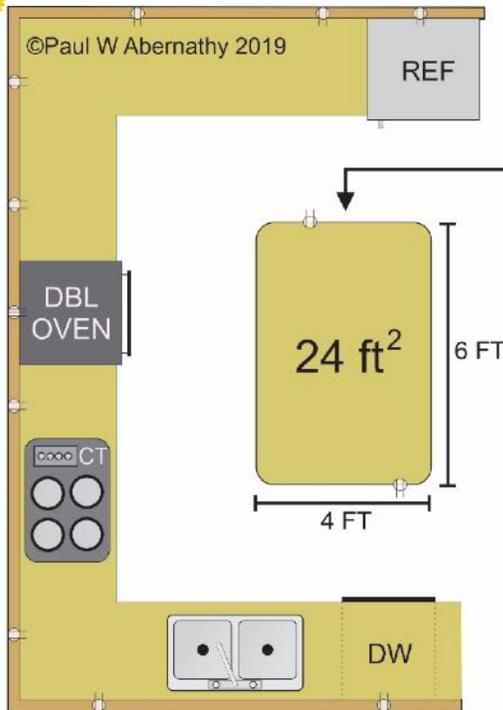
Now, the (C) subdivision was reduced to three (3) items versus the (5) items in the previous 2017 NEC. They old rules are not gone they just got absorbed into a new layout scheme. The requirement for a receptacle on every countertop or work

from the 2017 NEC is that in the 2017 NEC Islands and Peninsular each had their own specific item rule. In the 2020 NEC they are combined.

**210.52(C)(2) Island and Peninsular Countertops and Work Surfaces.** This is where the real change to the islands and peninsular rules happens in the 2020 NEC. While this author



## 2020 NEC® Code Change - 210.52(C)(2)



### 210.52(C)(2) Islands & Peninsulars

At least one receptacle outlet would be required for the first 0.84 m<sup>2</sup> (9 ft<sup>2</sup>), or fraction thereof, of the countertop or work surface\*. An additional receptacle outlet(s) would then be required for every additional 1.7 m<sup>2</sup> (18 ft<sup>2</sup>), or fraction thereof.

- Per the illustration, this would result in a total of two required receptacle outlets at a kitchen island that measured [(6 ft) x (4 ft) = 24 ft<sup>2</sup> - (9 ft<sup>2</sup>) = (15 ft<sup>2</sup>)].
- In 2017 NEC® the measurement consisted of a long dimension of 600 mm (24 in.) or greater and a short dimension of 300 mm (12 in.) or greater, one receptacle was required to serve the island or peninsular. The one required receptacle was Code compliant regardless of the size of the countertop or work surface

\* For a Peninsular at least one receptacle located within 2 ft of outer end.

remembers when it was fairly easy to determine the “connecting edge” of a peninsular to a wall space countertop space only to get confused by the new 2017 NEC language that introduced the newly used “perpendicular wall” as the connecting point into the equation which could be interpreted that if a wall space receptacle meeting the countertop wall spacing rules in 210.52(C)(1) was present and also within the newly established footprint of that peninsular that no additional

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 surface that is at least 12 inches or wider still remains in effect. However, there was clarification on the use of multioutlet assemblies where utilized.

The 2020 NEC says that each 12 inches of multioutlet assembly that contains at least two or more receptacles shall be considered one receptacle outlet. So, if you have 4 feet of multioutlet assembly, two receptacles are in each foot, then you would have four (4) overall receptacles. Maybe it is better explained that if you have a 12-inch section of countertop with a multioutlet assembly on it, it will need at least two simplex (single) receptacles on the multioutlet to meet the minimum of at least one that is demanded in the charging statement of 210.52(C) as discussed previously.

The next change was to break the wall space and island and peninsular rules for countertops and work surfaces into an item (1) and (2). Now, the only difference in this structure scheme

receptacle would be required for the peninsular. Sadly, that language defeated the intent of the code change in the 2017 NEC. So, here we are in the 2020 NEC and CMP 2 code-panel is going to attempt to fix the problem.

Here is what the 2020 NEC states:

*“Receptacle outlets shall be installed in accordance with 210.52(C)(2)(a) and (C)(2)(b).”*

*(a) At least one (1) receptacle outlet shall be provided for the first 9 ft<sup>2</sup>, or fraction thereof, of the countertop or work surface. A receptacle outlet shall be provided for every additional 18 ft<sup>2</sup>, or fraction thereof, of the countertop or work surface.*

*(b) At least one (1) receptacle outlet shall be located within 2 ft of the outer end of a peninsular countertop or work surface. Additional required receptacle outlets shall be permitted to be located as determined by the installer, designer, or building*

owner. The location of the receptacle outlets shall be in accordance with 210.52(C)(3).

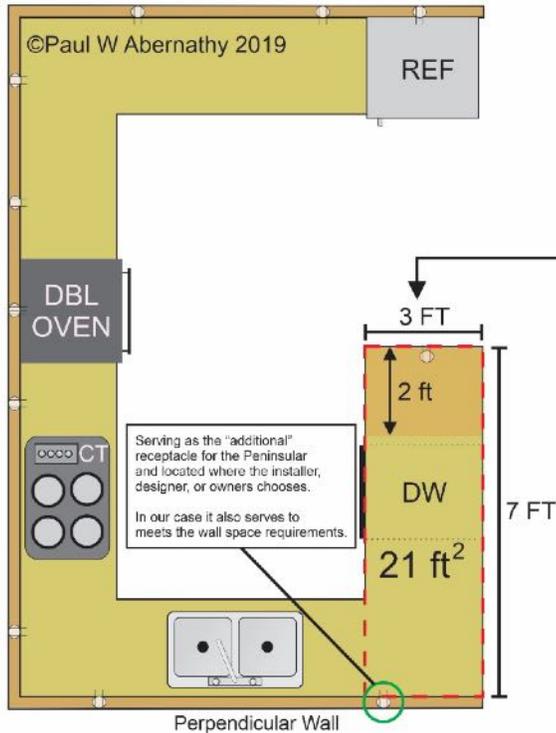
The reference to the measurement for the peninsular is still from the perpendicular wall.

attached to the dwelling unit or within 4 inches or less detached (floating).

**210.52(G)(1) Basements, Garages, and Accessory Buildings.** While there was no significant change to the rule

itself, but we do see a change in the form of an exception added to the requirement for receptacles in garages. The exception reads:

**2020 NEC® Code Change - 210.52(C)(2)**



**210.52(C)(2) Islands & Peninsulars**

At least one receptacle outlet would be required for the first 0.84 m<sup>2</sup> (9 ft<sup>2</sup>), or fraction thereof, of the countertop or work surface\*. An additional receptacle outlet(s) would then be required for every additional 1.7 m<sup>2</sup> (18 ft<sup>2</sup>), or fraction thereof.

- Per the illustration, this would result in a total of two required receptacle outlets at a kitchen peninsular that measured [(7 ft) x (3 ft) = 21 ft<sup>2</sup> - (9 ft<sup>2</sup>) = (12 ft<sup>2</sup>)].
- In 2017 NEC® the measurement consisted of a long dimension of 600 mm (24 in.) or greater and a short dimension of 300 mm (12 in.) or greater, one receptacle was required to serve the island or peninsular. The one required receptacle was Code compliant regardless of the size of the countertop or work surface.

\* For a Peninsular at least one receptacle located within 2 ft of outer end.

*“Exception: Garage spaces not attached to an individual dwelling unit of a multifamily dwelling shall not require a receptacle outlet in each vehicle bay”*

This change makes sense since garage spaces can be detached and remote from the individual dwelling units and requiring receptacles in each vehicle bay seems impracticable. Not impossible, just too onerous for the NEC to force such a design. In this edition of the NEC anyway as there is always 2023 ahead of us.

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**210.52(C)(3) Receptacle Outlet Locations.** While this appears as a new item it was simply the reorganizing of 210.52(C)(4) and (C)(5) into a list format. No significant changes took place in terms of the intent of the location requirements. It is mentioned here simply because it is all “GRAY” in the 2020 NEC and it may appear to be an actual change rather than simply a formatting change.

**210.52(E)(3) Balconies, Decks, and Porches.** With this change comes a new horizontal distance requirement. In the 2017 NEC, Balconies, Decks, and Porches had to be attached to the dwelling unit. In the 2020 NEC they can be within 4 inches away from the dwelling unit (floating). In many applications there are potential “air gaps” between the decking system (or balconies or porches as well I guess) that are not physically connected to the dwelling unit. This change will still demand at least (1) receptacles no higher than 6 ½ ft above the walking surface of those Balconies, Decks, and Porches, either

**210.63 Equipment Requiring Servicing.**

This rule didn’t change for the 2020 NEC but it looks much different than it did in the 2017 NEC and has now been subdivided into an (A) and (B). The rule still requires a 125-volt, single-phase, 15 – or 20-ampere receptacle outlet to be installed in an accessible location within 25 ft. of the heating, air conditioning, and refrigeration equipment.

However, in the 2020 NEC, the newly crafted 210.63 includes the rules previously found in 210.64 of the 2017 NEC.

**210.63(B) Other Electrical Equipment.** The subdivision states *in other than one- and two-family dwellings, a receptacle outlet shall be located as specified in 210.63(B)(1) and (B)(2).*

**(B)(1) Indoor Service Equipment.** *The required receptacle outlet shall be located within the same room or area as the*

service equipment. This was no actual change from 210.64 just to be clear, it was simply relocated.

**(B)(2) Indoor Equipment Requiring Dedicated Equipment Spaces.** Where equipment, other than service equipment requires dedicated equipment space as specified in 110.26(E), the required receptacle outlet shall be located within the same room or area as the electrical equipment and shall not be connected to the load side of the equipment's branch-circuit disconnection means. While this may appear to be new information it is not. It is just part of the newly merged 210.63 and 210.64 from the 2017 NEC to the 2020 NEC.

**210.65 Meeting Room.**

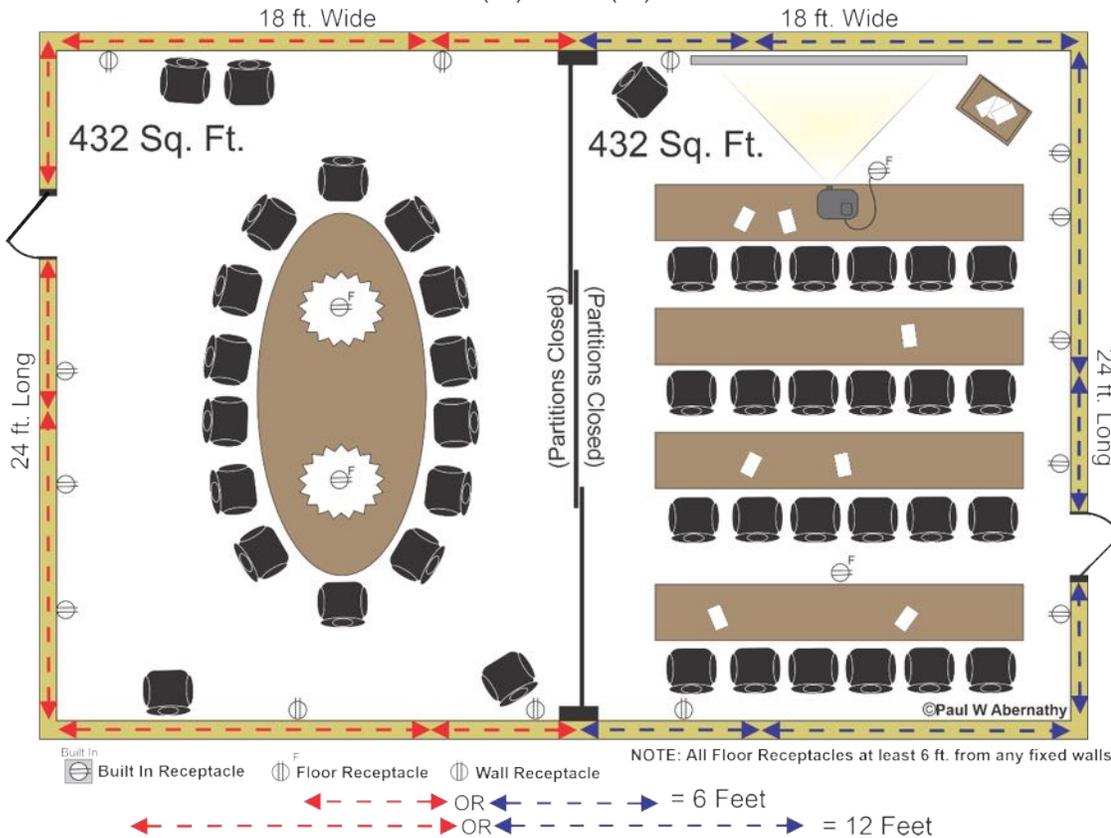
**210.65(B) Receptacle Outlets Required.** Prior to the 2017 NEC receptacle outlets were not required in meeting rooms which resulted in the use of extension cords and relocatable power taps, often being daisy chained to meet the needs of the attendees. However, while that still happens, the efforts were to change the necessary utilization deficiency and require receptacles in these meeting rooms moving forward in

previously found in 210.71 of the 2017 NEC. Clearly, we have move these requirements now up to 210.65 and clarified the intent of this rule.

**(B)(1) Receptacle Outlets in Fixed Walls.** The 2017 NEC was not clear with regards to actually installing the receptacles in the meeting room using the spacing requirements of 210.52(A)(1) through (A)(4) or just use that spacing rule to simply come up with a sum value of the necessary receptacle outlets needed, such as do you actually used the spacing rules in 210.52(A)(1) through (A)(4)? The 2020 NEC made it clear that you simply use the spacing rules to come up with an actual number (sum) of the receptacles you need overall and once you have that number the installer, designer, or building owner can tell you where they desire them on those fixed walls.

**(B)(2) Floor Receptacles.** To not copy and paste the NEC on this one I will simply tell you the change and the intent. In the 2017 NEC, the measurement of the floor area was misconstrued as only applying to square or rectangular meeting rooms. The 2020 NEC makes it clear the floor dimensions are to be 12 ft. or greater in any direction, such for circles or oval rooms as well and that also have a floor area of at least 215 ft<sup>2</sup>.

2020 NEC - Section 210.65(A) and (B)



As in the previous edition, keep in mind the rule requires at least one (1) floor receptacles located at least 6 ft. from any fixed wall for each 215 ft<sup>2</sup> or major portion of floor space. For example, a floor area of 323 ft<sup>2</sup> would require no less than 2 floor receptacle outlets. The first 215 ft<sup>2</sup> covers the one and the additional 108 ft<sup>2</sup> is more than a major portion since it is more than 107.5 ft<sup>2</sup>, which is over 50% of the 215 ft<sup>2</sup>.

The illustration on the left shows an example of a meeting room that was designed using all the rules found in 210.65(A) and (B) for the 2020 National Electrical Code.

the 2017 NEC by adding receptacle outlets on both the fixed walls and in the floors, where applicable. This rule was

## 210.70 Lighting Outlets Required.

**210.70(A)(1) Habitable Rooms.** *At least one (1) lighting outlet controlled by a listed wall-mounted control device shall be installed in every habitable rooms, kitchen, and bathroom. The wall-mounted control device shall be located near an entrance to the room on a wall.*

As you can see in the new language we now have a specific location where the switch(s) in habitable rooms, kitchens and bathrooms must be located, which is near the entrance to the room and on the wall. At this point it is also a good time to remind folks about the new definition for “habitable room” in Article 100, which is:

*“A room in a building for living, sleeping, eating, or cooking, but excluding bathrooms, toilet rooms, closets, hallways, storage or utility spaces, and similar areas.*

While the definition removes bathrooms, you will note that 210.70(A)(1) does include bathrooms so at least (1) lighting outlet controlled by a listed-wall-mounted control device is required for bathrooms. Just to make sure everyone is clear on that, the last thing we need is bathrooms without lighting outlets or wall-mounted control devices.

**210.70(A)(2) Additional Locations.** The rules for additional lighting outlets did not change in terms of the code requirements. However, there was clarity added to each of the list items. The phrase “*lighting outlet controlled by a listed wall-mounted control device*” was added to each list item. The progress of technology brings control devices that are indeed wall-mountable but not necessarily meeting the definition of a “switch” used in the 2017 NEC. So, this change simply broadens the ability to control these lighting outlets by any type of wall-mounted control device, not just switches.

**210.70(B) Guest Rooms or Guest Suites.** The same changes that occurred in 210.70(A)(2) we just discussed also took place in 210.70(B). As stated previously, these set of changes simply broaden the ability to use other type of control devices to control the lighting outlets in these specific occupancies.

**210.70(C) All Occupancies.** While the same change was done as in 210.70(A)(2) and (B) in terms of “listed-wall mounted control devices” the wall switch language was retained. For example, “*for attics and underfloor spaces, utility rooms, and basements, at least one lighting outlet containing a switch (internal to the lighting outlet) or controlled by a wall switch or listed wall –mounted control device shall be installed where these spaces are used for storage or contain equipment requiring servicing.*”

As you can see they are simply giving way to more control options. Now, the last paragraph in this subdivision reads as follows:

*“A point of control shall be at each entry that permits access to the attic and underfloor space, utility room, or basement. Where a lighting outlet is installed for equipment requiring service, the lighting outlet shall be installed at or near the equipment.”*

To be honest that was simply a rewording of the same language that as in the 2017 NEC. So why did I put it in this newsletter? Well, because mainly to fill up space on this last page of Article 210 changes. Hey, at least I am honest about it.

In the next newsletter we will pick up at **Article 215 –Feeders.**

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