

Overview of the 2020 NEC® Changes *(16-hour class)*

Day 1 – Part 1

8:00 – 10:00 am

The Numbers

- Public Inputs - 3,730
- Public Comments to Public Inputs - 1,930
- First Revisions - 1,400
- Second Revisions - 634
- Correlating Revisions - 73

New Articles

- Article 242 Overvoltage Protection (280 and 285)
- Article 311 Medium Voltage Conductors and Cables
- Article 337 Type P Cable (Drilling Rig Cable)
- Article 800 General Requirements for Communications

Purpose of the National Electrical Code, 90.1

- Protection Against Fires
- Protection Against Electric Shock or Electrocutation

Article 90 Introduction

Scope of the NEC, 90.2. Electric Vehicle Bidirectional Power, 90.2(A)(6). This new rule states that the connection between an electric vehicle and a premises wiring system for the purposes of bidirectional power flow is now within the scope of the NEC.

CHAPTER 1—GENERAL

Article 100 Definitions

Definitions, 100. The 2020 revision cycle globally addressed definitions throughout the Code. Many definitions in “.2 sections” of an Article were relocated to Article 100.

Definitions, 100. Article 100 now contains three parts.

- Part I, General
- Part II, Over 1,000V
- Part III, Hazardous (Classified) Locations



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Ground-Fault Current Path, 100. Definition revised to include the neutral conductor as part of the ground-fault current path.

Grounding Conductor, Equipment (EGC), 100. Definition clarifies that the EGC “is a part of” an effective ground-fault current path.

Article 110—Requirements for Electrical Installations

Installation and Use, 110.3(B). Revision makes it clear that equipment that is listed, labeled, or both be installed in accordance with the instructions included in the listing or labeling.

Conductor Material, 110.5.

Informational Note text regarding copper-clad aluminum conductors moved into the rule.

Terminal Connection Torque, 110.14(D). Revision requires the use of an approved means to torque terminations and three Informational Notes added.

Identification of Disconnect Means, 110.22. The disconnecting means now requires the identification of the source that supplies the circuit disconnecting means.



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Day 1 – Part 2

10:00 – 12:00 pm

CHAPTER 2—WIRING AND PROTECTION

Article 210—Branch Circuits

GFCI Protection, 210.8. Revisions are many and include clarifications, expansions to existing rules, and a few new items.

Dwelling Units, 210.8(A). Requirements were expanded for GFCI protection of receptacles rated 125V through 250V.

Indoor Damp and Wet Locations, 210.8(A)(11). Receptacles in an indoor damp or wet location now must have GFCI protection.

Other Than Dwelling Units, 210.8(B). All 125V through 250V receptacles supplied by single-phase branch circuits rated 50A or less or three-phase branch circuits rated 100A or less with a voltage of 150V or less to ground must now have GFCI protection.

Indoor Damp and Wet Locations, 210.8(B)(6). Receptacles in an indoor damp or wet location now must have GFCI protection.

Specific Appliances, 210.8(D). The requirement for outlets that supply dwelling unit dishwashers to have GFCI protection was moved to 422.5(A)(7) in Article 422-Appliances, and 210.8(D) was repurposed to cover “Specific Appliances.”

Equipment Requiring Servicing, 210.8(E). GFCI protection is now required for all receptacles required by 210.63 for a/c and service equipment.

Outdoor Outlets, 210.8(F) GFCI protection is now required for outlets supplying equipment such as HVAC units at dwelling units including hard-wired equipment.

Arc-Fault Circuit-Interrupters, 210.12. The AFCI protection requirements for branch circuits have been expanded to include guest rooms and guest suites.

Conductor Sizing, 210.19. The branch-circuit minimum conductor ampacity rule was clarified by adding a reference to the termination requirements in 110.14(C). New exception permits the use of 90°C conductors between terminal blocks installed outside of the source and load termination enclosures.

Equipment Requiring Servicing, 210.63. The receptacle requirements of 210.64 for servicing of equipment have been combined into 210.63.

Meeting Rooms, 210.65. This rule was relocated from 210.71 and clarified to indicate the number and location of the required receptacle outlets.



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Article 215—Feeders

Feeders, General, 215.2(A)(1). The feeder minimum conductor ampacity rule was clarified by adding a reference to the termination requirements in 110.14(C).

GFCI Protection for Personnel, 215.9. Feeders are now permitted to be protected by a ground-fault circuit interrupter installed in a readily accessible location in lieu of the provisions for such interrupters as specified in 210.8 and 590.6(A).

Article 220—Branch-Circuit, Feeder, and Service Load Calculations

Lighting Load for Non-Dwellings, 220.12. The scope of this section was modified to only include lighting loads for nondwelling occupancies, the lighting load table was revised to follow the maximum permitted lighting loads as specified by current energy codes.

Noncoincident Loads, 220.60. New text really screws up this rule.

Article 225—Outside Branch Circuits and Feeders

Number of Supplies, 225.30. New subsection (A) permits docking facilities and piers to be supplied by multiple feeders or branch circuits. New subsection (B) permits multiple feeders or branch circuits to a building or structure.



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Day 1 – Part 3

1:00 – 3:00 pm

Article 230—Services

Spliced Conductors, 230.46. This section was expanded to include marking requirements for power distribution blocks, pressure connectors, and other devices used to splice or tap service conductors with an additional time allowance for manufacturers to comply with this rule.

Service Equipment Barriers, 230.62(C). Text related to the service equipment barriers from 408.3(A)(2) was relocated to a new subsection (C) and revised.

Surge Protection, 230.67. New section requiring installation of a surge-protective device (SPD) for all dwelling unit services.

Number of Service Disconnects, 230.71. A service is required to have only one disconnecting means; except as permitted in 230.71(B).

Connections on the Supply Side of Service, 230.82. Emergency dwelling unit disconnect required by 230.85 and meter-mounted transfer switches are now permitted on the supply side of the service disconnect.

Emergency Disconnects, 230.85. A new requirement for one- and two-family dwelling units to have an emergency disconnect installed in a readily accessible exterior location was added.

Article 240—Overcurrent Protection

Location in Circuit, Feeder Taps, 240.21(B). The change here is intended clarify that you can originate a tap on the breaker termination point or at any point on the load side of the feeder overcurrent device.

Article 242—Overvoltage Protection

Overvoltage Protection, Article 242. Former Article 280 – Surge Arresters Over 1,000V and Article 285 – Surge Protective Devices (SPD's), have been combined and relocated into this new Article.

Article 250—Grounding and Bonding

Grounding for Supply Side of the Service, 250.25. This new section provides the rules for grounding and bonding of systems that are connected on the supply side of the service disconnect.

Buildings Supplied by a Feeder, 250.32(A). Text clarified to require a grounding electrode system and a grounding electrode conductor be installed at a building supplied by feeders.

Grounding Electrode Installation, 250.53. New sentence added to prohibit the use of rebar as a conductor to interconnect the electrodes of a grounding electrode system.

Grounding Electrode Conductor Installation, 250.64. The locations where aluminum or copper-clad aluminum grounding electrode conductors are permitted to be installed has been expanded.



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Exposed to Physical Damage, 250.64(B)(2) and (B)(3). Sections revised to indicate “Schedule 80” PVC is now required when subject to physical damage.

Raceways and Enclosures for GEC, 250.64(E). Revisions made to GEC protection requirements.

Raceways and Enclosures for GEC, 250.64(E)(3). Revised to require bonding jumper between GEC and ferrous material be at least the same size the largest GEC in that enclosure.

GEC Connections, Rebar Type Electrodes, 250.68(C)(3). This section was edited to add clarity on the rule on extending rebar for use as a grounding electrode extension.

Metal Enclosures, 250.109. New section permits metal enclosures to be used to connect bonding jumpers or equipment grounding conductors as a part of the effective ground-fault current path.

Equipment Grounding Conductor, 250.120. The permitted uses of aluminum and copper-clad aluminum EGCs has been expanded.

Restricted Use of EGC, 250.121. Requirements of 250.136 that prohibit using the structural metal frame of a building or structure as an EGC were relocated here.

Sizing Equipment Grounding Conductors, 250.122. Rule revised to clarify that the increase in the size of the phase conductors resulting from ampacity adjustment and/or correction, do not require an increase in the size of the EGC.

Conductors in Parallel, 250.122(F). The title and text revised to clarify the equipment grounding conductor requirements for multiconductor and parallel cable installations.

Equipment Secured to Grounded Supports, 250.136. Rule where the metal rack is permitted to be used as an equipment grounding conductors (EGC) clarified.

Connecting Receptacle to an EGC, 250.146. This section now clearly requires a receptacle grounding terminal to be connected to an EGC so there is an effective fault-current path.

Continuity of EGC in Boxes, 250.148. The title and text were revised to indicate that the rule applies to both the continuity of the EGCs and the “attachment in” a box.



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Day 1 – Part 4

3:00 – 5:00 pm

CHAPTER 3—WIRING METHODS AND MATERIALS

Article 300—General Requirements for Wiring Methods and Materials

Conductors, 300.3. Language added to ensure that when connections, taps, or extensions are made from paralleled conductors, all conductors from each phase and or neutral are included in the connection.

Protection Against Physical Damage, 300.4(G). Subsection reorganized into a list format (1) through (4) covering the use of listed metal fittings with smoothly rounded edges, insulated fittings, and threaded hubs.

Raceways Exposed to Different Temperatures, 300.7. The rule in the subsection (A), was revised to require the use of an “identified” sealant that’s safe for the conductors and the raceway itself, and to correlate with the language in 225.27.

Article 310—Conductors for General Wiring

Scope, 310.1. The scope of this article was changed to limit its application to the general requirements for conductors rated up to and including 2,000V.

Conductor Identification, 310.6. The rule addressing conductor identification from 310.110(C) was relocated here and the term “grounding” was revised to read “equipment grounding” for clarity.

Single-Phase Dwelling Services and Feeders, 310.12. The dwelling service feeder conductor sizing table from Annex D now resides in this new section.

Ampacities for Conductors, 310.14. Section 310.15(A) and (C) in the 2017 Code containing ampacity adjustments and corrections were relocated here.

Ampacity Tables, 310.15. New language provides guidance on conductor ampacity determination after considering ambient temperature and/or conductor bundling.

Ambient Temperature Correction Factors, 310.15(B). This rule requires the conductor ampacity to be corrected based on the ambient temperature by using Table 310.15(B)(1) or by using Equation 310.15(B).

Rooftop, 310.15(B)(2). This rule for conductor temperature corrections on rooftops was relocated with no significant change.

Adjustment Factors, 310.15(C). The rules for conductor ampacity adjustments were relocated with no technical changes.

Neutral Conductors, 310.15(E). Text determining whether neutral conductors are current carrying was editorially revised.

Ampacities of Insulated Conductors, Table 310.16. Ampacity Table 310.15(B)(16) was relocated to this section.



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Article 312—Cabinets

Overcurrent Device Enclosures, 312.8. Subsection (B) now permits both power monitoring and energy management equipment to be installed in a cabinet containing overcurrent protection devices or cutout box containing switches.

Conductors Entering Boxes or Conduit Bodies, 314.17. Revisions were made to this section relating to openings through which conductors enter.

Outlet Box Requirements, 314.27. The rule in (C) for ceiling outlet boxes in dwelling units, was revised to require a box rated for fan support in some cases.

Boxes, Conduit Bodies, Handholes Accessible, 314.29. Rule relating to wiring to be accessible placed into two subsections, (A) Aboveground and (B) Underground.



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Day 2 – Part 1

8:00 – 10:00 am

CHAPTER 4—EQUIPMENT FOR GENERAL USE

Article 400 Flexible Cords

Uses Not Permitted, 400.12. This rule relating to “uses not permitted” was fixed.

Switches Controlling Lighting Loads, 404.2(C). The wording in this rule was changed from “or rooms suitable for human habitation or occupancy” to “habitable rooms and occupiable spaces” to clarify that both dwelling and non-dwelling occupancies require a neutral conductor at the light switch location.

Article 404 – Switches

Grounding, 404.9(B). The revised language in this section clarifies snap switches, dimmers, control switches and metal faceplates be connected to an EGC, instead of ground.

Article 406 – Receptacles

Receptacles Under Sinks, 406.5(G)(2). New item (2) “Under Sinks” prohibits receptacles installed in a face-up position under a sink.

Receptacles in Damp or Wet Locations, 406.9. The prohibited locations for receptacles for in bathrooms has been expanded and a new exception was added to permit the installation of receptacles in small bathrooms.

Tamper-Resistant Receptacles, 406.12. Four of the existing list items, (1), (2), (4), and (7) in this section, were modified and an eighth list item was added.

Article 408 Switchboards and Panelboards

Power Monitoring and Management Equipment, 408.23. New rule addresses the installation of power monitoring and energy management equipment installed in switchboards and switchgear.

Overcurrent Protection, 408.36. The 2017 exception that permitted panelboards without individual protection where used as service equipment with multiple service disconnects, was deleted.

Panelboard Orientation, 408.43. This new section prohibits a panelboard from being installed in a face-up orientation.

Article 410 Luminaires

Grounding General, 410.40. The previous language for lighting and lighting equipment that required they be grounded was clarified.

Methods of Grounding, 410.44 Ex. The rules related to methods of grounding were revised for clarity.



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Special Provisions for Horticultural Lighting Part XVI, A new "Part XVI" was added to Article 410, that specifically address the unique requirements for what are now becoming better known as "grow" facilities.

Article 422 – Appliances

GFCI Protection, 422.5. There were editorial revisions to the text of subsection (A) and the list items were expanded to include sump pumps and dishwashers.

Storage-Type Water-Heaters, 422.13. Requirements restated into a more practical approach on Code usage.

Flexible Cords, 422.16. The general requirements for flexible cords were split into two list items without any technical changes.

Built-in Dishwashers and Trash Compactors, 422.16(B)(2). Because the dishwasher receptacle must be in a space adjacent to the dishwasher, this rule now requires protection for the flexible cord when it passes through an opening.

Permanently Connected Appliance Disconnect, 422.31. Subsections revised so that the rules are consistent with, "capable of being locked in the open position" per 110.25.

Article 424 – Electric Space Heating

Branch-Circuit Sizing, 424.4(B). Text revised on branch circuit conductors and overcurrent device sizing for fixed electric space heating and associated motors.

Disconnecting Means, 424.19. Rule editorial revised about the "open" position so that it's consistent with 110.25 and other lockable disconnect rules in the Code.



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Day 2 – Part 2

10:00 – 12:00 pm

Article 440 – Air-conditioning and Refrigeration Equipment

Grounding and Bonding, 440.9. Requirements for metallic raceways that use “compression type” fittings were edited for clarity.

Article 445 – Generators

Listing, 445.6. Not all generators are required to be listed!

Disconnect Means and Emergency Shutdown, 445.18. The title of this section was revised to clarify that this section applies to both disconnection as well as the emergency shutdown of the generator.

Article 450 – Transformers

Disconnecting Means, 450.14. When the disconnecting method for a transformer is located remotely, the disconnect must be lockable in the “open” position consistent with 110.25.

CHAPTER 5—SPECIAL OCCUPANCIES

Article 517—Health Care Facilities

Definitions, 517.2. There were additions and changes to the definitions here such as isolating “Dental Office” from the more generic “Medical Office” and clarification for a facility’s “Governing Body” along with a more sensitive terminology edit in the definition for a “Limited Care Facility.”

Applicability, 517.10. This section revised to show additional areas that are not covered by the rules in Part II of Article 517.

EGC for Receptacles and Fixed Equipment, 517.13. The title of the section was revised specifying its reference to the equipment grounding conductor.

Metal Face Plate, 517.13(B)(1)(4). This new list item specifies that a metal face plate secured to a metal yoke or strap of a receptacle or to a metal outlet box using metal screws is connected to an EGC.

Article 555 – Marinas, Boatyards, Floating Buildings, and Docking Facilities

This article was reorganized into three parts.

- Part I, is for general application
- Part II is for marinas, boatyards, and docking facilities
- Part III for floating buildings (relocated from Article 553)



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Scope, 555.1. New Informational Note 2 alerts the Code user as to hazardous voltages and currents in and around marinas and boatyards.

Electrical Datum Plane Distances, 555.3. This information was relocated from the definition of “Electrical Datum Plane” because definitions are not permitted to contain requirements which was the case.

Boat Hoists, 555.9. This rule was relocated here from 210.8(C) and requires that GFCI protection be provided for dwelling unit boat hoists outlets, regardless of voltage or amperage.

Bonding of Non-Current-Carrying Metal Parts, 555.13. This rule was relocated here from 553.11 and requires all metal parts to be connected to the ground bus of the panelboard.

Replacements, 555.30(C). New sub-part “C” requires the requirements of sub-parts A & B to apply to replacement installations which essentially means that the existing installation be brought up to Code.

Receptacles, 555.33. A new subsection added advising that when replacing receptacles subject to the electrical datum plane rules, they must be replaced per current Code requirements.

GFPE and GFCI Protection, 555.35. This section was relocated here from 550.3 and divided into two sub-parts:

- Ground-Fault Protection
- Leakage Current Measurement Device

Floating Buildings, Part III. New Part III consists mostly of rules that were relocated from the now deleted Article 553.



Day 2 – Part 3

1:00 – 3:00 pm

Article 590—Temporary Installations

Overcurrent Protective Devices, 590.8. The equipment used to provide temporary access to electricity is rarely used on a “one-time and done” basis so, they’re often re-used on many jobs. This rule was added to provide guidance for AHJ’s on the reuse of equipment for temporary applications.

CHAPTER 6—SPECIAL EQUIPMENT

Article 600—Electric Signs and Outline Lighting

Required Branch Circuit, 600.5(A). This section requires that commercial occupancies be provided with a sign outlet and it was revised to clarify that entrances that are not used by the customers, such as a delivery entrance, are not required to have a sign outlet.

Remote Location, 600.6(A)(4). This new subsection that addresses first responder access to remotely located disconnects. When a remote sign disconnect is installed, it must be in a location that is readily accessible to firefighters and service personnel and clearly marked to identify what the disconnect controls.

Article 625—Electric Vehicle Power Transfer System

Scope, 625.1. Both the title and scope of this article were changed to include systems which permit bidirectional current flow of electricity.

Definitions, 625.2. New definitions for electrical vehicle power export equipment (EVPE) and clarification that some electric vehicles can supply electrical loads external to the vehicle.

Rating, 625.42. This rule addresses the EVSE (electric vehicle supply equipment) supply circuit rating with adjustable input settings.

Article 680—Swimming Pools, Spas, Hot Tubs, Fountains, and Similar Installations

Definitions, 680.2. Several new definitions were added or relocated in this section and an informational note pertaining to corrosive environments was added.

Corrosive Environment, 680.2. This rule was relocated here from 680.14(A) and a new Informational Note provides additional information about the corrosion hazard.

Fountain, 680.2. The term fountain was expanded to include “splash pads.”

Immersion Pool, 680.2. This new definition was added to clarify that an immersion pool is used for ceremonial or ritual immersion of users and is designed and intended to have its contents drained or discharged.



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Splash Pad, 680.2. The term “splash pad” was added to the definitions and indicates it is a type of fountain making all the requirements for fountains apply to splash pads.

Approval of Equipment, 680.3. This rule was relocated here from 680.4 and requires that electrical equipment and products covered in Article 680 be installed in compliance with this article.

Inspections After Installation, 680.4. This new section allows the authority having jurisdiction to require periodic inspection and testing of the pool system.

Ground-Fault Circuit Interrupters, 680.5. This new rule makes it clear that the GFCI requirements in Article 680 are in addition to those found in section 210.8.

Bonding and Equipment Grounding Terminals, 680.7. The terms grounding and bonding were reversed in the title and within the section text to reflect that most of these terminals are really bonding terminals and not grounding terminals.

Wiring Methods in Corrosive Environment, 680.14. The rule now requires wiring methods used in a corrosive environment be listed and identified for such use such as...

Motors for Permanently Installed Pools, 680.21. GFCI protection of motors was expanded and a new subsection requires GFCI protection to be provided for existing pump receptacles when replacing a pool pump motor.

Lighting, Receptacles, and Equipment, 680.22. Clarifications were made throughout this section and new subsections were added with requirements for receptacles located in pool equipment rooms and electrical equipment which is not associated with the pool.

Pool Equipment Room, 680.22(A)(5). This new rule requires a GFCI protected 15A or 20A, 125V receptacle on a general-purpose branch circuit in the pool equipment room for the use of service personnel.

Other Equipment, 680.22(E). The new rule requires that “other equipment,” be located at least 5’ horizontally from the inside wall of a pool unless separated from the pool by a permanent barrier.



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Day 2 – Part 4

3:00 – 5:00 pm

Equipotential Bonding, 680.26. Revisions to this rule were made to the perimeter bonding requirements and the rules for metal fittings were clarified.

Perimeter Surfaces, Copper Ring, 680.26(B)(2)(b). This revised rule permits a copper ring to be used where the steel reinforcing cannot be used for the required bonding. It also now permits exothermic welding as an option to listed splicing devices where connections need to be made.

Perimeter Surfaces, Copper Grid, 680.26(B)(2)(c). This new rule permits a copper grid to be used where the steel reinforcing cannot be used for the required bonding and permits exothermic welding as an option to listed splicing devices.

Permanent Spas, Hot Tubs, Immersion Pools, Part IV. “Immersion Pools” was added to the “Part IV” title to reflect that their requirements are here.

Fountains and Splash Pads, General 680.50. Fountains in general must comply with Parts I and V of this article. Fountains that have water common with a pool and the newly added “splash pads” must also comply with the requirements of Part II including the bonding requirements.

Grounding and Bonding, 680.54. The title and sections for the bonding and grounding of “Fountains,” have been combined, expanded, clarified, and relocated to better include bonding as well as grounding.

GFCI Protection Nonsubmersible Pumps, 680.59. Submersible fountain pumps required GFCI protected by the requirements of 680.51(A). New rule requires GFCI protection for nonsubmersible pump motors rated 250V or less and 60A or less.

Article 695—Fire Pumps

Services and On-Site Power Production, 695.6(A)(1) Ex. Because a fire pump room is required to be 2-hour fire rated, a new exception was added to clarify that supply conductors within the fire pump room are not required to be installed in accordance with 230.6.

Informational Note, 695.6(A)(1). The fire pump controller is often service equipment, and the fire pump equipment may all be three-phase. A new informational note was added to call attention to the requirements of 250.24(C) requiring a neutral conductor be installed to the service equipment.

CHAPTER 7—SPECIAL CONDITIONS

Article 700—Emergency Systems



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Installation of Unit Equipment, 700.12(1)(2)(3). This was formerly subsection (F) but was relocated here. Most of the unit equipment rules remain unchanged except for item (3) that addresses the power supply to the unit equipment.

Article 702—Optional Standby Systems

Definition, 702.2. The definition for optional back-up power systems was revised to include “stored” power as well as on-site generated power. This allows stored power to be used to supply loads for optional standby systems. Batteries would be an example of stored power as well as fly wheel storage systems.

Meter Mounted Transfer Switches, 702.5(B). This new paragraph was added to address the use of meter-mounted transfer switches.

Signs, 702.7. The language in subpart (A) was revised to coordinate the signage requirements for the dwelling unit emergency disconnect required by 230.85.

CHAPTER 8—COMMUNICATIONS SYSTEMS

Article 800—General Requirements for Communications Systems. The general requirements contained in Chapter 8 were relocated to a new Article 800.

Article 805—General Requirements for Communications Circuits. The previous Article 800 rules were relocated to a new Article 805.

