
BURGLAR & FIRE ALARM
ESTABLISHED 1981
ASSOCIATION OF MICHIGAN
APPRENTICESHIP PROGRAM

BURGLAR & FIRE ALARM ASSOCIATION OF MICHIGAN ESTABLISHED 1981

APPRENTICESHIP PROGRAM

Period 2
Related Training Instruction (RTI)
Module 1 – NFPA 72 Fundamentals

Reading material associated with this module:
Chapters 1, 2, 3, 7, 10, 12
NFPA 72, National Fire Alarm Code, 2022 Edition

BURGLAR & FIRE ALARM ASSOCIATION OF MICHIGAN ESTABLISHED 1981

APPRENTICESHIP PROGRAM

NFPA 72
National Fire Alarm Code
2022 Edition
Fundamentals

NFPA 72 Editions

NFPA 72, 2013:

- NFPA 72, 2013 edition was the referenced edition under the 2015 Michigan Building Code.

NFPA 72, 2019:

- NFPA 72, 2019 edition is the referenced edition under the current 2021 Michigan Building Code.

NFPA 72, 2022:

- NFPA 72, 2022 edition is the referenced edition that the NICET Fire Alarm Systems certification test questions are based upon as of 2025.

- The second period modules utilize the NFPA 72, 2022 edition, as the primary purpose of this program is to prepare apprentices for the NICET Fire Alarm Systems certification exam.

NFPA 72 Editions

Enforcement:

- While many AHJs accept the use of the current edition's requirements (2025 being the newest edition of NFPA 72); legally only the edition referenced by the current building code can be enforced.
- Note that you will find a similar discrepancy applicable to NFPA 70, National Electrical Code (NEC) editions. The 2021 Michigan Building Code references the 2019 edition of the NEC, while the Michigan Electrical Code has adopted the 2023 edition.
- You will find these edition conflicts in many codes and standards due to variations in the timing of modification, publication, and adoption of the numerous codes and standards you will utilize for the design, installation, and maintenance of fire alarm systems.

NFPA 72, 2022 Edition - Structure

Chapters:

- 1 – Administration
- 2 – Referenced Publications
- 3 – Definitions
- 7 – Documentation
- 10 – Fundamentals
- 11 – Cybersecurity
- 12 – Circuits and Pathways
- 14 – Inspection, Testing, and Maintenance
- 17 – Initiating Devices
- 18 – Notification Appliances
- 21 – Emergency Control Function Interfaces
- 23 – Protected Premises Alarm and Signaling Systems
- 24 – Emergency Communications Systems
- 26 – Supervising Station Alarm Systems
- 27 – Public Emergency Alarm Reporting Systems
- 29 – Single- and Multiple-Station Alarms and Household Signaling Systems

NFPA 72, 2022 Edition - Structure

Revision and Information Symbols Utilized in NFPA Codes and Standards:

- * (Asterisk) symbol indicates there is explanatory material in Annex A.
- Shaded text - Indicates revisions.
- Δ - Indicates text deletions and figure/table revisions.
- ● - Indicates the deletion of a section.
- ***N*** - Indicates new material.

NFPA 72, 2022 Edition - Structure

Application:

- Chapters 1, 2, and 3 apply throughout the entire code.
- The requirements in Chapters 7, 10, 12, 14, 17, 18, 21, 23, 24, 26, and 27 shall apply for voluntary or mandated installations of equipment or systems, unless otherwise noted in the specific Chapter.
- Chapter 29 stands alone, unless it specifically references another Chapter.
- The basic requirements for all fire alarm systems except household fire alarm systems (Chapter 29) are contained in Chapter 10.
- Chapter 10 applies to systems, equipment, and components addressed in Chapters 11, 12, 14, 17, 18, 21, 23, 24, 26, and 27.
- The requirements of Chapter 7 apply where referenced in Chapter 10. Chapter 7 provides a central location for all documentation requirements.
- Chapter 10 addresses the broad scope of signaling systems, not only those associated with fire alarm systems. Beginning with the 2019 edition, Chapter 10 added requirements for carbon monoxide detection systems.

NFPA 72, 2022 Edition

Chapter 1 - Administration:

- NFPA 72 covers the application, installation, location, performance, inspection, testing, and maintenance of fire alarm systems, supervising station alarm systems, public emergency alarm reporting systems, fire and carbon monoxide detection and warning equipment, and emergency communications systems and their components.
- For the purposes of carbon monoxide detection, the standard is primarily concerned with life safety, not property protection.
- The code is not intended as a design specification or an instruction manual for untrained persons.

1.1.1, 1.1.3, 1.2

NFPA 72, 2022 Edition

Chapter 1 - Administration:

- NFPA 72 defines a minimum level of performance but does not limit methods of achieving the required performance.
- It shall not be interpreted to require a level of fire protection greater than that required by the applicable building or fire code.
- Alarm systems shall be classified as follows:
  - Fire alarm systems:
    - Household fire alarm systems.
    - Protected premises (local) fire alarm systems.
  - Carbon monoxide detection equipment and systems:
    - Single and multiple station carbon monoxide alarms.
    - Carbon monoxide detectors and their related systems and components.

1.2.3, 1.2.4, 1.3.1

NFPA 72, 2022 Edition

Chapter 1 - Administration:

- Alarm systems shall be classified as follows (continued):
  - Supervising station alarm systems:
    - Central station (service) alarm systems.
    - Remote supervising station alarm systems.
    - Proprietary supervising station alarm systems.
  - Public emergency alarm reporting systems.

NFPA 72, 2022 Edition

Chapter 1 - Administration:

- Emergency communication systems shall be classified as follows:
  - One-way emergency communications systems:
    - Distributed recipient mass notification systems.
    - In-building fire emergency voice/alarm communications systems.
    - In-building mass notification systems.
    - Wide-area mass notification systems.
  - Two-way emergency communications systems:
    - In-building emergency communications systems.

1.3.2

NFPA 72, 2022 Edition

Chapter 1 - Administration:

- This code is not intended to apply retroactively to facilities, equipment, structures, or installations that were existing or approved for construction or installation prior to the effective date of this document.
- This code is not intended to be retroactive to existing systems unless the authority having jurisdiction determines the existing situation involves a distinct hazard to life or property.

1.4.1, 1.4.2

NFPA 72, 2022 Edition

Chapter 1 - Administration:

- This code does not prevent the use of systems, methods, devices, or appliances of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety, if technical documentation is presented to the authority having jurisdiction to demonstrate equivalency.
- If found equivalent, they shall be approved.
- The values presented in the code are expressed with a degree of precision appropriate for practical application and enforcement. They are not intended to be more precise than the precision expressed.
- When dimensions are expressed in inches, the precision of the measurement is 1 inch, thus plus or minus ½ inch. Values presented in the code are not intended to be enforced to a higher level of precision.

1.5.1, 1.5.2, 1.5.3, 1.6.5, A1.6.5

NFPA 72, 2022 Edition

Chapter 2 – Referenced Publications:

- Chapter 2 documents the specific editions for referenced NFPA, ANSI, UL and other publications.
- These referenced documents, or portions listed, referenced in the code, shall be considered part of the requirements of the code.

2.1, 2.2

NFPA 72, 2022 Edition

Chapter 3 – Definitions:

- Chapter 3 contains definitions for terms used throughout the code.
- Terms that are not defined shall use the ordinarily accepted meanings, within the context in which they are used, as defined by *Merriam-Webster's Collegiate Dictionary, 11th edition*, as referenced in Chapter 2, Referenced Publications.
- **NFPA Official Definitions** are the same in all NFPA documents and cannot be altered without the approval of the NFPA Standards Council.
- **General Definitions** are technical terms crucial to the proper understanding of this code and the definition applies only to this specific code. These terms can be used or defined differently in other codes or standards.

3.1, 3.2, 3.3

NFPA 72, 2022 Edition

Chapter 7 – Documentation:

- This section (7.2 Minimum Required Documentation) provides the minimum required documentation for smaller systems that may not need the additional information contained in sections 7.3 through 7.5 to provide an adequate review of a project. In general, the more complex the system, the more stringent the requirements become for documentation. The intent is for governing laws, codes, or standards; other parts of this code; or project specifications or drawings to select the additional specific pieces of documentation from sections 7.3 through 7.5.

NFPA 72, 2022 Edition

Chapter 7 – Documentation:

- Minimum Required Documentation:
  - The AHJ shall be notified of installation or alteration of equipment or wiring, and provided with the following documentation:
    - Written narrative with system intent and description.
    - Riser diagram.
    - Floor plan layout showing locations of all devices, control equipment, and supervising station and shared communications equipment.
    - Sequence of operation in either input/output matrix or narrative form.
    - Equipment data sheets.
    - Battery capacity and safety margin calculations.
    - Voltage drop calculations for notification appliance circuits.

7.2.1

NFPA 72, 2022 Edition

Chapter 7 – Documentation:

- Minimum Required Documentation (continued):
  - Mounting height elevation for wall mounted devices and appliances.
  - Where occupant notification is required, minimum sound pressure levels that must be produced by the audible notification appliances in applicable covered areas.
  - Location of alarm notification appliances, including candela ratings for visual alarm notification appliances.
  - Pathway diagrams between the control unit and shared communications equipment within the protected premises.

7.2.1

NFPA 72, 2022 Edition

Chapter 7 – Documentation:

- Minimum Required Documentation (continued):
  - Upon completion of the system, the following documentation is required:
    - Manufacturers' published instructions, including operation and maintenance instructions.
    - Completed record of completion.
    - For software-based systems, a copy of the site-specific software, including specific instructions on how to obtain the means of system and software access (password).
    - Record (as-built) drawings.

7.2.1

NFPA 72, 2022 Edition

Chapter 7 – Documentation:

- Minimum Required Documentation (continued):
  - The following documentation is made available as the system is used and maintained during its lifetime:
    - Records, record retention, and record maintenance.
    - Completed record of inspection and testing.

7.2.1

NFPA 72, 2022 Edition

Chapter 7 – Documentation:

- Minimum Required Documentation (continued):
  - The record of completion provided shall contain the following:
    - Installer certification of compliance.
    - Service contractor certification of compliance.
    - Central station certification of compliance.
    - Property owner and AHJ acknowledgement.
  - System design documents shall identify the name and contact information of the system designer.
  - All fire alarm drawings shall use the symbols described in NFPA 170 or other symbols acceptable to the AHJ.

7.2.1, 7.2.2, 7.2.3

NFPA 72, 2022 Edition

Chapter 7 – Documentation:

- 7.3 Design (Layout) Documentation:
  - Design (layout) documents should contain information related to the system that could include specifications, shop drawings, input/output matrix, battery calculations, notification appliance voltage drop calculations for visual notifications devices and loudspeakers, and product technical data sheets.
  - These documents could also include preliminary plans issued for guidance and direction.
  - Preliminary plans may be used for bidding, solicitation, or for obtaining permits.
  - Additional types of design (layout) documents can include risk analysis documentation, performance-based design documentation, emergency response plan documentation, and evaluation documentation.

NFPA 72, 2022 Edition

Chapter 7 – Documentation:

- 7.4 Shop Drawings (Installation Documentation):
  - Most jurisdictions require shop drawings and related calculations when a permit is required for the installation of a new or altered system. The extent of the documentation is related to the scope of the project and the amount of information necessary for the plan reviewer to conduct a permit review and approval.
  - Shop drawings shall be drawn to an indicated scale, on sheets of uniform size, with a plan of each floor.
  - Shop drawings shall provide the basis for the record (as-built) drawings.

7.4.1, 7.4.2, 7.4.3

NFPA 72, 2022 Edition

Chapter 7 – Documentation:

- 7.4 Shop Drawings (Installation Documentation):
  - The following information shall be provided:
    - Name of protected premises, owner, occupant, installer or contractor.
    - Location of protected premises.
    - Device legend with symbols in accordance with NFPA 170 or as acceptable to the AHJ.
    - Date of issue and any revision dates.
  - The following drawings shall be provided:
    - Floor plans.
    - System riser diagram.
    - Control unit diagrams.

7.4.4, 7.4.5, 7.4.6, 7.4.7

NFPA 72, 2022 Edition

Chapter 7 – Documentation:

- 7.4 Shop Drawings (Installation Documentation):
  - Typical wiring diagrams.
  - A narrative description or input/output matrix of operation.
  - System calculations:
    - Battery calculations.
    - Notification appliance circuit voltage drop calculations.
    - Other required calculations, such as line resistance calculations, where required.

7.4.8, 7.4.9. 7.4.10

NFPA 72, 2022 Edition

Chapter 7 – Documentation:

- 7.5 Completion Documentation:
  - Before requesting final approval of the installation, if required by the AHJ, the installing contractor shall furnish a written statement that the system has been installed in accordance with the approved plans and tested in accordance with the manufacturers' instructions, and the appropriate NFPA requirements.
  - All systems shall include the following delivered documentation:
    - An owners' manual and manufacturers' published instructions covering all system equipment.
    - Record (as-built) drawings.
    - A completed record of completion form.
    - A record copy of the site-specific software for software-based systems.

The site-specific software is a system's programming for its specific application and not the executive software or the source code used to develop it.

7.5.2, 7.5.3.1

NFPA 72, 2022 Edition

Chapter 7 – Documentation:

- 7.5 Completion Documentation:
  - Record drawings (as-builts):
    - Record drawings shall consist of current updated shop drawings reflecting the actual installation of all system equipment, components, and wiring.
    - A sequence of operation shall be provided to reflect actual programming at the time of completion.
    - Revised calculations shall be provided depicting any changes due to installation conditions.
    - Record drawings shall be turned over to the owner with a copy placed inside the documentation cabinet.

7.5.5.1, 7.5.5.2, 7.5.5.3, 7.5.5.4

NFPA 72, 2022 Edition

Chapter 7 – Documentation:

- 7.5 Completion Documentation:
  - Record of completion:
    - The record of completion documentation shall be completed by the installing contractor and submitted to the authority having jurisdiction and the owner.
    - The record of completion documentation shall be updated to reflect all system additions or modifications.
    - The updated copy of the record of completion shall be maintained in a documentation cabinet.
    - All modifications made after the initial installation shall be recorded on a revised version of the original completion documents, which shall serve as a supplement to the original **unaltered** completion documents.

7.5.6.2, 7.5.6.4, 7.5.6.5, 7.5.6.6.1

NFPA 72, 2022 Edition

Chapter 7 – Documentation:

- 7.5 Completion Documentation:
  - Site-specific software:
    - For all software that connects to, and is part of, the building life safety network components, the software security access or the means of obtaining the software security access shall be provided to the owner or his representative.
    - The site-specific software documentation shall include both the user passcode and either the system programming password or specific instructions on how to obtain the programming password from the system manufacturer.
    - The passwords provided shall enable currently qualified programming personnel to access, modify, and add to the existing system's site-specific software.
    - A copy of the site-specific software shall be stored on site in nonvolatile memory.

7.5.7.1.1, 7.5.7.1.2, 7.5.7.1.3, 7.5.7.2

NFPA 72, 2022 Edition

Chapter 7 – Documentation:

- 7.6.6 Record of Inspection and Testing:
  - Records of all inspections, testing, and maintenance shall be documented using either the record of inspection and testing forms contained within this code, or an alternative record that includes all applicable information required by the record of inspection and testing.
- 7.7 Records, Record Retention, and Record Maintenance:
  - A complete record of tests and operations shall be kept until the next test and for one year thereafter, unless more stringent requirements are required elsewhere in this code.
  - Archiving of the records by any means shall be permitted if hard copies of the records can be provided promptly when required.
  - If off-premises monitoring is provided, records shall be maintained by the off-premise service provider for not less than one year unless more stringent requirements are required elsewhere in this code.

7.6.6. 7.7.1.1, 7.7.1.2, 7.7.1.4

NFPA 72, 2022 Edition

Chapter 7 – Documentation:

- 7.7.2 Document Accessibility:
  - Every new system shall include a documentation cabinet installed at the control unit or other approved location at the protected premises.
  - No record documentation shall be stored in the control unit. *Paper or electronic documents should not be stored in control units as they are not typically approved for the storage of combustible material.*
  - Where the documentation cabinet is not at the same location as the control unit, its location shall be identified at the system control unit.
  - The cabinet shall be prominently labeled SYSTEM RECORD DOCUMENTS.
  - The building owner shall review the electronic media formats and hardware used to access them annually for compatibility, and update if necessary.
  - The contents of the cabinet shall be accessible by authorized personnel only.

7.7.2.1, 7.7.2.3, 7.7.2.4, 7.7.2.5, 7.7.2.6, 7.7.2.7

NFPA 72, 2022 Edition

Chapter 10 – Fundamentals:

- 10.1 Application:
  - The basic functions of a complete fire alarm and/or signaling system shall comply with the requirements of this chapter.
- 10.3 Equipment:
  - Equipment shall be listed for the purpose for which it is used. Terms used to denote listed or labeled equipment may include certified, approved, or listed.
  - System components shall be installed, tested, inspected, and maintained in accordance with the manufacturer's published instructions.
  - All devices and appliances that receive their operating power from an initiating device circuit (IDC) or from a signaling line circuit (SLC) of a control unit shall be listed for use with the control unit. *This requirement does not apply to notification appliance circuits (NACs).*

10.1.1, 10.3.1, 10.3.2, 10.3.3

NFPA 72, 2022 Edition

Chapter 10 – Fundamentals:

- 10.3 Equipment:
  - Equipment shall be designed and installed for the following environmental conditions:
    - At 85% and 110% of the nameplate primary (main) and secondary (standby) input voltages.
    - At ambient temperatures of 32°F and 120°F.
    - At a relative humidity of 85% with an ambient temperature of 86°F.

10.3.5

NFPA 72, 2022 Edition

Chapter 10 – Fundamentals:

- 10.4 Design and Installation:
  - Devices and appliances shall be located and mounted so that accidental operation or failure is not caused by vibration or jarring.
  - Equipment shall be installed in locations where conditions do not exceed the voltage, temperature, or humidity limits specified in the manufacturer's instructions.
  - Control unit displays, visible indicators, or controls shall be mounted such that the highest switch, lamp, or textual display does not exceed 6' above the finished floor, nor is less than 15" above the finished floor. *Control units that do not have such operator interfaces are not bound by this requirement, however best practice for serviceability should be considered*.

10.4.2, 10.4.3, 10.4.4

NFPA 72, 2022 Edition

Chapter 10 – Fundamentals:

- 10.4 Design and Installation:
  - In areas that are not continuously occupied (24/7/365), early warning fire detection shall be at the location of each control unit(s), notification appliance circuit power extender(s) and supervising station transmitting equipment to provide notification of a fire at that location.
  - One of the following types of detectors shall be used:
    - Automatic smoke detector
    - Automatic heat detector where ambient conditions prohibit the installation of a smoke detector.
  - *An **additional** smoke detector to provide protection for the control unit(s) is not required in rooms that have total smoke detector coverage.*
  - *The term control unit does not include equipment such as annunciators and addressable devices.*

10.4.5

NFPA 72, 2022 Edition

Chapter 10 – Fundamentals:

- 10.4 Design and Installation:
  - Smoke or heat detectors shall not be required to be installed at the location of dedicated function fire alarm control units that are not required to provide local or supervising station notification signals.
  - Initiating devices of the manual or automatic type shall be selected and installed to minimize unwanted alarms.
  - Abandoned fire alarm equipment shall be removed.
  - Abandoned fire equipment shall be marked “not in service” until removed.

10.4.5.1, 10.4.6.1, 10.4.7.1, 10.4.7.2

NFPA 72, 2022 Edition

Chapter 10 – Fundamentals:

- 10.5 Personnel Qualifications:
  - System plans and specifications shall be developed by qualified persons who are experienced in the design, application, installation, and testing of the systems, and shall be identified on the documents.
  - Personnel shall provide documentation of their qualifications by one (or more) of the following:
    - Registration, licensing, or certification by a state of local authority.
    - Certification by an organization acceptable to the AHJ.
    - Manufacturer's certification for the specific type and brand of system provided.
  - The system designer shall provide evidence of their qualifications when required by the AHJ.
  - System design trainees shall be supervised by a qualified system designer.

10.5.1.1, 10.5.1.3, 10.5.1.4, 10.5.1.5

NFPA 72, 2022 Edition

Chapter 10 – Fundamentals:

- 10.5 Personnel Qualifications:
  - Installation personnel shall be qualified or shall be supervised by persons who are qualified in the installation, inspection, and testing of the systems.
  - State or local licensure regulations shall be followed to determine qualified personnel.
  - Personnel shall provide documentation of their qualifications by one (or more) of the following:
    - Registration, licensing, or certification by a state of local authority.
    - Certification by an organization acceptable to the AHJ.
    - Manufacturer's certification for the specific type and brand of system provided.
  - The system installer shall provide evidence of their qualifications when required by the AHJ.

10.5.2.1, 10.5.2.2, 10.5.2.3, 10.5.2.5

NFPA 72, 2022 Edition

Chapter 10 – Fundamentals:

- 10.5 Personnel Qualifications:
  - Numerous qualification requirements are detailed within this section of the code and apply to individuals performing the following:
    - Inspection personnel shall have developed competence through training or experience.
    - Testing personnel shall have knowledge and experience of the testing requirements contained in this code, of the equipment being tested, and the test methods.
    - Service personnel shall have knowledge and experience of the maintenance and servicing requirements contained in this code, of the equipment being serviced or maintained, and of the servicing or maintenance methods.

10.5.3

NFPA 72, 2022 Edition

Chapter 10 – Fundamentals:

- 10.5 Personnel Qualifications:
  - Supervising station operators shall demonstrate competence in all tasks required of them by one (or more) of the following:
    - Certified by the manufacturer of the receiving system or equipment or the alarm monitoring automation system.
    - Certified by an organization acceptable to the AHJ.
    - Licensed or certified by a state or local authority.
    - Other training or certification approved by the AHJ.
  - Public emergency alarm reporting systems personnel, which includes system designers, installers, and service personnel, must meet specific qualifications due to the specialized unique nature of these systems.

10.5.5, 10.5.6

NFPA 72, 2022 Edition

Chapter 10 – Fundamentals:

- 10.6 Power Supplies:
  - At least two independent power supplies shall be provided, one primary and one secondary, with each power supply of adequate capacity for the application.
  - **Or** a stored-energy emergency power supply system (SEPSS) can be used as the sole power source, which can be arranged as follows:
    1. When connected to an engine-driven generator arranged for protected premises use in accordance with 10.6.11.3.1, a SEPSS shall be permitted if configured in compliance with NFPA 111 for a Type O (No interruption) or U (UPS systems with utility as preferred source), Class 4 (Minimum operating time in hours at rated load without being refueled or recharged), Level 1 (failure could result in loss of life or serious injury) system capable of powering the maximum required system load.
    2. When **NOT** connected to an engine-driven generator, a SEPSS shall be permitted if configured in compliance with NFPA 111 for a Type O or U, Level 1 system capable of powering the maximum required system load and having a secondary power supply with sufficient capacity to meet the requirements of 10.6.7.2.

10.6.3.2, 10.6.3.3, 10.6.4.1, 10.6.4.2

NFPA 72, 2022 Edition

Chapter 10 – Fundamentals:

- 10.6 Power Supplies:
  - Failure of an SEPSS shall result in the initiation of a trouble signal.
  - The branch circuit supplying the fire alarm equipment shall supply no other loads, and shall be supplied by one of the following:
    - Commercial light and power.
    - An engine-driven generator with a trained operator on duty at all times.
    - Combination of above when arranged for cogeneration with an electric utility, with a trained person on duty at all times.
  - The location of the branch circuit disconnecting means shall be permanently identified at the control unit.

10.6.4.5, 10.6.5.1, 10.6.5.2.1

NFPA 72, 2022 Edition

Chapter 10 – Fundamentals:

- 10.6 Power Supplies:
  - The circuit disconnecting means for fire alarm and/or signaling systems shall have a red marking and be identified as “FIRE ALARM”.
  - The red marking shall not damage the overcurrent protective devices or obscure the manufacturer’s markings.
  - The circuit disconnecting means shall be accessible only to authorized persons.
  - The branch circuit and disconnecting means shall be mechanically protected against physical damage.
  - Where a circuit breaker is used, an approved breaker locking device shall be installed.
  - An overcurrent protection device shall be provided on each ungrounded conductor.

10.6.5.2, 10.6.5.3, 10.6.5.4, 10.6.5.5

NFPA 72, 2022 Edition

Chapter 10 – Fundamentals:

- 10.6 Power Supplies:
  - Secondary power shall be provided to a protected premises system within 10 seconds of failure of primary power.
  - Secondary power shall be provided to a supervising station system within 60 seconds of failure of primary power.
  - Signals shall not be lost, interrupted, or delayed by more than 10 seconds as a result of primary power failure.
  - Storage batteries dedicated to the system or ESS configured per NFPA 111 shall be permitted to supplement the secondary power supply to ensure required operation during transfer to secondary power.
  - When a UPS is used, a means of disconnecting the input and output of the UPS while maintaining continuity of power is required (bypass switch).

10.6.6.1, 10.6.6.2, 10.6.6.3

NFPA 72, 2022 Edition

Chapter 10 – Fundamentals:

- 10.6 Power Supplies:
  - The secondary power supply for a protected premises system shall have the capacity to operate the system in a non-alarm condition for a minimum of 24 hours, then operate all alarm notification appliances used for evacuation or to direct aid to the location of an emergency for 5 minutes unless otherwise permitted.
  - The secondary power supply for in-building emergency voice/alarm communications service shall have the capacity to operate the system in a non-alarm condition for a minimum of 24 hours, then operate the system during a fire or other emergency condition for a period of 15 minutes at maximum connected load.
  - The secondary power supply for supervising station facilities and equipment shall be capable of supporting operations for a minimum of 24 hours.
  - The secondary power supply capacity shall include all loads that are not automatically disconnected upon the transfer to secondary power supply.
  - Battery calculations shall apply a minimum correction factor of 1.25 to ensure the battery can meet current demand at the end of its service life.

NFPA 72, 2022 Edition

Chapter 10 – Fundamentals:

- 10.6 Power Supplies:
  - Protected premises and emergency communications systems secondary power shall be one of the following:
    - Storage batteries dedicated to the system
    - An automatic-start engine-driven generator serving the branch circuit, configured for 24 hours of operation and configured in accordance with NEC Article 700, plus dedicated batteries providing 4 hours of capacity.
  - Secondary circuits that provide power to the control unit and are not integral to the unit shall be protected against physical damage.

10.6.7.3.1,10.6.7.3.2

NFPA 72, 2022 Edition

Chapter 10 – Fundamentals:

- 10.6 Power Supplies:
  - Supervising station secondary power shall be one of the following:
    - Storage batteries dedicated to the system
    - An automatic-start engine-driven generator serving the branch circuit, configured for 24 hours of operation and configured in accordance with NEC Article 701, plus batteries dedicated to the supervising station equipment. providing 4 hours of capacity.
    - A branch circuit of multiple generators, at least one of which is arranged for automatic start.

10.6.7.4.1

NFPA 72, 2022 Edition

Chapter 10 – Fundamentals:

- 10.6 Power Supplies:
  - Power supply requirements also apply to control equipment and power supplies located remotely from the main control unit (such as strobe power supplies and remote transponders).
  - Remote power supplies shall have their locations identified at the main control unit (identification on the master control unit display satisfies this requirement).
  - The location of remotely located power supplies shall be identified on the record drawings.

10.6.8

NFPA 72, 2022 Edition

Chapter 10 – Fundamentals:

- 10.6 Power Supplies:
  - Batteries shall be permanently marked with date of manufacture in a month/year format.
  - Where the battery is not marked with the month/year by the manufacturer, the installer shall obtain the date-code and mark the battery with the month/year of battery manufacture.
  - Effective January 1, 2024, rechargeable batteries for the secondary power supply used in control units, devices, and accessories shall be listed or component recognized by a nationally recognized testing laboratory.
  - Examples of listing standards are UL 1989, *Standby Batteries*, and UL 2054, *Household and Commercial Batteries*.

NFPA 72, 2022 Edition

Chapter 10 – Fundamentals:

- 10.6 Power Supplies:
  - Storage batteries shall be located so that equipment is not adversely affected by battery gases.
  - Batteries shall be insulated against ground faults.
  - Batteries shall be protected against physical damage.
  - Battery racks shall be protected against corrosion.
  - Batteries and chargers not located in or next to the FACP shall have their location permanently identified at the FACP.
  - Battery chargers shall be capable of fully recharging a battery within 48 hours.
  - Battery charging equipment operation shall not damage the battery.
  - Batteries shall be protected against excessive load current by overcurrent devices.
  - Battery chargers shall be supervised to detect a failure of battery charging.

10.6.10.2, 10.6.10.3, 10.6.10.4, 10.6.10.6

NFPA 72, 2022 Edition

Chapter 10 – Fundamentals:

- 10.6 Power Supplies:
  - Engine-driven generators arranged as the primary supply shall be designed and installed in an approved manner.
  - Engine-driven generators provided as a secondary supply for protected premises or an emergency communications system shall comply with NFPA 110 requirements for a Type 10 (starts in 10 seconds), Class 24 (24 hours of fuel), Level 1 (life safety) system, and shall be installed in accordance with NEC Article 700.
  - Where pathway survivability is required by another section of the code, equal protection shall be provided for power supply circuits.
  - Automatic starting engine-driven generators provided as a secondary supply for a supervising station shall comply with NFPA 110 requirements for a Type 60 (starts within 60 seconds), Class 24 (24 hours of fuel), Level 2 (less critical to human safety) system, and shall be installed per NEC Article 701.

10.6.11

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Chapter 10 – Fundamentals:

- 10.6 Power Supplies:
  - A separate storage battery and separate automatic charger shall be provided for starting the automatic engine-driven generator and shall not be used for any other purpose.
  - The battery shall be sized in accordance with NFPA 110, section 5.6.4.

10.6.11.7.1, 10.6.11.7.2

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Chapter 10 – Fundamentals:

- 10.7 Signal Priority:
  - Fire alarm signals take priority over all other signals, except as follows:
    - ECS priority signals, when evaluated by stakeholders through a risk analysis, shall be permitted to take precedence over all other signals.
    - Emergency mass notification signals and messages shall be permitted to take priority over fire alarm notification signals per Chapter 24.
  - Emergency mass notification signals and messages shall have priority over supervisory and trouble signals.
  - Carbon monoxide signals shall be permitted to take priority over supervisory and trouble signals.
  - Pre-alarm signals shall take priority over supervisory and trouble signals.

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Chapter 10 – Fundamentals:

- 10.7 Signal Priority:
  - Hold up alarms or other life-threatening signals shall be permitted to take priority over supervisory and trouble signals where acceptable to the AHJ.
  - Supervisory signals shall take priority over trouble signals.

10.7

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Chapter 10 – Fundamentals:

- 10.10 Distinctive Signals:
  - Audible alarm devices for a fire alarm system shall produce distinctive sounds from similar appliances used for other purposes in the same area that are not part of the fire alarm or emergency communications system.
  - The same requirement applies for carbon monoxide systems.
  - Control unit sounder is permitted to use the same sound for different conditions if a visible indicator indicates the condition.
  - Visible indicators could include a lamp with a text label, an LCD screen, a computer monitor, or other textual visual appliances.

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Chapter 10 – Fundamentals:

- 10.11 Alarm Signals:
  - Actuation of alarm notification appliances or emergency voice communications, emergency control function interface devices, and annunciation at the protected premises shall occur within 10 seconds of the activation of the initiating device.
  - Visual notification appliances, textual visual notification appliances, and loudspeaker notification devices located in the same area shall be activated and deactivated as a group unless otherwise required by an ECS emergency response plan.
  - Visual alarm notification appliances shall not be activated when loudspeaker notification appliances are used as permitted by Chapter 24 for non-emergency paging.
  - The audible and visible alarm signal at the control unit only, shall reactivate every 24 hours or less until alarm condition is restored to normal.

10.11

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Chapter 10 – Fundamentals:

- 10.12 Fire Alarm Notification Appliance Deactivation:
  - Both audible and visible notification appliances shall be simultaneously deactivated *(can't silence audibles and keep visuals active)*.
  - The silencing means shall be key operated or located within a locked enclosure, or equivalent protection against unauthorized use.
  - A visible indicator shall be provided.

10.12.2, 10.12.3, 10.12.4

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Chapter 10 – Fundamentals:

- 10.12 Fire Alarm Notification Appliance Deactivation:
  - Subsequent activation of the following shall reactivate the notifications appliances:
    - Nonaddressable initiating devices on other initiating device circuits (or)
    - Addressable initiating devices of a different type in the same room (or)
    - Addressable initiating devices in a different room.
  - Addressable devices of the same type in the same room or space are not required to cause reactivation of the notification appliances.
  - A fire alarm notification appliance deactivation means that remains in the deactivated (off) position when there is no alarm condition shall sound an audible trouble signal until the means is restored to normal.

10.12.5.1, 10.12.5.2, 10.12.6

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Chapter 10 – Fundamentals:

- 10.13 Carbon Monoxide Notification Appliance Deactivation:
  - A carbon monoxide initiating device with an integral sounder shall be permitted to be silenced locally if the carbon dioxide alarm or supervisory status continues to be displayed at the control unit.
- 10.14 Supervisory Signals:
  - Supervisory signals are permitted to be either self-restoring or latching.
  - Visible and audible indication of activation shall be automatically indicated within 90 seconds at the following locations:
    - Fire alarm control unit for local fire alarm systems.
    - Fire command center for in-building fire emergency voice/alarm communications systems.
    - Supervising station location for supervising station systems.

10.13, 10.14.1, 10.14.2

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Chapter 10 – Fundamentals:

- 10.14 Supervisory Signals:
  - Visible indication shall be provided within 90 seconds upon restoration of self-restoring supervisory signals to normal at the same locations that activation indication was required.
  - Restoration of latching supervisory signals shall be indicated within 90 seconds at the same locations that activation indication was required.
  - The audible and visible supervisory signal at the control unit only, shall reactivate every 24 hours or less until the supervisory condition is restored to normal.
  - The audible and visible supervisory signal shall operate until it is manually silenced or acknowledged.

10.14.1, 10.14.2.1, 10.14.2.2, 10.14.6.1, 10.14.6.2

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Chapter 10 – Fundamentals:

- 10.14 Supervisory Signals:
  - A means for deactivation of supervisory notification signals shall be permitted.
  - The silencing means shall be key operated or located within a locked enclosure, or equivalent protection against unauthorized use.
  - A visible indicator shall be provided.
  - Subsequent activation of supervisory indication devices in other building zones shall cause reactivation of the supervisory notification appliances as required by the system input/output matrix.
  - A supervisory notification appliance deactivation means that remains in the deactivated (off) position when there is no supervisory condition shall sound an audible trouble signal until the means is restored to normal.

10.14.7

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Chapter 10 – Fundamentals:

- 10.15 Trouble Signals:
  - Trouble signals shall be indicated within 200 seconds by distinctive audible and visible signals, and visual indication of their restoration to normal, at:
    - Fire alarm control unit for protected premises fire alarm systems.
    - Fire command center for in-building fire emergency voice/alarm communications systems.
    - Emergency command center for one or more buildings where responsible authorities receive and disseminate information.
    - Central station or remote station location for supervising station systems installed in compliance with Chapter 26.
  - Visible and audible indication of restoration to normal is required for proprietary supervising station systems, all others only require visible indication of restoration.

10.15.1, 10.15.7, 10.15.8

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Chapter 10 – Fundamentals:

- 10.15 Trouble Signals:
  - The audible and visual trouble signal shall automatically reactivate every 24 hours or less until trouble signals are restored to normal.
  - The audible and visual trouble signal associated with the depletion or failure of the primary battery of a wireless system shall automatically resound every 4 hours or less until the depletion signal is restored to normal.
  - A means for deactivation of trouble notification signals shall be permitted.
  - The silencing means shall be key operated or located within a locked enclosure, or equivalent protection against unauthorized use.
  - A visible indicator shall be provided.
  - If an audible trouble notification appliance is also used to indicate a supervisory condition, a trouble notification appliance deactivation means shall not prevent subsequent activation of supervisory notification appliances.

10.15.9.1, 10.15.10

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Chapter 10 – Fundamentals:

- 10.15 Trouble Signals:
  - Subsequent trouble signals shall cause reactivation of the trouble notification appliances as required by the system input/output matrix.
  - A trouble notification appliance deactivation means that remains in the deactivated (off) position when there is no trouble condition shall sound an audible trouble signal until the means is restored to normal.

10.15.10.5, 10.15.10.6

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Chapter 10 – Fundamentals:

- 10.16 Emergency Control Function Status Indicators:
  - All controls provided to override any automatic emergency control function shall provide visible indication of the status of the circuits and shall reflect the actual status of the associated equipment or function.

10.16

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Chapter 10 – Fundamentals:

- 10.17 Notification Appliance Circuits and Supervised Notification Appliance Control Circuits:
  - *A notification appliance circuit (NAC) has appliances directly connected to the circuit whereas the supervised notification appliance control circuit does not. The supervised notification appliance control circuit is used to connect a fire alarm control unit to an additional power supply which would then provide NACs and notification appliances.*
  - An open, ground-fault, or short-circuit fault on the installation conductors of one alarm notification appliance circuit shall not affect the operation of any other alarm notification circuit for more than 200 seconds regardless of whether the short-circuit fault is present during the normal or activated circuit state. *(Keep this in mind where a NAC circuit is also controlling a NAC extender panel which is supplying its own NAC circuits. In such a circuit an open, ground-fault, or short-circuit fault on the installation conductors cannot affect the other circuits served by the NAC power extender for more than 200 seconds…..).*

10.17.1

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Chapter 10 – Fundamentals:

- 10.17 Notification Appliance Circuits and Supervised Notification Appliance Control Circuits:
  - Supervised notification appliance **control** circuits shall comply with all of the following:
    - A supervised notification appliance **control** circuit shall not serve more than one notification zone. *
    - The supervised notification appliance **control** circuit shall be monitored for integrity.
    - A fault in the supervised notification appliance **control** circuit installation conductors shall result in a trouble signal.

** A notification zone is a discrete area of a building in which people are intended to receive common notification. For a general evacuation system the notification zone is the entire building. The term notification zone is not defining a zone based on the area served by a NAC; rather it is based on the area that receives the signal simultaneously.*

10.17.2, 3.3.339.1

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Chapter 10 – Fundamentals:

- 10.17 Notification Appliance Circuits and Supervised Notification Appliance Control Circuits:

A signaling zone is an area consisting of one or more notification zones where identical signals are activated simultaneously. Depending upon the emergency response plan, a signaling zone can encompass several notification zones, i.e., in most high-rise buildings, each single floor (fire area) is a notification zone. Most emergency response plans call for the signaling zone to be the fire floor, floor above, and floor below.

3.3.339.

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Chapter 10 – Fundamentals:

- 10.18 Annunciation and Annunciation Zoning:
  - All required annunciation means shall be readily accessible to responding personnel.
  - All required annunciation means shall be located as required by the AHJ to facilitate an efficient response to the situation.
  - Where required by the enforcing authority; governing laws, codes, or standards; or other parts of this code; annunciators, information display systems, and controls for portions of a system provided for use by emergency service personnel shall be designed, arranged, and located in accordance with the requirements of the organizations intended to use the equipment.

10.18.3.1, 10.18.3.2, 10.18.6

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Chapter 10 – Fundamentals:

- 10.19 Monitoring Integrity of In-Building Fire Emergency Voice/Alarm Communications Systems (EVACS):
  - Failure of an audio amplifier shall result in a trouble signal if:
    - Primary power is on, or
    - Primary power is off and system is operating on secondary (backup) power, only when an alarm is present.
  - Failure of tone generating equipment shall result in a trouble signal, unless it is enclosed as an integral part and serves only a single, listed loudspeaker (self amplified speaker).
  - Firefighter phone circuits shall be monitored for open circuit faults and short circuit faults.
  - An open or short circuit fault on firefighter phone circuits shall cause a trouble signal.

10.19.1.1, 10.19.1.2, 10.19.1.3, 10.19.2

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Chapter 10 – Fundamentals:

- 10.21 Impairments:
  - The system owner or the owner's designated representative shall be notified when the system or any part is impaired. Impairments shall include out-of-service events.
  - The system owner or the owner's designated representative shall maintain a record of impairments for one year after correction.
  - The supervising station shall report to the AHJ any system for which required monitoring has been terminated.
  - The service provider shall report to the AHJ any system that is out of service for more than 8 hours. *
  - Mitigating measures acceptable to the AHJ shall be implemented for the period that the system is impaired.
  - The system owner or the owner's designated representative and the AHJ (if previously notified) shall be notified when impairment is resolved.

* The term *out of service* is meant to refer to the entire system or a substantial portion thereof.

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Chapter 12 – Circuits and Pathways:

- Introduction:
  - Chapter 12 addresses the performance and survivability characteristics of pathways or interconnections used in fire alarm and signaling systems. Pathway survivability is the ability of any conductor, optical fiber, radio carrier, or other means for transmitting system information to remain operational during fire conditions.
  - Chapter 12 does not require any specific performance class or survivability level for a particular application. The class and level required for a particular application is to be determined by enabling codes, standards, AHJs, or other chapters of this code if designated. Otherwise, the system designer is responsible for conducting an evaluation (see 24.4.3.2) to determine the class and level to be provided.

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Chapter 12 – Circuits and Pathways:

- 12.2 General:
  - All pathway wiring, cable and equipment installation shall be in compliance with NFPA 70 - National Electrical Code.
  - All fire alarm systems shall test free of grounds, except where parts of circuits or equipment are intentionally and permanently grounded in order to provide ground fault detection, noise suppression, emergency ground signals, and circuit protection grounding.
  - On conductive pathways, operational capability shall be maintained with the presence of a single ground fault.

12.2.3, 12.2.4.1, 12.2.4.2, 12.2.4.3

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Chapter 12 – Circuits and Pathways:

- 12.3 Pathway Class Designations:
  - Pathways shall be designated as Class A, Class B, Class C, Class D, Class E, Class N, or Class X based on their performance.
  - Class A:
    - Includes a redundant path.
    - Operational with a single open circuit fault.
    - Conditions that affect the intended operation are annunciated as a trouble signal.
    - Operational with a single ground fault (metallic conductors).
    - A single open circuit or single ground fault creates a trouble signal.

12.3.1

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Chapter 12 – Circuits and Pathways:

- 12.3 Pathway Class Designations:
  - Class B:
    - Does not include a redundant path.
    - Operational capability stops at single open.
    - Conditions that affect the intended operation are annunciated as a trouble signal.
    - Operational with a single ground fault (metallic conductors).
    - An open circuit or ground fault creates a trouble signal.

12.3.2

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Chapter 12 – Circuits and Pathways:

- 12.3 Pathway Class Designations:
  - Class C:
    - Includes one or more pathways where operational capability is verified by end-to-end communication, but individual paths are not monitored.
    - A loss of end-to-end communication is annunciated as a trouble signal.
    - Class C describes technologies that supervise the communication pathway by polling or continuous communication “handshaking” such as:
      - Fire alarm control unit or supervising station connections to a wired or wireless LAN, WAN, or Internet.
      - Fire alarm control unit DACT or supervising station DACR connections to the public switched telephone network.
    - Individual pathway segments are not required to be monitored. Supervision is accomplished by end-to-end communications.

12.3.3, A12.3.3

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Chapter 12 – Circuits and Pathways:

- 12.3 Pathway Class Designations:
  - Class D:
    - A pathway that has fail safe operation where no fault is annunciated, but the intended operation is performed in the event of pathway failure.
    - Examples of Class D pathways include:
      - Door hold open circuits, where the doors close on loss of power. A short circuit or open circuit results in door closure.
      - Door locking hardware that releases upon loss of power. A short circuit or open circuit results in locking hardware release.

12.3.4, A12.3.4

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Chapter 12 – Circuits and Pathways:

- 12.3 Pathway Class Designations:
  - Class E:
    - Pathways with no monitoring for integrity are designated as Class E.

12.3.5

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Chapter 12 – Circuits and Pathways:

- 12.3 Pathway Class Designations:
  - Class N:
    - A pathway shall be designated as Class N when it performs as follows:
      - Includes two or more pathways where operational capability of the primary pathway and a redundant pathway to each device shall be verified through end-to-end communication (exception where only a single device is served, the redundant pathway is not required).
      - Loss of intended communication between endpoints is annunciated as a trouble signal.
      - A single open, ground, short, or combination of faults on one pathway shall not affect any other pathway.
      - Conditions that affect the operation of the primary pathway(s) and redundant pathways(s) shall be annunciated as a trouble signal when the system's minimal operational requirements cannot be met.

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Chapter 12 – Circuits and Pathways:

- 12.3 Pathway Class Designations:
  - Class N:
    - A pathway shall be designated as Class N when it performs as follows (continued):
      - Primary and redundant pathways shall not be permitted to share traffic over the same physical segment.
    - The Class N pathway designation is to specifically address the use of modern network infrastructure when used in fire alarm or signaling systems. Class N circuits are essentially Ethernet connections, but with a requirement for redundancy and end-to-end data verification.

12.3.6, A12.3.6(1)

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Chapter 12 – Circuits and Pathways:

- 12.3 Pathway Class Designations:
  - Class X:
    - Includes a redundant path.
    - Operational with a single open circuit fault.
    - Operational on metallic conductors with a single short-circuit.
    - Operational on metallic conductors with a combination open fault and ground fault.
    - Conditions that affect the intended operation of the path are annunciated as a trouble.
    - Operational on metallic conductors with a single ground fault.
    - An open circuit, short circuit, or ground fault condition creates a trouble signal.

12.3.7

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Chapter 12 – Circuits and Pathways:

- 12.3 Pathway Class Designations:
  - Class A, Class N, and Class X Pathway Separation:
    - Class A, N, and X circuits using physical pathways (metallic, fiber optic) shall be installed so that the outgoing and return conductors are routed separately.
    - It is recommended that the outgoing and return circuit cables be separated at a minimum of 12” where installed vertically, and 48” where installed horizontally.
    - The outgoing and return circuit conductors shall be permitted in the same cable assembly, enclosure, or raceway only under the following conditions:
      - Within 10’ when entering or exiting an initiating device, notification appliance, or control unit enclosure.
      - Single drops installed in the raceway to individual devices or appliances.
      - In a single room not exceeding 1000sf in area, a drop installed in the raceway to multiple devices or appliances that does not include any emergency control function devices (ex. HVAC shutdown, elevator recall, etc.).

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Chapter 12 – Circuits and Pathways:

- 12.4 Pathway Survivability:
  - Level 0:
    - No provisions for survivability.
  - Level 1:
    - Cables and conductors installed in metal raceway or metal armored cable in a fully sprinklered building.
  - Level 2:
    - Level 2 survivability will consist of one or more of the following:
      - 2-hour fire-rated circuit integrity (CI) or fire-resistive cable.
      - 2-hour fire-rated cable system (electrical circuit protective system(s)).
      - 2-hour fire-rated enclosure or protected area.
      - Performance alternatives approved by the AHJ.

12.4.1, 12.4.2, 12.4.3

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Chapter 12 – Circuits and Pathways:

- 12.4 Pathway Survivability:
  - Level 3:
    - Level 3 survivability shall consist of pathways in buildings that are fully sprinklered and one or more of the following:
      - 2-hour fire-rated circuit integrity (CI) or fire-resistive cable.
      - 2-hour fire-rated cable system (electrical circuit protective system(s)).
      - 2-hour fire-rated enclosure or protected area.
      - Performance alternatives approved by the AHJ.

12.4.4

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Chapter 12 – Circuits and Pathways:

- 12.4 Pathway Survivability:
  - Level 4:
    - * Level 4 survivability shall consist of one or more of the following:
      - 1-hour fire-rated circuit integrity (CI) or fire-resistive cable.
      - 1-hour fire-rated cable system (electrical circuit protective system(s)).
      - 1-hour fire-rated enclosure or protected area.
      - Performance alternatives approved by the AHJ.

* Pathways are not ranked in a hierarchy of protection, i.e., a Level 4 pathway is not intended to be better than a Level 1 pathway. Rather, each provides a separate means of achieving an acceptable level of protection based on system performance and construction.

12.4.5, A12.4.5

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Chapter 12 – Circuits and Pathways:

- 12.6 Monitoring Integrity and Circuit Performance of Installation Conductors and Other Signaling Channels:
  - All means of interconnecting equipment, devices, appliances and wiring connections shall be monitored for integrity so that the occurrence of a single open or a single ground-fault condition shall create a trouble signal within 200 seconds.
  - Restoration to normal shall be indicated within 200 seconds.
  - Exceptions to monitoring for integrity include the following:
    - Shorts between conductors, except for telephone circuits, notification appliance circuits, or where two or more systems are interconnected. The systems must be interconnected using Class A, B, N, or X circuits.
    - NAC installed in the same room as the control panel, if in raceway or equivalent protection.
    - Trouble notification appliance circuit.

12.6.1, 12.6.2, 12.6.3, 12.6.6, 12.6.7

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Chapter 12 – Circuits and Pathways:

- 12.6 Monitoring Integrity and Circuit Performance of Installation Conductors and Other Signaling Channels:
  - Exceptions to monitoring for integrity include the following:
    - Interconnection between listed equipment in a common enclosure.
    - Interconnection between enclosures containing control equipment located within 20’ of each other where the conductors are installed in conduit or equivalent protection against mechanical injury.
    - Conductors for ground fault detection where a single ground fault does not prevent normal system operation.
    - Computer keyboard, monitor, mouse, or touch screen, where the wiring does not exceed 8’ in length; is a listed computer/data processing cable as permitted by NEC, and failure of the cable does not cause the failure of the required system functions not initiated from the keyboard, mouse, or touch-screen.

12.6.8, 12.6.9, 12.6.10, 12.6.12

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Chapter 12 – Circuits and Pathways:

- 12.6 Monitoring Integrity and Circuit Performance of Installation Conductors and Other Signaling Channels:
  - Monitoring for integrity of the installation conductors for a ground-fault condition shall not be required for the communications and transmission channels extending from a supervising station to a subsidiary station(s) or protected premises, or both, that comply with Chapter 26 and are electrically isolated from the fire alarm system (or circuits) by a transmitter(s).
  - Interconnection means shall be arranged so that a single break or single ground-fault does not cause an alarm signal.
  - A wire-to-wire short circuit fault on any alarm notification appliance circuit shall result in a trouble signal except for prior exceptions.

12.6.13, 12.6.14, 12.6.15

END OF PERIOD 2 – MODULE 1