



**NORTHBROOK
DEVELOPMENT
& PLANNING SERVICES**



Local Amendments to the National Electrical Code, 2011 Edition

Ordinance 2011-48

and

Ordinance 2016-58 (effective November 1, 2016)

ADOPTION OF NATIONAL ELECTRICAL CODE, 2011 EDITION.

A. Section 6-93, entitled "Adoption of the National Electrical Code," of Article VI, entitled "Electrical," of Chapter 6, entitled "Building and Construction Regulations," of the Municipal Code, shall be, and is hereby, amended as follows [Added text **bold and double-underlined**; deleted text ~~struck through~~]:

Sec. 6-93. Adoption of National Electrical Code.

The provisions of the National Electrical Code, 2011 Edition, published by the National Fire Protection Association are hereby adopted by this reference, subject only to the additions, deletions and modifications specifically set forth in Section 6-96 of this Code.

B. Section 6-96, entitled " Additions, deletions and modifications of the National Electrical Code, 2005 Edition." of Chapter 6, entitled "Building and Construction Regulations," of the Municipal Code, shall be, amended in its entirety and shall hereafter be and read as follows:

Sec. 6-96. Additions, deletions and modifications of the National Electrical Code, 2011 Edition.

The following sections of the National Electrical Code, 2011 Edition are hereby amended, deleted or modified as follows:

110.12 (C) Mechanical Execution of Work. Add a new Subsection (C) as follows:

- (C) "Connection to Existing Services, Feeders, Circuits and Loads. Any person and/or company that installs, alters, repairs or modifies electrical circuits, devices, fixtures, appliances, equipment and related electrical components, shall be responsible for assuring that the existing service, feeders, circuits and the like, are capable of supporting the new loads and that any work performed will not undermine, compromise or make unsafe any portion the electrical system.
- 1) The connection of any new or modified circuits to existing services, feeders, circuits and/or loads shall not cause those existing conditions to become compromised or overloaded. Correction, alteration, modification or other measures shall be performed to maintain the components of the existing electrical system in a reasonable condition. Depending on the amount of work involved, a separate permit may be necessary. It shall be the installers' responsibility to ensure that existing conditions are capable of handling the electrical installation approved by the permit, including electrically, mechanically and structurally.
 - 2) During the course of the installers' work, existing electrical conditions found to be significantly deficient shall be corrected to a reasonable condition as determined by the Northbrook Electrical Inspector.
 - a) For the purposes of this section, the term significantly deficient shall mean; As determined by the Northbrook Electrical Inspector, a condition observed to the wiring methods, materials and/or overall installation of any part of an existing electrical installation that

appears to be an increased fire, shock, overload and/or other safety hazard.”

110.24 (C) **Entrances to and Egress From working Space.** Insert a new Paragraph (C) as follows:

(C) “Calculations. A stamped / sealed letter from a Professional Engineer shall be provided attesting to the accuracy of the calculations performed personally or under his/her supervision.”

110.26 (D)(1) **Illumination.** Add a new Paragraph (1) as follows:

(1) “In other than dwelling units, at least one self contained battery operated emergency light, connected to the local lighting circuit, ahead of any switching, shall be required in all electrical closets, switchgear, rooms, fire sprinkler rooms and generator rooms.”

210.8(A) **Dwelling Units.** After the first sentence add:

“When feed through GFCI receptacles are used, they shall feed only receptacles on the same floor.”

210.8(B)(6) **Other Than Dwelling Units.** Insert a new subsection 6:

“All 125-volt single phase 15-20-ampere receptacles installed at sink or wet locations shall have ground-fault circuit-interrupter protection for personnel.”

210.70(A)(1) **Habitable Rooms.** After first sentence, add the following:

“Where such rooms or areas are accessible by more than one passageway, there shall be a switch to control the lighting outlet(s) unless the passageways are within six (6) feet of the opening of such room or area at each entry or exit.”

210.70(A)(2)(a) **Additional Locations.** In subparagraph (a) add the following phrase:

“and closets over 36 inches deep or 24 square feet in area.”

210.70(A)(3) **Storage or Equipment Spaces.** Delete paragraph (3) in its entirety and replace it with:

(3) “A minimum of one lighting outlet shall be installed in all accessible attic and crawl spaces, and shall be controlled by a switch located outside of the entrance to the area if the light is located more than three feet from the entrance. Crawl spaces, attic or under-floor spaces containing equipment requiring service shall have one light at the access point to the crawl space, attic or under-floor space, and one light at the equipment location in such space; both being controlled by a wall switch within three feet of the access point.”

230.11 **Additional Service Standards** Insert a new Section 230.11 as follows:

(A) **Service Entrance Conductors.** Service entrance conductors shall be installed in rigid metal conduit or intermediate metal conduit with a panelboard containing not less than twenty (20) circuits.

1) Mini breakers shall not be permitted in new construction work, but may be allowed by special permission, but only for room additions or remodeling work with a maximum of two (2) mini breakers or two (2)

additional circuits.

- 2) The installation of a sub-panel shall require special permission by the Northbrook Electrical Inspector, after submission and approval of complete load calculations including a load calculation of the existing service and panelboard to which the sub-panel will be attached.

Exception: Sub-panels shall be permitted with no load calculation and without special permission, provided the sub panel is protected by a circuit breaker and/or fuse no larger than 60 amps and located in the distribution panel from which the sub-panel is to be fed.

- (B) Residential Occupancies. Those conductors which supply all the current consumed by an individual apartment or dwelling unit shall have a rating not less than the load required, but in no event less than the following:

- 1) Dwelling units of any size shall have a 100 ampere minimum rating; except that dwelling units in excess of 2,000 square feet shall have a 200 ampere minimum rating and dwelling units over 4,000 square feet shall have a 400 ampere minimum rating.
- 2) Services up to 200 amperes shall have one disconnecting means. Two separate disconnecting means for a 400 ampere service will be permitted to allow a 400 amp residential service with 2 - 200 amp main breaker panelboards to be placed side by side, within 5 feet of the meter raceway.

- (C) Non-Residential Buildings. The service shall have a rating not less than 100 amperes.

- 1) All new services shall have only one service disconnect unless special permission is granted by the Northbrook Electrical Commission for multiple disconnects.

- (D) Reduced Neutrals. Reduced neutrals are permitted only by special permission of the Northbrook Electrical Commission.

- (E) Copper Conductors. Copper conductors shall be used on the load side of all services.

230.12 **Underground Service Conductors Required.** Add a new Section 230.12, entitled "Underground Service Conductors Required" to read as follows.

All new residential construction shall have underground service conductors.

Exception. The Director of Development and Planning Services may waive this requirement in the event this requirement would necessitate burying a service conductor beneath a public or private street.

230.43 **Wiring Methods for 600 Volts, Nominal or Less.** Delete the following as authorized methods:

- (1) Open wiring on insulators
- (2) Type IGS cable
- (5) Electrical Metallic Tubing
- (6) Electrical non metallic tubing (ENT)
- (7) Service entrance cables
- (12) Cablebus
- (13) Type MC cable
- (14) Mineral-insulated, metal-sheathed cable
- (15) Flexible metal conduit not over 6 ft. (1.83m) long between raceways, or between raceway and service equipment, with equipment bonding jumper routed with the flexible metal conduit or the liquid tight flexible metal conduit according to the provisions of Section 250-102(a), (b)
- (16) Liquid tight flexible nonmetallic conduit

230.43(11) Delete Paragraph 230.43(11) of “**Wiring Methods for 600 Volts, Nominal or Less**” concerning rigid PVC conduit and replace it with the following:

- (A) Rigid nonmetallic (PVC) electrical conduit schedule 40 or 80 shall be permitted to be used underground only.
- (B) Elbows and nipples extending above grade shall be RMC, IMC, or aluminum rigid only.
- (C) Elbows or nipples extending into a ground level Commonwealth Edison or privately owned transformer, PVC with a PVC connector and bushing shall be permitted.
- (D) Rigid nonmetallic (PVC) electrical conduit schedule 80 shall be permitted to be used above or below ground for temporary construction power, temporary services, temporary extensions to devices such as receptacles and lights during construction activities but shall be removed once construction activities have ended and the permanent wiring methods have been installed and commissioned.

230.44 **Cable Trays.** Delete entire Section.

230.70(1)(A) **Readily Accessible Location.** Add an exception to Paragraph (A) to read as follows:

- (A) Exception: Services for one and two-family dwellings (new and service upgrades and/or revisions) shall have the service disconnect(s) located outside (exterior of the building) in the meter enclosure and/or an approved disconnect located immediately adjacent to the meter.

250.50 **Grounding Electrode System.** Add new language at the end of the existing Section 250.50 to read as follows:

All grounding electrode conductors shall be:

- (1) Enclosed in metal raceway or metal conduit; and
- (2) A proper sized bonding jumper shall also be installed across the water meter.

Exception: PVC conduit shall only be permitted when installed in accordance with Article 352, as modified by local amendments.”

250.52(5) **Rod and Pipe Electrodes.** Delete (a) and (b) and replace with:

- (a) All electrodes shall be copper, copper clad or stainless steel.
- (b) All services shall have a minimum eight (8) foot by 5/8-inch nonferrous or copper clad ground rod installed at the meter fitting and be connected to utility company’s neutral buss as well as bonded to the meter enclosure.

250.68(C) **Metallic Water Pipe and Structural Metal.** Delete Paragraph 2 in its entirety.

250.68(D) **Grounding Electrode Conductors; Steel Grounding.** Add a new Subsection D to read as follows:

- (D) Grounding electrode conductors that utilize building steel as the grounding electrode shall;
 1. Have an irreversible connection between:
 - a. conductor and attachment lug
 - b. lug to building steel
 - c. conductor to building steel if directly attached.
 2. Irreversible connections can include:
 - a. exothermic welding
 - b. high-pressure compression
 - c. listed bolt on connections with break off / shear pin features
 - d. other listed components

250.70 **Methods of grounding conductor connection to electrodes.** Delete the last sentence of the paragraph and methods (1), (2), (3) and (4) in their entirety and replace it with the following:

“The following method may be used:

- (1) “A listed bolted clamp of cast bronze or brass.”

310.106(B) **Conductor Material.** Delete sentence and replace with: “Conductors in this Article shall be copper unless otherwise approved by the Northbrook Electrical Commission.”

Table 310.106(A) **Minimum Size of Conductors.** Delete reference to "Aluminum or Copper-Clad Aluminum."

310.15(B)(7) **120/240 Volt, Three (3) Wire, Single-Phase Dwelling Services and Feeders.** Delete subsection in its entirety.

314.27 (C)(1) **Requirements for Paddle Fan Outlets & Supports.** Add a new Subsection (C) (1) to read as follows:

(1) In dwelling units when a ceiling outlet box is supplied in the center or near center of a ceiling footprint (where a paddle fan can be installed) outlet boxes suitable for supporting fans as required by 314.27(c) shall be installed in the following locations:

- a. sleeping rooms,
- b. family rooms,
- c. studies,
- d. dining rooms,
- e. great rooms,
- f. living rooms, foyers, and
- g. other similar rooms.

Exception: When an electrical and/or mechanical lift or hoisting device is installed that is manufactured for the purpose of raising and/or lowering a luminaire and/or paddle fan, no additional boxes shall be required other than what is specified by the manufacturer of the lift or hoist. Any such lift or hoist shall be UL listed for the purpose.

320.10 **Armored Cable - Uses Permitted.** Delete entire paragraph and replace with:

"The use of armored cable and fittings shall be permitted for remodeling work where, in the opinion of the Northbrook Electrical Inspector, the installation of electrical metallic tubing presents a hardship. The maximum exposed run of armored cable shall not exceed three (3) feet."

330.10 **MC Cable - Uses Permitted.** Delete entire paragraph and replace with the following:

"The use of MC cable and fittings shall be permitted for remodeling work where, in the opinion of the Northbrook Electrical Inspector, the installation of electrical metallic tubing presents a hardship. The maximum exposed run of MC cable shall not exceed three (3) feet."

334 **Nonmetallic-Sheathed Cable.** Delete entire Article 334.

334.10 **Non-Metallic Cable - Uses Permitted.** Delete entire Article and replace with the following:

"Non-Metallic Cable (NM) cable shall be permitted to be used for temporary wiring of a construction site when installed in accordance with Article 590."

338 **Service Entrance Cable.** Delete entire Article 338.

348.10

FMC - Use Permitted. Delete entire section and replace with the following:

“The use of flexible metallic conduit and fittings shall be permitted as specified in (A) through (H).

- (A) In lengths not exceeding six (6) feet except where fished.
- (B) Exposed or concealed where needed for flexibility (including for vibration) to utilization equipment, appliances and transformers.
- (C) Fixture whips.
- (D) In remodeling work where, in the opinion of the Northbrook Electrical Inspector, the installation of electrical metallic tubing presents a hardship. The maximum exposed run of FMC shall not exceed three (3) feet.
- (E) In new or remodeling work where flexibility is needed and/or the installation of EMT, IMC or other approved pipe raceways cannot be installed.
- (F) Other applications when in the opinion of the Northbrook Electrical Inspector other methods are not practical or appropriate.
- (G) When part of a listed assembly or equipment and attached by the manufacturer such as a generator ATS controller. Un-necessary lengths shall be shorted to length needed to allow for the installation unless shortening the length violates the listing.
- (H) Ground conductors (EGC) shall be provided in all FMC installations and shall be sized and installed in accordance with article 250.”

352.10

RNC - Uses Permitted PVC conduit, schedule 40 or 80, shall be permitted for use in the following applications.

- (A) Exterior and Underground:
 - (1) Underground or below slabs and with voltages of less than 600 volts for:
 - (2) Service entrance conductors
 - (3) Feeders
 - (4) Branch Circuits.
 - (5) Control circuits.
 - (6) Underground installations shall be permitted under typical surface areas including:
 - (7) Grass, gravel, asphalt, pavers, concrete.
 - (8) Walkways, patios, driveways, parking lots, yards.
 - (9) For nominal voltage systems of 120 through 480 volts, PVC shall not be permitted above grade.

Exceptions:

- a. Stub-ups: Underground PVC shall be permitted to be stubbed-up above grade where it transitions to EMT, rigid metallic steel conduit, aluminum rigid conduit or IMC. PVC stub-ups shall not exceed 12 inches. Where necessary, PVC stub-ups shall be protected from damage by appropriate barriers.
- b. PVC shall be permitted above and below grade for low voltage systems. For the purpose of this article, low voltage shall mean 50 volts or less (ac or dc) and/or up to 70 volts for audio/paging systems. Uses can include:
 1. Swimming pool lights.
 2. Swimming pool controls.
 3. Landscape lighting.
 4. Signal, coax, fiber optic, phone, computer, data, communication wire.
 5. HVAC controls (i.e.: thermostat wiring).
 6. Building automation wiring.
 7. Alarm, CCTV, security systems, access control systems.
 8. Audio / sound systems.
 9. Low voltage lighting systems.
 10. Sleeves for future low voltage wiring.

(B) Interior:

- (1) In dwelling and non-dwelling applications, unless prohibited elsewhere in the code, PVC conduit shall be permitted for low voltage applications exposed and concealed. Uses can include:
 - (2) Swimming pool lights.
 - (3) Swimming pool controls.
 - (4) Landscape lighting.
 - (5) Signal, coax, fiber optic, phone, computer, data, communication wire.
 - (6) HVAC controls (i.e.: thermostat wiring).
 - (7) Building automation wiring.
 - (8) Alarm, CCTV, security systems, access control systems.
 - (9) Audio / sound systems.
 - (10) Low voltage lighting systems such as; under cabinet lights.
 - (11) Sleeves for future low voltage wiring.
 - (12) PVC shall not be permitted in plenum ceilings.

- (C) Temporary wiring and services.
 - (1) RNC shall be permitted for temporary wiring associated with construction sites and special events.
 - (2) RNC shall be permitted for temporary wiring associated with temporary services for construction sites and feeders to construction trailers.
 - (3) When used for temporary wiring, RNC shall be permitted above and below grade, interior and exterior, on or beneath finished surfaces.
- (D) Grounding:
 - (1) In one and two unit dwellings, RNC shall be permitted as a conduit to be used with a Grounding Electrode Conductor (GEC) or its jumpers, inside or outside, above or below grade, concealed or on finished surfaces.
 - (2) When used underground or underslab (inside or outside) and then extending above grade or floor, no transition is required to RMC. Uses can include:
 - a. Between service panel and grounding electrode(s).
 - b. Between meter enclosure containing a main disconnect and grounding electrode(s).
 - c. Between multiple grounding electrodes.
- (E) Special Conditions. RNC shall not be installed where exposed without special permission except as permitted in this amendment. RNC may be considered for special circumstances and approved by written request for special permission. Possible uses could be wet locations, exposure to chemicals or special corrosive environments (interior and/or exterior of a structure).

354 **Nonmetallic Underground Conduit.** Delete entire Article.

355 **Reinforced Thermal Resin Conduit (RTRC)** RTRC shall be permitted in accordance with local amendment pertaining to PVC in Section- 352.10

358.12 **EMT - Uses Not Permitted.** Add the following as conditions when EMT **shall not** be used:

- (7) For enclosing service entrance conductors.
- (8) In ground level floor slab that is in contact with the earth.

360 **Flexible Metal Tubing (FMT).** Delete entire Article and replace with the following:

“FMT shall be permitted to remain where already installed. FMT shall not be re-used once removed or when still attached to a light fixture and the light fixture is relocated.”

362 **Electrical Nonmetallic Tubing.** Delete entire Article.

366 **Auxiliary Gutters.** Amend Article 366 to prohibit the use of Nonmetallic Auxiliary Gutters.

370 **Cable Bus.** Delete entire Article.

376.10 **Metal Wireways - Uses Permitted.** Delete entire subsection and replace with

the following:

“The use of wireways shall be permitted as follows:

- (1) For exposed work;
- (2) In concealed spaces only in accordance with Section 640.24; and
- (3) In wet locations, where listed for the purpose.”

376.12 **Wireways - Uses Not Permitted.** Delete entire subsection and replace with the following:

“Metal Wireways shall not be permitted under the following conditions:

- (1) Where potentially subject to severe physical damage or corrosive vapors;
- (2) For service entrance conductors;
- (3) In suspended ceiling spaces; and
- (4) In hazardous (classified) locations.”

378 **Nonmetallic Wireways.** Delete entire Article.

382 **Nonmetallic Extensions.** Delete entire Article.

388 **Surface Nonmetallic Raceways.** Delete entire Article.

394 **Concealed Knob-and-Tube Wiring.** Delete entire Article.

396 **Messenger Supported Wiring.** Delete entire Article.

398 **Open Wiring on Insulators.** Delete entire Article.

410.10(D) **Bathtub and Shower Areas.** Delete first sentence and replace with the following:

“No parts of surface mounted luminaries(fixtures), cord connected luminaries, chain, cable, cord-suspended-luminaries, lighting track, pendants, or ceiling-suspended (paddle) fans shall be located within a zone measured 900 mm (3 ft.) horizontally and 2.5 meters (8 ft.) vertically from the top of the bathtub rim or shower stall threshold.”

410.16(B) **Luminaire Requirements in Clothes Closets.** Add a new subsection B, as follows:

“A luminaire (fixture) shall be installed in all closets over 36” deep or 24 square feet in area.”

410.44(A) **Flexible fixture whips.** Add a new subsection (A) as follows:

“All flexible fixture whips for 277 volt lighting applications shall have an equipment grounding conductor to be sized no smaller than #16 AWG. Terminated ends shall be securely attached to fixtures and junction boxes with an approved attachment device.”

410.117(C) **Tap conductors.** Delete the second sentence and replace it with the following:

“Such tap conductors shall be in metallic raceway of at least four (4) feet

(1.22m) but not more than six (6) feet (1.83m) in length.”

645.5(E)(2) Under Raised Floors. Delete the following phrase from first sentence: “rigid nonmetallic conduit...”

680.10 Underground wiring location. Delete the following phrase from the second sentence: “,or a nonmetallic raceway system.”

Amend Section 680.23, “Underwater Luminaires” by deleting the language in Subsection (A)(4), entitled “Voltage Limitation” in its entirety and replacing it with the following:

680.23(A)(4) Voltage Limitation. All underwater luminaires (pool lights located in the pool) shall be listed by a recognized testing laboratory such as UL, ETL, CSA and with a rating of not more than 24 volts between conductors. All under water luminaires shall be connected to a transformer that is listed for use with swimming pools. The line side of the transformer shall be connected to the load side of a Class-A GFCI protective device.

690.4(E)(1) Wiring and Connections. Add a new subsection (1) as follows:

(1) Qualifications. The installation, servicing or otherwise working on photovoltaic systems shall be performed by qualified persons as required by 690.4(E) who shall provide documentation that any such work performed was done under the on-site supervision of an individual qualified to work on photovoltaic systems, as evidenced by credentials from a recognized photovoltaic training provider.

720.1 Circuits and Equipment Operating at Less Than 50 Volts. Add new Subsections (A), (B) and (C) as follows:

(A) Low Voltage Definition: For the purposes of this amendment, “low voltage” shall mean wiring systems that operate at 50 volts (or less) ac and/or dc, signal and/or communication wiring, temperature control, building automation and structured wiring. Common wiring that falls under this category include: phone, data, internet, communications, alarm (all types), CCTV, coax, antennae (and dish), thermostat, lighting systems and similar.

(B) Permit and Inspection Required: Low voltage wiring system installation and extensions shall be required to obtain permits and be inspected. This includes but is not limited to low voltage systems inside commercial, industrial, shopping centers, and/or any building where children may be expected to enter and or remain for a period of time. This also includes buildings where the public may be expected to assemble and homes engaging in the business of childcare services, hair salons, and other undertakings where children may be expected to be present.

Exception 1. One and two-family dwellings.

Exception 2. Non-common individual dwelling units within a larger building such as a condominium building.

Exceptions 3. Extensions within an area that does not require low voltage wiring to extend above ceilings or through walls if such wiring does not terminate in open sockets or other open source of voltage that may be contacted by the public.

(C) Contractor Provisions: Low voltage wiring system installation shall be permitted to be installed by:

- 1) Licensed Electrical Contractor.
- 2) Licensed Low Voltage Electrical Contractor.
- 3) State of Illinois Licensed Alarm Contractor.
- 4) General Contractor.
- 5) HVAC Contractor.
- 6) In house IT, maintenance or other authorized personnel by the tenant, owner or management agency provided the tenant, owner or management agency obtains a general contractors license.

Exception 1 : This shall not be construed as superseding any State or Federal laws requiring specific licenses for alarm (or related) work, or other specialty work requiring special licensing from other agencies for specific work performed.