

## Study Session

# 3

## A117.1 Chapter 3 Building Blocks

**OBJECTIVE:** To obtain an understanding of the fundamental accessibility requirements related to floor surfaces, changes in level, turning space, clear floor space, knee and toe clearance, protruding objects, reach ranges and operable parts.

**REFERENCE:** Chapter 3, ICC A117.1-2009, Accessible and Usable Buildings and Facilities

- KEY POINTS:**
- How must carpet be installed? What types of carpet texture are acceptable?
  - What is the maximum permitted pile thickness?
  - How must the exposed edges of carpet be addressed?
  - What is the maximum size opening permitted in a floor surface? How must elongated openings be oriented?
  - What is the maximum height permitted for a vertical change in level?
  - Under what limitations is a beveled change in level permitted?
  - At what change in level is a ramp required?
  - What is the maximum permitted slope for the floor surface of a turning space?
  - What are the two options for providing a complying turning space? What is the minimum floor area required for each of the options?
  - What encroachments are permitted to extend into the turning space?
  - Are doors permitted to swing into a required turning space?
  - What is the maximum slope permitted for the floor surface of a clear floor space?
  - What is the minimum required size of a complying clear floor space?
  - What are the two types of approach to a clear floor space? Can either type of approach be provided under all conditions?
  - What maneuvering clearance must be provided to gain access to an alcove from a parallel approach? From a forward approach?
  - What space beneath an element is considered to be toe clearance?
  - What is the maximum depth permitted for toe clearance?
  - What is the minimum depth for toe clearance where it is required as a part of a clear floor space?

- KEY POINTS:**
- What is the minimum width required for toe clearance?
- (Cont'd)**
- What space beneath an element is considered to be knee clearance?
  - Where knee clearance is necessary as part of a clear floor space, what is the minimum required depth?
  - In what manner may knee clearance be reduced?
  - What is the minimum required width for knee clearance?
  - At what heights are protruding objects limited in their projection into the circulation path? What is the maximum projection permitted?
  - As protruding objects, what are the limitations for objects mounted on posts or pylons?
  - Where are guardrails or other barriers required to be adjacent to protruding objects?
  - What is the maximum reach range for an unobstructed forward reach? The minimum reach?
  - What depth of obstruction requires a reduced high forward reach? At what depth of obstruction is a high forward reach not possible?
  - What is the maximum reach range for an obstructed side reach? The minimum reach?
  - What depth of obstruction requires a reduced high side reach? At what depth of obstruction is a high side reach not possible?
  - How are operable parts regulated for clear floor space? Height? Operation?

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**Topic:** Carpet

**Category:** Building Blocks

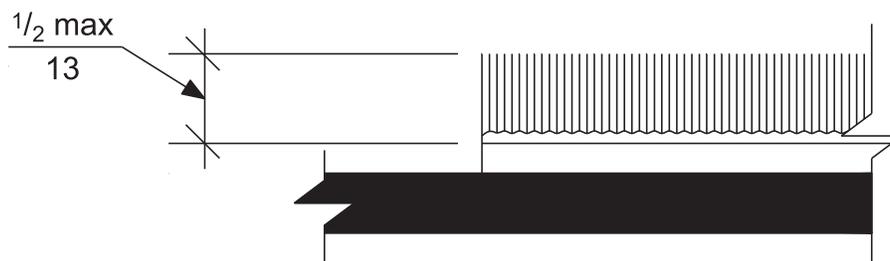
**Reference:** A117.1 302.2

**Subject:** Floor Surfaces

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**Code Text:** *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. The pile shall be  $\frac{1}{2}$  inch (13 mm) maximum in height. Exposed edges of carpet shall be fastened to the floor and shall have trim along the entire length of the exposed edge. Carpet edge trim shall comply with Section 303 (changes in level).*

**Discussion and Commentary:** Where both carpet and padding are used, minimum movement (preferably none) between the floor and the pad, and the pad and the carpet, is desired. Otherwise, over time the carpet could hump or warp. A thick, plush pad, particularly in combination with long carpet pile, makes it difficult for individuals in wheelchairs and those with other ambulatory disabilities to move about. Firm carpeting is achieved through proper selection and installation of both the carpet and padding.



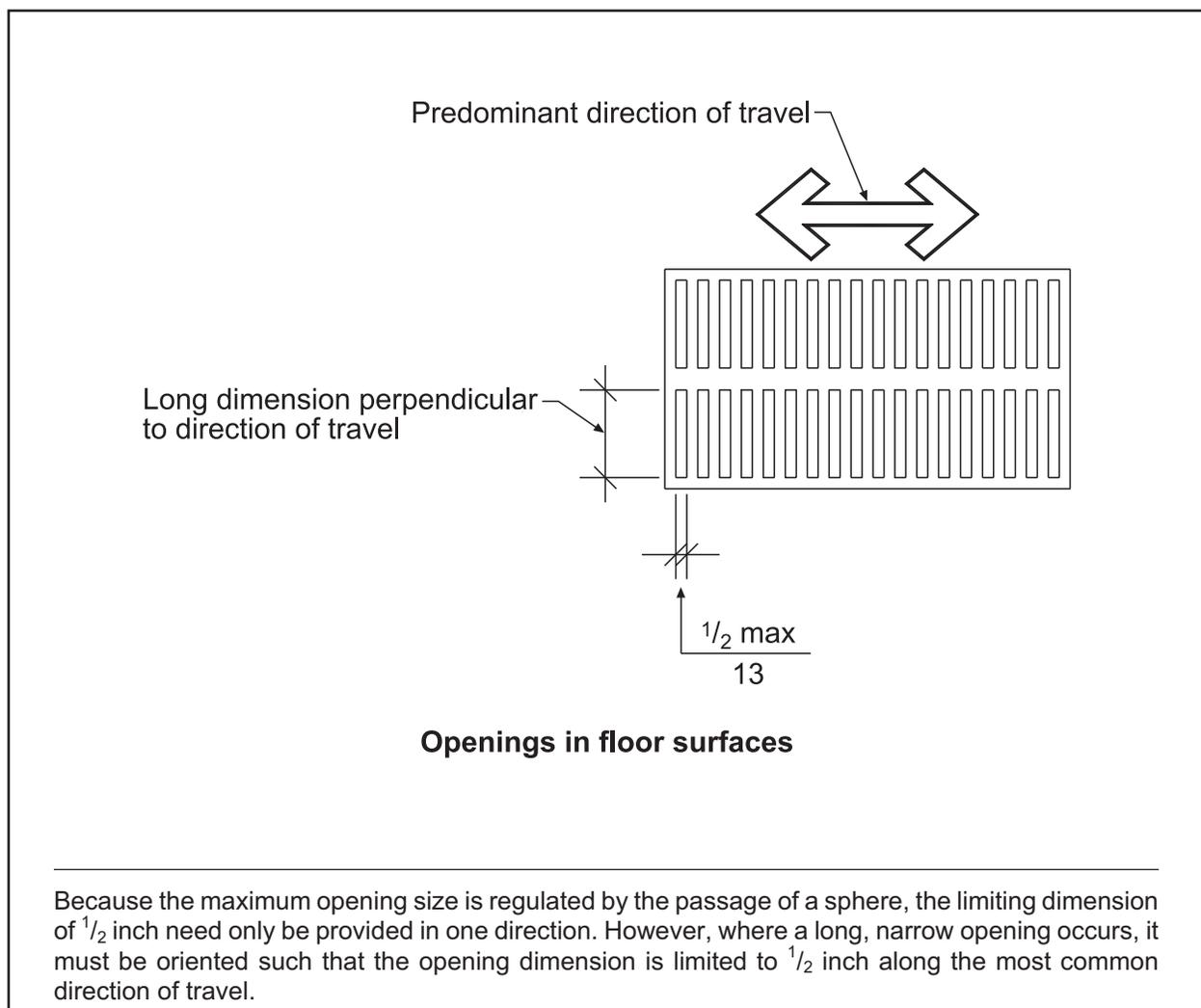
**Carpet on floor surfaces**

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Where edge trim is used in making the transition from a carpeted surface to some other flooring material, it must comply with the limitations for vertical changes in level. If vertical, a maximum  $\frac{1}{4}$ -inch elevation change is permitted. If the change is more than  $\frac{1}{4}$  inch but does not exceed  $\frac{1}{2}$  inch, a bevel is required with a maximum slope of 1:2.

**Code Text:** *Openings in floor surfaces shall be of a size that does not permit the passage of a 1/2 inch (13 mm) diameter sphere, except as allowed (at elevators, platform lifts and track crossings) 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.*

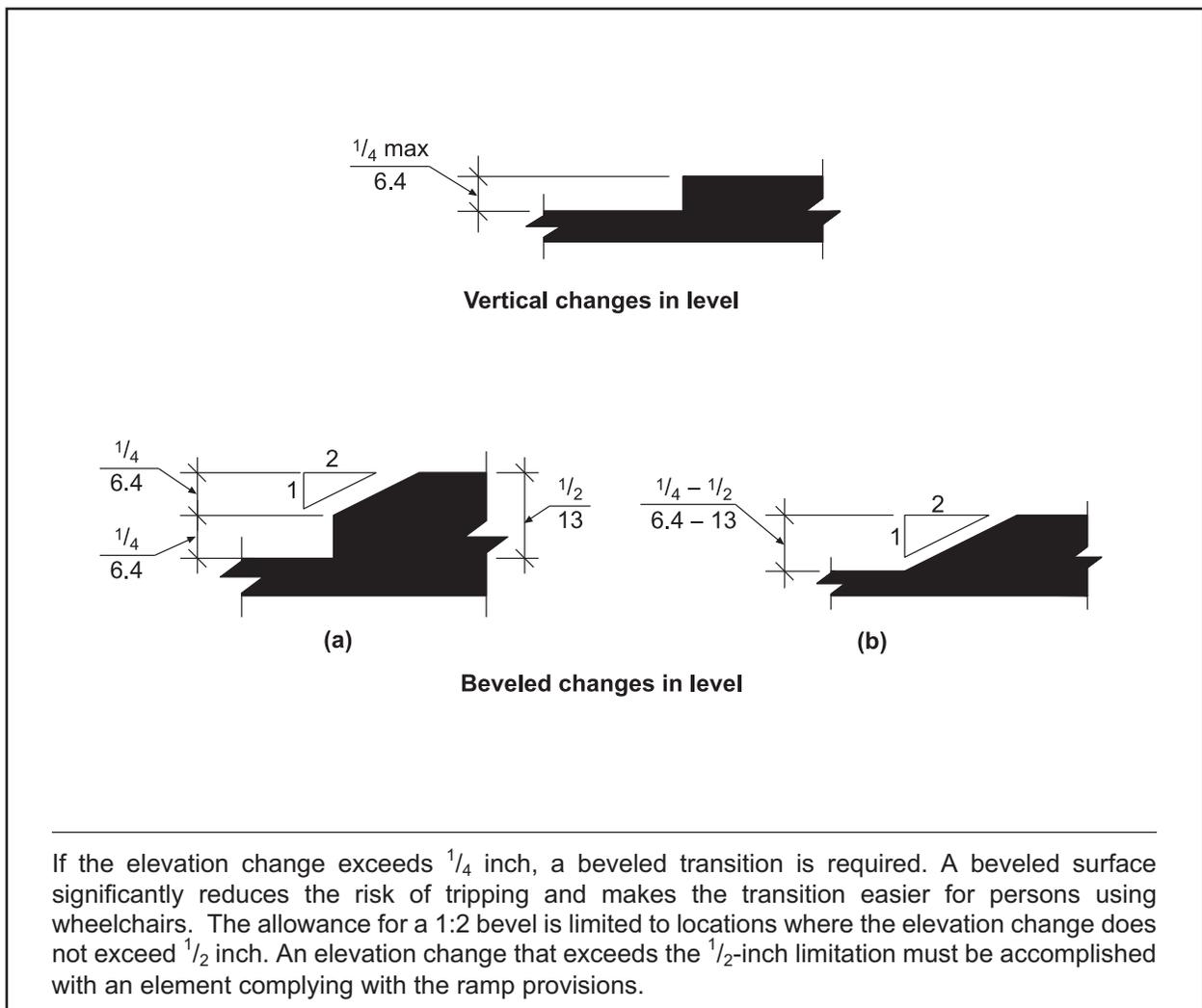
**Discussion and Commentary:** Where openings in a floor surface are too large in dimension, they can become a hazard to individuals utilizing crutches and similar walking aids. In addition, the wheels of a wheelchair could fall into the opening and limit free movement of the chair. Therefore, the size and direction of any openings that occur in floor surfaces are strictly regulated.



Because the maximum opening size is regulated by the passage of a sphere, the limiting dimension of 1/2 inch need only be provided in one direction. However, where a long, narrow opening occurs, it must be oriented such that the opening dimension is limited to 1/2 inch along the most common direction of travel.

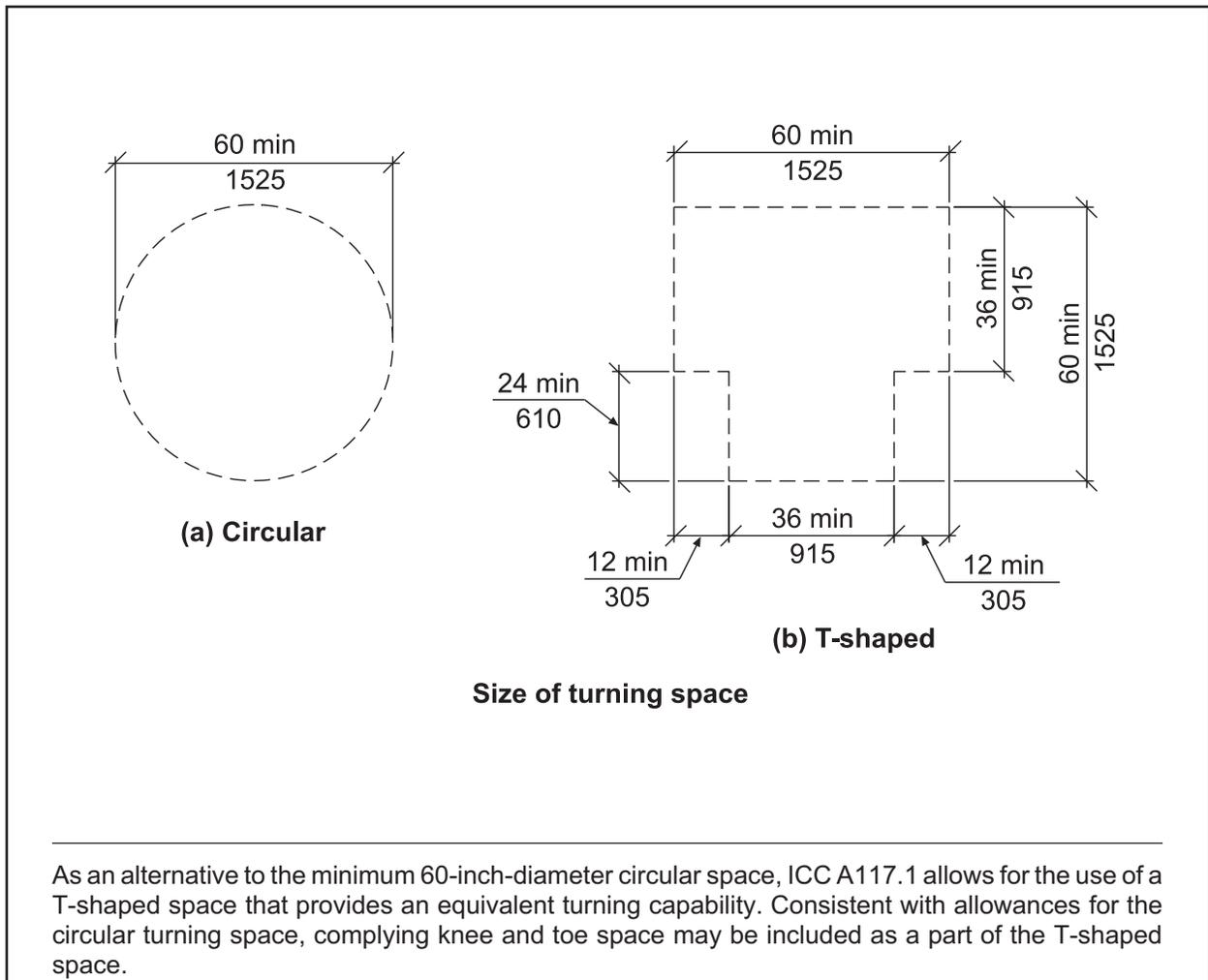
**Code Text:** Changes in level of  $\frac{1}{4}$  inch (6.4 mm) maximum in height shall be permitted to be vertical. Changes in level greater than  $\frac{1}{4}$  inch (6.4 mm) in height and not more than  $\frac{1}{2}$  inch (13 mm) maximum in height shall be beveled with a slope not steeper than 1:2. Changes in level greater than  $\frac{1}{2}$  inch (13 mm) in height shall be ramped and shall comply with Section 405 (ramps) or 406 (curb ramps).

**Discussion and Commentary:** Where the elevation of the floor surface changes abruptly along the path of travel, even if the elevation change is slight, it creates a hazard for users of the path. For individuals using a wheelchair, such an elevation difference can make it difficult to transition to the adjacent floor level. A maximum difference of  $\frac{1}{4}$  inch is permitted without the need for a beveled transition. This allows for a slight variation in elevation at the point where there is a change in floor coverings. Such a small variation does not create an unreasonable tripping hazard, and the transition can easily be made by a person using a wheelchair.



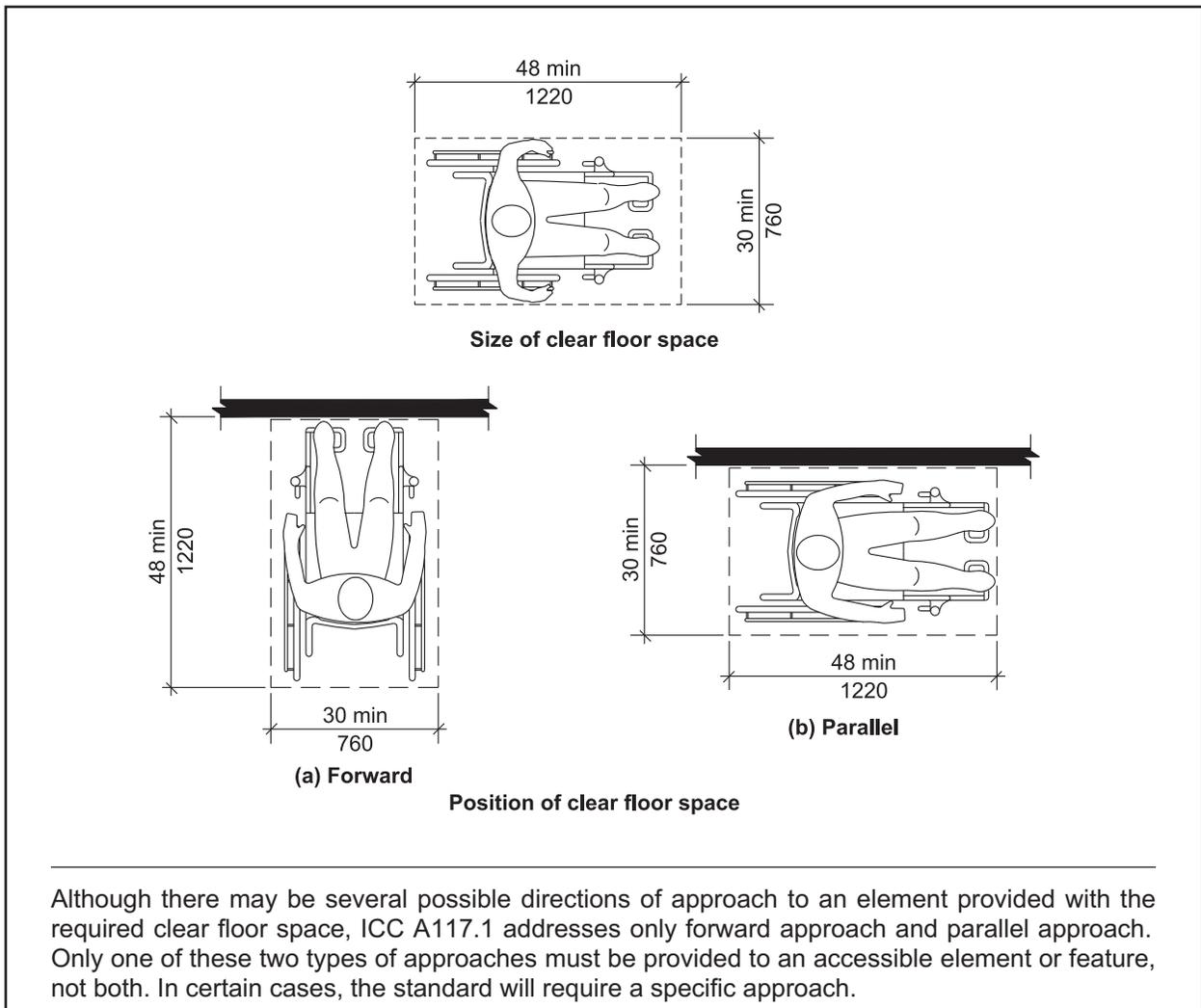
**Code Text:** *Floor surfaces of a turning space shall comply with Section 302. Changes in level are not permitted within the turning space except slopes not steeper than 1:48 . . . The turning space shall be a circular space with a 60-inch (1525 mm) minimum diameter. The turning space shall be permitted to include knee and toe clearance complying with Section 306. As an alternative, the turning space shall be a T-shaped space within a 60-inch (1525 mm) minimum square, with arms and base 36 inches (915 mm) minimum in width. Each arm of the T shall be clear of obstructions and the base shall be clear of obstructions 24 inches (610 mm) minimum. The turning space shall be permitted to include knee and toe clearance complying with Section 306 only at the end of either the base or one arm. Unless otherwise specified, doors shall be permitted to swing into turning spaces.*

**Discussion and Commentary:** When pivoting a wheelchair through a 180-degree turn, a minimum floor space must be provided. The floor space below sinks, shelves, drinking fountains and other objects can be considered a portion of the mandated floor space, provided complying knee and toe clearance is available.



**Code Text:** *Floor surfaces of a clear floor space shall comply with Section 302. Changes in level are not permitted within the clear floor space except slopes not steeper than 1:48 shall be permitted. The clear floor space shall be 48 inches (1220 mm) minimum in length and 30 inches (760 mm) minimum in width. Unless otherwise specified, clear floor space shall be permitted to include knee and toe clearance complying with Section 306. Unless otherwise specified, the clear floor space shall be positioned for either forward or parallel approach to an element. One full, unobstructed side of the clear floor space shall adjoin or overlap an accessible route or adjoin another clear floor space.*

**Discussion and Commentary:** The 30-inch by 48-inch dimension for minimum clear floor space is the basis for many of the provisions in ICC A117.1 that address use by persons using a wheelchair. In order to be usable, the floor space must be located on an accessible route.



**Code Text:** *If a clear floor space is in an alcove or otherwise confined on all or part of three sides, additional maneuvering clearances complying with Sections 305.7.1 (parallel approach) and 305.7.2 (forward approach) shall be provided, as applicable. Where the clear floor space is positioned for a parallel approach, the alcove shall be 60 inches (1525 mm) minimum in width where the depth exceeds 15 inches (380 mm). Where the clear floor space is positioned for a forward approach, the alcove shall be 36 inches (915 mm) minimum in width where the depth exceeds 24 inches (610 mm).*

**Discussion and Commentary:** The presence of an alcove or similar space results in more complex access to an element. The person using a wheelchair should be able to approach the element and position the wheelchair in such a manner that it is available and usable. Therefore, to allow for the necessary maneuvering clearances, the minimum required size of the clear floor space must be increased.

