

2020 NEC Changes

Important: Please refer to the 2020 National Electrical Code for detailed information

1. 210.8(A) GFCI Protection for Personnel: Dwelling Units

The changes in 210.8(A) will result in all 125-volt through 250-volt receptacles installed at dwelling units supplied by single-phase branch circuits rated 150-volts or less to ground be provided with ground-fault circuit-interrupter (GFCI) protection for personnel. During the 2020 NEC cycle it was substantiated that 250-volt receptacle outlets present similar shock hazards as 125-volt receptacle outlets. This change will impact the typical 240-volt receptacle outlets for cord-and-plug connected dryers, ranges, ovens or similar appliances. This new addition of 250-volt receptacles, and the removal of any ampere limitation, will require GFCI protection for commonly used receptacle outlets in the specified areas of 210.8(A)(1) through (A)(11):

Bathrooms, Garages and Accessory Buildings, Outdoors, Crawl Spaces, Basements, Kitchens, Sinks, Boathouses, Bathtubs and Shower Stalls, Laundry Areas, Indoor Damp and Wet Locations.

Also, (A)(2) for basements previously only required GFCI protection in unfinished areas; (A)(2) requires all receptacle outlets in basements (area below grade level) to be GFCI protected, regardless if the basement is finished or unfinished. During the 2020 NEC code cycle it was substantiated that conductive floor surfaces prone to damp, wet or flooded conditions may exist in both finished and unfinished basements. The potential for electrical hazards and risk of a shock hazard exists regardless of unfinished or finished surfaces.

2. 210.8(B) Ground-Fault Circuit-Interrupter Protection for Personnel: Other than Dwelling Units

In 210.8(B)(2), a change to the way kitchen areas are viewed will further expand the requirements for ground-fault protection for personnel.

All 125-volt through 250-volt receptacles supplied by single-phase branch circuits rated 150 volts or less to ground, 50 amps or less, and all receptacles supplied by three-phase branch circuits rated 150 volts or less to ground, 100 amps or less, shall have ground-fault circuit-interrupter protection when installed in kitchens or areas with a sink and permanent provisions for either food preparation or cooking.

As in other editions of the NEC, the kitchen area must include a sink; however, GFCI protection will be required where employees either cook or prepare food to serve customers.

This section *would* apply to:

- Coffee shops that serve food, candy, ice cream shops, and sandwich shops, etc. where the selling of the products and business services are regulated by the Department of Health or others.

This section **would not** apply to:

- Convenience stores and other similar locations where customers are serving themselves or purchasing pre-packaged food for consumption. These facilities would generally not be considered permanent food preparation or cooking areas. Reheating or heating prepared foods or keeping cooked foods warm or hot with portable appliances will not be considered permanent provisions for cooking.

However, if there is a sink in close proximity of the various appliances, those receptacles mentioned above and within six feet of the top inside edge of the sink would require ground-fault circuit-interrupter protection per 210.8(B)(5).

3. 210.8(F) Ground-Fault Circuit-Interrupter Protection for Personnel: Outdoor Outlets

GFCI protection is required on dwelling unit outdoor outlets* supplied by single-phase branch circuits rated 150-volts or less to ground, and 50-amperes or less. NEC 210.8(F) is only applicable to readily accessible outdoor equipment outlets. The intent of the requirement is to protect individuals who may come into contact with outdoor equipment that is likely to become energized. This change will mostly impact outdoor heat pumps, air-conditioning units and similar equipment. There is an exception that excludes outdoor lighting outlets from having to be GFCI protected.

210.8(F) is **not applicable** to:

- Outdoor outlets that are not readily accessible such as a submersible well pumps, sewer lift pumps, load management controllers or similar equipment.
- Replacement or repair of existing outdoor readily accessible electrical equipment utilizing the same feeder or branch circuit conductors.

The NEC has separate rules for fixed outdoor electric deicing and snow-melting equipment, and similarly for electric heat tracing equipment.

*Recall that NEC Article 100 defines an “Outlet” as a point on the wiring system at which current is taken to supply utilization equipment. The term “outlet” is often misused to refer to receptacles. Receptacle outlets are only one type of outlet. Other types of outlets include lighting outlets, appliance outlets, smoke alarm outlets, equipment outlets and so on.

4. 210.11(C)(4) Garage Branch Circuits

This rule was clarified to emphasize that the required 120-volt, 20-ampere branch circuit shall be installed to supply receptacle outlets required by 210.52(G)(1) for attached garages and in detached garages with electric power. In other words, garage receptacle outlets that are not required by 210.52(G)(1) do not have to be supplied by this dedicated 120-volt, 20-ampere branch circuit, or even be supplied by a 20-ampere rated branch circuit. Additional convenience receptacle outlets could be supplied by either a 15-ampere or 20-ampere rated branch circuit. Also, there is no prohibition to extend the required 20-ampere branch circuit to other receptacles in the garage (above 5.5-feet). The required 20-ampere branch circuit shall have no other outlets (such as lighting outlets). The exception also allows outdoor readily accessible receptacle(s) to be on the required garage 20-ampere branch circuit(s).

5. 210.52(C)(1-3) Receptacles in Wall Spaces, Island and Peninsular Countertops and Work Surfaces

During the 2020 NEC code cycle, a new method was introduced for determining the quantity of receptacle outlets for kitchen island or peninsular countertop work surfaces. The former horizontal measurement method has been changed to a square-foot calculation method. When determining the quantity of receptacles required, one receptacle outlet is required for the first 9 square feet of countertop work surface, or fraction thereof, and an additional receptacle outlet is required for each additional 18 square feet, or fraction thereof. See the examples in the table below.

Total Square Footage of Countertop (Examples)	Minimum Quantity of Receptacle Outlets
<p>8 square feet</p> <ul style="list-style-type: none"> At least one receptacle outlet for the first 9 square feet, or fraction thereof 	<p>One (1) receptacle outlet</p> <p>8 sq. ft. is less than 9 sq. ft. (a fraction thereof)</p>
<p>9 square feet</p> <ul style="list-style-type: none"> At least one receptacle outlet for the first 9 square feet, or fraction thereof 	<p>One (1) receptacle outlet</p> <p>9 sq. ft.</p>
<p>27 square feet</p> <ul style="list-style-type: none"> At least one receptacle outlet for the first 9 square feet, or fraction thereof An additional receptacle outlet for each 18 square feet, or fraction thereof 	<p>Two (2) receptacles outlets</p> <p>9 sq. ft. <u>+ 18 sq. ft.</u> = 27 sq. ft.</p>
<p>28 square feet</p> <ul style="list-style-type: none"> At least one receptacle outlet for the first 9 square feet, or fraction thereof An additional receptacle outlet for each 18 square feet, or fraction thereof 	<p>Three (3) receptacle outlets</p> <p>9 sq. ft. + 18 sq. ft. <u>+ 1 sq. ft.</u> = 28 sq. ft.</p>
<p>48 square feet</p> <ul style="list-style-type: none"> At least one receptacle outlet for the first 9 square feet, or fraction thereof An additional receptacle outlet for each 18 square feet, or fraction thereof 	<p>Four (4) receptacle outlets</p> <p>9 sq. ft. + 18 sq. ft. + 18 sq. ft. <u>+ 3 sq. ft.</u> = 48 sq. ft.</p>

6. 230.67 Surge Protection

All services supplying dwelling units (including mobile or manufactured homes) are required to be provided with a Type 1 or Type 2 surge-protective device (SPD). The SPD must be an integral part of the service equipment or located immediately adjacent to the service equipment. This new requirement also applies to service upgrades or service replacements at dwelling units. It is applicable to all dwelling unit services for one-family, two-family and multifamily dwellings. During the 2020 NEC code cycle it was substantiated that surge protective devices are necessary to protect against home fires and personal injury. For the typical home, surge protective devices also provide protection for all the sensitive electronic systems, a variety of different equipment, appliances, lifesaving apparatus such as smoke alarms and carbon-monoxide detectors, overcurrent devices such as GFCIs, AFCIs, and much more. This requirement would also include any additional service(s) as defined in Article 100 and installed according to 230.2(A) and (D).

If an installation utilizes an existing electrical service that will supply a new dwelling unit(s), the SPD will be required to be installed at the existing service, or in the panelboard at the new dwelling unit(s), as allowed by the exception in 230.67. For example, it's common in many areas to establish an electrical service on a vacant parcel of land, or at an accessory building, often for temporary power and long before the dwelling is ever constructed on the parcel. The SPD protection will be required at such time that the dwelling is actually constructed.

7. 230.71 Maximum Number of Disconnects

The service disconnecting means for each service is still permitted to consist of not more than six switches or sets of circuit breakers, or a combination of not more than six switches and sets of circuit breakers, located in a group of separate enclosures, or in a switchboard or switchgear separated by barriers. The six means of disconnect can no longer be mounted in a single enclosure. This requirement is in collaboration with the new requirement for service barriers in 230.62(C) which was relocated from 408.3(A)(2) in the 2017 NEC. Now barrier(s) are required for all services that are installed in a panelboard, switchboard, and switchgear to hinder the exposure to "live parts". The idea is that when you use the six disconnect rule (six breakers in a single enclosure), it would be difficult to install barriers to isolate the busbars in the panelboard or switchboard to protect from a potential shock hazard without disconnecting from the utility.

This requirement will not apply to existing panelboards or switchboards currently utilizing up to six circuit breakers in a single enclosure as the service disconnect. Example: In a farmyard service that has three breakers in an existing switchboard that feeds various outbuildings, an installer could simply add one more breaker to feed a "new" building from the existing equipment as long as there are six or less breakers in the enclosure.

8. 230.85 Emergency Disconnects

In order to provide first responders with a safe method of disconnecting power from a structure, one-family and two-family dwellings are required to have an emergency disconnect installed outdoors at a readily accessible location. The emergency disconnect must be rated for the available fault current. Typically, in order to achieve a short circuit current rating, an unfused disconnect switch constructed to UL 98 would be required to contain overcurrent protection, or the installer must provide the overcurrent protection ahead of the electrical equipment.

Equipment labels and marking must comply with NEC 110.21. The NEC does not prohibit locking the disconnect in the "On" position. First responders are well equipped to cut off or remove any locking devices that impede the ability to operate the emergency disconnect. There are three options for the emergency disconnect:

1. A service disconnect switch or circuit breaker:
Labeled as ***Emergency Disconnect, Service Disconnect***
2. Certain approved meter disconnects:
Labeled as ***Emergency Disconnect, Meter Disconnect, Not Service Equipment***
3. Other listed disconnect switches or circuit breakers that are suitable for use as service equipment:
Labeled as ***Emergency Disconnect, Not Service Equipment***

The requirement for the emergency disconnect **would** apply to:

- The replacement of service equipment, service entrance conductors, service raceways, or meter enclosures - if the new installation increases the service ampacity.
- Any new additional service(s) equipment as defined in Article 100 installed according to 230.2(A) and (D).

The requirement for the emergency disconnect **would not** apply to:

- The routine replacement of existing service panelboards (e.g. from fuses to circuit breakers) with the same ampacity.
- The replacement or repair of the service entrance conductors, service raceways, or meter enclosures where service disconnect ampacity is not increased.
- Replacement or repair of an existing service riser, or service entrance conductors, service raceways, and/or meter enclosure that was the result of damage.

Note: Under certain conditions the Exception to NEC 250.121 allows the equipment grounding conductor (EGC) to also be used as the grounding electrode conductor (GEC). Where the EGC/GEC enters the panelboard, the EGC/GEC conductor must be sized to NEC table 250.102(C)(1). An EGC (sized to NEC table 250.122) must contain an irreversible crimp where attached to the larger EGC/GEC and it must be extended to the equipment grounding bar. The GEC must then be routed outside the panelboard and extended to the GEC system.

9. Article 310 Arrangements/Tables

The ampacity tables in Article 310 have been revised and will simply be titled as Table 310.16 through Table 310.21. As an example, former Table 310.15(B)(16) will revert to its original numbering and simply be known as Table 310.16. Also, the table of ampacities for medium voltage conductors were removed and relocated to the new Article 311 – Medium Voltage Conductors and Cables. During the 2020 NEC code cycle there was significant effort to improve the usability of the code.

10. 406.9(C) Receptacles in Damp or Wet Locations, Bathtub and Shower Space

Receptacles are prohibited from being installed within an area measured 3-feet horizontally and 8-feet vertically from the top of the bathtub rim or shower stall threshold, which includes the space directly over the tub or shower stall. In bathrooms with dimensions less than the required area, the receptacle(s) are permitted to be installed opposite the bathtub rim or shower stall threshold on the farthest wall within the room. During the 2020 NEC code cycle it was substantiated that restrictions for receptacle outlets should closely mirror the requirements for luminaires and ceiling fans that date back to 1984 and 1996, respectively.

11. 408.6 Short-Circuit Current Rating (Switchboards, Switchgear, and Panelboards)

A new rule was added at 408.6 requiring that the available fault current, and the date the calculation was performed, to be field marked on the enclosure at the point of supply for switchboards, switchgear and panelboards. Equipment shall have a short-circuit rating not less than the available fault current. The marking and labeling shall comply with 110.21(B)(3). This new rule is not applicable in one- or two-family dwelling units. During the 2020 NEC code cycle it was substantiated that field marking and proper enforcement will ensure that equipment is properly protected.

12. 422.5(A) Ground-Fault Circuit-Interrupter (GFCI) Protection for Personnel. (Appliances)

Revisions were made to the GFCI protection requirements for appliances at 422.5(A). The revised and expanded rules require protection for sump pumps and all dishwashers rated at 150 volts or less to ground and 60 amperes or less, single- or 3-phase, located at both dwelling unit and non-dwelling unit locations, hard-wired or cord and plug connected. Also, the “provided for public use” condition has been removed from GFCI requirements for both automotive vacuum machines and tire inflation machines.

13. 547.5(G) Wiring Methods (*Agricultural Buildings*), GFCI Protection for Receptacles

The requirements for ground-fault circuit-interrupter (GFCI) protection have been revised and clarified for agricultural buildings that are within the scope of Article 547 (buildings, or portions thereof, or areas with similar conditions or like nature, involving excessive dust, dust with water, or corrosive atmosphere). The 2020 NEC is very clear that GFCI protection is only required for 125-volt, 15- and 20-ampere receptacles in areas having an equipotential plane, in outdoor locations, in damp or wet locations, or in dirt confinement areas for livestock. The requirements for GFCI protection for receptacles of higher voltage and amperage classifications are not applicable for agricultural buildings. For example, GFCI protection is not required for single-phase or three-phase, 240-volt, 30- or 50-ampere receptacles, or similar. During the 2020 NEC code cycle it was substantiated that unintended tripping of GFCI protective devices often creates significant safety issues. Farming operations require an orderly shutdown to avoid significant hazards or property damage.

14. 551.71(F) GFCI Protection for Receptacles (Recreational Vehicle Parks)

All 125-volt, single-phase, 15- and 20-ampere receptacles at RV parks are required to have listed ground-fault circuit-interrupter (GFCI) protection for personnel. 30- and 50-ampere receptacles used in RV park supply equipment shall not be required to meet the requirements of 210.8(B).

The 30- or 50-ampere power cord for an RV is considered a feeder, not a branch circuit. GFCI protection is not appropriate on a feeder circuit in these situations. The internal wiring in an RV provides the necessary GFCI protection for branch circuits that are integral to the RV.

In the first printing of the 2020 NEC, this section was under appeal as result of a Certified Amending Motion (CAM) that was heard at the NFPA annual meeting. As a result of the action taken at the annual meeting, the language referenced back to the 2017 NEC text. CMP-7 submitted a Tentative

Interim Amendment (TIA): TIA 20-8, Reference: 551.71(F), that was accepted and ultimately changed the text back to the initially proposed language forgoing the need for GFCI protection on the 30- and 50-ampere receptacle(s) in RV site equipment.

15. 555.35 Ground-Fault Protection of Equipment and Ground-Fault Circuit-Interrupter Protection (Marinas, Boatyards, Floating Buildings, and Commercial and Noncommercial Docking Facilities)

The ground-fault protection of equipment (GFPE) requirements for marinas, boatyards and docking facilities have been revised. The new GFPE requirements were divided into three parts to provide clarity and readability for these important ground-fault protection requirements.

1) 30 milliamperes

- Section 555.35(A)(1) addresses shore power receptacles with individual GFPE not to exceed 30 milliamperes (mA)

2) 4 to 6 milliamperes

- Section 555.35(A)(2) addresses 15- and 20-ampere receptacles for other than shore power with Class A GFCI protection (4 to 6 mA) being provided in accordance with 210.8 through a reference to 555.33(B)(1).

3) 100 milliamperes

- Section 555.35(A)(3) addresses feeder and branch-circuit conductors providing power to a dock or slip to have GFPE set to open at currents not exceeding 100 mA.

16. Revised Article 800 – General Requirements for Communication Systems

A new Article 800 will cover all “general” requirements and serve as a placeholder for redundant requirements throughout other communication articles.

- Article 800 – General Requirements for Communication Systems
- Article 805 – Communication Circuits
- Article 820 – Community Antenna Television and Radio Distribution Systems
- Article 830 – Network-Powered Broadband Communication Systems
- Article 840 – Premises-Powered Broadband Communication Systems

Article 810 for Radio and Television Equipment is not included in this list and is a standalone article.

Note: There are three rules in the 2017 NEC that were deferred to January 1, 2020 in order to give the industry time to comply. These new rules became enforceable on January 1, 2020 as part of the 2017 NEC. These same rules have been carried forward and are incorporated into the 2020 NEC.

- **240.67 Arc Energy Reduction.** Newly installed electrical equipment containing fuse(s) 1200 amps or greater must have Arc Energy Reduction to reduce the clearing time.
- **404.2(C) Switches Controlling Lighting Loads.** At replacement or retrofit switch locations where the grounded conductor can't be extended without removing finish materials, the installer shall not exceed 5 electronic lighting control switches on a branch circuit, and 25 electronic lighting control switches on the load side of any feeder installation.
- **404.22 Electronic Lighting Control Switches.** Electronic lighting control switches shall not introduce current on the equipment grounding conductor.