

# 2024 CODE CHANGES

## Significant Code Changes for NICET Fire Alarm Study

### NFPA 72 – 2016 to 2022

#### Chapter 7

- Floor plans shall indicate pathway class designation and survivability level per Ch 12, including the location of any EOL supervisory or power supervisory devices required for pathway class (7.4.5 (p))

#### Chapter 10

- Smoke or heat is not required at dedicated function control unit (10.4.5.1)
- Abandoned fire alarm equipment shall be removed and marked “not in service” until removed (10.4.7)
- Battery calculations shall apply a correction factor of 1.25 (10.6.7.2.14) (2016 – factor 1.2)
- Secondary power for communications equipment at protected premises used to transmit signals to a supervising station shall have sufficient capacity to operate for 24 hours under nonalarm condition and capacity to transmit signals for 5 minutes (10.6.7.2.11)
- CO detection system not monitored by supervising station requires 24-hour standby and 12-hour alarm capacity (10.6.7.2.15)
- CO detection system monitored by supervising station requires 24-hour standby and 5 minutes alarm capacity (10.6.7.2.17)
- UL 864 listed UPS may be used to power remotely located equipment (10.6.8.5)
- Rechargeable batteries for second power be listed or component recognized by a nationally recognized testing lab (10.6.10.1.3)
- CO detector with built-in sounder permitted to be silenced locally if CO alarm or supervisory status continues to display at control unit (10.13)
- Supervised notification appliance control circuits shall comply with: (10.17.2)
  - » Supervised notification appliance control circuits shall not serve more than one notification zone
  - » Circuit shall be monitored for integrity
  - » Fault on control circuit conductors shall indicate trouble

#### Chapter 12

- Level 4 pathway survivability shall include one or more of the following (12.4.5)
  - » 1-hour rated CI (circuit integrity) cable
  - » 1-hour rated cable system (electrical circuit protective system)
  - » 1-hour rated enclosure or protected area
  - » Performance alternatives approved by the AHJ

#### Chapter 14

- If observations are noted, they shall be permitted to be communicated to the system owner (14.2.2.4.1)
- The system owner shall not be required to address observations unless they become an impairment or deficiency (14.2.2.4.2)
- Observation (definition) – suggested correction, improvement, or enhancement not considered to be an impairment or deficiency (3.3.193)
- Changes to system executive or site-specific software for control equipment or transmitting equipment made from a location not on premises require an individual on-premises to verify testing accomplished (14.4.2.6)
- CO detectors installed after January 1, 2012, shall be tested at initial acceptance and annually by the introduction of CO into the sensor (14.4.3.5)
- CO alarms shall be replaced when the end-of-life signal activates or the manufacturer replacement date is reached (14.4.5.7)

- Table 14.3.1 (9) – Inspection of Valve Regulated Lead Acid Batteries (VRLA) (2016- sealed lead acid)
- Inspection – Semiannually
- Table 14.3.1(17)(11) and (12) – Sprinkler Supervisory and Waterflow Devices
- Inspection – Semiannually
- Table 14.4.3.2 (9) – Testing of Valve Regulated Lead Acid Batteries (VRLA) (2016- sealed lead acid)
- Temperature test – Semiannually
- Charger test – Semiannually
- Cell/unit voltage test – Semiannually
- Ohmic test – Semiannually
- Replacement/Load Test – 3 years

## Chapter 17

- Air sampling detector sampling piping shall be designed based on computer-based fluid dynamics calculation (17.7.4.6.2.2)
- CO detector location: (17.12)
- On the ceiling in the same room as a permanently installed fuel-burning appliance
- Centrally located on every habitable level and in every HVAC zone of the building
- Outside dwelling unit, guest room, and sleeping area within 21 feet of any door to sleeping room measured along the path of travel
- Other locations, as required by code

## Chapter 18

- Audible signals from CO detectors shall be: (18.4.3)
- Different than fire alarm signals
- Four-pulse temporal pattern (Temporal 4)
- Repeated until alarm reset or manually silenced
- Synchronized within the notification zone
- Table A.18.4.4 (Typical Average Ambient Sound Levels) (2016 Changes)

Location	2022 Average Ambient (dBA)	2016 Average Ambient (dBA)
Business occupancies	54	55
Industrial occupancies	88	80
Mechanical rooms	91	85
Places of Assembly	60	55

- Visible notification pulse durations longer than 20 milliseconds but not greater than 100 milliseconds shall be permitted where alerting capability is demonstrated to be equal to 20-millisecond duration (18.5.3.3)
- Obstructions (18.5.5.6)
  - » Ceiling mount visible appliances shall be mounted such the effect of the appliance is not blocked by obstructions
  - » The effect of obstructions on light from wall-mounted appliances shall be considered when determining location
  - » The effect of obstructions on the direct viewing of corridor appliances shall be considered when determining locations

## Chapter 21

- Emergency control function interface devices shall be located within 3 feet of the component controlling ECF where the control circuit if not Class D (21.2.4)
- Smoke detector shall be permitted in unsprinklered hoistways where required by ANSI/ASME A.17.1 (21.3.6.1)

- Initiating devices installed in hoistway shall be accessible for service, testing, and maintenance from outside the hoistway (21.3.7)
- Where required by NFPA 13, all HVLS fans shall be interlocked to shut down upon activation of waterflow in the area served by fans (21.8)

## Chapter 23

- Multiple Class N devices are not required in areas served by pathway not susceptible to ground faults, such as fiber or wireless (23.6.2.2)
- Class N shared pathway maintenance plan shall determine and document power distributions as follows: (23.6.3.7)
  - » Method provided to maintain power on all shared pathways
  - » Calculation of power requirements for all connected equipment
  - » Secondary power is provided for life safety equipment to provide 24 24-hour standby and 15 minutes at full load
  - » Maintenance plan identifies policies and procedures to monitor, maintain, test, and control changes to shared pathways
- Manual fire alarm boxes shall be permitted to be included with positive alarm sequence where specifically approved by the AHJ (23.8.1.2.1.3)
- Remote access shall be permitted for testing and maintenance, including reset, silence, and operation of emergency control functions when all of the following are met: (23.8.2.11.3)
  - » System provides a means to manually terminate the remote connection at the remote device or control unit
  - » Remote access is terminated within 1 hour of inactivity
  - » Reset, silence, and operation of emergency control functions are limited to portions of the system taken out of service
  - » Qualified personnel are on-site to enable reset, silence, or emergency control function by of system by password or limited access
- Remote access shall be permitted for purposes of remote diagnostics when both of the following are met: (23.8.2.11.4)
  - » System provides a means to manually terminate the remote connection at the remote device or control unit
  - » Remote access is terminated within 1 hour of inactivity
- Remote access shall be perm for purposes of software updating when all the following are met: (23.8.2.11.5)
  - » System provides a means to manually terminate the remote connection at the remote device or control unit
  - » Remote access is terminated within 1 hour of inactivity
  - » Qualified personnel are on-site to enable software updating of the system by password and limited access
  - » All software changes are tested per Chapter 14
- Fire alarm systems dedicated to elevator recall and supervisory service are not required to have a manual fire alarm box (23.8.5.1.3)
- Building System Information Unit (BSIU) shall: (23.8.4.2)
  - » Where the fire alarm control unit (FACU) controls BSIU, it shall be located in the same room as BSIU
  - » BSIU is not permitted to perform fire alarm control features that cannot be accomplished by FACU in the same room
  - » BSIU shall be UL 864 listed
  - » Operation of non-fire alarm functions shall not interfere with fire alarm functions
- Where CO signals are transmitted to on-site or off-premises constantly attended location, selective public mode occupant notification shall be permitted but not dependent on the operation of the fire alarm system (23.8.6.1.3)
- Boundaries of CO alarm notification zones shall be coincident with the area where the alarm originated and other notification zones following the building emergency response plan (23.8.6.3.3)
- Class A radio pathways shall operate as follows: (23.16.4.8)
  - » Redundant path included
  - » Operation capability verified by end-to-end communication
  - » Condition that affects operation annunciated as trouble
  - » Operation continues during condition that affects the operation of one of two remaining pathways
  - » Each transceiver or primary and secondary power or multiple primary batteries
- Class B radio pathways shall operate as follows: (23.16.4.9)
  - » Redundant path not included
  - » Operation capability verified by end-to-end communication

- » Condition that affects operation annunciated as trouble
- » Operation capability stops at the affected portion of the pathway
- » Each transceiver or primary and secondary power or multiple primary batteries

## Chapter 24

- Building constructed with fire resistance rating that is at least 1 hour and less than 2 hours shall provide pathway survivability of Level 4 (24.3.14.4.4)
- Primary and redundant, or outgoing and return, conductors in buildings with a fire-resistance rating of less than 1 hour with Class N or Class X circuits shall comply with at least one of the following: (24.3.14.4.6)
  - » Separated by floor assembly
  - » Separated by a minimum 1 hour fire-rated construction
  - » Separated by at least one-third of the maximum diagonal of the notification zone
- Open, ground fault, or short circuit on communications and control circuits between rooms or enclosures shall not affect the operation of the in-building emergency voice alarm communications equipment within these rooms or enclosures (24.3.14.4.6.4)
- Secondary power for two-way ECS shall be capable of operating in standby for 24 hours and then 4 hours with all remote call stations activating and all master stations annunciating calls (24.10.2.1)
- The system shall be capable of monitoring additional power supplies for communications equipment vital to off-premises signal transmission (24.10.2.2)
- Constantly attended location for area of refuge/area of rescue assistance shall be located either in the building or at an offsite monitoring location (24.10.2.3)
- Two-way ECS shall have the capability to verbally signal to identify specific building addresses to monitoring personnel before operators complete connection to the remote station (24.10.8)
- Directions for two-way ECS, instructions for summoning assistance, and written identification, including braille, of the location shall be posted adjacent to the remote station and shall comply with ANSI A117.1 for visual characters (24.10.13)

## Chapter 26

- Remote programming of transmission technologies shall be permitted when all of the following are met:
  - » Qualified personnel at protected premises at all times during remote programming
  - » Before remote programming occurs, notification per Chapter 14 shall be made
  - » A test plan shall be developed per Chapter 14
  - » A mitigation plan shall be initiated by the responsible party to contact the communications center in the event an actual alarm occurs during remote programming
  - » Where transmission technology is integral to the control unit, reacceptance testing and supervising station transmission equipment test per Chapter 14 when executive software is changed
  - » Where the transmission technology is not integral to the control unit, supervising station transmission equipment test per Chapter 14 shall be performed

## Chapter 29

- Single and multiple station CO alarms shall be installed as follows: (29.7)
  - » Outside each separate dwelling unit sleeping area, with 21 feet of the door to a sleeping area measured along the path of travel
  - » On every level of a dwelling unit, including basements, excluding attics and crawl spacing
  - » In sleeping and guest rooms containing fuel-burning appliances
  - » Other locations, as required by code
  - » Detectors shall be located on the wall or ceiling per instructions
  - » Where multiple CO detectors are installed, they shall be interconnected so that all detectors alarm when CO is detected
- Smoke, heat, and CO alarms with nonrechargeable, nonreplaceable primary batteries shall be monitored to ensure: (29.9.2)
  - » Smoke alarms will operate for at least 10 years, including tests
  - » CO alarms will operate for the life of the sensor, not to exceed 10 years
  - » Distinctive trouble signal occurs prior to battery failure

- » Battery voltage at trouble signal can produce fire alarm signal for 4 minutes or CO alarm signal for 12 hours, followed by 7 days of trouble signal
- » Trouble signal shall be produced at least once per minute for 7 days
- » Trouble signals are allowed to be silenced for up to 12 hours
- » Visible power on indicator provided
- Secondary source shall operate the CO alarm system for 12 hours in alarm, or 24 hours in standby and 12 hours for wireless (29.9.3)
- CO detectors and alarm requirements (29.10.3)
  - » CO alarm shall be listed to UL 2034
  - » CO detector shall be listed to UL 2075 and meet sensitivity requirements of UL 2034
  - » Signals from testing shall be identical to alarms
  - » Trouble signals shall be distinct from other trouble signals
  - » CO detectors shall be replaced when they fail
- Smoke detection circuits shall not be required to lock in (29.10.6.3)
- Household fire alarm systems are permitted to be supervised by public emergency reporting systems when: (29.10.9.3)
  - » Signals from smoke and CO alarms shall be processed by household fire alarm system
  - » Signals shall at least be a general alarm signal

## IBC 2015 to 2021

- Shop drawing shall be prepared per NFPA 72 (907.1.2)
- Group A - Manual fire alarm system required where occupant load is 300 or more, *or where occupant load is more than 100 above or below the lowest level of exit discharge (added in 2021)*
- Group R-4 – Smoke alarms only required for R-4 (2015 - manual fire alarm system required)
- High Rise Buildings – Buildings with occupied floor more than 120 feet above the level of fire department vehicle access require a multi-channel voice evacuation system (907.2.13.3)
- Group R-1 and R-2 – Notification (907.5.2.1.3)
  - » Fire alarm signals in sleeping rooms and smoke alarms in sleeping rooms are required to produce a 520Hz notification signal
  - » Where sleeping room smoke alarm is unable to produce a 520Hz notification signal, the 520Hz signal shall be provided by a listed notification appliance or smoke detectors with a 520Hz sounder base
- Group R-2 – Notification - Where wired expansion for visible notification appliances per ICC A117.1 is used, the power supply and circuits shall have at least 5% excess capacity, and a single access point to the circuits shall be available on every story, and drawings shall indicate the power supply and circuit documentation to accommodate future addition of visible notification appliances (907.5.2.3.3.1)
- Group S - Manual fire alarm systems with occupant notification are required in Group S public and self-storage three stories or greater for interior corridors and common areas. (907.2.10)
  - » Visible notification is not required in storage units.
  - » Exception: Manual fire alarm boxes are not required if the building is fully sprinklered and activates fire alarm system notification appliances
- Energy Storage Systems – smoke detector or radiant energy detector is required in a room containing an energy storage system per IFC 1207.5.4 (907.2.23)

## NFPA 101 – 2015 to 2021

- Smoke alarms in sleeping rooms shall have 520Hz audible notification (9.6.2.10.3.1)
- Fire alarm notification in sleeping rooms shall be 520Hz (9.6.3.3)
- Occupancies involving two or more integrated fire protection or life safety systems shall be tested to verify the proper operation and function of the system per (9.11.4)

- » When the systems are tested, the response from the integrated system shall be tested
- » After repair or replacement of equipment, required retesting of integrated systems shall be limited to verifying response of function initiated by repaired or replaced system
- NFPA 4 testing – the following integrated systems shall be tested prior to issuance of the certificate of occupancy and at intervals not exceeding 10 years:
  - » Integrated fire protection and life safety systems in high-rise buildings
  - » Integrated fire protection and life safety systems that include smoke control
- Air Traffic Control Tower – Emergency command center required where the highest occupiable level is greater than 75 feet above the lowest level of fire department access (11.3.4.8)
- High Rise Building – Riss analysis for mass notification system required when occupant load is 5000 or more or where the highest occupiable floor is more than 420 feet above the lowest level of fire department vehicle access (11.8.4.3)
- New Assembly – Emergency forces notification (monitoring) required (12.3.4.3.8)
- New Assembly - CO detectors or alarms shall be located as follows: (12.3.4.4)
  - » On the ceiling of rooms contains a permanently installed fuel-burning appliances
  - » Centrally located within the occupiable spaces served by the first air supply register from a permanently installed fuel-burning HVAC system
  - » Centrally located within occupiable spaces adjacent to communicating attached garage
- CO detectors shall not be required in the following:
  - » Garages
  - » Within guest rooms with communicating attached garages that are open parking structures
  - » Within guest rooms with communicating attached garage that are mechanically ventilated
- New Assembly - Risk analysis required for mass notification system shall be performed when occupant load is 500 or more (12.3.4.5)
- New Education – CO detectors or alarms shall be located as follows (14.3.4.4)
  - » Installed in a centrally located location in occupiable space adjacent to attached garage with a separation wall constructed of gypsum wallboard
  - » Not required in occupiable spaces separated from attached parking garage by walls of gypsum wallboard where the garage is open parking structure or garage is mechanically ventilated
  - » Shall be installed in a room containing permanently installed fuel-burning appliances and shall transmit alarm signal to approved on-site location or off-premises location
- New Educational - Risk analysis required for all new educational (14.3.4.5)
- Existing Education – Risk analysis for mass notification is required if the building fire alarm is replaced (15.3.4.5)
- New Health Care – where private mode is used, notification appliances shall not be required in patient care areas where alarm notification adversely affects patient care (18.3.4.3.1)
- New Ambulatory Health Care – where private mode is used, notification appliances shall not be required in patient care areas where alarm notification adversely affects patient care (20.3.4.3.1)
- New Hotel and Dormitory - Smoke alarms in sleeping rooms shall have 520Hz audible notification (28.3.4.6.1)
- New Hotel and Dormitory - Fire alarm notification in sleeping rooms shall be 520Hz (28.3.4.3.2)
- New Hotel and Dormitory – CO system required where either of the following exists: (28.3.4.7)
  - » Guest rooms have communicating attached garages
  - » Guest room contains permanently installed fuel-burning appliance
- CO detectors shall be located:
  - » Outside each guest room and in the immediate vicinity of sleeping rooms
  - » On every occupiable level of a guest room, including the basement
- CO detectors shall not be required in the following:
  - » Garages
  - » Within guest rooms with communicating attached garages that are open parking structures
  - » Within guest rooms with communicating attached garage that are mechanically ventilated

- CO detectors or alarms shall be located as follows:
  - » On the ceiling of rooms contains a permanently installed fuel-burning appliances
  - » Centrally located within the occupiable spaces served by the first air supply register from a permanently installed fuel-burning HVAC system
  - » Centrally located within occupiable spaces adjacent to communicating attached garage
- CO detectors shall automatically transmit an alarm to an approved on-site location or off-premises location per NFPA 72
- New Hotels and Dormitories – Risk analysis required for a dormitory for K-12, college, or university with an occupant load greater than 100 (38.3.4.4)
- New Apartment Buildings – CO system required where either of the following exists: (30.3.4.6)
  - » Guest rooms have communicating attached garages
  - » Guest room contains permanently installed fuel-burning appliance
- CO detectors shall be located:
  - » Outside each guest room and in the immediate vicinity of sleeping rooms
  - » On every occupiable level of a guest room, including the basement
- CO detectors shall not be required in the following:
  - » Garages
  - » Within guest rooms with communicating attached garages that are open parking structures
  - » Within guest rooms with communicating attached garage that are mechanically ventilated
- CO detectors or alarms shall be located as follows:
  - » On the ceiling of rooms contains a permanently installed fuel-burning appliances
  - » Centrally located within the occupiable spaces served by the first air supply register from a permanently installed fuel-burning HVAC system
  - » Centrally located within occupiable spaces adjacent to communicating attached garage
- CO detectors shall automatically transmit an alarm to an approved on-site location or off-premises location per NFPA 72
- New Apartment Buildings - Smoke alarms in sleeping rooms shall have 520Hz audible notification (30.3.4.3.2)
- New Apartment Buildings - Fire alarm notification in sleeping rooms shall be 520Hz (30.3.4.5.1.1)
- New and Existing Residential Board and Care -- CO system required where either of the following exists: (32.3.3.4.9)
  - » Guest rooms have communicating attached garages
  - » Guest room contains permanently installed fuel-burning appliance
- CO detectors shall be located:
  - » Outside each guest room and in the immediate vicinity of sleeping rooms
  - » On every occupiable level of a guest room, including the basement
- CO detectors shall not be required in the following:
  - » Garages
  - » Within guest rooms with communicating attached garages that are open parking structures
  - » Within guest rooms with communicating attached garage that are mechanically ventilated
- CO detectors or alarms shall be located as follows:
  - » On the ceiling of rooms contains a permanently installed fuel-burning appliances
  - » Centrally located within the occupiable spaces served by the first air supply register from a permanently installed fuel-burning HVAC system
  - » Centrally located within occupiable spaces adjacent to communicating attached garage
- New Mercantile – risk analysis for mass notification required for new malls (36.4.4.7.5)
- New Business – risk analysis for mass notification shall be performed for business occupancies with classrooms where the building is owned, rented, leased, or occupied by a college or university (38.3.4.5)