

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 A117.1-2017, Accessible and Usable Buildings and Facilities

KEY POINTS:

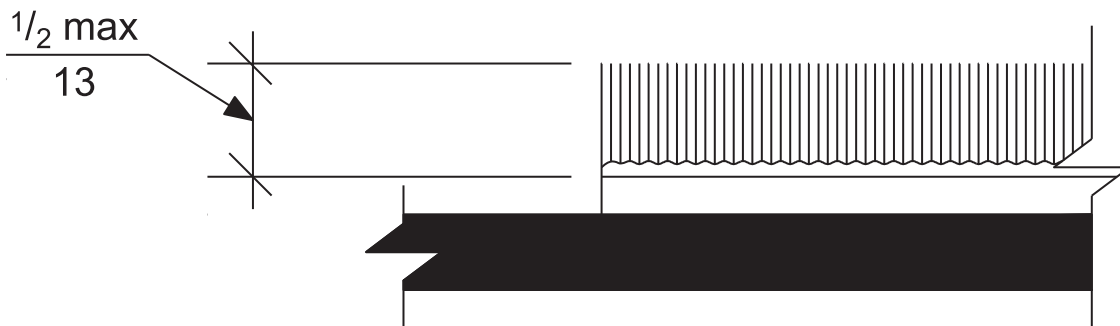
- How must carpet be installed? What types of carpet texture are acceptable?
- What is the maximum permitted pile thickness?
- How must the exposed edges of carpet be addressed?
- What is the maximum size opening permitted in a floor surface? How must elongated openings be oriented?
- What is the maximum 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 is the size difference for a circular turning space in new buildings as compared to existing buildings?
- 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?

KEY POINTS:
(Cont'd)

- 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?
- What is the minimum width required for toe clearance?
- 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 rails 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?

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.

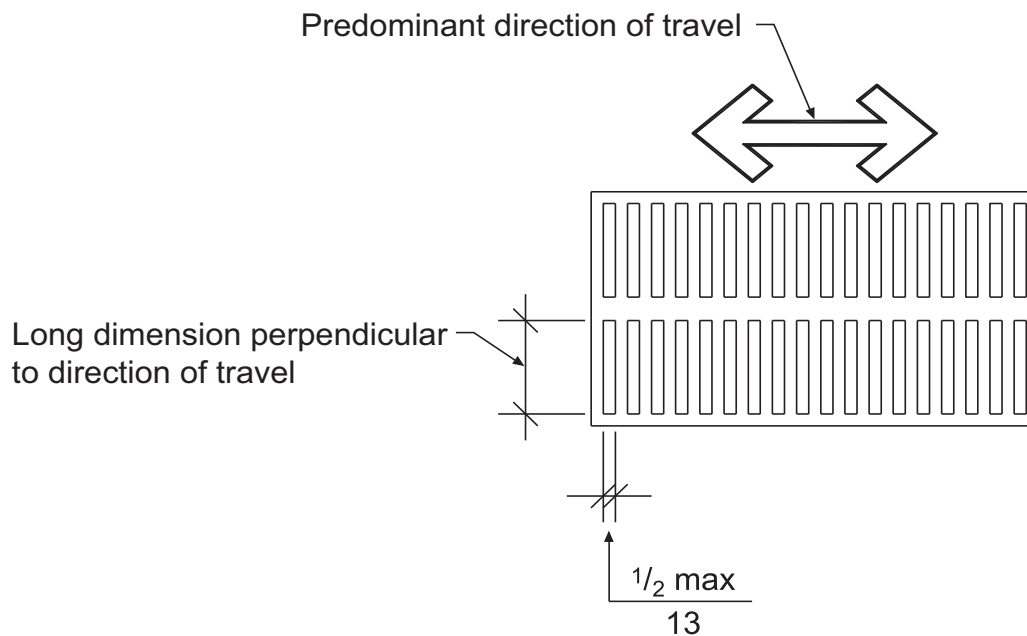


Carpet on floor surfaces

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 $\frac{1}{2}$ -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.



Openings in floor surfaces

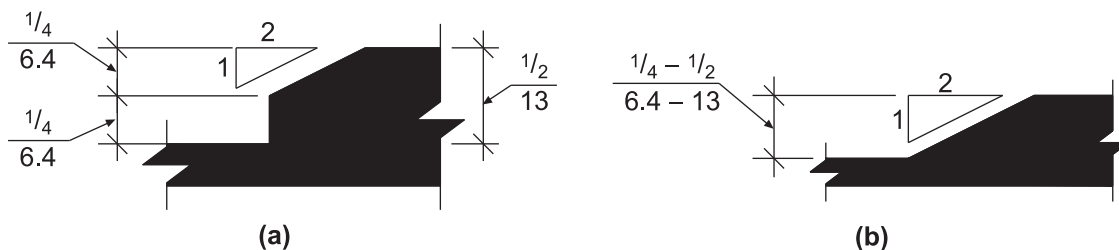
Because the maximum opening size is regulated by the passage of a sphere, the limiting dimension of $\frac{1}{2}$ inch need only be provided in one direction. However, where a long, narrow opening occurs, it must be oriented such that the opening dimension is limited to $\frac{1}{2}$ inch along the most 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 by a ramp (Section 405) or by a curb ramp (Section 406).*

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.



Vertical changes in level

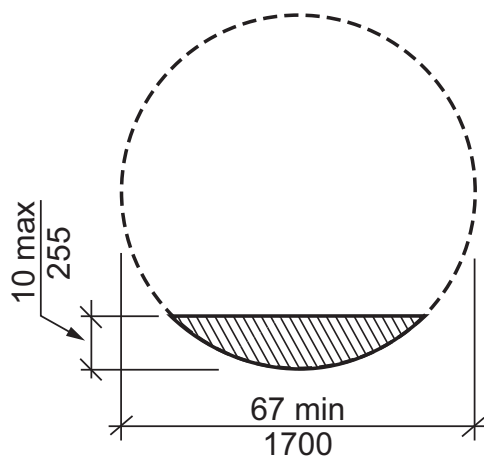


Beveled changes in level

If the elevation change exceeds $\frac{1}{4}$ inch, a beveled transition is required. A beveled surface significantly reduces the risk of tripping and makes the transition easier for persons using wheelchairs. The allowance for a 1:2 bevel is limited to locations where the elevation change does not exceed $\frac{1}{2}$ inch. An elevation change that exceeds the $\frac{1}{2}$ -inch limitation must be accomplished with an element complying with the ramp provisions or by a lower sloped surface.

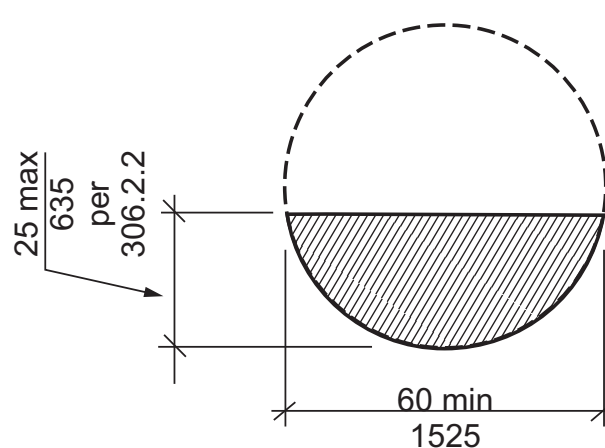
Code Text: *Floor surfaces of a turning space shall comply with Section 302. Changes in level shall not be permitted within the turning space except slopes not steeper than 1:48. . . . Turning spaces shall comply with Section 304.3.1 (circular space) or 304.3.2 (T-shaped space). . . . In new buildings and facilities, the circular turning space shall be a 67-inch (1700 mm) minimum diameter. . . . In existing buildings and facilities, the circular turning space shall be a 60-inch (1525 mm) minimum diameter. Turning spaces shall be permitted to include knee and toe clearance overlap complying with Section 306. In new buildings and facilities the depth of the overlap shall not be more than 10 inches (255 mm).*

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. The turning space requirements are somewhat unique since they establish differing requirements for the size of the space and the overlap that is permitted for new buildings and facilities and those that are existing.



 Overlap of knee and toe clearance

NEW BUILDINGS



 Overlap of knee and toe clearance

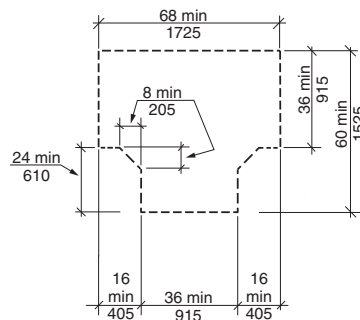
EXISTING BUILDINGS

Circular Turning Space – Size and Overlap

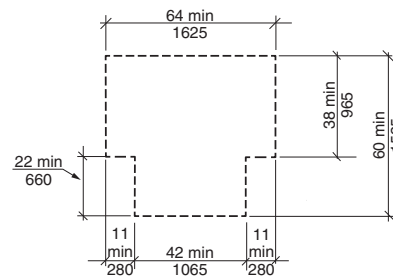
In order to increase the percentage of users of wheeled mobility devices (scooters, electric wheelchairs and manual wheelchairs) that are able to use the accessible elements, the standard establishes larger sizes which are only required for new buildings. Existing buildings may use the sizes and configurations of turning spaces that were previously permitted by the 2009 edition of the standard. Users should review the definition for “existing building” and “existing facility” since this permits the technical requirements to differ between new and existing buildings.

Code Text: *In new buildings and facilities, the turning space shall be a T-shaped space complying with one of the following: A T-shaped space (1) . . . 68 inches (1725 mm) wide and 60 inches (1525 mm) deep, with two arms and one base that are all 36 inches (915 mm) in width. At the intersection of each arm and the base, the interior corners shall be chamfered for 8 inches (205 mm) minimum. (2) . . . that fits within an area 64 inches (1625 mm) wide and 60 inches (1525 mm) deep, with two arms 38 inches (965 mm) minimum in width and a base 42 inches (1065 mm) minimum in width. (3) . . . 64 inches (1625 mm) wide and 60 inches (1525 mm) deep, with two arms and one base 40 inches (1015 mm) minimum in width. . . . In existing buildings and facilities, the . . . T-shaped space within a 60-inch (1525 mm) minimum square, with arms and base 36 inches (915 mm) minimum in width.*

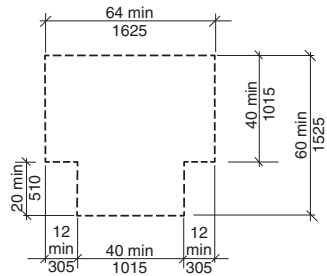
Discussion and Commentary: In existing buildings, the T-shaped turning space may comply with the size allowed by the 2009 and earlier standard. In new buildings the standard allows any of three options to be used. These T-shaped spaces for new buildings are all larger and either require larger arm widths or a chamfered corner to permit easier maneuvering for people in a wheelchair.



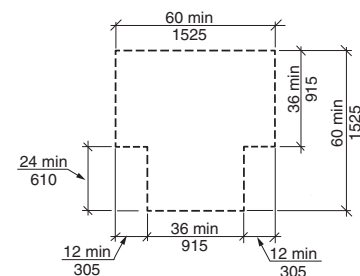
NEW BUILDINGS - OPTION 1



NEW BUILDINGS - OPTION 2



NEW BUILDINGS - OPTION 3



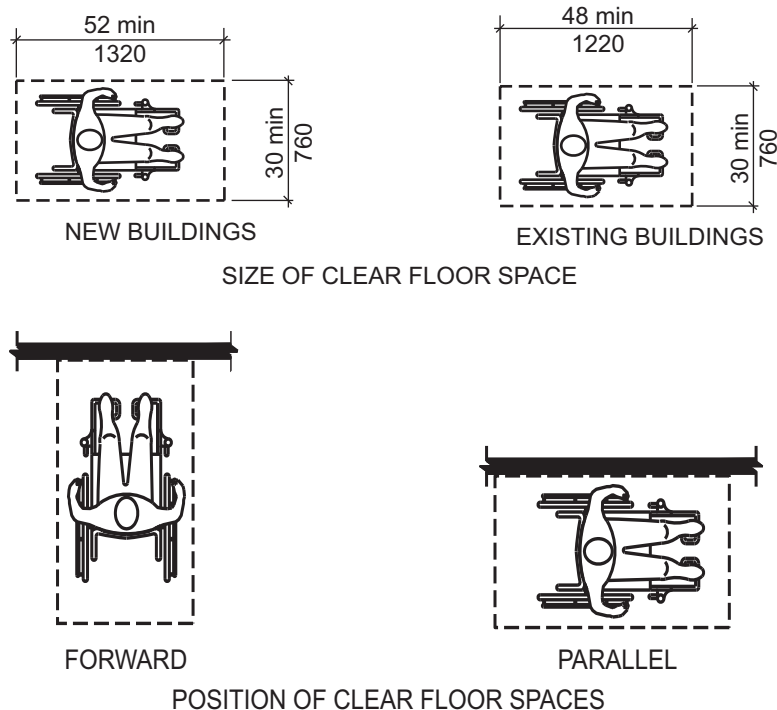
EXISTING BUILDINGS

T-shaped Turning Space

The turning spaces are permitted to include knee and toe clearance complying with Section 306. This overlap of the turning space is only permitted at either the base or one arm. Where Option 1 with the chamfered corners is used, the overlap is only allowed on the portion of the base or arm that is beyond the chamfer.

Code Text: *Floor surfaces of a clear floor space shall comply with Section 302. Changes in level shall not be permitted within the clear floor space except slopes not steeper than 1:48 shall be permitted. In new buildings and facilities, the clear floor space shall be 52 inches (1320 mm) minimum in length and 30 inches (760 mm) minimum in width. In existing buildings and facilities, 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, clear floor spaces 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 size requirements 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 and adjoin an accessible route. Review the definition for “existing building” and “existing facility” since it will impact the size requirements.



Although there may be several possible directions of approach to an element provided with the required clear floor space, ICC A117.1 addresses only forward approach and parallel approach. Only one of these two types of approaches must be provided to an accessible element or feature, not both. In certain cases, the standard will require a specific approach.