



COORDINATING ELEVATOR, SPRINKLER AND FIRE ALARM REQUIREMENTS

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APPLICABLE CODES

•ASME A17.1 – Safety Code for Elevators and Escalators – 2019 Edition



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APPLICABLE CODES

- International Building Code – 2021 Edition
- International Fire Code – 2021 Edition



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APPLICABLE CODES

- NFPA 13 – Standard for the Installation of Sprinkler Systems – 2022 Edition



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APPLICABLE CODES

- National Fire Alarm and Signaling Code – 2022 Edition



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IMPORTANT DEFINITIONS

·Elevator, Passenger – An elevator used primarily to carry persons other than the operator and persons necessary for loading and unloading.



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IMPORTANT DEFINITIONS

·Elevator, Freight – An elevator used primarily for carrying freight and on which only the operator and the persons necessary for unloading and loading the freight are permitted to ride.



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IMPORTANT DEFINITIONS

·Phase I Emergency Recall Operation – The operation of an elevator where it is automatically or manually recalled to the recall level and removed from normal service because of activation of firefighter's emergency operation.



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IMPORTANT DEFINITIONS

•Phase II Emergency In-Car Operation – The operation of an elevator by firefighters where the elevator is under their control.



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IMPORTANT DEFINITIONS

•Designated level – The main floor or other floor level that best serves the needs of the emergency personnel for firefighting or rescue purposes identified by the building code or fire authority.



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IMPORTANT DEFINITIONS

•Alternate level – A floor level identified by the building code or fire authority, other than the designated level.



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IMPORTANT DEFINITIONS

•Recall level – The designated or alternate level that cars are returned to when Phase I Emergency Recall Operation is activated.



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TYPES OF ELEVATORS

•Hydraulic



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TYPES OF ELEVATORS

•Traction



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TYPES OF ELEVATORS

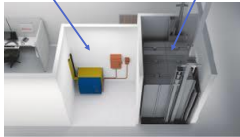
•Machine Room-Less (MRL)



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MRL BENEFITS

Machine Room Hoistway



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MRL BENEFITS

More usable space MRL Hoistway



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MACHINE ROOM LESS ELEVATORS

- Otis – GeN2
- Machine located in the overhead hoistway



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MACHINE ROOM LESS ELEVATORS

- ThyssenKrupp - ISIS
- Machine located in the pit



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MACHINE ROOM LESS ELEVATORS

- KONE – Monospace
- Machine under guide rail at top floor



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ASME A17.1

- Firefighters' Emergency Operation (FEO)
- Section 2.27
- FEO shall apply to ALL elevators except:
 - Hoistway is not required to be fire-resistive; AND
 - Rise does not exceed 80 in., AND
 - Hoistway does not penetrate a floor

• ...In other words, FEO is required for nearly all elevators



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ASME A17.1

- Recall must occur under one of the following conditions:
 - Manual activation using fire department key, and
 - Fire alarm initiating device (FAID)



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PHASE I EMERGENCY RECALL OPERATION

- Section 2.27.3.1.1
- A 3-position key operated switch that requires manual action shall be provided at:
 - *Designated level* for each single elevator or group of elevators



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PHASE I EMERGENCY RECALL OPERATION

- Section 2.27.3.1.1
- A 3-position key operated switch that requires manual action shall be provided at:
 - Labeled "FIRE RECALL"
 - "RESET" (since 2007)
 - "OFF"
 - "ON"



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PHASE I EMERGENCY RECALL OPERATION

- Section 2.27.3.1.1
- A 3-position key operated switch that requires manual action shall be provided at:
 - Located in the lobby within sight of the elevator or all elevators in that group and shall be readily accessible.



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PHASE I RECALL MANUAL ACTIVATION



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RECALL BY FIRE ALARM INITIATING DEVICE

- Initiating devices shall be located:
- At each elevator lobby served by the elevator



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RECALL BY FIRE ALARM INITIATING DEVICE

- Initiating devices shall be located:
- In the associated elevator machine room,
- Machinery space containing a motor controller or driving machine (in hoistway for MRL),
- Control space, or
- Control room.



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RECALL BY FIRE ALARM INITIATING DEVICE

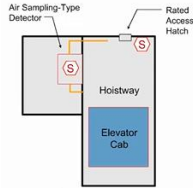
- Initiating devices shall be located:
- In the elevator hoistway, when sprinklers are located in the hoistway.



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NFPA 72 CHAPTER 21 – CHANGES (2019)

•Section 21.3.7 (19) – Fire alarm initiating devices required to be installed in elevator hoistways shall be accessible for service, testing and maintenance from outside the elevator shaft.





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NFPA 13 (22) SECTION 9.3.6.1

•Sidewall sprinklers shall be installed at the bottom of each elevator hoistway not more than 2 ft. above the floor of the pit.





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NFPA 13 (22) SECTION 9.3.6.2

•Sprinkler not required at the bottom of the shaft for enclosed, non-combustible elevator shafts not containing hydraulic fluids (traction elevators)





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NFPA 13 (22) SECTION 9.3.6.3

- Sprinkler protection not required in:
 - Machine rooms
 - Machinery spaces
 - Control spaces
 - Hoistways
- ...for traction type elevators when meeting NFPA 101 or applicable building code AND:



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NFPA 13 (22) SECTION 9.3.6.3

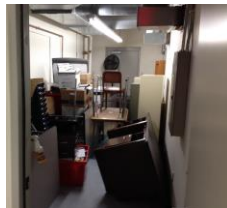
- The elevator machine room/space, control room/space or hoistway of traction elevator is dedicated to elevator equipment only, AND
- The elevator machine room/space, control room/space or hoistway are protected with smoke detectors in accordance with NFPA 72, AND...



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NFPA 13 (22) SECTION 9.3.6.3

- The elevator machine room/space, control room/space or hoistway is separated from the remainder of the building in accordance with IBC, AND
- No materials unrelated to the elevator equipment are permitted to be stored in the elevator machine room/space, control room/space, or hoistways
- The elevator machinery is not of hydraulic type



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NFPA 13 (22) SECTION 9.3.6.4

- Sprinklers installed in elevator machine rooms or at the top of hoistways shall have an ordinary or intermediate temperature rating
- Quick-response not permitted



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NFPA 13 (22) SECTION 9.3.6.6

- Upright, pendent, or sidewall spray sprinklers shall be installed at the top of elevator hoistways.
- Sprinklers at the top of the elevator hoistway are not required for passenger elevators when:
 - Elevator is non-combustible or limited combustible materials AND
 - Car enclosure meets the requirements of ASME A17.1
- Required for freight elevators



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NFPA 13 (22) SECTION 9.3.6.7.1

- Sprinklers are required at the top and bottom of the hoistway where elevators utilize combustible suspension means with plastic coating



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NFPA 13 (22) SECTION 9.3.6.7.2

•Sprinklers are not required in the elevator hoistway when suspension means provide not less than FT-1 rating per UL 2556



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NFPA 72

• Changes made to NFPA 72 2013 – 2022 editions to clarify coordinate requirements



2013 edition
21.3 Elevator Recall for Firefighters' Service



2022 edition
21.3 Elevator Phase I Emergency Recall Operation



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NFPA 72 (22) ELEVATOR REQUIREMENTS

•**21.3.2** For buildings without a required fire alarm system (not required per section 907), FAID shall be connected to a:

- Non-required building fire alarm system, OR
- Dedicated function fire alarm control unit



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NFPA 72 (22) ELEVATOR REQUIREMENTS

•Dedicated function fire alarm system – A protected premises fire alarm system installed specifically to perform emergency control function(s) where a building fire alarm system is not required.



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DEDICATED FUNCTION FIRE ALARM SYSTEMS

•Dedicated Function Fire Alarm Systems

- Where codes or standards require monitoring of specific functions, but do not mandate a building fire alarm system, a dedicated function fire alarm system shall be provided.
- Elevator recall
- Sprinkler system
- HVAC detectors
- Other functions of the fire alarm system are not required.



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DEDICATED FUNCTION FIRE ALARM SYSTEM

Clarification was made between the 2013 and 2016 editions to outline that a dedicated function system could be used for more than one purpose

2013 Edition
Dedicated Function Fire Alarm Control Unit. A Protected premises fire alarm control unit which is intended to provide operation of a specifically identified emergency control function.

2016-2022 Editions
Dedicated Function Fire Alarm Control Unit. A protected premises fire alarm control unit that is intended to operate specifically identified emergency control function(s).



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PROBLEM ?



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NFPA 72 (22) ELEVATOR REQUIREMENTS

- When sprinklers are required in elevator hoistways by other codes or standards, a fire alarm initiating device shall be installed to initiate elevator recall in accordance with ASME A17.1
- Where sprinklers are located ABOVE the lowest level of recall (top of hoistway), the FAID shall be located at the top of the hoistway
- Where sprinklers are located in the pit, FAID shall be installed in the pit in accordance with chapter 17



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NFPA 72 (22) ELEVATOR REQUIREMENTS

- When approved by the AHJ, detectors associated with elevator control functions may be supervisory only.



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NFPA 72 (22) ELEVATOR REQUIREMENTS

•When heat detectors are provided to shut down elevator power prior to sprinkler operation, the detector shall have a lower temperature rating and a higher sensitivity when compared to the sprinkler.



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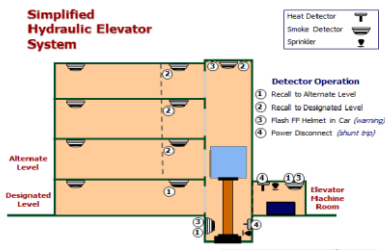
NFPA 72 (22) ELEVATOR REQUIREMENTS

•Heat detectors shall:
 •Be placed within 24 inches of each sprinkler; and,
 •In accordance with chapter 17; or,
 •Approved engineered methods (performance-based design)



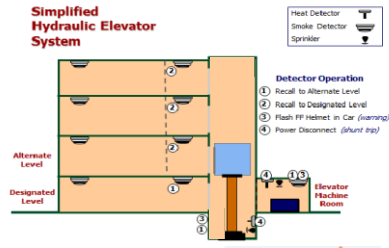
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HYDRAULIC ELEVATOR – PREVIOUS CODES



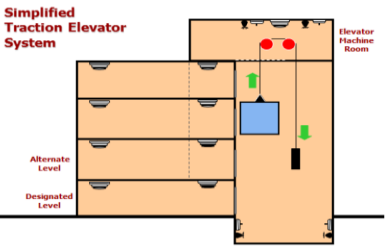
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HYDRAULIC ELEVATOR – CURRENT CODES



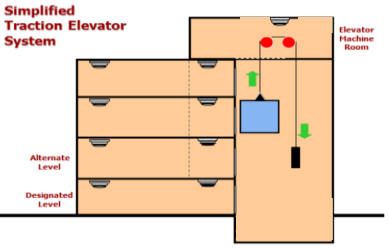
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TRACTION ELEVATOR – PREVIOUS CODES



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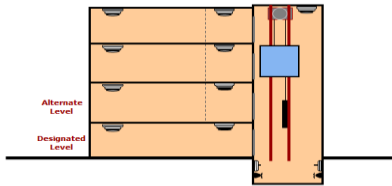
TRACTION ELEVATOR – CURRENT CODES



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PASSENGER MRL – PREVIOUS CODES

**Machine room-less
Elevators**

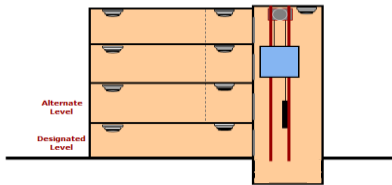


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PASSENGER MRL – CURRENT CODES

**Machine room-less
Elevators**

*A fire alarm initiating device is required in the control space



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ELEVATOR SHUNT TRIP – ASME A17.1

- Section 2.8.3.3.2
- Where elevator equipment is located or configured such that the application of water from fire sprinklers could cause unsafe elevator operation, means shall be provided to disconnect main line power to the affected elevator.



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ELEVATOR SHUNT TRIP – IBC 3005.5

- Section 3005.5
- Where elevator hoistways, machine rooms, control rooms/spaces, are protected with fire sprinklers, a means shall be provided to disconnect the main line power supply to the affected elevator.
- Activation of fire sprinklers outside the hoistway or elevator equipment spaces shall not disconnect the main line power supply.



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ELEVATOR SHUNT TRIP

- Shunt trip is only required if sprinklers are provided in the elevator hoistway, machine room, or control room/spaces.
- Application of water on brakes
- Moving elevator equipment
- Energized electrical circuits
- Elevator reaction may be inconsistent leading to unsafe use.



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ELEVATOR SHUNT TRIP – ASME A17.1

- Section 2.8.3.3.3
- Smoke detectors shall NOT be used to activate sprinklers in these spaces or to disconnect the main line power supply.





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ELEVATOR SHUNT TRIP

- Is the shunt trip going away?
- Traction elevators: YES
- Hydraulic/freight elevators: NO



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QUESTIONS ?



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