Welcome

2023 NEC® Update

Part 2 • Article 220.70 – 398.15(C)

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Adapted from the 2023 NEC® NFPA # 70

Will satisfy 4 hours of electrical code study for renewal of electrical licensing by the State of Minnesota.

The Electrical Association will provide your hours to the State of Minnesota upon completion of this course.

Electrical Association

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General

GUIDELINES

In the interest of time and focusing on major Code changes, not all modifications that occurred have been included in this presentation.

01

Informational Notes, text location changes, and minor text clarifications may have been intentionally omitted.

02

Actual Code articles in their entirety are required to maintain compliance.

03

The AHJ takes precedence over all matters of the NEC.

3

Presentation Method

We'll compare the code changes between the 2020 NEC and the 2023 NEC side by side on each slide.

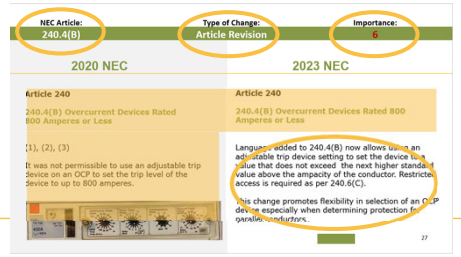
01
2023 NEC article

02
How the article changed

03
Level of importance (10 is the highest)

04
Paraphrased text

05
Brief explanation



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General

FORMATTING

Changes in the code book are formatted in the four following ways:

01 ***N*** New material is marked in the margin (rather than a vertical line in the margin)

02 • Where one or more paragraphs have been deleted

03 Δ Where written content has been changed or deleted

04 text Where the text has been revised

5

Learning Outcomes

Upon completion of this course, the student should be able to do the following:

01 Use the modified calculation criteria for healthcare facilities portion of receptacle loads to which a demand factor applies.

02 Select surge protective devices for newly added areas of dormitories, guest rooms of hotels and motels, and areas of nursing homes and limited care facilities.

03 Plan work a based on changes to emergency disconnects required on the outside of dwelling units.

04 Locate new rules for branch circuit, feeders, and service rated over 1000 volts in the 2023 NEC

01

6

Learning Outcomes

05 Correctly adjust settings for overcurrent devices to the next higher setting based on ampacities of conductors.

06 Stating when overcurrent protective devices are required to be listed.

07 Explain the NEC rule on temporary current not being considered objectional currents.

08 Install primary and secondary conductors into a dry type transformer and not reduce air flow of ventilation openings.

02

7

Learning Outcomes

09 Correctly ground a replacement snap switch.

10 Select code compliant screws when installing covers on enclosures containing energized conductors.

11 Calaculate wire fill when an enclosure contains a terminal block.

12 Correctly position expansion fittings on PVC conduits that emerge from the earth.

03

8

Learning Outcomes

13 Identify changes that were made in the NEC regarding new trade sizes allowed for EMT and type IMC conduit.

14 Adjust wiring practices for revised conductor size in type MC cable.

04

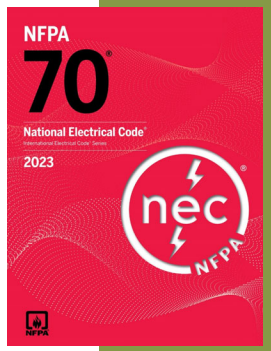
9

Let's Get Started

Article 220

Branch-Circuit, Feeder, and Service Load Calculations

Code Updates



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NEC Article:	Type of Change:	Importance:
220.70	New Article	Minor

2020 NEC

220.70 Energy Management System Loads

2023 NEC

220.70 Energy Management System Loads

If an energy management system (EMS) is used to limit the current to a feeder or service IAW 750.30, **a single value equal to the maximum ampere setpoint of the EMS** is to be used in load calculations for the feeder or service.

The setpoint value of the EMS must be considered a continuous load for the purposes of load calculations.

Although the installation and operation of energy management systems is addressed in Article 750, the calculation for services and feeders is addressed here.

06

11

NEC Article:	Type of Change:	Importance:
220.110	New Article	Major

2020 NEC

Part IV: Health Care Facilities

220.110 Branch-Circuit Loads

Not present

2023 NEC

Part IV: Health Care Facilities

220.110 Receptacle Loads

Receptacle loads calculated IAW 220.14(H) & (I) and supplied by branch circuits not exceeding 150 V to ground can be subjected to the demand factors provided in Tables 220.110(1) & (2) for health care facilities.

IN No. 1: See Article 100 for the definitions of patient care space categories.

IN No. 2: See 220.14(I) for the calculation of receptacle outlet loads

See New Tables 220.110(1) & 220.110(2)

Category 1&2 **Category 3&4**

Table 220.110(1) Demand Factors for Receptacles Supplied by General-Purpose Branch Circuits in Category 1 and Category 2 Patient Care Space

Portion of Receptacle Load to Which Demand Factor Applies (V/A)	Demand Factor (%)
First 5000 or less	100
From 5001 to 10,000	50
Remainder over 10,000	25

07

12

NEC Article:	Type of Change:	Importance:
220.120	New	Minor

2020 NEC

Relocation into Article 220 for load calculation and demand factors for receptacles for these facilities makes it easier to determine certain calculation criteria.

2023 NEC

Part VII: Marinas, Boatyards, Floating Buildings, Commercial & Noncommercial Docking Facilities

220.120 Receptacle Loads

General lighting and other loads in marinas, boatyards, floating buildings, and commercial and noncommercial docking facilities must be calculated IAW Part III of this article and, the demand factors in Table 220.120 are for each service or feeder circuit supplying receptacles that provide shore power for boats.

08

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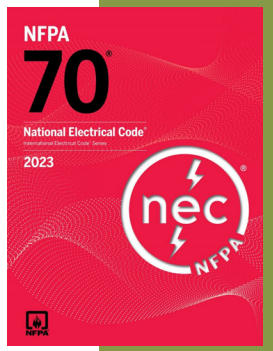
Moving on

Article 225

Outside Branch Circuits and Feeders

Code Updates



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NEC Article:	Type of Change:	Importance:
225.41	New Section	Major

2020 NEC

Ar
225
Not

2023 NEC

Article 225

225.41 Emergency Disconnects

For 1- and 2-family **dwellings** supplied by feeders or branch circuits, a disconnect must be installed:
(A)(1) Location Outdoors, readily accessible, within sight of home
(A)(2) Rating* SCCR greater than available fault current
(A)(3) Grouping If more than 1 disconnect they must be grouped

(B) Identification Where equipment for isolation of other energy source systems is not located adjacent to the emergency disconnect as required a plaque identifying the location of all emergency disconnects must be installed.

(C) Marking The disconnection means must be marked as **EMERGENCY DISCONNECT**

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15

NEC Article:	Type of Change:	Importance:
225.41	New Section	Minor

2023 NEC

Article 225

225.41 Emergency Disconnects

*** (A)(2) Rating**

Additional Important Information:

The A.I.C. Ampere Interrupting Capacity refers to an OCPD - how much current it can safely interrupt (doing its job) without failing.

The S.C.C.R. refers to the Short Circuit Current Rating, which is measurement of the short circuit current a device can tolerate without being damaged when a fault occurs on equipment associated with it.

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16

NEC Article:	Type of Change:	Importance:
225.42	New Article	Major

2020 NEC

Article 225

225.42 Surge Protection

Not present

Type 1

2023 NEC

Article 225

225.42 Surge Protection

(A) Surge-Protective Device

Feeders suppling the following require a surge-protective device (SPD) must be installed:

(1) Feeders for dwelling units
(2) Dormitory units
(3) Guest rooms and guest suites of hotels and motels
(4) Areas of nursing homes and limited-care facilities used as patient sleeping rooms

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NEC Article:	Type of Change:	Importance:
225.42	New Article	Major

2023 NEC

Type 1

Article 225

225.42 Surge Protection

(B) Location
SPD must be installed in or adjacent to the distribution equipment that is connected to the load side of the feeder

(C) Type
THE SPD must be a Type 1 or Type 2

(D Replacement
When distribution equipment is replaced a elements of this sections apply

(E) Ratings
Normal discharge rating of <10kA

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18

NEC Article:	Type of Change:	Importance:
225.50	Deleted Articles	Minor

2020 NEC

Article 225, Part III (Over 1000 V)

225.50 Sizing of Conductors

225.51 Isolating Switches

225.52 Disconnecting Means

225.56 Inspections and Tests

225.60 Clearances over Roadways, Walkways, Rail, Water, and Open Land

225.61 Clearances over Buildings and Other Structures

2023 NEC

Article 225, Part III (Over 1000 V)

225.50 – 225.61 were deleted

Global Change:

Requirements were relocated for outside branch circuits and feeders, and services over 1000 Vac or 1500 Vdc from Articles 215, **225**, and 230 into the new **Article 235: Branch Circuits Over 1000 Volts ac, 1500 Volts dc, Nominal**

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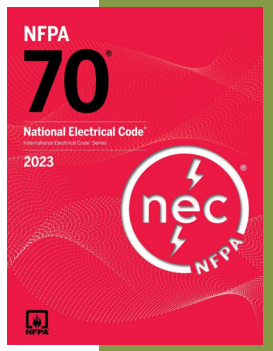
Moving on

Article 230

Services

Code Updates



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20

NEC Article:	Type of Change:	Importance:
230.43	Modified Article	Minor

2020 NEC

Article 230

230.43(21) Wiring Methods for 1000 Volts, Nominal or Less

Not present

2023 NEC

Article 230

230.43(21) Wiring Methods for 1000 Volts, Nominal or Less

Service-entrance conductors must be installed IAW the applicable requirements of the NEC covering the type of wiring method used and must be limited to the following methods:

Added:
(21) Flexible bus system

Note: This wiring method was also listed as new in the Definitions

21

NEC Article:	Type of Change:	Importance:
230.67(A)	Modified Article	Major

2020 NEC

Article 230

230.67(A) Surge-Protective Device

All services supplying dwelling units must be provided with a surge-protective device (SPD).

2023 NEC

Article 230

230.67(A) Surge-Protective Device

Service-entrance conductors must be installed IAW services supplying these occupancies and must be provided with a surge-protective device (SPD):
(1) Dwelling units
(2) Dormitory units
(3) Guest rooms and guest suites of hotels and motels
(4) Parts of nursing homes and limited-care facilities used exclusively as patient sleeping rooms

The article was modified to list the types of occupancies where surge protection was required at for services.

22

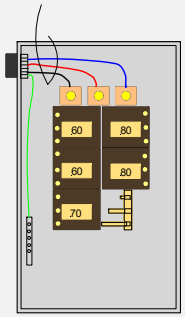
NEC Article:	Type of Change:	Importance:
230.71(B)	Modified Article	Minor

2020 NEC

Article 230

230.71(B) Two to Six Service Disconnecting Means

Two to six service disconnecting means for a service can be or consist of a combination of separate enclosures for each main disconnect with no exceptions.



2023 NEC

Article 230

230.71(B) Two to Six Service Disconnecting Means

An exception was added that made it permissible to install an additional disconnect device into a cabinet with existing multiple service disconnects enclosure provided they were installed when previous editions of the code permitted this practice and the number of service disconnects does not exceed six in the enclosure.

23

NEC Article:	Type of Change:	Importance:
230.85	Modified Article	Minor

2020 NEC

Article 230

230.85 Emergency Disconnects

For one- and two-family dwelling units, all service conductors must terminate in disconnecting means having a short-circuit current rating equal to or greater than the available fault current, installed in a readily accessible outdoor location. If more than one disconnect is provided, they must be grouped. Each disconnect must be one of the following:

(1) Service disconnects marked as follows: EMERGENCY DISCONNECT, SERVICE DISCONNECT
(2) Meter disconnects installed per 230.82(3) and marked as follows: EMERGENCY DISCONNECT, METER DISCONNECT, NOT SERVICE EQUIPMENT
(3) Other listed disconnect switches or circuit breakers on the supply side of each service disconnect that are suitable for use as service equipment and marked as follows: EMERGENCY DISCONNECT, NOT SERVICE EQUIPMENT

Markings must comply with 110.21(B)

Modifications to this Article >>

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NEC Article:	Type of Change:	Importance:
230.85	Modified Article	Minor

2023 NEC

Article 230

230.85 Emergency Disconnects

For 1 & 2 family dwellings, an emergency disconnect must be installed:

(B) Disconnects: Each disconnect is to be one of the following:

(1) A service disconnect;
(2) A meter disconnect **integral to the meter mounting** equipment not marked as suitable only for use as service equipment installed in accordance with 230.82;
(3) Other listed disconnect switches or circuit breakers that are marked suitable for use as service equipment, but not marked as suitable only for use as service equipment, installed on the supply side of each service disconnect

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NEC Article:	Type of Change:	Importance:
230.85	Modified Article	Minor

2023 NEC

Article 230

230.85 Emergency Disconnects

(C) Replacement
Where service equipment is replaced, all of the requirements of this section must apply

(D) Identification of Other Isolation Disconnects
Where equipment for isolation of other energy source systems is not located adjacent to the emergency disconnect required by this section, a plaque identifying the location for isolation of other energy sources is required.

NOTE: this change provided a clearer set of requirements for emergency disconnects by verbalizing rather than displaying the requirements of labeling.

21

26

NEC Article:	Type of Change:	Importance:
230.200	Modified Article	Minor

2020 NEC

Article 230, Part VIII (Services exceeding 1000V, Nominal)

230.200 General
230.202 Service-Entrance Conductors
230.204 Isolating Switches
230.205 Disconnecting Means
230.206 OCD as Disconnecting Means
230.208 Protection Requirements
230.209 Surge Arresters
230.210 Service Equipment—General
230.211 Switchgear
230.212 Over 35,000 V

2023 NEC

Article 230, Part VIII (Services exceeding 1000V, Nominal)

230.200 – 230.212 DELETED

This action **combines** all the requirements for feeders, outside branch circuits and feeders, and services over 1000 Vac or 1500 Vdc into the new **Article 235**.

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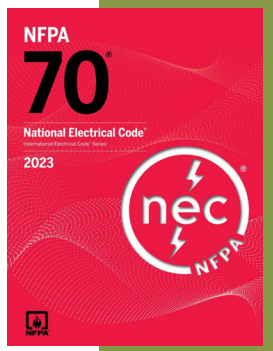
Moving on

Article 235

Branch Circuits over 1000 V ac, 1500 V dc, Nominal

Code Updates



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NEC Article:	Type of Change:	Importance:
235.1 – 235.412	New Article	Major

2020 NEC	2023 NEC
Article 235	**Article 235**
Parts I - V	**Part I** General 235.1 **Part II** Branch Circuits 235.3 – 235.63 **Part III** Feeders 235.201 – 235.212 **Part IV** Outside Branch Circuits, Feeders 235.301 – 235.361 **Part V** Services 235.401 – 235.412
Not present	Numerous articles from the Code relating to over 1000 volts were brought into this new article and logically organized in Part titles.

24

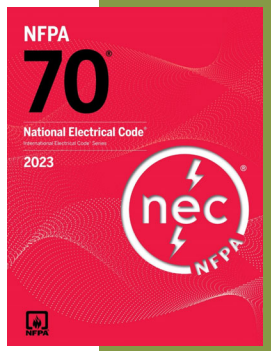
29

Moving on

Article 240

Overcurrent Protection

Code Updates



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NEC Article:	Type of Change:	Importance:
240.2	Revised Article	Minor

2020 NEC	2023 NEC
Article 240	**Article 240**
240 Re	**240.2 Reconditioned Equipment**
	**(A) Reconditioning is not permitted** (1) Equipment providing ground fault protection (2) GFCI's (3) LV Fuseholders (4) Molded Case circuit Breakers (5) LV Power Circuit breaker electronic trip units **(B) Reconditioning is permitted** (1) LV Power Circuit breakers (2) Electromechanical protective relays and current transformers These are not new, but all moved here based of the requirements of the Style Manual.

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NEC Article:	Type of Change:	Importance:
240.4(B)	Article Revision	Major

2020 NEC	2023 NEC
Article 240	**Article 240**
240.4(B) Overcurrent Devices Rated 800 Amperes or Less The next higher standard overcurrent device rating (above the ampacity of the conductors being protected) shall be permitted to be used, provided all of the following conditions are met: (2) The ampacity of the conductors does not correspond with the standard ampere rating of a fuse or a circuit breaker without overload trip adjustments above its rating	**240.4(B) Overcurrent Devices Rated 800 Amperes or Less** Language added to 240.4(B) now allows using an adjustable trip device setting to set the device to a value that does not exceed the next higher standard value above the ampacity of the conductor. Restricted access is required as per 240.6(C). This change promotes flexibility in selection of an OCP device especially when determining protection for parallel conductors.

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32

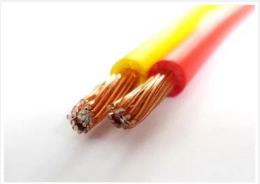
NEC Article:	Type of Change:	Importance:
240.4(D)(3)	Article Revision	Major

2020 NEC

Article 240.4

(D) Small Conductors
(3) 14 AWG

15 amps



2023 NEC

Article 240.4

(D) Small Conductors
(3) 14 AWG, *Copper-Clad Aluminum*

14 AWG assigned ratings based on this criteria

10 amps based on these conditions:
(1) The continuous load does not go over 6 amps
(2) OCP is accomplished by one of these:
(a) CB rated for 14 AWG copper-clad alum
(b) Fuse is rated for 14 AWG copper-clad alum
(verbatim from the NEC)

This change provide guidance for OCP when using copper-clad 14 AWG conductors.

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NEC Article:	Type of Change:	Importance:
240.4(H)	New Article	Minor

2020 NEC

Article 240

240.4(H) Dwelling Unit Service & Feeder Conductors

Not present

2023 NEC

Article 240

240.4(H) Dwelling Unit Service & Feeder Conductors

Dwelling unit service and feeder conductors can be sized in accordance with **Table 310.12(A)**.

This requirement is in the overcurrent protection **Article 240**, which sets the standard for OCP of conductors.

The statement correlates the permission granted in 310.12(A).

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NEC Article:	Type of Change:	Importance:
240.6(A)	Article Revision	Major

2020 NEC

Article 240

240.(6)(A) Standard Ampere Ratings for Fuses and Inverse Time Circuit Breakers

Standard values
are from 15 A to 6000 A

2023 NEC

Article 240

240.(6)(A) Standard Ampere Ratings for Fuses and Inverse Time Circuit Breakers

A change in standard values now has a **10 A** fuse or breaker as the smallest standard ampere in Table 240.6(A).

This change was influenced by the adoption of smaller branch circuits permitted for dwelling unit identified in Article 210.23(A)

10 Amp was "an additional standard *fuse* rating in the 2020 NEC. Now it is not listed as "additional standard ampere for fuses" but a standard.

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NEC Article:	Type of Change:	Importance:
240.6(D)	Article New Sub-section	Major

2020 NEC

Article 240

240.6(D) Remotely Accessible Adjustable-Trip Circuit Breakers

This change calls out cybersecurity measures for breakers that may be adjusted remotely to prevent their adjustment from being compromised.

2023 NEC

Article 240

240.6(D) Remotely Accessible Adjustable-Trip Circuit Breakers

Remote access for adjustment can be done by one of these ways:

(1) Connected directly through a local non-networked port.

(2) Connected through a networked interface that complies with 1 of the following processes:
(a) The breaker and software are identified as being evaluated for cybersecurity.
(b) A cybersecurity assessment of the network is completed. Documentation of the assessment and certification must be available to those authorized to inspect, operate, and maintain the system.

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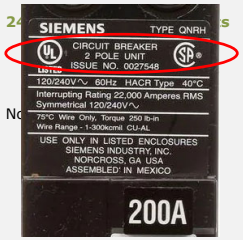
NEC Article:	Type of Change:	Importance:
240.7	New Section	Minor

2020 NEC

Article 240



2023 NEC

Article 240

240.7 Listing Requirements

These overcurrent protective devices are required to be listed:

(1) Branch-circuit overcurrent protective devices

(2) Relays and breakers providing GFPE function

(3) GFCI devices

Requiring branch-circuit overcurrent protective devices in the NEC to be listed provides a basis for the AHJ to approve the overcurrent protective devices.

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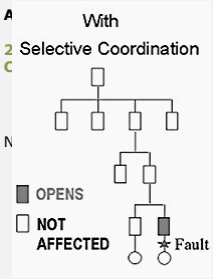
37

NEC Article:	Type of Change:	Importance:
240.11	New Section	Minor

2020 NEC



2023 NEC

Article 240

240.11 Selective Coordination

If one or more feeder overcurrent protective devices are required to be selectively coordinated with a service overcurrent protective device by other requirements of the NEC, all feeder OCPD's supplied directly by the service overcurrent protective device must be selectively coordinated with the service OCPD.

This change ensures that the service overcurrent protective device is less likely to open due to an overcurrent condition on a feeder that is not currently required to be electively coordinated with the service overcurrent protective device.

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NEC Article:	Type of Change:	Importance:
240.16	New Section	Minor

2023 NEC

Article 240

240.16 Interrupting Ratings

Branch-circuit overcurrent protective devices must have an interrupting rating **at least** 5000 amperes.

This requirement was relocated from the definition for Overcurrent Protective Device, Branch-Circuit.

Not a change, but Article 240.83(C) requires that a breaker have 5000 AIC **unless otherwise marked**.

Also Article 240.60(C)(3) requires a fuse with other than a 10,000 AIC be otherwise marked.

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39

NEC Article:	Type of Change:	Importance:
240.24(A) Exception	Exception Modified	Minor

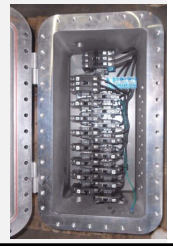
2020 NEC

Article 240

240.24(A) Location in or on Premises Accessibility Exception

Exception:

When opening an industrial control panel or similar enclosure, the use of a tool is acceptable to access breakers or switches that contain fuses.



2023 NEC

Article 240

240.24(A) Location in or on Premises Accessibility Exception

Language was added to the exception that allowed enclosures in hazardous locations, and those used to protect components from corrosive atmospheres were **judged as to their accessibility** of the OCP device within **when the cover was opened** and also complied with the requirements of 240.24(A).

This modification clarifies the criteria for judging accessibility of OCP devices in enclosures.

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NEC Article:	Type of Change:	Importance:
240.24(E) Exception	Article Modified	Minor

2020 NEC

Article 240

240.24(E) Location in or on Premises Not Located in Bathrooms

In homes, dorms, guest suites or guest rooms overcurrent protective devices (other than supplementary OCPDs) were not permitted to be installed in bathrooms.

2023 NEC

Article 240

240.24(E) Location in or on Premises Not Located in Bathrooms

A change was made that now prohibits OCPD's, other than supplemental type, to be installed in any bathroom, **shower, or locker room facility**.

The change was made because "there was no practical reason to continue to permit this installation practice". **Shower or locker room** was added.

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NEC Article:	Type of Change:	Importance:
240.100	Deleted Articles	Minor

2020 NEC

Article 240, Part IX. Overcurrent Protection over 1000 V, Nominal.

240.100 Feeders and Branch Circuits
240.101 Additional Requirements for Feeders

2023 NEC

Article 240, Part IX. Overcurrent Protection over 1000 V, Nominal.

Global Change:

Relocated requirements for overcurrent protection over 1000 Vac or 1500 Vdc from Articles 240.100 - 240.101, were moved to the new **Article 235**.

"Branch Circuits, Feeders, and Services Over 1000 Volts ac, 1500 Volts dc, Nominal"

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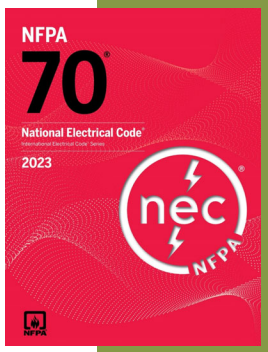
Moving on

Article 242

Overvoltage Protection

Code Updates



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NEC Article:	Type of Change:	Importance:
242.2	New Article	Minor

2020 NEC

Article 242

2023 NEC

Article 242

242.2 Overvoltage Protection

SPDs and surge arrestors can not be reconditioned.

New statement regarding reconditioning.

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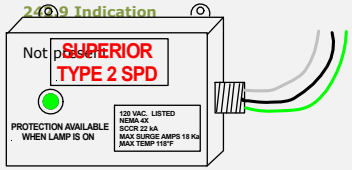
NEC Article:	Type of Change:	Importance:
242.9	New Article	Minor

2020 NEC

Article 242

242.9 Indication



2023 NEC

Article 242

242.9 Indication

All SPDs must provide a means of indicating they are functioning.

A welcome change to users and installers!

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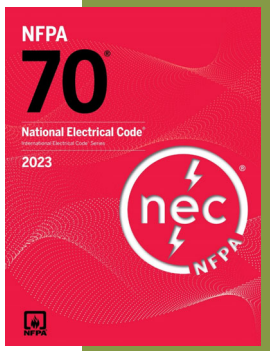
Moving on!

Article 245

Overcurrent Protection for Systems Rated over 1000 V ac, 1500 V dc

Code Updates



41

46

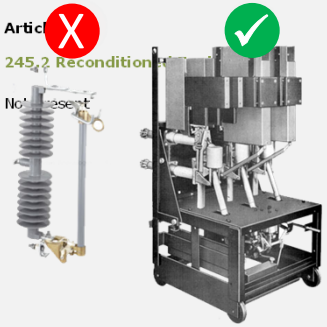
NEC Article:	Type of Change:	Importance:
245.2	New Article	Minor

2020 NEC

Artic

245.2 Reconditioned

No



2023 NEC

Article 245

245.2 Reconditioned Equipment

(A) Medium- and high-voltage breakers may be reconditioned as well as EP relays and current transformer.

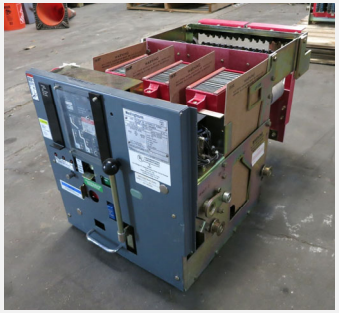
(B) Medium-voltage nonrenewable fuses and fuseholders can not be reconditioned.

42

47

NEC Article:	Type of Change:	Importance:
245.21	New Article	Minor

2020 NEC



2023 NEC

Article 245

245.21 Circuit Interrupting Devices

(A) Circuit Breakers
(B) Power Fuses & Fuseholders
(C) Distribution Cutouts and Fuse Links — Expulsion Type
(D) Oil Filled Cutouts
(E) Load Interrupters

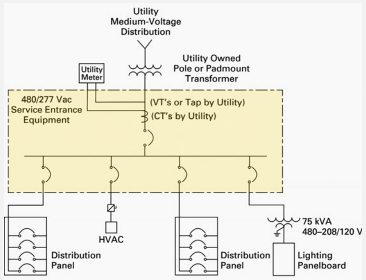
See **Article 245** for specific information for circuit interrupting devices.

43

48

NEC Article: **245.26** | Type of Change: **New Article** | Importance: **Minor**

2020 NEC



2023 NEC

Article 245

245.26 Feeders and Branch Circuits

(A) Location and Type of Protection
(B) Protective Devices
(C) Conductor Protection

See **Article 245.26** for additional information on feeders and branch circuits for systems rated over 1000 Volts ac, 1500 Volts dc information for circuit interrupting devices.

44

49

NEC Article: **245.27** | Type of Change: **New Article** | Importance: **Minor**

2020 NEC

Article 245

245.27 Additional Requirements for Feeders

Not present

2023 NEC

Article 245

245.27 Additional Requirements for Feeders

(A) Rating or Setting of Overcurrent Protective Devices
(B) Feeder Taps

See **Article 245.27** for additional information on requirements for feeders for systems rated over 1000 volts ac, 1500 volts dc

45

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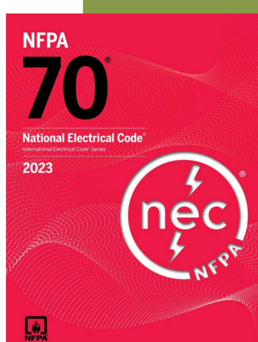
Moving on

Article 250

Grounding and Bonding

Code Updates



46

51

NEC Article: **250.3** | Type of Change: **Table Removed** | Importance: **Minor**

2020 NEC

Article 250

Table 250.3 Application of Other Articles (Grounding)

This was a table that provided the article or section for information relative to grounding and bonding equipment based on conductors or equipment.

2023 NEC

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NEC Article:	Type of Change:	Importance:
250.6(C)	Article Modified	Minor

2020 NEC

Article 250

250.6(C) Temporary Currents Not Classified as Objectionable Current

Temporary currents that occur because of unusual electrical condition like ground faults, are not considered as objectionable current for the purposes identified in Article 250.6(A) and (B).

2023 NEC

Article 250

250.6(C) Temporary Currents Not Classified as Objectionable Current

Currents resulting from ground faults, and from required grounding and bonding connections are not classified as objectionable for the purposes specified in 250.6(A) and (B).

The text was modified to make it clear that currents resulting from required grounding and bonding connections are **not** abnormal.

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53

NEC Article:	Type of Change:	Importance:
250.36(E)	Article Modified	Minor

2020 NEC

Article 250

250.36 High-Impedance Grounded Neutral Systems

(E) Equipment Bonding Jumper

The ***equipment*** bonding jumper must be an unspliced conductor run from the first system disconnecting means or OCPD to the grounded side of the grounding impedance.

2023 NEC

Article 250

250.36 High-Impedance Grounded Neutral Systems

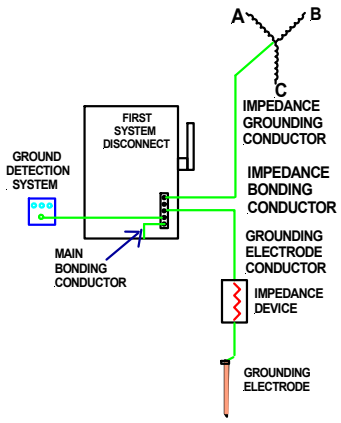
(E) Equipment Bonding Jumper

The ***impedance*** bonding jumper must be an unspliced conductor run from the first system disconnecting means or overcurrent device to the grounded side of the grounding impedance ***device***.

Wording was modified for clarity. >>

49

54



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NEC Article:	Type of Change:	Importance:
250.52(A)(3)(1)	Article Modified	Minor

2020 NEC

Article 250

250.52(A)(3)(1) Concrete-Encased Electrode

A concrete-encased electrode must consist of at least 20 ft of either (1) or (2):

(1) 1 or more bare or zinc galvanized or other electrically conductive coated steel reinforcing bars or rods of not less than 1/2" in diameter, installed in one continuous 20' length, or if in multiple pieces connected together by the usual steel tie wires….

2023 NEC

Article 250

250.52(A)(3)(1) Concrete-Encased Electrode

A concrete-encased electrode must consist of at least 20' of either of the following:

(1) One or more bare or zinc galvanized or other electrically conductive coated steel rebar of not less than 1/2" in diameter, installed in one continuous 20' length, or if in multiple pieces, the rebar must be connected together by steel tie wires, exothermic welding, welding, or other effective means to create a 20' or greater length.

Reworded for clarity (**"rebar" "the usual"**)

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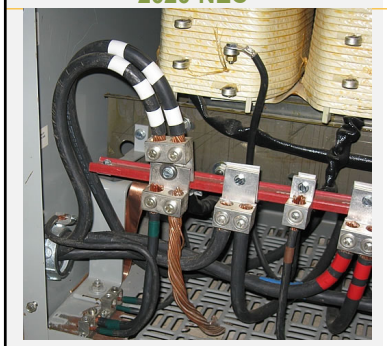
NEC Article:	Type of Change:	Importance:
250.64(G)	New Article	Minor

2020 NEC



2023 NEC

Article 250

250.64(G) Enclosures with Ventilation Openings

Grounding electrode conductors may not be installed through a ventilation opening of an enclosure.

Committee Statement:
"Routing grounding electrode conductors through a ventilation opening of an enclosure can result in reduced air flow and overheating of the associated equipment."

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57

NEC Article:	Type of Change:	Importance:
250.94(A)	Article Modified	Minor

2020 NEC

Article 250

250.94 Bonding for Communication Systems

(A) The Intersystem Bonding Termination Device

An intersystem bonding termination device must be on the external portion of a structure served at the service equipment or meter enclosure or the disconnecting means. If an IBT is used it must comply with 1-6.

2023 NEC

Article 250

250.94 Bonding for Communication Systems

(A) The Intersystem Bonding Termination Device

An intersystem bonding termination device must be on the external portion of a structure served at the service equipment or meter enclosure **or at the disconnecting means for any buildings or structures supplied by a feeder or branch circuit**. If an IBT is used it must comply with 1-6.

Underlined text was added.

53

58

NEC Article:	Type of Change:	Importance:
250.94(B)	Article Modified	Minor

2020 NEC

Article 250

250.94 Bonding for Communication Systems

(B) Other Means

When using a busbar as an intersystem bonding device, connections have to be made by a listed connector.

If aluminum busbars are used, the installation must also comply with 250.64(A).

2023 NEC

Article 250

250.94 Bonding for Communication Systems

(B) Other Means

When using a **busbar as an intersystem bonding** device, connections have to be made by a listed connector. If aluminum busbars are used, the installation must also comply with 250.64(A).

>>

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NEC Article:	Type of Change:	Importance:
250.94(B)	Article Modified	Minor

2020 NEC

Article 250

250.94 Bonding for Communication Systems

(B) Other Means

When using a busbar as an intersystem bonding device, connections have to be made by a listed connector.

If aluminum busbars are used, the installation must also comply with 250.64(A).

2023 NEC

Article 250

250.94 Bonding for Communication Systems

(B) Other Means

The busbar has to be connected to the grounding electrode system by a conductor that is **the larger** of the following:

(1) Not smaller than the largest grounding electrode conductor that is connected to the busbar
(2) As per article 250.94(A)(4)(a) >> #6 Cu

Requirements were added to indicate the minimum size of the conductor that connects the busbar to the grounding electrode system.

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60

NEC Article:	Type of Change:	Importance:
250.109	Article Modified	Minor

2020 NEC

Article 250

250.109 Metal Enclosures

Metal enclosures can be used to connect bonding jumpers or equipment grounding conductors, or both, together to become a part of an effective ground-fault current path.

Acceptable

2023 NEC

Article 250

250.109 Metal Enclosures

Metal enclosures can be used to connect bonding jumpers or equipment grounding conductors, or both, together to become a part of an effective ground-fault current path.

When installed, metal covers, **plaster rings, extension rings**, and metal fittings must be attached to these metal enclosures to ensure an effective ground-fault current path.

Plaster rings and extension rings were added terms to metal fittings.

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61

NEC Article:	Type of Change:	Importance:
250.118(A)(5)(f)	Modified Article	Minor

2020 NEC

Art

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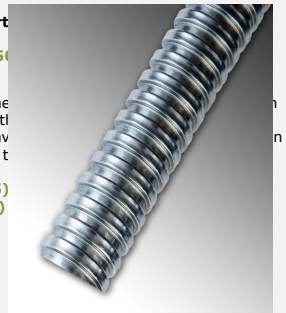

2023 NEC

Article 250

250.118 Metal Enclosures

(A) Permitted
Each equipment grounding conductor run with or enclosing the circuit conductors may be one or more of the following:

(5) FMC
(f) Stainless steel FMC, if used must have an equipment grounding conductor installed as per **250.102(E)(2).**

If EGC on outside of FMC, must not exceed 6'

Changed to match requirements of SS LFMC.

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62

NEC Article:	Type of Change:	Importance:
250.130(C)	Article Modified	Major

2020 NEC

Article 250

250.130(C) Equipment Grounding Conductor Connections

(C) Non-grounding Receptacle Replacement or Branch Circuit Extensions

This article required that if non grounding receptacles were replaced where no EGC was present in the box, six remedial options were offered including GFCI protection being added to protect the branch circuit.

2023 NEC

Article 250

250.130(C) Equipment Grounding Conductor Connections

(C) Replacement of Non-grounding Receptacle or Snap Switch and Branch Circuit Extensions

Language of the article was modified that now makes it necessary that **snap switches** also be connected to an EGC or grounded by one of the standard six options offered, one of which was GFCI protection for the branch circuit.

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63

NEC Article:	Type of Change:	Importance:
250.140(B)	Article Modified	Major

2020 NEC

Article 250

250.140 Frames of Ranges & Clothes Dryers

The exception (allowed a three-wire branch circuit) and using the grounded conductor as a neutral and as an equipment grounding conductor if one wasn't present at the outlet. These were based on meeting 4 conditions.

2023 NEC

Article 250

250.140 Frames of Ranges & Clothes Dryers

The article was modified **by making the exception the rule** in a new **Part B** and adding a requirement that Type SE cable, when it originates in enclosures other than a service, must have the bare, grounded conductor field insulated with a sleeve or tape to avoid accidental contact with grounded surfaces.

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64

NEC Article:	Type of Change:	Importance:
250.148(A)	Article Modified	Minor

2020 NEC

Article 250

250.148 Continuity of Equipment Grounding Conductors and Attachment in Boxes

(A) If circuit conductors are spliced or connected to equipment in a box, all wire type EGC associated with any of those circuits have to be connected within the box or to the box IAW 250.8 & 250.148(A).

2023 NEC

Article 250

250.148 Continuity of Equipment Grounding Conductors and Attachment in Boxes

(A) Language was modified to eliminate confusion about what EGC's were connected together in a box.

The exception still allows EGC associated with IG circuits to not be connected to other EGC in the box.

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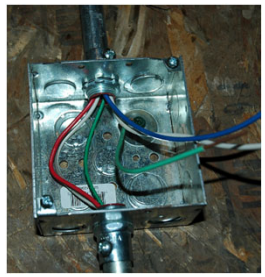
Changes made to this section clarify that all equipment grounding conductors in a box are to be connected to each other.



The isolated ground conductor, by exception, is not required to be connected to the box.

61

66

NEC Article:	Type of Change:	Importance:
250.148(C)	Article Modified	Minor

2020 NEC

Article 250

250.148 Continuity of Equipment Grounding Conductors and Attachment in Boxes

(C) Metal Boxes A connection used for no other reason must be made between the metal box and the equipment grounding conductor(s) as per **250.8** (permitted methods of grounding).

2023 NEC

Article 250

250.148 Continuity of Equipment Grounding Conductors and Attachment in Boxes

(C) Metal Boxes A connection used for no other reason shall be made between the metal box and the equipment grounding conductor(s). The equipment bonding jumper or equipment grounding conductor shall be sized from Table 250.122 based on the largest overcurrent device protecting circuit conductors in the box.

Conductor sizing requirement was added.

62

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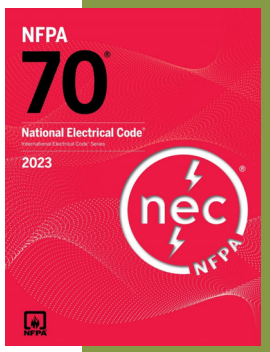
Moving on

Article 300

General Requirements for Wiring Methods and Materials

Code Updates



63

68

NEC Article:	Type of Change:	Importance:
300.2(A)	Article Modified	Major

2020 NEC

Article 300

300.2 Limitations

(A) Voltage
Wiring methods identified in Chapter 3 is for 1000 volts, nominal, or less where not specifically limited in some section of Chapter 3.

They are permitted to be over 1000 volts, nominal, where specifically allowed in the Code.

2023 NEC

Article 300

300.2 Limitations

(A) Voltage
Wiring methods identified in Chapter 3 are to be used for 1000 volts ac, 1500 V dc, nominal, or less where not specifically limited elsewhere in Chapter 3.

These wiring methods can be used for over 1000 V ac, 1500 volts dc, nominal, where specifically allowed in the Code

The change recognized 1500v DC.

64

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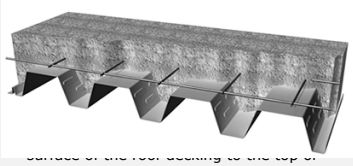
NEC Article:	Type of Change:	Importance:
300.4(E) Exception #2	Exception Added	Minor

2020 NEC

Article 300



the cable, raceway, or box.

Ex No. 2 Not Present

2023 NEC

Article 300

300.4(E) Protection from Damage, Ex No. 2

A cable, raceway, or box, installed in exposed or concealed locations **under** metal-corrugated sheet roof decking, must maintain spacing of 1½" measured from the lowest surface of the roof decking to the top of the cable, raceway, or box.

Exception No. 2: The 1½" spacing is not required when metal-corrugated sheet roof decking is covered with a 2" concrete slab. *(Exception No. 2 was added.)*

65

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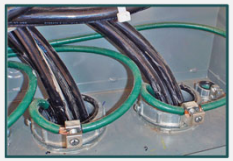
NEC Article:	Type of Change:	Importance:
300.4(G)	Exception Added	Minor

2020 NEC

Article 300

300.4 Protection Against Physical Damage

(G) When a raceway contains #4 AWG and larger, protection for conductor insulation must be provided by any of method 1-4:
(1)
(2)
(3)
(4)



2023 NEC

Article 300

300.4 Protection Against Physical Damage

(G) When a raceway contains #4 AWG conductors and larger, protection for conductor insulation must be provided by any of method 1-4 before the installation of conductors into the raceway
(1) (2) (3) (4)

The change required bushings or protective products to be **installed before wiring** is placed in the raceway(s).

66

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NEC Article:	Type of Change:	Importance:
Table 300.5(A)	Modified Article	Minor

2020 NEC

Article 300

300.5 Underground Installations

(A) Minimum Cover Requirements

Note #6 to Table 300.5(A) – Not present

Galvanized steel and stainless steel EMT, elbows, and fittings can be installed in concrete, **in direct contact with the earth**, or in areas subject to severe corrosive influences **if protected by corrosion protection** and approved as suitable for the condition.

2023 NEC

Article 300

300.5 Underground Installations

(A) Minimum Cover Requirements

Note #6 to Table 300.5(A) was added:

6. Directly buried electrical metallic tubing (EMT) must comply with **358.10**.

Change provided application standard for directly buried type EMT

67

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NEC Article:	Type of Change:	Importance:
300.5(D)(1)	Article Modified	Minor

2020 NEC

Article 300

300.5 Underground Installation

(D) Protection from Damage

(1) Emerging from Grade
Direct-buried conductors and cables must be protected from damage in accordance with 300.5(D)(1) - (D)(4).

2023 NEC

Article 300

300.5 Underground Installation

(D) Protection from Damage

(1) Emerging from Grade
~~Direct buried~~ Conductors and cables must be protected from damage in accordance with 300.5(D)(1) through (D)(4).

"Direct buried" was removed from the article indicating "**all cables**" must be protected from physical damage.

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NEC Article:	Type of Change:	Importance:
300.11(C)(2)	Article Modified	Minor

2020 NEC

Article 300

300.11(C)(2) Securing & Supporting

Raceways can only be used to support raceways, cables including Class 2 circuits, or nonelectrical equipment when the raceway contains power conductors for equipment the cables provide control signals for.

2023 NEC

Article 300

300.11(C)(2) Securing & Supporting

Raceways can only be used to support raceways, cables including Class 2 & **Class 3** circuits, or nonelectrical equipment when the raceway contains power conductors for equipment the cables provide control signals for.

Class 3 Circuits were added to this permissive condition.

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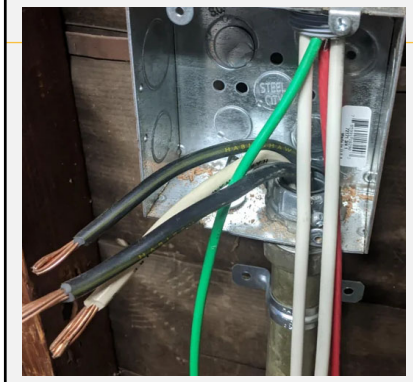
NEC Article:	Type of Change:	Importance:
300.14	Modified Article	Minor



2023 NEC

Article 300

300.14 Length of Free Conductors at Outlets, Junctions, and Switch Points

A clarification was introduced in new language that continues to require 6" of wire into the box from the point of entry, but states that the 6" may be the result of a **spliced or unspliced** conductor.

The revised wording makes clear the interpretation of the code.

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NEC Article:	Type of Change:	Importance:
300.25	Modified Article	Minor

2020 NEC

Article 300

300.25 Exit Enclosures (Stair Towers)

Exit enclosures that are **required to be separated from the building**, may only contain permitted wiring methods in the exit enclosure.

2023 NEC

Article 300

300.25 Exit Enclosures (Stair Towers)

Exit enclosures that are required to have a fire resistance rating must have approved wiring methods used in the exit enclosure.

An exception was added that allowed lighting on the outside of the exit enclosure doorway may be supplied by **wiring in the exit enclosure**.

Language was modified to explain the intent of the article and address branch circuit routing for egress lighting.

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NEC Article:	Type of Change:	Importance:
300.26	New Article	Minor

2020 NEC	2023 NEC
Article 300	**Article 300**
300.26 Remote-Control and Signaling Circuits	**300.26 Remote-Control and Signaling Circuits**
Not Present	(1) Class 1 power-limited remote-control and signaling circuits must comply with 724.3, Other Articles (2) Class 2 and Class 3 power-limited remote-control and signaling circuits must comply with 725.3, Other Articles (3) Non-power-limited remote-control and signaling circuits must be installed IAW 300.2 - 300.25.

The change provides additional resources on what is permissible with Class 1, 2, & 3 circuits. This improves usability of the code.

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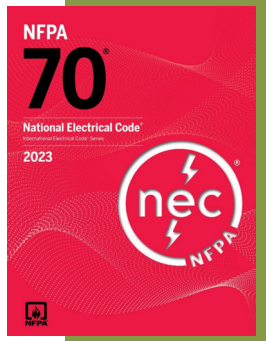
Moving on

Article 305

General Requirements for Wiring Methods and Materials for Systems Rated Over 1000 V ac, 1500 V dc, Nominal

Code Updates



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NEC Article:	Type of Change:	Importance:
Article 305	New Article	Major

Changes based on new Article 305(Over 100 VAC or 1500 VDC) Articles were relocated as indicated.

2020 NEC	ARTICLE	2023 NEC
300.1	Scope	305.1
	Other Articles (NEW)	305.3
300.32	Conductors of Different Systems	305.4
300.34	Conductor Bending Radius	305.5
300.35	Protection Against Induction Heating	305.6
300.31	Covers Required	305.7
300.38	Raceways in Wet Locations Above Grade	305.8
300.39	Braid-Covered Insulated Conductors- Exposed Installation	305.9
300.40	Insulation Shielding	305.10
300.42	Moisture or Mechanical Protection for Metal-Sheathed Cables	305.11
300.45	Danger Signs	305.12
300.50	Underground Installations	305.15

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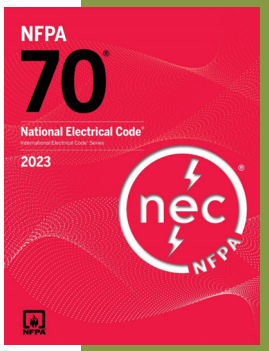
Moving on

Article 310

Conductors for General Wiring

Code Updates



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NEC Article:	Type of Change:	Importance:
310.10(G)(2)	Modified Article	Minor

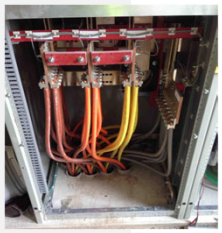
2020 NEC

Article 310

310.10(G) Conductors in Parallel

(2) Conductor and Installation Characteristics
Conductors that are paralleled for
- Each Phase
- Polarity
- Neutral
- Grounded Conductor
- Equipment Grounding Conductor

Have to comply with **(1)-(5)**.



2023 NEC

Article 300

310.10(G) Conductors in Parallel

These conductors, when paralleled, must comply with rules (1)-(5) of 310.10(G)(2):
- Grounded Conductor
- Neutral Conductor
- Grounding Jumper
- **SSBJ**, EBJ, EGC

Supply side bonding jumper was added to those that must comply with (1)-(5) when being paralleled.

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NEC Article:	Type of Change:	Importance:
310.15(B)(1-2)	Modified Table Names	Minor

2020 NEC

Article 310

310.15(B)(1)-(2) Ambient Temperature Correction Factors…

Table 310.15(B)(1) …Based on 30°C (86°F)

Table 310.15(B)(2) …Based on 40°C (104°F)

2023 NEC

Article 310

310.15(B)(1)-(2) Ambient Temperature Correction Factors…

Table 310.15(B)(1) was renamed:
Table 310.15(B)(1)(1)

Table 310.15(B)(2) was renamed:
Table 310.15(B)(1)(2)

Notes below each of these tables identified which conductor ampacity they were designated to be used with. Helpful to prevent misuse of tables.

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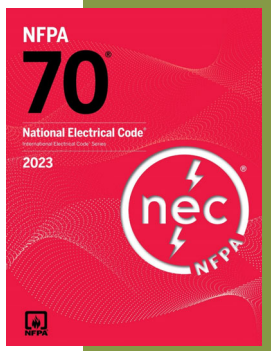
Moving on

Article 312

Cabinets, Cutout Boxes and Meter Socket Enclosures

Code Updates



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83

NEC Article:	Type of Change:	Importance:
312.10	New Article	Minor

2020 NEC

Article 312

312.10 Material

Material was moved to Art…

Exception to (3): Screws or other fasteners may extend into the enclosure not more than 7/16" if located within 3/8" of an enclosure wall.

2023 NEC

Article 312

312.10 Screw & Fasteners

Screws and fasteners that we install and that enter areas where wiring is placed must be provided by or at least specified by the manufacturer and must comply with:

(1) Screw must be a machine screw with a blunt end
(2) Any other fasteners used must have a blunt end
(3) Screws and fasteners can't extend into the enclosure more than 1/4" unless the end is protected.

79

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NEC Article:	Type of Change:	Importance:
312.102	New Article	Minor

2020 NEC

Article 312

312.10

Not pre

2023 NEC

Article 312

312.102 Doors and Covers

The following enclosures must have covers:
- Cabinets
- Cutout boxes
- Meter socket enclosures

Reason for Article: The covers for these enclosures are highly specialized and therefore should be created by the equipment manufacturers involved and included in the product acceptance evaluation.

80

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Moving on

Article 314

Outlet, Device, Pull and Junction Boxes; Conduit Bodies, Fittings; Handhole Enclosures

Code Updates

81

86

NEC Article:	Type of Change:	Importance:
314.5	New Article	Major

2020 NEC

Article 314

314.5 Screws & Other Fasteners

Not present

Note:
This article mirrors Article 312.10 for screw requirements.

2023 NEC

Article 314

314.5 Screws & Other Fasteners

Screws and fasteners that we install and that enter areas where wiring is placed must be provided by or at least specified by the manufacturer and must comply with:

(1) Screw must be a machine screw with a blunt end
(2) Any other fasteners used must have a blunt end
(3) Screws and fasteners can't extend into the enclosure more than 1/4" unless the end is protected.

Exception to (3): Screws or other fasteners may extend into the enclosure not more than 7/16" if located within 3/8" of an enclosure wall.

>> 82

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NEC Article:	Type of Change:	Importance:
314.5	New Article	Major

2023 NEC

Article 314

314.5 Screws & Other Fasteners (cont.)

(5) Screws or other fasteners penetrating a wall of a box exceeding 100³" may extend no more than ¼" or more than 7/16" if located within 3/8" of an adjacent box wall.
(6) Screws or fasteners penetrating the wall of a box not exceeding 100³" and not covered in 314.23(B)(1) must be made flush with the box interior.
(7) Screws or fasteners penetrating the wall of a conduit body must be made flush with the conduit body interior.

Exception to (3)-(6): A screw can be longer if the end of the screw is protected with an approved mean. (Guards)

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NEC Article:	Type of Change:	Importance:
314.16(B)(6)	Article Addition	Major

2020 NEC

Article 314

31

No

2023 NEC

Article 314

314.16(B)(6) Terminal Block Fill

If a terminal block is in a box, a **single volume allowance** IAW Table 314.16(B)(1) must be made for each terminal block based on the largest conductor(s) connected to the terminal block.

The change recognizes the additional space used by terminal blocks installed in wiring enclosures and assists us in determining the correct size of enclosure. To accommodate wiring safely.

84

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NEC Article:	Type of Change:	Importance:
314.24(C)	Article Addition	Major

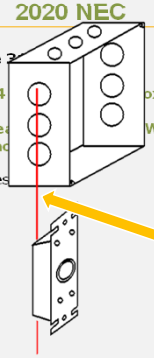
2020 NEC

Article

314.24 oxes

(C) Cle Wiring Entranc

Not pres



2023 NEC

Article 314

314.24 Dimensions of Boxes

(C) Clearances for Side-Wiring Entrances

Devices or equipment that are mounted in boxes that have access from the sides, the conductors coming through opening in the sides have to be protected as per (1) or (2). Entering from the side must be protected as covered in (1) or (2):
(***Side*** means any wall of a box other than the one opposite to the front.) >>

(1) The displacement of the device may not extend beyond the centerline of the wiring knockout. >>

85

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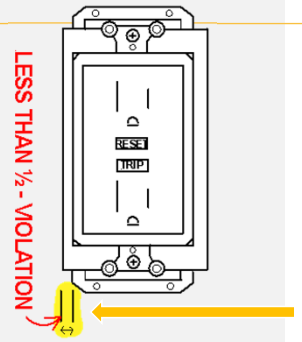
NEC Article:	Type of Change:	Importance:
314.24(C)	Article Addition	Major



2023 NEC

Article 314

314.24 Dimensions of Boxes

(C) Clearances for Side-Wiring Entrances

Devices or equipment that are mounted in boxes that have access from the sides, the conductors coming through opening in the sides have to be protected as per (1) or (2). Entering from the side must be protected as covered in (1) or (2):
(***Side*** means any wall of a box other than the one opposite to the front.) >>

(1) The displacement of the device may not extend beyond the centerline of the wiring knockout. >>

(2) The distance from the box wall to the device once it is installed in the box can not be less than ½".

85

91

NEC Article:	Type of Change:	Importance:
314.27(E)	Modified Article	Minor

2020 NEC

Article 314

314.27(E) Separable Attachment Fittings

The combination must be identified for the support of equipment based on the weight and mounting limits of the listing.

Box fill for this device may be calculated as per Article **314.16(B)(4)** and associated table.

2023 NEC

Article 314

314.27(E) Weight-Supporting Ceiling Receptacles (WSCR) and Weight-Supporting Attachment Fittings (WSAF)

Listed WSCR used in combination with compatible WSAF can be installed in outlet boxes to support of ceiling-suspended (paddle) fans, in accordance with 314.27(C) (maximum weight allowed by its listing).

The text was revised for clarity.

86

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NEC Article:	Type of Change:	Importance:
314 Part IV	Part Revision	Minor

2020 NEC

Article 314

Part IV: Pull and Junction Boxes, Conduit Bodies, and Handhole Enclosures for Use on Systems over 1000 V, Nominal

What was Part IV replaced Part III.

2023 NEC

Article 314

Part III: Construction Specifications

2022	Article 314 – Part IV	2023
314.40	Metal Boxes, Conduit Bodies, & Fittings	314.100
314.41	Covers	314.101
314.42	Bushings	314.102
314.43	Nonmetallic Boxes	314.103
314.44	Marking	314.104

87

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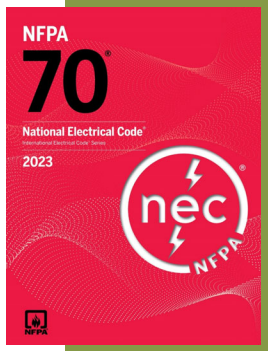
Moving on

Article 315

Medium Voltage Conductors, Cable, Cable Joints, and Cable Terminations

Code Updates



88

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NEC Article:	Type of Change:	Importance:
Article 315	New Article 315	Minor

Tables were renumbered from **Article 311**, which was removed.

Article 311
Medium Voltage Conductors and Cable

Article 315
Medium Voltage Conductors, Cable, *Cable Joints, and Cable Terminations*

>>

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NEC Article:	Type of Change:	Importance:
Article 315	New Article	Minor

Tables were renumbered from **Article 311**, which was removed.

2020 NEC	TABLE	2023 NEC
311.10(A)	Conductor Application & Insulation Rated 2001 & Higher	315.10(A)
311.10(B)	Thickness of Insul. For Jacket for Non-Sh. Solid Dielectric Insulated Conduc. Rated 2001 Volts to 5kV	315.10(B)
311.10(C)	Thickness of Insul. for Shielded Solid Dielectric Insulated Conduc. Rated 2001 Volts to 35 kV	315.10(C)
311.12(A)	Minimum Size of Conductors	315.12(A)
311.60(C)(67)	Ampacities of Insulated Single Copper Cond. Cables Triplex in Air	315.60(C)(1)
311.60(C)(68)	Ampacities of Insulated Single Aluminum Conductor Cables Triplexed in Air	315.60(C)(2)
311.60(C)(69)	Ampacities of Insulated Single Copper Conductor Isolated in Air	315.60(C)(3)
311.60(C)(70)	Ampacities of Insulated Single Aluminum Conductor Isolated in Air	315.60(C)(4)
311.60(C)(71)	Ampacities of an Insulated Three-Conductor Copper Cable Isolated in Air	315.60(C)(5)

The number of Tables associated with over 1000 volts extends beyond these listed.
See Article 311 for 15 additional tables relating to medium voltage and other information.

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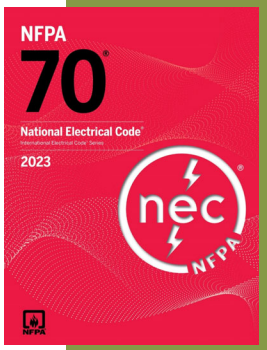
Moving on

Articles 320 - 398

Code Updates



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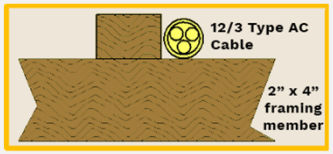
NEC Article:	Type of Change:	Importance:
320.23(A)	Modified Article	Minor

2020 NEC

Article 320 Armored Cable

320.23 In Accessible Attics

(A) Where run across the top of floor joists, or within 7 ft of the floor or floor joists across the face of rafters or studding, the cable has to be protected by guard strips that are equal to or greater in height than the cable.



2023 NEC

Article 320 Armored Cable

320.23 In Accessible Attics

(A) Where installed crosswise over the top of framing members, or crosswise over the face of rafters or studding within 7 ft of the floor or horizontal surface, the cable has to be protected by guard strips that are equal to or greater than the height of the cable.

The text was revised for clarity to ensure foot traffic in accessible attics would not damage cables capable of being stepped on.

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NEC Article:	Type of Change:	Importance:
322.56(B)	Article Revision	Minor

2020 NEC

Article 322 Flat Cable Assemblies: Type FC

322.56 Splices and Taps

(B) When making taps of flat cable assemblies, the installer must follow the requirements of 322.120 when color coding conductors.

2023 NEC

Article 322 Flat Cable Assemblies: Type FC

322.56 Splices and Taps

(B) When making taps of flat cable assemblies, the installer must follow the requirements of 322.120 when ~~**color coding**~~ **marking** conductors.

The change was minor but matched language found in 320.120 for uniformity.

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NEC Article:	Type of Change:	Importance:
330.112(A)	Article Modification	Minor

2020 NEC

Article 330 Metal-Clad Cable: Type MC

330.112(A) Insulation (MC Cable)

(A) 1000 Volts or Less
Insulated conductors of sizes 18 and 16 AWG must be listed in Table 402.3, with a maximum temperature not less than 90°C and as allowed by 725.49.

2023 NEC

Article 330 Metal-Clad Cable: Type MC

330.112(A) Insulation (MC Cable)

(A) 1000 Volts or Less
Insulated **control and signal** conductors of sizes 18 and16 AWG must be listed in Table 402.3, with a maximum temperature not less than 90°C and as allowed by **724.49**.

Ungrounded, grounded, and equipment grounding conductors 16 AWG and larger should be of a type listed in Table 310.4(1) or identified for use in Type MC cable.

Small editorial change by CMP.

94

100

NEC Article:	Type of Change:	Importance:
334.10(2)	Article Modification	Major

2020 NEC

Article 334 Nonmetallic-Sheathed Cable: Types NM and NMC

334.10 NM & NMC Cables Uses Permitted

Type NM and Type NMC cables can not be installed in detached multi-dwelling unit garages.

2023 NEC

Article 334 Nonmetallic-Sheathed Cable: Types NM and NMC

334.10 NM & NMC Cables Uses Permitted

Type NM and Type NMC cables can be used in the following location:

(2) Multi-family dwellings **and their detached garages** is permitted to be of Types III, IV, and V construction.

The CMP considered PI (public Input) that suggested the relative safety of exposed NM cable in detached multi-unit dwellings. It was permitted.

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NEC Article:	Type of Change:	Importance:
Article 335	New Article	Minor

2020 NEC

Article 337 Instrumentation Tray Cable: Type ITC

Article 335 Instrumentation Tray Cable

Not present

2023 NEC

Article 337 Instrumentation Tray Cable: Type ITC

Article 335 Instrumentation Tray Cable

The Article is new in this location, but its content is not. It was previously located in **Article 727**.

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NEC Article:	Type of Change:	Importance:
340.10(4)	Article Modification	Minor

2020 NEC

Article 340 Underground Feeder and Branch-Circuit Cable: Type UF

340.10 Uses Permitted

(4) Installed as nonmetallic-sheathed cable.

The installation and conductor requirements has to comply with Parts II and III of Article 334 and must be of the multiconductor type cable.

2023 NEC

Article 340 Underground Feeder and Branch-Circuit Cable: Type UF

340.10 Uses Permitted

(4) When installed as nonmetallic-sheathed cable, the installation and conductor requirements must comply with Parts II & III of Article 334, **except for 334.12(B)**, and must be of the multiconductor type.

334.12(B) Lists the conditions when type NM cable IS NOT installed, Which ARE suitable for Type UF

103

NEC Article:	Type of Change:	Importance:
342.20(B)	Article Modification	Minor

2020 NEC

Article 342 Intermediate Metal Conduit (IMC)

342.20 Size

(B) Maximum
IMC larger than **4"** can not be used.

2023 NEC

Article 342 Intermediate Metal Conduit (IMC)

342.20 Size

(B) Maximum
The panel accepted changes to include trade sizes **5" and 6"** IMC to Article 342 to be consistent with the rigid metal conduit Article 344.

104

NEC Article:	Type of Change:	Importance:
344.28	Revised Article	Minor

2020 NEC

Article 344 Rigid Metal Conduit (RMC)

344.28 Reaming and Threading

No reference made to PVC coated RMC.

2023 NEC

Article 344 Rigid Metal Conduit (RMC)

344.28 Reaming and Threading

PVC Coated Rigid Metal conduit must be threaded as per the manufacturers' instructions. This will prevent damage to the exterior coating.

This statement was added to ensure installers are aware of the manufacturers' instructions.

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105

NEC Article:	Type of Change:	Importance:
348.2	New Article	Minor

2020 NEC

Article 348 Flexible Metal Conduit (FMC)

2023 NEC

Article 348 Flexible Metal Conduit (FMC)

348.2 Reconditioned Equipment

FMC must not be reconditioned.

100

106

NEC Article:	Type of Change:	Importance:
350.2	New Article	Minor

2020 NEC

Article 350 Liquidtight Flexible Metal Conduit (LFMC)

2023 NEC

Article 350 Liquidtight Flexible Metal Conduit (LFMC)

350.2 Reconditioned Equipment

LFMC must not be reconditioned.

101

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NEC Article:	Type of Change:	Importance:
352.10(K)	Modified Article	Minor

2020 NEC

Article 352 Rigid Polyvinyl Chloride Conduit (PVC)

This new section makes it clear that Schedule 80 PVC Conduit and Schedule 80 PVC Conduit elbows are acceptable for areas of Physical Damage

2023 NEC

Article 352 Rigid Polyvinyl Chloride Conduit (PVC)

352.10 Uses Permitted

(K) Physical Damage

If the raceway is subject to physical damage, Schedule 80 PVC conduit, Schedule 80 PVC conduit elbows, and listed fittings for PVC conduit must be used.

IN: All listed PVC conduit fittings are suitable for connection to both Schedule 40 and Schedule 80 PVC conduit.

102

108

NEC Article:	Type of Change:	Importance:
352.44(B)	Article Added To	Major

2020 NEC

Article 35 hloride Conduit (

352.44 Exp

(B) Earth M

Not present

2023 NEC

Article 352 Rigid Polyvinyl Chloride Conduit (PVC)

352.44 Expansion Fittings

(B) Earth Movement

When PVC conduit is installed that emerges from the earth, it must be provided with expansion fittings that will compensate settlement of the earth as well as frost heaves.

352.44(B) was revised to address earth movement, including frost heave, and the installation of expansion fittings.

109

NEC Article:	Type of Change:	Importance:
356.10(8)	Article Modification	Minor

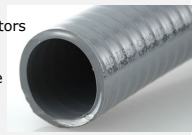
2020 NEC

Article 356 Liquidtight Flexible Nonmetallic Conduit (LFNC)

356.10 Use Permitted

LFNC can be used in exposed or concealed locations for the following purposes:

(8) Conductors or cables rated at a temperature higher than the listed temperature rating of LFNC conduit can be installed in LFNC, provided the conductors or cables are not operated at a temperature higher than the listed temperature rating of the LFNC.



2023 NEC

Article 356 Liquidtight Flexible Nonmetallic Conduit (LFNC)

356.10 Use Permitted

(8) LFNC is permitted in locations that have severe corrosive conditions addressed in Article 300.6

This additional attribute took the place of former **(8)** now known as **(9)**.

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NEC Article:	Type of Change:	Importance:
358.20	Article Modification	Minor

2020 NEC

Article 358 Electrical Metallic Tubing: Type EMT

358.20 Size

(B) Maximum
Type EMT may not be larger than **4"**

2023 NEC

Article 358 Electrical Metallic Tubing: Type EMT

358.20 Size

(B) Maximum
Type EMT may not be larger than **6"**

358.20(B) was revised to address the availability of 5" and 6" EMT and listing.

111

NEC Article:	Type of Change:	Importance:
366.10(C) Exc	Article Modified	Minor

2020 NEC

2023 NEC

Article 366 Auxiliary Gutters

366.10 Uses Permitted

(C) Extended Distance Auxiliary

Auxiliary gutters can extend no more than 30 feet beyond the equipment they support.

Exception: When used IAW Article 620.35 for elevators, they can extend more than 30'.

This was previously listed in 366.12(2) "Uses Not Permitted" (extending more than 30') in the 2020.

112

NEC Article:	Type of Change:	Importance:
Article 369	New Article	Minor

2020 NEC

Article 369 Insulated Bus Pipe (IBP)/ Tubular Covered Conductors (TCC) Systems

Not present

2023 NEC

Article 369 Insulated Bus Pipe (IBP)/ Tubular Covered Conductors (TCC) Systems

A cylindrical solid or hollow conductor with a solid insulation system, having conductive grading layers and a grounding layer imbedded in the insulation, and provided with an overall covering of insulating or metallic material.

Outdoor, air insulated electrical substations use exposed bus bars and cables to connect from transformers and bus ties to switchgear equipment. A length of chain thrown over an air insulated sub-station fence could create a catastrophic failure that could destroy the entire substation. Replacing the exposed bus bars and cables with a product called insulated bus pipe (IBP) would prevent such failures.

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NEC Article:	Type of Change:	Importance:
Article 369	New Article	Minor

Article 369 Insulated Bus Pipe (IBP)/Tubular Covered Conductors (TCC) Systems

Article	Subject	Article	Subject
369.1	Scope	369.20	Termination of Connections
369.2	Reconditioned Equipment	369.80	Ampacity
369.6	Listing Requirements	369.90	Temperature Rating
369.10	Uses Permitted	369.100	Construction
369.12	Uses Not Permitted	369.110	Barriers
369.14	Installation	369.120	Marking

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114

NEC Article:	Type of Change:	Importance:
371.30	New Article	Minor

2020 NEC

Article 371 Flexible Bus System

2023 NEC

Article 371 Flexible Bus System

371.30 Securing and Supporting

A flexible bus system is an assembly of flexible insulated bus, with a system of associated fittings used to secure, support, and terminate the bus.

When a need exists to couple a stationary bus system to another, a flexible bus system provides that degree of versatility, safety, and reliability.

This new article covers a great deal of information.

Article 371.1 through 371.120.

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NEC Article:	Type of Change:	Importance:
Article 371	New Article	Minor

Article 371 Flexible Bus Systems

Article	Subject	Article	Subject
371.1	Scope	371.18	Flexible Bus Systems Installation
371.6	Listing Requirements	371.20	Terminations
371.10	Uses Permitted	371.30	Securing and Supporting
371.12	Uses Not Permitted	371.40	Short Circuit Current Rating
371.14	Installation Design	371.60	Grounding
371.17	Overcurrent Protection	371.120	Marking

110

116

NEC Article:	Type of Change:	Importance:
392.10(A)	Table Modified	Minor

2020 NEC

Article 392 Cable Trays

Table 392.10(A) Wiring Methods Cable Trays Uses Permitted

Cables for power-limited circuits and fault-managed power circuits were not previously recognized as permitted to be installed in cable trays.

CHANGE

2023 NEC

Article 392 Cable Trays

Table 392.10(A) Wiring Methods Cable Trays Uses Permitted

10(A) The wiring methods identified in Table 392.10(A) can be installed in cable tray systems under the conditions described in their respective articles and sections.

Article 722.3(E)
Article 722.3(E) permits the installation of cables for power-limited circuits and fault-managed power circuits in cable trays that maintain compliance with part 1 and part 2 of Article 392.

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NEC Article:	Type of Change:	Importance:
393.6(B)(4)	Article Modified	Minor

2020 NEC

Article 393 Low-Voltage Suspended Ceiling Power Distribution Systems

393.6(B) Assembly of Listed Parts

(4) Listed low-voltage cables in accordance with 725.179, conductors in raceways, or other fixed wiring methods for the secondary circuit.

CHANGE

2023 NEC

Article 393 Low-Voltage Suspended Ceiling Power Distribution Systems

393.6(B) Assembly of Listed Parts

A low-voltage suspended ceiling power distribution system assembled from the following parts, listed according to the appropriate function, can be used:

(4) Listed low-voltage cables in accordance with ~~725.179,~~ 722.179, conductors in raceways, or other fixed wiring methods for the secondary circuit

722.179 was substituted because it reflects new classification of LV circuits.

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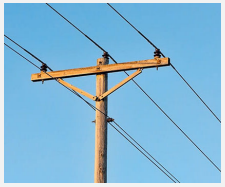
NEC Article:	Type of Change:	Importance:
Article 395	New Article	Minor

2020 NEC



2023 NEC

Article 395 Outdoor Overhead Conductors over 1000 V

395.1 Scope
The article includes the use and installation for outdoor overhead conductors over 1000 volts, nominal.

395.10 Uses Permitted
Outdoor overhead conductors over 1000 volts, nominal, are permitted as follows:
(1) Outdoors in free air
(2) For service conductors, feeders, or branch circuits

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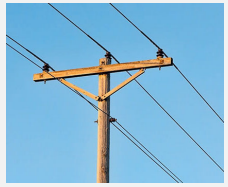
NEC Article:	Type of Change:	Importance:
Article 395	New Article	Minor



2023 NEC

Article 395 Outdoor Overhead Conductors over 1000 V

395.30 Support

(A) Conductors
Documentation of the engineered design by a licensed professional electrical engineer must be available upon request of the AHJ and must include consideration of the following:

(1) Applied voltage
(2) Conductor size
(3) Distance between support structures
(4) Wind/ice loading
(5) Type of structure
(6) Surges

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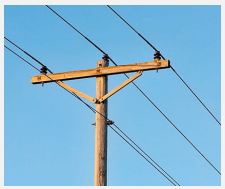
NEC Article:	Type of Change:	Importance:
Article 395	New Article	5

2023 NEC



Article 395 Outdoor Overhead Conductors over 1000 V

395.30 Support

(B) Structures
Structures of wood, metal, or concrete, or combinations of those materials, must be provided for support of overhead conductors over 1000 volts, nominal.

Documentation of the engineered design by a licensed professional engineer engaged primarily in the design of such systems and the installation of each support structure must be available upon request of the authority having jurisdiction and must include consideration of the following: *See list of ten criteria for judgement*.

>>

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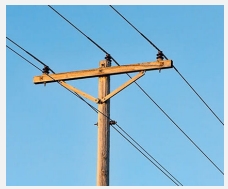
NEC Article:	Type of Change:	Importance:
Article 395	New Article	Minor

2023 NEC



Article 395 Outdoor Overhead Conductors over 1000 V

395.30 Support

(C) Insulators
Insulators used to support conductors must be rated for all of the following:
(1) Applied phase-to-phase voltage
(2) Mechanical strength required for each individual installation
(3) Impulse withstand BIL in accordance with Table 490.24(a)

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NEC Article:	Type of Change:	Importance:
398.15(C)(4)	Relocated Article	Minor

2020 NEC

Article 398 Open Wiring on Insulators

398.15(C) Exposed to Physical Damage

Conductors that are within 7 ft of the floor are considered exposed to physical damage.

These conductors must be protected from damage by one of the four methods listed.

(4) Rigid metal conduit, intermediate metal conduit, rigid nonmetallic conduit, or electrical metallic tubing.

2023 NEC

Article 398 Open Wiring on Insulators

398.15(C) Exposed to Physical Damage

Conductors that are within 7 ft of the floor are considered exposed to physical damage.

These conductors must be protected from damage by one of the four methods listed.

(4) Rigid metal conduit (RMC), intermediate metal conduit (IMC), rigid polyvinyl chloride conduit (PVC), reinforced thermosetting resin conduit (RTRC), or electrical metallic tubing (EMT). **RTRC was added to this group.**

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This completes 2023 NEC Code Updates – Part 2 Lesson 7

Thank You for Learning With Us!

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