

PLANNING AND DEVELOPMENT DEPARTMENT

MEMORANDUM 17-51

**DATE:** August 28, 2017  
**TO:** Honorable Mayor Joyce Downing and City Council Members  
**FROM:** James A. Hayes, AICP, City Manager  
Brook Svoboda, Director of Planning and Development  
**SUBJECT:** CB 1894 National Electric Code Update

**PURPOSE**

Staff is providing City Council Ordinance 1894, an Ordinance adopting the 2017 National Electric Code.

**BACKGROUND**

In 2012, pursuant to Ordinance No. 1773, Series of 2012, the City Council of Northglenn adopted the 2011 National Electrical Code (NEC), which was codified at Article 3, Chapter 10 of the Northglenn Municipal Code. The State Electrical Board updates the NEC every three years and recommends that municipalities adopt the revised code. Due to a staff oversight, the 2014 NEC was not adopted.

The most current edition is the 2017 edition, and adopting this version will allow the City to stay up to date and in compliance with State Statute - C.R.S. § 12-23-104 requires municipalities to adopt the most current edition of the National Electrical Code. The 2017 National Electrical Code is the most current version adopted by the State Electrical Board. Adopting this edition of the National Electrical Code will allow the City to enforce the State's current electrical code standards. The proposed amendments are consistent with previously adopted version of the Code. **Attachment 1** and **Attachment 2** provide an analysis and summary, both of which were performed (by others), of the changes between the 2014 and 2017 versions.

**UPDATE**

CB-1894 was approved at the July 24, 2017 meeting and a public hearing was scheduled for August 28, 2017.

**BUDGET IMPLICATIONS**

Staff is not recommending any fee schedule changes with the adoption of the code.

**SCHEDULE/TIME IMPLICATIONS**

N/A

**NEXT STEPS/CITY COUNCIL OPTIONS**

City Council can approve, deny or table CB-1894.

**STAFF RECOMMENDATION**

Staff recommends approval of CB-1894.

**STAFF Reference**

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## **ATTACHMENTS**

Attachment 1  
Attachment 2

Executive Summary of Changes of the NEC from 2014 to 2017  
Top 20 2017 NEC Updates

## Summary of the Changes – 2017 National Electrical Code®

Every three years, the *National Electrical Code*® (NEC®) is revised and expanded. Initially the NFPA® received 4,012 public suggestions for changes, which resulted in 1,235 first revisions. There were 1,513 public comments submitted in response to these 1,235 first revisions, resulting in 559 second revisions. Changes included editorial clarification, expanded requirements, new requirements, deleted requirements, and the relocation of other requirements. Nine new articles were proposed, and five new articles were added to the 2017 NEC.

With the fast pace of technology, it's more important than ever for anyone participating in the electrical industry to get up to speed with all the changes. Make sure that you get a copy of the 2017 NEC; then get a copy of Mike Holt's *Illustrated Guide to Changes to the National Electrical Code 2017* textbook that will help you understand the changes. With your *Code* book and Mike's textbook, watch and listen to the DVDs – Mike and his outstanding team of *Code* experts, provide feedback and insight on the topics being discussed, bringing to life the rules, their application, and what impact they will have on your work.

### Article 90—Introduction to the *National Electrical Code*

**90.2 Scope of the NEC.** Changes to this section include the removal of conductors, equipment and raceways, as well as clarifying that utility energy storage equipment isn't covered by the NEC.

**90.3 Code Arrangement.** Editorial revisions to the arrangement of the *Code* clarify how the different chapters in the NEC apply, supplement or modify each other.

## Chapter 1—General Rules

### 100 Definitions

This article contains definitions essential to the application of this *Code*; it does not include general terms or technical terms from other codes and standards. In general, only those terms are used in two or more articles are defined in Article 100.

**Accessible, Readily.** This definition was editorially revised; the language about “whom access is requisite” was removed, and a clarification about the use of keys to gain access clarified.

**Building.** Changes to this definition ensure that building codes, not the *NEC*, are the appropriate place to define a “building.”

**Communications Equipment.** Revisions clarify what Communications Equipment is.

**Communications Raceway.** The definition now indicates which cable types you're likely to see in a Communications Raceway.

**Coordination, Selective (Selective Coordination).** “Coordination, (Selective)” is now “Coordination, (Selective) (Selective Coordination).”

## Summary of the Changes – 2017 National Electrical Code®

**Electric Sign [Article 600].** The definition of “electric sign” is a bit more accurate, though not likely to change anyone’s worldview.

**Interactive Inverter.** This term used to be “Utility Interactive Inverter.”

**Photovoltaic (PV) System.** A change to this definition removes any arguments about whether or not the energy created is “suitable” for connecting to load.

**Raceway.** The definition of “raceway” no longer contains construction specifications, such as “metallic” or “nonmetallic.”

**Receptacle.** A small change was made in order to comply with the *NEC* style manual, and new text regarding a new type of receptacle was added.

**Structure.** A change to this definition clarifies that stand-alone equipment is no longer considered a structure.

### Article 110—Requirements for Electrical Installations

**110.3 Examination, Identification, Installation, Use, and Listing of Equipment.** Changes to this section of the *Code* include addressing reconditioned, refurbished, or remanufactured equipment and providing rules for who may list electrical equipment.

**110.5 Copper Conductors.** A Change to this rule helps to remove misapplication of the *Code*.

**110.9 Interrupting Overcurrent Protection Rating.** A change to this very important rule creates enforceable language.

**110.11 Deteriorating Agents.** New Informational Note intended to make *Code* users aware that there are minimum flood provisions contained in other building codes as they related to electrical installations.

**110.14 Conductor Termination and Splicing.** A properly calibrated tool must be used when torquing terminal connections.

**110.16 Arc-Flash Hazard Warning.** The requirements for warning qualified persons about arc-flash hazards have been increased, again.

**110.21 Markings.** New marking requirements for reconditioned equipment have been added, and the warning signage requirements have been editorially revised.

**110.24 Available Fault Current.** The available fault current calculation required by this section must now be made available upon request.

**110.26 Spaces About Electrical Equipment.** Changes to 110.26 include a new Informational Note refers to NFPA 70E, Standard for Electrical Safety in the Workplace, new requirements for spaces with “limited access”, and clarification of the outdoor dedicated space rules.

## Chapter 2—Wiring and Protection

### Article 210—Branch Circuits

**210.1 Scope.** Article 210 provides the general requirements for branch circuits such as, conductor sizing, overcurrent protection, identification, GFCI and AFCI protection, as well as receptacle outlets and lighting outlet requirements.

**210.4 Multiwire Branch Circuits.** The conductor grouping requirements for multiwire branch circuits now mirror similar rules contained in 200.4(B).

**210.5 Identification for Branch Circuits.** Existing wiring systems are now addressed in the requirement of marking and posting the identification of conductors when more than one voltage systems present on the premises wiring systems.

**210.7 Multiple Branch Circuits.** The rule requiring simultaneous disconnect for multiple branch circuits was editorially revised.

**210.8 GFCI Protection.** New informational note added, the methods used for measuring GFCI requirements are now addressed, some three-phase circuits now require protection, and new requirements for crawl spaces have been added.

**210.11 Branch Circuits Required.** The rules for the circuiting of dwelling unit garages have been relocated, and an exception was added.

**210.12 Arc-Fault Circuit-Interrupter Protection.** The AFCI requirements have been greatly expanded.

**210.52 Dwelling Unit Receptacle Outlet Requirements.** Many changes have been made to dwelling unit receptacle location rules, most having to do with countertops and work surfaces.

**210.64 Electrical Service Areas.** The rule requiring a convenience receptacle near the service disconnect was revised.

**210.70 Lighting Outlet Requirements.** Wall switch lighting outlet rules include adding wall switches for kitchens lighting, the use of dimmers for stairway lighting, and lighting in underfloor areas attics, equipment spaces, and similar areas of other than dwelling units.

**210.71 Meeting Rooms.** New rules require receptacle outlets for meeting rooms in commercial occupancies.

### Article 215—Feeders

**215.2 Minimum Rating.** A new rule clarifies the application of smaller feeder conductors sizing when using separate 90°C terminations in accordance with 110.14(C)(2).

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

**220.12 General Lighting.** A new exception for calculating lighting loads might result in designers dancing in the streets.

**220.87 Determining Existing Loads.** The allowance for using real world data when determining load calculations of existing installation was clarified.

### Article 225—Outside Branch Circuits and Feeders

**225.17 Masts as Supports.** The rules for overhead masts were editorially revised.

**225.22 Raceways on Exterior Surfaces.** This section was revised to use more accurate terms.

**225.27 Raceway Seals.** The requirements for sealing of raceways entering buildings from the outside have been expanded.

**225.30 Number of Feeder Supplies.** An additional feeder supply is now allowed for one- or two-family dwellings.

### Article 230—Services

**230.10 Vegetation as Support.** Trees are no longer allowed to support service equipment.

**230.29 Supports over Buildings.** A new section for overhead conductor support above buildings was added.

**230.42 Size and Rating.** The sizing requirements for service conductors have been revised for consistency with similar rules elsewhere in the *NEC*.

**230.53 Raceways on Exterior Surfaces.** This section was revised to use more accurate terms.

**230.54 Overhead Service Locations.** A clarification to the rules on service heads was made.

**230.66 Listed as Suitable for Service Equipment.** The rules requiring service equipment to be listed have been revised to include field labeled equipment, and a new requirement for meter socket enclosures was added.

**230.82 Connected on Supply Side of the Service Disconnect.** Wind and energy storage systems can now be installed on the supply side of the service disconnect.

**230.91 Location.** A new requirement for fused disconnects was added.

### Article 240—Overcurrent Protection

**240.24 Location of Overcurrent Devices.** The accessibility of overcurrent devices was clarified.

### Article 250—Grounding and Bonding

**250.4 General Requirements for Grounding and Bonding.** New Informational notes to inform *Code* user of NFPA 780, *Standard of Lightning Protection Systems*.

**250.24 Service Equipment—Grounding and Bonding.** Sizing the service neutral conductor when using a cable wiring methods is now addressed.

**250.30 Separately Derived Systems—Grounding and Bonding.** The requirement to use either structural metal or water piping as the preferred grounding electrodes was removed. Metal water piping can now be used for multiple separately derived systems, and the dimensions of the busbar used to splice grounding electrode conductors was clarified.

## Summary of the Changes – 2017 National Electrical Code®

**250.52 Grounding Electrode Types.** The description of what used to be known as structural metal was revised...again, coatings for plate electrodes must be electrically conductive, and swimming pools can't be used as a grounding electrode now.

**250.53 Grounding Electrode Installation Requirements.** The installation requirements for ground ring electrodes were revised for consistency with other rules and it was clarified that coatings on plate electrodes must be electrically conductive.

**250.60 Lightning protection Electrode.** The informational notes regarding lightning protection electrodes were both revised.

**250.66 Sizing Grounding Electrode Conductor.** The text of "sole connection" for rods, pipes, plates, rings, and concrete encased electrodes was clarified.

**250.68 Termination to the Grounding Electrode.** The five feet rule for underground water piping electrodes was clarified, the methods of connecting structural metal to the grounding electrode system have been relocated here, and rebar outside of the concrete was clarified.

**250.80 Service Raceways and Enclosures.** The items that aren't required to be bonded in underground service raceways have been expanded.

**250.86 Other Enclosures.** The items that aren't required to be bonded in underground raceways containing branch circuits and feeders have been expanded beyond just metal elbows.

**250.94 Bonding for Communications Systems.** The title of this section, which requires a bonding mechanism for limited energy systems, was revised for accuracy, options have been added, and a new exception was added.

**250.102 Grounded Conductor, Bonding Conductors, and Jumpers.** Several changes to this section including adding "Grounded Conductor" to the title that improves the accuracy and usability of this section.

**250.104 Bonding of Piping Systems and Exposed Structural Metal.** The requirements for bonding piping systems and structural metal have been editorially revised.

**250.118 Types of Equipment Grounding Conductors.** The allowance for using flexible metal conduit as an equipment grounding conductor are being restricted once again.

**250.122 Sizing Equipment Grounding Conductor.** The requirements for sizing EGCs for voltage drop and for feeder circuits have been clarified.

**250.148 Continuity and Attachment of Equipment Grounding Conductors to Boxes.** The requirements for splicing equipment grounding conductors in boxes have been edited to replace the word any with the word all. This has been no change in the meaning.

### Chapter 3—Wiring Methods and Materials

#### Article 300—General Requirements for Wiring Methods and Materials

**300.3 Conductors.** The exception allowing for parallel isolated phase installations was clarified.

**300.4 Protection Against Physical Damage.** An Informational Note was added to address superficial damage of cables or conduits.



## Summary of the Changes – 2017 National Electrical Code®

**300.5 Underground Installations.** Several changes have been made to the rules for underground installations including added footnotes in table 300.5, clarifications to requirements for parallel conductors, burial warning ribbons, sealing underground raceways, and backfill materials.

**300.7 Raceways Exposed to Different Temperatures.** The requirements for raceway expansion fittings now apply to other fittings as well.

**300.11 Securing and Supporting.** The rules for securing and supporting wiring methods were editorially revised to clarify it is a general rule.

**300.12 Mechanical Continuity.** The text about “metallic and nonmetallic” raceways was removed from the rule relating to mechanical continuity.

**300.19 Supporting Conductors in Vertical Raceways.** The rule about supporting conductors in vertical installations was clarified.

**300.22 Wiring in Ducts and Plenums Spaces.** Greater restrictions were added to the installation of limited-energy cables inside a physically constructed air movement duct.

### Article 310—Conductors for General Wiring

**310.15 Conductor Ampacity.** As always, many changes to the rules for establishing conductor ampacities have been made including requirements for cable bundling, rooftop temperature correction, and dwelling service conductor sizing.

### Article 312—Cabinet and Cutout Boxes

**312.8 Switch and Overcurrent Device Enclosures.** The rules for sufficient conductor space within cabinets have been revised to deal with power monitoring equipment.

### Article 314—Outlet, Device, Pull, and Junction Boxes; Conduit Bodies; and Handhole Enclosures

**314.15 Damp or Wet Locations.** Field-installed drainage holes now have a 1/8" minimum size.

**314.16 Number of Conductors in Boxes and Conduit Bodies.** The conductor fill calculation for boxes with a barrier is now addressed.

**314.17 Conductors That Enter Boxes or Conduit Bodies.** Nonmetallic-sheathed cables installed in metal boxes must now meet the ¼ in. cable sheath rule.

**314.20 Flush-Mounted Box Installations.** The rules for flush-mounted boxes have been expanded and clarified to cover all installations.

**314.27 Outlet Box.** New text addresses “receptacles” that support stuff...like luminaires and paddle fans.

**314.28 Sizing Boxes and Conduit Bodies—Conductors 4 AWG and Larger.** The allowance for using conduit bodies smaller than generally required was clarified, and power distribution blocks on the supply side of the service are now allowed if listed for the location.



### Article 320—Armored Cable (Type AC)

**320.6 Listing Requirement.** Type AC Cable and its associated fittings must now be listed.

**320.30 Securing and Supporting.** Cable ties for securing and supporting must now be listed.

### Article 330—Metal-Clad Cable (Type MC)

**330.6 Listing Requirements.** Type MC Cable and its associated fittings must now be listed.

**330.15 Exposed Work.** New requirements for the installation of exposed Type MC Cables have been added.

**330.30 Securing and Supporting.** Cable ties for securing and supporting must now be listed.

### Article 334—Nonmetallic-Sheathed Cable (Types NM and NMC)

**334.6 Listing Requirements.** Type NM Cable fittings must now be listed.

**334.12 Uses Not Permitted.** An editorial change was made to the language regarding ceilings.

**334.30 Securing and Supporting.** Cable ties for securing and supporting must now be listed.

### Article 336—Power and Control Tray Cable: Type TC

**336.6 Listing Requirements.** Type TC Cable fittings must now be listed.

### Article 338—Service-Entrance Cable (Types SE and USE)

**338.6 Listing Requirements.** Type SE Cable and its associated fittings must now be listed.

**338.10 Uses Permitted.** The conductor ampacity correction and adjustment rules for Type SE Cable have changed...again.

### Article 340—Underground Feeder and Branch-Circuit Cable (Type UF)

**340.6 Listing Requirements.** Type UF Cable fittings must now be listed.

### Article 342—Intermediate Metal Conduit (Type IMC)

**342.10 Uses Permitted.** IMC in corrosive environments must now be approved for the location.

### Article 344—Rigid Metal Conduit (Type RMC)

**344.10 Uses Permitted.** RMC in corrosive environments must now be approved for the location.

**344.14 Dissimilar Metals.** The rules for using fittings of dissimilar metal than the metal raceway have been clarified.

### Article 348—Flexible Metal Conduit (Type FMC)

**348.30 Securing and Supporting.** Cable ties for securing and supporting must now be listed.

### Article 350—Liquidtight Flexible Metal Conduit (Type LFMC)

**350.28 Trimming.** A new rule requires the cut edges of liquidtight flexible metal conduit to be trimmed.

**350.30 Securing and Supporting.** Cable ties for securing and supporting must now be listed.

### Article 356—Liquidtight Flexible Nonmetallic Conduit (Type LFNC)

**356.30 Securing and Supporting.** Cable ties for securing and supporting must now be listed.

### Article 358—Electrical Metallic Tubing (Type EMT)

**358.10 Uses Permitted.** The permitted uses list for electrical metallic tubing (EMT) was greatly expanded.

### Article 362—Electrical Nonmetallic Tubing (Type ENT)

**362.30 Securing and Supporting.** Cable ties for securing and supporting must now be listed.

### Article 376—Metal Wireways

**376.20 Conductors Connected in Parallel.** A new requirement for grouping parallel conductors was added.

**376.22 Number of Conductors and Ampacity.** The conductor fill rules for wireway sizing now include requirements for cables installed in wireways.

**376.56 Splices, Taps, and Power Distribution Blocks.** An allowance has been added for the use of power distribution blocks on the supply side of the service disconnect.

## Article 392—Cable Trays

**392.22 Number of Conductors or Cables.** The cable tray conductor fill sizing calculations have been clarified.

**392.80 Ampacity of Conductors.** An Informational Note was added to remind the *Code* user of the conductor termination temperature rules.

## Chapter 4—Equipment for General Use

### Article 400—Flexible Cords and Flexible Cables

The title of this article was changed to more clearly address its application.

**400.1 Scope.** A new Informational Note was added to try to clear up the scope of Article 400.

**400.12 Uses Not Permitted.** Changes attempt to clarify the restriction on cord use above a suspended ceiling.

### Article 404—Switches

**404.2 Switch Connections.** An attempt was made to clarify the rule on when you need a neutral wire at switches.

**404.9 Switch Faceplates.** A new requirement for metal faceplates to be “grounded” was added.

**404.22 Electronic Lighting Switches.** A new rule requires electronic switch manufacturers to use a neutral for return current, not the equipment grounding conductor.

### Article 406—Receptacles, Cord Connectors, and Attachment Plugs (Caps)

**406.2 Definitions.** A new definition for “outlet box hoods” was added.

**406.3 Receptacle Rating and Type.** The rules on automatically controlled receptacles have been revised, and new text regarding receptacles with USB outlets was added.

**406.4 General Installation Requirements.** Two Informational Notes about replacing nongrounding type receptacles have been added, and the rule for providing AFCI protection at replacement receptacles was clarified.

**406.5 Receptacle Mounting.** The rules governing the installation of receptacles in countertops and work surfaces have been clarified.

**406.6 Receptacle Faceplates.** A new rule requiring cover plates with USB ports or with night lights to be listed was added.

**406.12 Tamper-Resistant Receptacles.** The locations requiring tamper-resistant receptacles have been expanded, as have the types of receptacles requiring such protection.

### Article 408—Switchboards, Switchgear, and Panelboards

**408.4 Field Identification.** The requirement for marking other than dwelling unit panels was expanded.

### Article 411—Low Voltage Lighting

**411.1 Scope.** The title of this article, as well as its scope, has been changed to more accurately describe the allowable voltages of these systems.

### Article 422—Appliances

**422.5 Ground-Fault Circuit-Interrupter (GFCI) Protection for Personnel.** The rules for providing GFCI protection for specific appliances found throughout Article 422 have been relocated to this section, the voltage and current ratings for equipment requiring GFCI's have been specified, and the options for protection methods have been expanded.

**422.6 Listing Required.** A new rule requires most appliances to be listed.

**422.16 Flexible Cords.** The cord requirements for dishwashers and trash compactors have been revised to reflect product standards.

**422.18 Support of Ceiling Paddle Fans.** This section was edited to include listed outlet box systems, SQL receptacles meeting 314.27(E) requirements.

**422.21 Covering of Combustible Material at Outlet Boxes.** The requirement for covering noncombustible finishes inside the fan canopy has been greatly reduced.

**422.31 Permanently Connected Appliance Disconnects.** The disconnect rules for appliances are now all the same, regardless of VA or HP rating.

### Article 424—Fixed Electric Space-Heating Equipment

**424.38 Area Restrictions.** The allowable locations for space-heating cables have been extensively revised.

**424.39 Clearance from Other Objects and Openings.** The rules for heating cables near lights have been clarified.

### Article 430—Motors, Motor Circuits, and Controllers

**430.99 Available Fault Current.** A new rule requiring motor control centers to be marked with the available fault current was added.

### Article 440—Air-Conditioning and Refrigeration Equipment

**440.9 Grounding and Bonding.** A wire-type equipment grounding conductor is now required for some air-conditioning installations.

### Article 445—Generators

**445.18 Disconnecting Means and Shutdown of Prime Mover.** The rules for a generator disconnecting means have been clarified. And this time we mean it!

**445.20 GFCI for Receptacles on 15 kW or Smaller Portable Generators.** The rules for GFCI protection of generators is now different for bonded neutral and floating neutral generators.

### Article 480—Storage Batteries

**480.3 Listing Requirement.** Most batteries must now be listed.

**480.4 Battery and Cell Terminations.** The requirement for using anti-oxidizing compounds on terminations was clarified.

**480.9 Battery Support Systems.** The requirements for battery support systems have been decreased.

## Chapter 5—Special Occupancies

### Article 500—Hazardous (Classified) Locations

**500.2 Definitions.** Section 500.2 (definitions) has been deleted and relocated to Article 100.

### Article 501—Class I Hazardous (Classified) Locations

**501.10 Wiring Methods.** Threadless intermediate metal conduit and rigid metal conduit fittings will now be permitted in Class I, Division 2 locations.

**501.15 Raceway and Cable Seals.** Clarifications for factory-sealed equipment were made, and provisions for sealing equipment in accordance with manufacturer's instructions were added.

**501.115 Enclosures.** The types of equipment not requiring a seal have been clarified.

**501.145 Receptacles and Attachment Plugs.** The allowance for using attachment plugs in Class I locations has been changed.

### Article 511—Commercial Garages, Repair, and Storage

**511.3 Classification of Hazardous Areas.** This section of the *NEC*, used to determine area classifications in commercial garages, has been turned into a table.

**511.8 Underground Wiring.** A new section was added detailing the requirements for wiring beneath commercial garage floors.

### Article 514—Motor Fuel Dispensing Facilities

**514.8 Underground Wiring.** The allowance for underground nonmetallic raceways was expanded to permit HDPE conduit.

**514.9 Raceway Seal.** The installation requirement for raceway seal fittings now matches 501.15 for boundary seals.

**514.11 Circuit Disconnect.** The requirements for emergency electrical shutoff devices for fuel dispensers have been (somewhat) clarified and a new requirement was added for unattended dispensing facilities.

### Article 517—Health Care Facilities

**517.2 Definitions.** New definitions for Governing Body and Medical Office (Dental Office) have been added, and existing definitions for Health Care Facility and Patient Care Space have been clarified.

**517.13 Grounding of Equipment in Patient Care Spaces.** Some requirements for equipment grounding conductors (EGCs) in patient care spaces have been expanded while others are now reduced. Exception 2 of 517.13(B) was clarified and isolated ground receptacles are no longer a black hole in this rule.

**517.16 Isolated Ground Receptacles.** The allowances for isolated ground receptacles in health care facilities now make sense.

### Article 525—Carnivals, Circuses, Fairs, and Similar Events

**525.23 GFCI-Protected Receptacles and Equipment.** GFCI devices that are part of portable cords must now be listed for portable use.

### Article 547—Agricultural Buildings

**547.2 Definitions.** The definition of equipotential plane was revised for accuracy.

### Article 550—Mobile Homes, Manufactured Homes, and Mobile Home Parks

**550.13 Receptacle Outlets.** Dishwashers in mobile and manufactured homes must now be GFCI protected.

**550.25 AFCI Protection.** The AFCI protection requirements for manufactured and mobile homes now mirror the rules for dwellings in 210.12.

### Article 555—Marinas, Boatyards, and Commercial and Noncommercial Docking Facilities

**555.1 Scope.** The title of this article, its scope, and many of its provisions were changed to include residential installations.

**555.3 Ground-Fault Protection.** The trip setting requirements of the ground-fault protection device required in this article were changed.

**555.24 Electric Shock Hazard Sign.** A new warning sign is required at boat docks or marinas.

### Article 590—Temporary Installations

**590.4 General.** Changes to this section expand allowable wiring methods to include SE cable and revises rules relating to open splices on temporary wiring.

**590.6 Ground-fault Protection for Personnel.** “Special Purpose GFCIs” are now permitted for receptacles other than those rated 15A, 20A, and 30A, 125V.

## Chapter 6—Special Equipment

### Article 600—Electric Signs and Outline Lighting

**600.1 Scope.** Retrofit kits for signs are now covered by this article.

**600.2 Definitions.** A new definition for “Photovoltaic (PV) Powered Sign” was added.

**600.4 Markings.** A new requirement for marking of retrofitted signs was added.

**600.6 Disconnecting Means.** Several changes have been made to the disconnect requirement for signs, including adding an Informational Note to express the intent of the rule, clarifying which conductors require disconnection, adding an exception for signs that contain a panelboard, indicating the location and type of warning sign in instances where the disconnect is remote, and adding an exception for the controller disconnect.

**600.24 Class 2 Power Sources.** A clarification to requirements for the grounding and bonding of Class 2 power sources has been made.



## Summary of the Changes – 2017 National Electrical Code®

**600.33 Class 2 Sign Illumination Systems, Secondary Wiring.** A new table was added to discuss the cable types that can be used for Class 2 signs circuits.

**600.34 Photovoltaic (PV) Powered Sign.** A new section for PV powered signs was added.

### Article 604—Manufactured Wiring Systems

**604.6 Listing Requirements.** Manufactured wiring systems must now be listed.

### Article 620—Elevators, Escalators, and Moving Walks

**620.16 Short-Circuit Current Rating.** Elevator control panels must now be marked with the short-circuit current rating.

**620.23 Branch Circuit for Machine Room/Machinery Space.** The circuiting requirements for lighting and receptacles in the equipment machine room/machinery space have been expanded.

**620.24 Branch Circuit for Hoistway Pit Lighting and Receptacles.** The circuiting requirements for lighting and receptacles in a hoistway pit area have been expanded, and a new Informational Note was added.

**620.51 Disconnecting Means.** The equipment that requires a disconnecting means is now clear.

**620.85 GFCI-Protected Receptacles.** The receptacle GFCI rules for elevators and similar equipment were expanded.

### Article 625—Electric Vehicle Charging System

**625.2 Definitions.** A new definition for “Wireless Power Transfer Equipment (WPTE)” was added.

**625.5 Listed.** The equipment required to be listed was clarified.

**625.40 Electric Vehicle Branch Circuit.** The circuiting requirement for electric vehicle charging systems has been relocated from 210.17 to 625.40.

### Article 630—Welders

**630.6 Listing.** A new requirement for the listing of welding and cutting equipment was added.

**630.31 Ampacity of Supply Conductors.** The language regarding voltage drop for resistance welders has been relegated to an Informational Note.

### Article 640—Audio Signal Processing, Amplification, and Reproduction Equipment

**640.3 Locations and Other Articles.** The “requirements” for audio cables in ducts, plenums, and air-handling spaces are now really “requirements.”

## Summary of the Changes – 2017 National Electrical Code®

**640.25 Loudspeakers in Fire-Resistance-Rated Partitions, Walls, and Ceilings.** The rules for loudspeakers in fire-resistance-rated assemblies have been lessened.

### Article 645—Information Technology Equipment

**645.3 Other Articles.** The wiring methods permitted in plenum spaces above information technology rooms are more clearly stated.

**645.4 Special Requirements.** The applicability of Article 645 has been clarified, again.

**645.5 Supply Circuits and Interconnecting Cables.** The permitted wiring methods under raised floors in IT equipment rooms are now contained in an even bigger list than before and a new Informational Note was added about securing and supporting.

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

**680.2 Definitions.** A new definition for “electrically powered pool lift” was added and the definition for storable pools (and other storable features) was revised.

**680.4 Approval of Equipment.** A new rule requires electrical equipment associated with pools to be listed.

**680.7 Grounding and Bonding Terminals.** Grounding and bonding terminals now have specific location-driven requirements.

**680.11 Underground Wiring.** The cover (burial depth) requirements for pools and similar installations are now no different than those for other installations.

**680.12 Equipment Rooms and Pits.** A reminder that pools and similar installations are in corrosive environments was added.

**680.14 Corrosive Environment.** A new section provides the requirements for equipment subject to corrosion.

**680.21 Motors.** The allowable methods for wiring a pool motor have been greatly simplified.

**680.22 Lighting, Receptacles, and Equipment.** The requirements for receptacles supplying circulation pumps were lessened, and new provisions for “low-voltage gas fired” equipment were added.

**680.23 Underwater Luminaires.** Some unenforceable language about GFCI protection has been removed, and the allowable wiring methods for underwater luminaires have been simplified.

**680.25 Feeders.** The wiring methods for feeders supplying pools and similar installations were changed into a reasonable requirement.

**680.26 Equipotential Bonding.** Changes to the bonding requirements of perimeter surfaces (decking) were made for accuracy and logic.

**680.28 Gas-Fired Water Heaters.** New GFCI provisions for gas-fired water heaters were added.

**680.42 Outdoor Installations.** The rules for the interior wiring supplying outdoor spas and hot tubs were simplified.

**680.74 Equipotential Bonding.** The rules for bonding hydromassage tubs have been revised, again.

**680.80 General.** A new Part VIII, covering electrically powered pool lifts, was added to this article.

### Article 695—Fire Pumps

**695.14 Control Wiring.** The fire pump control wiring methods have been expanded.

**695.15 Surge Protection.** Fire pump controllers must now have surge protection.

### Chapter 7—Special Conditions

#### Article 700—Emergency Systems

**700.3 Tests and Maintenance.** The equipment that might require maintenance is no longer limited to just batteries.

**700.5 Transfer Equipment.** Transfer equipment must now be marked by the installer to indicate its short-circuit current rating.

**700.10 Wiring.** Raceways and cables, as well as receptacles, for emergency systems must now be marked, and the exception regarding selective coordination for breakers feeding a common bus was turned into positive *Code* language.

**700.12 General Requirements.** The requirements for batteries permitted for emergency power have been revised.

#### Article 701—Legally Required Standby Systems

**701.3 Tests and Maintenance.** The equipment that may require maintenance is no longer limited to just batteries.

**701.5 Transfer Equipment.** Transfer equipment must now be marked by the installer to indicate its short-circuit current rating.

#### Article 702—Optional Standby Systems

**702.5 Transfer Equipment.** Transfer equipment must now be marked by the installer to indicate its short-circuit current rating.

#### Article 725—Remote-Control, Signaling, and Power-Limited Circuits

**725.1 Scope.** The scope of this article was revised for accuracy to include circuits that are part of utilization equipment.

**725.3 Other Articles.** This article now contains provisions for cable routing assemblies and communications raceways.

**725.121 Power Sources for Class 2 and Class 3 Circuits.** Some of the Class 2 power sources will require a label, effective January 1st, 2018.

**725.144 Transmission of Power and Data.** A new section and table were added to address cables that transmit power and data.

**725.179 Listing and Marking of Class 2 and Class 3 Cables.** Type LP (limited power) cable was added.

### Article 760—Fire Alarm Systems

**760.3 Other Articles.** This article now contains provisions for cable routing assemblies and for communications raceways.

**760.179 Listing and Marking of Power-Limited Fire Alarm Cables (PLFA).** Power-limited fire alarm cables must now have a temperature rating of at least 60°C.

### Article 770—Optical Fiber Cables and Raceways

**770.2 Definitions.** Many definitions have been relocated to Article 100.

**770.24 Mechanical Execution of Work.** A new Informational Note was added to warn people about the effect paint, cleaners, and similar contaminants might have on cable jackets.

## Chapter 8—Communications Systems

### Article 800—Communications Circuits

**800.2 Definitions.** The definition of “point of entrance” was revised.

**800.24 Mechanical Execution of Work.** A new Informational Note was added to warn people about the effect of paint, cleaners, and similar contaminants might have on cable jackets.

**800.100 Cable and Primary Protector Bonding and Grounding.** This section was revised to clarify that installing an intersystem bonding terminal is always okay.

**800.133 Installation of Communications Wires, Cables, and Equipment.** The types of circuits that can share a raceway or other enclosure with communications cables were increased.

### Article 810—Radio and Television Satellite Equipment

**810.15 Metal Antenna Supports—Grounding.** The requirement to ground antennas was reduced.

### Article 820—Community Antenna Television (CATV) and Radio Distribution Systems (Coaxial Cable)

**820.2 Definitions.** The definition of “point of entrance” was revised to be consistent with similar sections of the *NEC*.

**820.24 Mechanical Execution of Work.** A new Informational Note was added to warn people about the effect of paint, cleaners, and similar contaminants might have on cable jackets.

**820.100 Bonding and Grounding Methods.** This section was revised to clarify that installing an intersystem bonding terminal is always okay.

**820.133 Installation of Coaxial Cables and Equipment.** The types of circuits that can share a raceway or other enclosure with coaxial cable were increased.

## Top 20 2017 NEC Updates

20. No. 20 — Ground-Fault Protection for Personnel New allowances permit listed cord sets or devices with GFCI protection in addition to the required GFCI protection for personnel, and now permit “special-purpose GFCIs” for receptacles.
19. No. 19 — Electric Shock Hazard Signage A new Section requires a warning sign at boat docks or marinas.
18. No. 18 — Ground-Fault Detection The trip setting of the ground-fault protection device required in this Section was reduced.
17. No. 17 — Scope Change The title of Art. 555, its scope, and many of its provisions were changed to include residential installations.
16. No. 16 — Grounding of Equipment in Patient Care Spaces The title of this Section was changed to match the rest of the Article. Some requirements for equipment grounding conductors (EGCs) in patient care spaces have been expanded while others are now reduced. Exception No. 2 of Sec. 517.13(B) was clarified and isolated ground receptacles are no longer a black hole in this rule
15. No. 15 — Grounding and Bonding A wire-type equipment grounding conductor is now required for some airconditioning installations.
14. No. 14 — Tamper-Resistant Receptacles The locations requiring tamper-resistant receptacles have been expanded, as have the types of receptacles requiring such protection.
13. No. 13 — Electronic Lighting Switches A new rule requires electronic switch manufacturers to use a neutral for return current, not the equipment grounding conductor.
12. No. 12 — Switch Connections An attempt was made to clarify when a neutral is required at a switch.
11. No. 11 — Uses Not Permitted Changes attempt to clarify the restriction on cord use above a suspended ceiling. But unfortunately, the attempt failed.
10. No. 10 — Conductors Connected in Parallel A new requirement for grouping parallel conductors was added.
9. No. 9 — Sizing Boxes and Conduit Bodies: Conductors 4 AWG and Larger The allowance for using conduit bodies smaller than generally required was clarified, and power distribution blocks on the supply side of the service are now allowed (if listed for the location).
8. No. 8 — Switch and Overcurrent Protection Device Enclosures The rules for sufficient conductor space within cabinets have been revised to deal with power monitoring equipment.
7. No. 7 — Conductor Ampacity As always, many changes to the rules for establishing conductor ampacities have been made, including requirements for cable bundling, rooftop temperature correction, and dwelling service conductor sizing.
6. No. 6 — Sizing Grounding Electrode Conductors The text of “sole connection” for rods, pipes, rings, and concrete-encased electrodes was clarified.

5. No. 5 — Meeting Rooms New rules require receptacle outlets for meeting rooms in commercial occupancies
4. No. 4 — AFCI Protection The AFCI requirements have been greatly expanded.
3. No. 3 — GFCI Protection Appliance GFCI requirements were relocated to Sec. 422.5, measuring and GFCI requirements for receptacles near sinks was clarified, GFCI requirements for unfinished basement and non-dwelling receptacles were clarified, and new requirements were added for crawl spaces.
2. No. 2 — Conductor Termination and Splicing A properly calibrated tool must be used when torquing terminal connections.
1. No. 1 — Listing of Equipment Changes to this Section of the Code include addressing reconditioned, refurbished, or remanufactured equipment and providing rules for who may list electrical equipment.

SPONSORED BY: MAYOR DOWNING

COUNCILMAN'S BILL

ORDINANCE NO.

No. CB-1894  
Series of 2017

\_\_\_\_\_  
Series of 2017

A BILL FOR AN ORDINANCE REPEALING AND REENACTING ARTICLE 3 TO CHAPTER 10 OF THE NORTHGLENN MUNICIPAL CODE TO ADOPT BY REFERENCE THE 2017 NATIONAL ELECTRICAL CODE WITH AMENDMENTS

WHEREAS, in 2012, pursuant to Ordinance No. 1625, Series of 2012, the City Council of Northglenn adopted the 2011 National Electrical Code, which was codified at Article 3, Chapter 10 of the Northglenn Municipal Code;

WHEREAS, the City Council therefore desires to repeal its adoption of the 2011 National Electrical Code, and adopt the 2017 National Electrical Code, sponsored by the National Fire Protection Association, Quincy, Massachusetts, as adopted by the State of Colorado, to help ensure that the buildings in the City remain in good and safe repair, which ensures the health, safety and welfare of the public, and which improves the value of all property within the City, and helps make the City a desirable place within which to reside and do business.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF NORTHGLENN, COLORADO, THAT:

SECTION 1. ARTICLE 3 OF CHAPTER 10 OF THE NORTHGLENN MUNICIPAL CODE IS HEREBY REPEALED IN ITS ENTIRETY AND RE-ENACTED TO READ AS FOLLOWS:

SECTION 10-3-1. TITLE. THIS ORDINANCE SHALL BE KNOWN AND CITED AS THE NATIONAL ELECTRICAL CODE.

SECTION 10-3-2. ADOPTION OF THE 2017 NATIONAL ELECTRICAL CODE. THE 2017 NATIONAL ELECTRICAL CODE, SPONSORED BY THE NATIONAL FIRE PROTECTION ASSOCIATION, QUINCY, MASSACHUSETTS, AS ADOPTED BY THE STATE OF COLORADO, IS ADOPTED BY REFERENCE AS A PRIMARY CODE TO HAVE THE SAME FORCE AND EFFECT AS THOUGH SET FORTH IN THIS CHAPTER IN EVERY PARTICULAR.

SECTION 10-3-3. COPIES ON FILE. AT LEAST ONE CERTIFIED COPY OF THE 2017 NATIONAL ELECTRICAL CODE, AS ADOPTED BY THE STATE OF COLORADO, IS ON FILE IN THE OFFICE OF THE CITY CLERK AND MAY BE INSPECTED DURING REGULAR BUSINESS HOURS.

SECTION 10-3-4. SCOPE. THE PURPOSE OF THE CODE IS NOT TO CREATE OR OTHERWISE ESTABLISH OR DESIGNATE ANY PARTICULAR



CLASS OR GROUP OF PERSONS WHO WILL OR SHOULD BE ESPECIALLY PROTECTED OR BENEFITED BY THE TERMS OF THE CODE.

SECTION 10-3-5. ADOPTION OF ANNEX H.

ANNEX H IS HEREBY ADOPTED WITH THE FOLLOWING AMENDMENTS:

(A) ARTICLE 80.5 IS HEREBY DELETED IN ITS ENTIRETY.

(B) ARTICLE 80.13(13) IS HEREBY AMENDED BY THE INSERTION OF "TWO (2) BUSINESS DAYS" IN THE BLANK SPACE.

(C) ARTICLE 80.15 IS HEREBY AMENDED IN ITS ENTIRETY TO READ AS FOLLOWS:

"APPEALS OF ORDERS, DECISIONS OR DETERMINATIONS MADE BY THE BUILDING OFFICIAL RELATIVE TO THE APPLICATION AND INTERPRETATION OF THIS CODE MAY BE MADE TO THE NORTHGLENN BOARD OF ADJUSTMENT. APPEALS SHALL BE IN ACCORDANCE WITH SECTION 11-42-5 OF THE NORTHGLENN ZONING ORDINANCE."

(D) ARTICLE 80.19(E) IS HEREBY AMENDED IN ITS ENTIRETY TO READ AS FOLLOWS:

THE FEE FOR EACH PERMIT REQUIRED UNDER THE NATIONAL ELECTRICAL CODE SHALL BE AS SET FORTH BELOW:

ELECTRICAL PERMIT FEES.

RESIDENTIAL: THIS INCLUDES SINGLE FAMILY DWELLINGS, SITE-BUILT AND MODULAR/FACTORY-BUILT HOMES, DUPLEXES, CONDOMINIUMS, AND TOWNHOMES.

1) NOT MORE THAN 1,000 SQUARE FEET	\$100.00
2) 1,001 SQUARE FEET AND NOT MORE THAN 1,500 SQUARE FEET	\$150.00
3) 1,501 SQUARE FEET AND NOT MORE THAN 2,000 SQUARE FEET	\$200.00
4) PER 100 SQUARE FEET IN EXCESS OF 2,000 SQUARE FEET	\$10.00

ALL OTHER ELECTRICAL FEES: EXCEPT AS PROVIDED ABOVE, ELECTRICAL FEES SHALL BE COMPUTED ON THE DOLLAR VALUE OF THE ELECTRICAL INSTALLATIONS INCLUDING TIME, MATERIAL, AND

CONTRACTOR PROFIT. SUCH FEES SHALL BE CALCULATED AS FOLLOWS:

1) PROJECTS UNDER \$500 (INCLUDING MATERIAL AND LABOR)	\$50.00
2) NOT MORE THAN \$2,000.00	\$100.00
3) \$2,001 AND ABOVE	\$100 + \$10 PER THOUSAND OR FRACTION THEREOF

MISCELLANEOUS ELECTRICAL FEES:

1) MOBILE/MODULAR HOME AND TRAVEL TRAILER PARKS, PER SPACE	\$100.00
2) RE-INSPECTION FEE FOR ALL OF THE ABOVE	\$50.00
3) ADD FEE FOR TEMPORARY HEAT RELEASE	\$50.00

(E) ARTICLE 80.19(F)(3) IS HEREBY AMENDED BY THE INSERTION OF "TWO (2) BUSINESS DAYS" IN THE BLANK SPACE.

(F) ARTICLE 80.23 IS HEREBY AMENDED IN ITS ENTIRETY TO READ AS FOLLOWS:

IT SHALL BE UNLAWFUL FOR ANY PERSON TO VIOLATE ANY OF THE PROVISIONS OF THE NATIONAL ELECTRICAL CODE.

ANY VIOLATION OF THE PROVISIONS OF THIS ORDINANCE AND ANY VIOLATION OF ANY OF THE PROVISIONS OF THE NATIONAL ELECTRICAL CODE, AS ADOPTED, SHALL, UPON CONVICTION, BE PUNISHABLE AS PROVIDED IN SECTION 1-1-10(a)(2) OF THE NORTHGLENN MUNICIPAL CODE.

(G) ARTICLE 80.25(C) IS HEREBY AMENDED BY THE INSERTION OF "TWO (2) BUSINESS DAYS" IN THE BLANK SPACE.

(H) ARTICLE 80.27(A) IS HEREBY AMENDED BY THE INSERTION OF "CITY OF NORTHGLENN" IN THE BLANK SPACE.

(I) ARTICLE 80.27(B)(3) IS HEREBY AMENDED BY THE INSERTION OF "COLORADO" IN THE BLANK SPACE.

(J) ARTICLE 80.27(B)(4) IS HEREBY AMENDED TO READ AS FOLLOWS:

SHALL COMPLY WITH THE STATE OF COLORADO ELECTRICAL BOARD REQUIREMENTS.

(K) ARTICLE 80.29 IS HEREBY AMENDED BY THE INSERTION OF “CITY” IN THE BLANK SPACE.

(L) ARTICLE 80.33 IS HEREBY DELETED IN ITS ENTIRETY.

(M) ARTICLE 80.35 IS HEREBY DELETED IN ITS ENTIRETY.

SECTION 10-3-6. APPLICATION. THE PROVISIONS OF THIS ARTICLE AND THE PROVISIONS OF THE NATIONAL ELECTRICAL CODE ADOPTED BY REFERENCE SHALL APPLY TO EVERY BUILDING OR STRUCTURE LOCATED EITHER WITHIN OR WITHOUT THE CORPORATE LIMITS OF THE CITY OF NORTHGLENN, THE USE OF WHICH THE CITY HAS JURISDICTION AND AUTHORITY TO REGULATE.

SECTION 10-3-7. VIOLATIONS -- PENALTY. IT SHALL BE UNLAWFUL FOR ANY PERSON TO VIOLATE ANY OF THE PROVISIONS OF THE NATIONAL ELECTRICAL CODE, AS ADOPTED, OR THE PROVISIONS OF THIS ORDINANCE.

ANY VIOLATION OF THE PROVISIONS OF THIS ORDINANCE AND ANY VIOLATION OF ANY OF THE PROVISIONS OF THE NATIONAL ELECTRICAL CODE, AS ADOPTED, SHALL, UPON CONVICTION, BE PUNISHABLE AS PROVIDED IN SECTION 1-1-10(a)(2) OF THIS CODE.

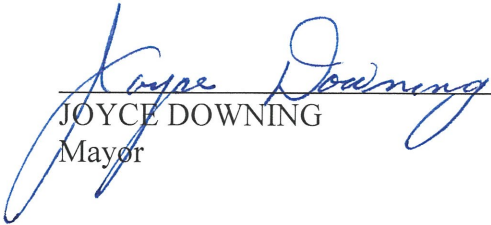
SECTION 10-3-8. CONFLICTS. IF THE PROVISIONS OF THIS CODE, AS ADOPTED IN THIS ARTICLE, CONFLICT WITH ANY OTHER PROVISIONS OF THE NORTHGLENN MUNICIPAL CODE THEN THE MORE RESTRICTIVE OF THE TWO SHALL GOVERN. WHERE THERE IS A CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL BE APPLICABLE.

SECTION 10-3-9. SEVERABILITY CLAUSE. IF ANY ARTICLE, SECTION, PARAGRAPH, SENTENCE, CLAUSE OR PHRASE OF THIS ORDINANCE IS HELD TO BE UNCONSTITUTIONAL OR INVALID FOR ANY REASON, SUCH DECISION SHALL NOT AFFECT THE VALIDITY OR CONSTITUTIONALITY OF THE REMAINING PORTIONS OF THIS ORDINANCE. THE CITY COUNCIL HEREBY DECLARES THAT IT WOULD HAVE PASSED THIS ORDINANCE AND EACH PART OR PARTS THEREOF, IRRESPECTIVE OF THE FACT THAT ANY ONE PART OR PARTS BE DECLARED INVALID OR UNCONSTITUTIONAL.

SECTION 10-3-10. SAFETY CLAUSE. THE CITY COUNCIL HEREBY FINDS, DETERMINES, AND DECLARES THAT THIS ORDINANCE IS NECESSARY FOR THE PRESERVATION OF THE PUBLIC HEALTH, SAFETY AND WELFARE.

SECTION 10-3-11. EFFECTIVE DATE. THIS ORDINANCE SHALL BECOME EFFECTIVE SEPTEMBER 12, 2017.

INTRODUCED, READ AND ORDERED POSTED this 24<sup>th</sup> day of July,  
2017.

  
\_\_\_\_\_  
JOYCE DOWNING  
Mayor

ATTEST:

  
\_\_\_\_\_  
JOHANNA SMALL, CMC  
City Clerk


PASSED ON SECOND AND FINAL READING this \_\_\_\_ day of \_\_\_\_\_,  
2017.

\_\_\_\_\_  
JOYCE DOWNING  
Mayor

ATTEST:

\_\_\_\_\_  
JOHANNA SMALL, CMC  
City Clerk

APPROVED AS TO FORM:

  
\_\_\_\_\_  
COREY Y. HOFFMANN  
City Attorney