



## **2011 National Electrical Code Significant Changes**

### **City Review**

1. Article 100                      Definitions.  
  
There are new definitions for service conductors overhead, service conductors underground, and uninterruptible power supply.
  
2. 110.14                         Electrical Connections.  
  
Connectors and terminals for conductors more finely stranded than Class B and Class C stranding will need to be identified for specific class or classes.
  
3. 110.24                         Available Fault Current.  
  
Requirement calls for a field applied marking indicating the maximum available short-circuit current being supplied at the line terminals of the service equipment.
  
4. 110.31(A)                     Electrical Vaults.  
  
The exception relaxes the construction fire rating from 3-hours to 1-hour if the vault is provided with an automatic fire-suppression system.
  
5. 210.5(C)                      Identification of Ungrounded Conductors.  
  
This requirement mandates identification of all ungrounded branch-circuit conductors where more than one nominal voltage system is employed on the premise. Also provides requirements for the identification and posting of the identification.
  
6. 210.8(B)(6)&(7)             Ground-Fault Circuit Interrupter Protection for Personal.  
  
GFCI are now required to be readily accessible. New list item, indoor wet locations, requires GFCI protection for all 125-volt, single phase, 15 and 20 ampere receptacles installed in areas such as, car washes, food processing areas of facilities that make food products ,meat packing plants, locker rooms with associated showering facilities and all other indoor wet areas that are washed down daily.

7. 210.8(B)(8) Ground-Fault Circuit Interrupter Protection for Personal.
- All 125-volt, single phase, 125 and 20 ampere receptacles installed in garages, service bays and similar areas where electrical diagnostic equipment, hand tools, or portable lighting equipment are to be used are now required to be GFCI protected.
8. 210.12(B) Arc-Fault Circuit-Interrupter Protection.
- For branch circuit modifications, replacements and extensions, requires the use of either a listed combination AFCI circuit breaker at the origin of the branch circuit or a listed outlet branch circuit type AFCI at the first receptacle outlet of the existing circuit.
9. 210.52(A)(4) Dwelling Unit Receptacle Outlets.
- Receptacles installed to serve countertops in kitchens, pantries, breakfast rooms, dining rooms, and similar areas of dwelling units as required by 210.52 (C) may not be counted as a receptacle when applying the rule in 210.52(A) for general wall spaces.
10. 210.52(E)(3) Dwelling Unit Receptacle Outlets
- All balconies, decks and porches that are accessible from the inside a dwelling unit require a receptacle. The exception from 2008 NEC is now deleted that such structures with 20 square feet or less was exempt.
11. 210.52(I) Dwelling Unit Receptacle Outlets
- Foyers that are not part of a hallway and have an area that is greater than 60 square feet shall have a receptacle located in each wall space 3ft or more in width and unbroken by doorways, floor-to-ceiling windows and similar openings.
12. 225.56 Inspections and Tests.
- New Section 225.56(A) Pre-Energization and Operating Tests requires that the complete electrical system (over 600 volts) be performance tested when first installed. New Section (B) Test Report requires that the test results required by 225.56(A) be delivered to the AHJ.
13. 230.24(A) Clearances.

A new exception to permit the clearance between a roof and service conductors operating not more than 300 volts to be 3ft where the roof area is guarded or isolated.

14. 250.53(A)(2)

Rod, Pipe and Plate Electrodes.

Rod, pipe and plate electrodes are required to be supplemented by an additional electrode. This section has been completely rewritten and reformatted to clarify the requirements for grounding electrode installations.

15. 250.121

Use of Equipment Grounding Conductors.

This new rule prohibits equipment grounding conductors from being used simultaneously as grounding electrode conductors.

16. 300.5(C)

Underground Cables Under Buildings.

Types MI and MC cables that are suitable for use in direct burial or concrete encasement applications are permitted to be installed underneath buildings or structures without being contained in a raceway. This means that they are not easily removed or replaced without the removal of concrete and earth beneath the building.

17. 300.11(A)(2)

Non-Fire Rated Assemblies.

Where independent support wires are used, they shall be distinguishable by color, tagging or other effective means.

18. 310.15(B)(16)

Allowable Ampacities of Insulated Conductors.

Table 310.16 is now Table 310.15(B)(16). The Ambient temperature Correction Factors has been moved from the Table and relocated to its own new section and Table 310.15(B)(2) and Table 310.15(B)(2)(a).

19. 328.14

Installation.

This new requirement mandates that Type MV cable (medium voltage cable) be installed by qualified persons only.

20. 338.10(B)(4)

Installation Methods for Branch Circuits and Feeders.

The use of Type SE cable is no longer subject to the ampacity requirements of 334.80. The use of Type SE cable in thermal insulation requires a final derated ampacity of 60 C.

21. 3XX.30(C) Unsupported Raceways.
- The 2008 NEC added to five sections (342(IMC), 344(RMC), 352(PVC), 355(RTRC),358(EMT)) a new subdivision containing permissive text allowing unsupported raceways of lengths up to 18 inches where oversized concentric or eccentric knockouts were not encountered. The 2011 NEC has reversed its position and now requires that shot nipples be installed with support.
21. 392.18(H) Cable Tray Installation, Marking.
- All cable tray installations containing conductors rated over 600 volts are now required to have permanent legible warning notices with the words "DANGER-HIGH VOLTAGE-KEEP AWAY" at a minimum of every 10 feet and in a readily visible position.
22. 404.2(C) Switches Controlling Lighting Loads.
- Where switches control lighting loads supplied by a grounded general purpose branch circuit, the grounded conductor for controlled lighting circuit shall be provided at the switch location. Two exceptions and an informational note have been added.
23. 406.4(D)(4)(5)(6) Tamper-Resistant Receptacles and Weather-Resistant Receptacles.
- Where receptacle replacements are made, the existing device is required to be upgraded with the required tamper-resistant type or weather-resistant type. The AFCI receptacle requirement becomes effective January 1, 2014.
24. 406.12 Tamper-Resistant Receptacles in Dwelling Unit. (exc.)
- Provides exceptions to the tamper-resistant requirement where receptacles are not accessible and are typically well out of reach of small children.
25. 406.13 Tamper -Resistant Receptacles in Guest Rooms and Guest Suites.
- This section extends the tamper-resistant receptacle requirements to guest rooms and guest suites of hotels and motels.
26. 406.14 Tamper -Resistant Receptacles in Child Care Facilities.

This section extends the tamper-resistant receptacle requirements to all nonlocking 125-volt, 15 and 20 ampere receptacles in child care facilities.

27. 408.3(F)

Switchboard or Panelboard Identification.

A switchboard or panelboard containing an ungrounded system is now required to be marked in a manner similar to that for systems with a high leg.

28 408.4(B)

Source of Power.

All feeder supplied switchboards and panelboards in other than one- or two-family dwellings are now required to have marking identifying the source of supply.

29. 410.130(G)

Disconnecting Means.

Requires all fluorescent luminaires that utilize double-ended lamps and contain ballast(s) that can be served in place to be provided with a means to disconnect the ballast from the source of supply. This revision also requires that ballast replacements include a disconnecting means if one is not already in place.

30. 430.52(C)97)

Motor Short-Circuit Protector

An informational note has been added to 430.51(C)(7) to clarify that a "motor short-circuit protector" as a fused device, not an MCP-type or "motor circuit protector-type" circuit breaker.

31. 450.14

Disconnecting Means.

This safety driven requirement will now mandate: (1) a disconnect means within sight or (2) a disconnecting means capable of being locked in the open position for disconnects located remote from the transformer and field markings of the transformer with the location of the remote disconnect.

32 .514.11(A)

Circuit Disconnects.

This section requires for disconnecting all systems routed to fuel dispensing equipment including power data, communications and video, in addition to equipment for remote pumping.

33. 517.16

Receptacles with Insulated Grounding Terminal.

This revision results in a restriction against the installation of any isolated grounding receptacles and circuits in branch circuits serving patient care locations.

34. 517.18(A) Patient Bed Location Branch Circuits.

This change restricts the installation of multi-wire branch circuits in patient bed locations in general care areas and critical care areas of health care facilities. Branch circuits that do not share a neutral conductor are required for supplying these patient care locations.

35.547.5(G) GFCI Protection.

The permission in the 2008 NEC to install a receptacle without GFCI protection to supply a dedicated load within 3 feet of a GFCI protected receptacle has been deleted.

36. 590.4(D) Receptacles.

Branch circuits supplying temporary lighting shall be separate from supplying power to a receptacle for temporary power.

37. Article 600 Electric and Outline Lighting.

Several sections were revised to cover light-diode (LED) sign illumination systems.

38. 620.53 Car Light, Receptacle(s), and Ventilation Disconnecting Means.

A new exception has been added that recognizes a remote lockable disconnect means can replace the in-sight disconnect general rule.

39. 680.62(B) Bonding.

A new exception has been added that exempts bonding requirements for small metal parts that are not likely to become energized associated with pools and tubs for therapeutic use.

40. 690.4(B) Identification and Grouping.

This section prohibits Photovoltaic (PV) source and output circuits from occupying the same raceway, cable tray, cable, outlet box or junction box as

other non-PV systems. New requirements for identification and grouping of all PV conductors are provided in 690.4(B)(1) through (B)(4). This includes PV source circuits and where more than one PV system exists.

41. 690.4(E)

Qualified Persons.

Wiring and Connections, has been added to require that all equipment, associated wiring and interconnections of PV systems be installed only by qualified persons. This mandates that the entire PV system be installed only by qualified person.

42. 690.4(F)

Circuit Routing.

The section requires that photovoltaic source and PV output conductors be physically routed along building structural members such as beams, rafters, trusses and columns where the location of these structural members can be made through observation. Where circuits are imbedded in the roof, the location of circuits must be clearly marked.

43. 690.4(G)

Bipolar Photovoltaic Systems.

Where two monopole subarrays are to be connected as a bipolar system and the sum of the individual voltages of the monopole subarrays exceeds installation or equipment voltage ratings, all conductors must be physically separated until connected to the inverter.

44. 690.4(H)

Multiple Inverters.

This is a new requirement that requires that where more than one utility-interactive inverter is installed and they are remote from one another, a directory must be developed and installed in accordance with 705.10.

45. 690.10(E)

Back-fed Circuit Breakers.

Where a plug in type breaker is used to control/protect a stand alone or utility interactive systems, the circuit breaker must have an additional means of securement to the panelboard. A circuit breaker marked line and load may not be used in this manner.

46. 690.11

AFCI (Direct Current).

Direct current (DC) AFCI protection is now required for all PV systems with DC source and/or output circuits on or penetrating a building operating at a PV systems maximum system voltage of 80 volts or greater.

47. 690.31(E)

Type MC Cable.

Type MC cable is now a permitted wiring method where DC photovoltaic source or output circuits from a building integrated or other photovoltaic system are run inside a building or structure.

48. 690.31(E)(1)

Wiring Methods.

This requirement prohibits all DC PV source and output raceways and MC cable from being installed within 10 inches of the roof decking or sheathing except where directly below the roof surface covered by PV modules and associated equipment.

49. 690.31(E)(2)

Wiring Methods.

Where flexible metal conduit smaller than  $\frac{3}{4}$  trade size and Type MC cable smaller than 1 inch in diameter and containing PV power circuit conductors are installed across ceiling or floor joists, they must be protected by guard strips.

50. 690.(E)(3)&(4)

Marking.

PV power source conductors run inside a building are now required to be marked as "Photovoltaic Power Source". This marking required for all wiring methods, boxes and conduit bodies.

51. 694.7

Qualified Persons.

Small wind systems are required to be installed only by qualified persons.

52. 695.3(F)

Phase Converters.

A new requirement that prohibits the use of phase converters to supply an electric fire pump.

53. 695.6(H)

Power Controller.

This new requirement prohibits the installation of electrical circuit protective systems such as TYPE MI cable from terminating directly into a fire pump controller.

54. 695.6(J)

Raceway Termination.

Raceway terminations into a fire pump controller are required to be made in a listed conduit hub.

55. 708.10(C)(2)

Fire Protection for Feeders.

This revision increases the minimum fire rating for feeders supplying a critical operations power system from 1 hour to 2 hours.