



BURGLAR ESTABLISHED 1981
& FIRE ALARM

ASSOCIATION OF **MICHIGAN**

APPRENTICESHIP PROGRAM

Period 2

Related Training Instruction (RTI)

Module 4 – NFPA 72 Emergency Control Functions, Protected Premises, and ECS

Reading material associated with this module:

Chapters 21, 23, 24

NFPA 72, National Fire Alarm Code, 2022 Edition

NFPA 72
National Fire Alarm Code
2022 Edition
Chapter 21 – Emergency Control Function
Interfaces

NFPA 72, 2022 Edition

Chapter 21 – Emergency Control Function Interfaces:

- 21.1 Application:
 - Chapter 21 covers the minimum requirements and methods for emergency control function interfaces with fire alarm and signaling systems.
 - A fire alarm system may monitor the status of other individual systems or provide a form of output to control other individual systems. These functions may include the following:
 - Elevator Phase I Emergency Recall Operation.
 - Shutdown of HVAC systems.
 - Release of held-open doors and electrically locked doors.
 - Damper / fan shutdown.
 - Smoke control / stair pressurization.
 - NFPA 72 covers only the fire alarm or signaling system in the circuits powered by it, not any part of the other individual systems.

NFPA 72, 2022 Edition

Chapter 21 – Emergency Control Function Interfaces:

- 21.2 General:
 - Emergency control functions can be performed automatically.
 - Automatic emergency control functions shall not interfere with power for lighting or operating elevators.
 - Emergency control function interface devices shall be located within 3' of the component controlling the emergency control function where the control circuit is not configured as a Class D circuit (*operation is performed in the event of a pathway failure, i.e. magnetic door holders, etc.*).
 - The location of the emergency control function interface device within 3' applies to the point of interface and not the remotely operated equipment, *i.e., an addressable relay for fan shutdown shall be within 3' of the fan controller interface but would not be required to be located within 3' of the actual fan being controlled by the interface.*

NFPA 72, 2022 Edition

Chapter 21 – Emergency Control Function Interfaces:

- 21.2 General:
 - The emergency control function interface device shall function within the voltage and current limitations of the panel.
 - *The interface device is often an auxiliary relay. The intent of this section is that the relay be listed specifically to operate with the FACU and not be an off-the-shelf item from an electronics supply store.*
 - The installation wiring to the emergency control function interface device shall be Class A, Class B, Class D, Class N, or Class X.
 - Emergency control functions shall not interfere with the operation of the fire alarm system.
 - Installation wiring to the emergency control function interface device shall be monitored for integrity.

21.2.5, 21.2.6, 21.2.7, 21.2.8

NFPA 72, 2022 Edition

Chapter 21 – Emergency Control Function Interfaces:

- 21.2 General:
 - The method of interconnect between the emergency control function interface device and the component controlling the emergency control function shall be by electrical contacts listed for the connected load, data communication over a signaling line circuit dedicated to the fire alarm system or shared with other premises operating systems, or other listed methods.
 - If the fire alarm system is part of a life safety network and communicates to other systems or receives data from other systems, the communications path shall be monitored for integrity, data received from the network shall not affect the operation of the fire alarm system other than to display status, and where non-fire alarm systems are connected to fire alarm systems through a network or digital communications, a signal shall be generated between the systems. Failure of the fire alarm system to receive confirmation of the transmission shall cause a trouble signal within 200 seconds.

21.2.10, 21.2.11

NFPA 72, 2022 Edition

Chapter 21 – Emergency Control Function Interfaces:

- 21.3 Elevator Phase I Emergency Recall Operations:
 - All initiating devices used to initiate the Elevator Phase I Emergency Recall shall be connected to the required building fire alarm system.
 - In buildings without a required fire alarm system, initiating devices used to initiate Elevator Phase I Emergency Recall shall be connected to either a non-required building fire alarm system, or a dedicated function fire alarm control unit that shall be designated as “Elevator Recall and Supervisory Control Unit” permanently identified on the FACU and record drawings.
 - The fire alarm control unit used for this purpose should be located in a normally occupied area and should have audible and visual indicators to annunciate elevator recall and trouble conditions; however, no form of general occupant notification or evacuation signal is required or intended.

21.3.1, 21.3.2, A21.3.2

NFPA 72, 2022 Edition

Chapter 21 – Emergency Control Function Interfaces:

- 21.3 Elevator Phase I Emergency Recall Operations:
 - A lobby smoke detector shall be located on the ceiling within 21’ of the centerline of each elevator door within the elevator bank under the control of the detector.
 - Elevator lobbies exceeding 15’ in height, or other than smooth and flat, shall have the detector location determined in accordance with chapter 17.
 - Smoke detectors or other automatic fire detection shall not be installed in unsprinklered elevator hoistways unless required by ASME A17.1 to initiate Elevator Phase I Emergency Recall for either of the following:
 - Hoistway machinery spaces containing a motor controller or driving machine.
 - Control spaces located in the hoistway.

21.3.5.1, 21.3.5.2, 21.3.6.1

NFPA 72, 2022 Edition

Chapter 21 – Emergency Control Function Interfaces:

- 21.3 Elevator Phase I Emergency Recall Operations:
 - Smoke detectors or other automatic fire detection shall be permitted to be installed in unsprinklered elevator hoistways if required by other governing codes or standards for actuation of elevator hoistway smoke relief equipment.
 - Fire alarm initiating devices required to be installed in elevator hoistways by other sections of this code or by other governing laws, codes, or standards, shall be required to be accessible for service, testing, and maintenance from outside the elevator hoistway.

21.3.6.2, 21.3.7

NFPA 72, 2022 Edition

Chapter 21 – Emergency Control Function Interfaces:

- 21.3 Elevator Phase I Emergency Recall Operations:
 - Examples of proposed methods for providing access:
 - Provide an access hatch door and associated protective guard for a spot-type detector.
 - Provide an air-sampling detector installed outside the hoistway with its sampling tube installed to sample the air inside the hoistway.
 - If heat detection is required, linear heat detectors with connection points located outside the hoistway, or spot-type heat detectors installed with an access hatch door and associated protective guard.
 - If a waterflow switch is provided, install the waterflow switch outside the hoistway. The use of time delay capability for this device is acceptable.

A21.3.7

NFPA 72, 2022 Edition

Chapter 21 – Emergency Control Function Interfaces:

- 21.3 Elevator Phase I Emergency Recall Operations:
 - When sprinklers are required in elevator hoistways by other codes and standards, fire alarm initiating devices shall be installed to initiate Elevator Phase I Emergency Recall and the following shall apply:
 - Where sprinklers are installed at the top of the hoistway, associated fire detection devices shall be located at the top of the hoistway.
 - Where sprinklers are located at the bottom of the hoistway (the pit), associated fire detection devices shall be installed in the pit.
 - Smoke detectors shall not be installed in elevator hoistways to initiate Elevator Phase I Emergency Recall unless listed for the environment.
 - If ambient conditions prohibit installation of automatic smoke detection used to initiate Elevator Phase I Emergency Recall, other automatic fire detection initiating devices shall be permitted.

NFPA 72, 2022 Edition

Chapter 21 – Emergency Control Function Interfaces:

- 21.3 Elevator Phase I Emergency Recall Operations:
 - When actuated, any fire alarm initiating device that is used to initiate Elevator Phase I Emergency Recall shall be annunciated at the FACP and remote annunciators.
 - Actuation of the hoistway, machine room, machinery space, control space, or control room detectors shall cause separate and distinct visible annunciation at the fire alarm control unit and remote annunciators as well as activating the fire hat icon to alert personnel the elevators are no longer safe to use.
 - Where approved by the AHJ, the detectors used to initiate Elevator Phase I Emergency Recall shall be permitted to initiate a supervisory signal in lieu of an alarm signal.
 - Where elevator lobby smoke detectors are used for required area coverage as well as elevator recall, an alarm signal shall be initiated.

21.3.11, 21.3.12, 21.3.13

NFPA 72, 2022 Edition

Chapter 21 – Emergency Control Function Interfaces:

- 21.3 Elevator Phase I Emergency Recall Operations:
 - The following three separate outputs from the fire alarm control unit shall be provided to initiate Elevator Phase I Emergency Recall:
 - Designated level associated output.
 - Alternate level associated output.
 - Elevator machine room, machinery space, control space, or control room associated output (fire hat output).

21.3.14

NFPA 72, 2022 Edition

Chapter 21 – Emergency Control Function Interfaces:

- 21.3 Elevator Phase I Emergency Recall Operations:
 - Designated Level Recall:
 - Activation of lobby smoke detectors or other automatic fire detection detectors located at any associated elevator lobby other than the lobby at the designated level.
 - Activation of smoke detectors or other automatic fire detection detectors located at any associated machine room, machinery space containing a motor controller or driving machine, control space, or control room, except where such areas are located at the designated level.
 - Activation of smoke detectors or other automatic fire detection detectors located at any associated hoistway when sprinklers are located in those hoistways, unless otherwise specified in section 21.3.14.2(3).

21.3.14.1

NFPA 72, 2022 Edition

Chapter 21 – Emergency Control Function Interfaces:

- 21.3 Elevator Phase I Emergency Recall Operations:
 - Alternate Level Recall:
 - Activation of lobby smoke detectors or other automatic fire detection detectors located at the designated level lobby.
 - Activation of smoke detectors or other automatic fire detection detectors located at any associated machine room, machinery space containing a motor controller or driving machine, control space, or control room, if such areas are located at the designated level.
 - 21.3.14.2(3) Activation of smoke detectors or other automatic fire detection detectors located in any associated elevator hoistway if they are installed at or below the lowest level of recall in the elevator hoistway and the alternate level is located above the designated level.

21.3.14.2

NFPA 72, 2022 Edition

Chapter 21 – Emergency Control Function Interfaces:

- 21.7 Heating, Ventilation, and Air-Conditioning (HVAC) Systems:
 - If connected to the fire alarm system serving the protected premises, all detection devices used to cause the operation of HVAC systems, smoke dampers, fire dampers, fan control, smoke doors and fire doors shall be monitored for integrity.
 - Connections between fire alarm systems and the HVAC system for monitoring and control shall operate and be monitored for integrity (*trouble contacts on duct detectors*) in accordance with applicable NFPA standards.
 - If CO detection or a dedicated CO detection system initiates a ventilation response, a smoke control response of the fire alarm system shall take precedence over the response of the CO detection during a fire alarm condition.
 - When the HVAC system and fire alarm system are interconnected as a combination system, a fire-fighter’s smoke control station (FSCS) shall be provided to perform manual control over the automatic operation programmed.

NFPA 72, 2022 Edition

Chapter 21 – Emergency Control Function Interfaces:

- 21.9 High Volume Low Speed (HVLS) Fans:
 - Where required by NFPA 13, all HVLS fans shall be interlocked to shut down upon actuation of a sprinkler waterflow switch that indicates waterflow in the area served by the fans.
- 21.9 Door and Shutter Release:
 - Other than smoke detectors used only for door and shutter release and not for open area protection all detection devices used for door and shutter hold open release service shall be monitored for integrity.
 - Unless installed as Class D circuits, *which allow closure or release upon loss of operating power*, all door and shutter hold-open release and integral door and shutter release and closure devices used for release service shall be monitored for integrity.
 - Magnetic door and shutter holders that allow doors to close upon loss of operating power shall not be required to have a secondary power source.

NFPA 72, 2022 Edition

Chapter 21 – Emergency Control Function Interfaces:

- 21.10 Electrically Locked Doors:
 - Electrically locked doors in a required means of egress shall unlock in the direction of egress where required by other laws, codes, and governing standards.
 - Secondary power supplies of fire alarm control units shall not be used to maintain exit doors in a locked condition unless the fire alarm system is designed with circuitry and sufficient secondary power to ensure the exits will unlock within 10 minutes after the loss of primary power.
 - Locks powered by independent power supplies dedicated to lock power and access control functions and that unlock upon loss of power are exempt from the secondary power requirement above.

21.10.1, 21.10.3, 21.10.4

NFPA 72, 2022 Edition

Chapter 21 – Emergency Control Function Interfaces:

- 21.10 Electrically Locked Doors:
 - If doors are unlocked by the fire alarm system, the unlocking function shall occur prior to or concurrent with, activation of any public-mode notification appliances in the area(s) served by the normally locked doors.
 - All doors that are required to be unlocked by the fire alarm system shall remain unlocked until the fire alarm system is manually reset.

21.10.5, 21.10.6

NFPA 72, 2022 Edition

Chapter 21 – Emergency Control Function Interfaces:

- 21.11 Exit Marking Audible Notification Systems:
 - Where required by other governing laws, codes, standards, or the AHJ, exit marking audible notification appliances shall be actuated by the building fire alarm system.
 - Exit marking systems shall meet the requirements of chapter 18.

21.11.1, 21.11.2

NFPA 72
National Fire Alarm Code
2022 Edition
Chapter 23 – Protected Premises Alarm
and Signaling Systems

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.1 Application / 23.2 General:
 - Chapter 23 cover the requirements for the installation and performance of protected premises (local) fire alarm systems. Building fire alarm systems, dedicated function fire alarm systems, in-building mass notification systems, and releasing fire alarm systems are subcategories of protected premises fire alarm systems.
 - This chapter contains requirements common to all local fire alarm systems excluding household fire alarm systems, which are covered in chapter 29.
 - The systems covered in this chapter shall be for the protection of life or property, or both, by indicating the existence of heat, fire, smoke, carbon monoxide, or other emergencies.
 - Evacuation or relocation is not a required output action for every system installed in accordance with this chapter.

23.1, 23.2.1, A23.2.1

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.2 General:
 - A record of installed software and firmware version numbers shall be prepared and maintained per the documentation requirements of sections 7.5 and 7.7.
 - Software and firmware within the alarm and signaling system that interfaces to other required software or firmware shall be functionally compatible.
 - All software and firmware shall be protected from unauthorized changes.
 - All changes shall be tested in accordance with the reacceptance testing requirements of 14.4.2.
 - The requirements of this chapter shall not preclude the use of separate fire, carbon monoxide, or other life safety systems, provided the systems do not generate simultaneous conflicting notifications or conflicting actuation of safety functions.

23.2.2.1, 23.2.2.1.1, 23.2.2.2, 23.2.2.3, 23.2.3

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.3 System Features:
 - Required system features shall be based on the requirements of codes or statutes adopted by the enforcing jurisdiction.
 - Nonrequired (voluntary) system features shall be based on the goals and objectives intended by the system owner.
 - Nonrequired systems and components shall meet the requirements of this code.
 - Nonrequired systems and components shall be identified on the record drawings.
 - *The purpose and design basis of the system should be documented for future reference if questions arise about why the system was installed.*

23.3.1, 23.3.2, 23.3.2.1, 23.3.2.2

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.3 System Features:
 - Protected premises shall include one or more of the following functions:
 - Manual fire alarm initiation.
 - Automatic fire alarm and supervisory signal initiation.
 - Monitoring of abnormal conditions in fire suppression systems.
 - Actuation of fire suppression systems.
 - Activation of emergency control functions (AHU shutdown, closing fire doors, elevator recall, etc.)
 - Activation of alarm notification appliances.

23.3.3.1

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.3 System Features:
 - Protected premises shall include one or more of the following functions (continued):
 - In-building emergency voice/alarm communications.
 - Automatic carbon monoxide alarm and supervisory signal initiation.
 - Actuation of carbon monoxide notification appliances.
 - Guard's tour supervisory service.
 - Process monitoring supervisory systems.
 - Actuation of off-premises systems.
 - Combination systems.

23.3.3.1

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.3 System Features:
 - Dedicated function fire alarm systems shall be permitted in facilities without a building fire alarm system and shall not be required to include other features or functions of a building fire alarm system.
 - Examples of dedicated function fire alarm systems include elevator recall and supervisory control, and sprinkler waterflow and supervisory functions.
 - Where a dedicated function fire alarm system exists and a building fire alarm system is subsequently installed, the systems shall be interconnected and comply with the interconnection requirements of section 23.8.2.

23.3.3.2.1, A23.3.3.2, 23.3.3.2.2

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.4 System Performance and Integrity:
 - Initiating device circuits, notification appliance circuits, and signaling line circuits shall be designated by class, depending on the circuit's capability to operate during specified fault conditions.
 - *Selection of the appropriate pathway class shall be by the system designer, unless another code or the AHJ designates a specific pathway class.*
 - Specified fault conditions shall result in a trouble signal at the protected premises within 200 seconds.

23.4.2, 23.4.2.1

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.4 System Performance and Integrity:
 - Where power to a device is provided over a separate circuit from the SLC or IDC, the operation of the power circuit shall meet the performance requirements of the SLC or IDC.
 - For example, if the SLC to which a smoke detector is attached is Class A, a separate power circuit to the smoke detector would also have to be arranged in a manner that provides the same level of performance under the specified fault conditions as the SLC.

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.4 System Performance and Integrity:
 - When determining the integrity and reliability of the interconnecting signaling paths installed in a protected premises, the following shall be considered:
 - Transmission media used.
 - Length of the circuit conductors.
 - Total building area covered by, and quantity of initiating devices and notification appliances connected to, a single circuit.
 - Effect of a fault in the fire alarm system that would hinder the performance objectives of the system.
 - Nature of hazards present within the protected premises.
 - Functional requirements of the system necessary to provide the required level of protection.
 - Size and nature of the population of the protected premises.

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.5 Performance of Initiating Device Circuits (IDCs):
 - Initiating device circuits (IDC) shall be assigned class designations of Class A or Class B pathways.
- 23.6 Performance of Signaling Device Circuits (SLCs):
 - Signaling line circuits (SLC) shall be assigned class designations of Class A, Class B, Class N, or Class X pathways.
- 23.7 Performance of Notification Appliance Circuits (NACs):
 - Notification appliance circuits (NAC) shall be assigned class designations of Class A, Class B, or Class X pathways.

23.4.2.2

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.6 Performance of Signaling Device Circuits (SLCs):
 - A single fault on a pathway connected to addressable devices shall not cause the loss of the devices in more than one zone (applies to both short-circuit and open-circuit faults).
 - *The above section introduces the concept of “SLC zones”. SLC s, unlike IDCs and NACs, have few limitations and can monitor and control upwards of 250 or more devices. A single SLC pathway can be the only pathway by which alarms are actuated, emergency control functions are controlled, and audible and visual notification appliances are actuated. A single point of failure on an SLC can negate most, if not all, of the code’s requirements for an acceptable minimum level of performance and reliability for the protection of life and property from fire. Designers should consider the potential that a single open or short caused by fire or damage to the SLC could disable an entire SLC prior to the activation of an alarm condition along with the notification and emergency control functions.*

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.6 Performance of Signaling Device Circuits (SLCs):
 - For the purpose of this section, each floor of the building shall be considered a separate zone.
 - For the purpose of this section, if the floor of a building is subdivided into multiple zones by fire or smoke barriers and the fire plan for the protected premises allows relocation of occupants from the zone of origin to another zone on the same floor, each zone on the floor shall be considered a separate zone.

23.6.1.1, 23.6.1.2

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.6 Performance of Signaling Device Circuits (SLCs):
 - The zoning requirements for SLC circuits shall not apply to:
 - Circuits between enclosures containing transponders and control units regardless of the number of initiating devices, notification appliances, or control relays that might be connected to those control units.
 - Circuits connecting short-circuit fault isolation modules to enclosures containing transponders and control units where the conductors are installed in metal raceway or equivalently protected against mechanical injury and where the circuit does not exceed 3' in length.
 - Alterations or modifications to an existing SLC not required to comply with the zoning requirements of 23.6.1 when originally installed.

23.6.1.3

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - *10.11.1 - 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 an initiating device.*
 - Alarm verification is not considered a presignal system, since the delay in the signal produced is 60 seconds or less and requires no human intervention.

A23.8.1.1

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - Systems utilizing a presignal feature shall be permitted if approved by the AHJ and the system meets the following conditions:
 - The initial fire alarm signals sound only in department offices, control rooms, fire brigade stations, or other constantly attended locations.
 - Where there is a connection to a remote station, the transmission of the fire alarm signal occurs upon the initial alarm signal.
 - Subsequent system operation is by either of the following means:
 - Human action that actuates the evacuation alarm signal or other response per the emergency response plan.
 - A feature that allows the control unit to delay the general alarm by more than one minute after the start of the alarm processing.

23.8.1.1.1, 23.8.1.1.2

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - Systems utilizing a presignal feature shall be permitted if approved by the AHJ and the system meets the following conditions (continued):
 - Investigation of a presignal alarm is performed by qualified personnel.
 - The emergency response plan of a presignal facility includes details of the alarm receipt, investigation, and alarm activation procedures and is approved by the AHJ.

23.8.1.1.2

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - Systems utilizing a positive alarm feature shall be permitted if approved by the AHJ and the system meets the following conditions:
 - To initiate the positive alarm sequence (PAS) operation the signal from the automatic fire detection device selected for PAS operation shall be acknowledged at the fire alarm control unit by qualified personnel within 15 seconds of annunciation.
 - If not acknowledged within 15 seconds, notification signals and remote signals shall be automatically and immediately actuated.
 - If the alarm is acknowledged within 15 seconds, qualified personnel shall have an alarm investigation phase of up to 180 seconds to evaluate the fire condition and reset the system.

23.8.1.2.1, 23.8.1.2.1.1

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - Systems utilizing a positive alarm feature shall be permitted if approved by the AHJ and the system meets the following conditions (continued):
 - If the alarm is not reset during the alarm investigation phase, notification signals and remote signals shall be automatically and immediately actuated.
 - If a second automatic fire detector selected for PAS is actuated during the alarm investigation phase, notification signals and remote signals shall be automatically and immediately actuated.
 - If any other fire alarm initiating device is actuated, notification signals and remote signals shall be automatically and immediately actuated.
 - The system shall provide means for bypassing the PAS.
 - Manually-actuated alarm-initiating device shall be permitted to be included in PAS where specifically approved by the AHJ.

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - Alarm and signaling system control panels within a building shall be interconnected to function as a single system.
 - Where the building is not served by a building fire alarm system, independent dedicated function and/or releasing systems shall not be required to be interconnected to function as a single system.
 - All subsystems shall be capable of simultaneous, full-load operation without degradation of the overall required system performance.
 - The methods of interconnection shall be monitored for integrity and be as follows:
 - Electrical contacts listed for the required load.
 - Data communications over a signaling line circuit(s) dedicated to the fire alarm or shared with other premises operating systems.
 - Other listed methods. 23.8.2.1, 23.8.2.2, 23.8.2.3, 23.8.2.4, 23.8.2.5

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - Where the signaling line circuit is shared by other premises operating systems, operation shall comply with the combination requirements of section 23.8.4.
 - All signal control and transport equipment (such as servers, routers) located in a critical fire alarm or emergency control function interface device signaling path shall be listed for fire alarm service, or:
 - The equipment meets the requirements for environmental conditions of section 10.3.5.
 - The equipment is provided with primary and secondary power and monitored for integrity.
 - Ensure the 10 second actuation time performance specification.

23.8.2.6, 23.8.2.6.1

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - System bandwidth is monitored to confirm that all communications between equipment that is critical to the operation of the fire alarm system or emergency control function interface device takes place within 10 seconds and failure shall be indicated within 200 seconds.
 - Failure of any equipment that is critical to the operation of the fire alarm system or emergency control function interface device is indicated at the master fire alarm control unit within 200 seconds.
- A listed barrier gateway, integral with or attached to each control unit or group of control units, shall be provided to prevent the other systems from interfering with or controlling the fire alarm system.
 - *BACNet is a typical example of integration with other systems.*

23.8.2.6.1, 23.8.2.6.2

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - Protected premises alarm control units shall be capable of being reset or silenced only from the protected premises unless remote silence and reset is approved by the AHJ.
 - Remote access (achieved by, but not limited to, cellular, internet, or radio frequency) to fire alarm or signaling systems (for testing, maintenance, diagnostics, and software upgrade) shall be permitted in accordance with the following:
 - Remote access shall not affect the operation or response of the fire alarm or signaling systems unless permitted by the following:
 - If for testing and maintenance activities, including resetting, silencing, or operation of emergency control functions with a means to manually terminate the remote access connection at the remote device and at the fire alarm or signaling system control unit at any time, and the remote access shall be automatically terminated within a maximum of 1 hour of inactivity in the remote access mode. 23.8.2.9, 23.8.2.11.1, 23.8.2.11.2, 23.8.2.11.3

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - Resetting, silencing, or operation of emergency control functions shall be limited to portion(s) of the system taken out of service.
 - Qualified personnel shall be on-site to enable resetting, silencing, and operation of emergency control functions at the affected system(s) by password or limited access.
- Remote access shall be permitted to be enabled remotely for the purposes of performing remote diagnostics when the following conditions are met:
 - The system shall provide a means to manually terminate the remote access connection at the remote device and at the fire alarm or signaling system control unit at any time, and the remote access shall be automatically terminated within a maximum of 1 hour of inactivity in the remote access mode.

23.8.2.11.3, 23.8.2.11.4

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - Remote access involves queries of the system and does not involve changing the system.
 - Remote access for the purpose of software updating shall be permitted when all of the following are met:
 - The system shall provide a means to manually terminate the remote access connection at the remote device and at the fire alarm or signaling system control unit at any time, and the remote access shall be automatically terminated within a maximum of 1 hour of inactivity in the remote access mode.
 - Qualified personnel shall be on-site to enable software updating at the affected fire alarm or signaling system control unit by password or limited access.
 - All software changes shall be tested in accordance with section 14.4.

A23.8.2.11.4, 23.8.2.11.5

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - A protected premises system shall be permitted to be interconnected to the household warning equipment for the purpose of actuating the notification appliances connected to the household warning equipment.
 - *This applies to household fire alarm systems and not to single- and multiple-station smoke alarms.*
 - The actuation of household warning equipment shall only be permitted to display at the protected premises control unit and annunciators as supervisory signals.

23.8.3.1, 23.8.3.2

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - Combination systems:
 - Fire alarm systems shall be permitted to share equipment and wiring with non-fire systems.
 - Operation of a non-fire system function(s) originating within a connected non-fire system shall not interfere with the required operation of the fire alarm system.
 - *The only exception to this is where an MNS (mass notification system) might take priority over fire alarm signals.*
 - If the equipment is attached to the fire alarm system via separate pathways, then shorts or opens in this equipment or between the equipment and the fire alarm system pathways, shall not impede or impair the monitoring for integrity of the fire alarm system or prevent alarm, supervisory, or fire safety control signal transmission.

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - Combination systems:
 - Fire alarm signals shall be distinctive, clearly recognizable, and shall be indicated as follows, in descending order of priority:
 - Signals associated with life safety.
 - Signals associated with property protection.
 - Trouble signals associated with life and/or property protection.
 - All other signals.
 - If the AHJ determines the annunciation of combined systems confusing or leading to a delayed response, the AHJ is permitted to require separate annunciation for fire alarm components.

23.8.4.7, 23.8.4.8

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - Signals from carbon monoxide detectors and carbon monoxide detection systems transmitted to a fire alarm systems shall be indicated as a carbon monoxide alarm signal.
 - Where carbon monoxide warning equipment is connected to a protected premises fire alarm system, receipt of signals shall initiate the audible signal required by section 18.4. *The CO signal is a four-pulse temporal pattern per 18.4.3.*
 - Operation of carbon monoxide alarms or detectors shall not cause fire alarm or combination system control units to actuate either protected premises or supervising station fire alarm signals.
 - Signals from a fire extinguisher electronic monitoring device transmitted to a fire alarm system shall be permitted to be supervisory signals.

23.8.4.9, 23.8.4.9.3, 23.8.4.9.4, 23.8.4.10

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - Fire alarm systems employing automatic fire detectors or sprinkler waterflow devices, shall include at least one manual pull station.
 - An exception is provided for the manual pull station required above for fire alarm systems dedicated to elevator recall control and supervisory service.
 - Devices employing trouble contacts must be wired so that a trouble condition does not impair the alarm initiation on the circuit.

23.8.5.1.2, 23.8.5.1.3, 23.8.5.3.1

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - Systems equipped with alarm verification features shall be permitted under the following conditions:
 - Alarm verification is not initially enabled, unless conditions are anticipated that are expected to create nuisance alarms. Enabling of the alarm verification feature shall be protected by a password or limited access.
 - Shall not delay activation of the system by more than 1 minute.
 - Activation of a device other than a smoke detector shall cause an alarm without additional delay.
 - The current status of the alarm verification feature is recorded on the Record of Completion.

23.8.5.4.1

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - If automatic drift compensation of sensitivity for a fire detector is provided, the fire alarm control unit shall identify the affected detector at compensation limit.
 - Systems requiring operation of two automatic detectors for system operation shall:
 - Not be prohibited by the AHJ.
 - Have at least two detectors in each protected space.
 - Not utilize alarm verification.
 - The specific sequence of operation is detailed in the design documents as defined by chapter 7.

23.8.5.4.2, 23.8.5.4.3

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - For systems requiring operation of two automatic detectors to initiate emergency control functions or to actuate fire extinguishing or suppression systems, the detectors shall be installed at the spacing determined in accordance with chapter 17.
 - *The designer is allowed to and may elect to reduce the detector spacing for specific purposes (i.e., suppression actuation).*
 - For systems requiring operation of two automatic detectors to actuate public mode notification, the detectors shall be installed at a linear spacing not more than 0.7 times the linear spacing determined in accordance with chapter 17.

23.8.5.4.4, 23.8.5.4.5

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - Where duct smoke detectors are not resettable from the protected premises fire alarm system, a listed alarm/supervisory indicator with an integral reset switch shall be provided in an accessible location.
 - Sprinkler waterflow and tamper switches, if required to be monitored, shall be connected to one of the following:
 - A building fire alarm system.
 - A dedicated function sprinkler waterflow and supervisory system.
 - The number of waterflow alarm-initiating devices permitted to be connected to a single initiating device circuit shall not exceed 5.
 - The number of supervisory signal-initiating devices permitted to be connected to a single initiating device circuit shall not exceed 20.

23.8.5.4.6.4, 23.8.5.5.1, 23.8.5.5.2, 23.8.5.5.3, 23.8.5.6.1, 23.8.5.6.2, 23.8.5.6.3

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - Where required to be monitored and a building fire alarm system is installed, the actuation of a fire suppression system other than sprinkler shall annunciate either an alarm or supervisory condition at the building fire alarm control unit.
 - Where required to be monitored and a building fire alarm system is installed, an off-normal condition of a fire suppression system other than sprinkler shall annunciate a supervisory condition at the building fire alarm control unit.
 - Supervisory signals that latch in the off-normal state and require manual reset of the system to restore them to normal shall be permitted.

23.8.5.7.1, 23.8.5.8.1, 23.8.5.8.2

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - Where fire pumps are required to be monitored and a building fire alarm system is installed, the “pump running” signal shall be permitted to be supervisory or alarm.
 - *Note that NFPA 25 requires automatic weekly testing of fire pumps.....caution is advised when choosing to make the “pump running” signal alarm causing....*
 - All other pump signals shall be supervisory signals.

23.8.5.9.1, 23.8.5.9.2

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - Fire alarm and supervisory signals generated at releasing service fire alarm control units shall be connected to, and annunciated at, the protected premises fire alarm system.
 - Where required by other governing laws, codes, and standards, actuation of any suppression systems connected to a releasing service fire alarm control unit shall be annunciated at the protected premises FACU, even when the system actuation is by manual means or otherwise accomplished without actuation of the releasing service fire alarm control unit.
 - *Each releasing service fire alarm control unit should be configured as a separate zone or discrete point to allow identification of the system involved, i.e., a clean agent system in a computer room and a wet chemical system in a kitchen in the same building.*

23.8.5.10.1, 23.8.5.10.2, 23.8.5.10.3

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - Automatic fire suppression system alarm-initiating devices and supervisory signal-initiating devices and their circuits shall be designed and installed so that they cannot be subject to tampering, opening, or removal without initiating a signal.
 - Trouble signals must also be initiated for junction boxes and device covers located **outside** of buildings unless tamper-resistant screws or other approved mechanical means are used for preventing access.
 - The integrity of each fire suppression system actuating device and its circuit shall be supervised.

23.8.5.11.1, 23.8.5.11.2, 23.8.5.11.3, 23.8.5.11.4

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - Fire alarm systems provided for evacuation or relocation of occupants shall have at least one notification appliance in each notification zone of the building (each floor), located in compliance with chapter 18 based on the appropriate notification mode as required.
 - Occupant notification of carbon monoxide shall be throughout the protected premises.
 - If the CO signals are transmitted to a constantly attended on-site location or off-premises location, selective public mode occupant notification shall be permitted to be limited to the notification zone encompassing the area where the CO signal was initiated.
 - Visual signals shall not be required in exit stair enclosures and elevator cars.
 - Emergency evacuation signals are not required in exit stair enclosures and elevator cars.
23.8.6.1.1, 23.8.6.1.2, 23.8.6.1.3, 23.8.6.2

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.8 System Requirements:
 - Notification zones shall match building outer walls, fire or smoke compartments, floor separations, or other fire safety subdivisions.
 - Carbon monoxide alarm notification zones shall be coincident with the area where the alarm initiation originated and other notification zones in accordance with the buildings' emergency response plan.
 - Circuit configuration for addressable notification appliances shall comply with the applicable performance requirements for notification zones.
 - Where there are addressable notification appliances on an SLC that serves different zones, a single open, short or ground on the installation conductors shall not affect the operation of more than one notification zone

23.8.6.3.2, 23.8.6.3.3, 23.8.6.4.1 23.8.6.4.2

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.9 In-Building Emergency Voice/Alarm Communications:
 - In-building fire emergency voice alarm communications systems (EVACS) shall meet the requirements of chapter 24.
 - Where a voice/alarm communications system is installed for occupant notification related to carbon monoxide detection, it shall meet the requirements of section 24.4 (EVACS), excluding the notification circuit pathway survivability requirements of 24.4.8.6.
 - Live voice communication systems and two-way communication service shall meet the requirements of chapter 24.

23.9.1, 23.9.2, 23.9.3, 23.9.4

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.10 Fire Alarm Systems Using Tone:
 - Fire alarm systems used for partial evacuation and relocation shall be designed and installed so that attack by fire within a notification zone shall not impair control and operation of the notification appliances outside that notification zone.
 - *One or more of the following means could be acceptable to provide a level of survivability consistent with the intent of the requirement:*
 - *Installing the system in a fully sprinklered building in accordance with NFPA 13.*
 - *Routing notification appliance circuits separately.*
 - *Using short-circuit fault-tolerant signaling line circuits for controlling evacuation signals.*

23.10.2, A23.10.2

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.11 Suppression System Actuation:
 - Fire alarm control panels used for automatic or manual activation of a fire suppression system shall be listed for releasing service.
 - Releasing devices for suppression systems shall be listed for use with releasing service control units.
 - Each releasing device (e.g., solenoid, relay) shall be monitored for integrity in accordance with applicable NFPA standards.
 - The installation wiring shall be monitored for integrity.

23.11.1, 23.11.2, 23.11.3, 23.11.4

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.11 Suppression System Actuation:
 - Releasing service fire alarm systems shall be provided with a disconnect switch to allow the system to be tested without activating the suppression system.
 - Operation of a disconnect switch shall cause a supervisory signal at the releasing service fire alarm control unit.
 - The disconnect shall be a physical switch and not accomplished by using software.
 - Software disconnects, even if activated by dedicated buttons or switches, shall not be permitted as a method to secure a suppression system from inadvertent discharge.
 - Sequence of operation shall be consistent with the applicable suppression system standards.

23.11.5, 23.11.5.1, 23.11.5.2, 23.11.5.3, 23.11.6

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.11 Suppression System Actuation:
 - Each space protected by an automatic fire suppression system actuated by the releasing service fire alarm system shall contain one or more automatic fire detectors installed in accordance with chapter 17.
 - Suppression systems or groups of systems shall be controlled by a single releasing panel that monitors the initiating devices, actuates the releasing devices and controls the notification appliances.
 - If multiple control units are listed for releasing device service, and if a trouble condition or manual disconnect on either control unit causes a trouble or supervisory signal, the initiating device on one control unit shall be permitted to actuate releasing devices on another control unit in lieu of the above requirement for a single control unit.

23.11.8, 23.11.9

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.11 Suppression System Actuation:
 - If the releasing service fire alarm control unit is located in a protected premises having a separate fire alarm system, it shall be monitored for alarm, supervisory, and trouble signals, but shall not be dependent on or affected by the operation or failure of the protected premises fire alarm system.
 - Releasing fire alarm systems performing suppression system releasing functions shall be installed in such a manner that they are effectively protected from damage caused by activation of the suppression system(s) they control.
 - *The control unit must be sealed, enclosed in a cabinet designed to prevent entry of the extinguishing agent, or located outside the discharge area of the fire suppression system.*

23.11.10, 23.11.11

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.12 Off-Premises Signals:
 - Systems requiring transmission of signals to locations providing supervising station service, shall also comply with chapter 26.
 - Relays or modules for transmission of trouble signals to a supervising station shall be arranged to provide fail-safe operation.
- 23.13 Guard’s Tour Supervisory Service:
 - Guard’s tour reporting stations shall be listed for the purpose.
 - A permanent record of all reporting station activations shall be made at a protected premises fire alarm control unit.
- 23.14 Suppressed (Exception Reporting) Signal Station:
 - Exception reporting systems are permitted and must generate a delinquency signal within 15 minutes after the predetermined actuation time if the guard fails to actuate a tour station as scheduled.

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.16 Special Requirements for Low-Power Radio (Wireless) Systems:
 - Low-power radio devices are required to comply with the applicable requirements of Title 47, Code of Federal Regulations, Part 15.
 - Compliance with Section 23.16 shall require the use of low-power radio equipment specifically listed for the purpose.
 - *Equipment listed solely for dwelling unit use would not comply with this requirement.*

A23.16, 23.16.1, A23.16.1

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.16 Special Requirements for Low-Power Radio (Wireless) Systems:
 - A primary battery(s) (dry cell) battery shall be permitted as the sole power source for devices incorporating a low-power radio transmitter/transceiver if:
 - Each transmitter serves only one device and is individually identified at the control panel.
 - Must power the device for 1 year, then support alarm transmission for 7 days after low battery signal is sent. Low battery signal shall be distinctive from alarm, supervisory, tamper, and trouble and, when silenced, resound every 4 hours.
 - Battery failure must cause a trouble signal at FACP that resounds every 4 hours.
 - Any mode of battery failure on one transmitter shall not affect any other transmitter.

23.16.2, 23.16.2.1, 23.16.2.2

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.16 Special Requirements for Low-Power Radio (Wireless) Systems:
 - When a low-power wireless initiating device is actuated, it shall comply with the following:
 - It shall automatically transmit an alarm signal and be identified at the FACU.
 - The alarm transmissions must be repeated every 60 seconds until the initiating device receives a signal confirming receipt of the alarm signal by the FACU.
 - Maximum delay from device activation to actuation of alarm notification appliances and display at the FACU is 10 seconds.
 - Alarms signals must latch at the FACP until manually reset.
 - 60 seconds after the conclusion of resetting the FACU, a non-restored actuated low-power wireless initiating device shall be identified at the FACU.

23.16.3.1, 23.16.3.1.1, 23.16.3.1.2, 23.16.3.1.4, 23.16.3.1.5, 23.16.3.1.6

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.16 Special Requirements for Low-Power Radio (Wireless) Systems:
 - Any fault condition that disables communications between the initiating device and FACP shall be annunciated within 200 seconds.
 - A single fault on the signaling channel shall not cause an alarm signal.
 - Removal of a low-power radio transmitter from its installed location shall cause immediate transmission of a distinctive trouble signal that indicates its removal and individually identifies the affected device.
 - Reception of an interfering transmission for a continuous period of 20 seconds or more shall cause an audible and visible indication at the FACU specifically indicated as an interfering signal.

23.16.4.2, 23.16.4.3, 23.16.4.5, 23.16.4.6., 23.16.4.7

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.16 Special Requirements for Low-Power Radio (Wireless) Systems:
 - Radio frequency Class A pathways shall operate as follows:
 - A redundant pathway is included.
 - Operational capability is verified by end-to-end communication.
 - Conditions that affect operation of the required pathways are annunciated as a trouble signal when two pathways are no longer available to each device.
 - Operational capability in a radio frequency pathway/channel continues during conditions that affect operation of one of the two remaining pathways.
 - Each transceiver or repeater in a radio frequency or wireless pathway is powered by one of the following means:
 - Both a primary and secondary source per section 10.6.
 - Multiple primary batteries meeting 23.16.2.2.

23.16.4.8.1

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.16 Special Requirements for Low-Power Radio (Wireless) Systems:
 - Radio frequency Class B pathways shall operate as follows:
 - A redundant pathway is not included.
 - Operational capability is verified by end-to-end communication.
 - Conditions that affect operation of the pathway are annunciated as a trouble signal.
 - Operational capability stops at the affected portion of the pathway.
 - Each transceiver and/or repeater in a radio frequency or wireless pathway is powered by one of the following means:
 - Both a primary and secondary source per section 10.6.
 - Multiple primary batteries meeting 23.16.2.2.

23.16.4.9.1

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.16 Special Requirements for Low-Power Radio (Wireless) Systems:
 - Radio frequency Class A pathways shall operate as follows:
 - Where operational capability is to be maintained during a fault, the operational capability shall be restored within 200 seconds of the application of the fault.

23.16.4.8.2, 23.16.4.9.2

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.16 Special Requirements for Low-Power Radio (Wireless) Systems:
 - Output signals from a wireless receiver/transceiver of a control unit:
 - Where a wireless receiver/transceiver of a control unit is used to actuate remote devices such as notification appliances and relays by wireless means, the remote devices shall meet the following requirements:
 - Power supplies shall comply with chapter 10 or the requirements for dry cell batteries.
 - All monitoring for integrity requirements of chapters 10, 12, 23, and the monitoring for integrity requirements of this chapter (23.16.4) shall apply.
 - Maximum delay from device activation to actuation of alarm notification appliances and display at the FACU is 10 seconds.

23.16.5

NFPA 72, 2022 Edition

Chapter 23 – Protected Premises Alarm and Signaling Systems:

- 23.16 Special Requirements for Low-Power Radio (Wireless) Systems:
 - Output signals from a wireless receiver/transceiver of a control unit:
 - Where a wireless receiver/transceiver of a control unit is used to actuate remote devices such as notification appliances and relays by wireless means, the remote devices shall meet the following requirements:
 - The FACU shall automatically repeat actuated response signals associated with life safety events at intervals not exceeding 60 seconds or until confirmation that the output device has received the alarm signal.
 - The remote devices shall continue to operate (latch-in) until manually reset at the FACU.

23.16.5

NFPA 72
National Fire Alarm Code
2022 Edition
Chapter 24 – Emergency Communications
Systems

NFPA 72, 2022 Edition

Chapter 24 – Emergency Communications Systems (ECS):

- Introduction:
 - *Chapter 24 contains a vast amount of information regarding various ECSs. The presentation for this chapter covers the most common types of systems that you will encounter. It is recommended that you familiarize yourselves with the information and requirements contained in the entirety of chapter 24, but the testing for this chapter will only entail what is covered in this presentation.*

NFPA 72, 2022 Edition

Chapter 24 – Emergency Communications Systems (ECS):

- 24.1 Application / 24.2 Purpose:
 - *Chapter 24 covers the requirements for the installation and performance of emergency communications systems (ECS), in-building fire emergency voice/alarm communications systems (EVACS), and other communications systems such as mass notification systems (MNS) and paging systems used for emergency purposes.*
 - The requirements of this chapter apply to ECSs within buildings and outdoor areas, and could target a general building, area, space, campus, or region.
 - The systems covered by this chapter shall be for the protection of life by indicating an emergency situation and communicating information necessary to facilitate an appropriate response and action. ECSs are intended to communicate information about emergencies including fire, human-caused events (accidental and intentional), other dangerous situations, accidents, and natural disasters.

NFPA 72, 2022 Edition

Chapter 24 – Emergency Communications Systems (ECS):

- 24.3 General:
 - ECS systems shall be capable of the reproduction of prerecorded, synthesized, or live (microphone, telephone handset, radio) messages with voice intelligibility.
 - Where listed speakers do not achieve the intelligibility requirements of the code for a notification zone, non-listed speakers shall be permitted to be installed to achieve the intelligibility for that notification zone.
 - *In certain acoustically challenging areas, listed fire alarm speakers might not produce an intelligible message. Non-fire alarm listed speakers are permitted to be installed in these limited areas. Failure of a non-listed speaker should not disrupt the operation of listed fire alarm speakers and operation of the fire alarm or mass notification control equipment.*

24.3.1.1, 24.3.1.2, A24.3.1.2

NFPA 72, 2022 Edition

Chapter 24 – Emergency Communications Systems (ECS):

- 24.3 General:
 - Speakers used for emergency communications system functions as well as ancillary (non-emergency) functions shall meet one of following conditions:
 - (1) The fire command center or the emergency command center as applicable shall be constantly attended by trained personnel, and selective paging is permitted by the AHJ **OR**:
 - (2a) The speakers and associated audio equipment are installed or located with safeguards to resist tampering or misadjustment of those components essential for emergency notification and:
 - (2b) The monitoring integrity requirements for power supplies in section 10.6.9, the two-way telephone monitoring requirements per section 10.19, and the monitoring of signal conductors per section 12.6, continue to be met while the system is used for non-emergency purposes.

24.3.5.2

NFPA 72, 2022 Edition

Chapter 24 – Emergency Communications Systems (ECS):

- 24.3 General:
 - ECSs shall be designated as one-way or two-way as follows:
 - One-way systems shall consist of one or more of the following:
 - In-building fire emergency voice/alarm communications systems (EVACS).
 - In-building mass notification systems.
 - Wide-area mass notification systems.
 - Distributed recipient mass notification systems (DRMNS).

24.3.7.1

NFPA 72, 2022 Edition

Chapter 24 – Emergency Communications Systems (ECS):

- 24.3 General:
 - ECSs shall be designated as one-way or two-way as follows:
 - Two-way systems shall consist of one or more of the following:
 - Two-way, in-building wired emergency services communications systems (i.e., firefighter’s telephone systems).
 - Two-way radio communications enhancement systems.
 - Area of refuge emergency communications systems.
 - Stairway communications systems.
 - Elevator landing communications systems.
 - Occupant evacuation elevator lobby communications.

24.3.7.2

NFPA 72, 2022 Edition

Chapter 24 – Emergency Communications Systems (ECS):

- 24.3 General:
 - Pathway survivability levels shall be as described in section 12.4.
 - In-building fire emergency voice/alarm communications systems that **do not** employ relocation or partial evacuation, a Level 0, 1, 2, 3, or 4 pathway survivability shall be permitted.
 - For in-building fire emergency voice/alarm communications systems that **do** employ relocation or partial evacuation, the following requirements shall apply to communication and control circuit pathways between a room or rated enclosure containing fire alarm equipment and other room(s) or rated enclosures containing fire alarm equipment required for occupant notification:
 - *This protection requirement would also apply to an SLC that extends from a master FACU to another remote FACU where notification appliance circuits might originate.*

24.3.14.4.1, 24.3.14.4.2

NFPA 72, 2022 Edition

Chapter 24 – Emergency Communications Systems (ECS):

- 24.3 General:
 - Building fire resistance \geq 2 hours, provide a pathway survivability of Level 2 or Level 3 **or a** Level 1 pathway survivability for Class N (SLC) or Class X (NAC) circuits installed in accordance with the requirements of 24.3.14.4.6.
 - Building fire resistance of at least 1 hour and less than 2 hours, provide a pathway survivability of Level 4 **or a** Level 1 pathway survivability for Class N (SLC) or Class X (NAC) circuits installed in accordance with the requirements of 24.3.14.4.6.
 - Building fire resistance less than 1 hour, the installation shall comply with 24.3.14.4.6.

24.3.14.4.2, A24.3.14.4.2, 24.3.14.4.3, 24.3.14.4.4, 24.3.14.4.5

NFPA 72, 2022 Edition

Chapter 24 – Emergency Communications Systems (ECS):

- 24.3 General:
 - Class N (SLC) or Class X (NAC) circuits complying with Level 1 pathway survivability shall be installed in accordance with the following:
 - The requirements of 12.3.8 for pathway separation do not apply to this section.
 - The requirement of 23.6.1 for a single fault on a pathway connected to addressable devices not causing the loss of devices in more than one zone does not apply to this section.

24.3.14.4.6, 24.3.14.4.6.1, 24.3.14.4.6.2

NFPA 72, 2022 Edition

Chapter 24 – Emergency Communications Systems (ECS):

- 24.3 General:
 - Class N (SLC) or Class X (NAC) circuits complying with Level 1 pathway survivability shall be installed in accordance with the following:
 - Circuits shall be separated in accordance with at least one of the following:
 - The primary and redundant conductors shall be separated by a floor assembly.
 - The primary and redundant conductors are located in dissimilar protected areas separated by at least 1-hour fire-rated construction.
 - The primary and redundant conductors are separated by at least one-third the maximum diagonal of the notification zone
 - Performance alternatives approved by the AHJ.

24.3.14.4.6.3

NFPA 72, 2022 Edition

Chapter 24 – Emergency Communications Systems (ECS):

- 24.3 General:
 - An open, ground fault, or short-circuit fault on the communication and control circuits between the rooms or enclosures required by 24.4.8.6.6 shall not affect operation of the EVACS within these rooms or enclosures.
 - *Entire communication and control circuits can be impacted by a short fault on the circuit unless isolation is provided. In order to protected equipment enclosures, short-circuit isolation could be provided integral to the equipment, or a 2-hour rated room or enclosure could be utilized.*
- Pathways survivability levels for wide-area MNS shall be determined by risk analysis.
- Two-way wired in-building emergency services communications systems installed in a building with less that a 2-hour fire rating shall have a pathway survivability Level of 1, 2, 3, or 4.

24.3.14.4.6.4, A24.3.14.4.6.4, 24.3.14.6, 24.3.14.7

NFPA 72, 2022 Edition

Chapter 24 – Emergency Communications Systems (ECS):

- 24.3 General:
 - Two-way wired in-building emergency services communications systems installed where the building has a 2-hour or greater fire rating shall have a pathway survivability Level of 2 or 3.

24.3.14.4.8

NFPA 72, 2022 Edition

Chapter 24 – Emergency Communications Systems (ECS):

- 24.4 In-Building Fire Emergency Voice/Alarm Communications Systems (EVACS):
 - Unless otherwise permitted by the requirements for relocation or partial evacuation, evacuation messages shall be preceded and followed by a minimum of two cycles of the Code 3 temporal signal.
 - Controls shall be located in a location approved by the AHJ and be secured to only allow access by trained and authorized people.
 - Operating controls shall be clearly identified.
 - If multiple EVACS control locations are provided, only one shall be in control, and it shall be indicated by a visible indication at that location.
 - Manual controls shall have visible indication of on/off status for EVAC zones .

24.4.2.1, 24.4.5.1, 24.4.5.2, 24.4.5.3, 24.4.5.4, 24.4.5.5, 24.4.5.6

NFPA 72, 2022 Edition

Chapter 24 – Emergency Communications Systems (ECS):

- 24.4 In-Building Fire Emergency Voice/Alarm Communications Systems (EVACS):
 - If live voice instructions are provided, they shall:
 - Override previously initiated signals to the selected notification zone.
 - Have priority over any subsequent automatically initiated signals to the selected notification zone.
 - If a previously initiated recorded message is interrupted by live voice instructions, upon release of the microphone, the previous message to the selected notification zones shall not resume playing automatically unless required by the emergency response plan.
 - Notification appliances required to provide special suppression pre-discharge notification shall not be overridden by other systems.
 - The fire alarm system shall not automatically override emergency mass notification messages.

NFPA 72, 2022 Edition

Chapter 24 – Emergency Communications Systems (ECS):

- 24.4 In-Building Fire Emergency Voice/Alarm Communications Systems (EVACS):
 - The following shall apply to systems used for relocation or partial evacuation during a fire condition:
 - Systems shall be provided with manual voice transmission capabilities selectively to one or more notification zones or on an all-call basis.
 - A 1 to 3 second alert tone followed by a message shall be provided, with the sequence repeated at least three times.
 - When the message is recorded, the repeated message sequence above shall itself be repeated after a pause of 180 seconds maximum until automatically silenced or reset by emergency personnel.
 - Where provided, speakers in each enclosed stairway, each exit passageway, each occupant evacuation elevator lobby, and each group of elevator cars within a common hoistway or bank shall be connected to separate notification zones for manual paging only. 24.4.8, 24.4.8.2, 24.4.8.3, 24.4.8.3.1, 24.4.8.3.2, 24.4.8.5

NFPA 72, 2022 Edition

Chapter 24 – Emergency Communications Systems (ECS):

- 24.4 In-Building Fire Emergency Voice/Alarm Communications Systems (EVACS):
 - The following shall apply to systems used for relocation or partial evacuation during a fire condition:
 - Fire alarm systems used for partial evacuation and relocation shall be designed and installed such that attack by fire within a notification zone does not impair control and operation of the notification appliances outside the notification zone.
 - All circuits necessary for the operation of the notification appliances shall be protected until they enter the evacuation zone they serve by the pathway survivability level requirements of 24.3.14.4.2.
 - *These circuits could include SLC, strobe, speaker, and amplifier audio circuits.*

24.4.8.6.1, 24.4.8.6.3

NFPA 72, 2022 Edition

Chapter 24 – Emergency Communications Systems (ECS):

- 24.4 In-Building Fire Emergency Voice/Alarm Communications Systems (EVACS):
 - The following shall apply to systems used for relocation or partial evacuation during a fire condition:
 - Where the separation of EVACS control equipment locations results in portions of the system controlled by one location being dependent upon the control equipment at other locations, the circuits between the dependent locations shall be protected by the pathway survivability level requirements of 24.3.14.4.2.
 - Where cable integrity is not maintained such as in system control units, power supplies, amplifiers, junction boxes, or terminal cabinets, in addition to the pathway survivability requirements, they should be protected using one of the following:
 - 2-hour fire-rated enclosure.
 - 2-hour fire-rated room.
 - A performance alternative approved by the AHJ.

NFPA 72, 2022 Edition

Chapter 24 – Emergency Communications Systems (ECS):

- 24.4 In-Building Fire Emergency Voice/Alarm Communications Systems (EVACS):
 - Undivided fire or smoke areas shall not be divided into multiple notification zones.
 - *This does not prohibit the use of multiple notification appliance circuits in a notification zone.*
 - When multiple notification appliance circuits are provided within a single notification zone, all the notification appliances in the zone shall activate and deactivate together.
 - Where there are different notification appliance circuits within a signaling zone that perform separate functions, such as presignal, general alarm, and predischARGE and discharge signals, they shall not be required to activate or deactivate simultaneously.

24.4.9.1, A24.4.9.1, 24.4.9.2, 24.4.9.3

NFPA 72, 2022 Edition

Chapter 24 – Emergency Communications Systems (ECS):

- 24.8 Two-Way, In-Building Wired Emergency Services Communications Systems:
 - Two-way telephone communications service shall be for use by the fire service and shall be located with EVACS equipment.
 - Shall be capable of permitting the simultaneous operations of 5 telephone stations.
 - A notification signal at the control equipment, distinctive from any other signal, shall indicate an off-hook phone condition.
 - A common talk (conference or party line) system shall be permitted.
 - If intended to be used by fire wardens, the system shall be a selective talk system, where phones are selected from the control location.
 - If the control equipment does not identify the location of the caller, the phone or jack shall be labeled to permit the caller to identify their location by voice.

24.8.1, 24.8.2, 24.8.6, 24.8.7, 24.8.11, 24.8.13, 24.8.15

NFPA 72, 2022 Edition

Chapter 24 – Emergency Communications Systems (ECS):

- 24.8 Two-Way, In-Building Wired Emergency Services Communications Systems:
 - In buildings provided with a two-way telephone communications system, at least one telephone station or jack shall be provided at the following locations:
 - Each floor level.
 - Each notification zone.
 - Each elevation cab.
 - Elevator lobbies.
 - Elevator machine room(s).
 - Emergency and standby power room(s).
 - Fire pump room(s).

24.8.12

NFPA 72, 2022 Edition

Chapter 24 – Emergency Communications Systems (ECS):

- 24.8 Two-Way, In-Building Wired Emergency Services Communications Systems:
 - If phone jacks are provided, at least two portable handsets, as approved by the AHJ, shall be provided and stored at each control center for use by emergency responders.
 - All circuits necessary for the operation of the two-way telephone system shall be installed with the pathway survivability requirements of 24.3.14.7.
- 24.9 Two-Way Radio Communications Enhancement Systems:
 - All in-building two-way radio communications enhancement systems shall be designed, installed, and maintained in accordance with NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Communications Systems*.

24.8.16, 24.8.19, 24.9

END OF PERIOD 2 – MODULE 4