

Tennessee Electrical Rule Changes Beginning October 1, 2018

All areas under authority of state deputy electrical inspectors shall be inspected per the 2017 National Electrical Code with these additional new amendments:

- Field marking of available fault current shall be optional
- Arc Fault Circuit Interrupters (AFCI) shall be optional for bathrooms, laundry areas, garages, branch circuits dedicated to supplying refrigeration equipment, and unfinished basements which are portions or areas of the basement not intended as habitable rooms and limited to storage, work or similar type area.
- Permits and inspections will now be required for all electric signs.
- Light fixtures in dwelling unit crawlspaces shall have guarded covers.
- For residential and commercial buildings, electrical power shall be supplied to the building in order for the inspector to perform final inspection.
- The allowable phase-to-phase voltage in boat yard and pier distribution systems of one thousand (1000) volts or less may be exceeded if written documentation approving the increase is submitted by a state licensed engineer.

The following state amendments have been repealed and will no longer be enforced. Future installations shall comply with the adopted electrical code:

- Fixture location in clothes closets twenty eight inches or less in depth.
- Maximum number of outlets allowed on dwelling unit branch circuits.
- Optional use of listed weather-resistant 15 or 20 amp receptacles installed outdoors.

City of Knoxville Electrical Code Proposed Changes

- Replace all references to 2011 National Electrical Code with 2017.
- Remove reference to electric fences in 10.52(1). Electric fence requirements and restrictions are more fully covered by city ordinance Article 4, Section 19-100.
- Add “1000 volts or greater” in section 10.52(4) to the list of systems requiring sealed plans. To require a design professional for PV systems that are now allowed up to 1500 volts output.
- Revise 10.52(13)(A) “In Any Occupancy” to read “In Any Unsprinklered Occupancy”. This will permit the use of NM and NMC cable in newer buildings with an approved automatic sprinkler system while still providing equivalent protection for buildings constructed before 2002 that have not yet been retrofitted with sprinklers.
- Revise 10.52(13)(B)(1) to read “Dwellings which are located within the same building with a designated commercial use where NM cable is prohibited by the National Electrical Code.” To clarify that NM cable is not permitted in mixed-use buildings unless all occupancies within the building are allowed by code to be wired in that manner.
- Remove 10.52(15)-*Fire alarms and smoke detectors*. Smoke alarms and fire alarm systems will be regulated by the appropriate building code.

Significant 2014 and 2017 National Electrical Code Changes

General

110.26(E)(2)(a)&(b) – Dedicated and working clearance space requirements extended to outdoor equipment.

110.14 - A properly calibrated tool must be used when torquing terminal connections.

210.4 - The conductor grouping requirements for multi-wire branch circuits now mirror similar rules for grounded (neutral) conductors contained in 200.4(B).

230.10 – Trees are no longer allowed to support service equipment.

250.80, 250.86 - Metallic items that aren't required to be bonded for underground service, feeder, or branch circuit raceways has been expanded.

250.118 – The allowance for using flexible metal conduit as an equipment ground path is now restricted to 1-1/4" or smaller.

Chapter 3 – Type AC, MC NM, NMC, TC, SE, USE, and UF cables and fittings must now be listed. Also, cable ties used for securing and supporting must be listed.

314.25 – Clarification - Drywall screws not permitted for installing devices or covers.

406.3(F) – Receptacles with integral USB chargers shall be listed.

406.6(D) – Receptacle faceplates with built-in nightlights or usb chargers shall be listed.

406.5(E) – Prohibition of face-up receptacles expanded to all occupancies.

406.9(B)(1), 590.4(D)(2) – In-use covers on all receptacles in wet locations will now need "extra-duty" type covers.

422.5 – GFCI devices for all appliances must now be readily accessible.

Article 555 - Marinas, Boatyards, and Commercial and Noncommercial Docking Facilities. Title and scope has been changed to include residential boat docks.

555.3 – Ground fault protection of supply to marinas, boatyards, and docking facilities has been reduced to 30 mA.

555.24 – New warning sign requirement for boatdocks and marinas.

590.4(J) – Temporary branch circuits and feeders cannot be laid on the floor or ground.

625.40 – Each outlet installed for recharging electric vehicles shall be supplied by an individual branch circuit.

Residential

210.8(A)(7) – GFCI protection expanded to include all receptacles within 6 ft of dwelling kitchen sinks.

210.8(A)(9) – GFCI protection now required for receptacles within 6 ft of dwelling tubs and showers.

210.8(A)(10) – GFCI protection now required for dwelling laundry area receptacles.

210.8(D) – GFCI protection now required for dishwashers in dwellings.

210.8(E) – GFCI protection now required for lighting in crawl spaces.

210.12 – AFCI devices must now be readily accessible.

210.12(A),(B),(C) – AFCI protection expanded to include outlets and devices in kitchens, family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, and hallways of dwelling units, dormitory units, and guest rooms or guest suites in hotels and motels.

210.11(C)(4),210.52(G)(1) – Dwelling garages must have a separate 20 amp branch circuit with at least one receptacle for each car space.

Table 310.15(B)(7) has been removed. New rules apply for sizing single-phase dwelling service and feeder conductors.

406.4(D) – AFCI and GFCI replacement receptacles must be in readily accessible locations.

406.12 – All 15 and 20 amp, 125 and 250 volt nonlocking-type receptacles in dwelling units and mobile or manufactured homes shall be listed tamper-resistant.

422.16 – Receptacles for built-in dishwashers shall be located in the space adjacent to the space where the dishwasher is located. The receptacle shall be accessible.

Commercial

110.26(C)(3) – Requirement for panic hardware on personnel doors lowered from 1200A to 800A.

210.8(B) – GFCI protection has been expanded to include all single-phase receptacles rated 150 volts to ground, 50 amps or less and three-phase receptacles rated 150 volts to ground, 100 amps or less in areas listed in Other Than Dwelling Units.

210.13 – New GFPE requirement for branch circuits 1000A or more and over 150V to ground.

210.64 – Receptacle now required within 50 ft of all service equipment. 1 and 2 family excluded.

210.71 – New requirements for receptacle locations in meeting rooms in other than dwelling units.

220.12 – New exception for calculating lighting loads when design complies with energy code.

230.82(3) – Meter disconnect switches must be labeled “METER DISCONNECT – NOT SERVICE EQUIPMENT”.

250.30(A)(4) – The requirement to use structural metal or water piping as the grounding electrode for separately-derived systems was removed. They are now required to be bonded to the building grounding electrode system.

300.22(C)(1) – Nonmetallic cable ties in Other Spaces Used For Environmental Air (Plenums) must be listed as having low smoke and heat release properties. ANSI/UL 2043-2008

Article 393 – New article for low-voltage suspended ceiling power distribution systems.

406.3(E) – New marking requirement for receptacles controlled for energy management or building automation.  Controlled

406.12 – All 15 and 20 amp, 125 and 250 volt nonlocking-type receptacles installed in guest rooms and guest suites of hotels and motels, child care facilities, preschool and elementary education facilities, business offices, corridors, waiting rooms and the like in clinics, medical and dental offices and outpatient facilities, gymnasiums, skating rinks, auditoriums, and dormitories shall be listed tamper-resistant.

410.6 – Luminaire retrofit kits must now be listed.

410.10(F) – Luminaires must also be no less than 1 ½ in. below metal roof decking.

422.5 – Public tire inflation and auto vacuum machines now need GFCI protection.

422.5 – GFCI protection for cord-and-plug connected high-pressure spray washers expanded to 250V and 60A or less.

424.66 – New working space requirements for duct heaters. See 110.26.

Article 424 -New part X for low-voltage fixed electric space heating equipment.

Article 425 – New article for fixed resistance and electrode industrial process heating equipment.

440.9 – Wire type grounding conductors required for rooftop AC units unless wired with rigid conduit.

450.10 – Grounding or bonding terminals cannot be installed on or over the transformer vent screen.

450.11 – Transformers can only be reverse wired if permitted in the manufacturer’s instructions.

511.3(C)&(D) – Two new tables added for area classification of commercial garage spaces.

511.18 – Underground wiring for commercial garages shall be installed in rigid steel or intermediate metal conduit. Other methods permitted if not less than 2’ deep below floor.

517.18(A) – New color and circuit marking requirements for receptacles supplied from the critical branch.

517.18(B) – Number of general care bed location receptacles increased from 4 to 8.

517.19(B) – Number of critical care bed location receptacles increased from 6 to 14.

517.19(C) – Operating rooms now need 36 receptacles with at least 12 on the normal branch or a critical branch from a different transfer switch, and connected to the reference grounding point.

600.6(A)(1) – There must be a disconnect at the point where the circuit enters the sign.

600.33 – New tables with permitted wire types for LED and other power-limited signs.

620.23 - The circuiting requirements for lighting and receptacles in the elevator equipment machine room/machinery space have been expanded.

Article 625, New Part IV - Wireless power transfer equipment for electric vehicles.

645.27 – All OCP devices in critical operations data systems must be selectively coordinated.

680.13 – Fountains must now also have a maintenance disconnecting means.

680.21(C) – All 120 through 240 volt, single-phase pool pump motors need GFCI protection regardless of amperage.

680.42(B) – Clarified equipotential bonding rules for Spas and Hot Tubs.

680.80 – A new Part VIII, covering electric pool lifts, has been added.

690.12 – New requirement for rapid shutdown of PV systems on buildings.

Article 691 – New article for large-scale photovoltaic electric power production facilities.

695.14 – EMT is now permitted for fire pump control wiring.

695.15 – Fire pump controllers must have a listed surge protector.

700.8 – New requirement for listed surge protective devices on all emergency system switchboards and panelboards.

700.10 – Raceways, enclosures, cables and receptacles supplied from an emergency system shall be distinctively marked to allow ready identification.

700.12(F), Exception & 700.19 – Emergency lighting cannot be part of a multi-wire branch circuit.

700.24 – Emergency luminaires and controls must be individually listed for emergency use.

700.32 – Selective coordination for emergency systems must be designed by an engineer.

Article 705 – New part IV for microgrid systems.

Article 706 – New article for energy storage systems.

Article 710 – New article for electric power production sources operating in stand-alone mode.

Article 712 – New article for direct current microgrids.

Article 728 – New article on fire-resistive cable systems.

Article 750 – New article on energy management systems.

760.24 – New support requirements for CI fire alarm cables.

820.47(A) – New separation requirements for underground coaxial cables from other systems.

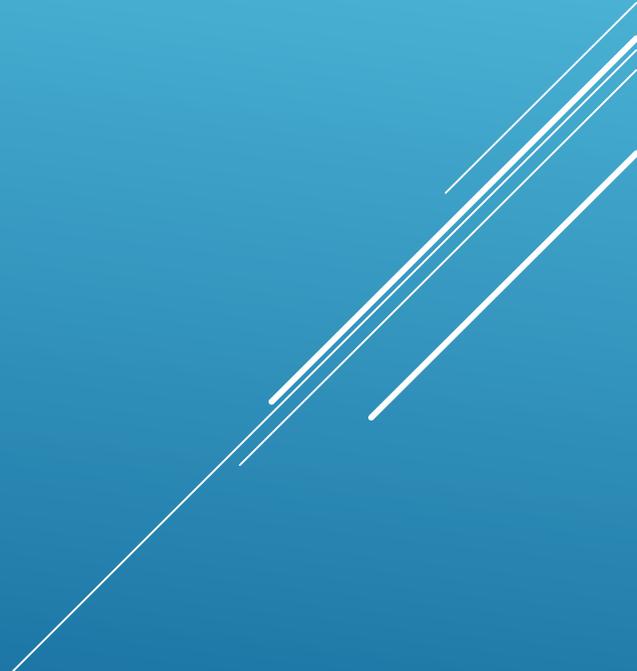
830.24 – Nonmetallic cable ties must be listed as having low smoke and heat release properties.

2014 / 2017 SIGNIFICANT ELECTRICAL CODE CHANGES

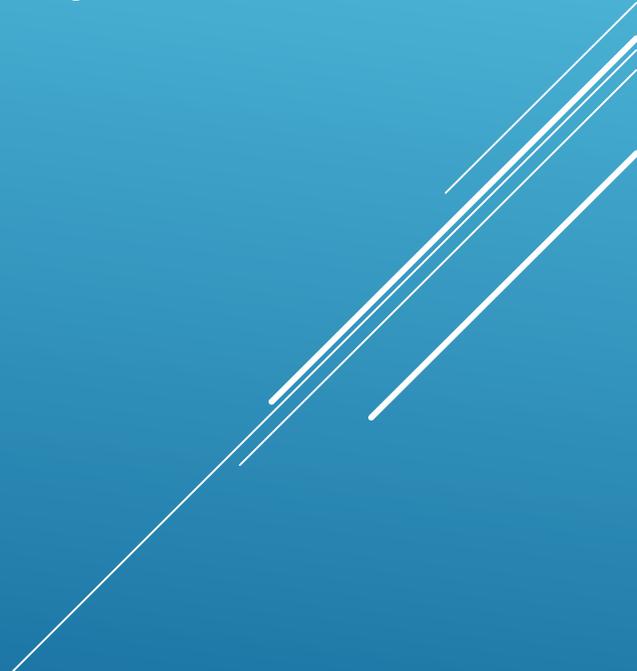


Tennessee Electrical Rule Changes Beginning October 1, 2018

ALL AREAS UNDER AUTHORITY OF STATE DEPUTY
ELECTRICAL INSPECTORS SHALL BE INSPECTED PER THE
2017 NATIONAL ELECTRICAL CODE WITH THESE
ADDITIONAL NEW AMENDMENTS:



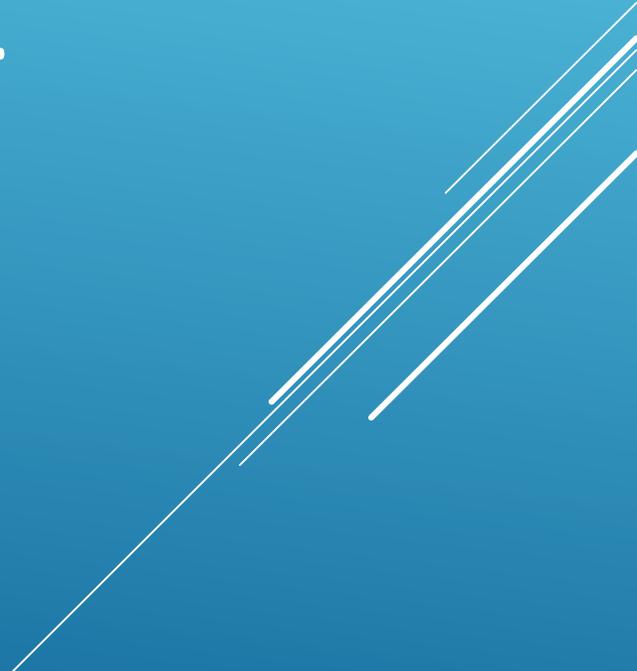
Field marking of available fault current required
in 110.16 shall be optional



Arc Fault Circuit Interrupters (AFCI) shall be optional for bathrooms, laundry areas, garages, branch circuits dedicated to supplying refrigeration equipment, and unfinished basements which are portions or areas of the basement not intended as habitable rooms and limited to storage, work or similar type area.

The city will begin inspecting for AFCI protection based on the 2011 NEC. Family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, or similar rooms or areas.

Permits and inspections will now
be required for all electric signs.

The image features a solid blue background with a gradient from light blue at the top to a darker blue at the bottom. In the lower right quadrant, there are several white, parallel diagonal lines of varying lengths and thicknesses, creating a modern, abstract graphic element.

Light fixtures in all dwelling unit crawlspaces shall have guarded covers.



For residential and commercial buildings, electrical power shall be supplied to the building in order for the inspector to perform final inspection.



The allowable phase-to-phase voltage in boat yard and pier distribution systems of one thousand (1000) volts or less may be exceeded if written documentation approving the increase is submitted by a state licensed engineer.



The following state amendments have been repealed and will no longer be enforced.

Future installations shall comply with the adopted electrical code:



Fixture location in clothes closets
twenty eight inches or less in depth.



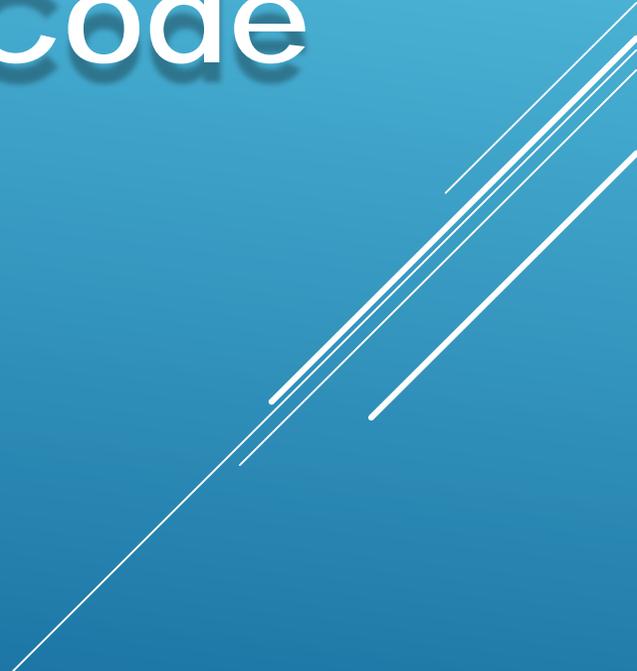
Maximum number of lighting or receptacle outlets allowed on dwelling unit branch circuits.

Removed from state code but remains in Knoxville Electrical Code

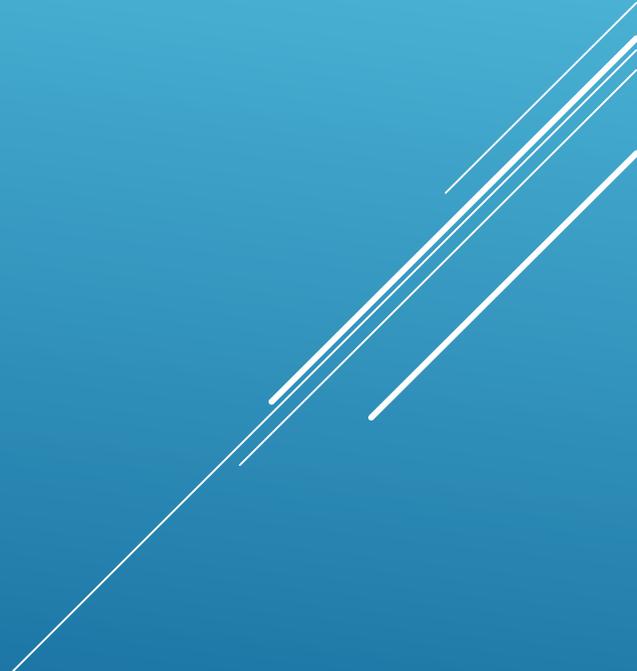
Optional use of listed weather resistant 15 or 20 amp receptacles installed outdoors.



City of Knoxville Electrical Code Proposed Changes



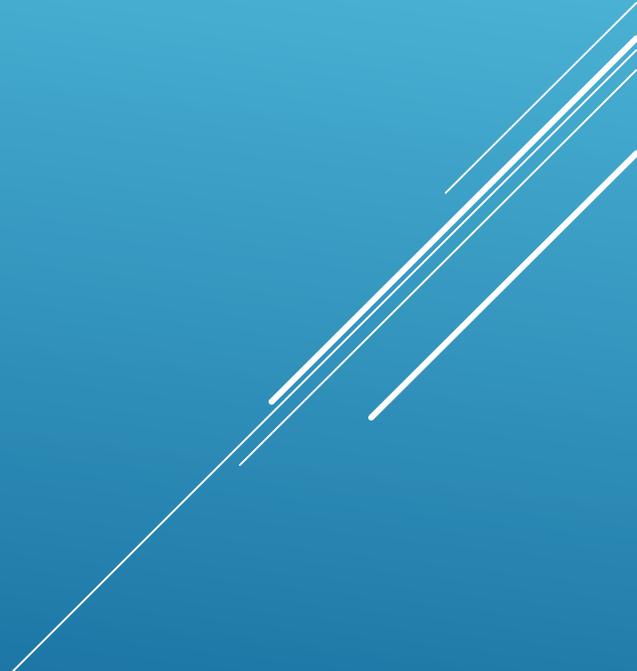
Replace all references to 2011 National Electrical Code
with 2017.



Remove reference to electric fences in 10.52(1).

Electric fence requirements and restrictions are more
fully covered by city ordinance

Article 4, Section 19-100.

A decorative graphic consisting of several parallel white lines of varying lengths, slanted diagonally from the bottom right towards the top right, located in the lower right quadrant of the slide.

Add “1000 volts or greater” in section 10.52(4) to the list of systems requiring sealed plans.

To require a design professional for PV systems that are now allowed up to 1500 volts output.

Revise 10.52(13)(A) “In Any Occupancy” to read
“In Any Unsprinklered Occupancy”.

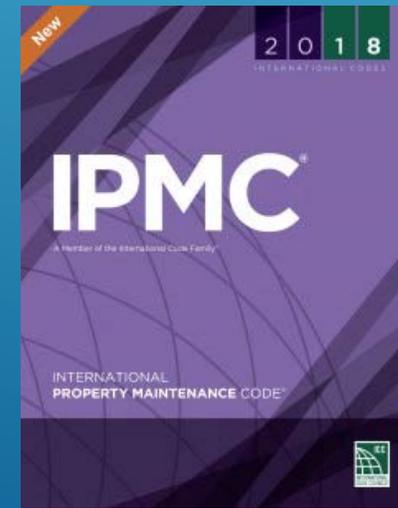
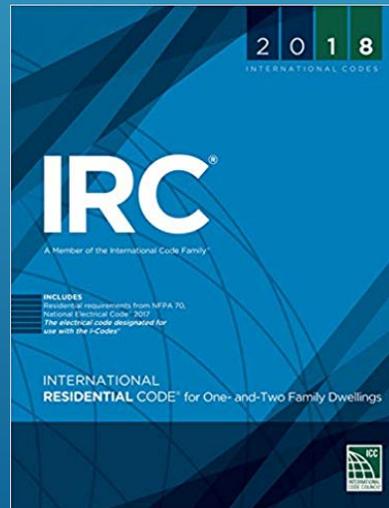
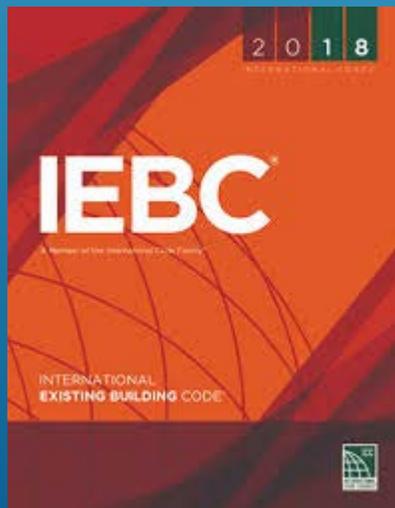
This will permit the use of NM and NMC cable in newer buildings with an approved automatic sprinkler system while still providing equivalent protection for buildings constructed before 2002 that have not yet been retrofitted with sprinklers.

Revise 10.52(13)(B)(1) to read “Dwellings which are located within the same building with a designated commercial use where NM cable is prohibited by the National Electrical Code.”

To clarify that NM cable is not permitted in mixed-use buildings unless all occupancies within the building are allowed by code to be wired in that manner.

Remove 10.52(15)-*Fire alarms and smoke detectors.*

*Smoke alarms and fire alarm systems will be regulated
by the appropriate building code.*



2014 and 2017 Combined Changes to the National Electrical Code



+

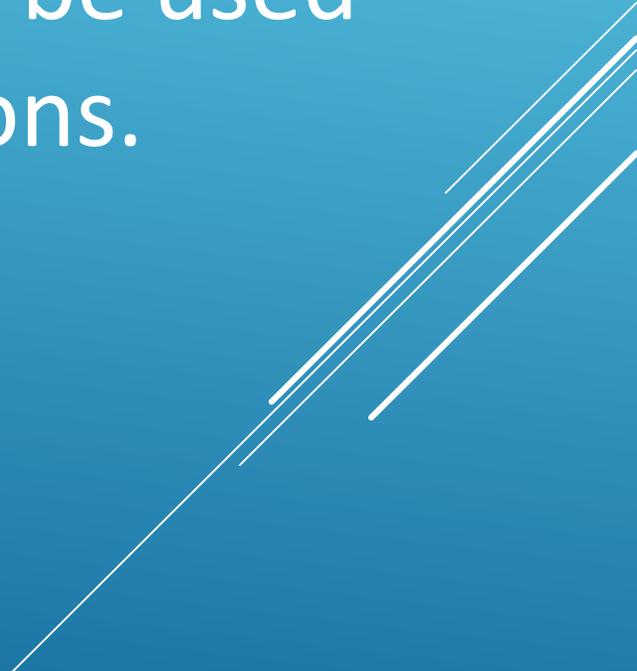


General Requirements

110.26(E)(2)(a)&(b) – Dedicated and working clearance space requirements extended to outdoor equipment.

A decorative graphic consisting of several parallel white lines of varying lengths, slanted diagonally from the bottom right towards the top right, located in the lower right quadrant of the slide.

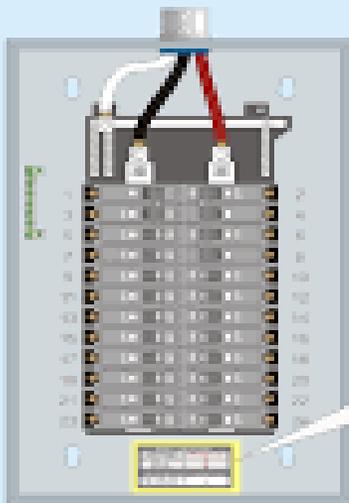
110.14 - A properly calibrated tool must be used when torqueing terminal connections.

Decorative white lines consisting of several parallel diagonal strokes in the bottom right corner of the slide.

110.14(D) Installation.

Where a tightening torque is indicated as a numeric value on equipment or in installation instructions provided by the manufacturer, a calibrated torque tool shall be used to achieve the indicated torque value, unless the equipment manufacturer has provided installation instructions for an alternative method of achieving the required torque.

Conductor Termination
Manufacturer's Torque Specifications
110.14 Note



Manufacturer's Instructions

BRANCH AND NEUTRAL	
WIRE RANGE	TORQUE IN-LBS
14-10 CU, 12-10 AL	20
8 CU-AL	25
6-4 CU-AL	35

EQUIP. GND. BAR COMBINATIONS	
TWO 14 OR 12 CU	25
TWO 12 OR 10 AL	

Many terminations and equipment are marked with tightening torques.

Copyright © 2011, www.Mike Holt.com







210.4 - The conductor grouping requirements for multi-wire branch circuits now mirror similar rules for grounded (neutral) conductors contained in 200.4(B).

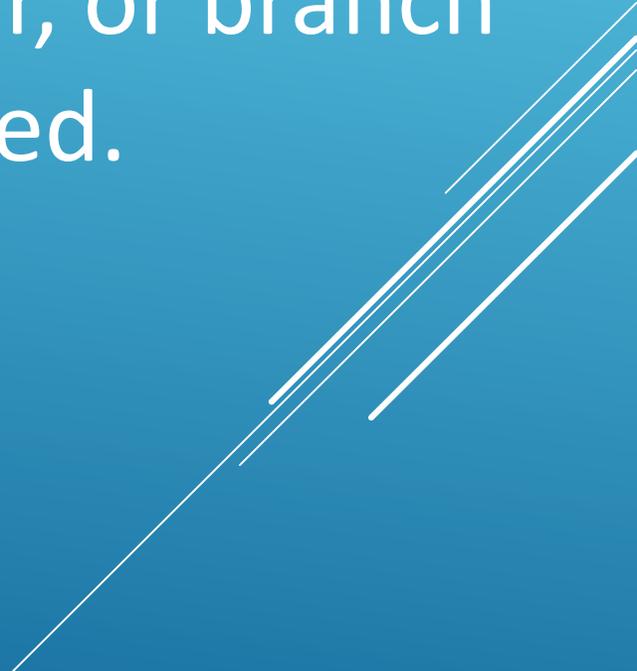


230.10 – Trees are no longer allowed to support service equipment.

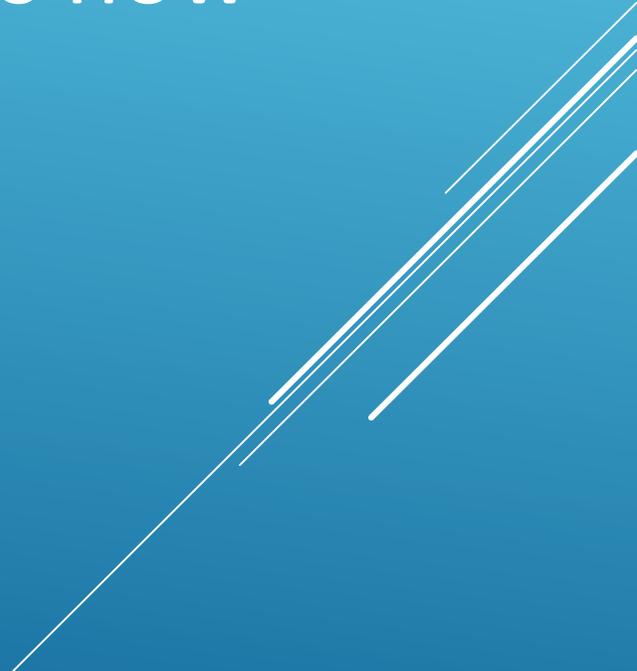




250.80, 250.86 - Metallic items that aren't required to be bonded for underground service, feeder, or branch circuit raceways has been expanded.



250.118 – The allowance for using flexible metal conduit as an equipment ground path is now restricted to 1-1/4" or smaller.



Chapter 3 – Type AC, MC, NM, NMC, TC, SE, USE, and UF cables and fittings must now be listed.

Also, cable ties used for securing and supporting must be listed.

A decorative graphic consisting of several parallel white lines of varying lengths, slanted diagonally from the bottom right towards the top right, located in the lower right quadrant of the slide.





100 PC

PLT4S-C0

LENGTH: 14.5in / 368mm

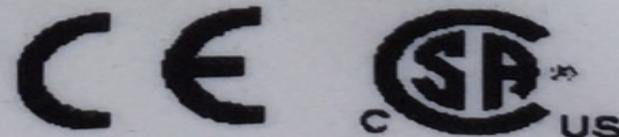
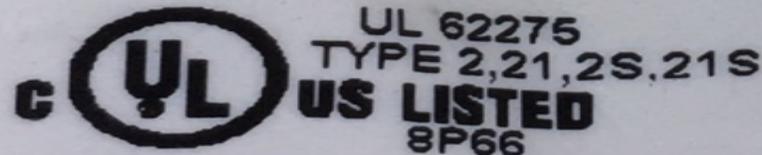
BLACK WEATHER RESISTANT NYLON

MIN BUNDLE DIA. 0.06in / 1.6mm
 MAX BUNDLE DIA. 4in / 102mm
 LOOP TENSILE STRENGTH 50 LB / 222 N
 OPERATING TEMP RANGE -60°C 85°C
 MIN INSTALLATION TEMP 0°C
 -20°C @ MIN BUNDLE DIA. 0.125in / 3.18mm
 *UV RESISTANT
 AH-2 PLENUM RATED



INSTALLATION TOOL:
 GTS (MS90387-1) STD 6-8 OR PTS STD 6-8

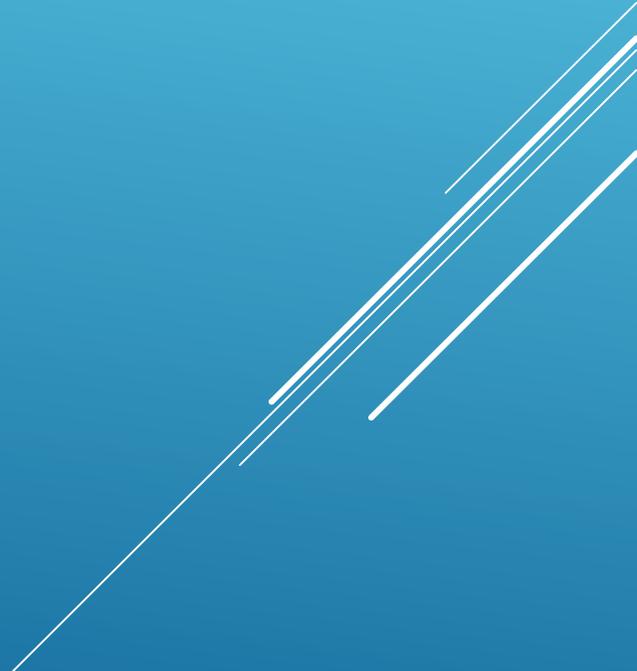
QC#:15593366N



(75895) 1752
MADE IN SINGAPORE

SEE THE PANDUIT ELECTRICAL PRODUCT WARRANTY ON
www.panduit.com/warranty

314.25 – Clarification - Drywall screws not permitted for installing devices or covers.





2 USB Ports
Total of 2.4Amp,5VDC

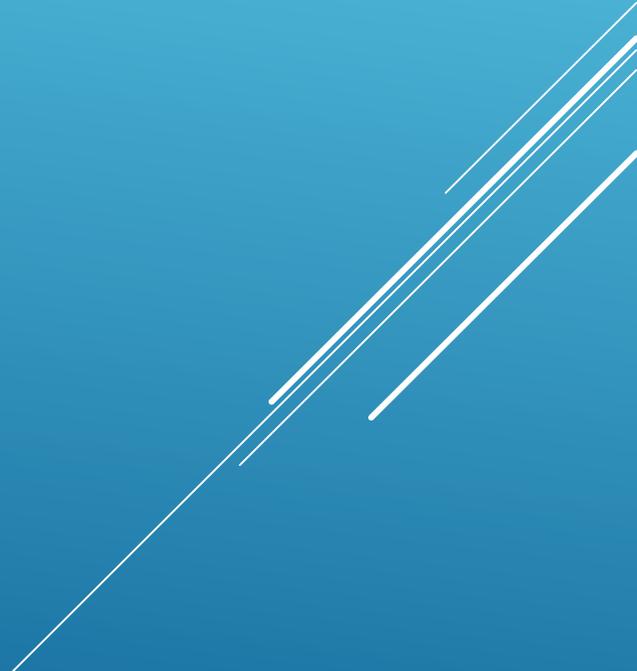
Receptacle
15 Amp 125VAC 60Hz

406.3(F) – Receptacles
with integral USB chargers
shall be listed.



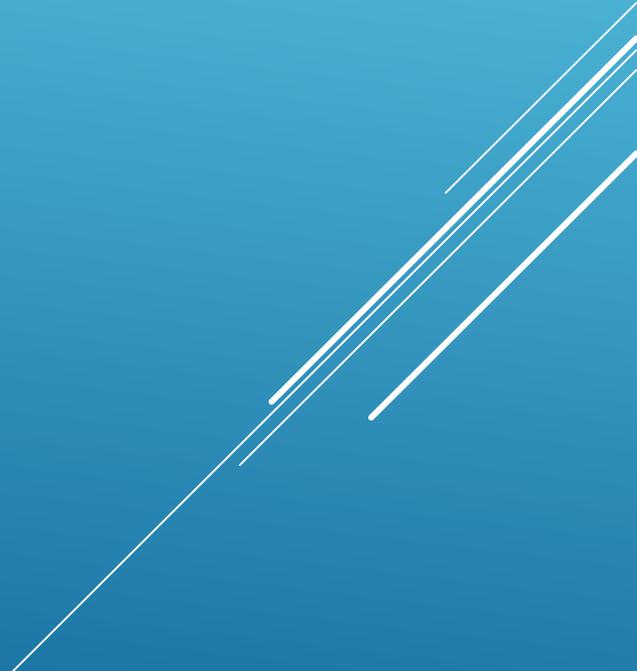
406.6(D) – Receptacle faceplates with built-in nightlights or usb chargers shall be listed.

406.9(B)(1), 590.4(D)(2) – In-use covers on all receptacles in wet locations will now need “extra-duty” type covers.





422.5 – GFCI devices for all appliances must now be readily accessible.



Article 555 - Marinas, Boatyards, and Commercial and Non-commercial Docking Facilities.

Title and scope has been changed to include residential boat docks.

A decorative graphic consisting of several parallel white lines of varying lengths, slanted diagonally from the bottom right towards the top right, located in the lower right quadrant of the slide.





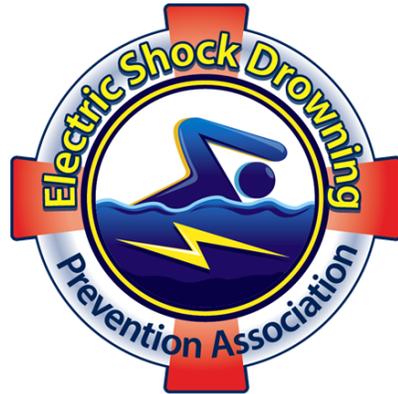
555.3 – Ground fault protection of supply to marinas, boatyards, and docking facilities has been reduced from 100 mA to 30 mA.





555.24 – New warning sign requirement for boatdocks and marinas.

No SWIMMING!



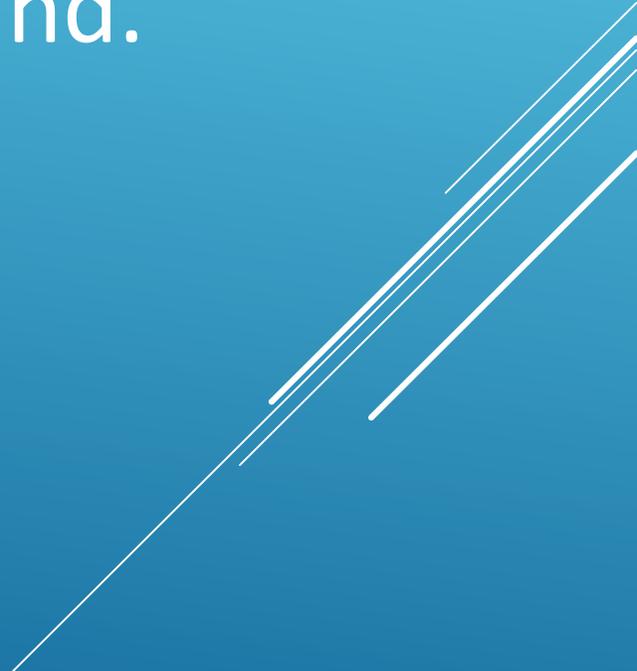
WARNING!
Potential Shock Hazard

Electrical currents may be present in the water. These electrical currents can be harmful or lethal.

www.electricshockdrowning.org



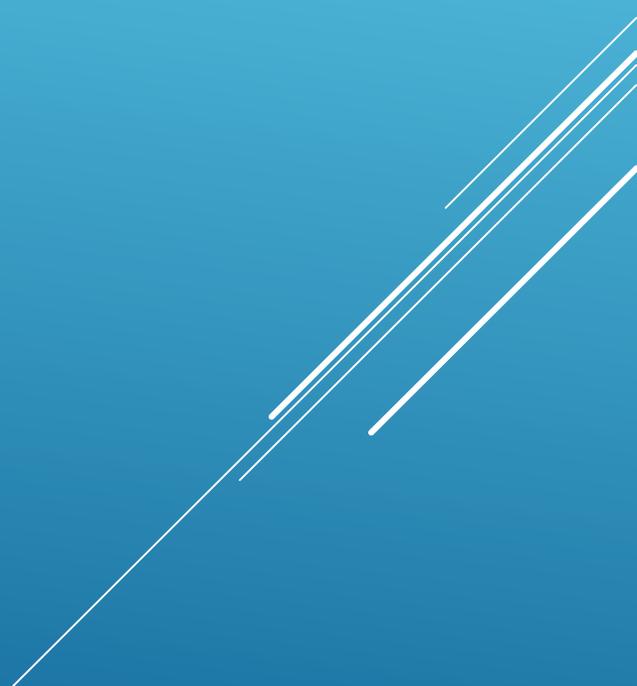
590.4(J) – Temporary branch circuits and feeders cannot be laid on the floor or ground.



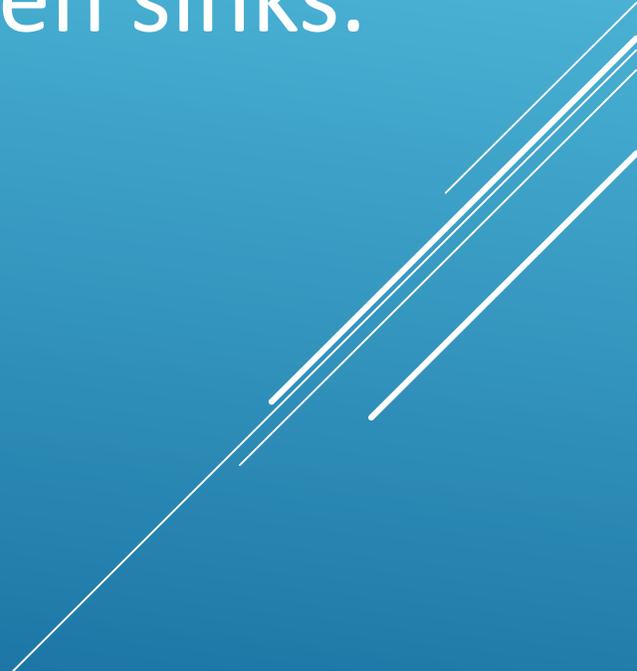
625.40 – Each outlet installed for recharging electric vehicles shall be supplied by an individual branch circuit.



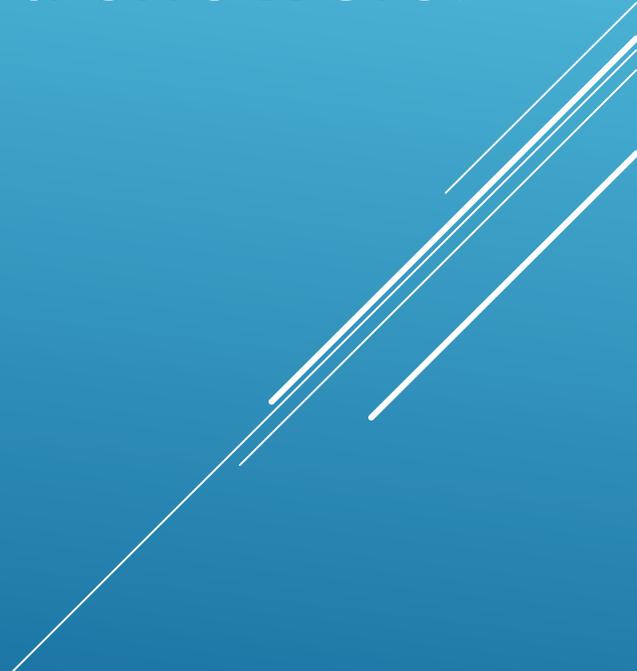
Residential Changes



210.8(A)(7) – GFCI protection expanded to include all receptacles within 6 ft of dwelling kitchen sinks.



210.8(A)(9) – GFCI protection now required for receptacles within 6 ft of dwelling tubs and showers.





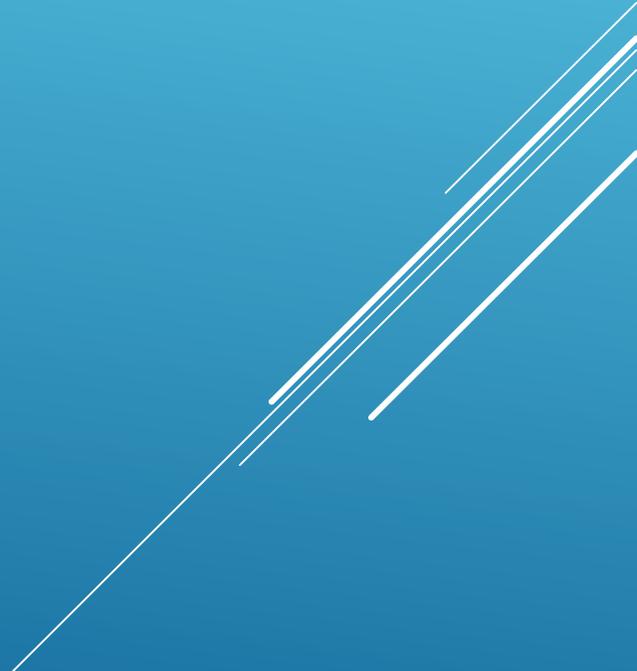


210.8(A)(10) – GFCI protection now required for dwelling laundry area receptacles.





210.8(D) – GFCI protection now required for dishwashers in dwellings.



210.8(E) – GFCI protection now required for lighting in crawl spaces.



210.11(C)(4), 210.52(G)(1) – Dwelling garages must have a separate 20 amp branch circuit with at least one receptacle for each car space.



210.12(A),(B),(C) – AFCI protection expanded to include outlets and devices in kitchens, family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, and hallways of dwelling units, dormitory units, and guest rooms or guest suites in hotels and motels



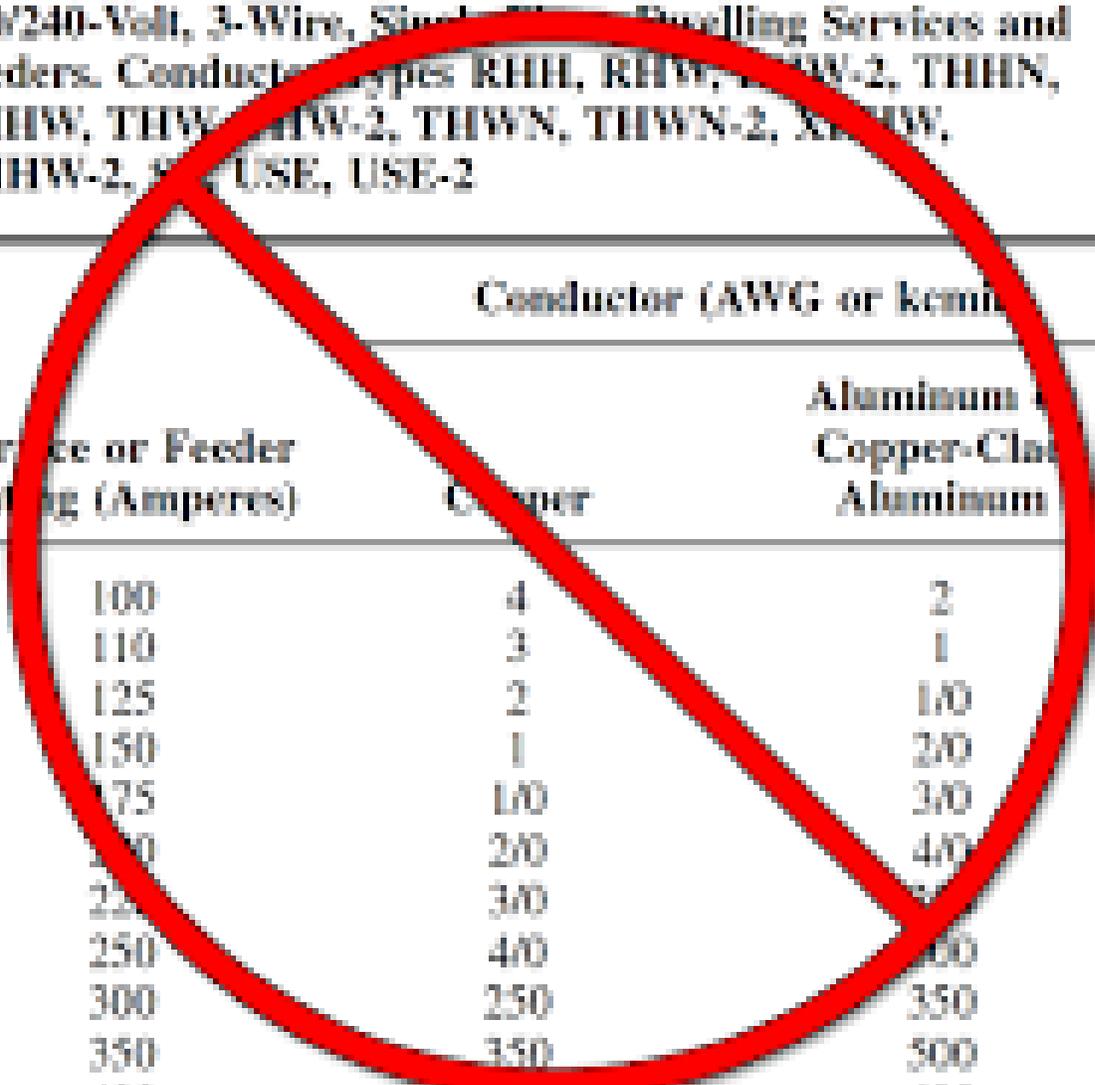
Table 310.15(B)(7) has been removed.

New rules apply for sizing single-phase dwelling service and feeder conductors.

Service conductor ampacity now required to be not less than 83% of service rating.

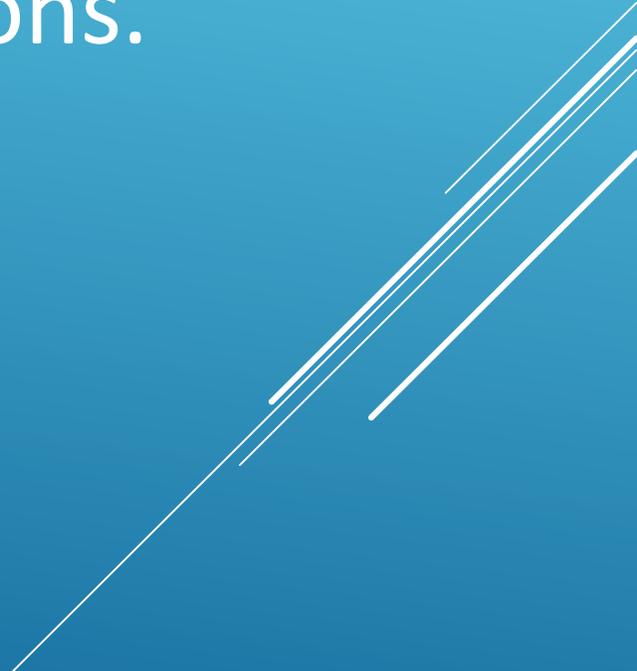
Similar rule applies for feeders.

Table 310.15(B)(7) Conductor Types and Sizes for 120/240-Volt, 3-Wire, Single-Phase Dwelling Services and Feeders. Conductor types RHH, RHW, RHW-2, THHN, THHW, THW, THW-2, TIWN, TIWN-2, XHHW, XHHW-2, USE, USE-2



Service or Feeder Rating (Amperes)	Conductor (AWG or kcmil)	
	Copper	Aluminum or Copper-Clad Aluminum
100	4	2
110	3	1
125	2	1/0
150	1	2/0
175	1/0	3/0
200	2/0	4/0
225	3/0	250
250	4/0	300
300	250	350
350	350	500
400	400	600

406.4(D) – AFCI and GFCI replacement receptacles must be in readily accessible locations.



406.12 – All 15 and 20 amp, 125 and 250 volt nonlocking-type receptacles in dwelling units and mobile or manufactured homes shall be listed tamper-resistant.



422.16 – Receptacles for built-in dishwashers shall be located in the space adjacent to the space where the dishwasher is located.

The receptacle shall be accessible.

A decorative graphic consisting of several parallel white lines of varying lengths, slanted diagonally from the bottom right towards the top right, located in the lower right quadrant of the slide.

New Commercial Requirements



110.26(C)(3) – Requirement for panic hardware on personnel doors lowered from 1200A to 800A.



210.8(B) – GFCI protection has been expanded to include all single-phase receptacles rated 150 volts to ground, 50 amps or less and three-phase receptacles rated 150 volts to ground, 100 amps or less in areas listed in Other Than Dwelling Units.



210.8(B) – Other Than Dwelling Units

Bathrooms

Kitchens

Rooftops

Outdoors

Within 6' of a sink

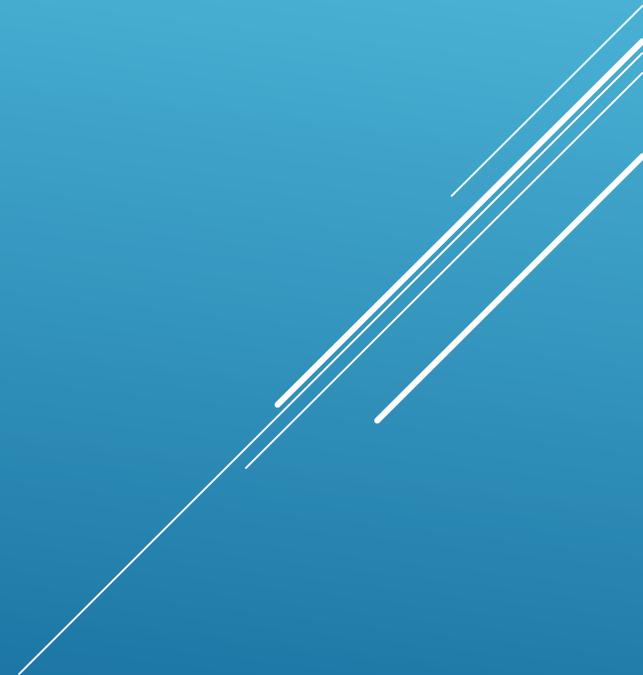
Indoor wet locations

Locker rooms with showers

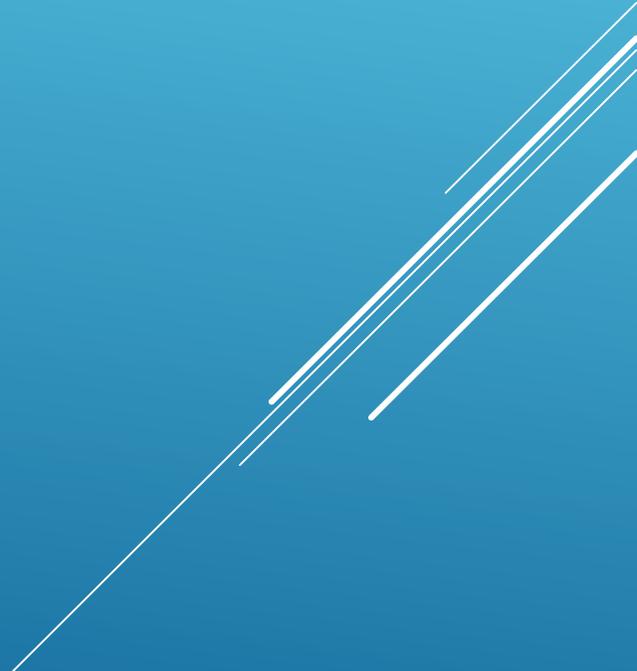
Garages, Service Bays and similar areas

Crawl spaces

Unfinished areas of a basement



210.13 – New GFPE requirement for branch circuits
1000A or more and over 150V to ground.

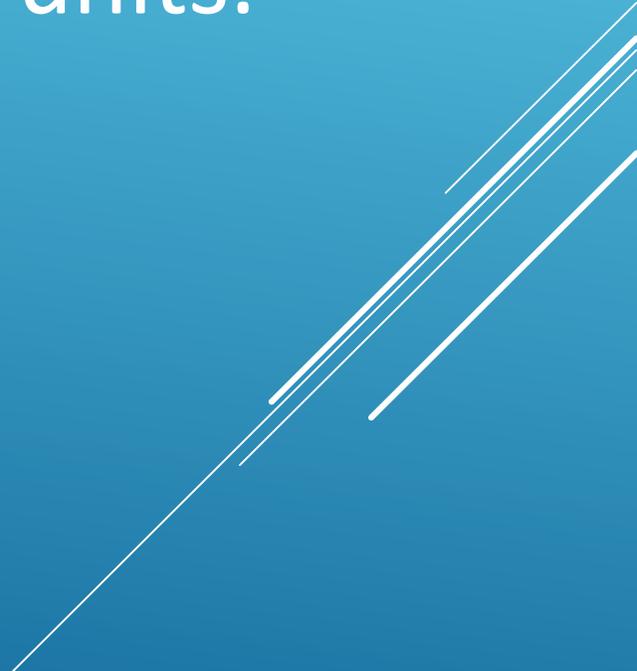


210.64 – Receptacle now required within 50 ft of all service equipment.

1 and 2 family excluded.



210.71 – New requirements for receptacle locations in meeting rooms in other than dwelling units.



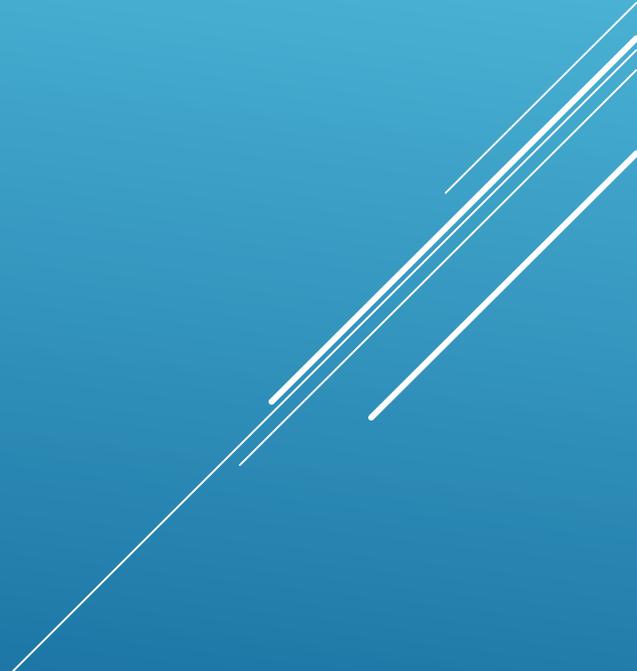
220.12 – New exception for calculating lighting loads for office and bank areas when design complies with energy code.

Allows a reduction of 1 volt-ampere / square foot

A decorative graphic consisting of several parallel white lines of varying lengths, slanted diagonally from the bottom right towards the top right, located in the lower right quadrant of the slide.

230.82(3) – Meter disconnect switches must be
labeled

“METER DISCONNECT
NOT SERVICE EQUIPMENT”.



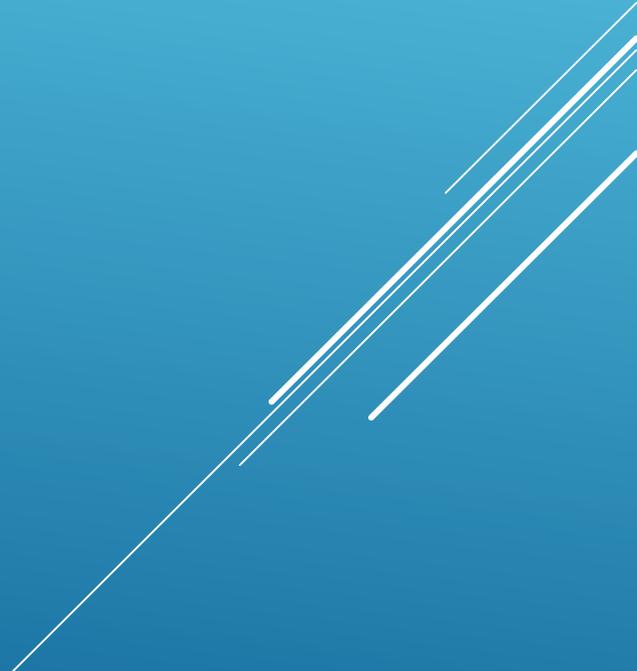
250.30(A)(4) – The requirement to use structural metal or water piping as the grounding electrode for separately-derived systems was removed. They are now required to be bonded to the building grounding electrode system.



300.22(C)(1) – Nonmetallic cable ties and other nonmetallic cable accessories located in “Other Spaces For Environmental Air (Plenums)” must be listed as having low smoke and heat release properties. ANSI/UL 2043-2008



Article 393 – New article
Low-Voltage Suspended Ceiling Power
Distribution Systems.



406.3(E) – New marking requirement for receptacles controlled for energy management or building automation.

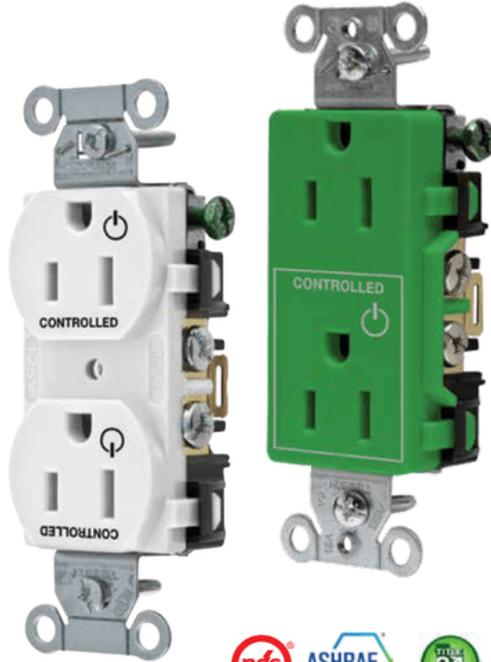


CONTROLLED

Permanently Marked Receptacles

HUBBELL
Wiring Device-Kellems

for Automatic Outlet Control Systems



Hubbell permanently marked receptacles for automatic outlet control systems are embossed with the universally recognized power symbol and the word "CONTROLLED." These markings clearly identify which convenience outlets are turned off when the workspace is vacant.

- Permanent power symbol remains clearly visible after installation
- Control both outlets per device for 100% controlled applications or just one outlet for 50% controlled applications
- Ideal for commercial buildings, retail, schools, hotel rooms
- Available in SNAPConnect® and conventionally wired versions
- Part of the Hubbell Load:Logic™ Plug Control system. Visit www.hubbell-wiring.com for details



Automatic Outlet Control systems are required for at least 50% of the receptacles installed in private offices, open offices, and computer classrooms



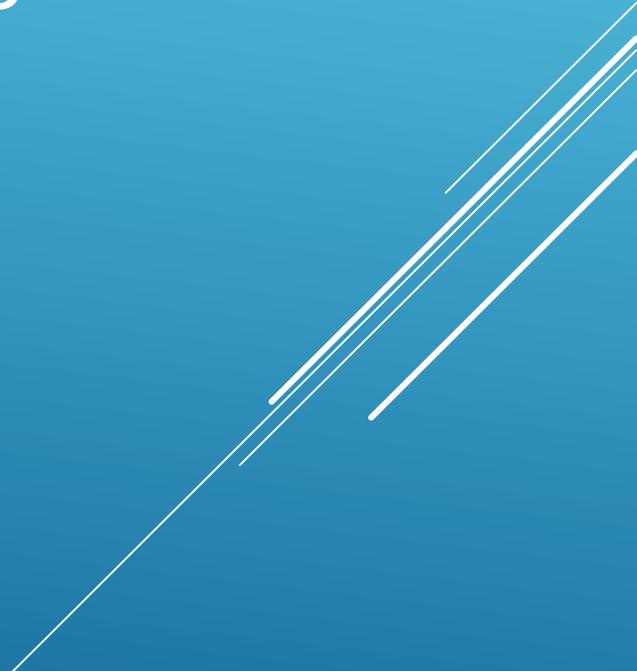
406.12 – All 15 and 20 amp, 125 and 250 volt nonlocking-type receptacles installed in dwelling units, guest rooms and guest suites of hotels and motels, child care facilities, preschool and elementary education facilities, business offices, corridors, waiting rooms and the like in clinics, medical and dental offices and outpatient facilities, gymnasiums, skating rinks, auditoriums, and dormitories shall be listed tamper-resistant.

Exception if over 5 ½ ft above the floor

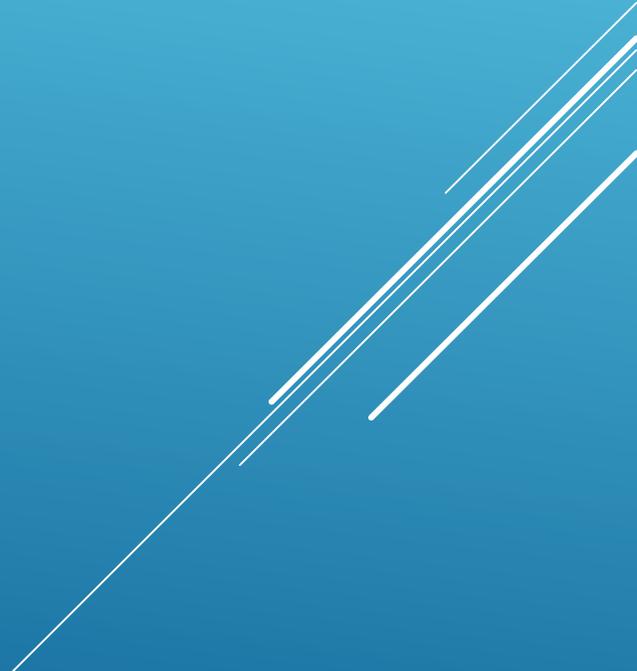


410.6 – Luminaire retrofit kits must now be listed.

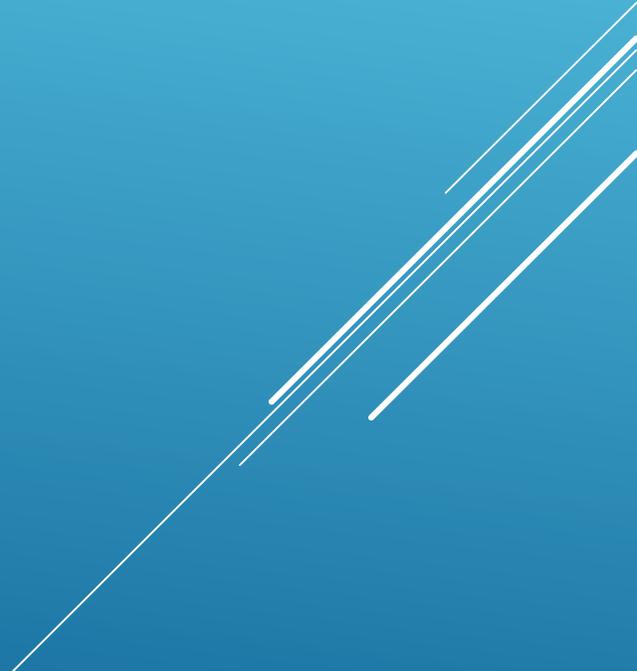
410.10(F) – Luminaires must also be no less than 1 ½ in. below metal roof decking.



422.5 – Public tire inflation and auto vacuum machines now need GFCI protection.



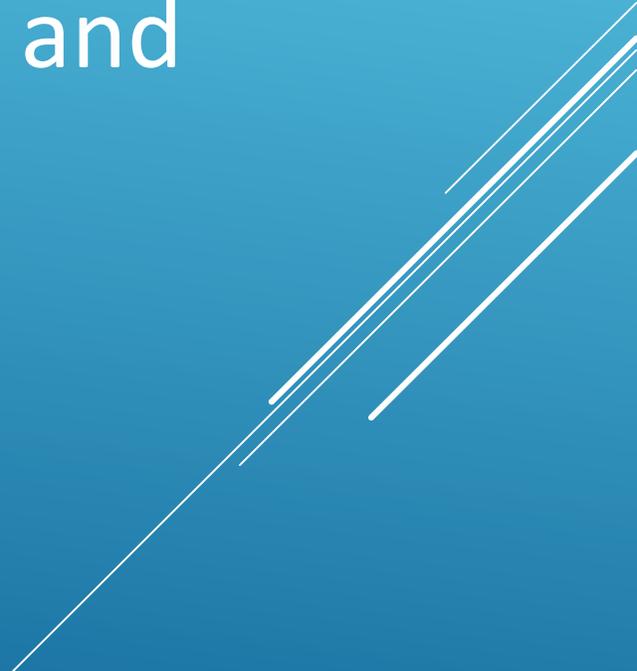
424.66 – New working space requirements for duct heaters. See 110.26.





Article 424 -New part X for low-voltage fixed electric space heating equipment.

Maximum 30 volts AC or 60 volts DC and not exceeding 25 amps.

A decorative graphic consisting of several parallel white lines of varying lengths, slanted upwards from left to right, located in the bottom right corner of the slide.

Article 425 – New article for fixed resistance and electrode industrial process heating equipment.

Covers:

Boilers

Immersion Heaters

Duct Heaters

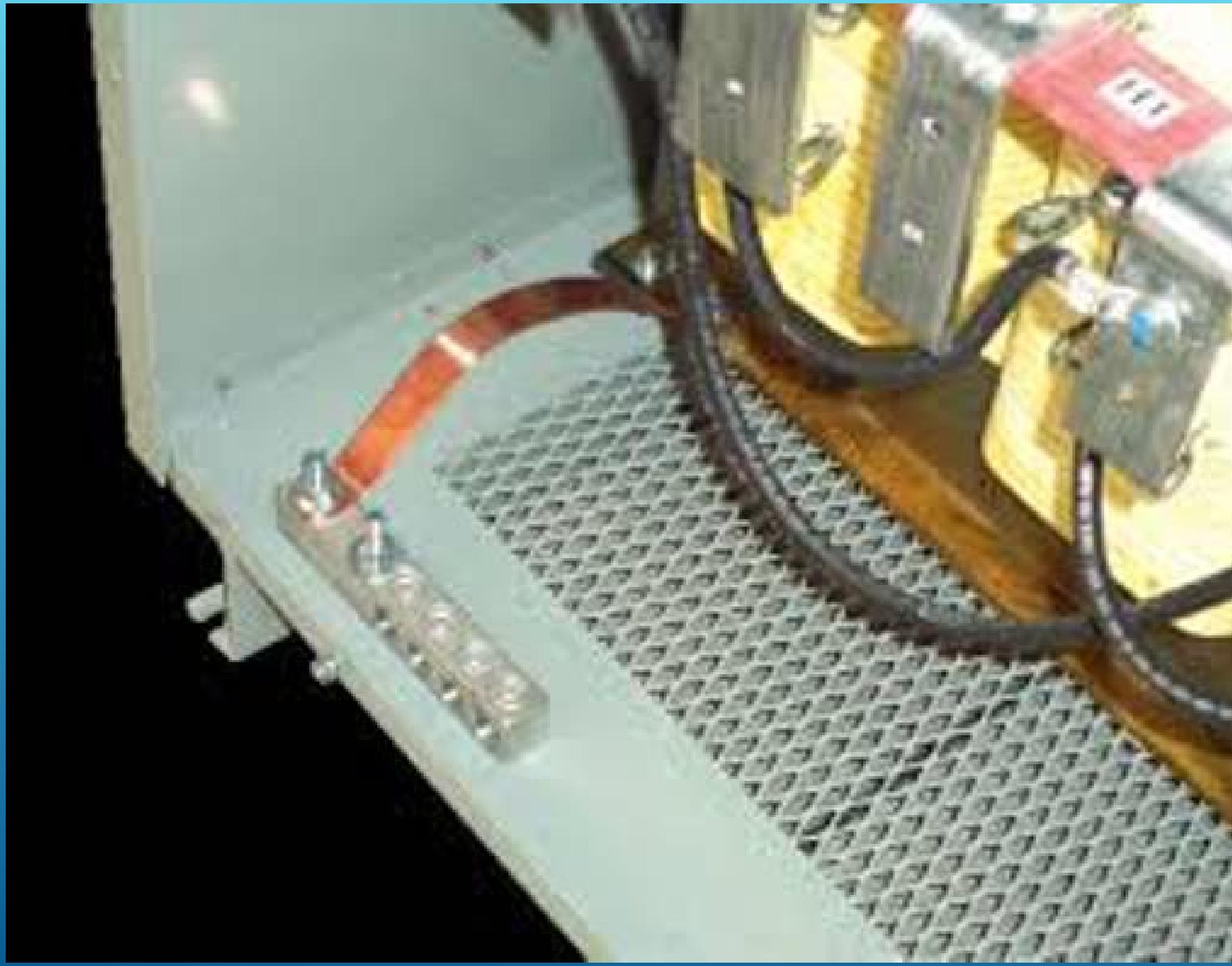
Infrared Lamps

Does not apply to heating or room air-conditioning

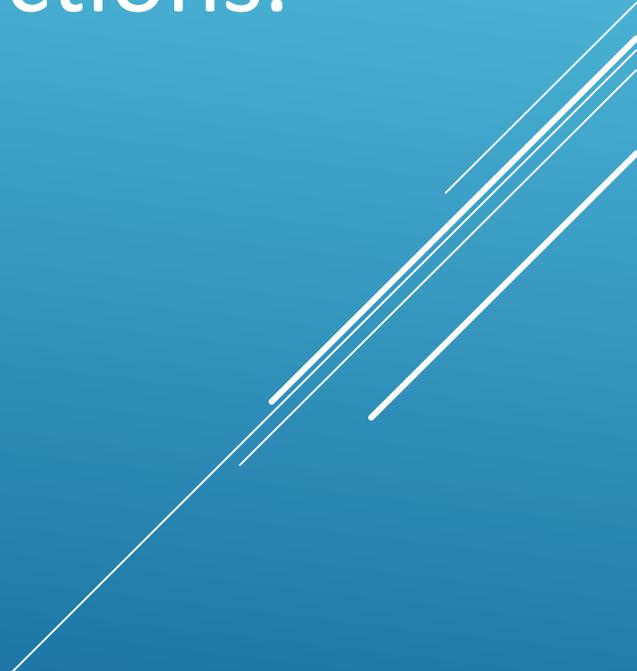
450.10 – Grounding or bonding terminals cannot be installed on or over the transformer vent screen.

A decorative graphic consisting of several parallel white lines of varying lengths, slanted diagonally from the bottom right towards the top right, located in the lower right quadrant of the slide.





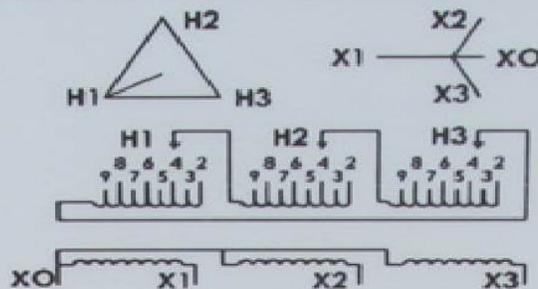
450.11 – Transformers can only be reverse wired if permitted in the manufacturer's instructions.



XXX Transformer Company



45 KVA @150 C RISE IMP 5.50 %
PRIMARY 480 (H)
SECONDARY 208Y/120 (X)
WEIGHT 400 LBS. 60HZ 3 PHASE
220 C INSULATION SYSTEM FH4G
AMBIENT TEMP 40 C MAX



TAP	JUMPER CONNECTION VOLTS	AMPS
2	503	51.6
3	492	52.8
4	480	54.1
5	469	55.4
6	455	57.1
7	443	58.6
8	432	60.1



POWER TRANSFORMER 641H

FILE E37783

MEETS TP-1-1996 EFFICIENCY

MODEL 36 B

TYPE 2 ENCLOSURE, TYPE 3R ENCLOSURE WHEN PROVIDED
 WITH WEATHERSHIELDS PART NO. 51TR3
 BEFORE HANDLING, INSTALLING AND OPERATING, SEE INSTRUCTION IN-7700
 ALUMINUM CONDUCTOR PRIMARY: 10 KV BIL SECONDARY: 10 KV BIL
 FOUR INCH MINIMUM CLEARANCE IS REQUIRED FROM WALLS OR OTHER OBSTRUCTIONS FOR ALL VENTILATION OPENINGS

N/P T4T4SE-1

DRY TYPE TRANSFORMER CLASS AA

MADE IN MEXICO

Reverse Feed (Back-feed), or Step-Up Operation

This step-down transformer may be reverse fed for step-up operation to increase voltage. This means that the incoming power is connected to the low voltage (X's) and the load is connected to the high voltage (H's). If the low voltage is wye, the X₀ terminal must NOT be connected in any way. Likewise, if the low voltage is a delta with a 120 volt lighting tap (high-leg), the X₄ terminal must NOT be connected in any way.

CAUTION: Much higher than normal inrush currents may occur with reverse feed operation and may cause nuisance fuse blowing or breaker tripping. For this reason, fuses and breakers with time-delay characteristics must be used.

If a breaker is used for incoming over-current protection, it must be a thermal-magnetic type breaker, not a

Reverse Feed (Back-feed), or Step-Up Operation

This step-down transformer may be reverse fed for step-up operation to increase voltage. This means that the incoming power is connected to the low voltage (X's) and the load is connected to the high voltage (H's). If the low voltage is wye, the X_0 terminal must NOT be connected in any way. Likewise, if the low voltage is a delta with a 120 volt lighting tap (high-leg), the X4 terminal must NOT be connected in any way.

CAUTION: Much higher than normal inrush currents may occur with reverse feed operation and may cause nuisance fuse blowing or breaker tripping. For this reason, fuses and breakers with time-delay characteristics must be used.

If a breaker is used for incoming over-current protection, it must be a thermal-magnetic type breaker, not a magnetic-only type breaker.

511.3(C)&(D) – Two new tables added for area classification of commercial garage spaces.

Based on information from NFPA 30A

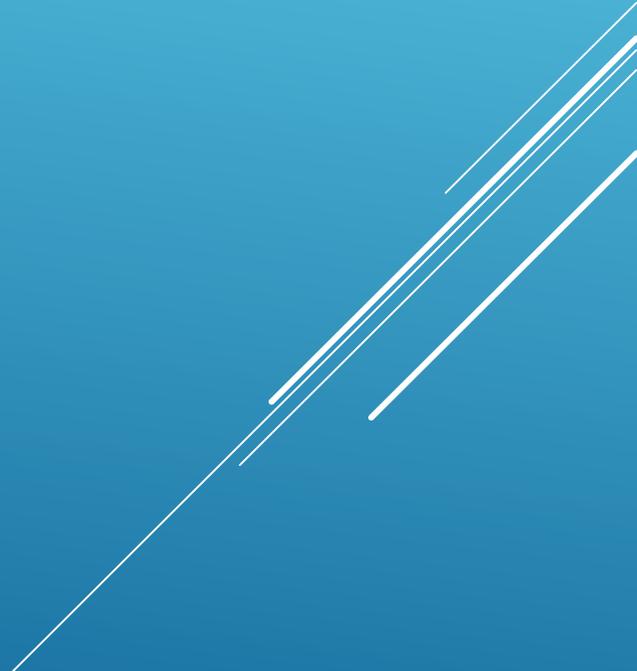
“Motor Fuel Dispensing Facilities and Repair Garages”

A decorative graphic consisting of several parallel white lines of varying lengths, slanted diagonally from the bottom right towards the top right, located in the lower right quadrant of the slide.

511.8 – Underground wiring for commercial garages shall be installed in rigid steel or intermediate metal conduit.

Exception: PVC, RTRC, or HDPE permitted if not less than 2' deep below floor.

517.18(A) – New color and circuit marking requirements for receptacles supplied from the critical branch.



600.6(A)(1) – There must be a disconnect at the point where the circuit enters the sign.



600.33 – New tables with permitted wire types and substitutions for LED and other power-limited signs.

CL2, CL3, CL2R, CL3R, CL2P, CL3P, PLTC

A decorative graphic consisting of several parallel white lines of varying lengths, slanted diagonally from the bottom right towards the top right, set against a blue gradient background.

620.23 - The circuiting requirements for lighting and receptacles in the elevator equipment machine rooms/machinery spaces have been expanded to include control spaces where equipment rooms are not used.



Article 625, New Part IV - Wireless power transfer equipment for electric vehicles.

Covers inductive, or wireless power transfer (contactless inductive charging) means.

645.27 – All OCP devices in critical operations data systems must be selectively coordinated.

Critical Operations Data System.

An information technology equipment system that requires continuous operation for reasons of public safety, emergency management, national security, or business continuity.

680.80

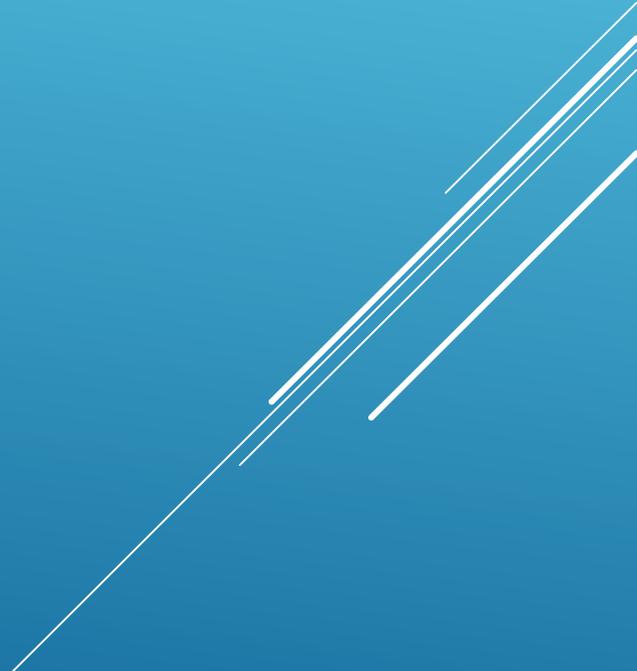
A new Part VIII,
covering electric
pool lifts, has
been added.



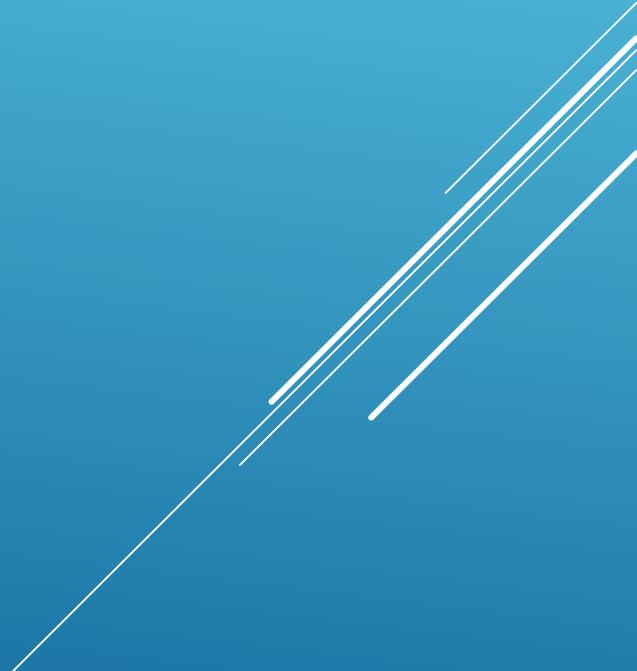
Article 691 – New article for large-scale photovoltaic electric power production facilities.



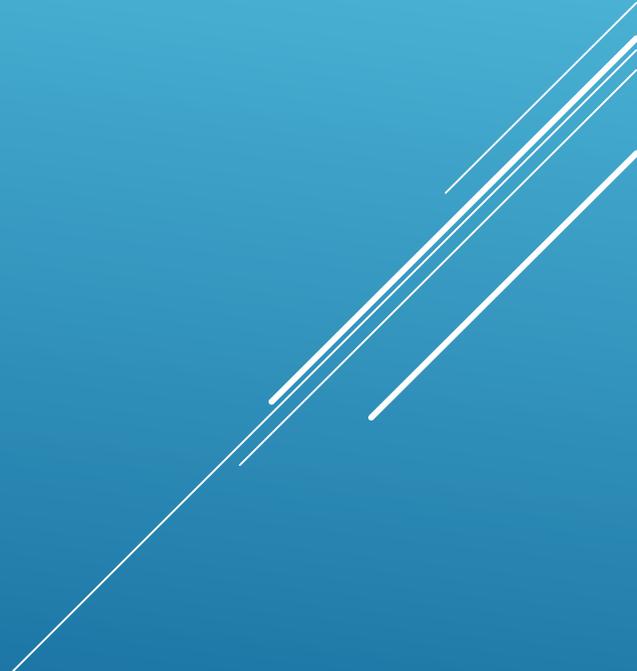
695.14 – EMT is now a permitted method
for fire pump control wiring.



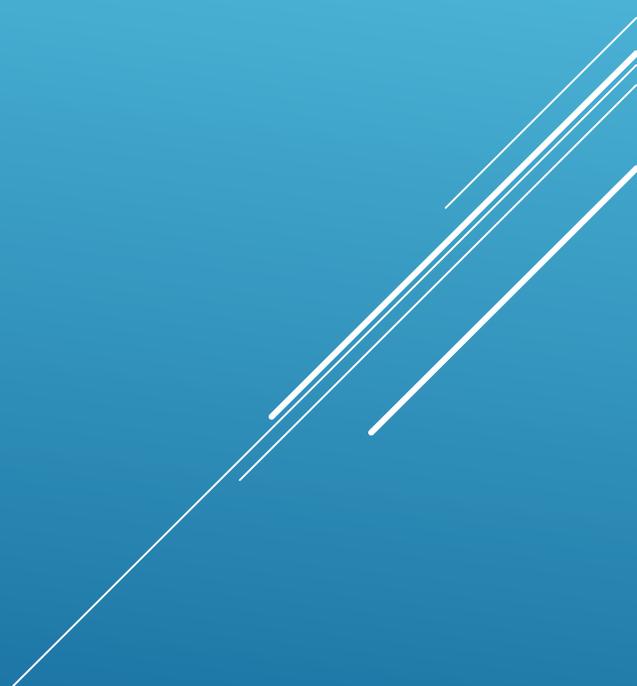
695.15 – Fire pump controllers must have a listed surge protector.



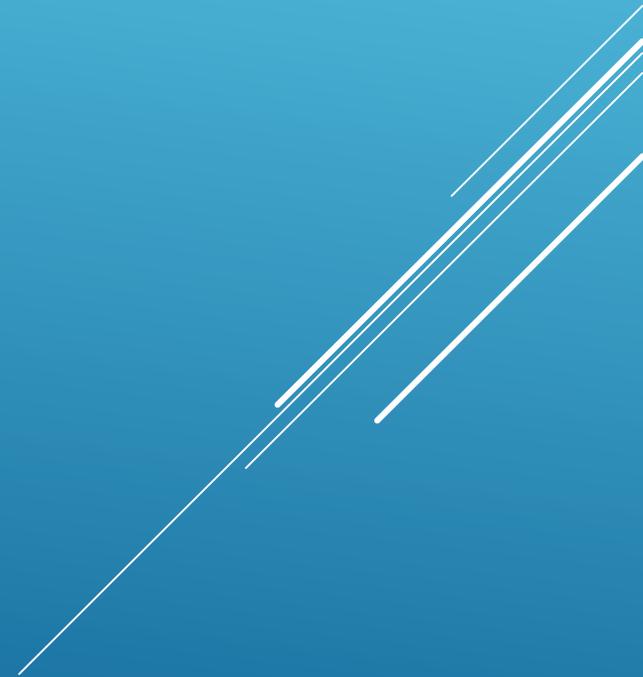
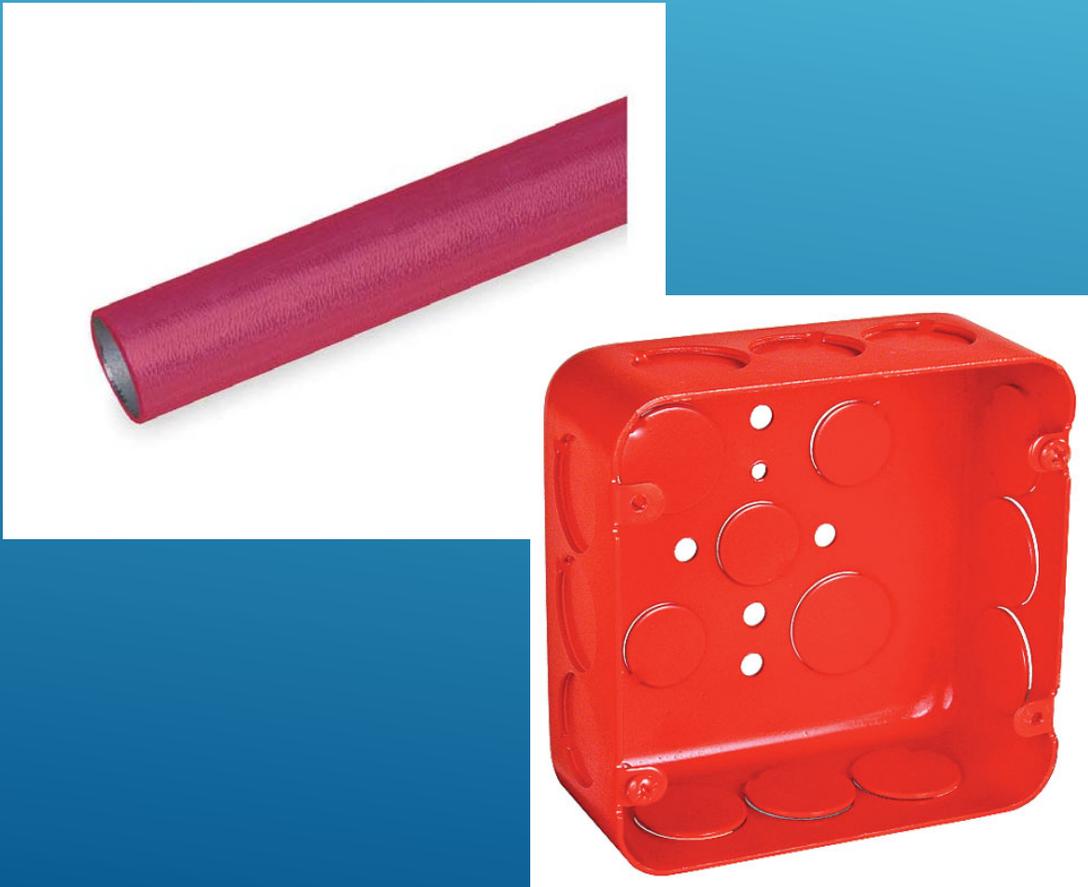
700.8 – New requirement for listed surge protective devices on all emergency system switchboards and panelboards.



700.10 – Raceways, enclosures, cables and receptacles supplied from an emergency system shall be distinctively marked to allow ready identification.



700.10 – Raceways, enclosures, cables and receptacles supplied from an emergency system shall be distinctively marked to allow ready identification.



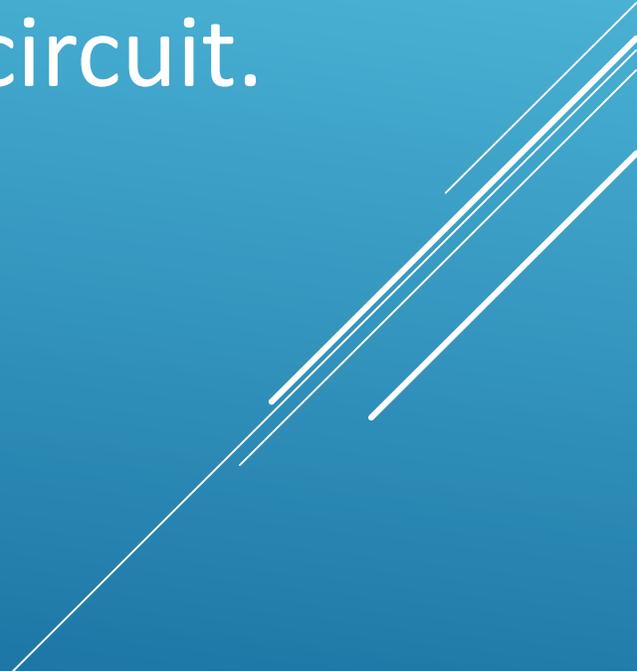
700.10 – Raceways, enclosures, cables and receptacles supplied from an emergency system shall be distinctively marked to allow ready identification.



700.10 – Raceways, enclosures, cables and receptacles supplied from an emergency system shall be distinctively marked to allow ready identification.



700.12(F), Exception & 700.19 – Emergency lighting cannot be part of a multi-wire branch circuit.



New Articles

Article 705 – New part IV for microgrid systems

Article 706 – Energy Storage Systems

Article 710 – Stand-Alone Systems

Article 712 – Direct Current Microgrids

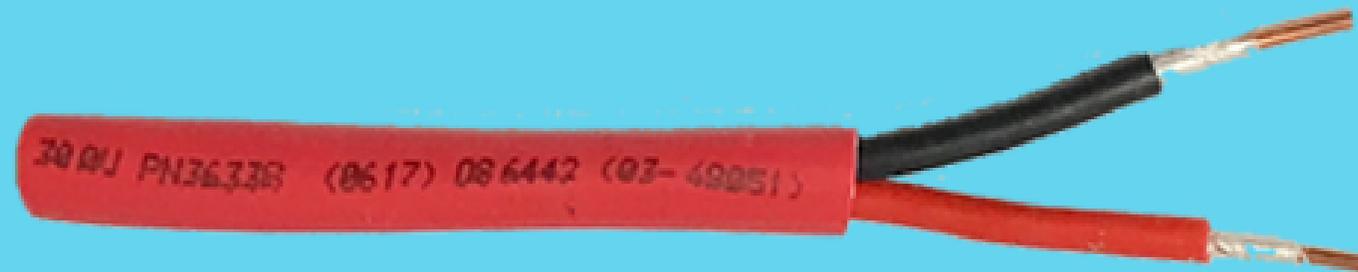
Article 728 – Fire-Resistive Cable Systems.

Article 750 – Energy Management Systems.

760.24 – New support requirements for
CI fire alarm cables.

18" or 24" apart. Supports must be steel.

Break Free with VITALink® CI Free Air Cables!



**Comtran's VITALink® 2 Hour Fire Rated Circuit Integrity cables
are the first to achieve CI Free Air Rating!**





Questions



Comments



Feedback



**2018 Knoxville Electrical Code Changes
Supplemental Meeting Notes
8/2/2018**

- The City adopts and follows the state electrical rules.
- 2017 doesn't require AFCI in bedrooms unless it's a dormitory.
- No more final inspections unless there's connected power. Can be connected with a generator etc. but has to be connected.
- NEC requirements for dwelling unit receptacle circuits are 3 watts per square foot. All lighting must be spread out and balanced out.
- Reference mixed use buildings (residential /commercial) – If both residential area and commercial area are legally able to be wired in NM cable, then the entire building can be wired in NM. If one area is not legally able to be wired in NM cable then can't use NM cable at all.
- Multiple wire branch circuits have to be identified in some way using tie wrap, grouping etc. Neutral conductors and all related phase conductors must be grouped at least once.
- The "CE" mark listed on product bags does not mean anything and it will not get an approval. Mainly used in Europe and China for trading purposes and is just a letter from the manufacturer stating the product will work the way they say it will. Doesn't count toward listing requirements.

General Code Changes

- 110.26(E)(2)(a)&(b) – Was not previously required
- 110.14 – Includes requirement for calibrated torquing tool.
- Chapter 3 – Type AC, MC NM, MNC, TC, SE, USE and UF cables and fittings...Code says everything has to be approved but not everything has to be listed. Expanding the list of requirements due to counterfeit equipment coming in from other countries. Save the product bag which lists all of the product info.
- Article 555 – Applies to both commercial and residential boat docks.
- 555.24 – Must specifically state "Electrical currents may be present in marina".
- 590.4(J) – Temporary branch circuits and feeders must be supported and off of floor and cannot be subject to damage. This does not apply to extension cords and so cord will be considered an extension cord if it's plugged in and connected.
- 625.40 – This will affect commercial chargers more than it will affect residential.

Residential Code Changes

- 210.8(A)(7) – (A) Applies to dwelling units, used to only be required in countertop area.
- 210.8(A)(9) – New code required because bathtubs are not only in bathrooms anymore. New designs now put bathtubs in bedrooms etc. Not required if cord passes through some type of doorway to get to bathtub.
- 210.8E – Mirrors the state requirement
- 210.11(C)(4) – Requires the individual branch circuit that cannot leave the garage/210.52(G)(1) Requires a separate receptacle for each car space.
- 210.12(A),(B),(C) – 2017 requirements, if adopted, will be required Jan 1.
- 310.15(B)(7) – Now service conductor ampacity is required to be no less than 83% of service rating. Similar rule applies for feeders.
- 406.4(D) – Is a receptacle mounted under the sink or counter considered readily accessible? It depends on the Inspector. Some may say no but should be ok with ground fault receptacle in the cabinet.
- 406.12 – New requirement

Commercial Code Changes

- 110.26 – This is something that the engineers should be picking up on and it should be worked out before electricians see it on the plans. All doors must open out for emergency situations.
- 210.8(B) – “Other than dwelling units” used to mean only bathrooms, kitchens and rooftops. Now it includes anywhere outdoors, within 6’ of sink, indoor wet locations, locker rooms, crawlspaces.
- 210.71 – 1000 square feet or less is considered a meeting room. This will happen on the design side.
- 230.82(3) – Unless it’s also service equipment, then it’s marked as service disconnect.
- 250.30(A)(4) – Wherever you can hit it
- 300.22(C)(1) – Only way to tell is to keep the package with the label
- Article 393 – Have connectors that attach to the grid
- 406.3E – Will be in new energy code, required at least 50% in the room. Not currently required.
- 406.5(E) – Uncovered face-up receptacles need to be covered so they don’t fill up with dirt & water
- 406.12 – Exception if over 5 ½ ft. above the floor
- 410.6 – Questionable kits coming in from other countries

- 424.66 – Same requirements of 110.26 now apply in duct heaters
- Article 425 – Does not apply to heating or room air conditioning
- 440.9 – Not required for fans, exhaust or any other equipment, just rooftop AC units
- 450.10 – Because manufacturers are going with as little ventilation as they can
- 450.11 – Label needs to be on transformer or be prepared to provide instructions upon inspection.
- 511.8 – Major change for underground wiring in commercial garages, requirements are now similar to those in airplane hangars.
- 600.6(H)(1) – Exception: If the sign is large enough that the electrical panel is inside the sign, then a disconnect is not required.
- 645.27 – Critical operations data systems such as 911 and banking centers that can never be without power. Selective coordination is done in the engineering/design phase to make sure as little power as possible is turned off when troubleshooting a problem.
- 680.21(C) – Applies to residential or commercial
- 680.80 – Now required on all public pools as per ADA code
- 690.12 – New requirement to have push button that will shut down energy within 10 seconds
- 700.10 – If in building with emergency system, all emergency elements must be identified, electrical boxes painted red etc.
- 700.12 (F)(2)(3) – “Unit equipment” contains a battery. Emergency lighting cannot be fed from a multi-wire branch circuit.