

Chapter 4. Accessible Routes

401 General

401.1 Scope. Accessible routes required by the scoping provisions adopted by the administrative authority shall comply with the applicable provisions of Chapter 4.

402 Accessible Routes

402.1 General. Accessible routes shall comply with Section 402.

402.2 Components. Accessible routes shall consist of one or more of the following components: Walking surfaces with a slope not steeper than 1:20, doors and doorways, ramps, curb ramps excluding the flared sides, elevators, and platform lifts. All components of an accessible route shall comply with the applicable portions of this standard.

402.3 Revolving Doors, Revolving Gates, and Turnstiles. Revolving doors, revolving gates, and turnstiles shall not be part of an accessible route.

403 Walking Surfaces

403.1 General. Walking surfaces that are a part of an accessible route shall comply with Section 403.

403.2 Floor Surface. Floor surfaces shall comply with Section 302.

403.3 Slope. The running slope of walking surfaces shall not be steeper than 1:20. The cross slope of a walking surface shall not be steeper than 1:48.

403.4 Changes in Level. Changes in level shall comply with Section 303.

403.5 Clear Width. Clear width of an accessible route shall comply with Table 403.5.

Table 403.5—Clear Width of an Accessible Route

Segment Length	Minimum Segment Width
≤ 24 inches (610 mm)	32 inches (815 mm) ¹
> 24 inches (610 mm)	36 inches (915 mm)

¹Consecutive segments of 32 inches (815 mm) in width must be separated by a route segment 48 inches (1220 mm) minimum in length and 36 inches (915 mm) minimum in width.

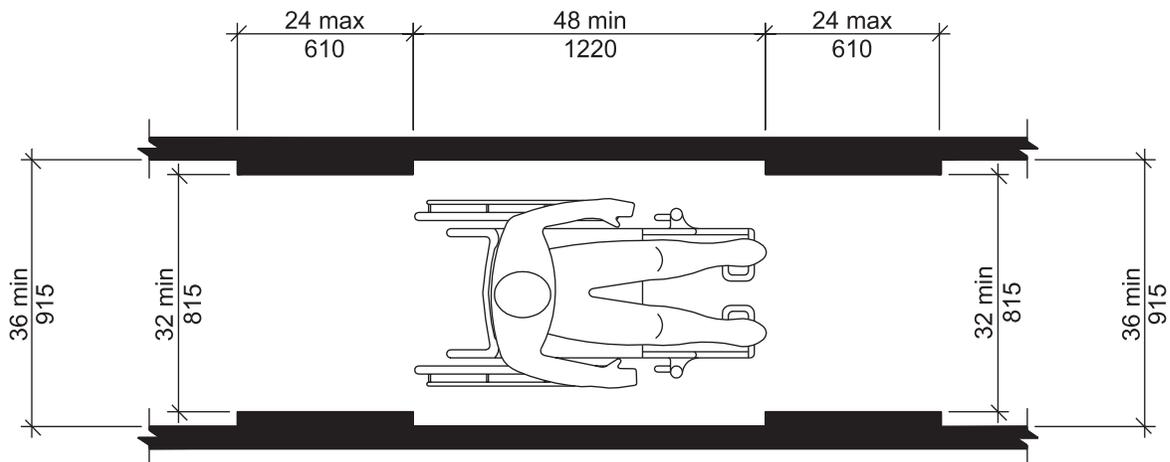


Fig. 403.5
Clear Width of an Accessible Route

403.5.1 Clear Width at Turn. Where an accessible route makes a 180 degree turn around an object that is less than 48 inches (1220 mm) in width, clear widths shall be 42 inches (1065 mm) minimum approaching the turn, 48 inches (1220 mm) minimum during the turn, and 42 inches (1065 mm) minimum leaving the turn.

EXCEPTION: Section 403.5.1 shall not apply where the clear width at the turn is 60 inches (1525 mm) minimum.

403.5.2 Passing Space. An accessible route with a clear width less than 60 inches (1525 mm) shall provide passing spaces at intervals of 200 feet (61 m) maximum. Passing spaces shall be either a 60 inch (1525 mm) minimum by 60 inch (1525 mm) minimum space, or an intersection of two walking surfaces that provide a T-shaped turning space complying with Section 304.3.2, provided the base and arms of the T-shaped space extend 48 inches (1220 mm) minimum beyond the intersection.

403.6 Handrails. Where handrails are required at the side of a corridor they shall comply with Sections 505.4 through 505.9.

404 Doors and Doorways

404.1 General. Doors and doorways that are part of an accessible route shall comply with Section 404.

404.2 Manual Doors. Manual doors and doorways, and manual gates, including ticket gates, shall comply with the requirements of Section 404.2.

EXCEPTION: Doors, doorways, and gates designed to be operated only by security personnel shall not be required to comply with Sections 404.2.6, 404.2.7, and 404.2.8.

404.2.1 Double-Leaf Doors and Gates. At least one of the active leaves of doorways with two leaves shall comply with Sections 404.2.2 and 404.2.3.

404.2.2 Clear Width. Doorways shall have a clear opening width of 32 inches (815 mm) minimum. Clear opening width of doorways with swinging doors shall be measured between the face of door and stop, with the door open 90 degrees. Openings, doors and doorways without doors more than 24 inches (610 mm) in depth shall provide a clear opening width of 36 inches (915 mm) minimum. There shall be no projections into the clear opening width lower than 34

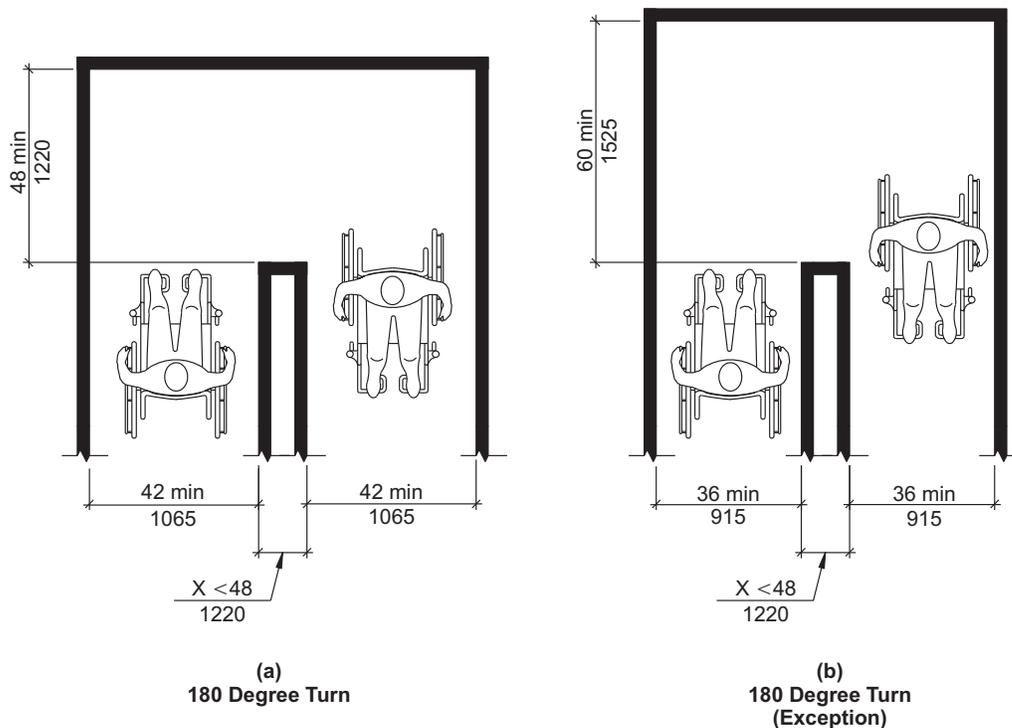


Fig. 403.5.1
Clear Width at Turn

inches (865 mm) above the floor. Projections into the clear opening width between 34 inches (865 mm) and 80 inches (2030 mm) above the floor shall not exceed 4 inches (100 mm).

EXCEPTIONS:

1. Door closers and door stops shall be permitted to be 78 inches (1980 mm) minimum above the floor.
2. In alterations, a projection of $\frac{5}{8}$ inch (16 mm) maximum into the required clear opening width shall be permitted for the latch side stop.

404.2.3 Maneuvering Clearances at Doors.

Minimum maneuvering clearances at doors shall comply with Section 404.2.3 and shall include the full clear opening width of the doorway.

404.2.3.1 Swinging Doors. Swinging doors shall have maneuvering clearances complying with Table 404.2.3.1.

404.2.3.2 Sliding and Folding Doors. Sliding doors and folding doors shall have maneuvering clearances complying with Table 404.2.3.2.

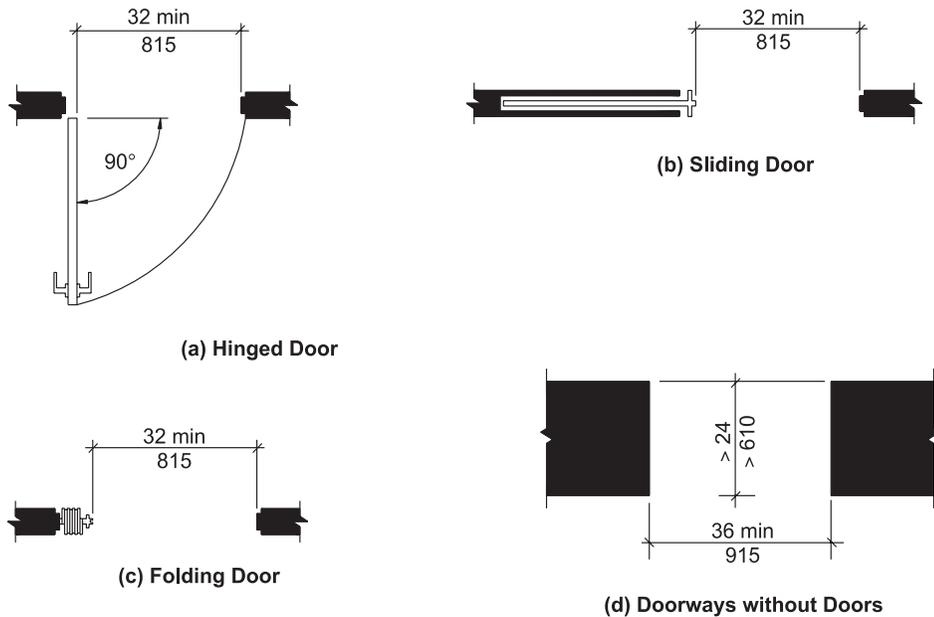
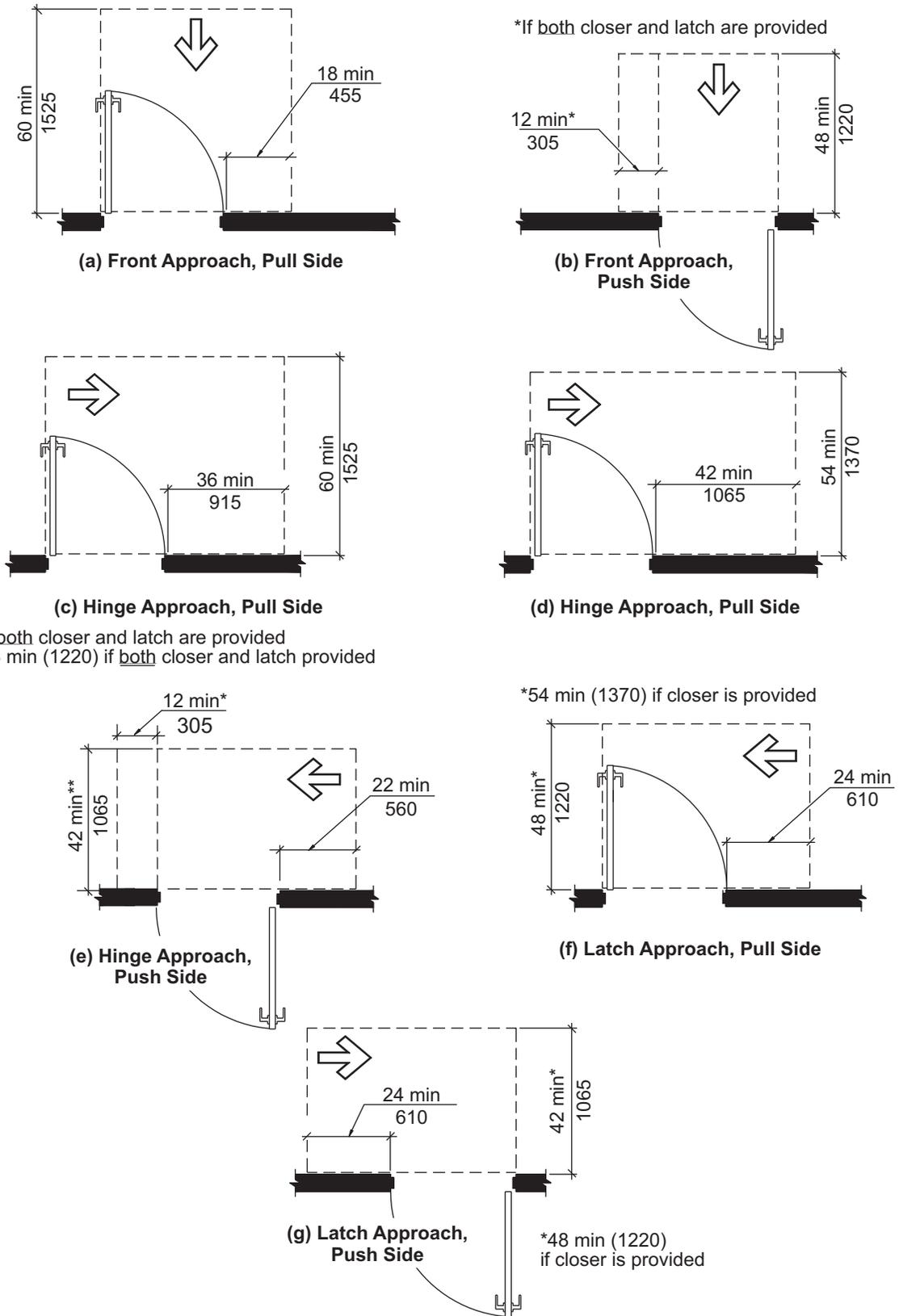


Fig. 404.2.2
Clear Width of Doorways

Table 404.2.3.1—Maneuvering Clearances at Manual Swinging Doors

TYPE OF USE		MINIMUM MANEUVERING CLEARANCES	
Approach Direction	Door Side	Perpendicular to Doorway	Parallel to Doorway (beyond latch unless noted)
From front	Pull	60 inches (1525 mm)	18 inches (455 mm)
From front	Push	48 inches (1220 mm)	0 inches (0 mm) ³
From hinge side	Pull	60 inches (1525 mm)	36 inches (915 mm)
From hinge side	Push	54 inches (1370 mm)	42 inches (1065 mm)
From hinge side	Push	42 inches (1065 mm) ¹	22 inches (560 mm) ^{3&4}
From latch side	Pull	48 inches (1220 mm) ²	24 inches (610 mm)
From latch side	Push	42 inches (1065 mm) ²	24 inches (610 mm)

¹Add 6 inches (150 mm) if closer and latch provided.
²Add 6 inches (150 mm) if closer provided.
³Add 12 inches (305 mm) beyond latch if closer and latch provided.
⁴Beyond hinge side.



* If both closer and latch are provided
 ** 48 min (1220) if both closer and latch provided

Fig. 404.2.3.1
Maneuvering Clearance at Manual Swinging Doors

404.2.3.3 Doorways without Doors. Doorways without doors that are less than 36 inches (915 mm) in width shall have maneuvering clearances complying with Table 404.2.3.3

404.2.3.4 Recessed Doors. Where any obstruction within 18 inches (455 mm) of the latch side of a doorway projects more than 8 inches (205 mm) beyond the face of the door, measured perpendicular to the face of the door, maneuvering clearances for a forward approach shall be provided.

404.2.3.5 Floor Surface. Floor surface within the maneuvering clearances shall have a slope not steeper than 1:48 and shall comply with Section 302.

404.2.4 Thresholds at Doorways. If provided, thresholds at doorways shall be 1/2 inch (13 mm) maximum in height. Raised thresholds and changes in level at doorways shall comply with Sections 302 and 303.

EXCEPTION: Section 404.2.4 shall not apply to existing thresholds or altered thresholds 3/4 inch (19 mm) maximum in height that have a beveled edge on each side with a maximum slope of 1:2 for the height exceeding 1/4 inch (6.4 mm).

404.2.5 Two Doors in Series. Distance between two hinged or pivoted doors in series shall be 48 inches (1220 mm) minimum plus the width of any door swinging into the space. The space between the doors shall provide a turning space complying with Section 304.

Table 404.2.3.2—Maneuvering Clearances at Sliding and Folding Doors

Approach Direction	MINIMUM MANEUVERING CLEARANCES	
	Perpendicular to Doorway	Parallel to Doorway (beyond stop or latch side unless noted)
From front	48 inches (1220 mm)	0 inches (0 mm)
From nonlatch side	42 inches (1065 mm)	22 inches (560 mm) ¹
From latch side	42 inches (1065 mm)	24 inches (610 mm)

¹Beyond pocket or hinge side.

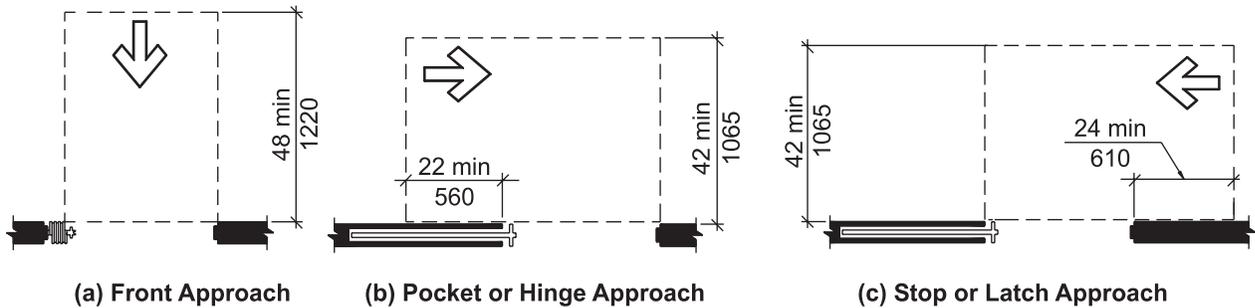


Fig. 404.2.3.2
Maneuvering Clearance at Sliding and Folding Doors

Table 404.2.3.3—Maneuvering Clearances for Doorways without Doors

Approach Direction	MINIMUM MANEUVERING CLEARANCES Perpendicular to Doorway
From front	48 inches (1220 mm)
From side	42 inches (1065 mm)

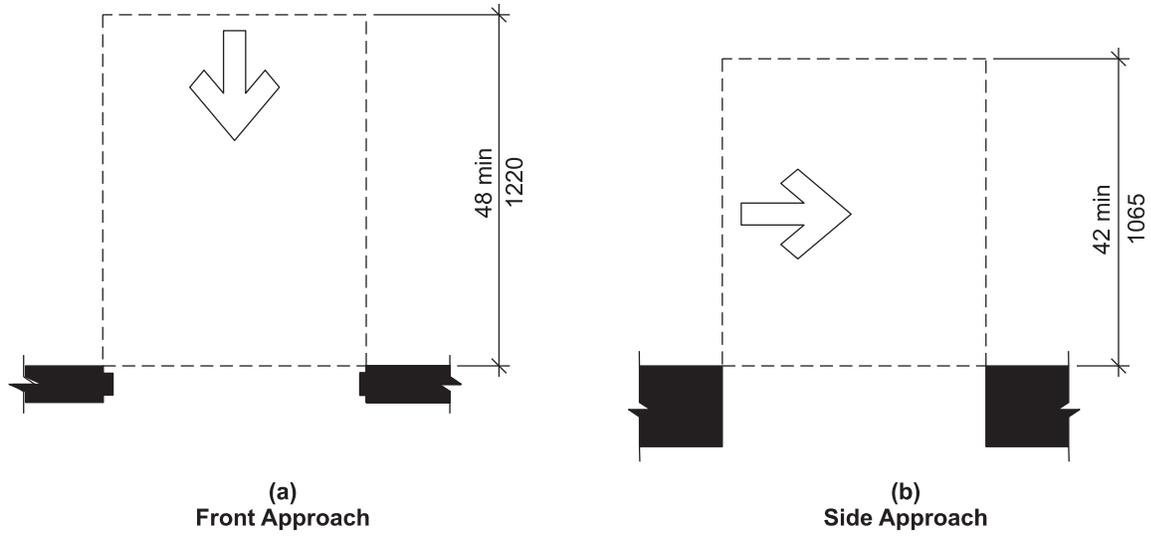


Fig. 404.2.3.3
Maneuvering Clearance at Doorways without Doors

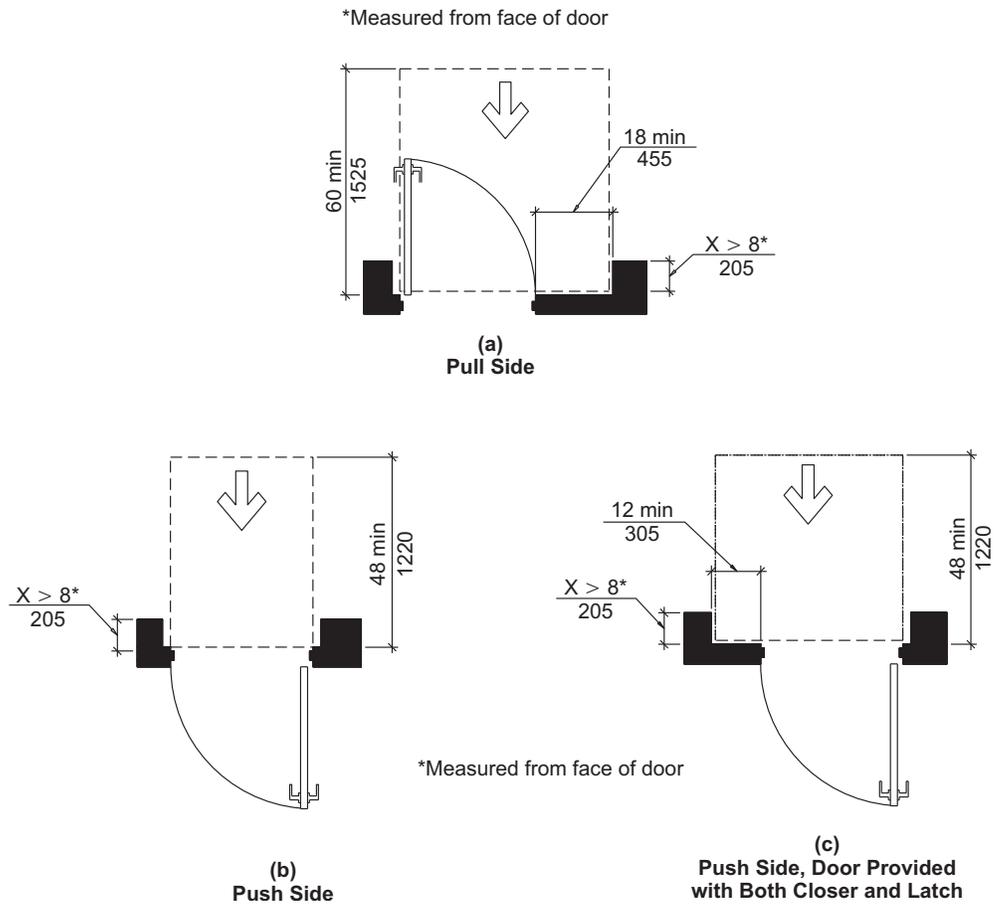


Fig. 404.2.3.4
Maneuvering Clearance at Recessed Doors

404.2.6 Door Hardware. Handles, pulls, latches, locks, and other operable parts on accessible doors shall have a shape that is easy to grasp with one hand and does not require tight grasping, pinching, or twisting of the wrist to operate. Operable parts of such hardware shall be 34 inches (865 mm) minimum and 48 inches (1220 mm) maximum above the floor. Where sliding doors are in the fully open position, operating hardware shall be exposed and usable from both sides.

EXCEPTION: Locks used only for security purposes and not used for normal operation are permitted in any location.

404.2.7 Closing Speed.

404.2.7.1 Door Closers. Door closers shall be adjusted so that from an open position of 90 degrees, the time required to move the door to an open position of 12 degrees shall be 5 seconds minimum.

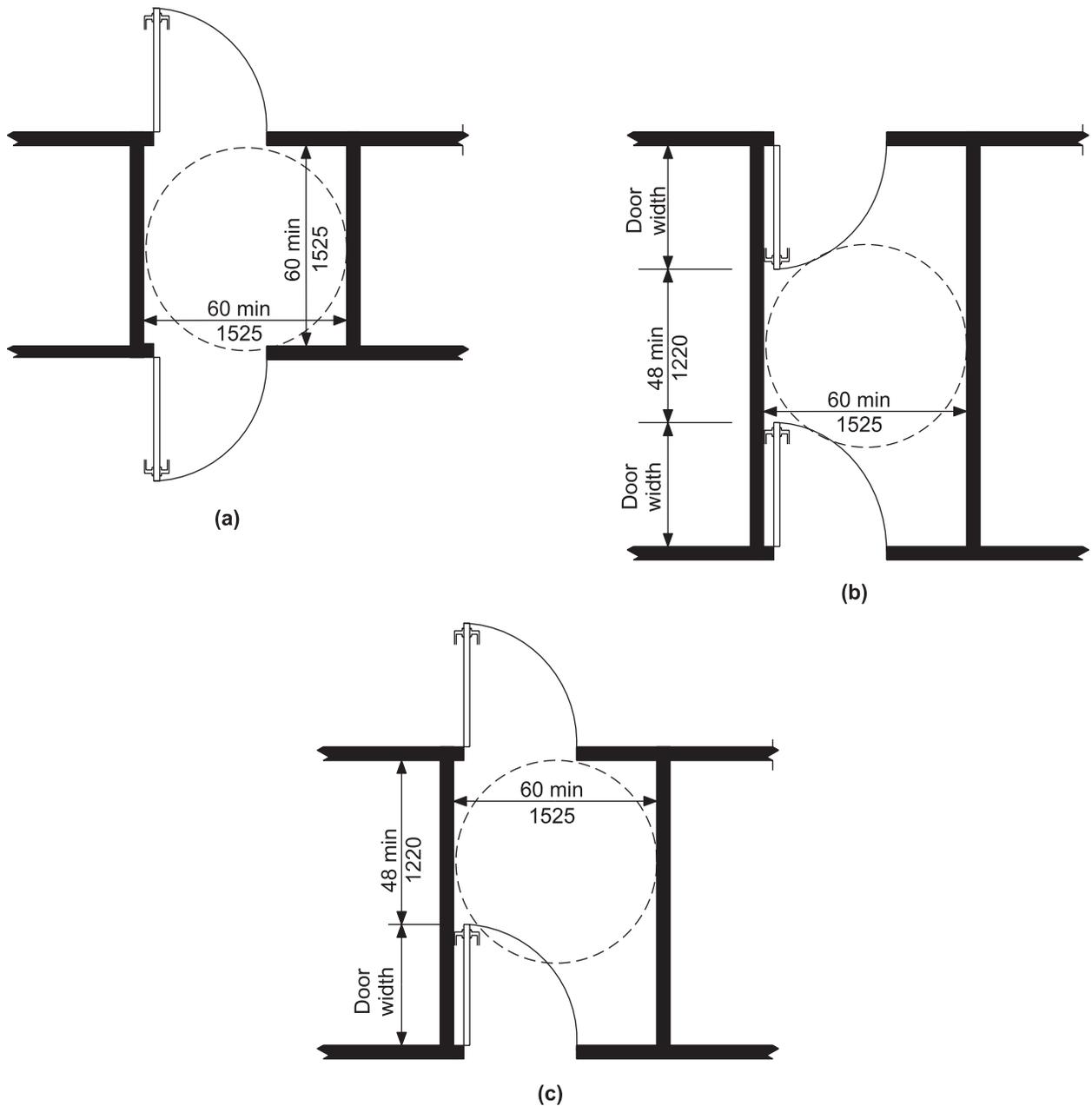


Fig. 404.2.5
Two Doors in a Series

404.2.7.2 Spring Hinges. Door spring hinges shall be adjusted so that from the open position of 70 degrees, the door shall move to the closed position in 1.5 seconds minimum.

404.2.8 Door-Opening Force. Fire doors shall have the minimum opening force allowable by the appropriate administrative authority. The force for pushing or pulling open doors other than fire doors shall be as follows:

1. Interior hinged door: 5.0 pounds (22.2 N) maximum
2. Sliding or folding door: 5.0 pounds (22.2 N) maximum

These forces do not apply to the force required to retract latch bolts or disengage other devices that hold the door in a closed position.

404.2.9 Door Surface. Door surfaces within 10 inches (255 mm) of the floor, measured vertically, shall be a smooth surface on the push side extending the full width of the door. Parts creating horizontal or vertical joints in such surface shall be within $\frac{1}{16}$ inch (1.6 mm) of the same plane as the other. Cavities created by added kick plates shall be capped.

EXCEPTIONS:

1. Sliding doors.
2. Tempered glass doors without stiles and having a bottom rail or shoe with the top leading edge tapered at no less than 60 degrees from the horizontal shall not be required to meet the 10 inch (255 mm) bottom rail height requirement.
3. Doors that do not extend to within 10 inches (255 mm) of the floor.

404.2.10 Vision Lites. Doors and sidelites adjacent to doors containing one or more glazing panels that permit viewing through the panels shall have the bottom of at least one panel on either the door or an adjacent sidelite 43 inches (1090 mm) maximum above the floor.

EXCEPTION: Vision lites with the lowest part more than 66 inches (1675 mm) above the floor are not required to comply with Section 404.2.10.

404.3 Automatic Doors. Automatic doors and automatic gates shall comply with Section 404.3. Full powered automatic doors shall comply with ANSI/BHMA A156.10 listed in Section 105.2.4.

Power-assist and low-energy doors shall comply with ANSI/BHMA A156.19 listed in Section 105.2.3.

EXCEPTION: Doors, doorways, and gates designed to be operated only by security personnel shall not be required to comply with Sections 404.3.2, 404.3.4, and 404.3.5.

404.3.1 Clear Opening Width. Doorways shall have a clear opening width of 32 inches (815 mm) in power-on and power-off mode. The minimum clear opening width for automatic door systems shall be based on the clear opening width provided with all leaves in the open position.

404.3.2 Maneuvering Clearances. Maneuvering clearances at power-assisted doors shall comply with Section 404.2.3.

404.3.3 Thresholds. Thresholds and changes in level at doorways shall comply with Section 404.2.4.

404.3.4 Two Doors in Series. Doors in series shall comply with Section 404.2.5.

404.3.5 Control Switches. Manually operated control switches shall comply with Section 309. The clear floor space adjacent to the control switch shall be located beyond the arc of the door swing.

405 Ramps

405.1 General. Ramps along accessible routes shall comply with Section 405.

405.2 Slope. Ramp runs shall have a running slope not steeper than 1:12.

EXCEPTION: In existing buildings or facilities, ramps shall be permitted to have slopes steeper than 1:12 complying with Table 405.2 where such slopes are necessary due to space limitations.

405.3 Cross Slope. Cross slope of ramp runs shall not be steeper than 1:48.

405.4 Floor Surfaces. Floor surfaces of ramp runs shall comply with Section 302.

405.5 Clear Width. The clear width of a ramp run shall be 36 inches (915 mm) minimum. Where handrails are provided on the ramp run, the clear width shall be measured between the handrails.

405.6 Rise. The rise for any ramp run shall be 30 inches (760 mm) maximum.

Table 405.2—Allowable Ramp Dimensions for Construction in Existing Sites, Buildings, and Facilities

Slope ¹	Maximum Rise
Steeper than 1:10 but not steeper than 1:8	3 inches (75 mm)
Steeper than 1:12 but not steeper than 1:10	6 inches (150 mm)

¹A slope steeper than 1:8 shall not be permitted.

405.7 Landings. Ramps shall have landings at bottom and top of each ramp run. Landings shall comply with Section 405.7.

405.7.1 Slope. Landings shall have a slope not steeper than 1:48 and shall comply with Section 302.

405.7.2 Width. Clear width of landings shall be at least as wide as the widest ramp run leading to the landing.

405.7.3 Length. Landings shall have a clear length of 60 inches (1525 mm) minimum.

405.7.4 Change in Direction. Ramps that change direction at ramp landings shall be sized to provide a turning space complying with Section 304.3.

405.7.5 Doorways. Where doorways are adjacent to a ramp landing, maneuvering clearances required by Sections 404.2.3 and 404.3.2 shall be permitted to overlap the landing area. Where doors that are subject to locking are adjacent to a ramp landing, landings shall be sized to provide a turning space complying with Section 304.3.

405.8 Handrails. Ramp runs with a rise greater than 6 inches (150 mm) shall have handrails complying with Section 505.

405.9 Edge Protection. Edge protection complying with Section 405.9.1 or 405.9.2 shall be provided on each side of ramp runs and at each side of ramp landings.

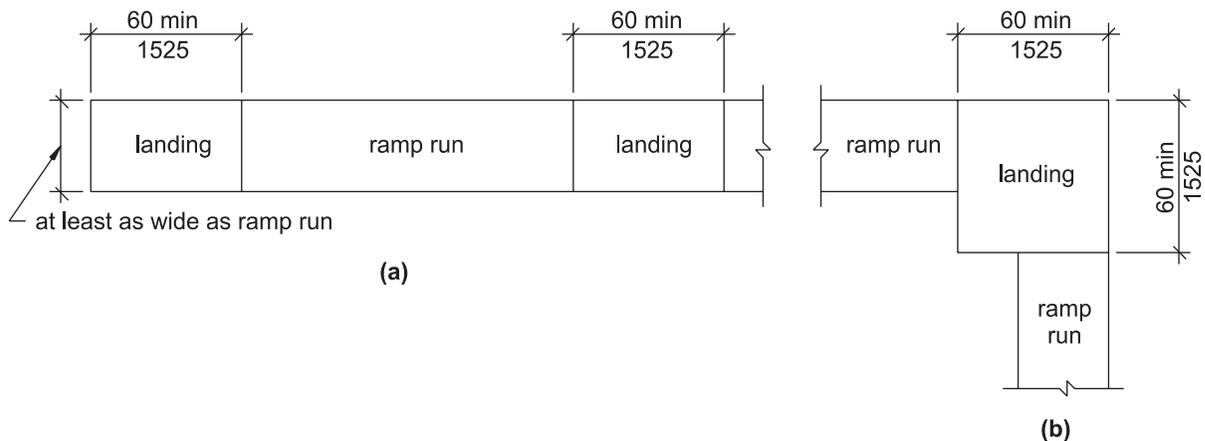
EXCEPTIONS:

1. Ramps not required to have handrails where curb ramp flares complying with Section 406.3 are provided.
2. Sides of ramp landings serving an adjoining ramp run or stairway.
3. Sides of ramp landings having a vertical drop-off of 1/2 inch (13 mm) maximum within 10 inches (255 mm) horizontally of the minimum landing area.

405.9.1 Extended Floor Surface. The floor surface of the ramp run or ramp landing shall extend 12 inches (305 mm) minimum beyond the inside face of a railing complying with Section 505.

405.9.2 Curb or Barrier. A curb or barrier shall be provided that prevents the passage of a 4-inch (100 mm) diameter sphere where any portion of the sphere is within 4 inches (100 mm) of the floor.

405.10 Wet Conditions. Landings subject to wet conditions shall be designed to prevent the accumulation of water.



**Fig. 405.7
Ramp Landings**

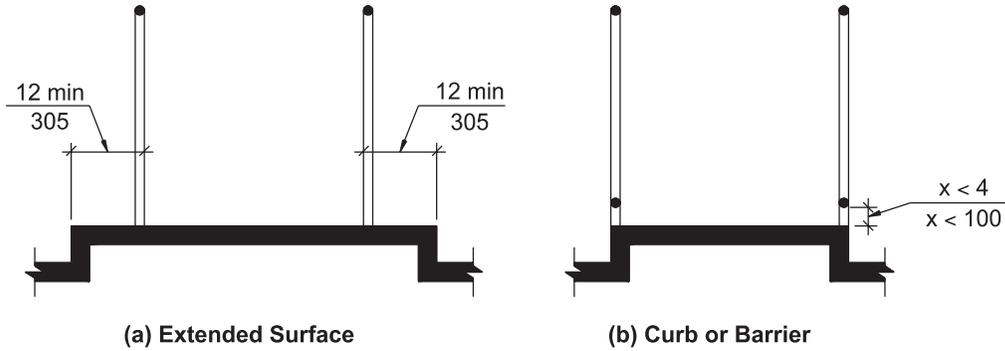


Fig. 405.9
Ramp Edge Protection

406 Curb Ramps

406.1 General. Curb ramps on accessible routes shall comply with Sections 406, 405.2, 405.3, and 405.10.

406.2 Counter Slope. Counter slopes of adjoining gutters and road surfaces immediately adjacent to the curb ramp shall not be steeper than 1:20. The adjacent surfaces at transitions at curb ramps to walks, gutters and streets shall be at the same level.

406.3 Sides of Curb Ramps. Where provided, curb ramp flares shall not be steeper than 1:10.

406.4 Width. Curb ramps shall be 36 inches (915 mm) minimum in width, exclusive of flared sides.

406.5 Floor Surface. Floor surfaces of curb ramps shall comply with Section 302.

406.6 Location. Curb ramps and the flared sides of curb ramps shall be located so they do not project into vehicular traffic lanes, parking spaces, or parking access aisles. Curb ramps at marked crossings shall be wholly contained within the markings, excluding any flared sides.

406.7 Landings. Landings shall be provided at the tops of curb ramps. The clear length of the landing shall be 36 inches (915 mm) minimum. The clear

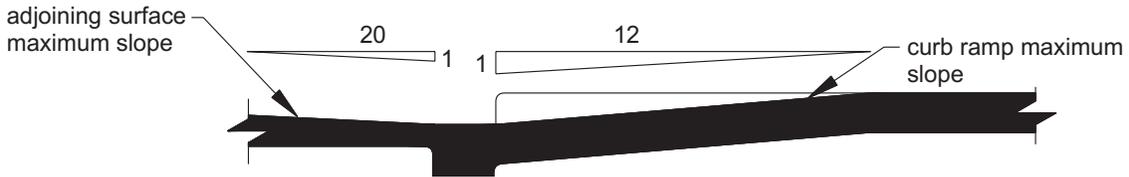


Fig. 406.2
Counter Slope of Surfaces Adjacent to Curb Ramps

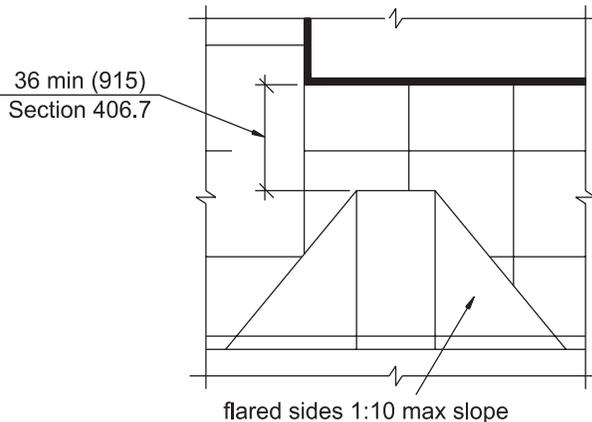


Fig. 406.3
Sides of Curb Ramps

width of the landing shall be at least as wide as the curb ramp, excluding flared sides, leading to the landing.

EXCEPTION: In alterations, where there is no landing at the top of curb ramps, curb ramp flares shall be provided and shall not be steeper than 1:12.

406.8 Obstructions. Curb ramps shall be located or protected to prevent their obstruction by parked vehicles.

406.9 Handrails. Handrails are not required on curb ramps.

406.10 Diagonal Curb Ramps. Diagonal or corner-type curb ramps with returned curbs or other well-defined edges shall have the edges parallel to the direction of pedestrian flow. The bottoms of diagonal curb ramps shall have 48 inches (1220 mm) minimum clear space outside active traffic lanes of the roadway. Diagonal curb ramps provided at marked crossings shall provide the 48 inches (1220 mm) minimum clear space within the markings. Diagonal curb ramps with flared sides shall have a segment of curb 24 inches (610 mm) minimum in length on each side of the curb ramp and within the marked crossing.

406.11 Islands. Raised islands in crossings shall be a cut-through level with the street or have curb ramps at both sides. Each curb ramp shall have a level area 48 inches (1220 mm) minimum in length and 36 inches (915 mm) minimum in width at the top of the curb ramp in the part of the island intersected by the crossings. Each 48-inch (1220 mm) by 36-inch (915 mm) area shall be oriented so the

48-inch (1220 mm) length is in the direction of the running slope of the curb ramp it serves. The 48-inch (1220 mm) by 36-inch (915 mm) areas and the accessible route shall be permitted to overlap.

406.12 Detectable Warnings at Raised Marked Crossings. Marked crossings that are raised to the same level as the adjoining sidewalk shall be preceded by a 24-inch (610 mm) deep detectable warning complying with Section 705, extending the full width of the marked crossing.

406.13 Detectable Warnings at Curb Ramps. Where detectable warnings are provided on curb ramps, they shall comply with Sections 406.13 and 705.

406.13.1 Area Covered. Detectable warnings shall be 24 inches (610 mm) minimum in the direction of travel and extend the full width of the curb ramp or flush surface.

406.13.2 Location. The detectable warning shall be located so the edge nearest the curb line is 6 inches (150 mm) to 8 inches (205 mm) from the curb line.

406.14 Detectable Warnings at Islands or Cut-through Medians. Where detectable warnings are provided on curb ramps or at raised marked crossings leading to islands or cut-through medians, the island or cut-through median shall also be provided with detectable warnings complying with Section 705, are 24 inches (610 mm) in depth, and extend the full width of the pedestrian route or cut-through. Where such island or cut-through median is less than 48 inches (1220 mm) in depth,

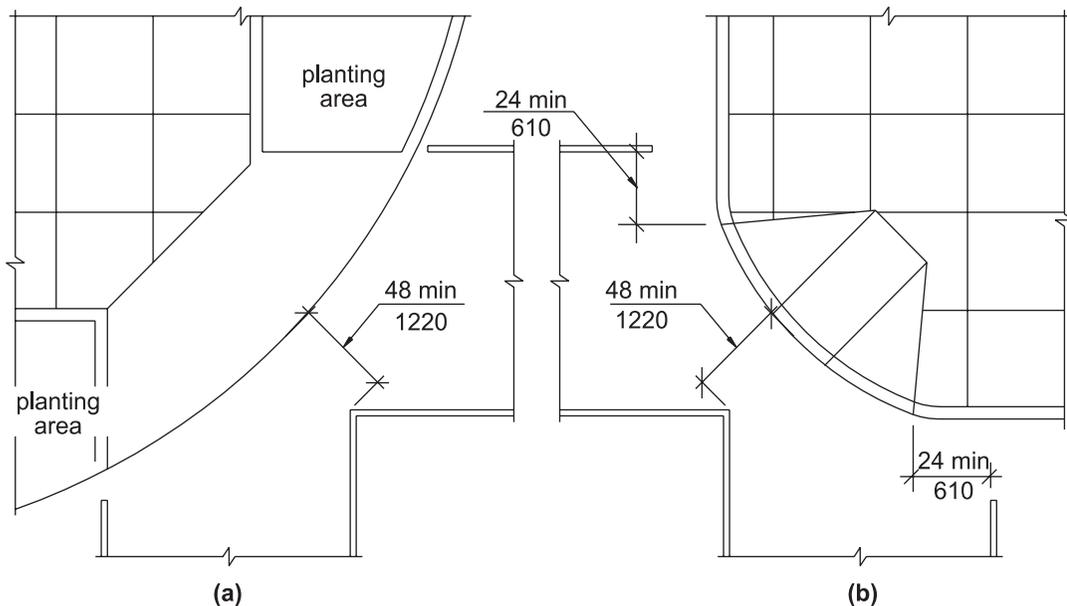


Fig. 406.10
Diagonal Curb Ramps

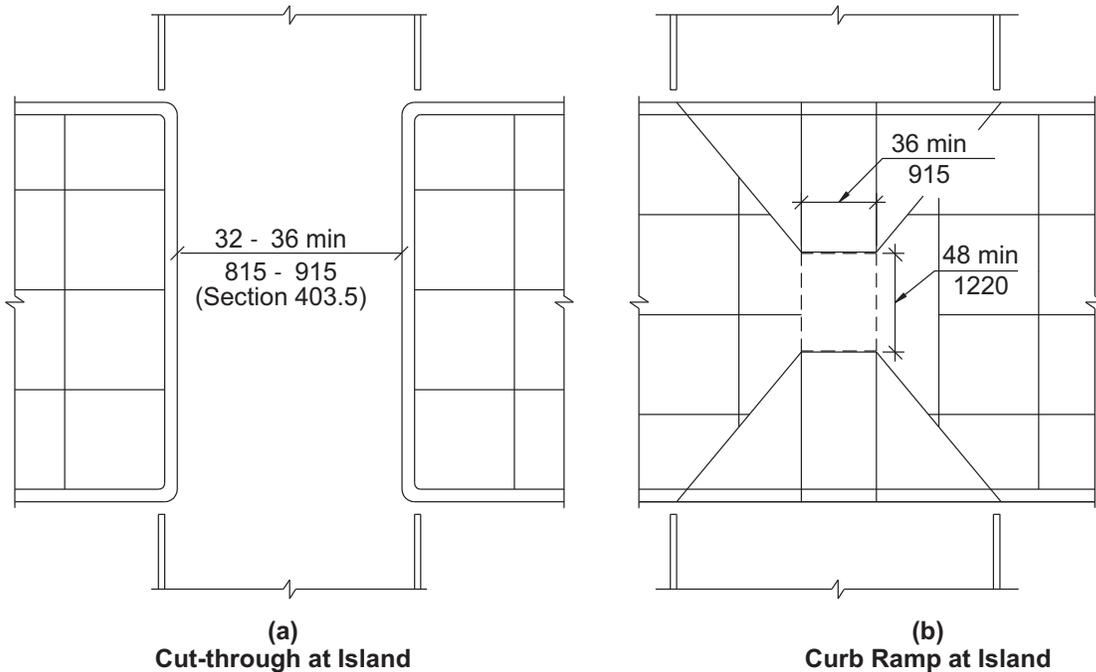


Fig. 406.11
Islands

the entire width and depth of the pedestrian route or cut-through shall have detectable warnings.

407 Elevators

407.1 General. Elevators shall comply with Section 407 and ASME A17.1 listed in Section 105.2.5. Elevators shall be passenger elevators as classified by ASME A17.1. Elevator operation shall be automatic.

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.

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.

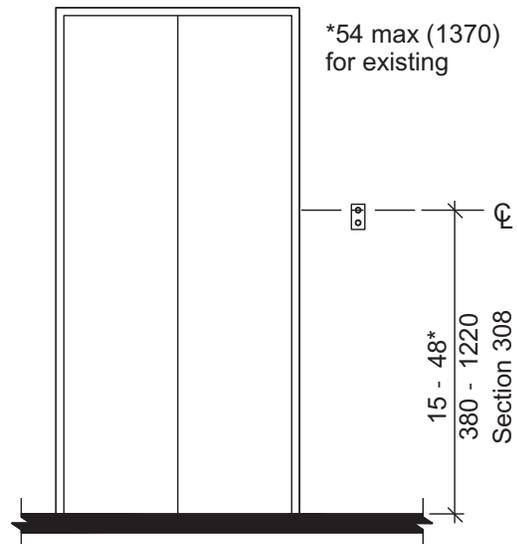


Fig. 407.2.1.1
Height of Elevator Call Buttons

407.2.1.2 Size. Call buttons shall be 3/4 inch (19 mm) minimum in the smallest dimension.

EXCEPTION: Existing elevator call buttons shall not be required to comply with Section 407.2.1.2.

407.2.1.3 Clear Floor Space. A clear floor space complying with Section 305 shall be provided at call controls.

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.

407.2.1.5 Signals. Call buttons shall have visible signals to indicate when each call is registered and when each call is answered.

EXCEPTIONS:

1. Destination-oriented elevators shall not be required to comply with Section 407.2.1.5, provided visible and audible signals complying with Section 407.2.1.7 are provided.
2. Existing elevators shall not be required to comply with Section 407.2.1.5.

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.

407.2.1.7 Destination-oriented Elevator Signals. Destination-oriented elevators shall be provided with visible and audible signals to indicate which car is responding to a call. The audible signal shall be activated by pressing a function button. The function button shall be

identified by the International Symbol for Accessibility and tactile indication. The International Symbol for Accessibility, complying with Section 703.6.3.1, shall be $\frac{5}{8}$ inch (16 mm) in height and be a visual character complying with Section 703.2. The tactile indication shall be three raised dots, spaced $\frac{1}{4}$ inch (6.4 mm) at base diameter, in the form of an equilateral triangle. The function button shall be located immediately below the keypad arrangement or floor buttons.

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 visible and audible signals 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.

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 $2\frac{1}{2}$ inches (64 mm) minimum measured along the vertical centerline

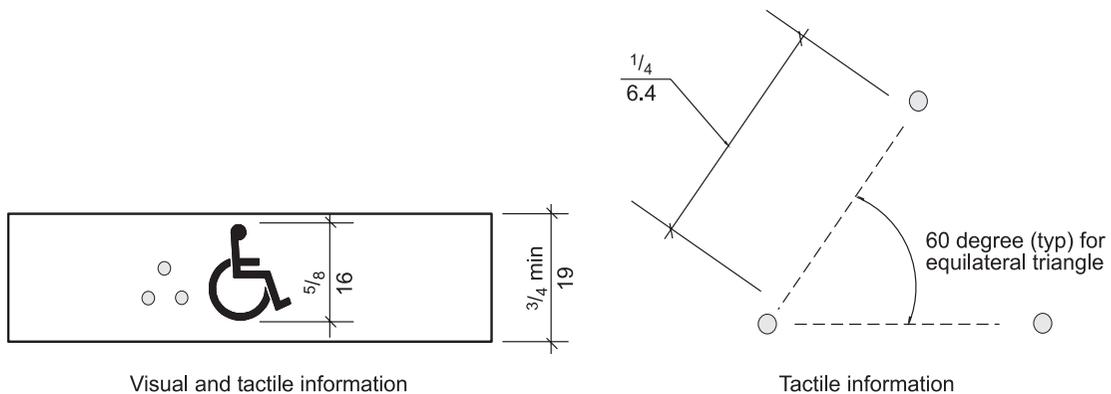


Fig. 407.2.1.7
Destination-oriented Elevator Indication

of the element. Signals shall be visible from the floor area adjacent to the hall call button.

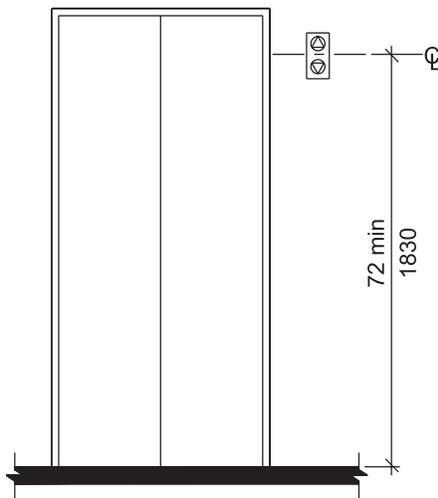
EXCEPTIONS:

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.

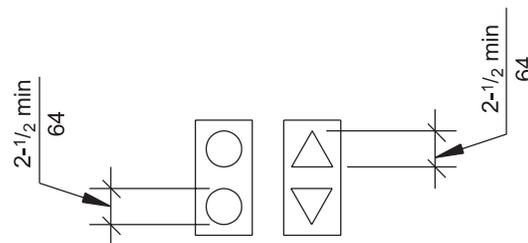
407.2.2.3 Audible Signals. Audible signals shall sound once for the up direction and twice for the down direction, or shall have verbal annunciators that indicate the direction of elevator car travel. Audible signals shall have a frequency of 1500 Hz maximum. Verbal annunciators shall have a frequency of 300 Hz minimum and 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.

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.



(a) Height of Signals



(b) Size of Signals

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 tactile characters complying with Section 703.3 located on both jambs of elevator hoistway entrances. Tactile characters shall be 2 inches (51 mm) minimum in height. A tactile star shall be provided on both jambs at the main entry level.

407.2.3.2 Car Designations. Destination-oriented elevators shall provide car identification in tactile characters complying with Section 703.3 located on both jambs of the hoistway immediately below the floor designation. Tactile characters shall be 2 inches (51 mm) minimum in height.

407.2.4 Destination Signs. Where signs indicate that elevators do not serve all landings, signs in tactile characters complying with Section 703.3 shall be provided above the hall call button fixture.

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

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

**Fig. 407.2.2.2
Elevator Visible Signals**

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:

- a) they comply with Sections 404.2.2 and 404.2.8;
- b) the car door closing is not initiated until the hoistway door is closed.

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.

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 acti-

vated, although contact shall be permitted before the door reverses.

407.3.3.3 Duration. The reopening device 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 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.

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.

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

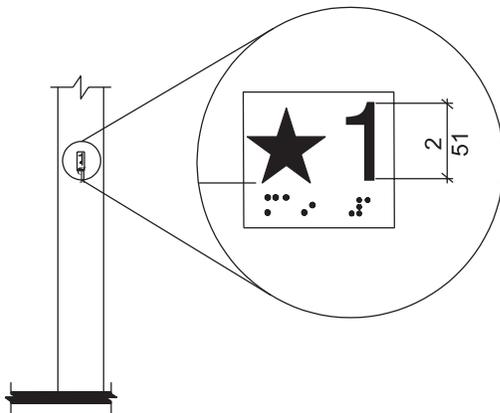


Fig. 407.2.3.1
Floor Designation

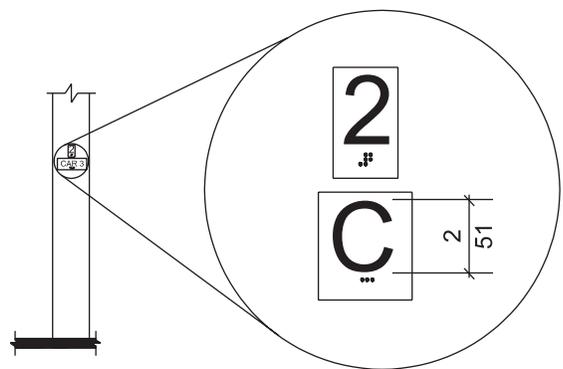


Fig. 407.2.3.2
Designation-oriented Elevator Car Identification

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.

407.4 Elevator Car Requirements. Elevator cars shall comply with Section 407.4.

407.4.1 Car 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.

407.4.3 Platform to Hoistway Clearance. The clearance between the car platform sill and the edge of any hoistway landing shall be in compliance with ASME/ANSI A17.1 listed in Section 105.2.5.

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 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 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.

EXCEPTIONS:

1. Where the elevator panel serves more than 16 openings and a parallel approach to the controls is provided, buttons with floor designations shall be permitted to be 54 inches (1370 mm) maximum above the floor.
2. In existing elevators, where a parallel approach is provided to the controls, car control buttons with floor designations shall be permitted to be located 54 inches (1370 mm) maximum above the floor. Where the panel is changed, it shall comply with Section 407.4.6.1.

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 of Door
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

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

²Other 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.

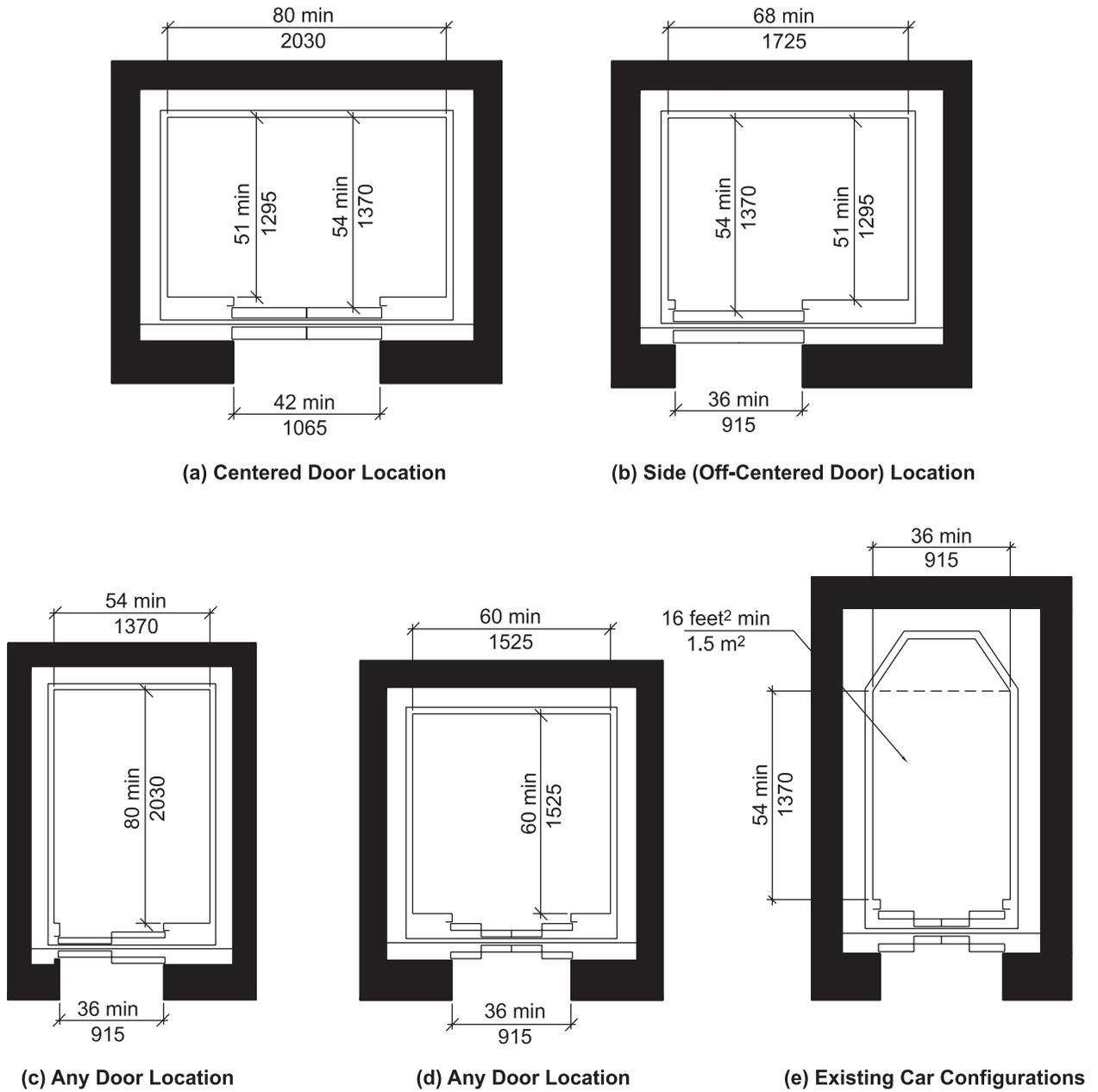


Fig. 407.4.1
Inside Dimensions of Elevator Cars

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.

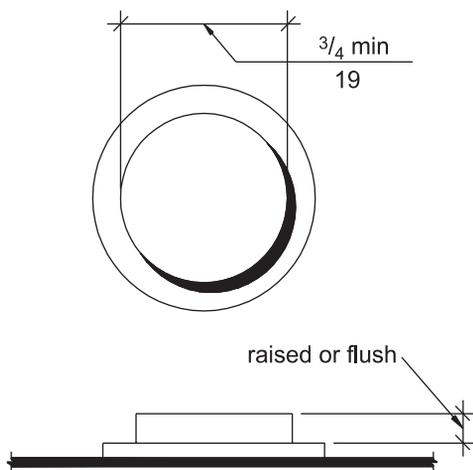


Fig. 407.4.6.2
Elevator Car Control Buttons

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. Floors shall be designated . . . -4, -3, -2, -1, 0, 1, 2, 3, 4, et cetera, 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.

407.4.6.3 Keypads. 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.

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

EXCEPTIONS:

1. In existing elevators, where a new car operating panel complying with Section 407.4.7 is provided, existing car operating panels shall not be required to comply with Section 407.4.7.
2. Where existing building floor designations differ from the arrangement required by Section 407.4.6.2.2, or are alphanumeric, a new operating panel shall be permitted to use such existing building floor designations.

407.4.7.1 Buttons. Car control buttons shall comply with Section 407.4.7.1.

407.4.7.1.1 Type. Control buttons shall be identified by tactile characters complying with Section 703.3.

407.4.7.1.2 Location. Tactile character and braille designations shall be placed immediately to the left of the control button to which the designations apply. Where a negative number is used to indicate a negative floor, the braille designation shall be a cell with the dots 3 and 6 followed by the ordinal number.

EXCEPTION: Where space on an existing car operating panel precludes tactile markings to the left of the control button, markings shall be placed as near to the control button as possible.

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.

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 visual characters complying with Sec-

tion 703.2 and shall be 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 to 0.120 inch (3.05 mm) maximum, and a height of 0.025 inch (0.6 mm) minimum to 0.037 inch (0.9 mm) maximum.

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, as permitted by Section 407.4.6.1, Exception #1. 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.

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.

EXCEPTION: Destination-oriented elevators shall not be required to comply with Section 407.4.9.1.3, provided the visible indicators extinguish when the call has been answered.

407.4.9.1.4 Destination Indicator. In destination-oriented elevators, a display shall be provided in the car with visible indicators to show car destinations.

407.4.9.2 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) or less, 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.

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 to 3,000 Hz maximum.

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/ANSI A17.1 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. Tactile characters complying with Section 703.3 and symbols complying with Section 407.4.7.1.3 shall be provided adjacent to the device.

408 Limited-Use/Limited-Application Elevators

408.1 General. Limited-use/limited-application elevators shall comply with Section 408 and ASME A17.1 listed in Section 105.2.5. Elevator operation shall be automatic.

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

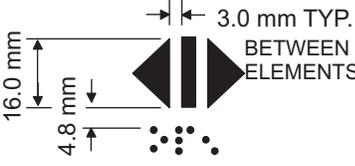
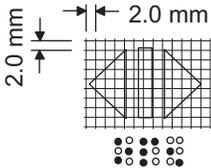
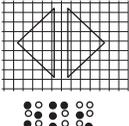
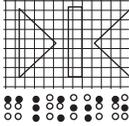
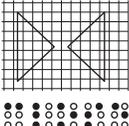
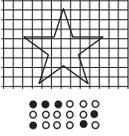
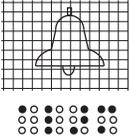
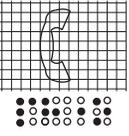
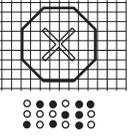
408.2.1 Call Controls. Elevator call buttons and keypads shall comply with Section 407.2.1.

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.

408.3 Elevator Door Requirements. Elevator hoistway doors shall comply with Section 408.3.

Table 407.4.7.1.3—Control Button Identification

Control Button	Tactile Symbol	Braille Message	Proportions Open circles indicate unused dots within each Braille Cell
 <p>DOOR OPEN</p>		 <p>op"en"</p>	
 <p>REAR/SIDE DOOR OPEN</p>		 <p>op"en"</p>	
 <p>DOOR CLOSE</p>		 <p>close</p>	
 <p>REAR/SIDE DOOR CLOSE</p>		 <p>close</p>	
 <p>MAIN</p>		 <p>ma"in"</p>	
 <p>ALARM</p>		 <p>al"ar"m</p>	
 <p>PHONE</p>		 <p>ph"one"</p>	
 <p>EMERGENCY STOP (WHEN PROVIDED) X on face of octagon is not required to be tactile</p>		 <p>"st"op</p>	

408.3.1 Sliding Doors. 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 A156.19 listed in Section 105.2.3.

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

408.3.3 Door Location and Width. Car doors shall provide a clear opening width of 32 inches (815 mm) minimum. Car doors shall be positioned at a narrow end of the car.

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.

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

408.4.1 Inside Dimensions of Elevator Cars. Elevator cars shall provide a clear floor area of 42 inches (1065 mm) minimum in width, and 54 inches (1370 mm) minimum in depth.

EXCEPTIONS:

1. Cars that provide a 51 inches (1295 mm) minimum clear floor width shall be permitted to provide 51 inches (1295 mm) minimum clear floor depth.
2. 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.

408.4.2 Floor Surfaces. Floor surfaces in elevator cars shall comply with Section 302.

408.4.3 Platform to Hoistway Clearance. The clearance between the car platform sill and the edge of any hoistway landing shall be in compli-

ance with ASME/ANSI A17.1 listed in Section 105.2.5.

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. 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.

409 Private Residence Elevators

409.1 General. Private residence elevators shall comply with Section 409 and ASME/ANSI A17.1 listed in Section 105.2.5. Elevator operation shall be automatic.

EXCEPTION: Elevators complying with Section 407 or 408.

409.2 Call Buttons. Call buttons at elevator landings shall comply with Section 309. Call buttons shall be $\frac{3}{4}$ inch (19 mm) minimum in their smallest dimension.

409.3 Doors and Gates. Elevator car and hoistway doors and gates shall comply with Sections 409.3 and 404.

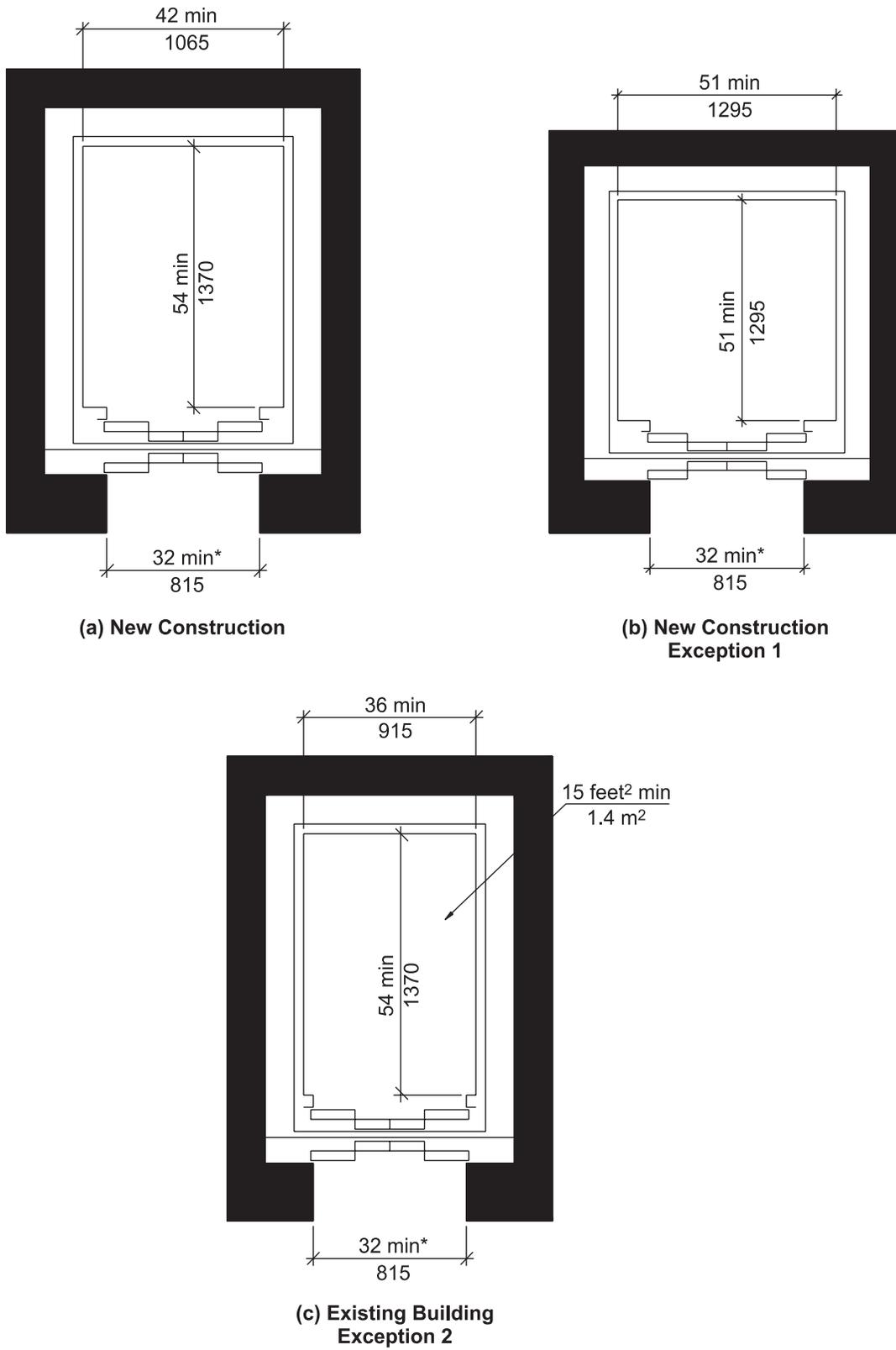
EXCEPTION: The maneuvering clearances required by Section 404.2.3 shall not apply for approaches to the push side of swinging doors.

409.3.1 Power Operation. Elevator car doors and gates shall be power operated and shall comply with ANSI/BHMA A156.19 listed in Section 105.2.3. Elevator cars with a single opening shall have low energy power operated hoistway doors and gates.

EXCEPTION: For elevators with a car that has more than one opening, the hoistway doors and gates shall be permitted to be of the manual-open, self-close type.

409.3.2 Duration. Power operated doors and gates shall remain open for 20 seconds minimum when activated.

409.3.3 Door or Gate Location. Car gates or doors shall be positioned at a narrow end of the clear floor area required by Section 409.4.1.



*Door opening size from Section 408.3.3

Fig. 408.4.1
Inside Dimensions of Limited Use/Limited Application (LULA) Elevator Cars

409.4 Elevator Car Requirements. Elevator cars shall comply with Section 409.4.

409.4.1 Inside Dimensions of Elevator Cars.

Elevator cars shall provide a clear floor area 36 inches (915 mm) minimum in width and 48 inches (1220 mm) minimum in depth.

409.4.2 Floor Surfaces. Floor surfaces in elevator cars shall comply with Section 302.

409.4.3 Platform to Hoistway Clearance. The clearance between the car platform sill and the edge of any hoistway landing shall be $1\frac{1}{4}$ inches (32 mm) maximum.

409.4.4 Leveling. Each car shall automatically stop at a floor landing within a tolerance of $\frac{1}{2}$ inch (13 mm) under rated loading to zero loading conditions.

409.4.5 Illumination. The level of illumination at the car controls, platform, and car threshold and landing sill shall be 5 foot-candles (54 lux) minimum.

409.4.6 Elevator Car Controls. Elevator car controls shall comply with Sections 409.4.6 and 309.4.

409.4.6.1 Buttons. Control buttons shall be $\frac{3}{4}$ inch (19 mm) minimum in their smallest dimension. Control buttons shall be raised or flush.

409.4.6.2 Height. Buttons with floor designations shall comply with Section 309.3.

409.4.6.3 Location. Controls shall be on a sidewall, 12 inches (305 mm) minimum from any adjacent wall.

409.4.7 Emergency Communications. Emergency communications systems shall comply with Section 409.4.7.

409.4.7.1 Type. A telephone and emergency signal device shall be provided in the car.

409.4.7.2 Operable Parts. The telephone and emergency signaling device shall comply with Section 309.3.

409.4.7.3 Compartment. If the device is in a closed compartment, the compartment door hardware shall comply with Section 309.

409.4.7.4 Cord. The telephone cord shall be 29 inches (735 mm) minimum in length.

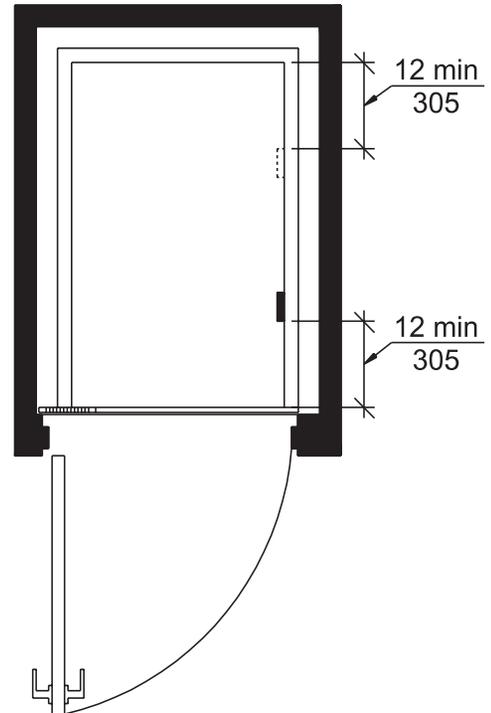


Fig. 409.4.6.3
Location of Controls in Private Residence Elevators

410 Platform Lifts

410.1 General. Platform lifts shall comply with Section 410 and ASME/ANSI A18.1 listed in Section 105.2.6. Platform lifts shall not be attendant operated and shall provide unassisted entry and exit from the lift.

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. End door clear opening width shall be 32 inches (815 mm) minimum. Side door clear opening width shall be 42 inches (1065 mm) minimum.

EXCEPTION: Lifts serving two landings maximum and having doors or gates on opposite sides shall be permitted to have self-closing manual doors or gates.

410.2.2 Ramps. End ramps shall be 32 inches (815 mm) minimum in width. Side ramps shall be 42 inches (1065 mm) minimum in width.

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 $1\frac{1}{4}$ inch (32 mm) maximum.

410.5 Clear Floor Space. Clear floor space of platform lifts shall comply with Section 305.

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

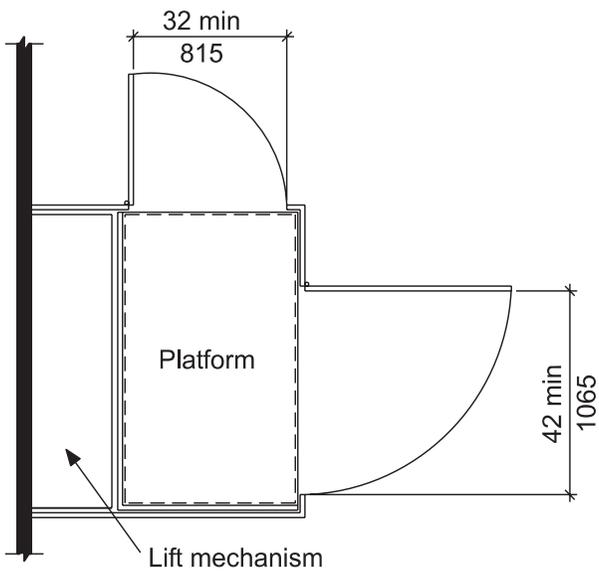


Fig. 410.2.1
Platform Lift Doors and Gates