NFPA 72 – *National Fire Alarm and Signaling Code*

Reviewing ITM & Required Documentation

1

Welcome

- Emergency procedures
- Communications devices
- Breaks/Lunch

Today's attendees

- Fire code officials
- Building code officials
- Other code officials
- Health officials
- Mechanical contractors
- Design professionals

Your topical experience

- Up to 5 years
- 5-10 years
- More than 10 years

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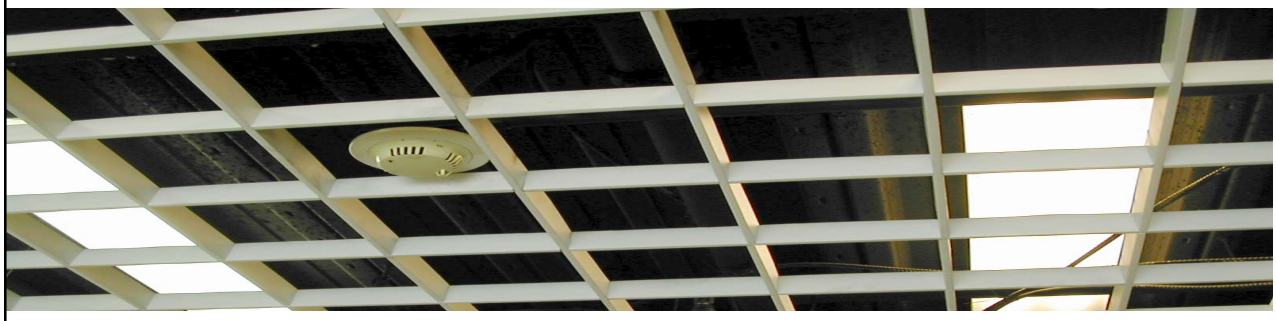
Presentation Goal



Assist code officials in understanding the role of acceptance and on-going testing to increase fire alarm system performance and reliability.

3

Learning Objectives

- Identify fire alarm and signaling system requirements for:
  - Inspection
  - Testing
  - Maintenance
- Review NFPA 72 acceptance and ITM documentation
- Compare current and previous reports to evaluate system performance

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Course Layout

- Module 1: Fire Alarm Overview
- Module 2: Acceptance Testing
- Module 3: ITM
- Module 4: Documentation
- Module 5: Life-Cycle Troubleshooting

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Prerequisite Knowledge

- Basic fire alarm system terms, functions and operations
- Fundamental fire alarm acceptance tests and inspections
- Locally adopted fire code
- References to NFPA 72, *National Fire Alarm and Signaling Code*

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A Word about I-Code *Words*

- Words that have special I-Code definitions are *italicized*
- Refer to Chapter 2 "Definitions"

Example: What is the *average ambient sound level*?

"Root mean square, A-weighted sound pressure level measured over a 24-hour period, or any time the person is present, whichever time period is less."

Example: Who is the *impairment coordinator*?

"Person responsible for the maintenance of a particular fire protection system."

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Fire Alarm Overview

Refresher – What You Need to Know

8

System Functions

- Monitor building space and systems to detect fire
- Monitors itself and other systems and annunciate problems
- Notify all building occupants of unsafe conditions
- Control and release fire and life-safety features
- Notify monitoring service of emergency or supervisory conditions
- Provide information relating to location and type of situation

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Fire Alarm System Types

- Conventional *zone* systems
  - Non- addressable
  - Locates devices by physical wiring circuit only
  - Difficult to provide detailed information as to what device is activated or in a trouble state
  - Still economically viable for small systems

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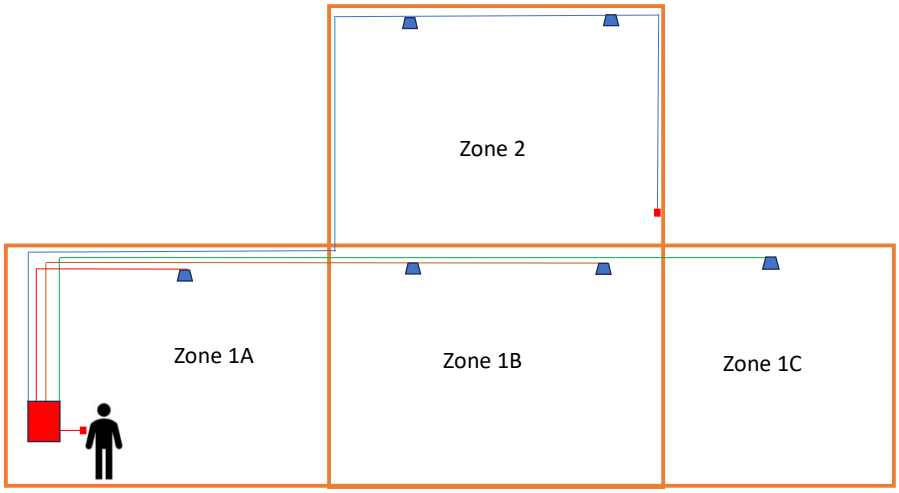
Conventional *Zone* System



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Fire Alarm System Types (cont'd)

- Addressable systems
  - Allows each device to report individually
  - Multiple devices can be on the same circuit and still be independently monitored
  - Easily identify where the problem or alarm is originating

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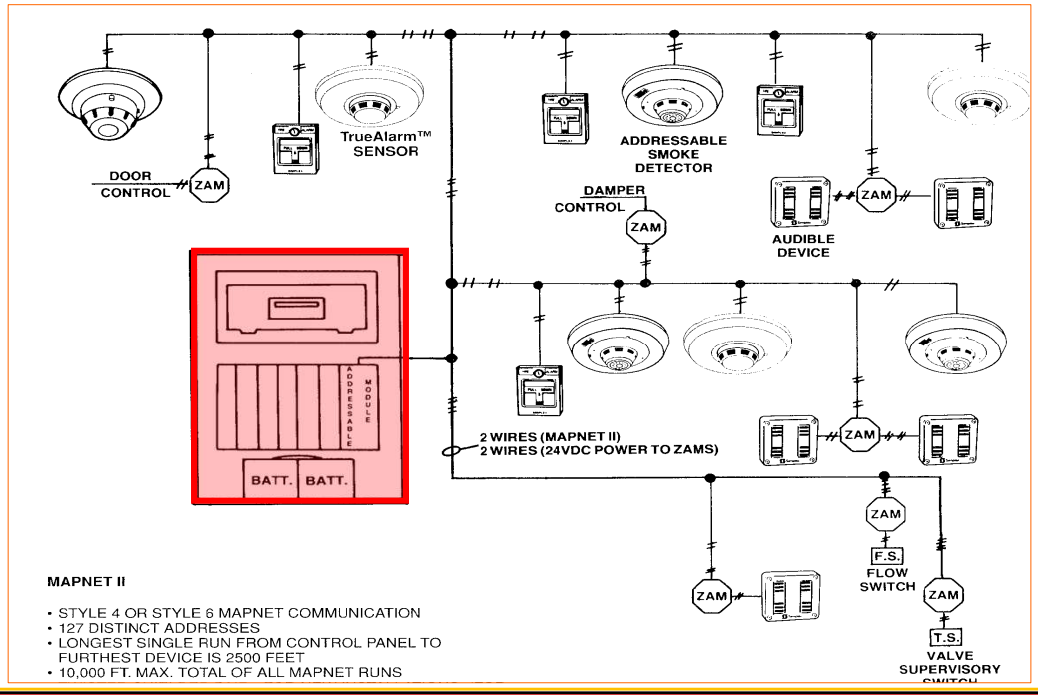

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Fire Alarm System Types (cont'd)

- IFC §907.6.3 Addressable systems required
  - Exceptions
    - Single story buildings < 22,500 sq. ft.
    - Systems include only manual boxes, water flow initiating devices and no more than 10 additional alarm-initiating devices
    - Special initiating devices that do not support individual device identification
      - Line heat detection
    - Systems or devices replacing existing equipment.

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Fire Safety Functions

- Door hold-open/releasing service
- HVAC shutdown
- Fire/smoke dampers
- Door unlocking
- Elevator recall
- Elevator shunt trip
- System releasing service
- Smoke control




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Alarm Signal

- Emergency condition or alert that requires immediate action.
  - Smoke detector
  - Heat detector
  - Flame detector
  - Manual pull station
  - Sprinkler system water flow



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Supervisory Service

- "Operative condition of fixed suppression systems or,
- "Other systems for protection of life and property."

- Fire pumps
- Emergency and standby generators
- Water tanks
  - Temperature
  - High/low pressure

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Supervisory Signal

- Need for action in connection with the supervision of guard tours, fire suppression systems or equipment, or maintenance features of a related system.
  - Valve closed or partially closed
  - Zone valve closed or partially closed
  - Duct detector in alarm

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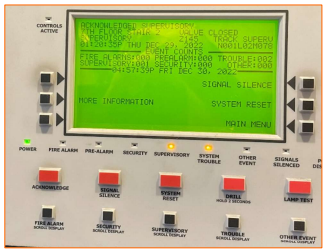
Trouble Signal



- Indicates fault in a monitored circuit, system or component.
  - Missing device
  - Extra device
  - Open circuit
  - Short circuit
  - Bad battery
  - Ground fault
- *Trouble signal* <u>does not</u> always mean the system <u>will not</u> operate.

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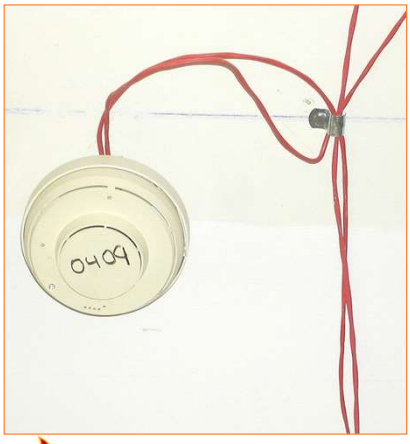
Conductor Nomenclature



- Cable – No formal definition; industry term for two or more conductors in a single sheath
- Class B "two-wire" system – one cable
- Class A "four-wire" – two cables
- Signaling Line Circuit – path between any combination of addressable devices

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Wiring Watchouts: NFPA 70

Condition	NEC Section
• Wiring in corrosive, damp or wet locations	760.3(D)
• Bushings where cables emerge from raceways	760.3(K)
• Equipment grounding conductors identified	760.3(O)
• Circuits installed in neat, workmanlike manner	706.24(A)
• Circuit integrity (CI) cable supported ≤ 24 inches	
• If in hoistway, must be placed within conduit	

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NFPA 70 – Power-limited Cable (PLFA)

- Listed as PLFA
- Copper 26 AWG or larger (single conductor ≥ 18 AWG)
- Conductor voltage rating ≥ 300 volts
- Cable temperature rating ≥ 60˚ C (140˚ F)
- Must comply with NFPA 72 survivability requirements
  - Circuit integrity (CI) cable
  - Two-hour fire resistance per ANSUL/UL 2196 (2017 Edition)
- Overcurrent device ≤ 20 amps

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Fire Alarm Cables/Applications

Cable Designation	Application
Power Limited (< 600 volts)	
FPL	Basic, least expensive and recognized by the NEC (NFPA 70 - National Electric Code).
FPLR	Suitable for vertical run through a shaft or from floor to floor within a building.
FPLR Shielded	Components of the standard FPLR but, includes an aluminum polyester foil shield and drain wire to protect against electromagnetic interference.
FPLP	• Plenum cable recognized for use in air ducts and plenum spaces and any other space that is used for the flow of environmental air. • All FPLP cables are listed as having adequate fire-resistant and low-smoke-producing characteristics as well.
FPLP Shielded	Plenum fire alarm cables with aluminum polyester foil shield and drain wire to block an additional interference.

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NFPA 70 – Non-power-limited Cable (NPLFA)

- Listed as NPLFA cables
- Output voltage ≤ 600 volts
- Copper 18 AWG or larger
- Must comply with NFPA 72 survivability requirements
  - Circuit integrity (CI) cable
  - Two-hour fire resistance per ANSUL/UL 2196 (2017 Edition)

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Fire Alarm Cables/Applications (cont'd)

Cable Designation	Application
Non-Power Limited (≥ 600 volts)	
NPLF	• Recognized by NEC and suitable for all general fire alarm cable uses. • Cannot be used in riser, ducts or plenum spaces used for environmental air flow unless properly installed within a conduit.
NPLFR	Suitable for vertical run through a shaft or from floor to floor within a building.
NPLFP	Suitable for installation in ducts, plenums and other spaces where environmental air flows.

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Pathway Class Designations – NFPA 72-§12.3

Class	Circuit Performance	Examples
A	• Redundant path, capable of operating past single open • Opens and ground fault report as *trouble* • Operational capability continues with ground fault	Four-wire system
B	• No redundant path • Cannot operate past single open • Opens and ground fault report as *trouble* • Operational capability continues with ground fault	Two-wire system

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Pathway Class Designations (cont'd) – 72-§12.3

Class	Performance	Examples
C	• One or more paths with end-to-end operational capability with polling or handshaking • Communication loss reported as *trouble*	LAN, WAN internet
D	• Fail-safe operation • Operation performed in event of pathway failure • No fault annunciated	Door release or locking hardware

E	Not monitored for integrity	• Equipment in an enclosure
		• Non-essential items
		  • Keyboard
		  • Printer
		  • Monitor

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Pathway Class Designations (cont'd) – 72-§12.3

Class	Performance	Examples
N	• Two or more pathways operational paths to primary and redundant devices • Monitored by end-to end communications • Communication loss reported as *trouble*	Ethernet circuits
X	Redundant path, operates past single open and short,	Essentially Class A pathways with isolation capability (short circuit protection) between each device.

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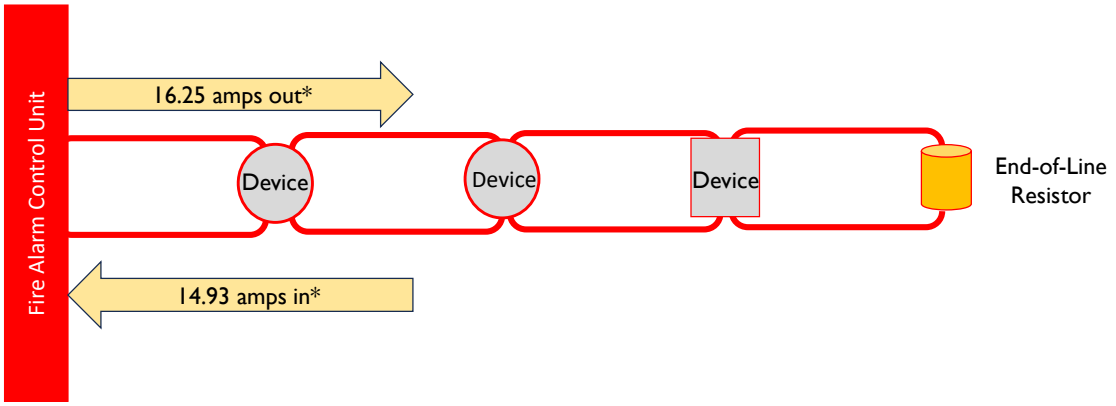
Class B: How it Works - Quiescent



*Values are for illustration only

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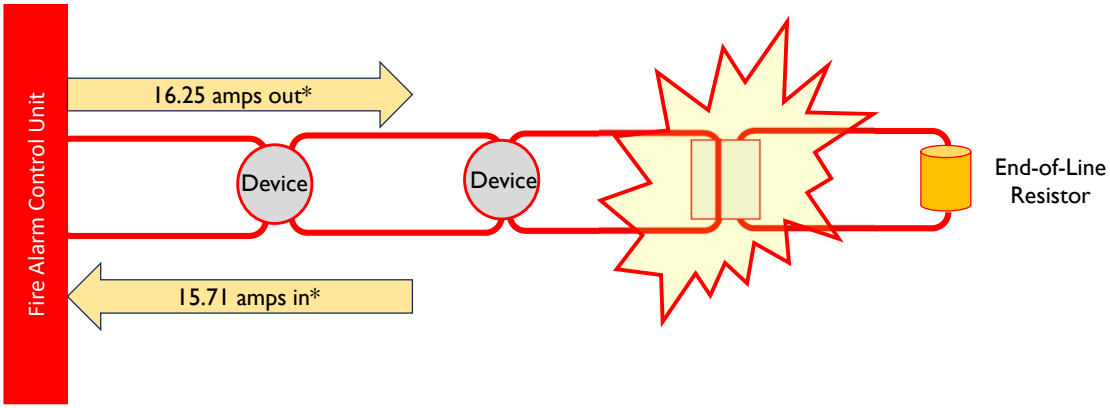
Class B: How it Works - *Alarm*



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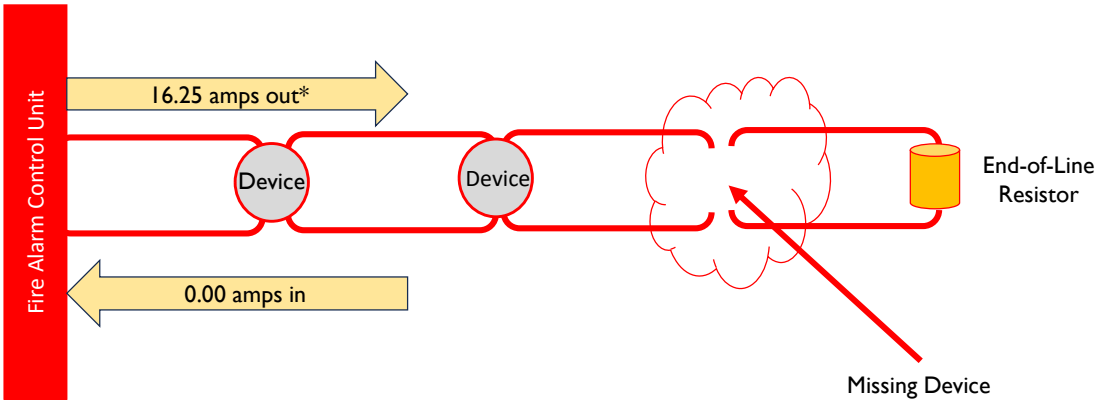
Class B: How it Works - Trouble



*Values are for illustration only

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Class B Circuit: Trouble Signal Deceit

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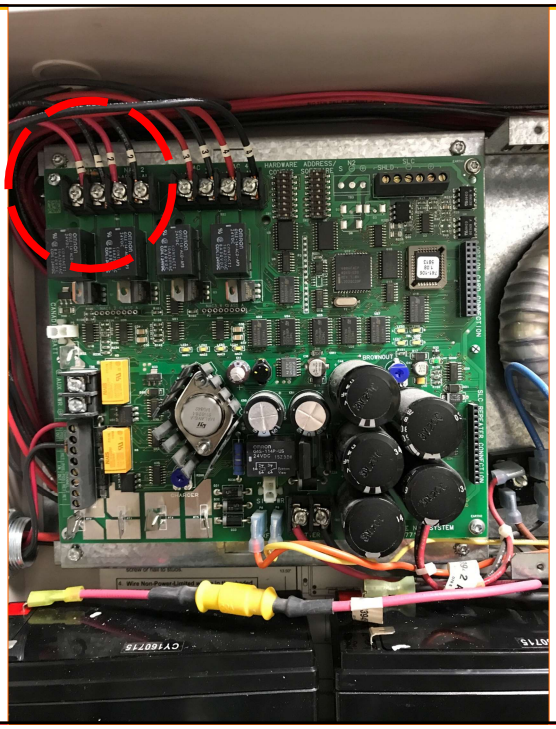

Do you see anything wrong in this panel?

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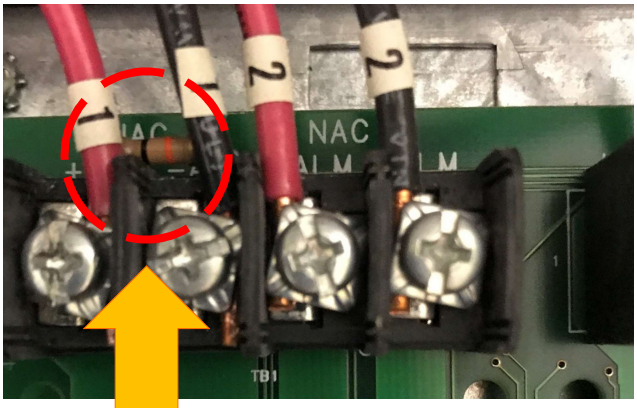

- EOLR on wired circuit
- Most likely due to field wiring issue
- Panel will not detect a problem with supervised circuit

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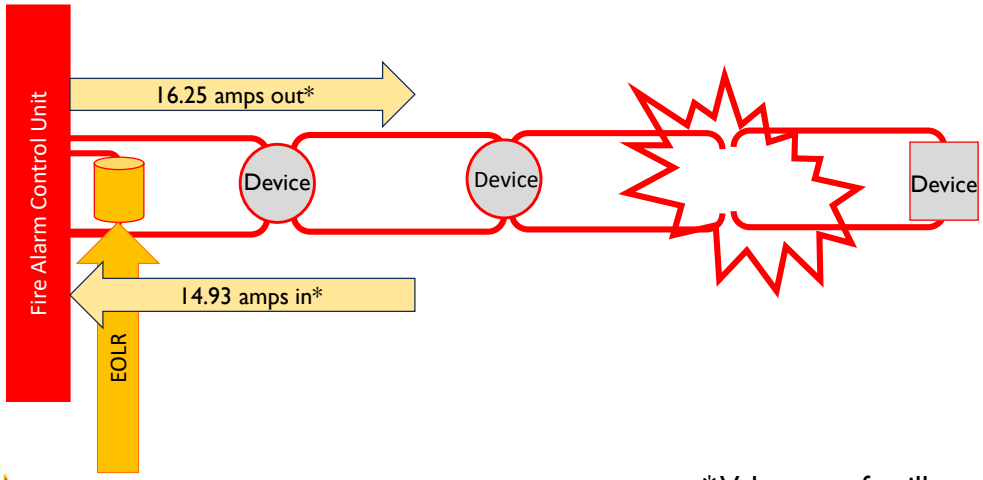
Class B: How it's Sabotaged



*Values are for illustration only

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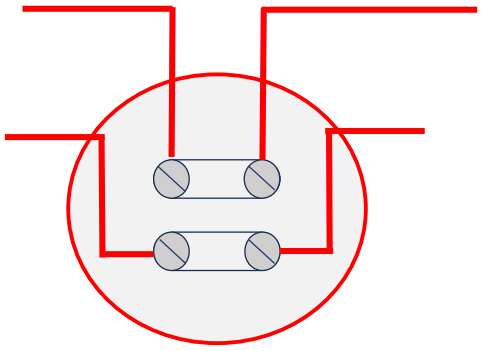
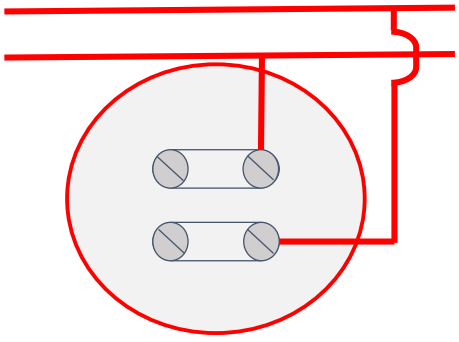
T-Tapping (Double Loop)

Acceptable



Not Acceptable

T-tapping is permitted on SLC: signaling line circuits.



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Class A Circuitry

- Redundant path
  - Capable of operating past single open
  - Opens and ground fault report as *trouble signal*
  - Operational capability continues with ground fault

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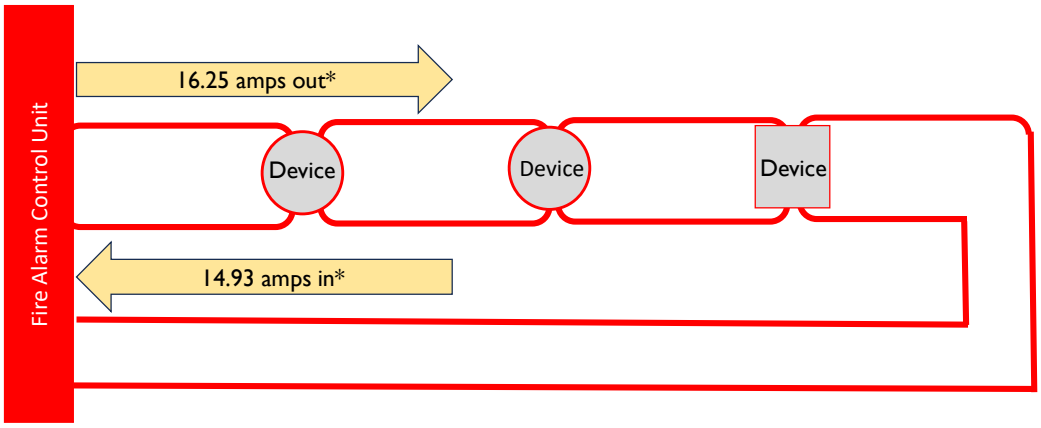
Class A: How it Works - Quiescent



*Values are for illustration only

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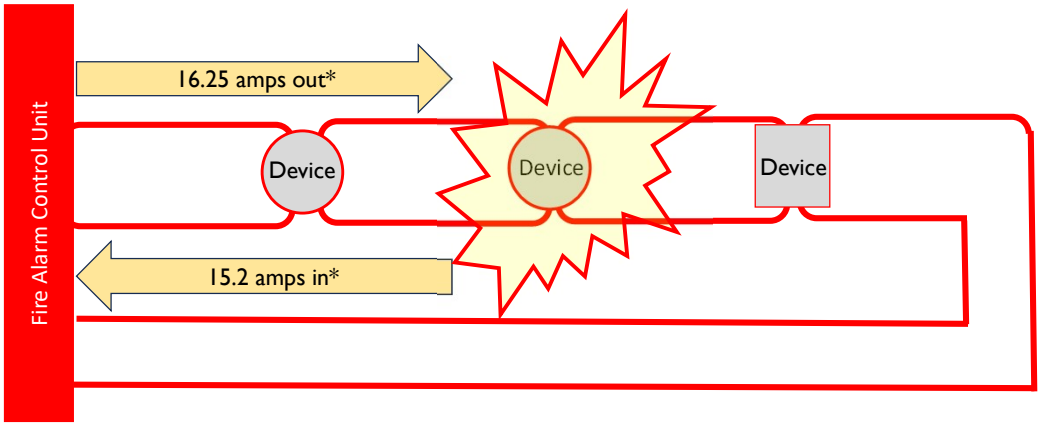
Class A: How it Works - Alarm



*Values are for illustration only

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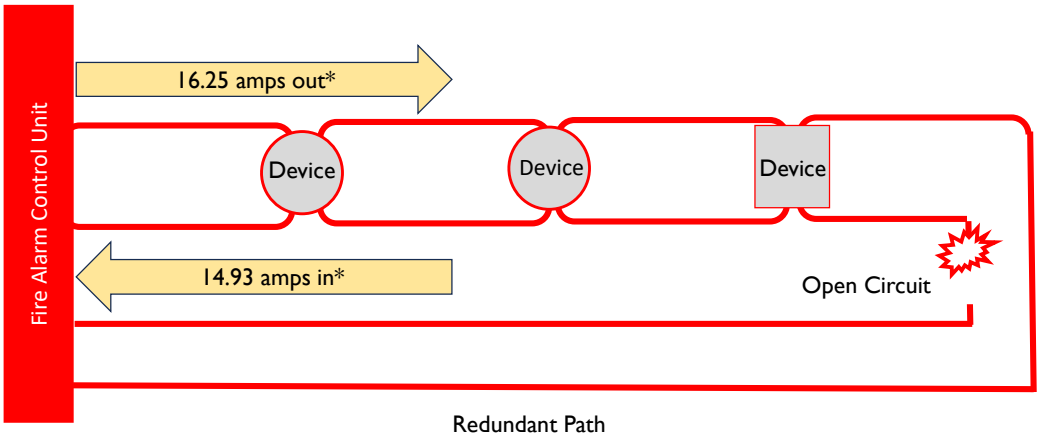
Class A: How it Works - Trouble



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Pathway Survivability: Refer to NFPA 70

- Protection consistent with building's fire resistance rating

Level	Protection
0	No specific requirements
1	• NFPA 13 sprinklered building • Conductors, cables and physical pathways protected by metal raceways or metal armored cables

2	• Non-sprinklered building:
	  • Two-hour rated circuit integrity or fire-resistive cable
	  • Two-hour fire rated cable
	  • Two-hour enclosure or protected area
	  • Approved performance-based alternatives

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Pathway Survivability: Refer to NFPA 70 (cont'd)

Level	Protection
3	NFPA 13 Sprinklered building: • Two-hour rated circuit integrity or fire-resistive cable • Two-hour fire rated cable • Two-hour enclosure or protected area • Approved performance-based alternatives
4	Same as Level 2, but one-hour limit

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NFPA 72: Special Circumstances

- Level 2 or 3 survivability for:
  - One-way emergency voice/communication systems (EV/AC) for relocation or partial evacuation
  - Two-way communications systems (e.g., ERCCS)
  - Areas of refuge communications

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Suggested Responses

- Monitor building space and systems to detect fire
- Monitors itself and other systems and annunciate problems
- Notify all building occupants of unsafe conditions
- Control and release fire and life-safety features
- Notify monitoring service of emergency or supervisory conditions
- Provide information relating to location and type of situation

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Acceptance Testing

Installing Contractor's Responsibility

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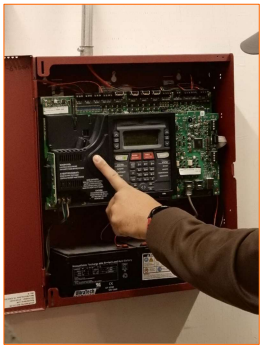
NFPA 72 – §14.4.1 - Initial Acceptance Testing

- "All new systems shall be inspected and tested in accordance with the requirements of [NFPA 72] Chapter 14."
- 100% of system
  - Devices
  - Appliances
  - Circuits
  - Functions



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NFPA 72-§14-2.1.1 - Purpose

- "Ensure compliance with approved design documents and to ensure installation in accordance with [NFPA 72] and other installation standards."
- "Ensure system operation in accordance with design documents."
- ITM applies to new and existing systems

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NFPA 72-§4.2.10.1 - Test Plan

- "Clearly establish the scope of the testing for the fire alarm or signaling system."
- May vary with project size and complexity
- May require several contractors
  - Sprinkler
  - HVAC
  - Elevator
  - Fire pump
- Test plan and results become part of testing records.

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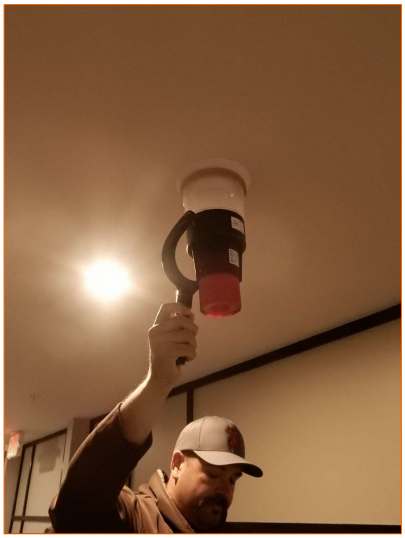
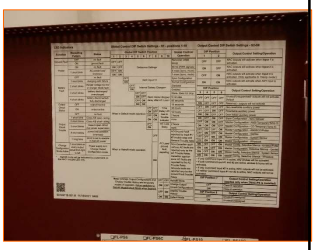
Typical Acceptance Tests

- Initiating devices
- Fire alarm control unit
  - Control unit annunciation
  - Notification
  - Required fire safety control
  - Supplementary
  - Secondary power





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Acceptance Test Tools

- Calibrated sound level meter
  - ANSI S1.4a, *Specification for Sound Level Meters*, Type 2
- Manometer
  - Duct detector airflow rates
- Heat gun or pressure pump (pneumatic tester)
- Listed/labeled artificial smoke or aerosol
- Listed/labeled carbon monoxide aerosol
- Multi-sensor/multi-criteria detector (smoke/heat/CO)
- Portable radios/phones
- Input/output matrix

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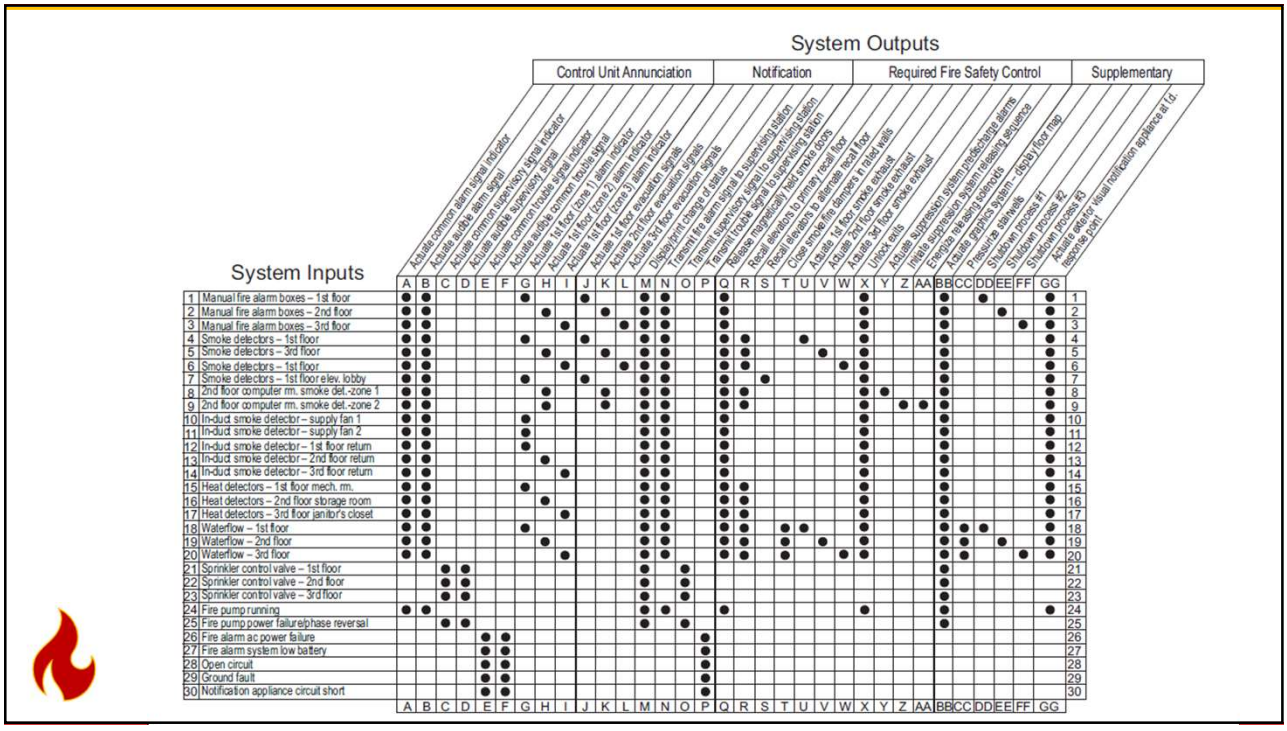

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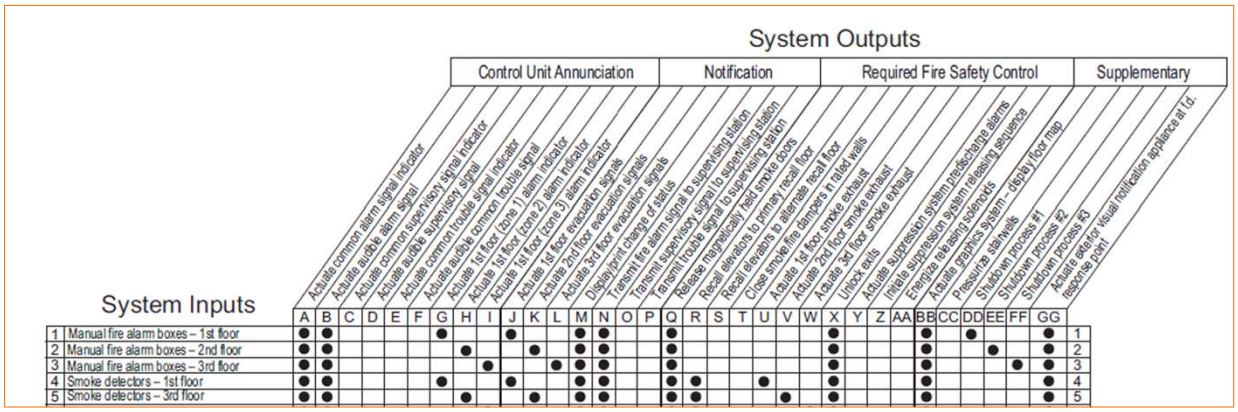
I/O Matrix Extract



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Initiating Devices

- Manual pull stations
- Smoke detectors/alarms
- Heat detectors
- Duct detectors
- Waterflow
- Supervisory
- Fire pump
- Circuit supervision

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Professional Tip

- Smoke detectors need to be at least three feet from moving air sources

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Control Unit Annunciation

- Common alarm signal
- Audible alarm signal
- Common supervisory signal
- Common trouble signal
  - AC power loss
  - Ground fault
- Zone or device indicators

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WARNING

Stroboscopic Effect and Loud Noise on Next Slide

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Notification Functions

- Evacuation signals
  - Audible/voice
  - Visual
    - Check candela ratings
- FACU system status change (display/print)
- Transmit signal(s) to supervising station
  - Alarm
  - Trouble
  - Supervisory

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NFPA 72- §A26.1.2

"The term immediately in this context is intended to mean "without unreasonable delay."

"Routine handling should take a maximum of 90 seconds from the receipt of an alarm signal or at the end of the verification time by the supervising station until the initiation of retransmission to the communications center."

[See back-up slides for 72-§26.2.2 exception]

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Fire Safety Control

- Release fire doors
- Recall elevators to primary or secondary floors
- Close fire/smoke dampers
- Initiate smoke control or exhaust
- Unlock exits
- Release fire protection system(s)

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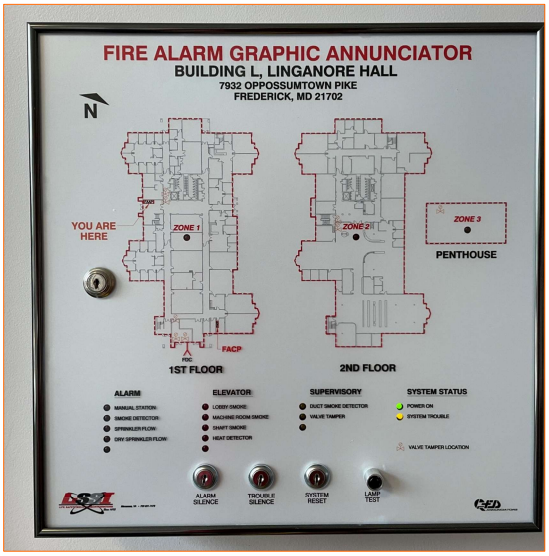
Supplementary Functions

- Illustrate graphic display (remote annunciator)
- Pressurize stairwells
- Shutdown process equipment
- Illuminate exterior visual signals



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Circuit Checks – Metallic Conductors

Signal	Simulation	Method	Outcome
Ground fault	Single open and ground	Jumper from wire terminal (not power) to ground	FACU ground fault light
Circuit integrity	Lost appliance	Remove 10% components on each circuit	FACU trouble light
Voltage loss	Stray voltage	Ammeter not exceed 1 volt	--
Short circuit	Single open and ground	Jumper from wire terminal (not power) to ground	FACU trouble light
Loop resistance	Power loss for notification appliance circuits	Ammeter	Match manufacturer's data

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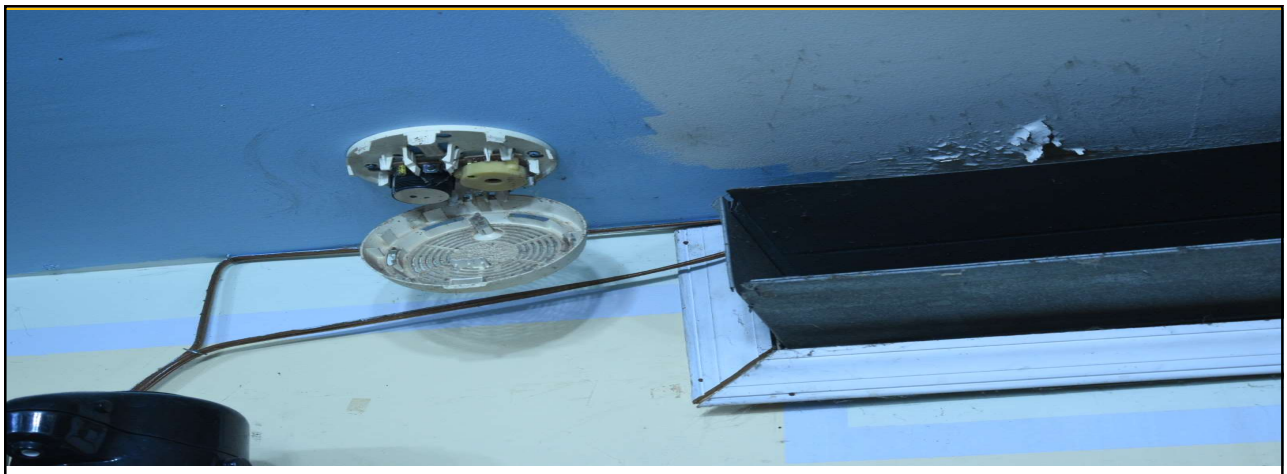

ITM

Enhancing On-Going Reliability

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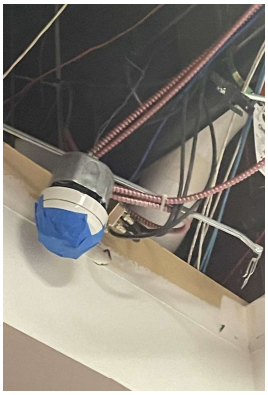
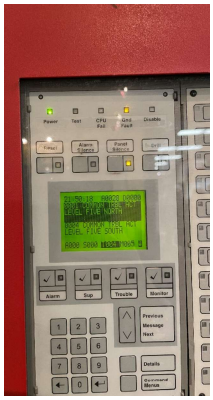
NFPA 72-14.1.2.1.3 - Inspections

- Periodic inspections
- "Assure that obvious damages or changes that might affect the system are visually identified."



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NFPA Table 14.3.1 - Inspection Schedules (Extract)

Component	Frequency
Fire Alarm Control Unit (Monitored)	
• Fuses, lamps, main power	Annually
• Trouble signal	Semi-annually
Fire Alarm Control Unit (Unmonitored)	
• Fuses, lamps, main power	Weekly
• Trouble signal	

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NFPA Table 14.3.1 - Inspection Schedules (Extract) (cont'd)

Component	Frequency
Supervising station transmission equipment	Annually
Voice/alarm communications equipment	Semi-annually
Batteries	Semi-annually
NAC panels	Annually
Initiating devices	Semi-annually
Releasing devices	
Manual fire alarm boxes	
Notification appliances	

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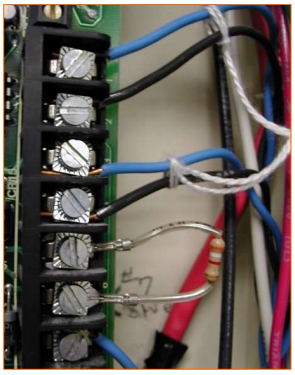
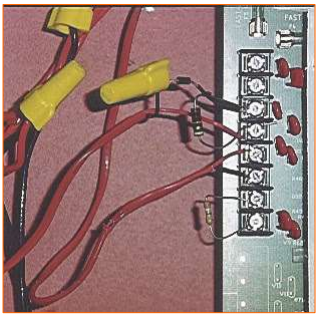
NFPA 72-14.2.1.4 - Testing

- "To statistically assure operational reliability."





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NFPA Table 14.4.1 - Testing Schedules (Extract)

Component	Frequency
Fire Alarm Control Unit	Annually
• Functions	
• Fuses	
• Interfaced equipment	
• Lamps and LEDs	
• Audible and visual signals (alarm/supervisory/trouble)	
• Off-premise signal transmission	
• Ground-fault monitoring circuit	

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NFPA Table 14.4.1 - Testing Schedules (Extract)

Component	Frequency
Phone jacks and amplifier equipment for fire service use	Annually
Energy storage systems (battery, generator)	
Secondary power supply	
Circuit integrity	
Automatic initiating devices	
Supervisory devices	
Notification appliances	
Releasing service	

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Impairments/Deficiencies

- 72 - §14.2.2.2.2 Deficiencies shall be corrected.
- 72 - §14.2.2.2.3 Deficiencies – not corrected - reported in writing to owner within 24 hours
- 72 - §14.2.2.2.4 Recalls – reported in writing to owner
- IFC §901.7 Impairment plans (See Back-up slides)

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Maintenance

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NFPA 72-14.5.1- Maintenance

- "In accordance with manufacturer's published instructions."
  - Detector calibrations
  - Cleaning
  - Batteries

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Documentation

NFPA 72 - Chapter 7

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NFPA 72-§7.2 – Minimum Documentation

- If required by *code official*
  - Intent and system description narrative
  - Riser diagram
  - Floor plan layout
  - Operations sequence (input/output matrix)
  - Equipment data sheets
  - Manufacturer's published instructions

73

Minimum Documentation (cont'd)

- Battery capacity and safety margin
- Notification appliance circuits voltage drop calculations
- Mounting height elevation for wall-mounted devices and appliances
- Minimum sound pressure levels required
- Alarm notification appliance locations
  - Visible appliance candela ratings

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NFPA 72-§7.5.2/IFC §901.2.1

- If *code official* requires:
- Installing contractor compliance statement:
  - Installed in accordance with *approved* plans
  - Tested in accordance with NFPA standards and manufacturer's published instructions
  - Integrated on Record of Completion (§ 12)

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NFPA 72 – §14.6 - Documentation

- Acceptance test shall become a permanent record maintained by owner for system life.
- Annual inspections shall be retained until the next test and for one year after.
  - Refer to state records management laws.
- Records shall be on medium that will survive the retention period.
  - Paper or electronic.
  - Available to inspecting authority (on-site or accessible electronically)

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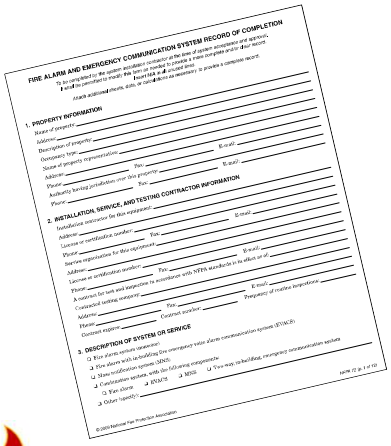
NFPA Fig. 7.8. 2 (a) - Record Of Completion


FIRE ALARM AND EMERGENCY COMMUNICATION SYSTEM RECORD OF COMPLETION

1. PROPERTY INFORMATION

2. INSTALLATION, SERVICE, AND TESTING CONTRACTOR INFORMATION

3. DESCRIPTION OF SYSTEM OR SERVICE

- Establishes baseline for newly installed, expanded or renovated system.
- Key elements:
  - Installing contractor
  - Record design drawings (as-built)
  - Component inventory
    - Type and count
  - Deviations from approved design
  - Certification and approval record

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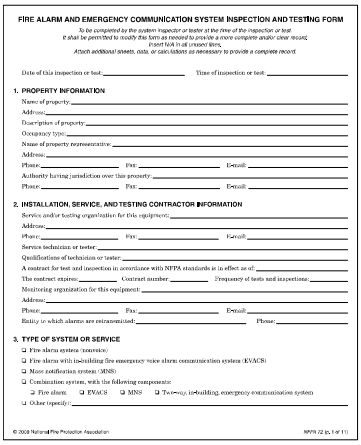
NFPA Fig. 7.8.2 (g) - Inspection & Testing

- For ongoing inspection and testing
- Key elements:
  - Distinguishes between inspection and testing
  - Documents tested devices
    - Initiating and notification appliance performance
  - Provides comments for follow-up
    - Performance failure, maintenance needs, missing devices


FIRE ALARM AND EMERGENCY COMMUNICATION SYSTEM INSPECTION AND TESTING FORM

1. PROPERTY INFORMATION

2. INSTALLATION, SERVICE, AND TESTING CONTRACTOR INFORMATION

3. TYPE OF SYSTEM OR SERVICE

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Life-Cycle Performance

Tracking System ITM over Time

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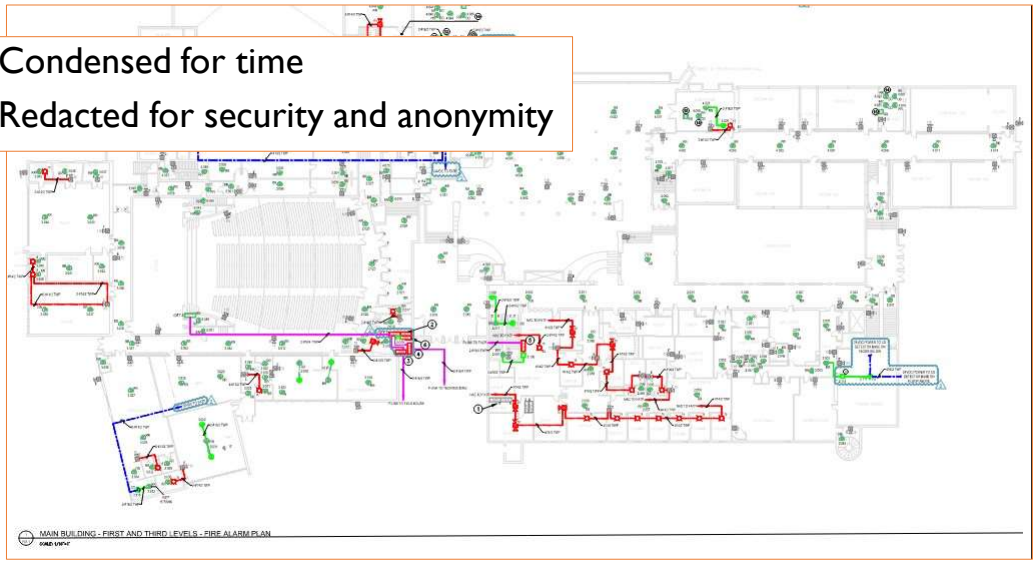
Case Study: XYZ High School

- Condensed for time
- Redacted for security and anonymity



80

Property Information

Within current period?

Attach additional sheets, data, or calculations as necessary to provide a complete record.

Inspection/Test Start Date/Time: August 14, 2023 Inspection/Test Completion Date/Time: 1415-1625

Supplemental Form(s) Attached: Yes (yes/no)

1. PROPERTY INFORMATION

Name of property: Redacted High School

Address: Redacted Address

Description of property: Public high school with attached gymasium

Name of property representative: John Doe, Director of Facilities

Address: Redacted Address

Phone: 888-555-1212 Fax: 888-555-1213 E-mail: Facilities@School.edu

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Testing/Monitoring

- Change from previous?
- Why?
- UL-certified?

2. TESTING AND MONITORING INFORMATION

Testing organization: ACME Alarm and Security Services

Address: 1234 NE 54th Avenue

Phone: 855-455-1111 Fax: 855-425-3414 E-mail: ServiceTech@ACME.com

Monitoring organization: Central Station Services, LLC

Address: 29 NW 79th Avenue

Phone: 811-777-3023 Fax: E-mail: CSSLLC@CSSLLC.com

Account number: 27SD14203 Phone line 1: 855-301-1214 Phone line 2: 822-301-8222

Means of transmission: DACT

Entity to which alarms are retransmitted: Redacted Fire Department Phone: 401-733-0265

Correct?

82

Documentation/Description

What if this is blank?

3. DOCUMENTATION

Onsite location of the required record documents and site-specific software: Next to FACU in Electrical Room 101

4. DESCRIPTION OF SYSTEM OR SERVICE

4.1 Control Unit

Manufacturer: SIMPLEX Model number: 4100

4.2 Software Firmware

Ask if this is most current?

Firmware revision number: V1.7A

4.3 System Power

4.3.1 Primary (Main) Power

Nominal voltage: 120 V Amps: 20 A Location: Panel 101: Circuit 16: Electrical Room 101

Overcurrent protection type: CB Amps: 20A Disconnecting means location: Same

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Secondary Power

4. DESCRIPTION OF SYSTEM OR SERVICE *(continued)*

4.3.2 Secondary Power

Type: Sealed Lead-Acid Location: FACU Cabinet

Battery type (if applicable): FAng-Shu Model 12V-22

Calculated capacity of batteries to drive the system:

In standby mode (hours): 24 In alarm mode (minutes): 5

Correct for system type?

5. NOTIFICATIO

Monitoring organization	Contact: Dispatcher 20-C	Time: 1400
Building management	Contact: John Doe	Time: 1412
Building occupants	Contact: Principal	Time: 1412
Authority having jurisdiction	Contact: FM Adams	Time: 1415
Other, if required	Contact:	Time:

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Results

All inspections/tests marked?

Comments indicate corrections?

6. TESTING RESULTS

6.1 Control Unit and Related Equipment

Description	Visual Inspection	Functional Test	Comments
Control unit	☒	☒	Loose lugs on NAC : Tightened
Lamps/LEDs/LCDs	☒	☒	Replaced "System Trouble" LED
Fuses	☒	☒	
	☒	☒	
	☒	☒	
Ground-fault monitoring	☒	☒	
Supervision	☒	☒	
Local annunciator	☒	☒	
Remote annunciators	☒	☒	Replace LED in annun. next to main entry
Remote power panels	☒	☒	Battery voltage okay

6.2 Secondary Power

Description	Visual Inspection	Functional Test	Comments
Battery condition	☒	☒	Dated 10/2021: no leakage seen
Load voltage	☒	☒	No. 1: 24 No. 2: 24
Discharge test	☒	☒	
Charger test	☒	☒	
Remote panel batteries	☒	☒	
Batteries marked with date of manufacture	☒	☒	OK

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Attachments Reminder

SYSTEM RECORD OF INSPECTION AND TESTING *(continued)*

6. TESTING RESULTS *(continued)*

6.3 Alarm and Supervisory Alarm Initiating Device

Attach supplementary device test sheets for all initiating devices.

6.4 Notification Appliances

Attach supplementary appliance test sheets for all notification appliances.

6.5 Interface Equipment

Attach supplementary interface component test sheets for all interface components.

Circuit Interface / Signaling Line Circuit Interface / Fire Alarm Control Interface

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Signal Transmission

6.6 Supervising Station Monitoring

Description	Yes	No	Time	Comments
Alarm signal	☒	☐	44 sec.	
Alarm restoration	☒	☐	42 sec.	
Trouble signal	☒	☐	47 sec.	
Trouble restoration	☒	☐	52 sec.	
Supervisory signal	☒	☐	45 sec.	
Supervisory restoration	☒	☐	46 sec.	

- Reasonable times?
- If not, explain.

6.7 Public Emergency Alarm Reporting System

Description	Yes	No	Time	Comments
Alarm signal	☐	☐	N/A	
Alarm restoration	☐	☐	N/A	
Trouble signal	☐	☐	N/A	
Trouble restoration	☐	☐	N/A	
Supervisory signal	☐	☐	N/A	
Supervisory restoration	☐	☐	N/A	

Not part of this system.

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Post-Test Status

7. NOTIFICATIONS THAT TESTING IS COMPLETE

Monitoring organization	Contact: Dispatcher 20-C	Time: 1530
Building management	Contact: John Doe	Time: 1600
Building occupants	Contact: Principal	Time: 1620
Authority having jurisdiction	Contact: County Consolidated Dispatch Center	Time: 1628
Other, if required	Contact:	Time:

8. SYSTEM RESTORED TO NORMAL OPERATION

Date: August 14, 2023 Time: 1630

9. CERTIFICATION

This system as specified herein has been inspected and tested according to NFPA 72, ____ edition, Chapter 14.

Signed: S. J. Anderson Printed name: S.J. Anderson Date:

Organization: ACME Security and Fire Title: Service Tech Phone:

Qualifications (refer to 10.6.3): NICET Level II

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Noted Defects/Malfunctions

10. DEFECTS OR MALFUNCTIONS NOT CORRECTED AT CONCLUSION OF SYSTEM INSPECTION, TESTING, OR MAINTENANCE

1. No records of smoke detector calibration in last five years.
2. Two small private offices have been added to Counseling Center without detection.

Who will follow-up to assure compliance?

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Notification Appliance Results

Any concerns?

Appliance Type	Location/Identifier	Test Results
S/H	Main entry lobby	OK
S/H	Exterior waterflow alarm	OK
S/H x 4	First floor corridor	OK - all synch
S/H x 4	Second floor corridor	OK - all synch
H	Electrical Room 101	OK
S x 2	First and second floor boys rooms	OK
S x 2	First and second floor girls rooms	OK
S/H x 4	Gymnasium	One out of synch - corrected
S/H x 4	Cafeteria	OK
S	Teacher's Lounge	OK
S/H	Boy's locker room	OK
S/H	Girl's Locker room	J-box off wall - reinstalled
S/H	Vocational Shop	Cracked lens - replaced
S	Special Ed class	OK

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Initiating Device Results

Device Type	Address	Locatio		Test Results
PS	101-101	Electrical Room 101		OK
SD	101-102	Electrical Room 101		OK
WFS	101-103	A/S riser room		OK - 48 secs.
TS X 3	101-(104 - 105 -106)	A/S riser room	[One TS cover plate missing - ordered]	
PS	101-107	Administrative office		OK
HD	101-108	1st floor boys' rest room	Hanging by wire - reinstalled	
HD	101-109	1st floor girls' rest room		OK
HD	100-201	Gym - Boy's locker room		OK
HD	100-202	Gym - Girl's Locker room		OK

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Suggested Responses

- Notification report said S/H in second floor restrooms worked.
  - Initiating device report mentions nothing about second floor initiating devices.
  - Correct or overlooked?
- Tamper switch cover deficiency not listed in Sec. 10: Defects/Malfunctions unrepaired.

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Recommended Review Practices

- Request and keep a copy of the original acceptance test for your permanent records.
- Obtain Statement of Compliance (IFC §901.2.1/NFPA 72-§7.8.2)
- Review prior year to see what deficiencies were noted.
- Review number of devices on the system and check for any additions or deletions.
- If a device failed, ask for documentation as to reason for failure and if the device has been repaired or replaced.

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Recommended Enforcement Practices

- Code official should not automatically create violation list based on the annual inspection report.
  - Depending on inspection date, items may have been already repaired.
- Follow-up with protected premises to obtain compliance plan/schedule.
- Inspection and repair company(ies) may not be same.
- Ask for copies of final compliance report.
- Maintain records in accordance with local/state records management laws.

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Remember: ITM

- Verifies system function and performance ***ONLY!***
- Does not guarantee compliance with current code.
  - It verifies that the system, as installed , is operational.
- Annual inspection does not guarantee system meets the code requirements for installation.
  - Original acceptance inspection should establish code compliance with code in effect *at the time* of installation.

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Review

- Identify fire alarm and signaling system requirements for:
  - Inspection
  - Testing
  - Maintenance
- Review NFPA 72 acceptance and ITM documentation
- Compare current and previous reports to evaluate system performance

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Questions or Comments?

Please complete the end-of course evaluation. Thank you.

May 30, 2024

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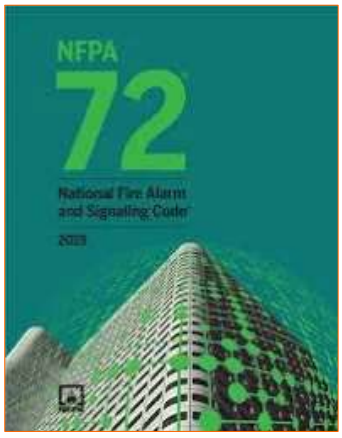
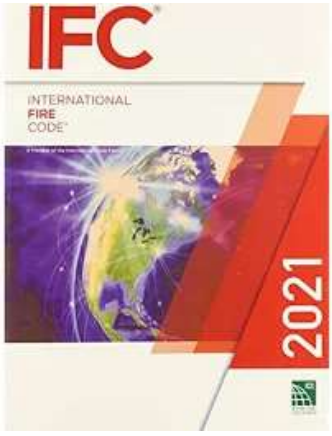
References





- NFPA 72, *National Fire Alarm and Signaling Code* (2019 Edition)
- *International Fire Code* (2021 Edition)
- NFPA 70, *National Electrical Code* (2020 Edition)

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Additional Resources

- NFPA 72, *National Fire Alarm and Signaling Code Handbook*
- Video: Fire Alarm Inspection and Testing per NFPA 72
- IFSTA: *Fire Detection, Protection and Suppression Systems*
- Nazar, Henry: *An Introduction to Fire Alarm Systems*
- FireTech Productions (Online): Inspection and Testing of Fire Alarm Systems Levels I and II
- Kinetix Fire Alarm Signal Times by Transmission Method

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Back-Up Slides

Supplemental Information

May 30, 2024

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Additional NFPA Forms

Form Descriptor (NFPA 72 Figure Number)	Application/System
7.8.2 (b)	Emergency Communication Systems: • Mass notification • In-building voice/alarm • Two-way in-building
7.8.2 (c)	Power systems: • Primary/batteries • Generator • Energy storage
7.8.2(d)	NAC panels
7.8.2(e)	Interconnected systems: • Fan shutdown • Elevator recall
7.8.2(f)	Deviations from adopted codes and standards

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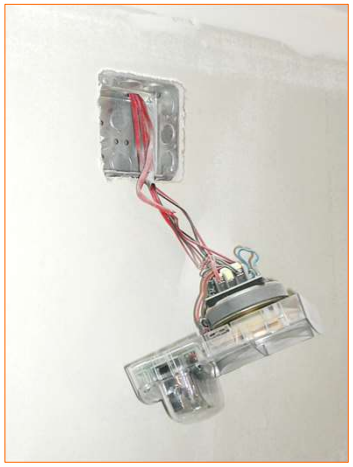
IFC §901.7.1 - Impairment Coordination



1. The extent and expected duration of the impairment have been determined.
2. The areas or buildings involved have been inspected and the increased risks determined.
3. Recommendations have been submitted to management or the building owner/manager.
4. The fire department has been notified.
5. The insurance carrier, the alarm company, the building owner/manager and other authorities having jurisdiction have been notified.
6. The supervisors in the areas to be affected have been notified.
7. A tag impairment system has been implemented.
8. Necessary tools and materials have been assembled on the impairment site.

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IFC §901.7.6 Service Restoration

1. Necessary inspections and tests have been conducted to verify that affected systems are operational.
2. Supervisors have been advised that protection is restored.
3. The fire department has been advised that protection is restored.
4. The building owner/manager, insurance carrier, alarm company and other involved parties have been advised that protection is restored.
5. The impairment tag has been removed.

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NFPA 72 - §26.2.2 – Supervising Stations

- "Personnel shall attempt to verify alarm signals prior to reporting to the communication center only where all of the following conditions exist:"
  - Alarm signal verification is required by FD for specific protected premises.
  - Documentation exists from fire department for alarm signal verification for protected premises at the signaling station.
  - If verification requirement changes, responsible FD must notify protected premises and signaling station.
  - Verification process does not take longer than 90 seconds from time alarm received.
  - Verification of a "true fire" received from approved personnel on premises.
  - Verified signals immediately retransmitted to communication center.
  - Signals where verification not conclusive must be immediately retransmitted.
  - Verified unwanted signals reported to FD in approved manner and frequency.

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Shared Pathway Levels: Life-Safety and Non-Life Safety Applications 72- §12.5

- Integrated building management, energy management, HVAC, security

Level	Protection
0	Common equipment for life-safety and non-life safety
1	Not required to separate, but priority to life-safety over non-life safety
2	Separate non-life safety segregate all life safety features from non-life safety
3	Equipment dedicated solely to life safety

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Nomenclature – 72-§12.7

Pathway Class – Survivability Level – Shared Pathway Level

Designation (Examples)	Description
A.0	Class A - Survivability Level 0
A.1	Class A - Survivability Level 1
A2.2	Class A - Survivability Level 2 – Shared Pathway Level 2
B3.1	Class B - Survivability Level 3 – Shared Pathway Level 1

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