

Revisions for the 2023 National Electrical Code – Part 1

An Online Continuing Education Course for Engineers

Course Number: E-4075

Credit: 4 Hours / 4 PDH / 4 CPD

Revisions for the 2023 National Electrical Code – Part 1

Patrick Ouillette, P.E.

Introduction

This course is intended to familiarize the reader with the major changes contained in the 2023 National Electrical Code®. These are the “need to know” changes. The document is heavily illustrated to enable effective and efficient visual learning. The course addresses Code revisions that apply to all types of occupancies: residential, commercial, and industrial. The course is divided into 3 parts:

- Part 1: Code-wide changes through Article 240 (4 PDHs)
- Part 2: Article 250 through Article 500 (3 PDHs)
- Part 3: Article 512 through Annex E (3 PDHs)

The layout and the method of this presentation will enable new Code users to easily navigate through the changes. Those well experienced in the Code will find depth in the coverage. Through the heading(s) at the beginning of each Code change addressed in the document, the reader will readily identify the section affected by the change and the specific subject being discussed. The Significance section sets the stage. An Analysis of the Code change follows, with explanation where necessary to help the student understand the revision, its background, and the logic of the change. Graphics, photographs, examples, or calculations are used to illustrate the change and to enhance learning. The Summary is a brief re-statement of the highlights of the Code change. An Application Question with answer is included at the end of some Code sections studied for exercise in applying the change. Some of the sections analyzed contain a Code Refresher that addresses existing Code requirements related to the change. General Code information and rules are weaved into the writing throughout the document. The author’s writing method attempts to provide general Code study and a Code refresher through discussion of the Code changes. NFPA 70E®, *Electrical Safety in the Workplace*, is briefly discussed and referenced several times within the course.

Although there are many references to the 2023 NEC® throughout this document, the course and quiz can be completed without the need to refer to the NEC® itself. However, the learning experience will be enhanced by referring to the NEC® as the course is completed. For further study on any Code section within this course, the full text of the 2023 NEC® should be consulted.

You can read the 2023 NEC® online at the following site, courtesy of NFPA:

<https://www.nfpa.org/NEC/electrical-codes-and-standards/NFPA-70?code=70>

The 2020 National Electrical Code® Style Manual

The *NEC Style Manual* is a document that provides the editorial and administrative requirements for the *NEC*. It was updated in December 2020. The Manual is intended as a tool to assist in making *NEC* documents as clear, usable, and unambiguous as possible. To align with the updated *Style Manual*, all definitions have been moved from individual articles to Article 100—Definitions.

Also, Informational Notes throughout the *NEC* have been modified to align with the requirements of the *NEC Style Manual*.

Medium-Voltage Articles Numbered “XX5”

The 2023 *NEC* begins a numbering and re-numbering scheme to number an article that covers medium-voltage requirements with a number that ends with “5.” You’ll notice this effort in the numbering of the new articles in the 2023 *NEC*.

Low-Voltage Thresholds

The move that began in the 2014 Code cycle to raise the low-voltage threshold from 600 volts to 1000 volts continues in 2023. Because of the growing use of dc voltage systems, the dc low-voltage threshold has been added throughout the 2023 *NEC*. In the 2023 Code the starting point for medium voltage is over 1000 volts ac, 1500 volts dc, nominal.

The *NEC* agrees with ANSI C84.1 and IEEE 141 recognizing ac voltages of over 1000 volts as the starting point for medium voltages. The medium-voltage range spans from over 1000 volts to less than 100 kV. The three highest practical ac voltage systems in this range are 34,500 V, 46,000 V, and 69,000 V.

New Articles, Deleted Articles, and Revised Article Titles

Article 110—General Requirements for Electrical Installations [revised title]

This article was formerly titled *Requirements for Electrical Installations*. However, the entire *NEC* consists of requirements for electrical installations. The new title better reflects the contents and type of rules that are located in Article 110.

Article 235—Branch Circuits, Feeders, and Services Over 1000 Volts ac, 1500 Volts dc, Nominal [new]

This is a new article that pulls together the medium-voltage requirements from Articles 210—Branch Circuits, 215—Feeders, 225—Outside Branch Circuits and Feeders, and 230—Services. In the 2020 Code Articles 215, 225, and 230 contain a Part for “Over 1000 Volts,” and Article 210 contains a subsection for “Branch Circuits Over 600 Volts.”

Article 245—Overcurrent Protection for Systems Rated Over 1000 Volts ac, 1500 Volts dc [new]

This is another new article that separates the rules for medium voltage. Part IX of Article 240 (Overcurrent Protection over 1000 Volts, Nominal) has been relocated to new Article 245.

The article covers overcurrent protection for systems rated over 1000 volts ac, 1500 volts dc.

Overcurrent protection for systems rated below these voltage levels is covered in Article 240.

Article 305—General Requirements for Wiring Methods and Materials for Systems Rated Over 1000 Volts ac, 1500 Volts dc, Nominal [new]

In previous Code editions, Article 300 contained a Part II, Requirements for over 1000 Volts, Nominal. These rules have been removed from Article 300 and become the basis for new Article 305.

One of the most helpful sections in this new article is the creation of Table 305.3, Wiring Methods Permitted for Use in Systems Rated Over 1000 Volts ac, 1500 Volts dc, Nominal. This table lists all of the wiring methods that are permitted for medium-voltage applications.

Article 315—Medium Voltage Conductors, Cable, Cable Joints, and Cable Terminations [new]

In the 2020 Code, this was new Article 311. In the 2023 Code, it becomes new Article 315. The title of the article has changed, since rules for cable joints and terminations have been added to its contents.

Article 335—Instrumentation Tray Cable: Type ITC [new, formerly Art. 727]

This was formerly Article 727. Article 727 has been deleted and its contents relocated to new Article 335. Since Instrumentation Tray Cable is a wiring method, its relocation to Chapter 3 of the *NEC* is appropriate. The title of *NEC* Chapter 3 is “Wiring Methods and Materials.”

Article 337—Industrial Mobile Cable: Type IM [revised title]

Only the title of this article and the cable type designation has changed. Article 337 was a new article in the 2020 *NEC* titled “Type P Cable.” This is a robust heavy-duty industrial cable. Its primary use, within the purview of the *NEC*, is as a wiring method for land-based petroleum drilling rigs, but its use is not limited to any particular application. Type “P” is deleted. The cable designation in the new Code is Type IM.

Article 369—Insulated Bus Pipe (IBP) / Tubular Covered Conductors (TCC) [new]

Article 369 introduces a wiring method that is new to the *NEC* in 2023. The article covers Insulated Bus Pipe (IBP), also referred to as Tubular Covered Conductors (TCC). **Insulated Bus Pipe** (IBP) is defined in the *NEC* as, “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.” IBP can be constructed utilizing copper or aluminum conductors and can be either solid or hollow. It is permitted for voltages up to and including 35,000 volts ac. IBP is permitted indoors and outdoors, but not where accessible to other than qualified persons. Installations cannot be concealed by the building structure. Details of the article are discussed later in this book.

Article 371—Flexible Bus Systems [new]

Article 371—Flexible Bus Systems is another new Wiring Method article recognized in the 2023 Code. The product’s flexibility makes it easily customized in the field. Systems are engineered for specific applications. Installations must conform to the engineering drawings and specifications, and to the manufacturer’s instructions. Flexible bus systems can be used for a variety of circuit types in applications of 1000 volts or less. As of this writing, UL has not assigned a Product Category, but product listing is expected. The article is covered in more detail later in this book.

Article 395—Outdoor Overhead Conductors over 1000 Volts [new, formerly Art. 399]

This was formerly Article 399 with the same title. The contents of the article have not changed. The change in the article number is a result of the numbering convention implemented in the 2023 *NEC* cycle to end medium-voltage articles with the number “5.”

Article 480—Stationary Standby Batteries [revised title]

The first edition of the *NEC* published in 1897 contained requirements for installations of storage batteries in Article 480. The new generation of batteries employed in “energy storage systems” differ from traditional storage batteries and require separate rules. Thus, Article 706—Energy Storage Systems (ESSs) was introduced in the 2020 *NEC*. The difference between stationary standby batteries and ESSs is in their application. ESSs are primarily intended to store and provide energy during normal operating conditions. A stationary standby battery spends the majority of time in continuous float charge, or in a high state of charge, in readiness (standby) for a discharge event.

The only significant change in Article 480 is the addition of a new section, 480.1, which applies only to stationary standby lead-acid cells. Other battery systems are covered by Article 706.

Application

Requirements for lead-acid or nickel-cadmium cells

- a. 460
- b. 480
- c. 705
- d. 706

Article 495—Equipment

This was formerly Art. 490. The title of the article is revised to reflect the addition of equipment overcurrent protection to the contents of the article. The change is the result of the numbering convention implemented in the 2020 *NEC* cycle to end medium-voltage articles with the number “5.”

Article 510—Hazardous (Classified) Locations – Specific [deleted]

This article is no longer necessary and has been deleted. It consisted of only two sections, Scope and General. These sections directed the Code user to other articles. Necessary text has been moved to applicable articles to ensure compliance.

To view the remainder of the course material and to take the quiz for PDH credit, you must purchase the course.

Close this window and click “Add to cart” on the product page.