National Electrical Code Changes for 2008

Developed and Presented by:
The Codes and Standards Group
of
Schneider Electric

The US Electrical Safety System
**2008 NEC Process**

- Approximately 3700 proposals to revise the 2005 NEC
- 20 Code Making Panels met in January 2006, reviewed and voted on the proposals
  - ROP (Report on Proposals) was sent out for public comment
  - Public comments were due by October 20, 2006
- Code Making Panels met in December 2006 to review public comments
- ROC (Report on Comments) Voting Closed on February 1, 2007
- NFPA Annual Meeting - June 2007
- NEC issued by the NFPA Standards Council - July 2007
- Publication of 2008 NEC mid September 2007

**90.3 Code Arrangement**

| Chapter 1 - General                  | Applies generally to all electrical installations |
| Chapter 2 - Wiring and Protection    |                                                |
| Chapter 3 - Wiring Methods and Materials |                                            |
| Chapter 4 - Equipment for General Use |                                                |

Supplements or modifies Chapters 1 through 4

| Chapter 8 - Communications Systems |
| Chapter 9 - Tables                  |
| Annex A through Annex G             |

Chapter 5 - Special Occupancies
Chapter 6 - Special Equipment
Chapter 7 - Special Conditions

Chapter 8 is not subject to the requirements of Chapters 1 through 7 except as specifically referenced in Chapter 8

Applicable as referenced

Information only not mandatory
**Article 100 - Definitions**

- **Clothes Closet** – a non-habitable room or space intended primarily for storage of garments and apparel
- **Kitchen** – an area with a sink and permanent facilities for food preparation and cooking

**Article 100 – Grounding and Bonding**

- **Bonded (Bonding)** – connected to establish electrical continuity and conductivity
- **Ground** – the earth
- **Grounded (Grounding)** – connected to ground or to a conductive body that extends the ground connection
- **Grounding Conductor, Equipment (EGC)** – the conductive path installed to connect normally non-current carrying metal parts of equipment together and to the system grounded conductor or to the grounding electrode conductor, or both.
Article 100 – Branch-Circuit Overcurrent Device

- New Definition
  Branch-Circuit Overcurrent Device. A device capable of providing protection for service, feeder, and branch circuits and equipment over the full range of overcurrents between its rated current and its interrupting rating. Branch-circuit overcurrent protective devices are provided with interrupting ratings appropriate for the intended use but no less than 5,000 amperes.

- Added to compliment the definition for supplementary overcurrent device that was added to the 2005 NEC

Article 100 - Neutral

- Neutral Point – the common point on a wye-connection in a polyphase system or midpoint on a single-phase, 3-wire system, or midpoint of a single phase portion of a 3-phase delta system, or midpoint of a 3-wire, direct current system.
**Article 100 – Qualified Person**

- **Revised Definition** (new words in red)
  
  Qualified Person. One who has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training to recognize and avoid the hazards involved.
  

- Revised to correlate with NFPA 70E-2004 110.6(D)

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**Article 100 – Short-Circuit Current Rating**

- **New Definition**
  
  Short-Circuit Current Rating. The prospective symmetrical fault current at a nominal voltage to which an apparatus or system is capable to be connected without sustaining damage exceeding defined acceptance criteria.

- Defines a term that is used in many NEC articles and UL product standards
Article 100 – Surge Protection

- Surge Arrestor – a protective device for limiting surge voltages by discharging or bypassing surge current; it also prevents continued flow of follow current while remaining capable of repeating these functions.

- Surge Protective Device (SPD) – a protective device for limiting transient voltages for diverting or limiting surge current; it also prevents continued flow of follow current while remaining capable of repeating these functions and is designated as follows:
  - Type 1: Permanently connected SPDs intended for installation between the secondary of the service transformer and the line side of the service disconnect overcurrent device.
  - Type 2: Permanently connected SPDs intended for installation on the load side of the service disconnect overcurrent device, including SPDs located at the branch panel.
  - Type 3: Point of utilization SPDs
  - Type 4: Component SPDs

110.20 – Enclosure Types

- Moves enclosure selection table from 430.91 to Article 110

- Applies to 600V and less enclosures for:
  - Switchboards
  - Panelboards
  - MCCs
  - Industrial Control Panels
  - Meter Sockets
  - Motor controllers
110.22 - Identification of Disconnecting Means

- Restructured
- New clause (B) added

(B) Engineered Series Combination Systems. Where circuit breakers or fuses are applied in compliance with series combination ratings selected under engineering supervision and marked on the equipment as directed by the engineer, the equipment enclosure(s) shall be legibly marked in the field to indicate the equipment has been applied with a series combination rating. The marking shall be readily visible and state the following:

CAUTION — ENGINEERED SERIES COMBINATION SYSTEM RATED _______ AMPERES. IDENTIFIED REPLACEMENT COMPONENTS REQUIRED.

FPN: See 240.86(A) for engineered series combination systems.

110.26(C) – Entrance to Working Space

(2) – Large Equipment, (3) – Personnel Doors

- (2) Requires two entrances to the working space if the equipment is 1200A or greater and the equipment is over 6 feet wide.
- (3) Where there is equipment 1200A or greater there are doors that are within 25’ of the nearest edge of the working space – the door must have panic hardware and must open outward.
210.4 – Multiwire Branch Circuits

(B) – Disconnecting Means, (D) - Grouping

- Requirement for simultaneous disconnect of all circuits
  - Not just on same yoke – now includes other circuits such as lighting
- The conductors must now be grouped at one point in the panel (wire tie)
  - Not required if conductors are from cable or raceway unique to the circuit

210.5(C) – Identification for Branch Circuits

Ungrounded Conductors

- Must identify the ungrounded conductors of a branch circuit where:
  - There is more than one nominal voltage system in the building
  - The conductors are accessible
- Identification includes both phase and system
- ID can be color coding, marking, tagging, tape, etc.
- Means of ID shall be documented in a manner that is readily available or shall be posted at each panelboard or similar distribution equipment.
**210.8(A) – GFCI (Dwelling Units)**

(2) – Garages, (5) – Unfinished Basements

- Deletes the exceptions to (A)(2) and (A)(5) that allow non-GFCI protected receptacles for dedicated appliances and receptacles that are not readily accessible.
- GFCI protection will now be required for all receptacles in the garage and unfinished basements
  - Exception for fire or burglar alarm is still in place

**210.8(B) – GFCI (Other than Dwelling)**

(4) Outdoors

- GFCI expanded to all 125V, 15 and 20A receptacles installed outdoors regardless of the occupancy or location
- Added exception for industrial locations when they use the assured equipment grounding conductor program
210.8(B) – GFCI (Other than Dwelling)

(5) - Sinks

- GFCI protection expanded to all 125V, 15 and 20A receptacles installed within 6’ of any sink
- Exception exempts industrial laboratories where a greater hazard may occur due to loss of power
- Exception exempts receptacles located in patient care areas of health care facilities (unless covered by 210.8(B)(1))

210.8(C) – GFCI

Boat Hoists

- Requires GFCI protection for the boat hoist
- Required whether permanently connected or cord- and plug-connected
- Includes hoists of all amperages rated 240V and less in dwelling unit locations
210.12 - AFCI

(B) – Dwelling Units

- 120V, 15A and 20A branch circuits that supply outlets in dwelling unit:
  - Family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways or similar rooms

- Requires a listed, combination-type AFCI
Combination AFCI at the First Outlet

Wiring from panel to first outlet must be installed in RMC, IMC, EMT or steel jacketed AC cable.
Must also have metal outlet and junction boxes.

Install combination AFCI at the first outlet

Typical Panel Directory*

<table>
<thead>
<tr>
<th>Description</th>
<th>Ckt No.</th>
<th>Ckt No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC1</td>
<td>1</td>
<td>2</td>
<td>Range</td>
</tr>
<tr>
<td>AC2</td>
<td>3</td>
<td>4</td>
<td>Range</td>
</tr>
<tr>
<td>AC3</td>
<td>5</td>
<td>6</td>
<td>H2O Heater</td>
</tr>
<tr>
<td>AC3</td>
<td>7</td>
<td>8</td>
<td>H2O Heater</td>
</tr>
<tr>
<td>Furnace 1</td>
<td>9</td>
<td>10</td>
<td>Furnace 2</td>
</tr>
<tr>
<td>Dryer 11</td>
<td>11</td>
<td>12</td>
<td>Washer</td>
</tr>
<tr>
<td>Dryer 13</td>
<td>13</td>
<td>14</td>
<td>Microwave</td>
</tr>
<tr>
<td>Kitchen 15</td>
<td>15</td>
<td>16</td>
<td>Bath 2</td>
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<tr>
<td>Kitchen 17</td>
<td>17</td>
<td>18</td>
<td>Bath 3</td>
</tr>
<tr>
<td>Bath 1</td>
<td>19</td>
<td>20</td>
<td>Lighting</td>
</tr>
<tr>
<td>Bedroom 1</td>
<td>21</td>
<td>22</td>
<td>Bathrooms 3 &amp; 4</td>
</tr>
<tr>
<td>Bedroom 2</td>
<td>23</td>
<td>24</td>
<td>Bedrm Lighting</td>
</tr>
<tr>
<td>Lighting 25</td>
<td>25</td>
<td>26</td>
<td>Lighting</td>
</tr>
<tr>
<td>Living/Dining</td>
<td>27</td>
<td>28</td>
<td>Family Room</td>
</tr>
<tr>
<td>Lighting 29</td>
<td>29</td>
<td>30</td>
<td>Basement</td>
</tr>
<tr>
<td>Garage 31</td>
<td>31</td>
<td>32</td>
<td>Garage Lites &amp; Opener</td>
</tr>
</tbody>
</table>

* May verify based on local codes, size and design of structure, and installation variations

Presently 4 AFCI Circuits Protected

4 NEW AFCI Circuits Protected
210.52 – Dwelling Unit Receptacle Outlets

Receptacles that do not count

- Part of a luminaire or appliance
- Controlled by a wall switch
- Located within cabinets or cupboards
- Located more than 5-1/2 ft above the floor

![Images showing receptacles]

210.52(C) – Countertops

- Coverage expanded to include countertops in pantries, breakfast rooms, dining rooms and similar areas.
- Rules regarding splitting of the counter space applies to both islands and peninsula countertops

![Diagram showing countertop layout]
210.52(C)(1) Exception – Countertops

Wall Counter Space – Kitchens and Dining Rooms

- Receptacles are not required to be installed on a wall directly behind a range or sink where located behind a sink as shown below.

Outlet within 600 mm (24 in.)  Space exempt from wall line if X < 300mm (12 in.)  Outlet within 600 mm (24 in.)

Sink, range or counter-mounted cooking unit extending from face of counter

210.52(C)(1) Exception – Countertops

Wall Counter Space - Kitchens and Dining Rooms

Space exempt from wall line if X < 450mm (18 in.)  Outlet within 600 mm (24 in.)

Outlet within 600 mm (24 in.)

Sink, range or counter-mounted cooking unit mounted in corner
210.52(E) – Dwelling Receptacle Outlets

- Expanded to require an outdoor outlet be installed on all balconies, decks and/or porches
- Receptacle required for each unit of a multifamily dwelling
- 2005 NEC only required for grade level unit

210.52(G) – Basements and Garages

- Expanded to require a receptacle outlet in addition to those for specific equipment
- 2005 NEC only required receptacle outlet in addition to laundry outlet
210.62 – Show Windows

- At least one receptacle for each 12 linear feet
- Now required to be within 18 inches of the top of the window

215.10 – Ground Fault Protection of Equipment

- Requires GFPE on any feeder disconnect:
  - Rated 1000A or more
  - On wye systems with more than 150V to ground and not more than 600V phase to phase
- Exception restated to make it clear that GFPE is not required where:
  - GFPE is on the supply side of the feeder AND on the load side of any transformer supplying the feeder
### 230.44 – Cable Trays Supporting Service Entrance Conductors

- Permitted to support service entrance conductors
- Cable Tray shall be identify as carrying service entrance conductors
- Labeling must be visible after installation
- Must be able to trace through the cable

### 240.4 - Protection of Conductors

- Restructured and correlated with NFPA 79-2002, *Electrical Standard for Industrial Machinery*
- Industrial machinery manufacturers want to be able to use smaller conductors to remain competitive
- Ampacity levels correlate with UL 508A, UL 508 and Table 400.5(A)
- Revised text (new words in red)
  
  (D) Small Conductor. Unless specifically permitted in 240.4(E) or (G), the overcurrent protection shall not exceed that required by (D)(1) through (D)(7) after any correction factors for ambient temperature and number of conductors have been applied.
240.4 - Protection of Conductors

(1) **18 AWG Copper.** 7 amperes, provided all the following conditions are met:
   (1) Continuous loads do not exceed 5.6 amperes.
   (2) Overcurrent protection is provided by one of the following:
       a. Branch-circuit-rated circuit breakers listed and marked for use with 18 AWG copper wire
       b. Branch-circuit-rated fuses listed and marked for use with 18 AWG copper wire
       c. Class CC, Class J, or Class T fuses

(2) **16 AWG Copper.** 10 amperes, provided all the following conditions are met:
   (1) Continuous loads do not exceed 8 amperes.
   (2) Overcurrent protection is provided by one of the following:
       a. Branch-circuit-rated circuit breakers listed and marked for use with 16 AWG copper wire
       b. Branch-circuit-rated fuses listed and marked for use with 16 AWG copper wire
       c. Class CC, Class J, or Class T fuses

(3) **14 AWG Copper.** 15 amperes

(4) **12 AWG Aluminum and Copper-Clad Aluminum.** 15 amperes

(5) **12 AWG Copper.** 20 amperes

(6) **10 AWG Aluminum and Copper-Clad Aluminum.** 25 amperes

(7) **10 AWG Copper.** 30 amperes

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240.21(C)(3) – Transformer Secondary Conductors

**Industrial Installation**

- Primary conductors protected at their ampacity
- Secondary conductors sized at not less than the rating of the transformer secondary current rating.

- 480V
- 240V
- 25' max

Condition of Maintenance and Supervision ensure on qualified persons service the installation

- Sum of OC device ratings cannot exceed tap conductor ampacity
- OC devices must be grouped
240.21(H) – Battery Conductors

- New

  (H) Battery Conductors. Overcurrent protection shall be permitted to be installed as close as practicable to the storage battery terminals in a non-hazardous location. Installation of the overcurrent protection within a hazardous location shall also be permitted.

240.24(F) – Location in or on Premises

Not Located over Steps

Overcurrent devices shall not be located over steps of a stairway.
240.86(A) – Series Ratings

Selected Under Engineering Supervision in Existing Installations

- Allows a series rating to be “engineered” under the following conditions:
  - By a licensed professional engineer engaged primarily in the design or maintenance of electrical installations
  - Selection shall be documented and stamped by the professional engineer
  - Documentation shall be made available
  - Rating shall be field marked on the end use equipment
  - Existing installations only
  - Engineer shall ensure that the downstream breakers that are part of the series combination remain passive during interruption period of the line side device.

240.92 – Location in Circuit

(B) – Feeder Taps

- Adds a new provisions to the “Supervised Industrial Installation” rules
- Allows conductor size to be based on ICEA formulas
  - Example – for copper conductors:
    \[
    \frac{I^2}{A} t = 0.0297 \log_{10}[(T_2 + 234)(T_1 + 234)]
    \]
    
    I = short circuit current in amperes
    A = conductor area in circular mils
    t = time of short circuit in seconds
    T_1 = initial conductor temperature
    T_2 = final conductor temperature
250.20(D) – Separately Derived Systems

Text added to make it clear that a generator installation with transfer equipment that switches the grounded conductor must be grounded in accordance with 250.30(A)

250.32(B) – Buildings Supplied by a Feeder or Branch Circuit

Grounded Systems

- Feeders and branch circuits are required to be installed with an equipment grounding conductor
- Exception allows use of the grounded conductor to ground equipment in existing premises wiring systems
250.94 – Bonding for Other Systems

Requires intersystem bonding terminations for other systems
- Must be external to enclosures at the service equipment (or the disconnect for any additional buildings or structure)
- Must be accessible for connection and inspection
- Must accommodate not less than three intersystem bonding conductors
- Cannot interfere with opening a service or metering equipment enclosure

(1) Set of terminals securely mounted to the meter enclosure and electrically connected to the meter enclosure. Terminals shall be listed as grounding and bonding equipment.

(2) A bonding bar near the service equipment enclosure, meter enclosure, or raceway for service conductors. Connected with a minimum 6 AWG copper conductor to the equipment grounding conductors in the service equipment enclosure, meter enclosure or exposed nonflexible metallic raceway.

(3) A bonding bar near the grounding electrode conductor. Connected to the grounding electrode with a minimum 6 AWG.

Courtesy of Thomas and Betts
**Article 280 – Surge Arresters**

- Now applies only to arresters over 1kV
- Article 285 now covers all Surge Protective Devices less than 1kV

**Article 285 – Surge Protective Devices (SPD)**

- UL 1449 - 3rd Edition Released
- UL Proposal to align NEC terminology with UL standard
  - Type 1 - Line side of Service Disconnect
  - Type 2 – Load Side of Service Disconnect
  - Type 3 – Outlet device / Plug strips
  - Type 4 – Recognized Component
300.4(E) – Raceways Under Roof Decking

- Requires a cable or raceway to be installed not less than 38 mm (1½ in.) from the nearest surface of the metal-corrugated sheet roof decking.

RMC and IMC are not required to comply with the spacing.

310.15(B)(2) – Adjustment Factors

(c) – Conduits Exposed to Sunlight on Rooftops

- Requires that the ambient temperature used for ampacity correction be adjusted by specified factors where:
  - Conductors or cables are installed in conduit
  - The conduit is on or above a rooftop
  - The conduit is exposed to direct sunlight

- 0 – ½” above roof = +33C
- ½” – 3 ½” above roof = +22C
- 3 ½” – 12” above roof = +17C
- 12” – 36” above roof = +14C
310.15(B)(6) – Single Phase Dwelling Feeder

Main Power Feeder

Main Power Feeder further restricted to a single panelboard that supplies all loads to the dwelling by either feeders or branch circuits.

312.4 – Cabinets and Cutout Boxes

Repairing Noncombustible Surfaces

- Revision expands requirement from plaster, drywall and plasterboard to all noncombustible surfaces

- Would now apply to tile, etc.
314.16(B)(4) – Device or Equipment Fill

Double Volume Allowance

A device or utilization equipment wider than a single 2 in. device box shall have double volume allowance for each gang required for mounting.

314.24(C)(1) Utilization Equipment

Utilization equipment requiring greater box depths

Boxes that enclose utilization equipment that projects more than 48 mm (1-7/8 in.) rearward from the mounting plane of the box shall have a depth that is not less than the depth of the equipment plus 6 mm (1/4 in.).
334.15(C) – Exposed Work
In Unfinished Basements and Crawl Spaces

Rule now applies to crawl spaces in addition to unfinished basements

Smaller conductors must be run through bored holes or on running boards

Conductors not smaller than #6/2 or #8/3 can be secured to the bottom of the joist

NM cable installed on the wall of an unfinished basement
Must be protected in accordance with 300.4 or must be installed in a listed conduit or tubing
Sheath must extend at least ¼” into the outlet box
Cable must be secured within 12” of the entry into the conduit or tubing.
Insulating bushing or adapter required
334.80 – NM Sheathed Cable: Type NM, NMC, NMS

More than two cables containing two or more current carrying conductors

#12 AWG = 30A @ 90C
8 conductors = 80% derating
30A x .8 = 24A

Draft stopped or fire stopped with foam, caulk or thermal insulation

334.80 - Ampacity

- Requires ampacity adjustment factors to be applied to NM cable where:
  - More than two cables (with two or more current carrying conductors) are installed without spacing
  - The cables are installed in contact with thermal insulation

Thermal Insulation
Cables installed without spacing
342.30(C) – Securing and Supporting

Unsupported Raceways

Permits unsupported raceway where:
- The raceway is not more than 450 mm (18 in.)
- Remains in unbroken lengths (without coupling)
- The raceways shall terminate in an outlet box, junction box, device box, cabinet, or other termination at each end of the raceway.
- Oversized, concentric or eccentric knockouts are not encountered.
- Type IMC, RMC, EMT, or Rigid PVC

376.56(B) – Power Distribution Blocks

No unexposed live parts in wireways

Splices and taps shall be:
- Accessible
- Distribution blocks shall be listed
- The conductors, splices, and taps, shall not fill the wireway to more than 75 percent of its area at that point
- Power distribution blocks shall not have uninsulated live parts exposed
382 – Nonmetallic Extension

New Article

Chapters 4-6 – Lock-Off

- Where a disconnecting means is not located within sight of the equipment it serves, it must be capable of being locked in the open (OFF) position with a means that must remain with the device whether or not the lock is installed
- Required in 20 different sections for LV equipment
406.8(B) – Wet or Damp Locations
15 and 20A Receptacles

- Requires a receptacle that is listed as weather-resistant type
- Includes 125V and 250V configurations
- Excludes locking type receptacles

406.11 – Tamper Resistant Receptacles in Dwelling Units

- Requires listed tamper-resistant receptacles for:
  - 125 volt 15 and 20 ampere receptacles
  - Installed in all areas specified in 210.52
408 – Panelboards

- 42 Circuit Restriction being removed
- Product Standard has requirements for Class CTL panels that will need to be addressed
- Product markings will restrict number of circuits until product standard is revised
- 42 Circuit panelboard limitation still resides within NEC Article 645
- Definitions for lighting and appliance panelboard and power panelboard deleted (408.34)

408.36 – Overcurrent Protection

- Requires that the panelboard be provided with overcurrent protection
  - Not greater than the rating of the panelboard
  - Located at any point on the supply side
- Single overcurrent protection not required for a panelboard used as service equipment and applied under the rules of 230.71 (Exception #1)
- Two mains allowed for panelboards with not more than 42 overcurrent devices (Exception #2)
408.54 – Maximum Number of Overcurrent Devices

- 42 circuit limitation for Lighting and Appliance Panelboards is being removed
- Panelboard must be provided with a physical means to prevent the installation of the number of devices than it was designed, rated or tested
- Product standards (UL 67) still need to be revised to allow more than 42 circuits in lighting and appliance applications
  - Current rules in the standard would still limit the panelboard to 42 circuits

409.110(3) - Marking

- New exception that allows SCCR marking to be omitted on control panels containing only control circuit components
410.6 – Listing Required

All luminaires and lampholders shall be listed

410.62(C)(1)(2) – Flexible Cord Installations

Luminaire permitted to be cord connected when:

- Luminaire located directly below the outlet
- The cord is visible
- The cord is not subject to strain
- Luminaire (fixture) assembly with strain relief and canopy having a maximum 152 mm (6 in.) long section of raceway for attachment to an outlet box above a suspended ceiling.
**422.52 – Electric Drinking Fountains**

- Must now be GFCI protected (does not affect bottled water coolers)

**430.32C – Selection of Overload Device**

- Wording changed
  
  (C) Selection of Overload Relay Device

- Recognizes that overload protection can be provided by fuses or circuit breakers

- A proposed change to UL 489 may create test and marking requirements for “Motor Protection Circuit Breakers”
430.126 – Overtemperature Protection

(A) General. Adjustable Speed drive systems shall protect against motor overtemperature conditions where the motor is not rated to operate at the nameplate rated current over the speed range required by the application.

1. Motor thermal protector meeting 430.32
2. Adjustable speed drive system with load and speed sensitive overload protection
3. Overtemperature protection relay utilizing thermal sensors embedded in the motor
4. Thermal sensors embedded in the motor that communicates with the drive

450.5 (B)(2) Grounding Transformers

- Exception added for high impedance grounded systems that will allow a 20A or less overcurrent protective device that will simultaneously open all ungrounded conductors where the grounding autotransformer and grounding impedance are continuous duty rated and the designed ground fault current is 10A or less.


2005 NEC – Grounding autotransformer sized based on available OCPD required 20A X 480V = 10 kVA even though the maximum phase current = 10A / 3 = 3.3 A

2008 NEC – Grounding autotransformer sized based on continuous duty = 3.3A X 480V = 2 kVA
480.5 Disconnecting Means

- A disconnecting means shall be provided for all ungrounded conductors derived from a stationary battery system over 30 volts.

- The disconnecting means shall be readily accessible and located within sight of the battery system.

511.2 Major Repair Garage

- A building or portions of a building where major repairs, such as engine overhauls, painting, body and fender work, and repairs that require draining of the motor vehicle fuel tank are performed on motor vehicles, including associated floor space used for offices, parking, or showrooms.
511.2 Minor Repair Garage

- A building or portions of a building used for lubrication, inspection, and minor automotive maintenance work, such as engine tune-ups, replacement of parts, fluid changes (e.g., oil, antifreeze, transmission fluid, brake fluid, air conditioning refrigerants), brake system repairs, tire rotation, and similar routine maintenance work, including associated floor space used for offices, parking, or showrooms.

511.3 Area Classification (in part)

511.3 Area Classification

(A) Parking Garages
(B) Repair Garages, With Dispensing
(C) Major Repair Garages
(D) Minor Repair Garages
(E) Modifications

See NEC 511.3 for full text under each subdivision.
517.2 – Health Care Facilities

**Wet Procedure Location**

Those *spaces within* patient care areas *where a procedure is performed* and that are normally subject to wet conditions while patients are present.

- Helps resolve any confusion between the general definition of a wet location and how that term was intended to be used in NEC 517.
- Focuses the location on where the procedure is performed.

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**Patient Care Vicinity**

In an area in which patients are normally cared for, the *patient care vicinity* is the space with surfaces likely to be contacted by the patient or an attendant who can touch the patient.

- Revision aligns with NFPA 99 definition.
- Focuses the requirement on the *care* vicinity not the *patient*'s vicinity.
517.32(C)(3) – Health Care Facilities

**Alarm and Alerting Systems**

- A new Item 3 was added permitting connection to the life safety system

  Mechanical, control, and other accessories, such as dampers and some motors, required for effective life safety shall be permitted to be supplied by the life safety branch.

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Article 522 – Control Systems for Permanent Amusement Attractions

This article covers the installation of control circuit power sources and conductors for electrical equipment, including associated control wiring in or on all structures, that are an integral part of a permanent amusement attraction.
590.6 – Temporary Installations - GFCI

New text makes it clear that the GFCI provisions apply whether power is derived from a utility source or an on-site generator.

Article 626 – Electrified Truck Parking Space Equipment

The provisions of this article cover the electrical conductors and equipment external to the truck or transport refrigerated unit that connect trucks and transport refrigerated units to a supply of electricity, and the installation of equipment and devices related to electrical installations within an electrified truck parking space.
645.17 – Information Technology Equipment

Power Distribution Units

- Introduced in the 2005 NEC
- Used for information technology equipment
- May have multiple panelboards within a single cabinet
- Each panelboard limited to 42 overcurrent devices
- Utilization equipment listed for information technology application

680.22(B) – Pool Motors

GFCI Protection

- Wiring supplying pool pump motors rated 15 and 20 amperes, 125 or 240 volts shall be provided with GFCI protection
- Required whether hard wired or cord and plug connected
680.26(B)(1) – Equipotential Bonding

Conductive Pool Shells

- Conductive pool shells include poured concrete, pneumatically applied or sprayed concrete, concrete block with painted or plastered coatings
- Can use the structural steel
- Where there is no structural steel, a copper conductor grid must be installed
  - Min of 8 AWG bare solid copper
  - Conform to the contour of the pool and pool deck
  - Arranged in a 12 in x 12 in network
  - Be secured within or under the pool not more than 6 in from the outer contour of the pool shell

680.26(B)(2) – Equipotential Bonding

Perimeter Surfaces

Perimeter surface is considered to extend three feet beyond the inside walls of the pool and includes unpaved surfaces as well as poured concrete and other types of paving

- Bonding can be via the structural reinforcing steel or wire mesh. If not installed it must be provided with the following:
  - At least one min 8 AWG solid copper conductor
  - Follows the contour of the perimeter surface
  - Only use listed splices

Attached to pool reinforcing steel using a minimum of 4 points uniformly spaced around the pool
680.26(C) – Equipotential Bonding

Pool Water

- Requires an intentional bonding of the pool water
  - Minimum conductive surface area of 9 sq in.
  - Is permitted to consist of parts that are required to be bonded in 680.26(B)

680.71 – Hydromassage Bathtubs

Protection

- Must now be supplied by an individual branch circuit
- GFCI must be readily accessible
New Sections

IV. Wiring Methods

690.31 Methods Permitted.

(F) Flexible, Fine-Stranded Cables. Flexible, fine-stranded cables shall be terminated only with terminals, lugs, devices, or connectors that are identified and listed for such use.

VIII. Storage Batteries

690.74 Battery Interconnections.

Flexible, fine-stranded cables shall only be used with terminals, lugs, devices and connectors that are listed and marked for such use.

700.6(C) – Automatic Transfer Switches

Automatic transfer switches, rated 600 VAC and below, shall be Listed for emergency system use.
(5) Wiring from an emergency source shall be permitted to supply any combination of emergency, legally required, or optional loads in accordance with (a), (b) and (c).

(a) From separate vertical switchboard sections, with or without a common bus, with or without a common bus, or from individual disconnects mounted in separate enclosures.

(b) The common bus or separate sections of the switchboard or the individual enclosures shall be permitted to be supplied by single or multiple feeders without overcurrent protection at the source.

(c) Legally required and optional standby circuits shall not originate from the same vertical switchboard section, panelboard enclosure or individual disconnect enclosure as emergency circuits.

Exception to (5) (b). Overcurrent protection shall be permitted at the source or for the equipment, provided the overcurrent protection is selectively coordinated with the down stream overcurrent protection.
700.12(B)(6) – Outdoor Generator Sets

- Added Text
  The disconnecting means shall meet the requirements of 225.36.

- If a disconnect on the genset is intended to meet the requirements of 700.12(B)(6), then it must meet the service equipment requirements of 225.36

700.27 – Emergency Systems
Selective Coordination

Emergency system(s) overcurrent devices shall be selectively coordinated with all supply side overcurrent protective devices.

Exception: Selective coordination shall not be required in (1) or (2):

1. Between transformer primary and secondary overcurrent protective devices, where only one overcurrent protective device or set of overcurrent protective devices exist(s) on the transformer secondary,

2. Between overcurrent protective devices of the same size (ampere rating) in series.

Making these two breakers coordinate with one another does not enhance system selectivity!
700.27 & 701.18 – Emergency & Legally Required Standby Systems

- CB 1
- CB 2
- CB 3
- ENGINE-GENERATOR SET
- SWITCHBOARD

Making these breakers coordinate with one another does not enhance system selectivity!

702.5(2) – Automatic Transfer Equipment

- If an automatic transfer is used in an optional system, the system must either:
  - The source (generator) must be able to pick up the full load transferred by the equipment
  - A load management system must be installed that will limit the load to that capable of being supplied by the source
708 – Critical Operations Power Systems

- In Response to Homeland Security Activity
- Steps beyond an Emergency System
- How do we keep a system in operation for days?

760.41(B) – NPLFA Branch Circuit

- Requires an individual branch circuit be used to supply the power source of the fire alarm system
- May not be supplied from a GFCI or AFCI
- Parallel requirement for 760.121(B) for Power Limited systems
The Codes and Standards group can offer on-site custom training on the NEC and related topics.

Our staff has extensive involvement in codes and standards development, interpretation and application.