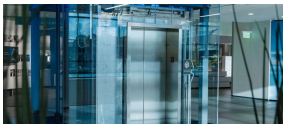
pennsylvania
DEPARTMENT OF LABOR & INDUSTRY



Elevators

September 18, 2024

1

Elevator and Building Code Interactions

Department of Labor and Industry

Bureau of Occupational and Industrial Safety

Elevator & Building Divisions

Two Standards working under one law to bring safety in the built environment, with the goal to provide a safe elevator for the public.

2

Elevators are essential to modern construction

Modern **elevators** are the crucial element that makes it practical to live and work dozens of stories above ground. High-rise cities like New York absolutely depend on elevators. Even in smaller multi-story buildings, elevators are essential for making offices and apartments accessible to handicapped people.

3

What is an elevator?

An elevator (North American English) or lift (British English) is a machine that **vertically transports people or freight between levels**. They are typically powered by electric motors that drive traction cables and counterweight systems such as a hoist, although some pump hydraulic fluid to raise a cylindrical piston like a jack.

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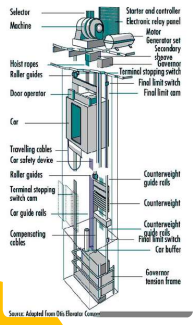


Enhancing Vertical Mobility

An elevator, additionally called a lift, is a vertical transportation device used to move people or items among distinctive floors of a building. Elevators are equipped with a vehicle or platform that travels alongside vertical tracks.

5

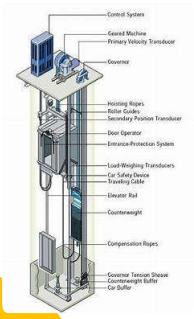
Types of Vertical Transportation

- **ELEVATORS**
- **ESCALATORS**
- **DUMBWAITERS**
- **WHEELCHAIR LIFTS**
- **TRAMWAYS**
- **CONVEYORS**
- **SHIPBOARD AND MINE ELEVATORS**

6

Examples of common vertical lifting devices in Buildings are as follows;

7



Elevator Electric & Hydraulic

- Elevators are a **lifeline for individuals with mobility challenges**, enabling them to navigate tall buildings and public spaces with ease. They promote inclusivity by ensuring equal access to people of all ages and abilities.

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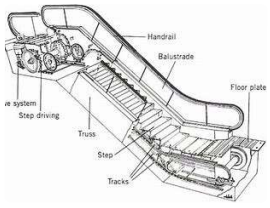


Escalators

Space-saving: Escalators take up less space than traditional elevators, making them a popular choice in areas with limited floor space.

9

Dumbwaiter

Dumbwaiters are an ideal item transportation solution for many buildings. Some of the most common places they're used are:

- Restaurants
- Hotels
- Casinos
- Hospitals

10

Platform Lift

- There are a wide variety of uses for the platform lift. They may be used for elevation changes to provide an accessible route for an elevation change. They are often used to lift products and material in industrial setting. Sometimes cars in parking garages.

11

Conveyors

- A **conveyor system** is a type of mechanical handling equipment that is used to transfer material from place to another.
- **Conveyors** provide ease of use in applications such as the transportation of heavy or bulky materials.

12

Act 45: Pennsylvania Construction Code (PCCA) and its' amendments

The Statutory Authority

13

Statutes and Regulations

- The construction, alteration and maintenance of all elevators in the Commonwealth of Pennsylvania are regulated by the Uniform Construction Code (UCC).
- The Pennsylvania Construction Code Act 45 of 1999 and all of its amendments create the statutory authority under which the UCC regulations are promulgated.
- The regulations implementing this statute are Chapters 401, 403 and 405.

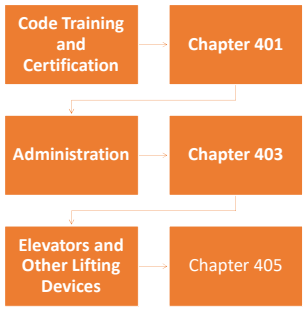
14

Conflicts

- When a code requirement or standard conflicts with the UCC regulations, the regulation takes precedence. Also, any conflict between regulations and statute, the statute will take precedence.

15

Regulations



16

Uniform Construction Code Chapter 405

Chapter 405 (Elevators and Other Lifting Devices) was approved in December 2003 and first took effect on April 9, 2004. It was amended in 2006, and the revised chapter took effect December 31, 2006. Most recently, this chapter was amended on April 16, 2016.

17

PROJECTS WITHIN THE DEPARTMENT'S JURISDICTION

Under Pennsylvania's Uniform Construction Code, the Department of Labor and Industry has sole jurisdiction to approve the construction and use of all elevators and other lifting devices (as specified in **Section 405.2** of the UCC regulation), no matter where they are located.

18

ASME A17.1-2000 ASME A17.1 a-2002

- Part 1 (General)
- Part 2 (Electrical Elevators),
- Part 3 (Hydraulic Elevators),
- Part 4 (Elevators with other types of driving machines),
- Part 5 (Special application elevators),
- Part 6 (Escalators and moving walks),
- Part 7 (Dumbwaiters and material lifts),
- Part 8 (General Requirements)
- Part 9 (Standard codes and specifications)

19

L &I Elevator Division

- **PERMITS FOR CONSTRUCTION, REPAIR, REPLACEMENT, AND ALTERATION OF LIFTING DEVICES**
- **PLAN REVIEW**
- **INSPECTIONS**

20

Elevator Division Questions

Information on the Permit approval process
Can be found at:
https://www.dli.pa.gov/

If you have questions about the application process, code requirements or other issues related to the construction, repairs, replacement, or alteration of elevators and other lifting devices, call 717-787-7465 or send an email to elevators@pa.gov.

21

Uniform Construction Code Chapter 405

Chapter 403 (Administration) was approved in December 2003 and first took effect on April 9, 2004. UCC Section 403.21(a)(1)(ii)(A-J)

22

403.21(a)(1) Uniform Construction Code (**IBC**)

(ii) The following provisions of Chapter 30 are adopted:

(A) Section 3002.1 (relating to hoistway enclosure protection).

(B) Section 3002.2 (relating to number of elevator cars in a hoistway).

(C) Section 3002.4 (relating to elevator car to accommodate ambulance stretcher).

(D) Section 3002.7 (relating to common enclosure with stairway).

(E) Section 3004.2.1 (relating to enclosure).

(F) Section 3004.3.1 (relating to enclosure).

(G) Section 3005.4 (relating to machine rooms, control rooms, machinery spaces, and control spaces).

(H) Section 3006 (relating to elevator lobbies and hoistway opening protection).

(I) Section 3007 (relating to fire service access elevators).

(J) Section 3008 (relating to occupant evacuation elevators).

23

3002.1 Hoistway enclosure protection.

(A) 3002.1 Hoistway enclosure protection. Elevator, dumbwaiter and other hoistway enclosures shall be *shaft enclosures* complying with Sections 712 and 713.

3002.1.1 Opening protectives. Openings in hoistway enclosures shall be protected as required in Chapter 7.

Exception: The elevator car doors and the associated hoistway enclosure doors at the floor level designated for recall in accordance with Section 3003.2 shall be permitted to remain open during Phase I Emergency Recall Operation.

3002.1.2 Hardware. Hardware on opening protectives shall be of an *approved* type installed as tested, except that *approved* interlocks, mechanical locks and electric contacts, door and gate electric contacts and door-operating mechanisms shall be exempt from the fire test requirements

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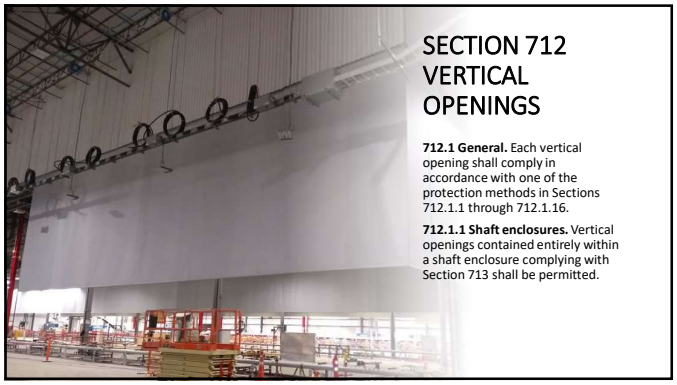

SECTION 712 VERTICAL OPENINGS

712.1 General. Each vertical opening shall comply in accordance with one of the protection methods in Sections 712.1.1 through 712.1.16.

712.1.1 Shaft enclosures. Vertical openings contained entirely within a shaft enclosure complying with Section 713 shall be permitted.

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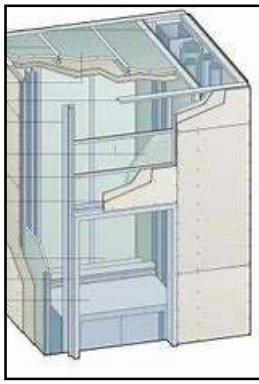


2018 IBC 713

- **SHAFT ENCLOSURES**

713.1 General. The provisions of this section shall apply to shafts required to protect openings and penetrations through floor/ceiling and roof/ceiling assemblies. *Interior exit stairways* and *ramps* shall be enclosed in accordance with Section 1023.

26

3002.2 Number of elevator cars in a hoistway. Where four or more elevator cars serve all or the same portion of a building, the elevators shall be in not fewer than two separate hoistways. Not more than four elevator cars shall be in any single hoistway enclosure.

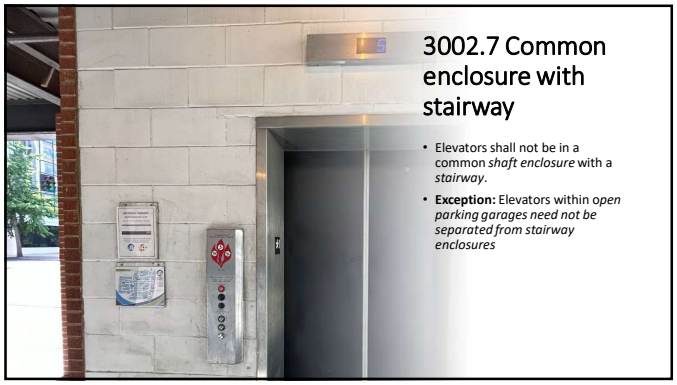
4 or less cars in one hoistway!

27

3002.4 Elevator car to accommodate ambulance stretcher.

- Where elevators are provided in buildings four or more *stories* above, or four or more *stories* below, *grade plane*, not fewer than one elevator shall be provided for fire department emergency access to all floors. The elevator car shall be of such a size and arrangement to accommodate an ambulance stretcher 24 inches by 84 inches (610 mm by 2134 mm) with not less than 5-inch (127 mm) radius corners, in the horizontal, open position and shall be identified by the international symbol for emergency medical services (star of life). The symbol shall be not less than 3 inches (76 mm) in height and shall be placed inside on both sides of the hoistway door frame.

28



3002.7 Common enclosure with stairway

- Elevators shall not be in a common *shaft enclosure* with a *stairway*.
- **Exception:** Elevators within *open parking garages need not be separated from stairway enclosures*

29

CONVEYING SYSTEMS 3004.2.1 Enclosure

Escalator floor openings shall be enclosed with *shaft enclosures* complying with Section 713.

30

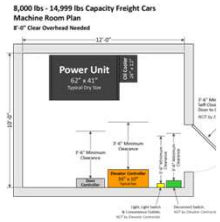
3004.3.1 Enclosure

- Conveyors and related equipment connecting successive floors or levels shall be enclosed with *shaft enclosures* complying with Section 713.

31

3005.4 Machine rooms, control rooms, machinery spaces, and control spaces

- Elevator machine rooms, control rooms, control spaces and machinery spaces outside of but attached to a hoistway that have openings into the hoistway shall be enclosed with *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both. The *fire-resistance rating* shall be not less than the required rating of the hoistway enclosure served by the machinery. Openings in the *fire barriers* shall be protected with assemblies having a *fire protection rating* not less than that required for the hoistway enclosure doors. **With Exceptions:**



32

Exceptions:

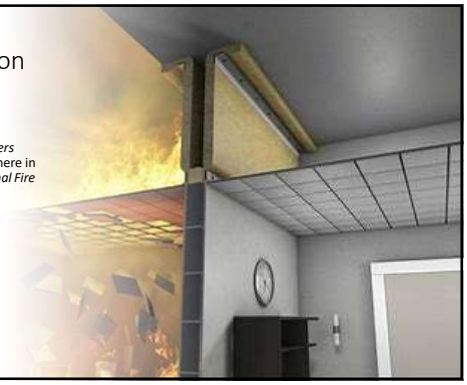
1. For other than fire service access elevators and occupant evacuation elevators, where machine rooms, machinery spaces, control rooms and control spaces do not abut and do not have openings to the hoistway enclosure they serve, the *fire barriers* constructed in accordance with Section 707 or *horizontal assemblies* constructed in accordance with Section 711, or both, shall be permitted to be reduced to a 1-hour *fire-resistance rating*.

2. For other than fire service access elevators and occupant evacuation elevators, in buildings four *stories* or less above *grade plane* where machine room, machinery spaces, control rooms and control spaces do not abut and do not have openings to the hoistway enclosure they serve, the machine room, machinery spaces, control rooms and control spaces are not required to be fire-resistance rated.

33

Fire IBC Section 707 Barriers

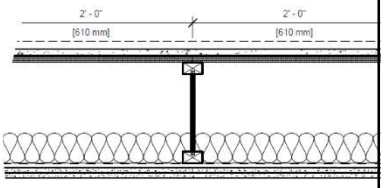
- **707.1 General.** *Fire barriers* installed as required elsewhere in this code or the *International Fire Code* shall comply with this section.



34

IBC Section 711 Floor and Roof Assemblies

- **711.1 General.** *Horizontal assemblies* shall comply with Section 711.2. Nonfire-resistance-rated floor and roof assemblies shall comply with Section 711.3.



35

SECTION 3006 ELEVATOR LOBBIES AND HOISTWAY OPENING PROTECTION

- **3006.1 General.** Elevator hoistway openings and enclosed elevator lobbies shall be provided in accordance with the following

36

3006.1

1. Where hoistway opening protection is required by Section 3006.2, such protection shall be in accordance with Section 3006.3.
2. Where enclosed elevator lobbies are required for underground buildings, such lobbies shall comply with Section 405.4.3.
3. Where an area of refuge is required and an enclosed elevator lobby is provided to serve as an area of refuge, the enclosed elevator lobby shall comply with Section 1009.6.
4. Where fire service access elevators are provided, enclosed elevator lobbies shall comply with Section 3007.6.
5. Where occupant evacuation elevators are provided, enclosed elevator lobbies shall comply with Section 3008.6.

37

Hoistway opening protection required. Elevator hoistway door openings shall be protected in accordance with Section 3006.3 where an elevator hoistway connects more than three stories, is required to be enclosed within a shaft enclosure in accordance with Section 712.1.1 and any of the following conditions apply:

38

1. The building is not protected throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1 or 903.3.1.2.
2. The building contains a Group I-1, Condition 2 occupancy.
3. The building contains a Group I-2 occupancy.
4. The building contains a Group I-3 occupancy.
5. The building is a high rise and the elevator hoistway is more than 75 feet (22 860 mm) in height. The height of the hoistway shall be measured from the lowest floor to the highest floor of the floors served by the hoistway.

39

Exceptions:

1. Protection of elevator hoistway door openings is not required where the elevator serves only open parking garages in accordance with Section 406.5.
2. Protection of elevator hoistway door openings is not required at the level(s) of exit discharge, provided that the level(s) of exit discharge is equipped with an *automatic sprinkler system* in accordance with Section 903.3.1.1.
3. Enclosed elevator lobbies and protection of elevator hoistway door openings are not required on levels where the elevator hoistway opens to the exterior.

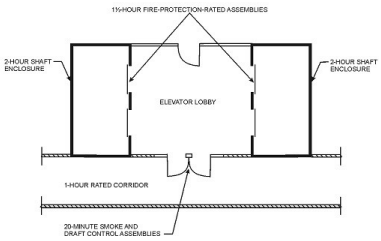
40

3006.2.1 Rated corridors. Where corridors are required to be fire-resistance rated in accordance with Section 1020.1, elevator hoistway openings shall be protected in accordance with Section 3006.3.

List of some buildings required to have rated corridors:

Unsprinklered buildings:

Group A, B, E, F, M, S and U occupancies with occupant load served by corridor greater than 30.



41

3006.3 Hoistway opening protection.

Where Section 3006.2 requires protection of the elevator hoistway door opening, the protection shall be provided by one of the following:

42

1. An enclosed elevator lobby shall be provided at each floor to separate the elevator hoistway shaft enclosure doors from each floor by fire partitions in accordance with Section 708. In addition, doors protecting openings in the elevator lobby enclosure walls shall comply with Section 716.2.2.1 as required for corridor walls. Penetrations of the enclosed elevator lobby by ducts and air transfer openings shall be protected as required for corridors in accordance with Section 717.5.4.1.

43

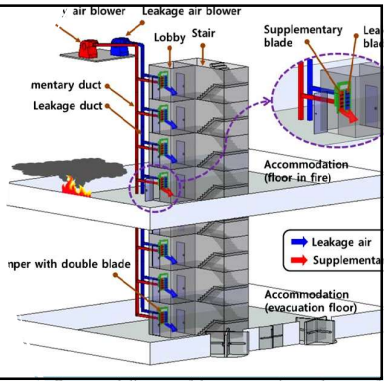
2. An enclosed elevator lobby shall be provided at each floor to separate the elevator hoistway shaft enclosure doors from each floor by smoke partitions in accordance with Section 710 where the building is equipped throughout with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. In addition, doors protecting openings in the smoke partitions shall comply with Sections 710.5.2.2, 710.5.2.3 and 716.2.6.1. Penetrations of the enclosed elevator lobby by ducts and air transfer openings shall be protected as required for corridors in accordance with Section 717.5.4.1.

44

3. Additional doors shall be provided at each elevator hoistway door opening in accordance with Section 3002.6. Such door shall comply with the smoke and draft control door assembly requirements in Section 716.2.2.1.1 when tested in accordance with UL 1784 without an artificial bottom seal.

45

4. The elevator hoistway shall be pressurized in accordance with Section 909.21.



46

3006.4 Means of egress

Elevator lobbies shall be provided with not less than one means of egress complying with Chapter 10 and other provisions in this code. Egress through an enclosed elevator lobby shall be permitted in accordance with Item 1 of Section 1016.2.

1016.2 Egress through intervening spaces. Egress through intervening spaces shall comply with this section.

1. *Exit access* through an enclosed elevator lobby is permitted. Access to not less than one of the required *exits* shall be provided without travel through the enclosed elevator lobbies required by Section 3006. Where the path of exit access travel passes through an enclosed elevator lobby, the level of protection required for the enclosed elevator lobby is not required to be extended to the *exit* unless direct access to an *exit* is required by other sections of this code.

47

FIRE SERVICE ACCESS ELEVATOR

Section 3007

3007.1 General. Where required by Section 403.6.1, every floor above and including the lowest level of fire department vehicle access of the building shall be served by fire service access elevators complying with Sections 3007.1 through 3007.9. Except as modified in this section, fire service access elevators shall be installed in accordance with this chapter and ASME A17.1/CSA B44.

With Exception

48

Exception:

Elevators that only service an open or enclosed parking garage and the lobby of the building shall not be required to serve as fire service access elevators

49

403.6 Elevators. Elevator installation and operation in *highrise buildings* shall comply with Chapter 30 and Sections 403.6.1 and 403.6.2.

HIGH-RISE BUILDING. A building with an occupied floor located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.

50

403.6.1 Fire Service Access Elevator

403.6.1 Fire service access elevator. In buildings with an occupied floor more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access, not fewer than two fire service access elevators, or all elevators, whichever is less, shall be provided in accordance with Section 3007. Each fire service access elevator shall have a capacity of not less than 3,500 pounds (1588 kg) and shall comply with Section 3002.4.

51

What Is a Fire Service Access Elevator (FSAE)?

A fire service access elevator (FSAE) is a dedicated elevator that the fire department can use during fire emergencies in high-rise buildings. These elevators are essential because as buildings get taller, firefighting becomes more challenging.

52

3007.2 Automatic sprinkler system. The building shall be equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, except as otherwise permitted by Section 903.3.1.1.1 and as prohibited by Section 3007.2.1.

3007.2.1 Prohibited locations. Automatic sprinklers shall not be installed in machine rooms, elevator machinery spaces, control rooms, control spaces and elevator hoistways of fire service access elevators.

3007.2.2 Sprinkler system monitoring. The sprinkler system shall have a sprinkler control valve supervisory switch and water-flow-initiating device provided for each floor that is monitored by the building's *fire alarm system*.

53

3007.3 Water protection. Water from the operation of an automatic sprinkler system outside the enclosed lobby shall be prevented from infiltrating into the hoistway enclosure in accordance with an approved method.

54

3007.4 Shunt trip. Means for elevator shutdown in accordance with Section 3005.5 shall not be installed on elevator systems used for fire service access elevators.

55

3007.5 Hoistway enclosures. The fire service access elevator hoistway shall be located in a *shaft enclosure* complying with Section 713. (Shaft fire resistance requirements.)
3007.5.1 Structural integrity of hoistway enclosures. The fire service access elevator hoistway enclosure shall comply with Sections 403.2.3.1 through 403.2.3.4.

56

3007.5.1 Structural integrity of hoistway enclosures. The fire service access elevator hoistway enclosure shall comply with Sections 403.2.3.1 through 403.2.3.4.

403.2.3.1 Wall assembly. The wall assemblies making up the enclosures for *interior exit stairways* and elevator hoistway enclosures shall meet or exceed Soft Body Impact Classification Level 2 as measured by the test method described in ASTM C1629/C1629M.

57

403.2.3.2 Wall assembly materials

The face of the wall assemblies making up the enclosures for *interior exit stairways* and elevator hoistway enclosures that are not exposed to the interior of the enclosures for *interior exit stairways* or elevator hoistway enclosure shall be constructed in accordance with one of the following methods:

1. The wall assembly shall incorporate not fewer than two layers of impact-resistant construction board each of which meets or exceeds Hard Body Impact Classification Level 2 as measured by the test method described in ASTM C1629/C1629M.

2. The wall assembly shall incorporate not fewer than one layer of impact-resistant construction material that meets or exceeds Hard Body Impact Classification Level 3 as measured by the test method described in ASTM C1629/C1629M.

3. The wall assembly incorporates multiple layers of any material, tested in tandem, that meets or exceeds Hard Body Impact Classification Level 3 as measured by the test method described in ASTM C1629/C1629M.

58

Types of Gypsum

Hard Body Impact Classification

Soft Body Impact Classification

- Impacts of this nature are of two types: (1) **hard-body impact**, which results from direct concentrated contact with a tool or hard object; and (2) soft-body **impact**, which results from bodily contact with the building's human occupants.

59

The intent of the code is to provide impact resistance on the side with the two layers of gypsum board, thus protecting the shaft enclosure from impact coming from outside the shaft.

60

403.2.3.3 Concrete and masonry walls

Concrete or masonry walls shall be deemed to satisfy the requirements of Sections 403.2.3.1 and 403.2.3.2.

61

403.2.3.4 Other wall assemblies

Any other wall assembly that provides impact resistance equivalent to that required by Sections 403.2.3.1 and 403.2.3.2 for Hard Body Impact Classification Level 3, as measured by the test method described in ASTM C1629/C1629M, shall be permitted

62

3007.5.2 Hoistway lighting

When fire-fighters' emergency operation is active, the entire height of the hoistway shall be illuminated at not less than 1 *foot-candle* (11 lux) as measured from the top of the car of each fire service access elevator.

63

3007.6 Fire service access elevator lobby. The fire service access elevator shall open into an enclosed fire service access elevator lobby in accordance with Sections 3007.6.1 through 3007.6.5. Egress is permitted through the enclosed elevator lobby in accordance with Item 1 of Section 1016.2.
Exception: Where a fire service access elevator has two entrances onto a floor, the second entrance shall be permitted to be protected in accordance with Section 3006.3.

64

3007.6 Fire service access elevator lobby

The fire service access elevator shall open into an enclosed fire service access elevator lobby in accordance with Sections 3007.6.1 through 3007.6.5. Egress is permitted through the enclosed elevator lobby in accordance with Item 1 of Section 1016.2.

- **Exception:** Where a fire service access elevator has two entrances onto a floor, the second entrance shall be permitted to be protected in accordance with Section 3006.3.

65

3007.6.1 Access to interior exit stairway or ramp. The enclosed fire service access elevator lobby shall have direct access from the enclosed elevator lobby to an enclosure for an *interior exit stairway* or *ramp*.
Exception: Access to an *interior exit stairway* or *ramp* shall be permitted to be through a protected path of travel that has a level of fire protection not less than the elevator lobby enclosure. The protected path shall be separated from the enclosed elevator lobby through an opening protected by a smoke and draft control assembly in accordance Section 716.2.2.1.

66

3007.6.2 Lobby enclosure. The fire service access elevator lobby shall be enclosed with a *smoke barrier* having a *fire-resistance rating* of not less than 1 hour, except that lobby doorways shall comply with Section 3007.6.3.

Exception: Enclosed fire service access elevator lobbies are not required at the *levels of exit discharge*.

67

3007.6.3 Lobby doorways. Other than doors to the hoistway, elevator control room or elevator control space, each doorway to an enclosed fire service access elevator lobby shall be provided with a 3/4-hour *fire door assembly* complying with Section 716. The *fire door assembly* shall comply with the smoke and draft control door assembly requirements of Section 716.2.2.1.1 and be tested in accordance with UL 1784 without an artificial bottom seal.

68

3007.6.4 Lobby size. Regardless of the number of fire service access elevators served by the same elevator lobby, the enclosed fire service access elevator lobby shall be not less than 150 square feet (14 m2) in an area with a dimension of not less than 8 feet (2440 mm).

69

3007.6.5 Fire service access elevator symbol

A pictorial symbol of a standardized design designating which elevators are fire service access elevators shall be installed on each side of the hoistway door frame on the portion of the frame at right angles to the fire service access elevator lobby.

70

3007.7 Elevator system monitoring

The fire service access elevator shall be continuously monitored at the *fire command center* by a standard emergency service interface system meeting the requirements of NFPA 72.

FIRE COMMAND CENTER. The principal attended or unattended location where the status of detection, alarm communications and control systems is displayed, and from which the systems can be manually controlled.

71

3007.8 Electrical power.

The following features serving each fire service access elevator shall be supplied by both normal power and Type 60/Class 2/Level 1 standby power:

1. Elevator equipment.
2. Elevator hoistway lighting.
3. *Ventilation* and cooling equipment for elevator machine rooms, control rooms, machine spaces and control spaces.
4. Elevator car lighting.

72

3007.8.1 Protection of wiring or cables. Wires or cables that are located outside of the elevator hoistway and machine room and that provide normal or standby power, control signals, communication with the car, lighting, heating, air conditioning, *ventilation* and fire-detecting systems to fire service access elevators shall be protected using one of the following methods:

73

Protection methods:

1. Cables used for survivability of required critical circuits shall be listed in accordance with UL 2196 and shall have a *fire-resistance rating* of not less than 2 hours.
2. Electrical circuit protective systems shall have a *fire-resistance rating* of not less than 2 hours. Electrical circuit protective systems shall be installed in accordance with their listing requirements.
3. Construction having a *fire-resistance rating* of not less than 2 hours.

Exception: Wiring and cables to control signals are not required to be protected provided that wiring and cables do not serve Phase II emergency in-car operations.

74

3007.9 Standpipe hose connection. A Class I standpipe hose connection in accordance with Section 905 shall be provided in the *interior exit stairway* and *ramp* having direct access from the enclosed fire service access elevator lobby.

3007.9.1 Access. The *exit* enclosure containing the standpipe shall have access to the floor without passing through the enclosed fire service access elevator lobby.

75

SECTION 3008 OCCUPANT EVACUATION ELEVATORS

- **3008.1 General.** Elevators used for occupant self-evacuation during fires shall comply with Sections 3008.1 through 3008.10.

76

What is an Occupant Evacuation Elevator?

Much like Fire Service Access Elevators, Occupant Evacuation Elevators are in fact elevators that have strict rules and regulations put in place to allow special uses above standard elevators. An Occupant Evacuation Elevator can be used for self-evacuation during a fire emergency pending the elevator system meets the requirements set forth in the International Building Code.

77

3008.1.1 Number of occupant evacuation elevators.

The number of elevators available for occupant evacuation shall be determined based on an egress analysis that addresses one of the following scenarios:

1. Full-building evacuation where the analysis demonstrates that the number of elevators provided for evacuation results in an evacuation time less than 1 hour.
2. Evacuation of the five consecutive floors with the highest cumulative occupant load where the analysis demonstrates that the number of elevators provided for evacuation results in an evacuation time less than 15 minutes.

78

3008.1.1 The design choice of either evacuation options shall result in the following;

Not less than one elevator in each bank shall be designated for occupant evacuation.

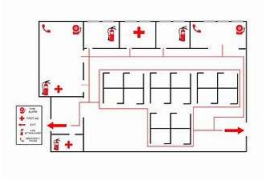
Not less than two shall be provided in each occupant evacuation elevator lobby where more than one elevator opens into the lobby.

Signage shall be provided to denote which elevators are available for occupant evacuation.

79

3008.1.2 Additional exit stairway. Where an additional *means of egress* is required in accordance with Section 403.5.2, an additional *exit stairway* shall not be required to be installed in buildings provided with occupant evacuation elevators complying with Section 3008.1.

80



3008.1.3 Fire safety and evacuation plan

The building shall have an *approved* fire safety and evacuation plan in accordance with the applicable requirements of Section 404 of the *International Fire Code*. The fire safety and evacuation plan shall incorporate specific procedures for the occupants using evacuation elevators.

81

3008.2 Automatic sprinkler system.

The building shall be equipped throughout with an *approved*, electrically supervised *automatic sprinkler system* in accordance with Section 903.3.1.1, except as otherwise permitted by Section 903.3.1.1.1 and as prohibited by Section 3008.2.1.

82

3008.2.1 Prohibited locations

Automatic sprinklers shall not be installed in elevator machine rooms, machinery spaces, control rooms, control spaces and elevator hoistways of occupant evacuation elevators.

83

3008.2.2 Sprinkler system monitoring.

The automatic sprinkler system shall have a sprinkler control valve supervisory switch and water-flow-initiating device provided for each floor that is monitored by the building's *fire alarm system*.

84

3008.3 Water protection.

Water from the operation of an automatic sprinkler system outside the enclosed lobby shall be prevented from infiltrating into the hoistway enclosure in accordance with an approved method.

85

3008.4 Shunt trip

Means for elevator shutdown in accordance with Section 3005.5 shall not be installed on elevator systems used for occupant evacuation elevators.

86

3008.5

3008.5 Hoistway enclosure protection. Occupant evacuation elevator hoistways shall be located in *shaft enclosures* complying with Section 713.

Structural integrity of hoistway enclosures. Occupant evacuation elevator hoistway enclosures shall comply with Sections 403.2.3.1 through 403.2.3.4

87

3008.6 Occupant evacuation elevator lobby

Occupant evacuation elevators shall open into an enclosed elevator lobby in accordance with Sections 3008.6.1 through 3008.6.6. Egress is permitted through the elevator lobby in accordance with Item 1 of Section 1016.2.

88

1016.2 Egress through intervening spaces. Egress through intervening spaces shall comply with this section.

1. *Exit access* through an enclosed elevator lobby is permitted. Access to not less than one of the required *exits* shall be provided without travel through the enclosed elevator lobbies required by Section 3006. Where the path of exit access travel passes through an enclosed elevator lobby, the level of protection required for the enclosed elevator lobby is not required to be extended to the *exit* unless direct access to an *exit* is required by other sections of this code.

89

3008.6.1 Access to interior exit stairway or ramp. The occupant evacuation elevator lobby shall have direct access from the enclosed elevator lobby to an *interior exit stairway* or *ramp*.

Exceptions:

1. Access to an *interior exit stairway* or *ramp* shall be permitted to be through a protected path of travel that has a level of fire protection not less than the elevator lobby enclosure. The protected path shall be separated from the enclosed elevator lobby through an opening protected by a smoke and draft control assembly in accordance Section 716.2.2.1.
2. Elevators that only service an open parking garage and the lobby of the building shall not be required to provide direct access.

90

3008.6.2 Lobby enclosure

The occupant evacuation elevator lobby shall be enclosed with a *smoke barrier* having a *fire-resistance rating* of not less than 1 hour, except that lobby doorways shall comply with Section 3008.6.3.

Exception: Enclosed occupant evacuation elevator lobbies are not required at the *levels of exit discharge*.

91

3008.6.3 Lobby doorways

Other than the doors to the hoistway, elevator machine rooms, machinery spaces, control rooms and control spaces within the lobby enclosure smoke barrier, each doorway to an occupant evacuation elevator lobby shall be provided with a 3/4-hour *fire door assembly* complying with Section 716. The *fire door assembly* shall comply with the smoke and draft control assembly requirements of Section 716.2.2.1.1 and be tested in accordance with UL 1784 without an artificial bottom seal.

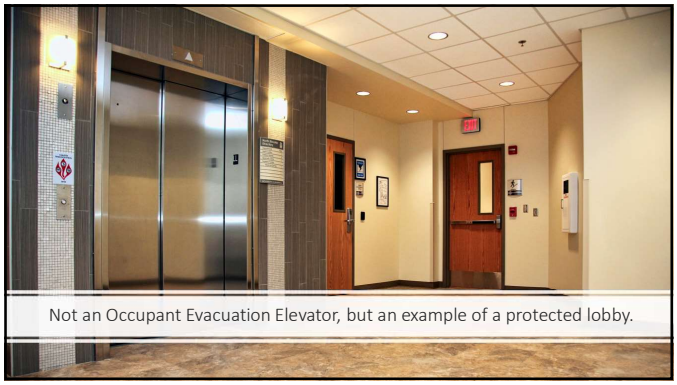
92

Lobby doorways.

3008.6.3.1 Vision panel. A vision panel shall be installed in each *fire door assembly* protecting the lobby doorway. The vision panel shall consist of fire protection-rated glazing, shall comply with the requirements of Section 716 and shall be located to furnish clear vision of the occupant evacuation elevator lobby.

3008.6.3.2 Door closing. Each *fire door assembly* protecting the lobby doorway shall be automatic-closing upon receipt of any fire alarm signal from the *emergency voice/alarm communication system* serving the building.

93



Not an Occupant Evacuation Elevator, but an example of a protected lobby.

94

3008.6.4 Lobby size. Each occupant evacuation elevator lobby shall have minimum floor area as follows:

1. The occupant evacuation elevator lobby floor area shall accommodate, at 3 square feet (0.28 m2) per person, not less than 25 percent of the *occupant load* of the floor area served by the lobby.
2. The occupant evacuation elevator lobby floor area shall accommodate one *wheelchair space* of 30 inches by 48 inches (760 mm by 1220 mm) for each 50 persons, or portion thereof, of the *occupant load* of the floor area served by the lobby.

Exception: The size of lobbies serving multiple banks of elevators shall have the minimum floor area *approved* on an individual basis and shall be consistent with the building's fire safety and evacuation plan.

95

3008.6.5 Signage.

An *approved* sign indicating elevators are suitable for occupant self-evacuation shall be posted on all floors adjacent to each elevator call station serving occupant evacuation elevators.

96

3008.6.6 Two-way communication system

A two-way communication system shall be provided in each occupant evacuation elevator lobby for the purpose of initiating communication with the *fire command center* or an alternate location *approved* by the fire department. The two-way communication system shall be designed and installed in accordance with Sections 1009.8.1 and 1009.8.2

97

98

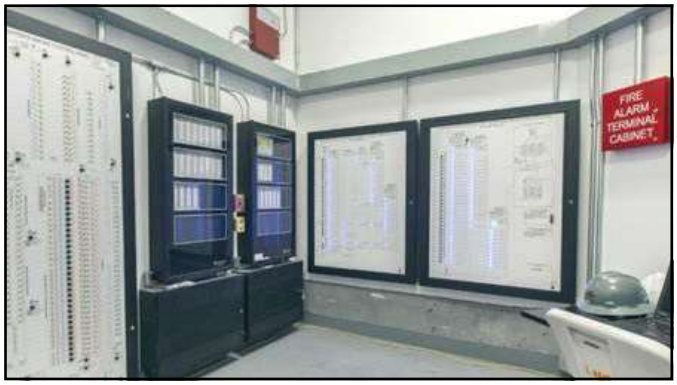
3008.7 Elevator system monitoring

The occupant evacuation elevators shall be continuously monitored at the *fire command center,* or a central control point *approved* by the fire department and arranged to display all the following information:

99

1. Floor location of each elevator car.
2. Direction of travel of each elevator car.
3. Status of each elevator car with respect to whether it is occupied.
4. Status of normal power to the elevator equipment, elevator machinery and electrical apparatus cooling equipment where provided, elevator machine room, control room and control space *ventilation* and cooling equipment.
5. Status of standby or emergency power system that provides backup power to the elevator equipment, elevator machinery and electrical cooling equipment where provided, elevator machine room, control room and control space *ventilation* and cooling equipment.
6. Activation of any fire alarm initiating device in any elevator lobby, elevator machine room, machine space containing a motor controller or electric driving machine, control space, control room or elevator

100



101

3008.7.1 Elevator recall.

The *fire command center* or an alternate location *approved* by the fire department shall be provided with the means to manually initiate a Phase I Emergency Recall of the occupant evacuation elevators in accordance with ASME A17.1/CSA B44.

102

3008.8 Electrical power.

The following features serving each occupant evacuation elevator shall be supplied by both normal power and Type 60/Class 2/Level 1 standby power:

1. Elevator equipment.
2. *Ventilation* and cooling equipment for elevator machine rooms, control rooms, machinery spaces and control spaces.
3. Elevator car lighting.

103

3008.8.1 Determination of standby power load.

Standby power loads shall be based on the determination of the number of occupant evacuation elevators in Section 3008.1.1.

104

3008.8.2 Protection of wiring or cables

Wires or cables that are located outside of the elevator hoistway, machine room, control room and control space and that provide normal or standby power, control signals, communication with the car, lighting, heating, air conditioning, *ventilation* and fire-detecting systems to occupant evacuation elevators shall be protected using one of the following methods:

105

Methods of protection of wiring or cables:

1. Cables used for survivability of required critical circuits shall be listed in accordance with UL 2196 and shall have a *fire-resistance rating* of not less than 2 hours. 2. Electrical circuit protective systems shall have a *fire-resistance rating* of not less than 2 hours. Electrical circuit protective systems shall be installed in accordance with their listing requirements.
3. Construction having a *fire-resistance rating* of not less than 2 hours.

Exception: Wiring and cables to control signals are not required to be protected provided that wiring and cables do not serve Phase II emergency in-car operation.

106

3008.9 Emergency voice/alarm communication system. The building shall be provided with an *emergency voice/alarm communication system*. The *emergency voice/alarm communication system* shall be accessible to the fire department. The system shall be provided in accordance with Section 907.5.2.2.

3008.9.1 Notification appliances. Not fewer than one audible and one visible notification appliance shall be installed within each occupant evacuation elevator lobby.

107

108

Labor and Industry Elevators and Accessibility

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109

Multi Story Buildings

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1104.4 Multistory buildings and facilities

- **At least one accessible route shall connect each accessible story, mezzanine and occupied roofs in multilevel buildings and facilities**.

110

Elevators and Accessibility

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- 1109.7 **Elevators - Passenger elevators on an accessible route shall be accessible** and **comply with Chapter 30**.

111

When Lifts are allowed as part of an accessible route

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IBC 1109.8 Lifts

Platform (wheelchair) lifts are permitted to be a part of a required accessible route in *new construction* where *indicated in Items 1 through 10*. Platform (wheelchair) lifts shall be installed in accordance with ASME A18.1.

1.An **accessible route to a performing area and speaker platforms.**

2.**An accessible route to wheelchair spaces required to comply with the wheelchair space dispersion** requirements of Sections 1108.2.2 through 1108.2.6.
- ***Usually assembly areas, such as auditoriums, stadiums***

3.**An accessible route to spaces that are not open to the general public with an occupant load of *not more than five*.**

4.An **accessible route within an individual dwelling unit** or sleeping unit **required to be an Accessible unit, Type A unit or Type B unit.**

112

When Lifts are allowed as part of an accessible route

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5. An **accessible route to jury boxes and witness stands**; raised courtroom stations including judges' benches, clerks' stations, bailiffs' stations, deputy clerks' stations and court reporters' stations; and to depressed areas such as the well of the court.

6. **An accessible route to load and unload areas serving amusement rides.**

7. An accessible route to play components or soft contained play structures.

8. **An accessible route to team or player seating areas serving areas of sport activity.**

113

Platform Lift

114

Elevators Used as a Means of Egress

1009.4 Elevators

- **In order to be considered *part of an accessible means of egress*, an elevator shall comply with the emergency operation and signaling device requirements of Section 2.27 of ASME A17.1/CSA B44.**
- ***Standby power*** shall be provided in accordance with Chapter 27 and Section 3003.
- **The elevator** shall be **accessed from an *area of refuge*** complying with Section 1009.6.

115

Elevators and Standby Power

Elevators – Standby Power
IBC 1009.4.1

2702.1.5 Load Duration

- **Emergency power systems and standby power systems** shall be designed to **provide the required power for a minimum duration of 2 hours** without being refueled or recharged, unless specified otherwise in this code.

2702.1.6 Uninterruptable Power Source

- **An uninterrupted source of power shall be provided for equipment** when ***required by the manufacturer's instructions***, the listing, this code or applicable referenced standards.

116

Standby Power – Plat Form Lifts

1009.5 Platform Lifts – Standby Power

2702.2.2 Elevators and Platform Lifts

- **Standby power shall be provided for elevators and platform lifts** as required in IBC 2015 Sections 1009.4, 1009.5, 3003.1, 3007.8 and 3008.8.

117

150 KVA Rooftop Standby Generator

118

Load Transfer to Standby Power

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1009.4.1 Elevators – Standby Power

2702.1.3 Load Transfer

- **Emergency Power**
  - **to supply, distribute, and control power and illumination essential for safety to human life**
- **Emergency power systems shall automatically provide secondary power *within 10 seconds*** after primary power is lost, unless specified otherwise in this code
- **Legally Standby Power**
  - **could create hazards or hamper rescue or fire-fighting operations.**
- **Standby power systems shall automatically provide secondary power *within 60 seconds*** after primary power is lost, unless specified otherwise in this code.

119

Area of Refuge

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1009.6 Areas of Refuge

- Every **required area of refuge shall be accessible from the space it serves by an accessible means of egress**.
- ***Definition - AREA OF REFUGE*. An area where persons unable to use stairways can remain temporarily to await instructions or assistance during emergency evacuation**.

  Note – Area of Refuge is required when building does not have a sprinkler.

1009.6.2 Stairway or Elevator Access

- **Every required area of refuge shall have direct access to a stairway** complying with Sections 1009.3and 1023 or an elevator complying with Section 1009.4.

OR

- **1109.4 – Accessible elevators with standby power**

120

Exceptions for Area of Refuge

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Exceptions:

1. Areas of refuge **are not** required at the elevator in **open parking garages**.

2. Areas of refuge are **not required** in buildings and facilities **equipped** throughout with an **automatic sprinkler** system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

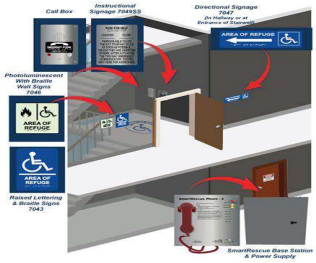
3. Areas of refuge are **not required** at **elevators not required to be located in a shaf**t in accordance with Section 712.

4. Areas of refuge **are not** required **at elevators serving smoke-protected assembly seating areas** complying with Section 1029.6.2.

5. Areas of refuge are **not required for elevators accessed from a refuge area in conjunction with a horizontal exit.**

121

Area of Refuge



122

ICC A117.1 ANSI - 2009

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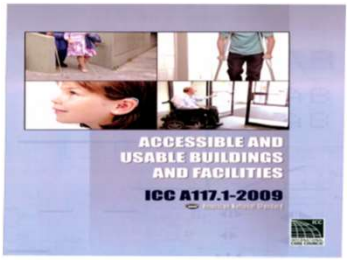

123

123

Purpose of the A117.1

101 Purpose

- The technical criteria in Chapters 3 through 9, Sections 1002, 1003 and 1006 and Chapter 11 of this ***standard make sites, facilities, buildings and elements accessible*** **to and usable by people with such physical disabilities as the inability to walk, difficulty walking, reliance on walking aids, blindness and visual impairment, deafness and hearing impairment, incoordination, reaching and manipulation disabilities, lack of stamina, difficulty interpreting and reacting to sensory information, and extremes of physical size**.
- ***The intent of these sections is to allow a person with a physical disability to independently get to, enter, and use a site, facility, building, or element***.

124

Reference Documents

105 Referenced Documents

105.1 General.

- The **documents listed in Section 105.2 shall be considered part of this standard to the prescribed extent of each such reference**. Where criteria in this standard differ from those of these referenced documents, the criteria of this standard shall apply.

125

Reference ASME Code

105.2 Documents. - Continued

- **105.2.5 Safety Code for Elevators and Escalators: ASME A17.1-2007/CSA B44-07** (American Society of Mechanical Engineers International, Three Park Avenue, New York, NY 10016-5990).
- **105.2.6 Safety Standard for Platform Lifts and Stairway Chairlifts: ASME A 18.1-2005** (American Society of Mechanical Engineers International, Three Park Avenue, New York, NY 10016-5990).

126

Chapter 2 Scoping

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201 General

- This standard ***provides technical criteria for making sites, facilities, buildings, and elements accessible***. The administrative authority shall provide scoping provisions to specify the extent to which these technical criteria apply.
- These ***scoping provisions*** **shall address the application of this standard to**:
- **each building and occupancy type; new construction, alterations, temporary facilities, and existing buildings; specific site and building elements; and to multiple elements or spaces provided within a site or building.**

127

Table of Contents – for Elevators ANSI – A117.1

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128

Chapter 4 – Elevators A117.1

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407 Elevators

407.1 General.

- **Elevators shall comply with Section 407 and ASME A17.1/CSA 844 listed in Section 105.2.5**.
- Elevators shall be passenger elevators as classified by ASME A17.1/CSA 844. ***Elevator operation shall be automatic.***

129

ASME A17.7- 2007

ASME A17.7-2007/CSA B44.7-07 (R2012)

Performance-Based Safety Code for Elevators and Escalators (A17.7/CSA B44.7 - 2007)

- This **performance-based Safety Code covers the design, construction, operation, inspection, testing, maintenance, alteration, and repair of the following equipment and its associated parts, rooms, spaces, and hoistways, where located in or adjacent to a building or structure: hoisting and lowering mechanisms, equipped with a car, that move between two or more landings.**
- This **equipment includes, but is not limited to, elevators; power-driven stairways and walkways for carrying persons between landings.**
- This **equipment includes, but is not limited to, escalators and moving walks; hoisting and lowering mechanisms, equipped with a car, that serve two or more landings and are restricted to the carrying of material by their limited size or limited access to the car;**
- This **equipment includes, but is not limited to, dumbwaiters and material lifts.**

130

Elevator Call Controls

- **407.2 Elevator Landing Requirements.** Elevator landings shall comply with **Section 407.2.**
- 407.2.1 **Call Controls**. Where elevator call buttons or keypads are provided, they shall comply with Sections 407.2.1 and 309.4.
- **Call buttons shall be raised or flush. Objects beneath hall call buttons shall protrude 1 inch (25 mm) maximum.**

EXCEPTIONS:

1**. Existing elevators** shall be **permitted to have recessed call buttons.**

2. The restriction on objects beneath call buttons **shall not apply to existing call buttons.**

131

Heights for Call Controls

407.2.1.1 Height

- Call buttons and keypads shall be located within one of the reach ranges specified in **Section 308**, **measured to the centerline of the highest operable part.**

EXCEPTION: Existing call buttons and existing keypads shall be permitted to be **located 54 inches (1370 mm) maximum above the floor,** measured to the centerline of the highest operable part.

132

Reach Ranges

308 Reach Ranges

- 308.1 General. Reach ranges shall **comply with Section 308**.
- 308.2 **Forward Reach**.
- 308.2.1 **Unobstructed**. Where a forward reach is:
- **unobstructed, the high forward reach shall be 48 inches (1220 mm) maximum and the low forward reach shall be 15 inches (380 mm) minimum above the floor.**

133

Unobstructed Forward Reach

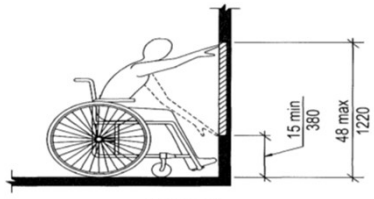


FIG. 308.2.1
UNOBSTRUCTED FORWARD REACH

134

Unobstructed Side Reach

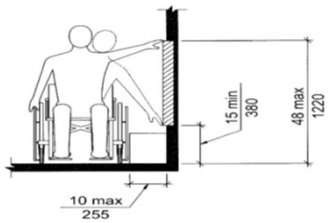
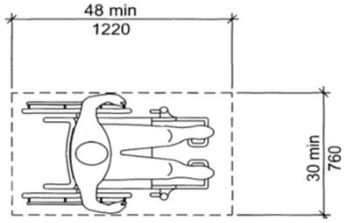


FIG. 308.3.1
UNOBSTRUCTED SIDE REACH

135

Clear Floor space



136

Floor Surfaces

302 Floor Surfaces

302.1 General.

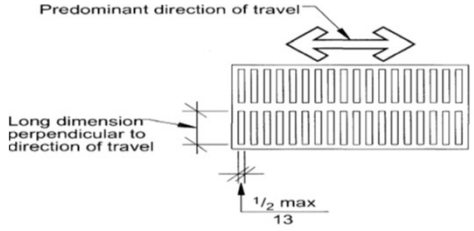
- **Floor surfaces shall be stable, firm, and slip resistant, and shall comply with Section 302. Changes in level in floor surfaces shall comply with Section 303.**

302.3 Openings.

- **Openings in floor surfaces shall be of a size that does not permit the passage of a 1/2 inch (13mm) diameter sphere**, except as allowed in Sections 407.4.3, 408.4.3, 409.4.3, 410.4, and 805.10.
- **Elongated openings** shall be placed so that the **long dimension is perpendicular to the predominant direction of travel**.

137

Openings in Floors



138

Changes in Level for Accessible Routes

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303 Changes in Level for accessible routes to the elevator
407.4.3 A117.1 ANSI for Platform to Hoistway clearance

303.1 General.
- Changes in level in floor surfaces shall comply with Section 303.

303.2 Vertical.
- **Changes in level of 1/4 inch (6.4 mm) maximum in height shall be permitted to be vertical**.

303.3 Beveled.
- **Changes in level greater than 1/4 inch (6.4 mm) in height and not more than 1/2 inch** (13 mm) maximum in height shall be beveled with a **slope not steeper than 1:2.**

139

139

Beveled changes in Floors

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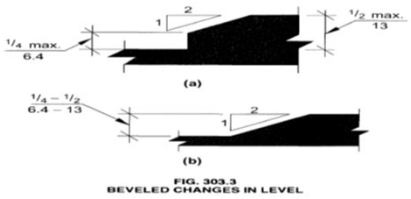

FIG. 303.3
BEVELED CHANGES IN LEVEL

140

140

Location of Call Buttons

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407.2.1.4 Location.
- **The call button that designates the up direction shall be located above the call button that designates the down direction**.

EXCEPTION: Destination-oriented elevators shall not be required to comply with Section 407.2.1.4.

141

Destination-Oriented Elevators

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Definition

***Destination-oriented elevator system*:**

- **An elevator system that provides *lobby controls* for the selection of destination floors, lobby indicators designating which elevator to board, and a car indicator designating the floors at which the car will stop.**

142

Destination-Oriented Elevators

143

Destination-Oriented Elevators

144

Signals and Call Buttons

407.2.1.5 Signals.

- **Call buttons shall have visible signals to indicate when each call is registered**
- **and when each call is answered. Call buttons shall provide an audible signal or mechanical motion of the button to indicate when each call is registered**.

EXCEPTIONS:
1 . **Destination-oriented elevators shall not be required to comply with Section 407.2.1.5, provided a *visible signal and audible tones and verbal announcements* complying with Section 407.2.1.7 are provided.**

2. **Existing elevators** shall not be required to comply with Section 407.2.1.5.

145

Keypads

407.2.1.6 Keypads.

- **Where keypads are provided, keypads shall be in a standard telephone keypad arrangement** and shall comply with Section 407.4.7.2.

146

Destination-oriented Elevator Signals.

407.2.1.7 Destination-oriented Elevator Signals.

- **Destination-oriented elevators shall be provided with a visible signal and audible tones and verbal announcements to indicate which car is responding to a call**. The audible tone and verbal announcement shall be activated by pressing a function button.
- **The function button shall be identified by the International Symbol for Accessibility and a raised indication.**

147

International Symbol for Accessibility

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148

Hall Signals. Hall signals, including in-car signals

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407.2.2 Hall Signals.

- Hall signals, including in-car signals, shall comply with Section 407.2.2.

407.2.2.1 Visible and Audible Signals.

- **A visible and audible signal shall be provided at each hoistway entrance to indicate which car is answering a call and the car's direction of travel**. Where in-car signals are provided they shall be visible from the floor area adjacent to the hall call buttons.

EXCEPTIONS:

1. **Destination-oriented elevators shall not be required to comply with Section 407.2.2.1, provided a visible signal and audible tones and verbal announcements complying with Section 407.2.1.7 are provided.**

2. **In existing elevators**, a signal indicating the direction of car travel shall not be required.

149

Visible Signals

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407.2.2.2 Visible Signals.

- **Visible signal fixtures shall be centered at 72 inches (1830 mm) minimum above the floor**. The visible signal elements shall be 2 1/2 inches (64 mm) minimum between the uppermost and lowest edges of the illuminated shape measured vertically. Signals shall be visible from the floor area adjacent to the hall call button.

EXCEPTIONS:

1. **Destination-oriented elevators** shall be permitted to have **signals visible from the floor area adjacent to the hoistway entrance.**

2. **Existing elevators** shall not be required to comply with Section 407.2.2.2

150

Audible Signals

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407.2.2.3 ANSI Audible Signals.

- **Audible signals shall *sound once for the up direction* and *twice for the down direction*, or shall have verbal annunciators that indicate the direction of elevator car travel.**
- **Audible signals shall have a *frequency of 1500 Hz* maximum. Verbal annunciators shall have a frequency of *300 Hz minimum and 3,000 Hz maximum*.**
- The **audible signal or verbal annunciator shall be 10 dBA minimum above ambient, but shall not exceed 80 dBA**, measured at the hall call button.

151

Audible Signals Exceptions

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EXCEPTIONS:

1. **Destination-oriented elevators** shall not be required to comply with Section 407.2.2.3, provided the audible tone and verbal announcement is the same as those given at the call button or call button keypad.

2. The requirement for the frequency and range of audible signals shall not apply in **existing elevators**

152

Signs and Floor Designation

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407.2.2.4 Differentiation.
- **Each destination-oriented elevator in a bank of elevators shall have audible and visible means for differentiation**.

407.2.3 Hoistway Signs.
- Signs at elevator hoistways shall comply with Section 407.2.3.

407.2.3.1 Floor Designation.
- **Floor designations shall be provided in *raised characters and braille* in complying with Sections 703.3 and 703.4. Raised characters shall be 2 inches (51 mm) minimum in height. *Floor designations shall be located on both jambs of elevator hoistway entrances*. A *raised star shall be provided on both jambs at the main entry level.***

407.2.3.2 Car Identification.
Destination-orientated elevators shall provide car identification in raised characters and braille complying with sections 703.3 and 703.4. Raised characters shall be 2 inches (51 mm) minimum in height.

153

Car Identifications

Car identifications

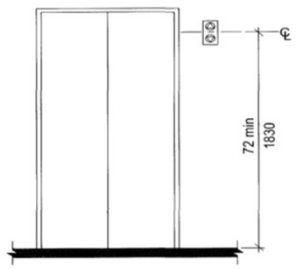
- **shall be located on both jambs of the hoistway immediately below the floor designation.**

407.2.4 Destination Signs

- **Where** signs indicate that elevators do not serve all landings**, signs in raised characters and braille** complying with Sections 703.3 and 703.4 shall be provided above the hall call button or keypad.

EXCEPTION: **Destination oriented elevator systems** shall not be required to comply with Section 407.2.4.

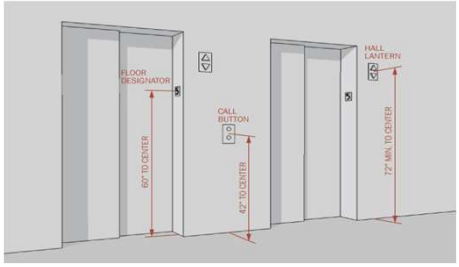
154



(a) Height of Signals

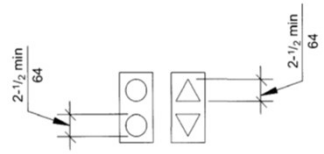
155

Heights of Elevator Buttons and visual devices



156

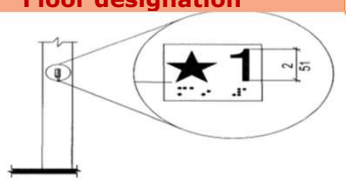
Size of Signals



(b) Size of Signals

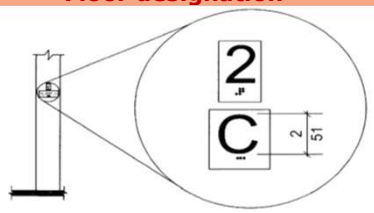
157

Floor designation



158

Floor designation



159

Elevator Door Requirements

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407.3 Elevator Door Requirements.
Hoistway and elevator car doors shall comply with Section 407.3.

407.3.1 Type.
Elevator doors shall be horizontal sliding type. *Car gates shall be prohibited.*

407.3.2 Operation.
Elevator hoistway and car doors shall *open and close automatically*.

EXCEPTION:
Existing manually operated hoistway swing doors shall be permitted, provided the **following criteria are met**:
a) The hoistway doors comply with Sections 404.2.2 and 404.2.8;
b) The car door closing is not initiated until the hoistway door is closed.

160

Car Gates Prohibited

161

Reopening Device

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407.3.3 Reopening Device.

- **Elevator doors shall be *provided with a reopening device*** complying with Section 407.3.3 that **shall stop and reopen a car door and hoistway door automatically if the door becomes obstructed by an object or person.**

EXCEPTION: **In existing elevators,** manually operated doors shall not be required to comply with Section 407.3.3.

162

Reopening/Hold Open Devices

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163

Heights of Reopening Devices

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407.3.3.1 Height.

- **The reopening device shall be activated by sensing an obstruction passing through the opening at 5 inches (125 mm) nominal and 29 inches (735 mm) nominal above the floor.**

407.3.3.2 Contact.
- **The reopening device *shall not require physical contact to be activated*,** although contact shall be permitted before the door
- reverses.

407.3.3.3 Duration.
- The reopening **device shall remain effective for *20 seconds minimum*.**

164

Door and Signal Timing

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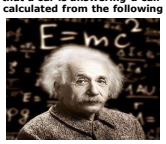
407.3.4 Door and Signal Timing.
The minimum acceptable time from notification that a car is answering a call until the doors of that car start to close shall be calculated from the following equation:

T = 0/(1.5 ftls) or T = 0/(455 mm/s) = 5 seconds minimum, where T equals the total time in seconds and 0 equals the distance (in feet or millimeters) from the point in the lobby or corridor 60 inches (1525 mm) directly in front of the farthest call button controlling that car to the centerline of its hoistway door.

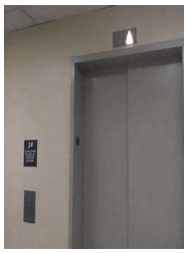


EXCEPTIONS:
1. For cars with in-car lanterns, "T" shall be permitted to begin when the signal is visible from the point 60 inches (1525 mm) directly in front of the farthest hall call button and the audible signal is sounded.

2. **Destination-oriented elevators** shall not be required to comply with Section 407.3.4.

165

Car Lanterns



166

Door Delay

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407.3.5 Door Delay.

Elevator doors shall *remain fully open in response to a car call for 3 seconds minimum.*

167

Door Opening Width

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407.3.6 Width.

- **Elevator door clear opening width shall comply with Table 407.4.1.**

EXCEPTION: In existing elevators, a power-operated car door complying with Section 404.2.2 shall be permitted.

168

Elevator Car Requirements

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407.4 Elevator Car Requirements.
- Elevator cars shall comply with Section 407.4., 407.4.1

Inside Dimensions.
- Inside dimensions of elevator cars shall comply with Table 407.4.1.

EXCEPTION:

Existing elevator car configurations that provide a *clear floor area of 16 square feet* (1.5 m2) minimum, and provide *a clear inside dimension of 36 inches* (915 mm) *minimum in width and 54 inches (1370 mm) minimum in depth, shall be permitted.*

407.4.2 Floor Surfaces
- . **Floor surfaces in elevator cars shall comply with Section 302**.

169

Table 407.4.1

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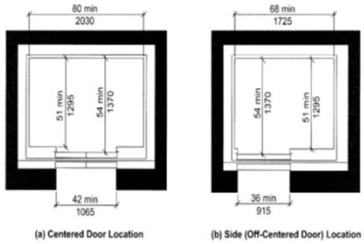
TABLE 407.4.1—MINIMUM DIMENSIONS OF ELEVATOR CARS

Door Location	Door Clear Opening Width	Inside Car, Side to Side	Inside Car, Back Wall to Front Return	Inside Car, Back Wall to Inside Face
Centered	42 inches (1065 mm)	80 inches (2030 mm)	51 inches (1295 mm)	54 inches (1370 mm)
Side (Off Center)	36 inches (915 mm)[1]	68 inches (1725 mm)	51 inches (1295 mm)	54 inches (1370 mm)
Any	36 inches (915 mm)[1]	54 inches (1370 mm)	80 inches (2030 mm)	80 inches (2030 mm)
Any	36 inches (915 mm)[1]	60 inches (1525 mm)[2]	60 inches (1525 mm)[2]	60 inches (1525 mm)[2]

[1] A tolerance of minus $\frac{5}{8}$ inch (16 mm) is permitted.
[2] Other car configurations that provide a 36-inch (915 mm) door clear opening width and a turning space complying with Section 304 with the door closed are permitted.

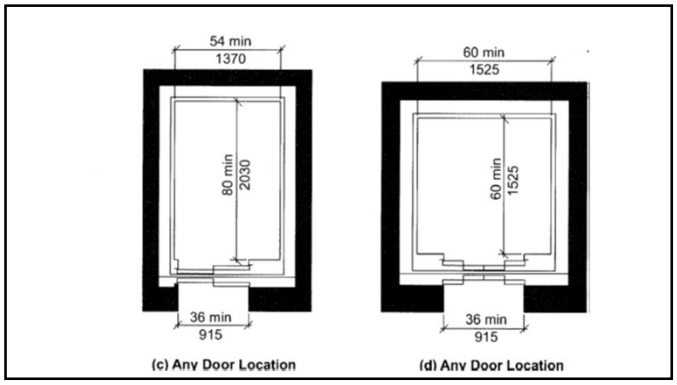
170

Elevator Car Requirements



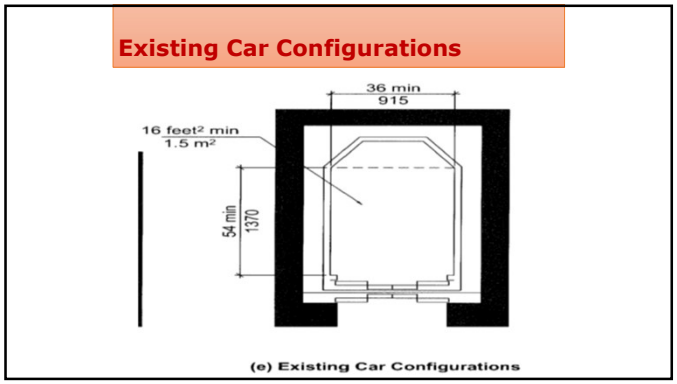
(a) Centered Door Location (b) Side (Off-Centered Door) Location

171



172

Existing Car Configurations



173

Platform to Hoistway Clearance

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407.4.3 Platform to Hoistway Clearance.

- The clearance between the car platform sill and the edge of any hoistway landing shall comply with ASME A 17.1 /CSA B44 listed in Section 105.2.5. – ***1 ¼"- Inches***

407.4.4 Leveling.

- Each car shall automatically stop and maintain position at floor landings within a tolerance of ***1/2 inch*** (13 mm) ***under rated loading to zero loading conditions.***

407.4.5 Illumination.

- The level of illumination at the car controls, platform, car threshold and car landing sill shall comply with ASM E A 17.1 /CSA 844 listed in Section 105.2.5.
- ***Five (5) Foot Candles***

174

Platform to Hoistway Clearance

175

Elevator Car Controls

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407.4.6 Elevator Car Controls.

Where provided, elevator car controls shall comply with Sections 407.4.6 and 309.

EXCEPTION: **In existing elevators**, where a new car operating panel complying with Section 407.4.6 is provided, existing car operating panels shall not be required to comply with Section 407.4.6. 407.4.6.1 Location. Controls shall be located within one of the reach ranges specified in Section 308.

176

Car Control Buttons

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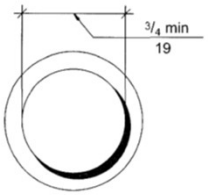
407.4.6.2 Buttons.

- **Car control buttons with floor designations shall be raised or flush**, and shall comply with Section 407.4.6.2.

EXCEPTION:
In existing elevators, buttons shall be permitted to be recessed. 407.4.6.2.1 Size. Buttons shall be 3/4 inch (19 mm) minimum in their smallest dimension

177

Car Control Button Dimensions



178

Car Control Button Dimensions

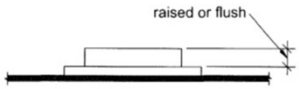


FIG. 407.4.6.2
ELEVATOR CAR CONTROL BUTTONS

179

Car Button Arrangement

407.4.6.2.2 Arrangement.

- **Buttons shall be arranged with *numbers in ascending order. Floors shall be designated ... -4, -3, -2, -1, 0, 1, 2, 3, 4,*** etcetera, ***with floors below the main entry floor designated with minus numbers*****. Numbers shall be permitted to be omitted, provided the remaining numbers are in sequence.**
- **Where a telephone keypad arrangement is used, the number key ("#") shall be utilized to enter the minus symbol ("-").** When two or more columns of buttons are provided they shall read from left to right.

180

Keypads and Emergency Controls

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407.4.6.3 Keypads.
- Where provided, **car control keypads shall be in a standard telephone** keypad arrangement and shall comply with Section 407.4.7.2.

407.4.6.4 Emergency Controls.
- **Emergency controls shall comply with Section 407.4.6.4. 407.4.6.4.1**

Height.
- ***Emergency control buttons shall have their centerlines 35 inches (890 mm) minimum above the floor.***

407.4.6.4.2 Location.
- **Emergency controls, including the emergency alarm, *shall be grouped at the bottom of the panel.***

181

Keypads and Emergency Controls

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407.4.7.1.3 Symbols.
- **The control button for the emergency stop, alarm, door open, door close, main entry floor, and phone, shall be identified with raised symbols and braille as shown in Table 407.4.7.1.3.**

407.4.7.1.4 Visible Indicators.
- **Buttons with floor designations shall be provided with visible indicators to show that a call has been registered**. The visible indication shall extinguish when the car arrives at the designated floor.

182

Keypads

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407.4.7.2 Keypads
- Keypad keys shall be identified by visual characters complying with Section 703.2 centered on the corresponding keypad button.

- ***The number five key shall have a single raised dot.*** The dot shall have a base diameter of 0.118 inch (3 mm) minimum and 0.120 inch (3.05 mm) maximum, and a height of 0.025 inch (0.6 mm) minimum and 0.037 inch (0.9 mm) maximum.

183

Elevator Car Call Sequential Step Scanning

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407.4.8 Elevator Car Call Sequential Step Scanning.

- **Elevator car call sequential step scanning shall be provided where car control buttons are *provided more than 48 inches (1220 mm) above the floor.***
- **Floor selection shall be accomplished by applying momentary or constant pressure to the up or down scan button. The up scan button shall sequentially select floors above the current floor.**
- **The down scan button shall sequentially select floors below the current floor**. When pressure is removed from the up or down scan button for more than 2 seconds, the last floor selected shall be registered as a car call. The up and down scan button shall be located adjacent to or immediately above the emergency control buttons.

184

Car Position Indicators

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407.4.9 Car Position Indicators.
- **Audible and visible car position indicators shall be provided in elevator cars.**

407.4.9.1 Visible Indicators.
- **Visible indicators shall comply with Section 407.4.9.1.**
- 407.4.9.1.1 Size. **Characters shall be 1/2 inch (13 mm) minimum in height.**

407.4.9.1.2 Location.
- **Indicators shall be located above the car control panel or above the door.**

407.4.9.1.3 Floor Arrival.
- **As the car passes a floor and when a car stops at a floor served by the elevator, the corresponding character shall illuminate.**

185

Car Position Indicators

186

Audible Indicators

407.4.9.2 Audible Indicators.
- **Audible indicators shall comply with Section 407.4.9.2. 407.4.9.2.1**

Signal Type.
- **The signal shall be an automatic verbal annunciator that announces the floor at which the car is about to stop**. The verbal announcement indicating the floor shall be completed prior to the initiation of the door opening.

EXCEPTION: **For elevators other than destination-oriented elevators that have a rated speed of 200 feet per minute (1 m/s) maximum, a non-verbal audible signal with a frequency of 1500 Hz maximum that sounds as the car passes or is about to stop at a floor served by the elevator shall be permitted.**

187

Signal Level and Frequency

407.4.9.2.2 Signal Level.
The verbal annunciator *shall be 10 dBA minimum above ambient, but shall not exceed 80 dBA*, measured at the annunciator.

407.4.9.2.3 Frequency.
The **verbal annunciator *shall have a frequency of 300 Hz minimum and 3,000 Hz maximum.***

188

Emergency Communications

407.4.10 Emergency Communications.
- **Emergency two-way communication systems between the elevator car and a point outside the hoistway shall comply with Section 407.4.10 and ASME A 17.1 ICSA B44 listed in Section 105.2.5.**

407.4.10.1 Height.
- **The highest operable part of a two-way communication system shall comply with Section 308.**

407.4.10.2 Identification.
- **Raised characters and braille** complying with Sections 703.3 and 703.4 and raised symbols complying with Section 407.4.7.1.3 shall be provided adjacent to the device.

189

Emergency Communications

190

Limited Use/Limited-application Elevators

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408 Limited-use Limited-application Elevators

408.1 General.

- Limited-use/limited-application elevators shall comply with Section 408 and ASME A17.11 CSA B44 listed in Section 105.2.5.
- **Elevator operation shall be automatic.**

191

LULA

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- ***A LULA is a Limited Use/Limited Application hybrid between a commercial elevator and a wheelchair lift. While it looks and works like a traditional elevator, a LULA's only purpose is to provide accessibility for handicapped residents or visitors to a building.***
- **LULA elevators can *travel vertically up to 25 feet at a speed of up to 30 feet per minute. A LULA elevator is limited to a capacity of 1,400 pounds and 18 square feet of floor space*.**
- **A LULA elevator takes up about half the space of a traditional elevator** and requires only 14 inches for a pit, 102 inches of overhead space for an existing building, or 134 inches for a new construction**. The LULA's hoistway may be made of wood or sheetrock, unlike the concrete hoistway required for a traditional elevator.**

192

LULA

193

LULA Accessible Requirements

Same as Elevator

408.2 Elevator Landing Requirements.
- **Landings serving limited-use/limited application** elevators shall comply with **Section 408.2**.

408.2.1 Call Controls.
- **Elevator call buttons and keypads** shall comply with Section 407.2.1.

408.2.2 Hall Signals.
- **Hall signals shall comply with Section 407.2.2.**

408.2.3 Hoistway Signs.
- **Signs at elevator hoistways** shall comply with Section 407.2.3.

194

LULA Accessible Requirements

408.3 Elevator Door Requirements.
- **Elevator hoistway doors** shall comply with Section 408.3. 408.3.1

Sliding Doors. – Same as Elevator
- **Sliding hoistway and car doors** shall comply with Sections 407.3.1 through 407.3.3, and 408.3.3.

408.3.2 Swinging Doors
- . **Swinging hoistway doors shall open and close automatically** and shall comply with Sections 408.3.2, 404, and 407.3.2.

408.3.2.1 Power Operation.
- Swinging doors shall be power-operated and shall comply with ANSI/BHMA A 156.19 listed in Section 105.2.3.

408.3.2.2 Duration.
- **Power-operated swinging doors shall *remain open for 20 seconds minimum when activated.***

195

LULA Accessible Requirements

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408.3.3 Door Location and Width.
- Car doors shall comply with Section 408.3.3.

408.3.3.1 Cars with Single Door or Doors on Opposite Ends.
- **Car doors shall be positioned at the narrow end of cars with a single door and on cars with doors on opposite ends. Doors shall provide a clear *opening width of 32 inches (815 mm) minimum*.**

196

LULA Accessible Requirements

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408.3.3.2 Cars with Doors on Adjacent Sides.

- **Car doors shall be permitted to be located on adjacent**
- **sides of cars that provide an 18 square foot**
- (1.67 m2) **platform**.

- **Doors located on the narrow end of cars shall provide a clear opening width of 36 inches (915 mm) minimum**.

- **Doors located on the long side shall provide a clear opening width of 42 inches (1065 mm) minimum and be located as far as practicable from the door on the narrow end.**

- EXCEPTION: Car doors that provide a clear opening width of 36 inches (915 mm) minimum shall be permitted to be located on adjacent sides of cars that provide a clear floor area of 51 inches (1295 mm) in width and 51 inches (1295 mm) in depth.

197

LULA Accessible Requirements

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408.4 Elevator Car Requirements.
Elevator cars shall comply with Section 408.4.34

408.4.1 Inside Dimensions.
- ***Elevator cars shall provide a clear floor width of 42 inches* (1065 mm) minimum. The clear floor area shall not be less than 15.75 square feet (**1.46 m2).

EXCEPTION: **For installations in existing buildings**, elevator cars that provide a clear floor area of 15 square feet (1.4 m2) minimum, and provide a clear inside dimension of 36 inches (915 mm) minimum in width and 54 inches (1370 mm) minimum in depth, shall be permitted. This exception shall not apply to cars with doors on adjacent sides.

198

LULA Accessible Requirements

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408.4.3 Platform to Hoistway Clearance. – Same a elevator
The clearance between the car platform sill and the edge of any hoistway landing shall comply with ASME A17.1/CSA B441 listed in Section 105.2.5.

199

LULA Accessible Requirements

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Same a Elevator

408.4.4 Leveling.
Elevator car leveling shall comply with Section 407.4.4. 408.4.5

Illumination.
Elevator car illumination shall comply with Section 407.4.5.

408.4.6 Elevator Car Controls.
Elevator car controls shall comply with Section 407.4.6.

Control panels shall be centered on a side wall.
408.4.7

Designations and Indicators of Car Controls.
shall comply with Section 407.4.7.

408.4.8 Emergency Communications.
Car emergency signaling devices complying with Section 407.4.10 shall be provided.

200

TABLE 407.4.7.1.3—CONTROL BUTTON IDENTIFICATION

Control Button Type	Raised Symbol	Braille Message	Proportions (Open to indicate unused dots within each braille cell)
DOOR OPEN		op'en"	
REAR/SIDE DOOR OPEN		op'en"	
DOOR CLOSE		close	
REAR/SIDE DOOR CLOSE		close	
MAIN		ma'in"	
ALARM		al'arm"	
PHONE		ph'one"	
EMERGENCY STOP (WHEN PROVIDED) X on face of octagon is not required to be tactile		"st'op	

201

Platform Lifts

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410 Platform Lifts

- **410.1 General. Platform lifts shall comply with Section 410 and ASME A 18.1 listed in Section 105.2.6.**
- **Platform lifts *shall not be attendant operated and shall provide unassisted entry and exit from the lift*.**

202

Platform Lifts

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203

Platform Lifts

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410.2 Lift Entry.
Lifts with doors or gates shall comply with Section 410.2.1. Lifts with ramps shall comply with Section 410.2.2.

410.2.1 Doors and Gates.

- **Doors and gates shall be low energy power operated doors or gates** complying with Section 404.3. Doors shall ***remain open for 20 seconds minimum.*** On lifts with one door or with doors on opposite ends, the end door clear opening width shall be 32 inches (815 mm) minimum.
- On lifts with one door on a narrow end and one door on a long side, the end door clear opening width shall be 36 inches (915 mm) minimum. Side door clear opening width shall be 42 inches (1065 mm) minimum.
- Where a door is provided on a long side and on a narrow end of a lift, the side door shall be located with either the strike side or the hinge side in the corner furthest from the door on the narrow end.

204

Platform Lifts Exceptions

EXCEPTIONS:
1. Doors or gates shall be permitted to be of the self-closing, manual type, where that door or gate provides access to a narrow end of the platform that serves only one landing. This exception shall not apply to doors or gates with ramps.

2. Lifts serving two landings maximum and having doors or gates on adjacent sides shall be permitted to have self closing manual doors or gates provided that the side door or gate is located with the strike side furthest from the end door. This exception shall not apply to door or gates with ramps.

205

Platform Lifts – Accessible Requirements

410.2.2 Ramps.
- **Ramp widths shall not be less than the platform opening they serve**.

410.3 Floor Surfaces.
- Floor surfaces of platform lifts shall comply with Section 302.

410.4 Platform to Runway Clearance.
- **The clearance between the platform sill and the edge of any runway**
- **landing *shall be 1 ¼-inches (32 mm) maximum*.**

410.5 Clear Floor Space.
- Clear floor space of platform lifts shall comply with Section 410.5. I 410.5.1 Lifts with Single Door or Doors on Opposite Ends. Platform lifts with a single door or with doors on opposite ends shall provide a clear floor **width of 36 inches (915 mm) minimum and a clear floor depth of 48 inches** (1220 mm) minimum.

206

Platform Lifts – Accessible Requirements

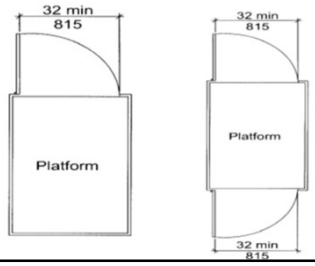
- **410.5.2 Lifts with Doors on Adjacent Sides.**
- Platform lifts with doors on adjacent sides shall **provide a clear floor width of 42 inches (1065 mm) minimum and a clear floor depth of 60 inches (1525 mm) minimum.**

EXCEPTION: In existing buildings, platform lifts with doors on adjacent sides shall be permitted to provide a clear floor width of 36 inches (915 mm) and a clear floor depth of 60 inches (1525 mm).

410.6 Operable Parts.
- Controls for platform lifts shall comply with Section 309.

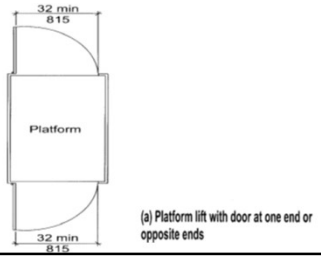
207

Platform Lifts – Accessible Requirements



208

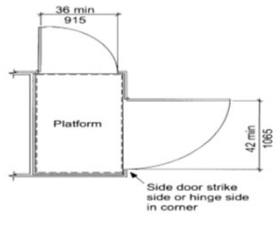
Platform Lifts – Accessible Requirements



(a) Platform lift with door at one end or opposite ends

209

Platform Lifts – Accessible Requirements



(b) Platform with doors on adjacent sides

210

210

Bullet Points

- Elevators and Accessibility
- How do we get there per code, scoping and installation
- The UCC, ICC A117.1 ANSI and ASME
- Accessible Route – both arriving and egress
- Exterior site and interior elements of a building(s)
- Accessible elements on Route
- Accessibility within a site
- Different type of elevators allowed for accessibility
- Applications of accessible elevators
- Power for elevators
- Features/Elements for accessible elevators, LULA and Platform lifts
- Safety, visual, audible controls for accessible elevators

211

Thank You

Any Questions????

212

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213