

## ADA-Compliant Modular Elevators

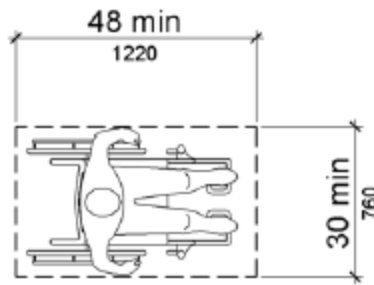
It is important architects are familiar with the Americans with Disabilities Act (ADA) rules and regulations. Phoenix Modular Elevator makes sure all of our models meet these requirements so you don't have to concern yourself with most of them. Below are the standards that apply to elevators. The portions in blue are building-related items that architects must incorporate into the building design, or building owners need to pay attention to. Everything else is on us!

### 407.1 General

- Elevators shall comply with 407 and with ASME A17.1 (incorporated by reference, see "Referenced Standards" in Chapter 1). They shall be passenger elevators as classified by ASME A17.1. Elevator operation shall be automatic.
- The ADA and other Federal civil rights laws require that accessible features be maintained in working order so that they are accessible to and usable by those people they are intended to benefit. Building owners should note that the ASME Safety Code for Elevators and Escalators requires routine maintenance and inspections. Isolated or temporary interruptions in service due to maintenance or repairs may be unavoidable; however, failure to take prompt action to effect repairs could constitute a violation of Federal laws and these requirements.

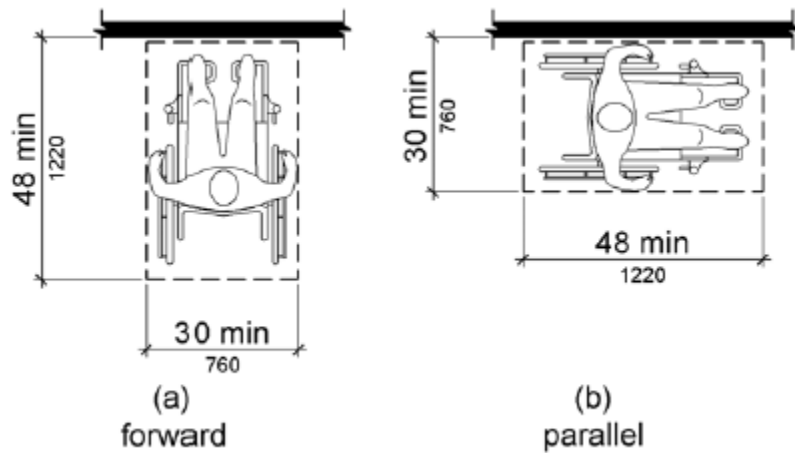
### 407.2 Elevator Landing Requirements

- **407.2.1 Call Controls.** Where elevator call buttons or keypads are provided, they shall comply with 407.2.1 and 309.4. Call buttons shall be raised or flush.
- **407.2.1.1 Height.** Call buttons and keypads shall be located within one of the reach ranges specified in 308, measured to the centerline of the highest operable part.
- **407.2.1.2 Size.** Call buttons shall be  $\frac{3}{4}$  inch (19 mm) minimum in the smallest dimension.
- **407.2.1.3 Clear Floor or Ground Space.** A clear floor or ground space complying with 305 shall be provided at call controls.
  - **305.2 Floor or Ground Surfaces.** Floor or ground surfaces of a clear floor or ground space shall comply with 302. Changes in level are not permitted.
  - **305.3 Size.** The clear floor or ground space shall be 30 inches (760 mm) minimum by 48 inches (1220 mm) minimum.



**Figure 305.3 Clear Floor or Ground Space**

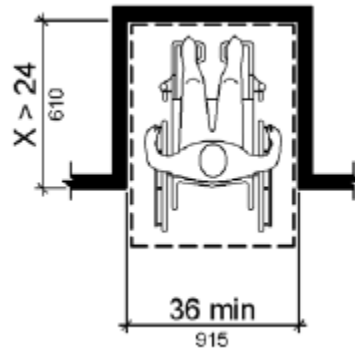
- **305.4 Knee and Toe Clearance.** Unless otherwise specified, clear floor or ground space shall be permitted to include knee and toe clearance complying with 306.
- **305.5 Position.** Unless otherwise specified, clear floor or ground space shall be positioned for either forward or parallel approach to an element.



**Figure 305.5 Position of Clear Floor or Ground Space**

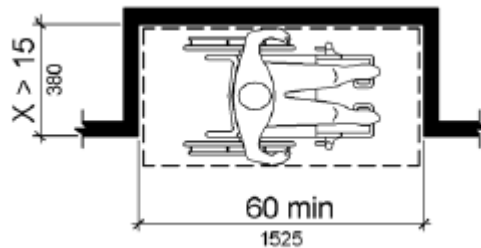
- **305.6 Approach.** One full unobstructed side of the clear floor or ground space shall adjoin an accessible route or adjoin another clear floor or ground space.

- **305.7 Maneuvering Clearance.** Where a clear floor or ground space is located in an alcove or otherwise confined on all or part of three sides, additional maneuvering clearance shall be provided in accordance with 305.7.1 and 305.7.2.
- **305.7.1 Forward Approach.** Alcoves shall be 36 inches (915 mm) wide minimum where the depth exceeds 24 inches (610 mm).



**Figure 305.7.1 Maneuvering Clearance in an Alcove, Forward Approach**

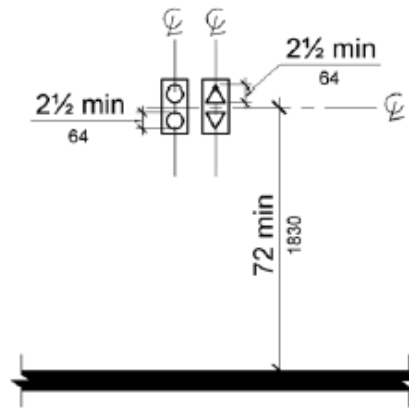
- **305.7.2 Parallel Approach.** Alcoves shall be 60 inches (1525 mm) wide minimum where the depth exceeds 15 inches (380 mm).



**Figure 305.7.2 Maneuvering Clearance in an Alcove, Parallel Approach**

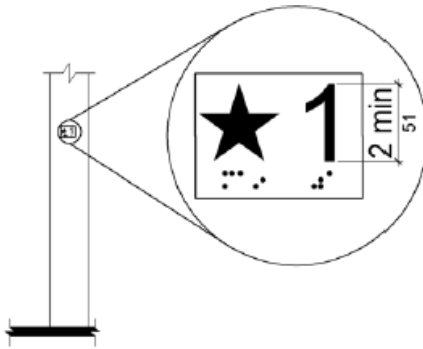
- **407.2.1.4 Location.** The call button that designates the up direction shall be located above the call button that designates the down direction.
- **407.2.1.5 Signals.** Call buttons shall have visible signals to indicate when each call is registered and when each call is answered.

- **407.2.1.6 Keypads.** Where keypads are provided, keypads shall be in a standard telephone keypad arrangement and shall comply with 407.4.7.2.
- **407.2.2 Hall Signals.** Hall signals, including in-car signals, shall comply with 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.
- **407.2.2.2 Visible Signals.** Visible signal fixtures shall be centered at 72 inches (1830 mm) minimum above the finish floor or ground. The visible signal elements shall be 2 ½ inches (64 mm) minimum measured along the vertical centerline of the element. Signals shall be visible from the floor area adjacent to the hall call button.



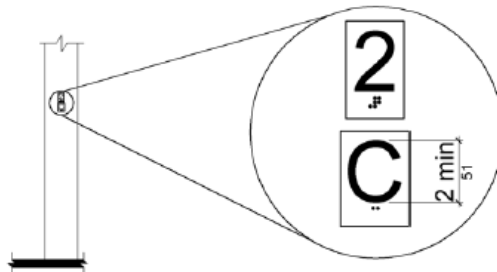
**Figure 407.2.2.2 Visible Hall Signals**

- **407.2.2.3 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 3000 Hz maximum. The audible signal and verbal annunciator shall be 10 dB minimum above ambient, but shall not exceed 80 dB, measured at the hall call button.
- **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 407.2.3.
- **407.2.3.1 Floor Designation.** Floor designations complying with 703.2 and 703.4.1 shall be provided on both jambs of elevator hoistway entrances. Floor designations shall be provided in both tactile characters and braille. Tactile characters shall be 2 inches (51 mm) high minimum. A tactile star shall be provided on both jambs at the main entry level.



**Figure 407.2.3.1 Floor Designations on Jambs of Elevator Hoistway Entrances**

- 407.2.3.2 Car Designations.** Destination-oriented elevators shall provide tactile car identification complying with 703.2 on both jambs of the hoistway immediately below the floor designation. Car designations shall be provided in both tactile characters and braille. Tactile characters shall be 2 inches (51 mm) high minimum.



**Figure 407.2.3.2 Car Designations on Jambs of Destination-Oriented Elevator Hoistway Entrances**

### **407.3 Elevator Door Requirements.**

- 407.3.1 Type.** Elevator doors shall be the horizontal sliding type. Car gates shall be prohibited.
- 407.3.2 Operation.** Elevator hoistway and car doors shall open and close automatically.
- 407.3.3 Reopening Device.** Elevator doors shall be provided with a reopening device complying with 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.

- **407.3.3.1 Height.** The 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 finish floor.
- **407.3.3.2 Contact.** The device shall not require physical contact to be activated, although contact is permitted to occur before the door reverses.
- **407.3.3.3 Duration.** Door reopening devices shall remain effective for 20 seconds minimum.
- **407.3.4 Door and Signal Timing.** The minimum acceptable time from notification that a car is answering a call or notification of the car assigned at the means for the entry of destination information until the doors of that car start to close shall be calculated from the following equation:  $T = D/(1.5 \text{ ft/s})$  or  $T = D/(455 \text{ mm/s}) = 5$  seconds minimum where T equals the total time in seconds and D 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.
- **407.3.5 Door Delay.** Elevator doors shall remain fully open in response to a car call for 3 seconds minimum.
- **407.3.6 Width.** The width of elevator doors shall comply with Table 407.4.1.

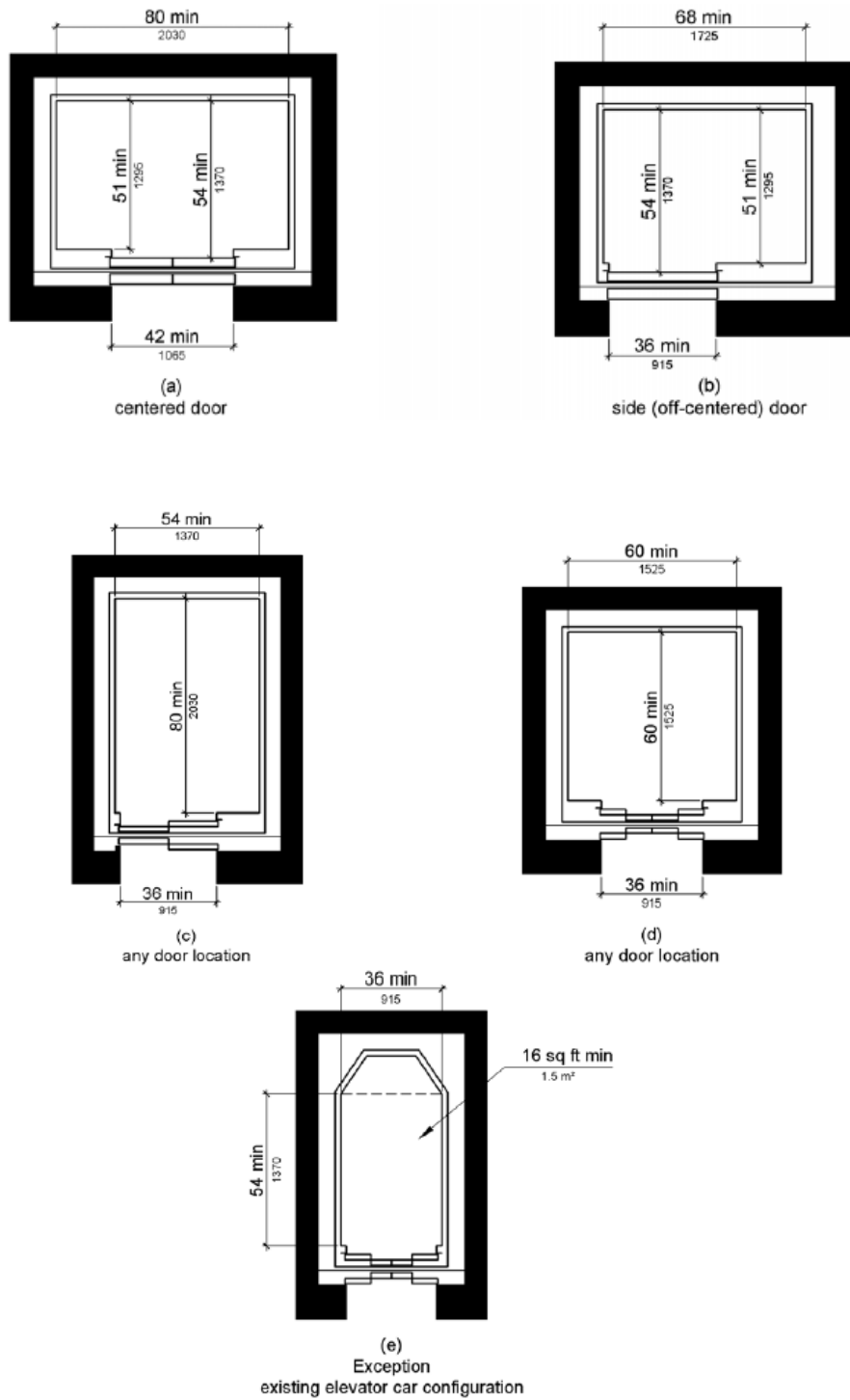
## 407.4 Elevator Car Requirements

- **407.4.1 Car Dimensions.** Inside dimensions of elevator cars and clear width of elevator doors shall comply with Table 407.4.1.

Table 407.4.1 Elevator Car Dimensions				
	Minimum Dimensions			
Door Location	Door Clear Width	Inside Car, Side to Side	Inside Car, Back Wall to Front Return	Inside Car, Back Wall to Inside Face of Door
Centered	42 inches (1065 mm)	80 inches (2030 mm)	51 inches (1295 mm)	54 inches (1370 mm)
Side (off-centered)	36 inches (915 mm) <sup>1</sup>	68 inches (1725 mm)	51 inches (1295 mm)	54 inches (1370 mm)
Any	36 inches (915 mm) <sup>1</sup>	54 inches (1370 mm)	80 inches (2030 mm)	80 inches (2030 mm)
Any	36 inches (915 mm) <sup>1</sup>	60 inches (1525 mm) <sup>2</sup>	60 inches (1525 mm) <sup>2</sup>	60 inches (1525 mm) <sup>2</sup>

1. A tolerance of minus 5/8 inch (16 mm) is permitted.

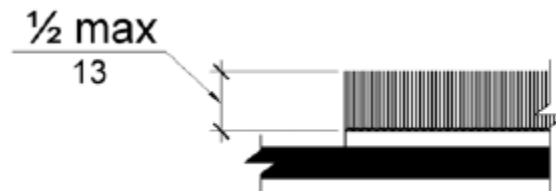
2. Other car configurations that provide a turning space complying with 304 with the door closed shall be permitted.



**Figure 407.4.1 Elevator Car Dimensions**

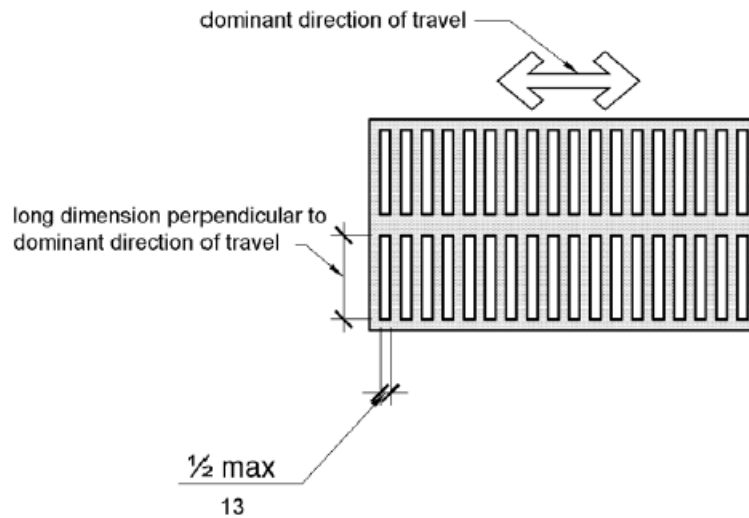


- **407.4.2 Floor Surfaces.** Floor surfaces in elevator cars shall comply with 302 and 303.
  - **302.1 General.** Floor and ground surfaces shall be stable, firm, and slip resistant and shall comply with 302.
  - **Advisory 302.1 General.** A stable surface is one that remains unchanged by contaminants or applied force, so that when the contaminant or force is removed, the surface returns to its original condition. A firm surface resists deformation by either indentations or particles moving on its surface. A slip-resistant surface provides sufficient frictional counterforce to the forces exerted in walking to permit safe ambulation.
  - **302.2 Carpet.** Carpet or carpet tile shall be securely attached and shall have a firm cushion, pad, or backing or no cushion or pad. Carpet or carpet tile shall have a level loop, textured loop, level cut pile, or level cut/uncut pile texture. Pile height shall be  $\frac{1}{2}$  inch (13 mm) maximum. Exposed edges of carpet shall be fastened to floor surfaces and shall have trim on the entire length of the exposed edge. Carpet edge trim shall comply with 303.
  - **Advisory 302.2 Carpet.** Carpets and permanently affixed mats can significantly increase the amount of force (roll resistance) needed to propel a wheelchair over a surface. The firmer the carpeting and backing, the lower the roll resistance. A pile thickness up to  $\frac{1}{2}$  inch (13 mm) measured to the backing, cushion or pad) is allowed, although a lower pile provides easier wheelchair maneuvering. If a backing, cushion or pad is used, it must be firm. Preferably, carpet pad should not be used because the soft padding increases roll resistance.



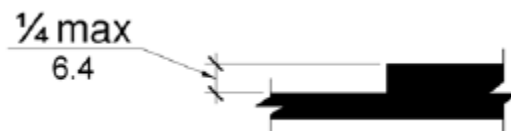
**Figure 302.2 Carpet Pile Height**

- **302.3 Openings.** Openings in floor or ground surfaces shall not allow passage of a sphere more than  $\frac{1}{2}$  inch (13 mm) diameter except as allowed in 407.4.3, 409.4.3, 410.4, 810.5.3 and 810.10. Elongated openings shall be placed so that the long dimension is perpendicular to the dominant direction of travel.



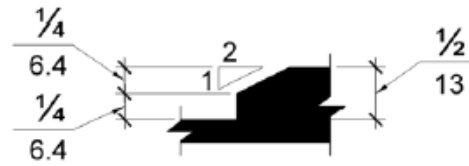
**Figure 302.3 Elongated Openings in Floor or Ground Surfaces**

- **303 Changes in Level**
- **303.1 General.** Where changes in level are permitted in floor or ground surfaces, they shall comply with 303.
- **303.2 Vertical.** Changes in level of  $\frac{1}{4}$  inch (6.4 mm) high maximum shall be permitted to be vertical.



**Figure 303.2 Vertical Change in Level**













- **303.3 Beveled.** Changes in level between  $\frac{1}{4}$  inch (6.4 mm) high minimum and  $\frac{1}{2}$  inch (13 mm) high maximum shall be beveled with a slope not steeper than 1:2.
- **Advisory 303.3 Beveled.** A change in level of  $\frac{1}{2}$  inch (13 mm) is permitted to be  $\frac{1}{4}$  inch (6.4 mm) vertical plus  $\frac{1}{4}$  inch (6.4 mm) beveled. However, in no case may the combined change in level exceed  $\frac{1}{2}$  inch (13 mm). Changes in level exceeding  $\frac{1}{2}$  inch (13 mm) must comply with 405 (Ramps) or 406 (Curb Ramps).



**Figure 303.3 Beveled Change in Level**

- **303.4 Ramps.** Changes in level greater than  $\frac{1}{2}$  inch (13 mm) high shall be ramped, and shall comply with 405 or 406.
- **407.4.3 Platform to Hoistway Clearance.** The clearance between the car platform sill and the edge of any hoistway landing shall be  $1\frac{1}{4}$  inch (32 mm) maximum.
- **407.4.4 Leveling.** Each car shall be equipped with a self-leveling feature that will automatically bring and maintain the car at floor landings within a tolerance of  $\frac{1}{2}$  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 be 5-foot candles (54 lux) minimum.
- **407.4.6 Elevator Car Controls.** Where provided, elevator car controls shall comply with 407.4.6 and 309.4.
- **407.4.6.1 Location.** Controls shall be located within one of the reach ranges specified in 308.
- **407.4.6.2 Buttons.** Car control buttons with floor designations shall comply with 407.4.6.2 and shall be raised or flush.
- **407.4.6.2.1 Size.** Buttons shall be  $\frac{3}{4}$  inch (19 mm) minimum in their smallest dimension.
- **407.4.6.2.2 Arrangement.** Buttons shall be arranged with numbers in ascending order. When two or more columns of buttons are provided, they shall read from left to right.
- **407.4.6.3 Keypads.** Car control keypads shall be in a standard telephone keypad arrangement and shall comply with 407.4.7.2.
- **407.4.6.4 Emergency Controls.** Emergency controls shall comply with 407.4.6.4.
- **407.4.6.4.1 Height.** Emergency control buttons shall have their centerlines 35 inches (890 mm) minimum above the finish floor.
- **407.4.6.4.2 Location.** Emergency controls, including the emergency alarm, shall be grouped at the bottom of the panel.
- **407.4.7 Designations and Indicators of Car Controls.** Designations and indicators of car controls shall comply with 407.4.7.
- **407.4.7.1 Buttons.** Car control buttons shall comply with 407.4.7.1.
- **407.4.7.1.1 Type.** Control buttons shall be identified by tactile characters complying with 703.2.

- **407.4.7.1.2 Location.** Raised character and braille designations shall be placed immediately to the left of the control button to which the designations apply.
- **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 tactile symbols as shown in Table 407.4.7.1.3.

<b>Table 407.4.7.1.3 Elevator Control Button Identification</b>		
<b>Control Button</b>	<b>Tactile Symbol</b>	<b>Braille Message</b>
Emergency Stop		 "ST"OP Three cells
Alarm		 AL"AR"M Four cells
Door Open		 OP"EN" Three cells
Door Close		 CLOSE Five cells
Main Entry Floor		 MA"IN" Three cells
Phone		 PH"ONE" Four cells

- **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.
- **407.4.7.2 Keypads.** Keypads shall be identified by characters complying with 703.5 and shall be centered on the corresponding keypad button. The number five key shall have a single raised dot. The dot shall be 0.118 inch (3 mm) to 0.120 inch (3.05 mm) base diameter and in other aspects comply with Table 703.3.1.
- **407.4.8 Car Position Indicators.** Audible and visible car position indicators shall be provided in elevator cars.
- **407.4.8.1 Visible Indicators.** Visible indicators shall comply with 407.4.8.1.
- **407.4.8.1.1 Size.** Characters shall be 1/2 inch (13 mm) high minimum.
- **407.4.8.1.2 Location.** Indicators shall be located above the car control panel or above the door.
- **407.4.8.1.3 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.
- **407.4.8.1.4 Destination Indicator.** In destination-oriented elevators, a display shall be provided in the car with visible indicators to show car destinations.
- **407.4.8.2 Audible Indicators.** Audible indicators shall comply with 407.4.8.2.
- **407.4.8.2.1 Signal Type.** The signal shall be an automatic verbal annunciator which announces the floor at which the car is about to stop.
- **407.4.8.2.2 Signal Level.** The verbal annunciator shall be 10 dB minimum above ambient, but shall not exceed 80 dB, measured at the annunciator.
- **407.4.8.2.3 Frequency.** The verbal annunciator shall have a frequency of 300 Hz minimum to 3000 Hz maximum.
- **407.4.9 Emergency Communication.** Emergency two-way communication systems shall comply with 308. Tactile symbols and characters shall be provided adjacent to the device and shall comply with 703.2.