



BURGLAR ESTABLISHED 1981
& FIRE ALARM

ASSOCIATION OF **MICHIGAN**

APPRENTICESHIP PROGRAM

Period 4
Related Training Instruction (RTI)
Module 1 – NFPA 70 National Electrical Code

Reading material associated with this module:
Introduction and Chapter 1
NFPA 70, National Electrical Code, 2023 Edition

NFPA 70
National Electrical Code
2023 Edition
Article 90 - Introduction

NFPA 70 National Electrical Code (NEC) 2023 Edition

Article 90 - Introduction:

- *An understanding of the purpose and organization of the National Electric Code (NEC) is critical to any user who wants to properly interpret and apply its requirements. This understanding is even more critical to those who work in the specialty areas of the NEC in which limited energy circuits (as in fire alarm circuits) are covered by special rules that may alter the code requirements.*
- *The State of Michigan 2023 Michigan Electrical Code, Part 8 rules adopt by reference the 2023 edition of the National Electrical Code (NEC) with amendments, deletions, and additions deemed appropriate for Michigan.*
- *The 2021 edition of the Michigan Building Code Section 907.6.1 Wiring, requires that wiring comply with the requirements of NFPA 70 (NEC) and NFPA 72 (National Fire Alarm and Signaling Code).*

NFPA 70 National Electrical Code (NEC) 2023 Edition

Article 90 - Introduction:

- *The 2022 edition of NFPA 72 National Fire Alarm and Signaling Code contains several requirements that refer to NFPA 70 (NEC).*
 - NFPA 72 – 10.6.2 Code Conformance. All power supplies shall be installed in accordance with applicable requirements of NFPA 70.
 - NFPA 72 – 10.6.5.5 Overcurrent Protection. An overcurrent protective device shall be provided in accordance with NFPA 70.
 - NFPA 72 – 12.2.3 The installation of all pathway wiring, cable, and equipment shall be in accordance with NFPA 70 and NFPA 72 Sections 12.2.3.1 through 12.2.3.4, which cover optical fiber cables (Articles 770 and 840), fire alarm system wiring (Article 760), Class 1, 2 and 3 circuits (Article 725), and resistance to attack by fire (Articles 760 and 728).

NFPA 72, 10.6.2, 10.6.5.5, 12.2.3

NFPA 70 National Electrical Code (NEC) 2023 Edition

Article 90 – Introduction:

- 90.2 Purpose:
- (A) Practical Safeguarding. The purpose of this Code is the practical safeguarding of persons and property from hazards arising from the use of electricity.
 - *Fire alarm circuits in common use today do not present a significant risk of fire or shock. In some cases, a risk of shock is present, but the circuit involved would not normally be capable of starting a fire. Fire alarm systems utilize power sources that limit both voltage and current to minimize fire or shock hazards.*
- (C) Installations Covered. This Code covers the installation and removal of electrical conductors, equipment, and raceways; signaling and communications conductors, equipment, and raceways; and optical fiber cables for the following:
 - Public and private premises including buildings and structures.
 - Installation of conductors and equipment that connect to the supply of electricity.

90.2

NFPA 70 National Electrical Code (NEC) 2023 Edition

Article 90 – Introduction:

- 90.3 Code Arrangement:
- This Code is divided into the introduction and 9 chapters. Chapters 1, 2, 3, and 4 apply generally to all electrical installations. Chapters 5, 6, and 7 apply to special occupancies, special equipment, or other special conditions and may supplement or modify the requirements of Chapters 1-7. Chapters 1-4 apply except as amended by Chapter 5-7 for particular conditions.
- Chapter 8 covers communications systems and is not subject to Chapters 1-7 except where the requirements are specifically referenced in Chapter 8.
- Chapter 9 consists of tables that are applicable as referenced.
- Informative annexes are not part of the requirements of this Code but are included for informational purposes.

90.3

NFPA 70 National Electrical Code (NEC) 2023 Edition

Article 90 – Introduction:

- 90.3 Code Arrangement:
- *In general Section 90.3 provides permission for the rules in Chapters 5, 6, and 7 to change the rules in the first four chapters.*
- *This permission and an understanding of the Code hierarchy is very important to anyone applying the NEC to fire alarm systems.*

NFPA 70 National Electrical Code (NEC) 2023 Edition

Article 90 – Introduction:

- 90.4 Enforcement:
- (A) Application. The Code is intended to be suitable for mandatory application by governmental bodies that exercise legal jurisdiction over electrical installations, including signaling and communications systems, and for use by insurance inspectors.
- *Code officials are commonly referred to as the “Authority Having Jurisdiction” (AHJ). The AHJ can be an organization, office, or individual.*
- (B) Interpretations. The AHJ has responsibility for enforcing the requirements of a code or standard, making interpretations of the rules, approving equipment, materials, an installation, or a procedure, and for granting the special permission contemplated in a number of the rules.

90.4

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Article 90 – Introduction:

- 90.4 Enforcement:
- (C) Specific Requirements and Alternative Methods. By special permission, the AHJ may waive specific requirements of the Code or permit alternative methods where equivalent objectives can be achieved.
- (D) New Products, Constructions, or Materials. This Code may require new products, constructions, or materials that may not be available at the time the Code is adopted. The AHJ may permit the use of the products, constructions, or materials that comply with the most recent previous edition of this Code adopted by the jurisdiction.

90.4

NFPA 70 National Electrical Code (NEC) 2023 Edition

Article 90 – Introduction:

- 90.5 Mandatory Rules, Permissive Rules, and Explanatory Material:
- (A) Mandatory Rules. Mandatory rules of this Code are those that identify actions that are specifically required or prohibited and are characterized by the use of the terms **shall** or **shall not**.
- (B) Permissive Rules. Permissive rules of this Code are those that identify actions that are allowed but not required, are normally used to describe options or alternative methods, and are characterized by the use of the terms **shall be permitted** or **shall not be required**.
- (C) Explanatory Material. Explanatory material, such as references to other standards, references to related sections of this Code, or information related to a Code rule is contained in this Code in the form of informational notes or an informative annex. Unless the standard reference includes a date, the reference is considered to use the latest edition of the standard. Such notes are not enforceable as requirements of this Code.

90.5

NFPA 70
National Electrical Code
2023 Edition
Chapter 1 - General

NFPA 70 National Electrical Code (NEC) 2023 Edition

Article 100 – Definitions:

- *It is imperative for you to familiarize yourself with the definitions contained in Article 100 related to fire alarm systems and their installation. Article 100 contains those definitions essential to the application of the code.*
- *It is important to understand the difference between NPFLA and PLFA circuits. These circuit differences will be discussed in further detail in a future module.*
- *Almost every circumstance you will come across as a “Fire Alarm System Technician” will involve PLFA wiring methods, materials and application.*

NFPA 70 National Electrical Code (NEC) 2023 Edition

Article 110 – General Requirements for Electrical Installations:

- The following Sections from Article 110 are specifically referenced in Article 760 or apply generally to all electrical installations:
 - 110.3(B) - Installation and Use:
 - Equipment that is listed, labeled, or both, or identified for a use shall be installed and used in accordance with the instructions included in the listing, labeling or identification.
 - 110.6 – Conductor Sizes:
 - Conductor sizes are expressed in American Wire Gauge (AWG) or in circular mils.
 - 110.7 – Wiring Integrity:
 - Completed wiring installations shall be free from short circuits, ground faults, or any connections to ground other than as required or permitted elsewhere in the Code.

NFPA 70 National Electrical Code (NEC) 2023 Edition

Article 110 – General Requirements for Electrical Installations:

- The following Sections from Article 110 are specifically referenced in Article 760 or apply generally to all electrical installations (continued):
 - 110.8 – Wiring Methods:
 - Only wiring methods recognized as suitable are included in this Code. The recognized methods of wiring shall be permitted to be installed in any type of building or occupancy except as otherwise provided in this Code.
 - 110.12 – Mechanical Execution of Work:
 - Electrical equipment shall be installed in a professional and skillful manner.
 - *See ANSI/NECA 1-2015, Standard for Good Workmanship in Electrical Construction.*
 - 110.12 (A) – Unused Openings:
 - Unused openings shall be closed to afford protection equivalent to the wall of the equipment.

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Article 110 – General Requirements for Electrical Installations:

- The following Sections from Article 110 are specifically referenced in Article 760 or apply generally to all electrical installations (continued):
 - 110.12(C) – Cables and Conductors:
 - Nonmetallic cable ties and other nonmetallic cable accessories used to secure and support cables in other spaces used for environmental air (plenums) shall be listed as having low smoke and heat release properties.
 - 110.26 – Spaces About Electrical Equipment:
 - Open equipment doors shall not impede access to and egress from the working space. Access or egress is impeded if one or more simultaneously opened equipment doors restrict working space access to be less than 24” wide and 6½’ high.

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Article 110 – General Requirements for Electrical Installations:

- The following Sections from Article 110 are specifically referenced in Article 760 or apply generally to all electrical installations (continued):
 - 110.26(A) – Working Space:
 - Working space for equipment operating at 1000 volts, nominal, or less to ground and likely to require examination, adjustment, servicing or maintenance while energized shall comply with the dimensions of 110.26(A)(1), (A)(2), (A)(3), and (A)(4) or as required or permitted elsewhere in the code.
 - 110.26(A)(1) – Depth of Working Space:
 - According to Table 110.26 (A)(1) equipment operating at 0-150 volts, nominal to ground would require a 3 ft. depth of working space, however (A)(1)(b) states:
 - (b) Low Voltage. By special permission, smaller working space shall be permitted where all exposed live parts operate at not greater than 30 volts rms, 42 volts peak, or 60 volts dc.

NFPA 70 National Electrical Code (NEC) 2023 Edition

Article 110 – General Requirements for Electrical Installations:

- The following Sections from Article 110 are specifically referenced in Article 760 or apply generally to all electrical installations (continued):
 - 110.26(A)(2) – Width of Working Space:
 - The width of the working space in front of the electrical equipment shall be the width of the equipment or 30 inches, whichever is greater. In all cases, the working space shall permit at least a 90-degree opening of equipment doors or hinged panels.
 - 110.26(A)(3) – Height of Working Space:
 - The working space shall be clear and extend from the grade, floor, or platform to a height of 6½' or the height of the equipment, whichever is greater. Within the height requirement of this section, other equipment or support structures associated with the electrical installation and located above or below the electrical equipment shall be permitted to extend not more than 6" beyond the front of the electrical equipment.

END OF PERIOD 4 – MODULE 1