2020 NEC Significant Changes

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Textbook Development

This presentation is based on the Electrical Training Alliance 2020 NEC Significant Changes textbook and training program.

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Changes in the 2020 NEC

• Many changes in the NEC occur to address new and emerging technology and industry trends while maintaining effective relevance of the NEC.

• This presentation provides a review of selected significant changes that electrical construction and system installation.
New Articles in the 2020 NEC

• Article 242 Overvoltage Protection
• Article 311 Medium Voltage Cable
• Article 337 Type P Cable
• Article 800 General Requirements for Communications Systems
• Article 805 Communications Circuits

• Deleted Articles
• Article 280-Surge Arrestors Over 1000 V
• Article 285-Surge Protective Devices (SPDs) 1000 V and Less
• Article 328 Type MV Cable
• Article 553 Floating Buildings

90.2(A)(5) and (6)

• Two new list items (5) and (6) have been added to 90.2(A).
• List item (5) addresses installations supplying shore power to ships and watercraft in marinas and boatyards and monitoring for leakage current.
• List (6) has been added to 90.2(A) to address installations used to export power from electric vehicles to premises wiring.
• Bidirectional flow of power is typically accomplished using utility interactive inverters.
Article 100 Fault Current, Fault Current, Available

- New definitions of the terms “fault current” and “fault current, available” have been added to Article 100.
- A new informational note and associated figure have been added to enhance clarity and usability.
- This revision aligns with similar recent revisions in other standards that use the terms, such as NFPA 70E.

Article 100 Fault Current, Fault Current, Available

- Fault Current. The current delivered at a point on the system during a short-circuit condition. (CMP-10)
- Fault Current, Available. The largest amount of current capable of being delivered at a point on the system during a short-circuit condition. (CMP-10)
- Informational Note: A short-circuit can occur during abnormal conditions such as a fault between circuit conductors or a ground fault. See Informational Note Figure 100.1.
Article 100 Prime Mover

- A definition of the term “Prime Mover” has been added to Article 100.
- It is defined as the machine that supplies mechanical horsepower to a generator.
- CMP-13 has been assigned technical responsibility of this term.

- Prime Mover. The machine that supplies the mechanical horsepower to a generator. (CMP-13)
Article 100 Reconditioned

- The term “reconditioned” has been added in multiple articles of the NEC and is now defined in Article 100.
- The process of reconditioning equipment differs from normal servicing of equipment that remains in place.
- Reconditioned equipment is often referred to as rebuilt, refurbished, or remanufactured.
Article 100 Reconditioned

• Reconditioned. Electromechanical systems, equipment, apparatus, or components that are restored to operating conditions. This process differs from normal servicing of equipment that remains within a facility, or replacement of listed equipment on a one-to-one basis. (CMP-10)

• Informational Note: The term reconditioned is frequently referred to as rebuilt, refurbished, or remanufactured.
Article 100 Service Equipment

• The definition of the term “Service Equipment” has been revised.
• The word “usually” has been removed to reduce ambiguity and the word “cutoff” has been replaced by the NEC term “disconnecting means.”
• This revision clarifies that “service equipment” connects to the utility electric system which may be overhead service conductors or a service lateral and is not limited to a building, structure, or other designated area.

Article 100 Service Equipment

• The necessary equipment, consisting of a circuit breaker(s) or switch(es) and fuse(s) and their accessories, connected to the serving utility and intended to constitute the main control and disconnect of the serving utility. (CMP-10)
110.3(B) Installation and Use

- Section 110.3(B) was revised and reworded to include the words “or both” in the rule.
- Equipment that is listed (certified), either bears the listing mark, bears a label, or both, often in combination.
- The revision aligns with the fact that most, but not all, listed (certified) equipment is labeled.
110.14(D) Terminal Connection Torque

- The title of subdivision (D) has been changed from “Installation” to Terminal Connection Torque.”
- The term “calibrated” has been deleted from this section.
- Three new informational notes provide practical guidance for installers and inspectors.
110.21(A)(2) Exception

- The exception has been revised to provide clarification as to when this exception can be applied.
- New IN No. 2 explains that terms such as refurbished, rebuilt, or remanufactured that are often used interchangeably with the term reconditioned.
- New IN No. 3 explains that the original listing mark could include the mark of the certifying body, and not an entire label.
110.24(A) Field Marking

- Section 110.24(A) has been revised for accuracy and clarification.
- The word “maximum” has been deleted in front of “available fault current” because it is not necessary.
- New IN No.2 explains that available fault current values are typically provided and published by utilities.
110.26(C)(3) Personnel Doors

• The words “or listed fire exit hardware” have been added to 110.26(C)(3).
• An informational note has been added that references two UL standards that apply to the door hardware referred to in this rule.
• The revision differentiates listed panic hardware from listed fire exit hardware.
110.28 Enclosure Types

- Two new informational notes have been added to Section 110.28.
- Informational Note No. 3 references the specific “uses permitted” sections with Articles 502, 503 and 506.
- Informational Note No. 4 indicates that these types of enclosures are permitted in any unclassified location and limited to Class II, Division 2; Class III, and Zone 22 hazardous (classified) locations.
210.8(F) Outdoor Outlets

- New Subdivision (F) includes general GFCI requirements for outdoor outlets other than those in 210.8(A).

Courtesy of Schneider Electric/Square D Company
210.15 Reconditioned Equipment

The following shall not be reconditioned:

- Equipment that provides ground-fault circuit-interrupter protection for personnel
- Equipment that provides arc-fault circuit-interrupter protection
- Equipment that provides ground-fault protection of equipment

Courtesy of Electrical Training Alliance
210.52(C)(2) Countertops and Work Surfaces

- Requirements for island and peninsular countertops are combined
- 9 ft.² of space or any fraction will require a receptacle and one more for every 18 ft.² or any fraction thereof
- A peninsular counter top work surface must have a receptacle outlet within 2 feet of the end of the countertop on worksurface
225.30(B) Common Supply Equipment

- 225.30(B) now permits up to six feeders to supply a separate building or structure.
- All of the feeder conductors must originate in the same panelboard, switchboard, or other distribution equipment.
- Each feeder must terminate in a single disconnecting means, and all of the feeder disconnects in the building or structure supplied, must be grouped in the same location.
230.46 Splices and Tapped Conductors

- The requirement for marking power distribution blocks used on service conductors is moved from 314.28(E)(1) to 230.46
- All power distribution blocks, pressure connectors, and devices for splices and taps of service conductors must be listed.
- Effective January 1, 2023, pressure connectors and devices for splices and taps on service conductors must be marked as suitable for use on the line side of service equipment.
230.62(C) Barriers

• The requirements of 408.3(A)(2) are relocated and expanded in new 230.62(C)
• All service equipment is now required to be provided with barriers to prevent line side inadvertent contact
• This includes but is not limited to panelboards, switchboards, switchgear, motor control centers, individual circuit breaker enclosures, SUSE rated transfer switches and fused disconnects.
230.67 Surge Protection

• New Section 230.67 requires services supplying dwelling units to be provided with an SPD
• The SPD must be located in or next to the service equipment.
• An exception permits an alternate location provided an SPD is located at each next level distribution equipment downstream toward the load.

230.71(B) Two to Six Service Disconnects

• Elimination of six service disconnects in a single enclosure.
• Panelboards for example, must be provided with a single main in each enclosure
• 230.71(B)(1) through (4) outline the permitted methods for two to six service disconnects
230.85 Emergency Disconnects

• For one- and two-family dwelling units, all service conductors shall terminate in disconnecting means having a short-circuit current rating equal to or greater than the available fault current, installed in a readily accessible outdoor location. If more than one disconnect is provided, they shall be grouped.
240.67(C)/240.87(C) Performance Testing

- New Subdivision (C) has been added to each Section.
- Arc-energy reduction methods must be performance tested when first installed on site
- Testing must be performed by qualified persons in accordance with the manufacturers instructions
- A written record of this testing must be made available to the AHJ
Article 242 Overvoltage Protection

• Articles 280 and 285 have been combined to form a new Article 242 titled Overvoltage Protection.
• The article has three parts, General, Surge Protective Devices (SPDs) 1000 Volts or Less, and Surge Arresters Over 1000 Volts
• Technical responsibility for Article 242 and its associated definitions in Article 100 has been shifted from CMP-5 to CMP-10.
250.92(B) Method of Bonding at Service

- The words “listed threaded hubs” have been incorporated into list item (2) of this section.
- Standard hubs that have not been evaluated and listed for use in service bonding applications are not permitted.
- Listed products are identified for the uses for which they are permitted.
Section 310.1 Scope

• The scope of article 310 is limited to not more than 2000 volts.
• Requirements and ampacity tables for conductors over 2000 volts have been incorporated into new Article 311.
• Copper-clad aluminum conductors must meet the material requirements of Section 310.3(B).
Article 311 Medium Voltage Conductors and Cables

• Article 328 has been deleted.
• New Article 311 is added to cover the use, installation, construction specifications, and ampacities for Type MV medium voltage conductors and cable.
• Requirements for conductors rated over 2000 volts are removed from article 310 and incorporated into new Article 311
404.9 and 404.10 ...Dimmers and Control Switches

- The words “Dimmers and Control Switches have been incorporated into these two sections.
- These rules are not limited in application to just general use snap switches.
- The revision is consistent with how this section is being applied in the field.
404.22 Electronic Control Switches

- The word “lighting” has been removed from this section.
- Expands the requirements to other than just lighting control switches.
- Similar revisions made in 210.70.
408.43 Panelboard Orientation

• Panelboards shall not be installed in the face-up position.
• Installing panelboards in a face-up position increases the likelihood that contaminants accumulate on the breakers and panelboard bussing, creating a hazard, and additionally creates a challenge with applying work space requirements.
450.9 Ventilation

- Section 450.9 now requires the top of transformers that are horizontal and readily accessible be marked to prohibit storage.
- The concept is to eliminate hazards created by storing material on top of transformers.
410.69 Identification of Control Conductors

- New Section 410.69 provides requirements on how to identify control circuit conductors.
- Shock incidents were reported that relate to gray control conductors being inadvertently spliced to branch circuit grounded (neutral) conductors.
- This requirement becomes effective January 1, 2022
410.170 and 410.188 Horticultural Lighting

• A new part XVI is added to article 410 with special provisions for horticultural lighting.
• These new requirements respond to rapidly increasing industry of indoor plant growing facilities.
• These installations are subject to increased temperatures, humidity and water spray and require unique support and flexibility.
430.7(A) Usual Motor Applications

• New item (16) allows electronic protection of motors marked “Electronically Protected” or E.P.” to be suitable for overload protection.

• (16) Motors that are electronically protected from overloads in accordance with 430.32(A)(2) and (B)(2) shall be marked “electronically protected” or “E.P.”
Global Revision in Terminology

- The changes in terminology relative to levels of patient care and basic care continue into the 2020 NEC.
- The revision first appears in the definitions in 517.2 under patient care space, general care space, critical care space, basic care space, and support space.
- The word “Category” along with the level (1, 2, 3, or 4) now precedes the specific area or type of care which follows in parenthesis.
- The revision aligns the terminology with that of NFPA 99.

Examples:
- 517.18 Category 2 (General Care) Spaces. Each patient bed location shall be provided with at least two branch circuits, one from the critical branch and one from the normal system...(See NEC text)
- 517.19 Category 1 (Critical Care) Spaces. Each patient bed location shall be provided with at least two branch circuits...(See NEC text)
517.2 Dental Office

- A building or part thereof in which the following occur:
  - Examinations and minor treatments/procedures are performed under the continuous supervision of a dental professional;
  - The use of limited to minimal sedation and treatment or procedures that do not render the patient incapable of self-preservation under emergency conditions; and
  - No overnight stays for patients or 24-hour operations. [99:3.3.38]
517.16(B) Outside of a Patient Vicinity

• This section has been revised to clarify the isolated equipment grounding conductor requirements for areas outside a patient vicinity.
• A new first sentence in 517.16 indicates that an isolated ground receptacle, if used, shall not defeat the purposes of the safety features of the grounding systems detailed in 517.13.
• The IG equipment grounding conductor is in addition to the two paths required in 517.13 and must be identified using the color green with one or more yellow stripes.
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