The New NYC Building Code

Chapter 9 Fire Protection

New York City Department of Buildings

Technical Affairs

John H. Lee, R.A., LEED AP

Copyright Materials

“The Queens Chapter of American Institute of Architects” is a Registered Provider with the American Institute of Architects Continuing Education Systems. Credit earned on completion of this program will be reported to CES Records for AIA members. Certificates of Completion for non-AIA members are available on request.

This program is registered with the AIA/CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product. Questions related to specific materials, methods, and services will be addressed at the conclusion of the presentation.

Learning Objectives

This seminar will focus on detailed provisions of Chapter 11 Accessibility of the New 2008 New York City Building Code including the following:

- Automatic Sprinkler Protection
- Alternative Fire Extinguishing Systems
- Standpipe Systems
- Fire Alarm Systems
- Smoke Control Systems
- Appendix Q and the modified NFPA national standards

Highlight of Changes in the 2008 Building Code

- Automatic sprinkler and fire alarm systems will be required in more spaces and buildings
- The Fire Code provides guidance for alternative fire extinguishing systems.
- Almost all residential occupancies will be equipped with an automatic sprinkler system
- High-rise buildings will require secondary on-site water supplies

Section 903 Automatic Sprinkler Protection

Automatic Sprinkler Protection (903)

Sprinkler requirements based on:

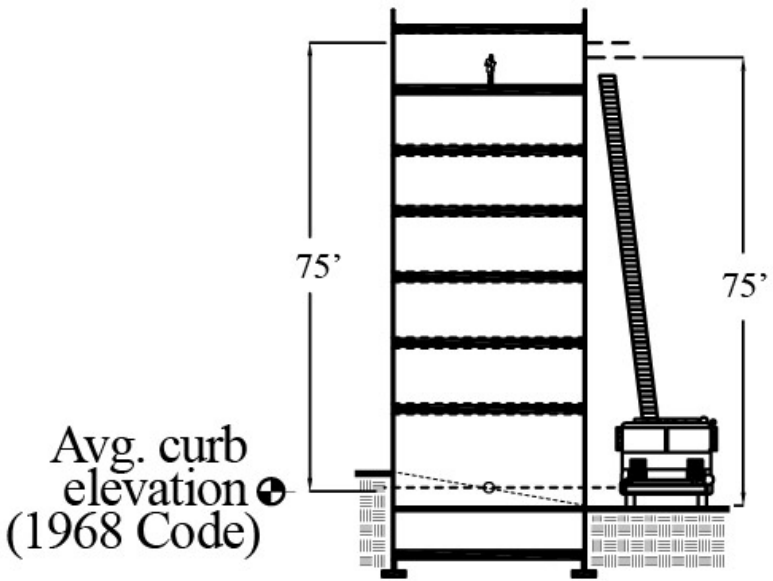
- **Occupancy classification of Fire Area**
- **Size of Fire Area**
- **Aggregate size of multiple Fire Areas**
- **Location of Fire Area relative to Lowest Level of Fire Department Vehicle access**
- **Special occupancies**
  - e.g. high-rise, atrium, underground structures

- **To meet height/area for desired construction type per Chapter 5**

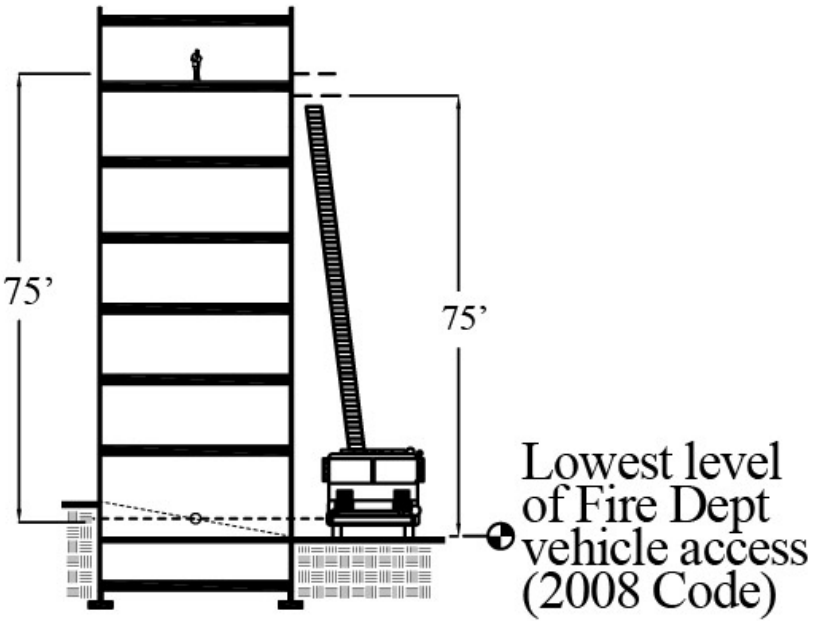
Lowest Level of Fire Department Vehicle Access

✔ = Yes, it *is* a high rise

✘ = No, it's *not* a high rise



1968 Code: ✔
2008 Code: ✘



1968 Code: ✔
2008 Code: ✔

Automatic Sprinkler Protection (903)

EXAMPLE: Automatic sprinkler system required for:

Assembly Groups A-1, A-2, A-3 and A-4
throughout the floor area where located, and all floors between the Group A occupancy and the level of exit discharge where:

- Fire area > 12,000 sq. ft. (5,000 sq. ft. in A-2).
- Fire area has an occupant load of 300 or more.
- The aggregate occupant load of all fire areas by Group A, located on any given floor other than level of exit discharge, is 300 or more.
- Group A-1 fire area contains a multi-theater complex.
- Group A-2 occupancy used as a cabaret.

Automatic Sprinkler Protection (903)

EXAMPLE: Automatic sprinkler system required for:

Mercantile Group M

throughout the *fire area* containing a Group M occupancy where :

- Fire area > 7,500 sq. ft.
- Fire area of any size is located more than 3 stories above grade.
- Fire area of any size is located in a high-rise building.
- Fire area of any size contains an unenclosed stair or escalator connecting two or more floors.

Automatic Sprinkler Protection (903)

EXAMPLE: Automatic sprinkler system required for:

Mercantile Group M

throughout the *entire building* containing a Group M occupancy where :

- Fire area > 12,000 sq. ft.
- Combined area of all Group M fire areas on all floors, including mezzanines > 24,000 sq. ft.

Automatic Sprinkler Protection (903)

Automatic sprinkler system required throughout spaces and throughout buildings with a main use or dominant occupancy of:

- **High-Hazard Group H fire areas**
- **Institutional Group I fire area**
- **Residential Group R fire area**
  - Exceptions:
    - Detached one- and two-family dwellings < 4 stories
    - Attached one- and two-family dwellings (townhouses) < 4 stories

Automatic Sprinkler Protection (903)

Buildings Over 55 Feet in Height

Automatic sprinkler system required throughout buildings with a floor level having an occupant load of 30 or more that is located 55 feet or more above the lowest level of fire department vehicle access.

Automatic Sprinkler Protection (903)

Additional Required Systems (see Chapter 4)

- Covered malls
- Special amusement buildings
- High-rise buildings
- Atriums
- Group H-2
- Flammable finishes
- Underground buildings
- Unlimited area buildings
- Group I-2
- Stages

Automatic Sprinkler Protection (903)

Sprinkler systems designed, installed and maintained in accordance with:

- **NFPA 13 – 2002, as modified for NYC**
- **NFPA 13R – 2002, as modified for NYC**
- **NFPA 13D – 2002, as modified for NYC**

Testing and maintenance per NYC Fire Code

Automatic Sprinkler Protection (903)

Quick- response and residential sprinklers as part of a required automatic sprinkler system must be installed in the following areas:

- Throughout all spaces within a smoke compartment containing patient dwelling units in Group I-2.
- Dwelling units in Group R and I-1 occupancies.
- Light hazard occupancies as defined by NFPA 13.

Automatic Sprinkler Protection (903)

Secondary Water Supply (§ 903.5.2)

A secondary on-site water supply equal to the hydraulically calculated sprinkler demand, including the hose stream requirement, shall be provided for :

1. high-rise building in Seismic Design Category C or D
2. high-rise building greater than 300 feet in height

Alternative Fire Extinguishing Systems (904)

Automatic fire-extinguishing systems, other than automatic sprinkler systems (i.e. water-based), shall be designed, installed, inspected, tested and maintained in accordance with the *Fire Code.*

Except: **Commercial cooking systems** are required to be protected by carbon dioxide or wet-chemical extinguishing systems as per the *Building Code*

Alternative Fire Extinguishing Systems (904)

Standards as per the *NYC Fire Code*:

- Dry-chemical — NFPA 17
- Wet-chemical — NFPA 17A
- Foam systems — NFPA 11 and NFPA 16
- Carbon dioxide — NFPA 12
- Halon systems — NFPA 12A
- Clean-agent — NFPA 2001
- Water-mist — NFPA 750

Standpipe Systems (905)

This section provides the conditions where standpipe systems are required and the locations for hose connections.

Standpipe systems installed in accordance with this section and **NFPA 14** as modified in Appendix Q.

Standpipe systems are permitted to be combined with automatic sprinkler systems.

Standpipe Systems (905)

Standpipe systems shall be installed throughout the following buildings:

- Buildings ≥ 2 stories and floor area ≥ 10,000 sq. ft. on any story;
- Buildings ≥ 3 stories and floor area ≥ 7,500 sq. ft. on any story;
- Buildings of any size with an occupant load of 30 or more on a floor located ≥ 55 feet above the lowest level of fire department vehicle access;
- All high-rise buildings

Standpipe Systems (905)

Standpipe systems shall be installed throughout the following buildings:

- Nonsprinklered Group A with occupant load > 1,000
- Covered mall buildings
- Stages
- Underground buildings
- Helistops

Fire Alarm Systems (907)

A few highlights of the new code:

- Installations in accordance with **NFPA 72**, as modified for NYC in Appendix Q
- Mechanical and electrical equipment rooms of *any* size must be equipped with smoke detectors connected to a fire alarm system
- Smoke detectors must be installed in elevator lobbies.

Fire Alarm Systems (907)

Construction documents must include at least:

1. A floor plan that indicates the use of all rooms.
2. Locations of alarm-initiating and notification appliances.
3. Alarm control and trouble signaling equipment.
4. Annunciation.
5. Power connection.
6. Fire alarm riser diagram and all fire alarm devices indicated on the floor plans
7. Copies of any variances granted by the department or the Fire Department.
8. Legend of all fire alarm symbols and abbreviations.
9. Design criteria for fire alarm audibility in various occupancies indicated on plans.
10. Fire alarm sequence of operation for the fire alarm control panel and the central station transmitter.
11. The interface of fire safety control functions.

Fire Alarm Systems (904)

Fire alarm requirements based on:

- **Occupancy classification of Fire Area**
- **Occupant load of Fire Area**
- **Location of Fire Area relative to Lowest Level of Fire Department Vehicle access**
- **Special occupancies**
  - e.g. high-rise, underground structures

Fire Alarm Systems (907)

Where an automatic fire alarm system is required, selective coverage **smoke detectors** shall be located as follows, unless partial or total coverage automatic detection is specified:

1. In each mechanical equipment, electrical, transformer, telephone equipment or similar room, in elevator machine rooms, and in elevator lobbies.

2. In air distribution systems (see Section 606 of the *Mechanical Code*).

Fire Alarm Systems (907)

A manual and automatic fire alarm system shall be installed in:

- Group A with occupant load of 300 or more
- Group B and M with an occupant load $\geq$ 500, or > 100 above or below lowest level of exit discharge
- Group E occupancies
- Group F occupancies $\geq$ 2 stories and occupant load $\geq$ 100, or when $\geq$ 25 persons above/below lowest level of exit discharge
- High-Hazard Group H
- Institutional Group I
- Mercantile Group M
- Residential Group R (with exceptions)

Fire Alarm Systems (907)

Smoke detectors within dwelling units in R-1 occupancies

Smoke detectors and audible notification appliances shall be installed in dwelling units and shall be annunciated by dwelling unit at a constantly attended location from which the fire alarm system is capable of being manually activated. Smoke detectors are required in the following areas:

1. In sleeping areas.
2. In every room in the path of means of egress from the sleeping area to the door leading from the dwelling unit.
3. In each story within a dwelling unit, including below-grade stories.

Fire Alarm Systems (907)

Smoke detectors in R-2 occupancies

An automatic fire alarm system without alarm notification in Group R-2 occupancies, other than student apartments.

The activation of any detector shall initiate a signal at a central station or a constantly attended location. Smoke detectors located as follows:

1. Mechanical equipment, electrical, transformer, telephone equipment or similar room greater than 75 sq. ft.
2. In air distribution systems per *NYC Mechanical Code.*
3. In elevator machine rooms and in elevator lobbies.

Fire Alarm Systems (907)

Smoke detectors in R-2 occupancies

Where the main use of dominant occupancy of a building is classified as R-2 student apartment, fire alarm system installed in accordance with the requirements for R-1 occupancies.

Where the building is occupied *partially* by Group R-2 student apartments (more than 15 student apartments), manual fire alarm system must be installed throughout all public corridors serving student apartments and student related uses including recreation rooms, lounges, dining rooms, laundry rooms and storage rooms.

.

Fire Alarm Systems (907)

Single and Multiple-station smoke alarms

Required in Groups R-2, R-3 and I-1 located as follows:

1. On the ceiling or wall outside of each room used for sleeping purposes within 15 feet from the door to room.
2. In each room used for sleeping purposes.
3. In each story within a dwelling unit, including below-grade stories and penthouses of any area.

Within an individual dwelling unit, the smoke alarms or detectors shall be *interconnected* in such a manner that activation of one alarm activates all alarms.

Fire Alarm Systems (907)

An emergency voice/alarm communications system required in:

- Group A with occupant load $\geq$ 1,000
- Special amusement buildings
- Covered mall buildings
- Atriums
- High-rise buildings

Exceptions:

1. Group I-1 and I-2 occupancies.
2. Group R-2 occupancies*

Fire Alarm Systems (907)

Emergency voice/alarm communications system

Operation of initiating devices shall automatically sound an alarm tone followed by live voice instructions giving approved information and directions on a general or selective basis to the following areas on a minimum of the alarming floor, floor above and floor below:

1. Elevator lobbies.
2. Corridors.
3. Rooms and tenant spaces exceeding 1,000 sq. ft.
4. Dwelling units in R-1 occupancies.
5. Areas of rescue assistance.

Emergency Alarm Systems (908)

This section provides the requirements for alarms to detect and notify of emergency conditions in Group H occupancies.

- Emergency alarms in a Hazardous Production Material facility.
- Gas detection systems in spaces storing or using highly toxic and toxic gases.
- Gas detection systems in ozone gas-generator rooms.
- Flammable-gas detection systems in repair garages.
- Refrigerant detector with an audible/visual alarm in machinery rooms.

Smoke Control Systems (909)

This section provides the requirements for smoke control systems in the following conditions:

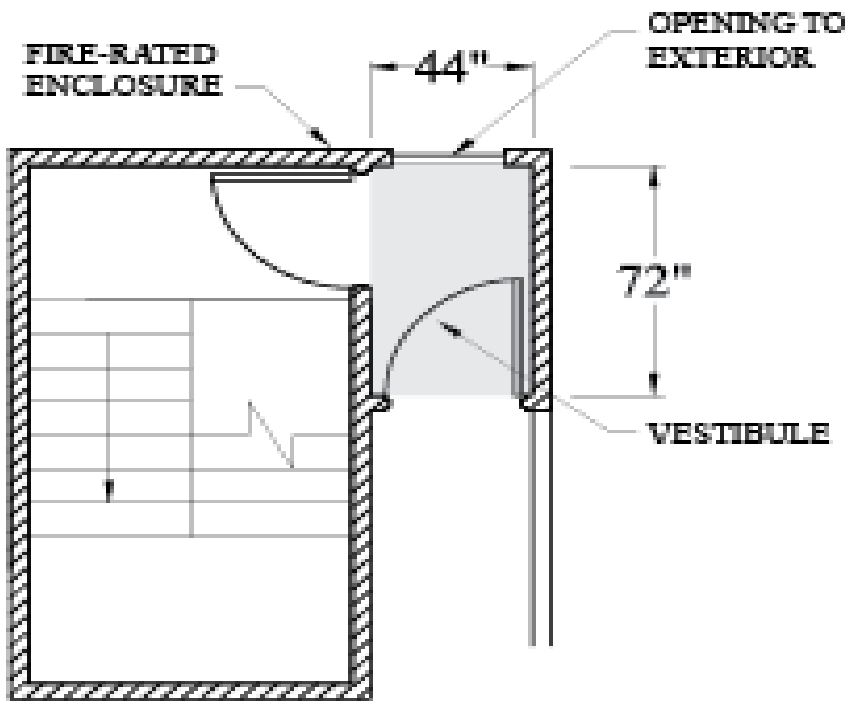
- Atrium buildings
- Covered malls
- Stages
- Underground buildings
- Smokeproof enclosures

Smoke Control Systems (909)

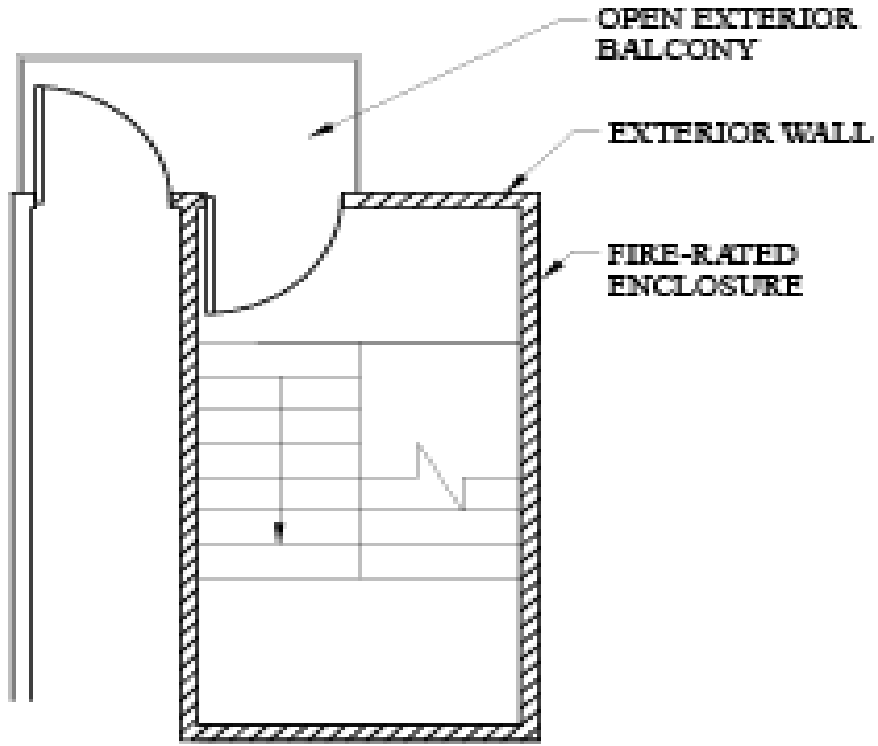
Smokeproof enclosures in high-rise buildings consisting of an enclosed interior exit stairways, each provided with one of the following:

- An open exterior balcony
- A naturally ventilated vestibule (2-hr rated)
- A mechanically ventilated vestibule (2-hr rated)
- Pressurization within the stairway

Smoke Control Systems (909)



NATURALLY VENTILATED
VESTIBULE



OPEN EXTERIOR BALCONY

Smoke Purge Systems (912)

- Capability to exhaust smoke from occupied spaces via dedicated equipment, the HVAC system or other openings
- Required in the following occupancies:

- High-rise buildings
  - Exception for R-2 with operable windows or smokeproof enclosures
- Buildings with any story > 50,000 sq. ft.
- Spaces > 100 ft from natural ventilation openings.
- High piled stock or rack storage (see Fire Code).

QUESTIONS?

This concludes The American Institute of Architects Continuing Education Systems Program

AIA Queens
P.O. Box 504
Borough Hall Station
Jamaica, NY 11424
718-997-8177
lisa@awarchitecture.us