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Building / Elevator Code Coordination Examples of Sprinkler, Heat and Smoke Detector Locations for Elevators

Revision Date: 6-4-2019 Revision to previous memos dated 10-20-2015, 2-17-2015, 1-1-2013, 2-18-2005 and 12-1-1999.

Subject of 6-4-2019 revision:

Updated to include new codes for traction elevators in buildings having building-code-applies date on or after May 1, 2018 therefore utilizing the 2015 IBC codes and 2013 NFPA 13 and NFPA 72 standards.
Add information regarding codes for Fire Service Access Elevators and Occupant Evacuation Elevators.

Subject of 10-20-2015 revision:

Renumbered Case 4b to Case 4b-2, added Cases 4b-1 for MRL traction elevator with combustible hoistway.
Renumbered Case 4d to Case 4d-1, added Cases 4d-2 for MRL/ITP elevator with non-combustible hoistway.

Purpose:

To assist in determining the fire sprinklering, heat detector and smoke detector locations within elevator hoistways, machine rooms, machinery spaces, control rooms and control spaces based on the current and most recent previous editions of the applicable codes. Requirements vary depending on the codes in effect, whether the elevator is a passenger or freight elevator, utilizes an electric traction or hydraulic drive system located in a machine room or in the hoistway, has a combustible or non-combustible hoistway and if the building or part of the building is sprinklered per NFPA 13 or NFPA 13R.

New Buildings:

This document is intended for application to new buildings with partial or full sprinkler systems. For new buildings that are unsprinklered, sprinklers, heat detectors and shunt trip disconnect systems are not required.

Existing Buildings:

Requirements to add sprinklers in existing buildings may depend upon changes in use or occupancy, additions, exit distances, requirements of other code authorities or other factors. Requirements to add sprinklers are not part of elevator modernizations because sprinklering requirements do not originate in the elevator code. To determine sprinkler requirements in existing buildings, consult with the appropriate building code or fire code official.

Where installing sprinklers in new or existing elevator machine rooms, at the top of hoistways or in elevator pits where sprinkler activation would effect elevator operation, SPS 318.1708(3)(a) and (f) require installation of the current version of firefighters emergency operation and table SPS 318.1013-4, Item 8 requires installation of a shunt trip disconnect system. A permit applied for by a licensed elevator contractor and an inspection are required prior to beginning the project.

Removing or delaying the connection of new sprinkler heads requires the written approval of the appropriate building code or fire code authority, not the elevator code authority.

Code Editions:

This document and corresponding code application and enforcement are based on:

Code	Building Code Applies Date prior to May 1, 2018	Building Code Applies Date on or after May 1, 2018
Wisconsin Commercial Building Code SPS 362	Aug. 2014	Apr. 2018
The adopted IBC – International Building Code	2009	2015
Wisconsin Existing Commercial Building Code SPS 366	Aug. 2014	Apr. 2018
IEBC – International Existing Building Code	2009	2015
NFPA 13 and NFPA 13R Fire Sprinkler Codes	2007	2013
NFPA 72 Fire Alarm Code	2007	2013
Wisconsin Elevators Escalators and Lift Devices Code SPS 318	Aug. 2014	Aug. 2014
The adopted ASME A17.1 National Elevator Code	2013	2013

Determining the Building Code Applies Date:

This date is not based on any documentation related to the elevator. This date is determined based upon receipt of certain building plans for building plan review. Often this date is related to the initial footing and foundation plans being received for review but could be based upon building shell or complete building plan submittal. For buildings reviewed by DSPS, the Code Applies Date will be stated near the middle of the first page of the conditional approval letter along with other details of the project such as occupancy type. For buildings reviewed by other agencies such as local code officials or the state Department of Health Services, the approval letter or building permit may be missing this information. The building plan reviewer will have to be contacted to provide the building code applies date.

Specific Codes:

NFPA 13 (2013), 8.15.5. Elevator Hoistways and Machine Rooms.

8.15.5.1. Sprinklers in elevator pits to be sidewall type not more than 2 feet above the pit floor.

8.15.5.2. Where a hoistway is non-combustible and the elevator is not hydraulic, the pit sprinkler may be omitted.

NEW 8.15.5.3. Sprinklers are no longer required in elevator machine rooms, machinery rooms, control rooms, control spaces or hoistways for traction elevators installed to meet the building code and where (1) the elevator spaces are dedicated to elevator equipment only, (2) the elevator spaces are protected by smoke detectors, (3) the elevator spaces are separated from the rest of the building as required by the building code, (4) The elevator spaces are not used for storage of non-elevator-related materials and (5) the elevator is not hydraulic.

8.15.5.4. Temperature ratings for sprinklers in elevator machine rooms or at the tops of hoistways shall be of ordinary or intermediate temperature rating. Glass bulbs will be orange, red, yellow or green and of the commercial, not residential type.

NEW 8.15.5.7.1. Where the suspension means for a traction elevator do not meet the FT-1 fire test rating, the top and pit of the hoistway must be sprinklered.

NEW 8.15.5.7.2. Where the suspension means for a traction elevator meet the FT-1 fire test rating, the hoistway is not required to be sprinklered.

NFPA 72 (2013), Chapter 17. Initiating Devices

17.4.10. To protect an object or space, the detector shall be placed in close proximity to the object or space. In an elevator lobby where the ceiling is in excess of 15 feet, the detector may be placed on a side wall above and within 60 inches of the top of the elevator hoistway door.

17.7.3.2.4.2. See this section for spot-type smoke detection for ceilings with beams or pockets, for corridors of 15 feet in width or less and for rooms of 900 square feet or less.

NFPA 72 (2013), 21.2. General

21.2.4. The relays necessary for connection of the fire alarm system to the elevator controller for firefighters emergency operation must be located within 3 feet of the elevator controller.

Per ASME A17.1, 2.27.3.2.7(c) these relays are not permitted to be accessed through the elevator hoistway. Provisions must be made to access the relays from the landing with the ITP. The relays may be enclosed in wall-mounted or recessed boxes or panels, above the ceiling with access provided, or in rooms or other spaces within 3 feet of the ITP accessible to fire alarm servicing personnel.

NFPA 72 (2013), 21.3. Elevator Recall for Firefighters' Emergency Operation.

21.3.5. Initiating devices in elevator lobbies are required to be within 21 feet horizontally of the centerline of elevator hoistway doors for elevator firefighters emergency operation.

NEW SPS 362.0907(5). New requirements have been provided in NFPA 72, 21.3.7(2) for heat detection and smoke detection of elevator pits however Wisconsin has not adopted these changes. Smoke detection in pits is dependent on using smoke detectors specifically listed for elevator pits (21.3.8) however detectors with this specific listing are not available at this time. Heat detection in sprinklered pits is not required at this time due to incompatibility with 17.6.3.1.3.1.

21.3.9 and ASME A17.1, 2.27.3.2.1. Initiating devices for firefighters emergency operation are shown in this document as smoke detectors. If the environment is not suitable for smoke detectors, other automatic fire detection (heat detectors) shall be permitted.

NFPA 72 (2013), 21.4. Elevator Shutdown (shunt trip).

21.4.1. Heat detectors for elevator shutdown prior to sprinkler operation must have a lower temperature and higher sensitivity compared to the sprinkler.

21.4.2. Heat detectors for elevator shutdown are required within 2 feet of each sprinkler head that could discharge water onto the elevator.

21.4.3. Water flow switches can be used in place of heat detectors but are not common.

IBC (2015), Section 202. A penthouse is an enclosed, unoccupied structure above the roof of a building, other than a tank, tower, spire, dome, cupola or bulkhead.

Combustible or non-combustible construction is defined as follows: If a wall or ceiling assembly contain only materials considered non-combustible such as drywall attached to steel studs or steel joists, the assembly is considered non-combustible. A hoistway entirely of such assemblies is considered non-combustible. If any part of an assembly is combustible such as drywall attached to wood studs or wood joists, the assembly and therefore the hoistway are considered combustible.

Fire Service Access Elevators – IBC Section 3007

Per IBC 403.6.1, buildings with an occupied floor more than 120' above the lowest level of fire department vehicle access must have the single elevator (if there is only one elevator), or at least two elevators (if there are two or more elevators) equipped as Fire Service Access elevators meeting Section 3007.

Per IBC 3007.2.1, automatic sprinklers shall not be installed in elevator machine rooms, machinery spaces, control rooms, control spaces and elevator hoistways of Fire Service Access elevators.

Per IBC 3007.4, because Fire Service Access elevators will not have sprinklers, they also shall not have shunt trip disconnects.

Also see NFPA 72, 21.5 for additional requirements for Fire Service Access Elevators.

The cases in this document do not apply to Fire Service Access elevators. Although not sprinklered, Fire Service Access elevator spaces may have smoke detectors.

Fire Service Access elevators should not be confused with elevators equipped with firefighters emergency operation which is sometimes referred to as "fire service".

Occupant Evacuation Elevators – IBC Section 3008

Elevators meeting IBC Section 3008 may be used by the general public for self-evacuation.

Per IBC 3008.2.1, automatic sprinklers shall not be installed in elevator machine rooms, machinery spaces, control rooms, control spaces and elevator hoistways of Occupant Evacuation elevators.

Per IBC 3008.4, because Occupant Evacuation elevators will not have sprinklers, they also shall not have shunt trip disconnects.

Also see NFPA 72, 21.6 for additional requirements for Occupant Evacuation Elevators.

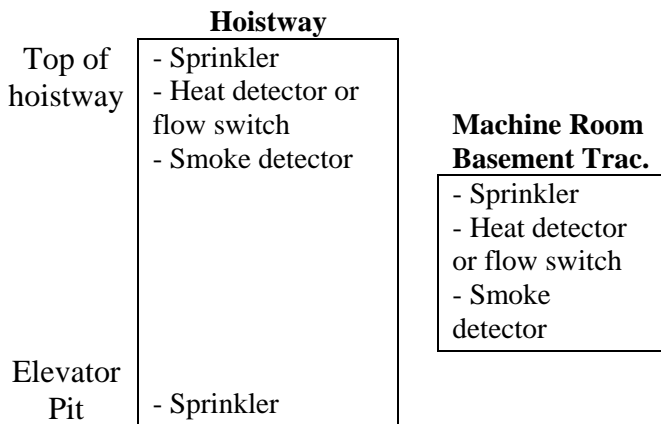
The cases in this document do not apply to Occupant Evacuation elevators. Although not sprinklered, Occupant Evacuation elevator spaces may have smoke detectors.

Occupant Evacuation elevators should not be confused with accessible-means-of-egress elevators addressed in IBC 1009.2.1.

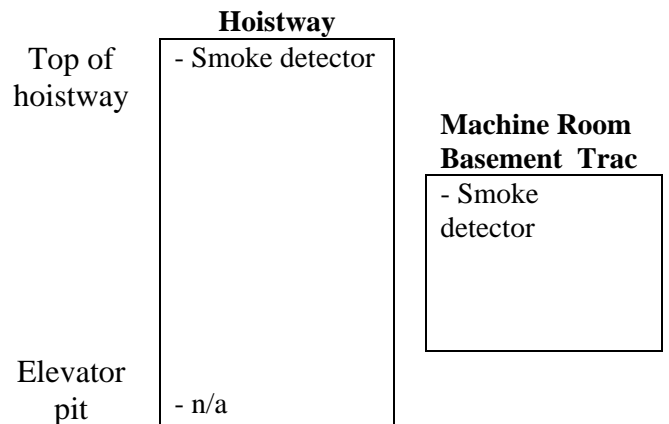
Case 1a: Building completely sprinklered per NFPA 13.

- passenger or freight elevator
- combustible hoistway
- electric traction elevator
- machine room on any level, not in penthouse
- smoke detector also at each landing

Building Code Applies Date Prior to May 1, 2018,
or After without FT-1 Rated Suspension Means

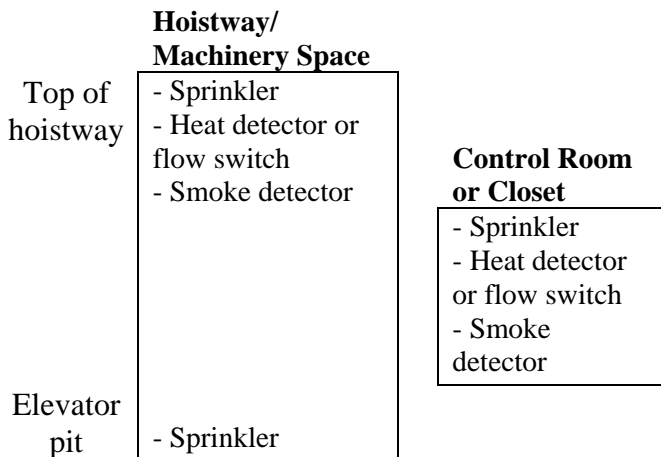


Building Code Applies Date On or After May 1, 2018
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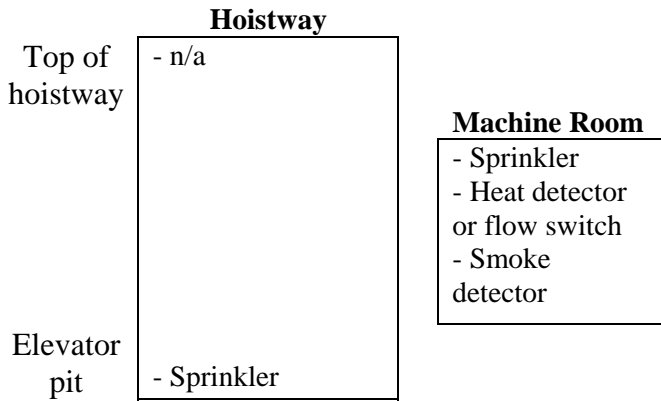
Case 1b: Building completely sprinklered per NFPA 13.

- passenger or freight elevator
- combustible hoistway
- hydraulic elevator
- machine room on any level, not in penthouse
- smoke detector also at each landing



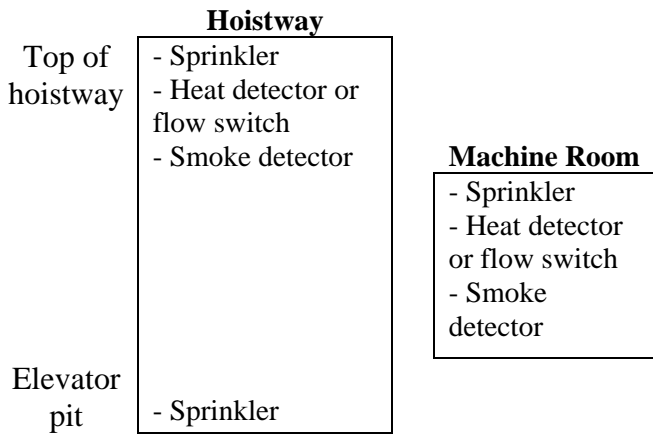
Case 2: Building completely sprinklered per NFPA 13.

- passenger elevator
- non-combustible hoistway
- hydraulic elevator
- machine room on any level, not in penthouse
- smoke detector also at each landing



Case 2a: Building completely sprinklered per NFPA 13.

- freight elevator
- non-combustible hoistway
- hydraulic elevator
- machine room on any level, not in penthouse
- smoke detector also at each landing



Case 3: Building completely sprinklered per NFPA 13.

- passenger or freight elevator
- combustible hoistway
- electric traction elevator
- penthouse machine room
- smoke detector also at each landing

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	Machine Room
	<ul style="list-style-type: none"> - Sprinkler - Heat detector or flow switch - Smoke detector
Top of hoistway	Hoistway
	<ul style="list-style-type: none"> - Sprinkler - Heat detector or flow switch - Smoke detector
Elevator pit	<ul style="list-style-type: none"> - Sprinkler

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	Machine Room
	<ul style="list-style-type: none"> - Smoke detector
Top of hoistway	Hoistway
	<ul style="list-style-type: none"> - Smoke detector
Elevator pit	<ul style="list-style-type: none"> - n/a

Case 4: Building completely sprinklered per NFPA 13.

- passenger elevator
- non-combustible hoistway
- electric traction elevator
- penthouse machine room
- smoke detector also at each landing

Building Code Applies Date Prior to May 1, 2018,
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	Machine Room
	<ul style="list-style-type: none"> - Sprinkler - Heat detector or flow switch - Smoke detector
Top of hoistway	Hoistway
	<ul style="list-style-type: none"> - n/a
Elevator pit	<ul style="list-style-type: none"> - n/a

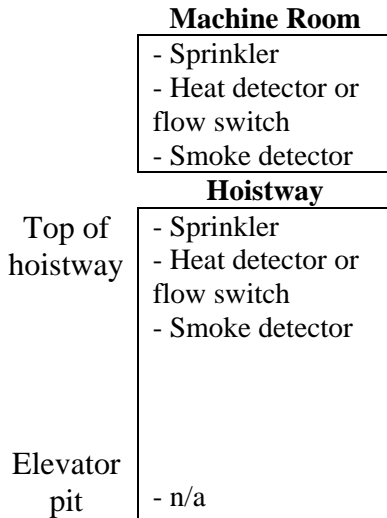
Building Code Applies Date On or After May 1, 2018
with FT-1 Rated Suspension Means

	Machine Room
	<ul style="list-style-type: none"> - Smoke detector
Top of hoistway	Hoistway
	<ul style="list-style-type: none"> - Smoke detector
Elevator pit	<ul style="list-style-type: none"> - n/a

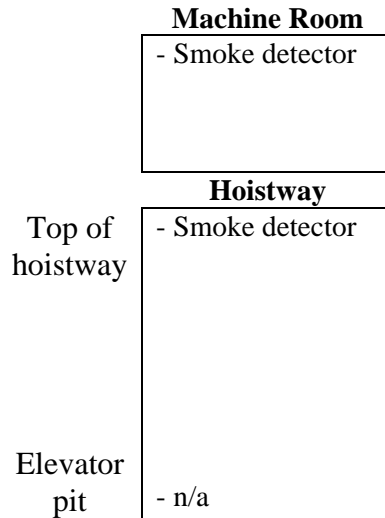
Case 4a: Building completely sprinklered per NFPA 13.

- freight elevator
- non-combustible hoistway
- electric traction elevator
- penthouse machine room
- smoke detector also at each landing

Building Code Applies Date Prior to May 1, 2018,
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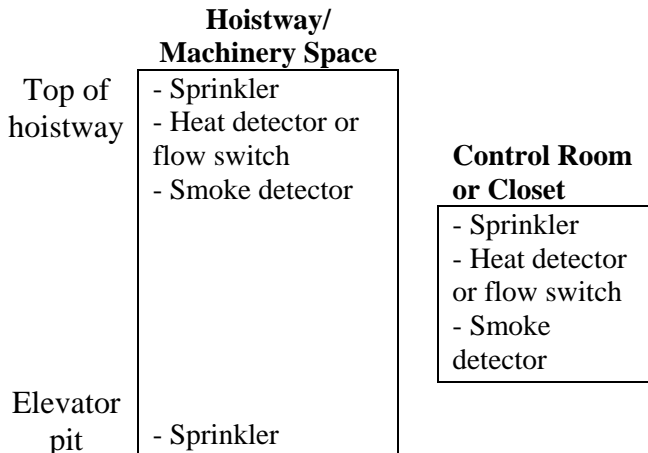
Building Code Applies Date On or After May 1, 2018
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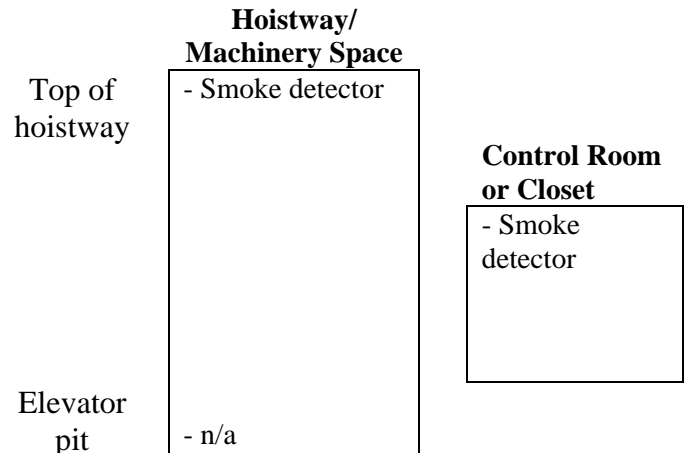
Case 4b-1: Building completely sprinklered per NFPA 13.

- passenger elevator
- combustible hoistway
- machine-room-less electric traction elevator, machine at top of hoistway
- controller in control room or control closet on any floor level
- smoke detector also at each landing

Building Code Applies Date Prior to May 1, 2018,
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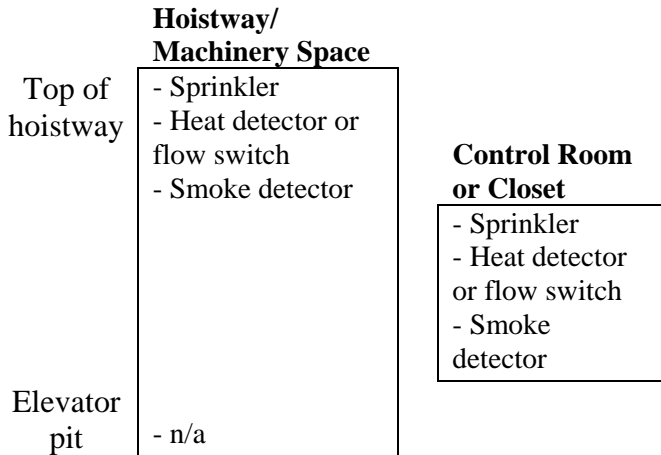
Building Code Applies Date On or After May 1, 2018
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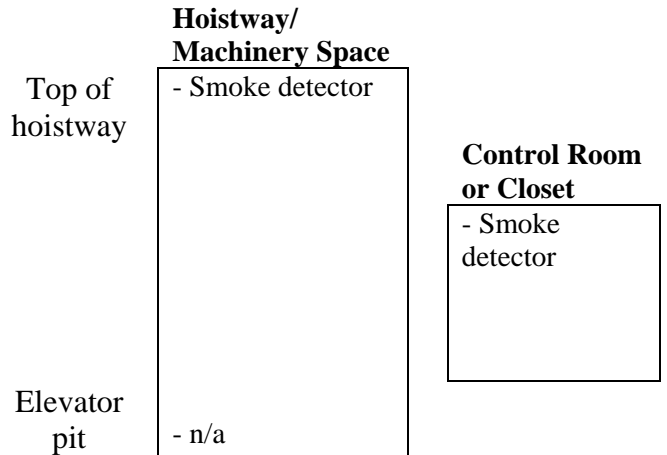
Case 4b-2: Building completely sprinklered per NFPA 13.

- passenger elevator
- non-combustible hoistway
- machine-room-less electric traction elevator, machine at top of hoistway
- controller in control room or control closet on any floor level
- smoke detector also at each landing

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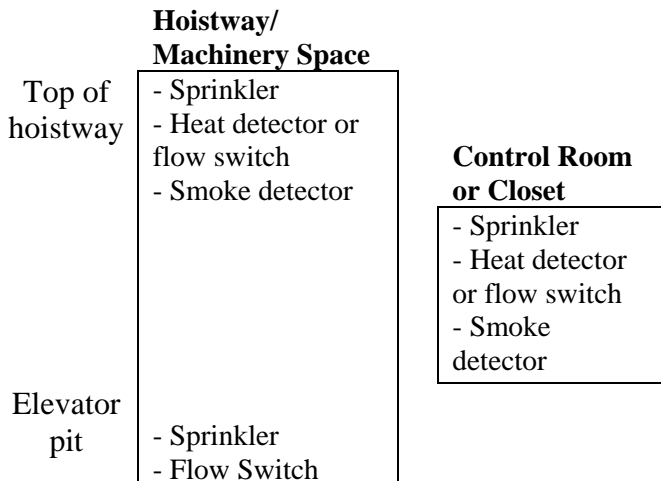
Building Code Applies Date On or After May 1, 2018
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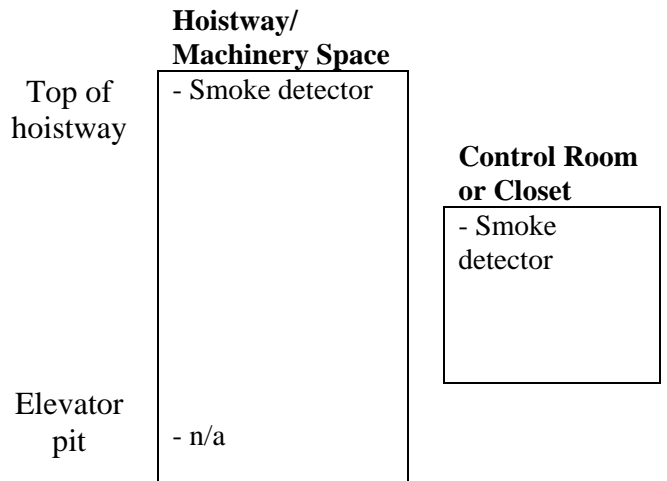
Case 4c: Building completely sprinklered per NFPA 13.

- passenger elevator
- combustible or non-combustible hoistway
- machine-room-less electric traction elevator, machine at bottom of hoistway
- controller in control room or control closet on any floor level
- smoke detector also at each landing

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Building Code Applies Date On or After May 1, 2018
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Case 4d-1: Building completely sprinklered per NFPA 13.

- passenger elevator
- combustible hoistway
- electric traction elevator
- machine and some control equipment at top of hoistway and an inspection and test panel (ITP) in an elevator hoistway door frame
- smoke detector also at each landing

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	Hoistway/ Machinery Space
Top of hoistway	- Sprinkler - Heat detector or flow switch - Smoke detector
Elevator pit	- Sprinkler

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	Hoistway/ Machinery Space
Top of hoistway	- Smoke detector
Elevator pit	- n/a

Case 4d-2: Building completely sprinklered per NFPA 13.

- passenger elevator
- non-combustible hoistway
- electric traction elevator
- machine and some control equipment at top of hoistway and an inspection and test panel (ITP) in an elevator hoistway door frame
- smoke detector also at each landing

Building Code Applies Date Prior to May 1, 2018,
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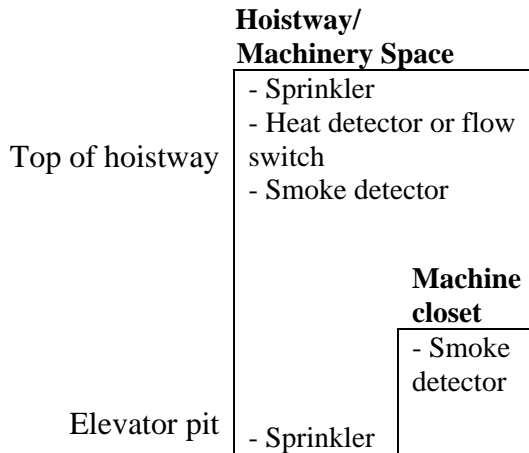
	Hoistway/ Machinery Space
Top of hoistway	- Sprinkler - Heat detector or flow switch - Smoke detector
Elevator pit	- n/a

Building Code Applies Date On or After May 1, 2018
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	Hoistway/ Machinery Space
Top of hoistway	- Smoke detector
Elevator pit	- n/a

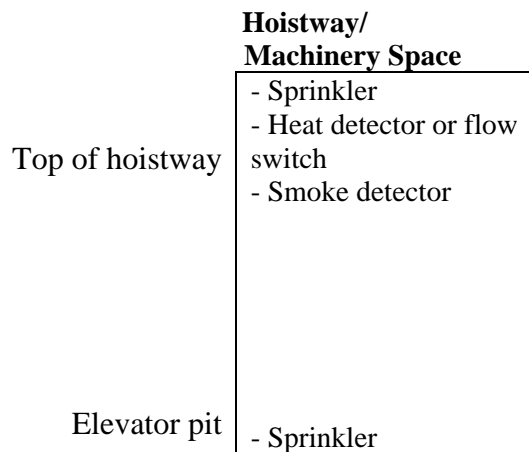
Case 4e: Building completely sprinklered per NFPA 13.

- passenger elevator
- combustible or non-combustible hoistway
- machine-room-less hydraulic elevator
- hydraulic tank extending to pit floor with machine/control equipment in hoistway accessed at or above floor level of lowest landing
- smoke detector also at each landing



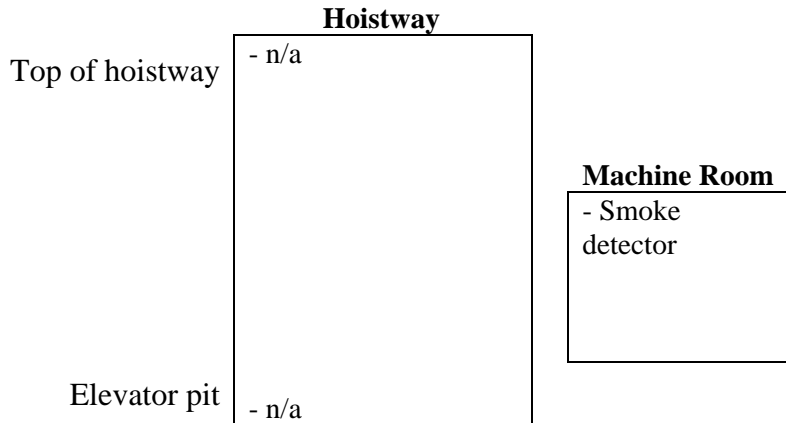
Case 4f: Building completely sprinklered per NFPA 13.

- passenger elevator
- combustible or non-combustible hoistway
- machine-room-less hydraulic elevator
- hydraulic tank in pit with machine/control equipment in hoistway and inspection and test panel (ITP) in an elevator hoistway door frame
- smoke detector also at each landing



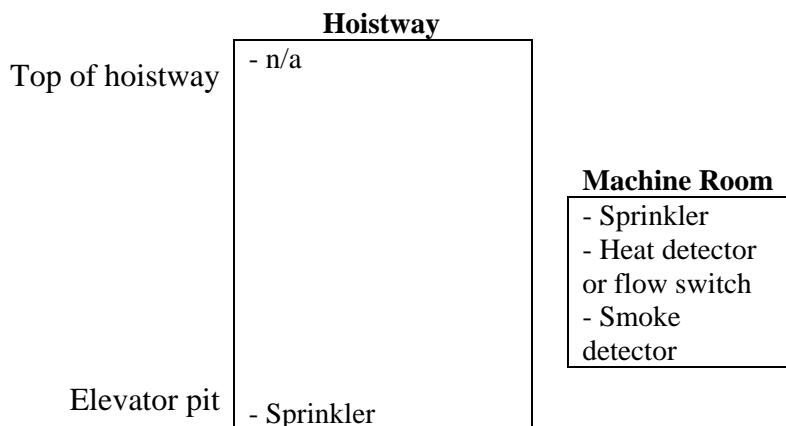
Case 5: Building sprinklered per NFPA 13R.

- passenger elevator
- R-2 occupancy with dwelling units in basement level
- non-combustible hoistway
- electric or hydraulic elevator.
- machine room on any level
- smoke detector also at each landing



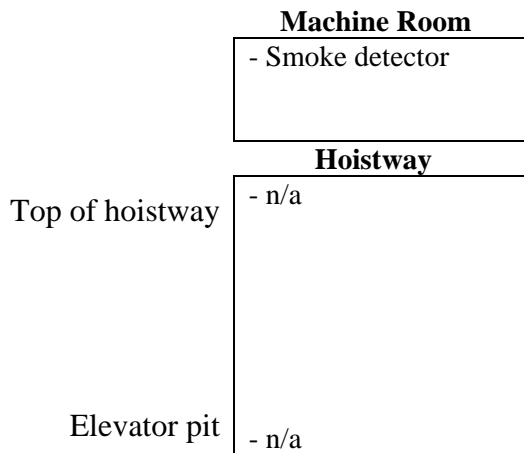
Case 6: Building sprinklered per NFPA 13R.

- passenger elevator
- non-combustible hoistway
- hydraulic elevator.
- machine room on lowest level
- R-2 occupancy on lowest level
- Parking sprinklered per NFPA 13 on lowest level
- smoke detector also at each landing



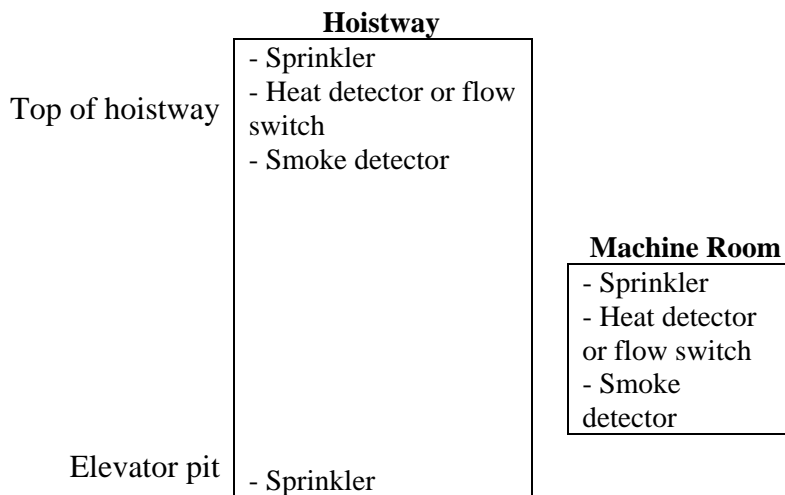
Case 7: Building sprinklered per NFPA 13R.

- passenger elevator
- combustible or non-combustible hoistway
- electric traction elevator
- penthouse machine room
- lowest level with fire department access openings
- R-2 occupancy in lowest level
- smoke detector also at each landing



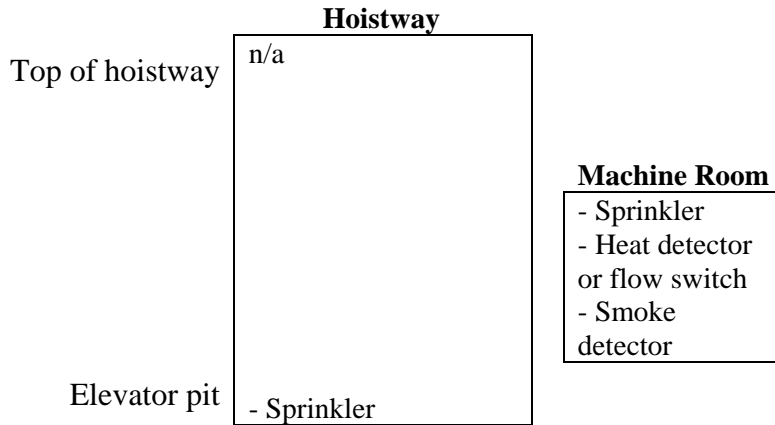
Case 8: Building partially sprinklered per NFPA 13R.

- passenger elevator
- combustible hoistway
- hydraulic elevator.
- machine room on lowest level
- lowest level sprinklered per NFPA 13 because of windowless floor level or parking
- smoke detector also at each landing



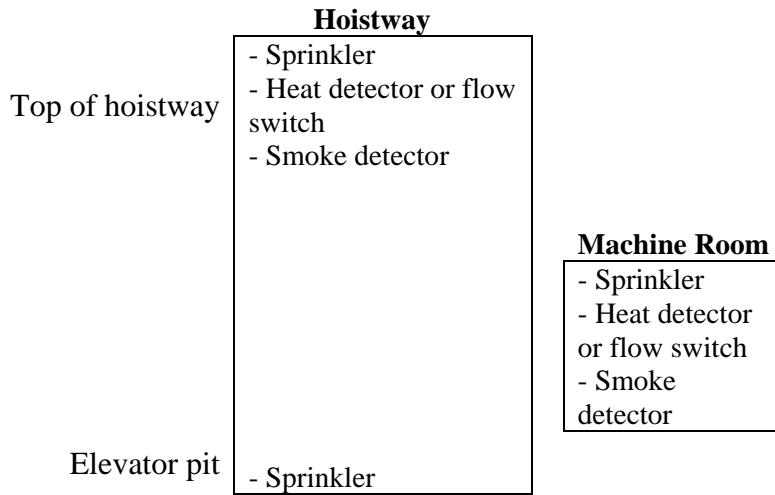
Case 9: Building partially sprinklered per NFPA 13R.

- passenger elevator
- non-combustible hoistway
- hydraulic elevator.
- machine room on lowest level
- lowest level sprinklered per NFPA 13 because of windowless floor level or parking
- smoke detector also at each landing



Case 9a: Building partially sprinklered per NFPA 13R.

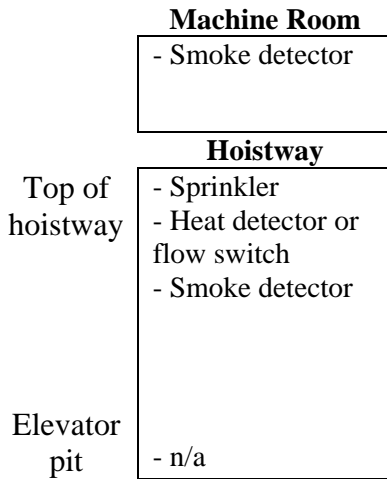
- freight elevator
- non-combustible hoistway
- hydraulic elevator.
- machine room on lowest level
- lowest level sprinklered per NFPA 13 because of windowless floor level or parking
- smoke detector also at each landing



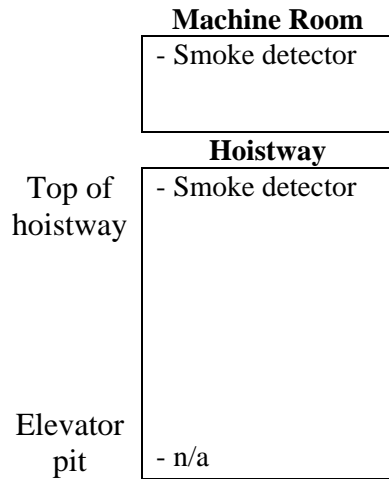
Case 10: Building partially sprinklered per NFPA 13R.

- passenger or freight elevator
- combustible hoistway
- electric traction elevator
- penthouse machine room
- lowest level sprinklered per NFPA 13 because of windowless floor level or parking
- smoke detector also at each landing

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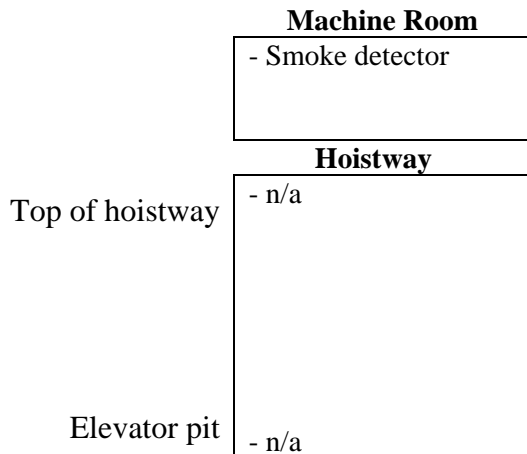


Building Code Applies Date On or After May 1, 2018
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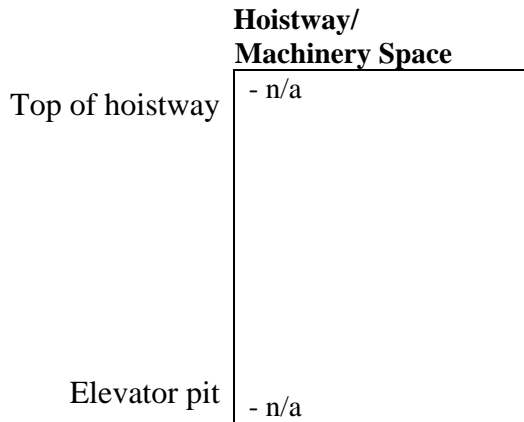
Case 11: Building partially sprinklered per NFPA 13R.

- passenger elevator
- non-combustible hoistway
- electric traction elevator
- penthouse machine room
- lowest level sprinklered per NFPA 13 because of windowless floor level or parking
- smoke detector also at each landing



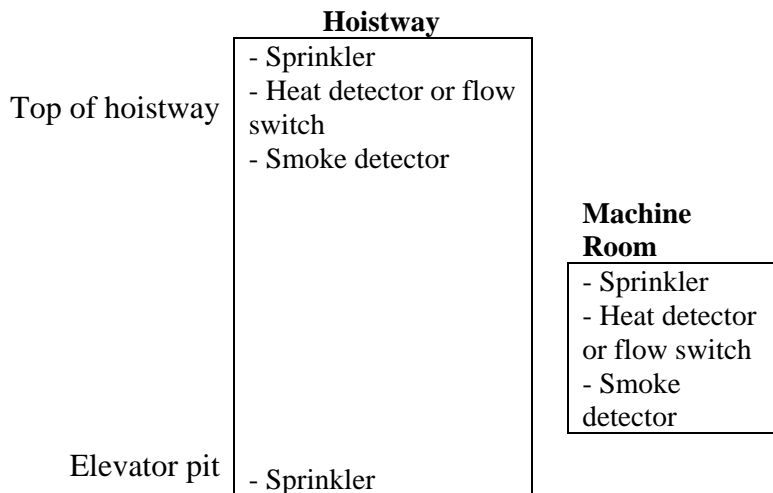
Case 11a: Building partially sprinklered per NFPA 13R.

- passenger elevator
- non-combustible hoistway
- electric traction elevator
- machine and some control eq. at top of hoistway and an inspection and test panel (ITP) in an elevator hoistway door frame
- lowest level sprinklered per NFPA 13 because of windowless floor level or parking
- smoke detector also at each landing



Case 12: Building partially sprinklered per NFPA 13.

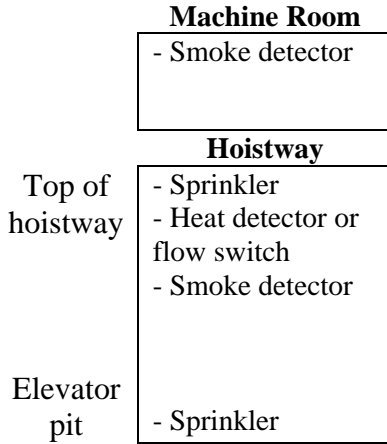
- passenger elevator
- combustibile hoistway
- hydraulic elevator.
- machine room on lowest level
- lowest level sprinklered per NFPA 13 because of windowless floor level
- smoke detector also at each landing



Case 13: Building partially sprinklered per NFPA 13.

- passenger elevator
- combustible hoistway
- electric traction elevator
- penthouse machine room
- lowest level sprinklered per NFPA 13 because of windowless floor level
- smoke detector also at each landing

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Building Code Applies Date On or After May 1, 2018
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