



Band A—Barrier-free Design

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MODULE A-1

GENERAL REQUIREMENTS

Introduction

Although most safety codes officers (SCOs) are aware that the ABC 2014 includes requirements for persons with disabilities, many may not be aware of the overall range of disabilities. This module explains the range of disabilities and identifies the categories of buildings that must be accessible and usable by persons with disabilities.

Learning Objectives

- Describe the types of disabilities that pertain to provisions in the ABC 2014.
- Describe the categories of buildings for which barrier-free access is required and the buildings that are exempt from incorporating barrier-free access.

A-1, OBJECTIVE #1

Describe Types of Disabilities that Pertain to Provisions in the ABC 2014

Disabilities

3.8.1.1. Application

2) *Buildings* required to be *barrier-free* must comply with all requirements designed to assist persons with physical, sensory and developmental disabilities.

A-3.8. Barrier-Free Design Assumptions. This Section contains minimum provisions to accommodate a person using a typical manual wheelchair or other manual mobility assistance devices such as walking aids, including canes, crutches, braces and artificial limbs.

Although the Appendix note for Section 3.8. appears to limit the Section's requirements to persons with physical disabilities requiring the use of mobility assistive devices, Sentence 3.8.1.1.(2) clarifies that all disabilities need to be considered in building design.

Disabilities can be grouped into three categories, and these categories were considered in preparing the barrier-free requirements of the ABC 2014.

Physical Mobility Disabilities

Individuals with physical mobility disabilities have limited ability to walk, raise their arms, or coordinate muscle activity. These persons may use wheelchairs, powered scooters, walkers, or canes, and they can be identified visually. Individuals with injuries involving fractured bones, dislocations, and injuries from accidents may also have difficulties in movement. Their responses may be slow and awkward because they are not used to mobility assistive devices.

By contrast, persons with other mobility disabilities do not require the use of assistive devices and, therefore, are not easily identified visually. Persons with severe arthritis, lung problems causing breathing difficulties, or other skeletal and internal problems are not addressed in the ABC 2014.

Sensory Disabilities

Sensory disabilities include individuals who have impaired sight or hearing. Many people experience deteriorating sight and hearing as they age. Because the loss is gradual, they may not seek medical help to obtain hearing aids and glasses. This can place them at risk if they need to recognize and respond to an emergency; for example, they may not hear a smoke alarm or a building's fire alarm. Blind persons, who rely on familiar sounds in a building to orient themselves, can be completely disoriented when a fire alarm signal sounds and blocks out all familiar sounds.

Other sensory disabilities include the loss of sensation or touch. Persons with these sensory disabilities may suffer burns or scalds from contact with hot surfaces or fluids.

Cognitive (Developmental) Disabilities

Cognitive disabilities applies to persons at various ages. Young infants and elderly persons with dementia or Alzheimer's disease are examples of individuals who may be unable to understand and react to emergency signals and instructions. Although these disabilities are often described in terms of their clinical designation, from the perspective of a building code, it is important to understand the functional disabilities of these individuals.

Functional cognitive disabilities include deficits or difficulties with:

- memory
- problem solving
- attention
- reading, linguistic, and verbal comprehension
- mathematics comprehension
- visual comprehension

Although some persons experience only one deficit, many experience more than one of these disabilities.

The ABC 2014 does not address extremes of bodily dimensions; therefore, doorways are not designed for very tall persons and handrails might not provide support for very heavy persons.



A-1, SELF-TEST #1

Compare your answers with the answer key in Appendix A.

1. Physical disability includes mental or cognitive disabilities in terms of mental disorientation and/or short-term memory loss.
 - a. True
 - b. False

2. This objective addresses the following number of disability categories.
 - a. Six
 - b. Four
 - c. Three
 - d. One

3. Sensory disability, as discussed in this module, includes the loss of hearing or sight.
 - a. True
 - b. False

4. The ABC 2014 does not address the needs of a person who is temporarily disabled as a result of an accident.
 - a. True
 - b. False

A-1, OBJECTIVE #2

Describe the Categories of Buildings for Which Barrier-free Access is Required and the Buildings that Are Exempt from Incorporating Barrier-free Access

General Requirements for Barrier-free Access

Although most provisions affecting barrier-free access to buildings are in Section 3.8. of Division B of the ABC 2014, many buildings, whether regulated by Part 3 or Part 9, require some level of barrier-free access and utilization.

Part 9 applies to buildings that are up to three storeys in building height and up to 600 m² in building area.

9.5.2.1. General

1) Except as provided in Articles 9.5.2.3. and 3.8.1.1., every *building* shall be designed in conformance with Section 3.8.

9.5.2.3. Exception for Apartment Buildings

1) Except as provided in Sentence (2), if the *building* is not equipped with an elevator, the *barrier-free* path of travel described in Section 3.8. need only be provided on the entrance level of an apartment *building*.

2) The *barrier-free* path of travel on the entrance level described in Sentence (1) need not be provided where the difference in floor elevation between the entrance level and every *dwelling unit* exceeds 600 mm.

Article 9.5.2.3. adds additional categories to the exceptions listed in Clauses 3.8.1.1.(1)(a) to (d) by exempting some small apartment buildings from the application of Section 3.8.

Upper storeys in walk-up apartment buildings that do not have an elevator are exempt from the application of Section 3.8.

Although upper storeys do not have to be barrier-free, the main floor has to provide barrier-free access, and by extension, appropriate access to the facilities on that level. In Figure A-1-2-1, the main floor of the three-storey apartment building is accessible because its main floor is at ground level.

Installing an elevator in a small apartment building requires barrier-free paths of travel to all storeys served by the elevator; however, the individual dwelling units do not need to be barrier-free unless they are required to be adaptable dwelling units in conformance with Sentence 3.8.1.1.(3).



Figure A-1-2-1 Three-storey apartment building

Many Part 9 apartment buildings have a split-entry system in which a flight of stairs leads down half a storey to the basement and another flight of stairs leads up half a storey to the main floor level of the building. Sentence 9.5.2.3.(2) exempts this type of apartment building from the application of Section 3.8. even if an elevator, not accessible from the entrance, were installed. These buildings can often be recognized by windows in the lowest storey having sills level with or just above the adjacent ground (see Figure A-1-2-2). The short flights of stairs leading up and down can be seen through the doorway (see Figure A-1-2-3).



Figure A-1-2-2 Split-entry apartment building [barrier-free provisions do not apply]



Figure A-1-2-3 Split entrance to apartment building [barrier-free provisions do not apply]

3.8.1.1. Application

- 1) The requirements of this Section apply to all *buildings* except
 - a) detached houses, semi-detached houses, houses with a *secondary suite*, duplexes, triplexes, townhouses, row houses and boarding houses, which are not used in social programs such as group homes, halfway houses and shelters (see A-1.4.1.2.(1), Secondary Suite, in Appendix A of Division A),
 - b) relocatable industrial accommodations,
 - c) *buildings* of Group F, Division 1 *major occupancy*, in which only the requirements dealing with hearing sensory disabilities would apply, and
 - d) *buildings* that are not intended to be occupied on a daily or full-time basis, including automatic telephone exchanges, pumphouses and substations, in which only the requirements dealing with hearing sensory disabilities would apply.

(See Appendix A.)

Sentence 3.8.1.1.(1) extends the range of buildings referred to in Article 9.5.2.1. to all Part 3 buildings but includes exceptions that apply to both Part 3 and Part 9 buildings.

The buildings shown in Figure A-1-2-4 [Clause 3.8.1.1.(1)(a)] are residential buildings governed by Part 9. The reference to social programs applies to a residential building that is funded or regulated by a government agency, whether federal, provincial, or municipal, and these buildings must comply with Section 3.8. with regard to construction and occupancy.



Figure A-1-2-4 Examples of small residential buildings exempt from barrier-free requirements

Relocatable industrial accommodations [Clause 3.8.1.1.(1)(b)] refers to buildings that are within the scope of Part 10 (see Figure A-1-2-5). Depending on the building size, some provisions of Part 3 or Part 9 might also apply. These buildings are at industrial work sites and often in remote locations. The occupants are construction workers, and the rigours and hazards of the worksite make it unlikely that persons with disabilities would be the occupants.



Figure A-1-2-5 Relocatable industrial accommodation

High-hazard industrial buildings [Clause 3.8.1.1.(1)(c)] are characterized by contents that can be involved in rapid fire development or explosions. Even with a detection and warning system, the response time frame would be so brief that a person with a mobility disability would have difficulty taking appropriate action within the limited time available to evacuate. Provisions relating to the needs of persons with hearing disabilities have to be met.

Clause 3.8.1.1.(1)(d) applies to buildings that are not occupied for extended periods. These buildings are often designed to blend in with nearby buildings, and their functions may not be obvious (see Figure A-1-2-6). Many buildings have confined space and

minimum clearance around equipment. Persons make visits to undertake routine maintenance and emergency repairs. Provisions relating to the needs of persons with hearing disabilities must be met. The only relevant requirement is the provision of visual warning devices to supplement the audible signalling devices of a fire alarm system, if a fire alarm system is required.



Figure A-1-2-6 Substation

A-3.8.1.1.(1) Application. Barrier-free design principles should be applied in all buildings and in all areas other than the exceptions mentioned in this Article. However, certain industrial buildings, by nature of their operation, may pose risks to their occupants due to the use of hazardous materials and/or processes. Some buildings classified as Group F, Division 2 or 3, including special purpose buildings in heavy industries such as forestry or metallurgy, often require grade separations and other features essential to their functioning, but not compatible with the concept of barrier-free accessibility. In such exceptional situations, relaxation of barrier-free requirements may be granted when no practical alternative can be found. However, even in such buildings, barrier-free accessibility complying with this Section must be provided to and within all areas with non-hazardous subsidiary occupancies.

Because of the buildings' operations, some industrial buildings may not be compatible with persons with physical disabilities. Although medium-hazard industrial buildings and low-hazard industrial buildings are not exempt by Sentence 3.8.1.1.(1), Appendix note 3.8.1.1.(1) accepts that situations exist in which it is reasonable to grant a waiver of compliance with all or part of Section 3.8. This is achieved by submitting a request for relaxation to the building Administrator.

Division C

2.2.1.4. Barrier-Free Relaxations

- 1) The *Chief Building Administrator* may grant relaxation of one or more of the requirements of Section 3.8. of Division B if an *owner* can demonstrate to the satisfaction of the *Chief Building Administrator* that
 - a) the specific requirements are unnecessary, or
 - b) extraordinary circumstances prevent conformance.

The relaxation permitted by Article 2.2.1.4. of Division C applies to any building otherwise required to comply with Section 3.8. of Division B. Documentation must be sufficiently clear and persuasive to enable the building Administrator to render a reasoned and justified decision.

Clause 2.2.1.4.(1)(b) might apply to a historic or heritage building in which features and dimensions require so much modification to provide barrier-free access that the historic features would be destroyed. Although the grain elevator in Figure A-1-2-7 is unlikely to be barrier-free, it might be possible to provide limited accessibility to the nearby railway station, such as the space inside the entry door. In historic buildings, it is unlikely that doorways on the main floor or the stairway to a second storey could be made barrier-free without destroying the character of the original building.



Figure A-1-2-7 Ukrainian Cultural Heritage Village: Home Grain Company grain elevator and Canadian National Railway Company station (both originally from Bellis, Alberta)



A-1, SELF-TEST #2

Compare your answers with the answer key in Appendix A.

1. A single-family house is exempt from compliance with the barrier-free access requirements of Section 3.8.
 - a. True
 - b. False

2. Nobody has the authority to relax any of the requirements of Section 3.8.
 - a. True
 - b. False

3. Small industrial buildings regulated by Part 9 are exempt from the application of Section 3.8.
 - a. True
 - b. False

MODULE A-2

APPROACH TO AND ENTRY INTO A BUILDING

Introduction

It makes no sense to design a building's interior for use by a person with a disability if that person is unable to reach and enter the building. This module examines the provisions of the ABC 2014 that allow a person with a disability to approach and enter the building.

Learning Objectives

- Describe the provisions related to vehicle stopping and parking places.
- Describe the requirements intended to allow persons with a disability to approach a building.
- Describe the requirements that enable persons with a disability to enter a building.

A-2, OBJECTIVE #1

Describe the Provisions Related to Vehicle Stopping and Parking Places

Barrier-free Access: Parking

The definition of barrier-free applies to a building and its facilities. The ABC 2014 requirements extend to the boundaries of the lot on which the building is erected. The relevant municipality is responsible to provide curb cuts, curb ramps, and other features beyond the lot boundary to assist persons with disabilities in using sidewalks, streets, and other public facilities.

Division A, 1.4.1.2.(1) Defined Terms

Barrier-free means that a *building* and its facilities can be approached, entered, and used by persons with physical, mental or sensory disabilities.

Although it is possible to approach a building site by walking or using a scooter, many persons with physical disabilities approach the site by private or special public transportation vehicles. Unloading a wheelchair requires substantially more space than is needed for other persons. Large buildings often provide parking spaces to serve the building's occupants. A parking lot or parking structure must include a number of accessible parking spaces for adapted vehicles. These spaces are marked for exclusive use by vehicles that are suitably identified. If public transportation vehicles are used, it is important to ensure that the routes around the building are clearly marked and provide sufficient space for loading and unloading.

3.8.2.2. Access to Parking Areas and Stall Design

- 3) If an exterior passenger loading zone is provided, it shall have
 - a) an access aisle not less than 1 500 mm wide and 6 000 mm long adjacent and parallel to the vehicle pull-up space,
 - b) a curb ramp, where there are curbs between the access aisle and the vehicle pull-up space, and
 - c) a clear height of not less than 2 750 mm at the pull-up space and along the vehicle access and egress routes.

The passenger loading zone specified in Sentence 3.8.2.2.(3) is not mandated: it is optional. However, if a long driveway leads from the street to a building entrance, it is reasonable to expect that a passenger loading zone is provided.

The dimensions of the pull-up space are based on a commercial vehicle that uses a side-mounted lift with the wheelchair lowered into the aisle (see Figure A-2-1-1).



Figure A-2-1-1 Vehicle with side-mounted lift

A vehicle with a lift at the back needs to be able to lower the platform to the road surface behind the vehicle from where the wheelchair can proceed to the edge of the road or sidewalk (see Figure A-2-1-2).



Figure A-2-1-2 Vehicle with rear-mounted lift

Both figures show how the roof of each commercial vehicle has been raised to allow a person to remain in the wheelchair during transport. This increases the overall height of the vehicle and explains why Clause 3.8.2.2.(3)(c) specifies a clearance not less than 2 750 mm for the full extent of the vehicle access and egress routes. The height restriction applies to any canopy similar to that shown in Figure A-2-1-2 as well as to overhead wiring and tree branches.

Figure A-2-1-3 shows a vehicle pull-up space that is perpendicular to the sidewalk. The aisle is immediately beside the pull-up space. If there is a curb between the aisle and the sidewalk, a curb cut through the curb or a ramp should be provided. See 3.8.2.2.(3)(a).

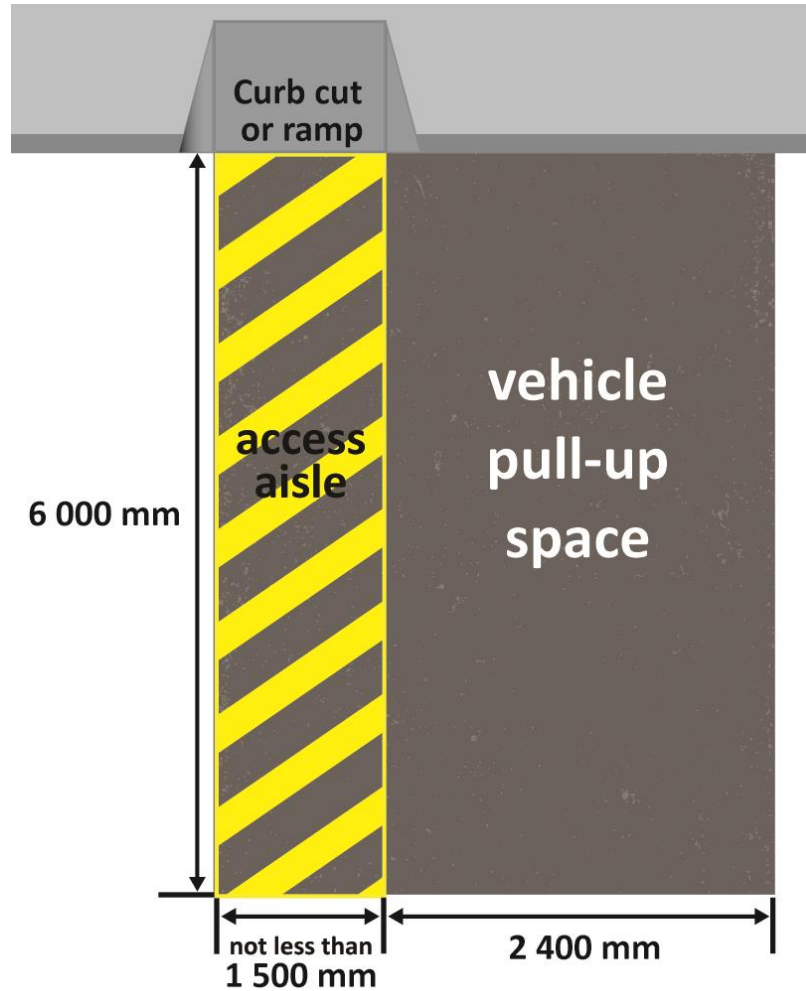


Figure A-2-1-3 Pull-up space perpendicular to sidewalk

Figure A-2-1-4 shows a variation in which the vehicle pulls up parallel to and beside the curb. The lift platform is lowered from the side of the vehicle to sidewalk level. The aisle and vehicle pull-up space should be offset so that a wheelchair user coming from a lowered rear-mounted lift can reach the sidewalk by using the curb cut or ramp.

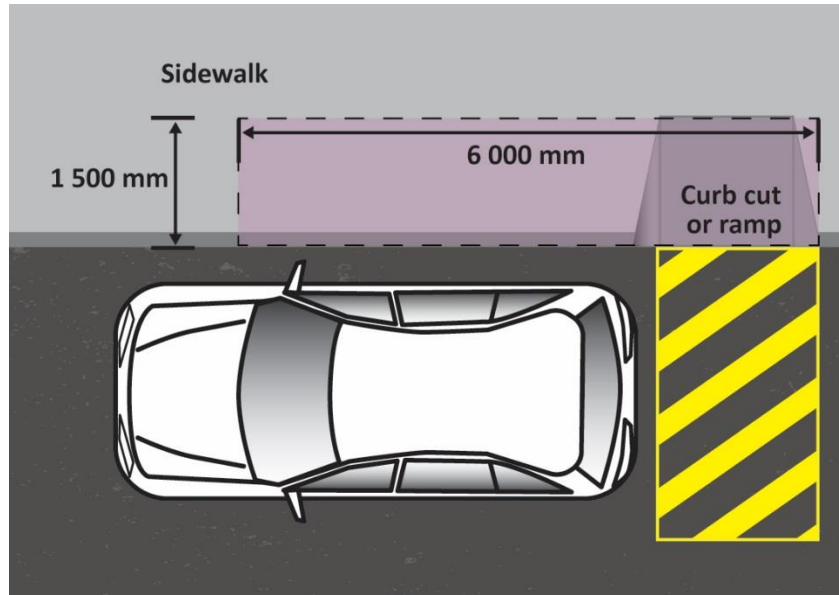


Figure A-2-1-4 Pull-up space parallel to sidewalk

Figure A-2-1-5 shows the aisle placed between the vehicle and the edge of the roadway. This option is used if the sidewalk is too narrow to incorporate the 1500 mm wide aisle.

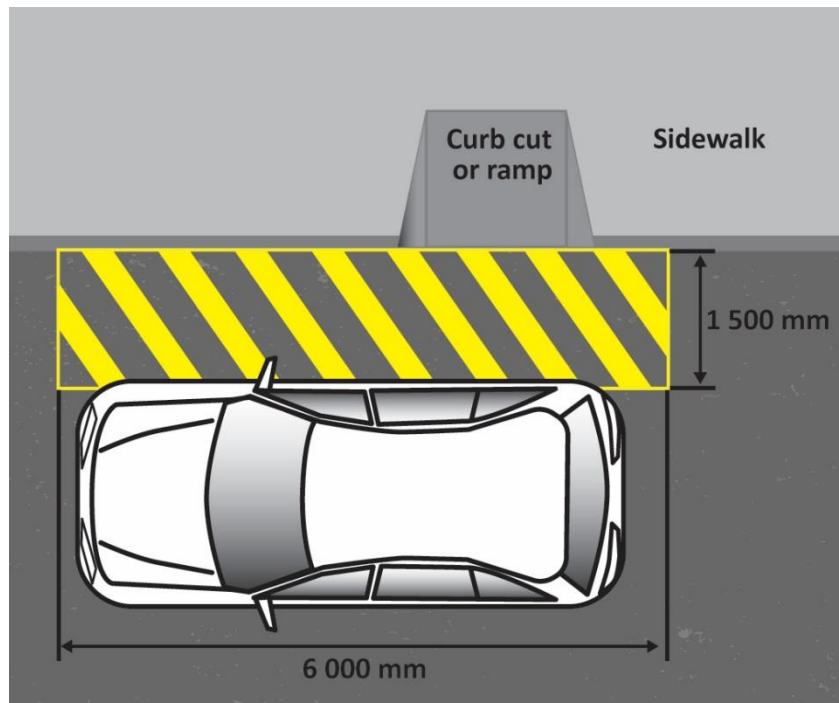


Figure A-2-1-5 Pull-up space parallel to aisle

Private vehicles used to transport wheelchairs have manually-operated or power-operated ramps, either at the side or at the back. The length of the ramp partly depends on the height of the vehicle's floorbed compared to the road surface. Typical lengths range from 1800 mm to 2500 mm. As a result, the 1500 mm wide aisle required by Clause 3.8.2.2.(3)(a) is useful for lift-equipped vehicles but not other vehicles, such as private vehicles with ramps.



Figure A-2-1-6 Private vehicle with side ramp



Figure A-2-1-7 Private vehicle with back ramp

Many municipalities have bylaws designating specific numbers of parking spaces, intended for users of a specific building or group of buildings. These might be on the building premises or in rented space in a separate location, either at ground level, in a parking structure, or below a building.

3.8.2.2. Access to Parking Areas

2) Except as provided in Sentence (5), where parking stalls are required by the development authority, made pursuant to the Municipal Government Act and its Regulations, parking stalls for use by persons with disabilities shall be provided in conformance with Table 3.8.2.2.

Table 3.8.2.2.
Designated Parking Spaces
 Forming Part of Sentence 3.8.2.2.(2)

Number of Parking Stalls Required	Number of Designated Stalls for Use by Persons with Physical Disabilities
2 – 10	1
11 – 25	2
26 – 50	3
51 – 100	4
for each additional increment of 100 or part thereof	one additional stall

A-3.8.2.2. Access to Parking Areas. The Municipal Government Act and its Regulations provide a mechanism for determining the characteristics of our communities. Where local bylaws require that parking be available, the Code requires that a percentage of parking spaces be designed to allow persons using wheelchairs sufficient room to get in and out of a vehicle. A barrier-free path of travel must also be provided from the parking area to the building. The designer must provide a properly identified and unobstructed path of travel from the parking area to the entrance that is accessible. The entrance chosen should, in any case, be one normally used by the occupants of the building. Long paths of travel are not recommended.

Although Appendix note A-3.8.2.2. states that the designer must provide a barrier-free unobstructed path from the parking spaces to the building entrance, that is only relevant if the parking spaces are in the same building or on the same property. If a parking structure serves several buildings and does not abut the properties on which the buildings are, the paths of travel are on municipal property, so there is an expectation that the sidewalks and paths of travel between the buildings and the parking structure are barrier-free.

Sentence 3.8.2.2.(4) specifies the characteristics of a parking stall for use by a person in a wheelchair.

3.8.2.2. Access to Parking Areas and Stall Design

- 4)** A parking stall intended for use by persons using a wheelchair or other mobility aid shall
- a) be designed as a 2.4 m wide parking stall adjacent to a 2.4 m wide access aisle where the access aisle is demarcated to indicate no parking,
 - b) have a firm, slip-resistant and level surface,
 - c) be clearly marked and identified by
 - i) a vertically mounted sign, located near the centre line of each designated stall, with the centre of the sign between 1 600 to 2 500 mm from the finished surface, and
 - ii) the International Symbol of Access painted on the pavement,
 - d) be located near to or adjoining a barrier-free path of travel leading to the nearest barrier-free entrance, and
 - e) be designed so that parked vehicles shall not obstruct access onto an elevated and level surface.

(See Appendix A.)

A-3.8.2.2.(4) Parking. Many wheelchair users who drive enter their vehicles on the passenger side (right-hand side) of the vehicle; many use a lift. It is possible to place two stalls side by side and make use of a common access aisle. Figure A-3.8.2.2.(4)-A provides suggested dimensions. Marking the access aisle with white or blue lines and marking the stalls with a large blue dot has been an effective way of designating the parking area for wheelchair users; however, such painted surfaces can become a slip hazard and unless they can be made slip-resistant must be avoided. A sign indicating that a permit is required to use the designated stall must also be posted (see Figure A-3.8.2.2.(4)-B).

Figure A-2-1-8 shows the application of Sentence 3.8.2.2.(4) to more than one barrier-free parking space. If a sidewalk serves the parking spaces, there should be a curb cut or ramp to allow a wheelchair to move from the aisle to the sidewalk. If the roadway serving the parking spaces is used to go to a building, the path of travel from the parking space to the building entrance must always conform to barrier-free requirements.

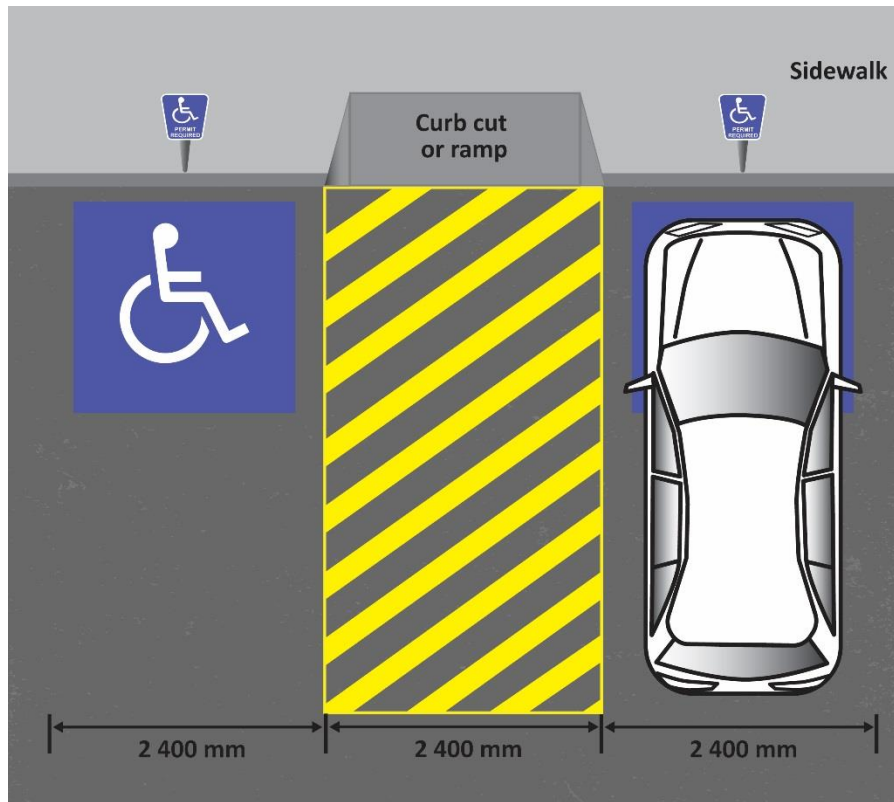


Figure A-2-1-8 Two adjacent parking spaces sharing an aisle

Sentence 3.8.2.2.(5) provides that each adaptable and/or barrier-free dwelling unit must have a barrier-free parking stall.



A-2, SELF-TEST #1

Compare your answers with the answer key in Appendix A.

1. The concept of barrier-free relates only to persons with mobility disabilities since persons with sensory disabilities are able to circulate easily throughout a building.
 - a. True
 - b. False

2. Provision of stopping areas for vehicles used to transport wheelchairs and their occupants is the sole responsibility of the municipality through a program of providing curb side stopping areas.
 - a. True
 - b. False

3. Two barrier-free parking spaces must always be located side by side with a common aisle for unloading wheelchairs.
 - a. True
 - b. False

4. In a parking area with 175 stalls, the number of stalls that must be barrier free, as required by planning regulations, is:
 - a. Two
 - b. Four
 - c. Five
 - d. Six

A-2, OBJECTIVE #2

Describe the Requirements Intended to Allow Persons with a Disability to Approach a Building

Barrier-free Access: Approach to a Building

Exterior walks allow persons to reach the building entrances from a street, a sidewalk, or a parking area. The majority of walks have to be designed for use by ambulatory pedestrians as well as by wheelchairs and other mobility-assistive devices.

3.8.3.2. Exterior Walks

- 1) Exterior walks that form part of a *barrier-free* path of travel shall
 - a) have a cross slope not more than 1:50,
 - b) be not less than 1 100 mm wide,
 - c) have a level area conforming to Clause 3.8.3.4.(1)(c) adjacent to an entrance doorway,
 - d) have a curb not less than 75 mm high wherever there is a vertical drop more than 75 mm from the walk surface and there is no wall, railing, or other barrier to provide protection,
 - e) have a surface not less than 1 100 mm wide of a different texture and contrasting in colour to that surrounding it, if the path of travel is level and even with adjacent surfaces,
 - f) be free of obstructions for the full width of the walk to not less than 1 980 mm high, except that handrails are permitted to project not more than 100 mm from either or both sides into the clear area, and
 - g) be designed as a ramp where the slope of the walk is more than 1 in 20.

Although the adjective level is used to describe an area adjacent to an entrance doorway, there should be sufficient slope to allow water to drain away and not pond on the surface. Standing water is a slipping hazard, especially if it freezes in winter. The cross slope of 1:50 keeps most surfaces free of standing water. Control of excessive cross slope on a walkway helps to prevent a wheelchair from drifting to the side of the walk.

3.8.1.3. Barrier-Free Path of Travel

- 4) The width of a *barrier-free* path of travel that is more than 30 m long shall be increased to not less than 1 500 mm for a length of 1 500 mm at intervals not exceeding 30 m.

Figure A-2-2-1 shows an exterior walk with the minimum width and the extra width to allow for passing at intervals. The level area adjacent to an entrance (shown at the right) is offset from

the doorway to allow a wheelchair to be placed out of the swing path of the door.

If the surrounding area is level with the walk, there must be both colour and texture difference so that a person with a visual disability is able to distinguish the location of the walk. If a curb or guard is required at the side of the walk, colour and texture difference is required only for the landings.

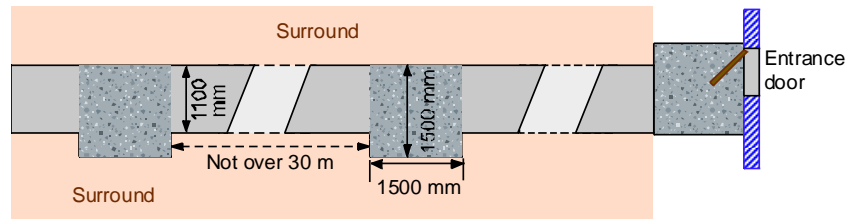


Figure A-2-2-1 Exterior walk with minimum width as well as extra width for passing

Any portion of the walk that has a slope more than 1:20 must be designed as a ramp. The upper limit of the slope is 1:12 [Clause 3.8.3.4.(1)(b)]. The maximum distance between landings cannot exceed 9 m.

The overhead clearance shown in Figure A-2-2-2 applies not only to the ramp, but to all parts of the walk, including landings.

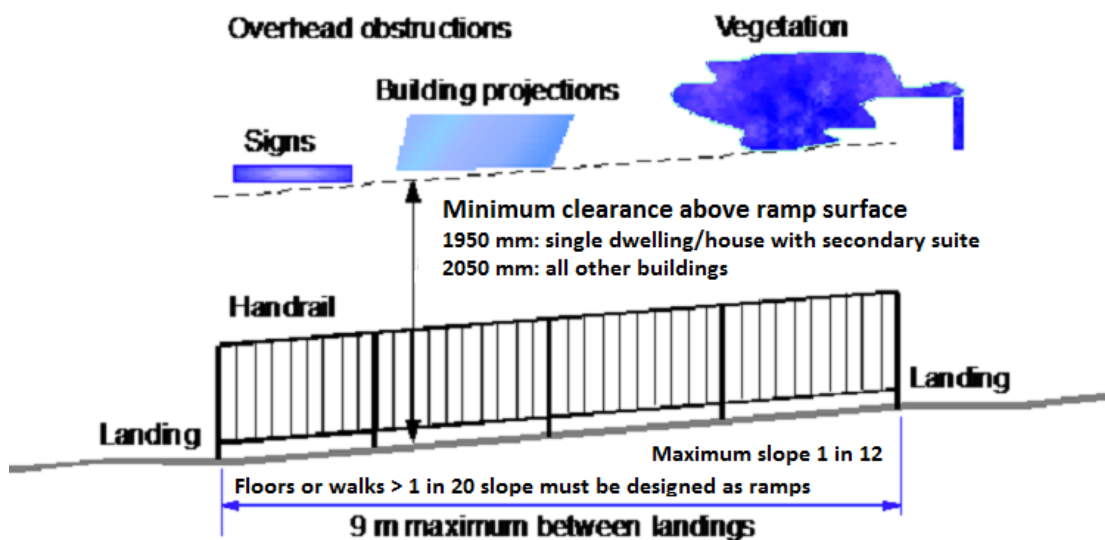


Figure A-2-2-2 Ramp with handrails and overhead clearance

A handrail is required on each side of the ramp as well as on each side of a walk if the walk is sloped and treated as a ramp. If the ramp continues past the landings, the handrail must continue past the landing to the next portion of the ramp.

Figure A-2-2-3 shows that a curb of at least 75 mm is required where a vertical drop beside the walk exceeds 75 mm and there is no wall, railing, or other barrier to provide protection [Clause 3.8.3.2.(1)(d)]. The figure also shows that a guard is required where a vertical drop exceeds 600 mm. If there is a vertical drop exceeding 600 mm beside a ramp, the handrail must also conform to guard requirements or a guard with an attached handrail is needed. A curb is not required if the bottom of the handrail attachment has a lower portion that acts as a curb.

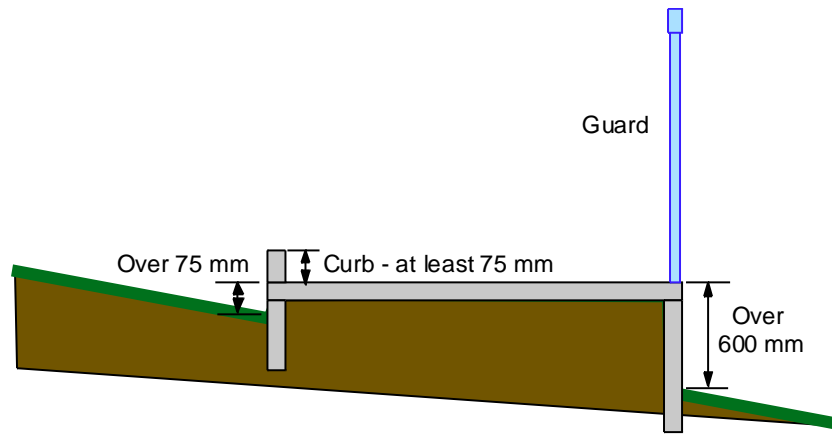


Figure A-2-2-3 Requirements for vertical drops beside walks and ramps

3.8.1.3. Barrier-Free Path of Travel

- 2) Interior and exterior walking surfaces that are within a *barrier-free* path of travel shall
- a) have no opening that will permit the passage of a sphere more than 13 mm diam,
 - b) have any elongated openings oriented approximately perpendicular to the direction of travel,
 - c) be stable, firm and slip-resistant,
 - d) be bevelled at a maximum slope of 1 in 2 at changes in level not more than 13 mm, and
 - e) be provided with sloped floors or ramps at changes in level more than 13 mm.

The size of any opening through a walk surface is limited so that a spherical object of more than 13 mm in diameter cannot pass through [3.8.1.3.(2)(a)]. This small opening restricts the possibility of the tip of a cane or the leg of a walker getting stuck in the opening.

Elongated openings must be less than 13 mm wide [3.8.1.3.(2)(b)], and also compliant with 3.8.1.3.(2)(a). The length is not controlled but must be oriented approximately perpendicular to the normal direction of travel along the walk. There should be no elongated openings at changes of direction over landings because there is not a single direction of movement at those locations. The spacing between slots is not stipulated. Figure A-2-2-4 shows the controls on the size of openings.

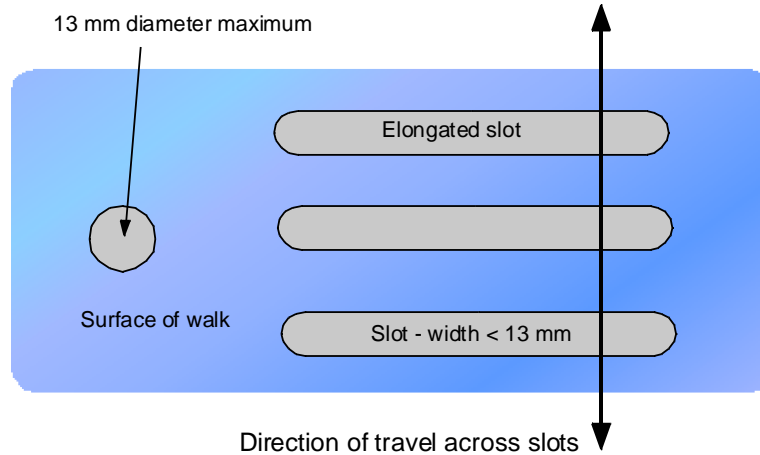


Figure A-2-2-4 Opening restrictions for walking surfaces

If there is a need for a difference in elevation at a junction of two surfaces of a walk, the transition should not obstruct the movement of wheelchairs and should not be a tripping hazard for pedestrians. Figure A-2-2-5 compares the length needed for a transition not over 13 mm with the length needed for a transition of 15 mm. The 1:2 bevel for a difference not over 13 mm takes up little space but might cause a tripping hazard for persons with a visual disability and for other persons.

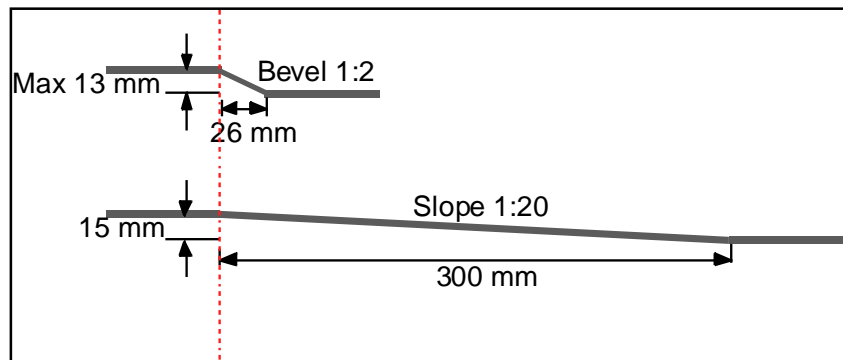


Figure A-2-2-5 Changes in level not more than 13 mm and more than 13 mm

3.8.2.2. Access to Parking Areas

- 1) A *barrier-free* path of travel shall be provided from the entrance described in Article 3.8.1.2. to
 - a) an exterior parking area, if exterior parking is provided,
 - b) at least one parking level in a parking structure, and
 - c) to every parking level in a parking structure served by a passenger elevator.

The barrier-free path of travel from an exterior parking facility to the building entrance usually involves an exterior walk and may need ramps.



A-2, SELF-TEST #2

Compare your answers with the answer key in Appendix A.

1. A short barrier-free ramp 5 m in length is permitted to have a slope not exceeding 1in10.
 - a. True
 - b. False

2. A guard is required on both sides of every ramp.
 - a. True
 - b. False

3. A grating to provide drainage and keep a barrier-free exterior walk clear of standing water is permitted to have slots at any angle provided they are not more than 10 mm wide.
 - a. True
 - b. False

A-2, OBJECTIVE #3

Describe the Requirements that Enable Persons with a Disability to Enter a Building

Barrier-free Access: Entering a Building

Sentence 3.8.1.2.(2) requires that every suite in an assembly, business and personal services, or mercantile occupancy requires at least one barrier-free entrance. Suites served by their own entrance require their own barrier-free entrance. This ensures that barrier-free access is not denied to individual suites in a large building. This Sentence commonly applies to business premises grouped in a row, each with its own entrance (Figure A-2-3-1).

3.8.1.2. Entrances

2) A suite of assembly occupancy, business and personal services occupancy or mercantile occupancy that is located in the first storey of a building, or in a storey to which a barrier-free path of travel is provided, and that is completely separated from the remainder of the building so that there is no access to the remainder of the building, shall have at least one barrier-free entrance.



Figure A-2-3-1 Building with small stores

Although the usual arrangement of suites that have a direct entrance from the exterior occurs on the first storey, there are buildings on sloping sites that have an upper storey with direct access to the exterior. In practice, suites with other types of occupancy in these buildings should also have a barrier-free entrance.

3.8.1.2. Entrances

(See Appendix A.)

1) In addition to the *barrier-free* entrances required by Sentence (2), not less than 50% of the pedestrian entrances, including the primary entrance, of a *building* referred to in Sentence 3.8.1.1.(1), including *walkways* leading to the entrances from a public thoroughfare and from on-site parking areas, shall be *barrier-free*.

Article 3.8.1.2 applies to all buildings not exempt by Article 3.8.1.1. Some high residential buildings have a few independently accessible stores on the first storey. The entrances to the stores do not qualify as barrier-free entrances to the building as a whole. Therefore, at least 50% of the pedestrian entrances to the main building must be barrier-free. The Appendix note clarifies that a group of doors at an entrance is considered a single entrance. Even though the principal entrance is barrier-free, another entrance that is normally used to access the building should also be barrier-free. For example, an entrance from a parking area should be barrier-free so that persons with a disability using the parking area are able to enter the building at the same location as other persons.

A-3.8.1.2. Entrances. An accessible route should exist from the sidewalk or roadway and parking area to an accessible building entrance. This route should be located so that persons with physical disabilities do not have to pass behind parked cars.

To provide more general access to buildings, not less than 50% of the pedestrian entrances are required to be barrier-free. This should include a principal entrance. If the 50% calculation results in a fraction, the number of barrier-free entrances should be the next higher unit value. For the purpose of determining the number of entrances to a building, several adjacent doors in a bank of doors are considered to be a single entrance.

The Appendix note statement that persons using wheelchairs should not have to pass behind parked cars is difficult to accomplish in practice. The requirement for firefighting access routes around buildings, especially to the principal entrance, forces the parking spaces away from the building on the other side of the access route. The normal parking arrangement has the stalls back to back without aisles between the stalls. The barrier-free spaces are usually the stalls closest to the building. This means that a person in a wheelchair might pass behind a few vehicles.

3.8.1.2. Entrances

3) A *barrier-free* entrance required by Sentences (1) or (2) shall be designed in accordance with Article 3.8.3.3.

4) At a *barrier-free* entrance that includes more than one doorway, only the primary entrance shall be required to be designed in accordance with the requirements of Article 3.8.3.3.

6) If an entrance is equipped with a security system, both visual and audible signals shall be used to indicate when the door lock is released.

Sentence 3.8.1.2.(4) states that only one doorway at an entrance with more than one doorway has to be barrier-free. In addition, Sentence 3.8.3.3.(12) modifies this by allowing only the active leaf to be barrier-free in a doorway with more than one leaf. Multiple leaves are installed to permit the movement of large objects to be moved in and out of the building. The additional leaf is only opened for this purpose; otherwise, the active leaf is in use.

Some buildings use cards to open a door from the outside. Many residential buildings use an intercom system between the entrance and the individual suites so that the residents have a control over persons entering the building. The door locks are remotely released by the residents. To notify a person waiting to enter the building, both visual and audible signals are required to indicate the release of the lock. Although this requirement is included as a barrier-free item, it is of benefit to all persons waiting to enter a building.

Doorways and Doors

3.8.3.3. Doorways and Doors

1) Every doorway that is located in a *barrier-free* path of travel shall have a clear width not less than 850 mm when the door is in the open position. (See Appendix A.)

A-3.8.3.3.(1) Doorway Width. Standard wheelchair width specifications indicate a range of sizes from 584 mm overall to 685 mm overall. Every doorway that is located in a barrier-free path of travel must have a clear width of not less than 850 mm when the door is in the open position and therefore it is important that this dimension be measured correctly. Figure A-3.8.3.3.(1) shows a door opened to 90°. It is clear that the door, and to a lesser extent the stop, impinges on the space within the door frame. The clear width of not less than 800 mm is measured from the face of the door to the outside edge of the stop on the door frame. It is not sufficient just to measure the inside width of the door frame. Other factors, including location of door stops other than on the door frame, and the installation of door closers and exit devices, should be taken into account. The intrusion of a door handle into the space is of lesser importance. It is recognized that there are many types of door frame and door mounts but the overall objective is to maintain a clear width of not less than 850 mm. The diagram depicts a somewhat restrictive scenario, as many doors can open wider than 90°, however, a door smaller than 864 mm would not be wide enough to ensure the minimum clear width of 800 mm that is required.

Wherever a barrier-free path of travel is required, the doorways must provide a clear width of 850 mm. Door stops and door hardware must not intrude into the clear width. Door panels need

to be slightly more than 850 mm wide to allow for the door stops. The door hardware, especially the bars of exit hardware, can catch on the sleeves and other clothing of a person in a wheelchair. The hardware, therefore, needs to be kept out of the clear width.

The clear width of 850 mm for a doorway required by Sentence 3.8.3.3.(1) applies only within the barrier-free path of travel. Some other doors in exits and in access to exit routes from suites are also required to have a minimum width of 850 mm. Part 9 defines the width of door leaves for areas of the building that are not barrier-free; however, Part 3 generally does not specify minimum door leaf widths or doorway widths outside the barrier-free path of travel. The 864 mm width refers to a standard door leaf size.

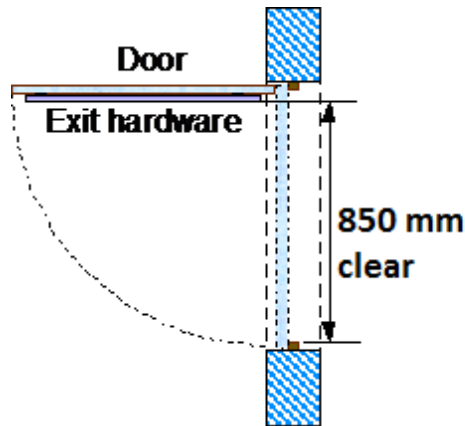


Figure A-2-3-2 Barrier-free doorway width

Door Handles

3.8.3.3. Doorways and Doors

3) Door operating devices shall be of a design which does not require tight grasping and twisting of the wrist as the only means of operation. (See Appendix A.)

A-3.8.3.3.(3) Lever Handles. Lever handles are usable by most persons with limited hand mobility and will meet the intent of this requirement. Lever handles with an end return towards the door are less prone to catch the clothing of someone passing through the doorway.

The circular knob hardware shown in Figure A-2-3-4(A) requires grasping and twisting of the wrist to operate the hardware and is not acceptable on doors in a barrier-free path of travel.

The hardware shown in Figure A-2-3-4(B) requires thumb dexterity at the same time that a pull is required on the handle. These present difficulties for persons with arthritis and other joint problems in their hands and should not be used on doors in a barrier-free path of travel. If the thumb turn used to secure a deadbolt requires wrist turning and dexterity in the fingers, it should not be used on doors in a barrier-free path of travel.



Figure A-2-3-3 (A) Circular knob (B) Knobs requiring thumb dexterity

The lever handle shown in Figure A-2-3-5 meets the intent of Sentence 3.8.3.3.(3), and the end return minimizes the potential for a sleeve catching on the end of the lever.



Figure A-2-3-4 Barrier-free handle

It is difficult to avoid the use of keys to lock doors in a barrier-free path of travel because they provide security. However, they require both finger dexterity and turning of the wrist to release the lock so other methods of locking the door should be explored. Figure A-2-3-6 includes a keypad in addition to an optional key. It requires fingertip control to enter the numbers and an ability to

remember and apply a series of numbers in correct sequence. This hardware might be difficult for elderly persons.



Figure A-2-3-5 Knob with keypad and optional key

3.8.3.3. Doorways and Doors

4) A threshold for a doorway referred to in Sentences (1) or (2) shall be not more than 13 mm higher than the finished floor surface and shall be bevelled to facilitate the passage of wheelchairs.

The threshold on an exterior door helps to prevent the entry of rain and water from melted snow and ice. The threshold is limited to 13 mm high and it must have a bevel on both sides across the width of the doorway with a slope not exceeding 1:2 (see Figure A-2-3-7). Earlier editions of the Alberta Building Code required a noncombustible threshold under doors in fire separations if combustible flooring passed under the door. This is no longer mandated and thresholds are unlikely to be used under interior doors unless required for compliance with installation instructions for a fire-rated door.

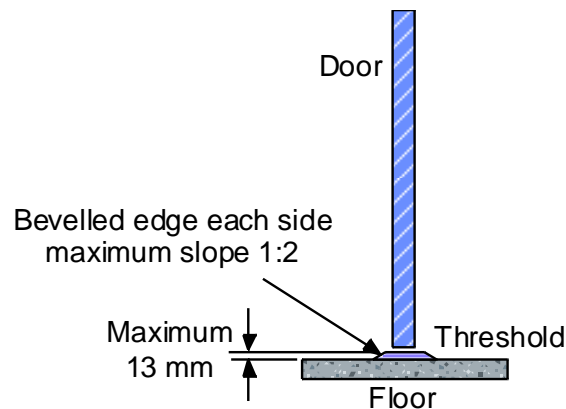


Figure A-2-3-6 Barrier-free threshold

Doors with Power Operatos

3.8.3.3. Doorways and Doors

5) Except as provided in Sentences (6) and (12), every door that provides a *barrier-free* path of travel through an entrance referred to in Article 3.8.1.2., including the interior doors of a vestibule where provided, shall be equipped with a power door operator that allows persons to activate the opening of the door from either side if the entrance serves

- a) a hotel,
- b) a *building* of Group B, Division 2 *major occupancy*, or
- c) a *building* of Group A, Group B, Division 3, Group D or E *major occupancy* more than 500 m² in *building area*.

(See Appendix A.)

A-3.8.3.3.(5) Doors with Power Operators. Doors equipped with a power operator actuated by a pressure plate identified with the international symbol for accessibility or, where security is required, by a key, card or radio transmitter, and that can otherwise be opened manually, meet the intent of the requirement. The location of these actuating devices should ensure that a wheelchair will not interfere with the operation of the door once it is actuated. Swinging doors equipped with power operators which are actuated automatically and open into passing pedestrian traffic should be provided with a guard or other device designed to prevent pedestrians from stepping in the swing area of the door. These guards or devices should be detectable by blind persons. For example, inverted U-shaped guards should have an additional rail at a height not more than 680 mm so that it is detectable by the long cane. These doors should also have a device (mat or other sensor) on the swing side to prevent the door from opening if someone is standing in the swing area.

Power operators might be used on the entrance doors to stores leading from a wide public corridor in a large mercantile building and the same provisions apply to these doors as for exterior doors. These doors are not subject to the pressure differences experienced at exterior doors and are used primarily for ease of movement through the doorway and for security.

3.8.3.3. Doorways and Doors

6) The requirements of Sentence (5) do not apply to an individual *suite* having an area less than 500 m² in a *building* having only *suites of assembly, care, business and personal services occupancy* or *mercantile occupancy* if the *suite* is completely separated from the remainder of the *building* so that there is no access to the remainder of the *building*.

Sentence 3.8.3.3.(6) applies to doors at the exterior of small individual suites and would not be encountered within a building.

Closers

8.3.3. Doorways and Doors

7) Except as permitted by Sentence (8) and except for a door with a power door operator, a closer for a door in a *barrier-free* path of travel shall be designed to permit the door to open when the force applied to the handle, push plate or latch-releasing device is not more than

- a) 38 N in the case of an exterior door, or
- b) 22 N in the case of an interior door.

8) Sentence (7) does not apply to a door at the entrance to a *dwelling unit*, or where greater forces are required in order to close and latch the door against the prevailing difference in air pressure on opposite sides of the door. (See Appendix A.)

A-3.8.3.3.(8) Air Pressure Differences. Differences in air pressure on opposite sides of a door may be due to the operation of mechanical systems such as those associated with smoke control. So-called “stack action” in buildings in winter can also cause differential pressures due to the buoyancy of warm air. Stack action is usually most noticeable between stairwells and the remainder of the building, and at the entrances to buildings; the taller the building, the greater the effect. Doors with automatic closers have to operate with sufficient opening force to allow the return action to overcome the differential pressure.

Closers are used to return a door to a closed position in a fire separation to maintain the integrity of the fire separation (see Figure A-2-3-8). Closers are also used on exterior doors to maintain the indoor environment. The closer force has to be sufficient to return the door to the closed position in a reasonable time and to counteract air pressure and friction in the hinges. If the force exerted by the closer is too high, it is difficult for a person in a wheelchair to open the door and pass through the doorway in either direction.



Figure A-2-3-7 Door closer

A power door operator can develop sufficient force to overcome any pressure difference and acts as a closer as well as an opener for the door. If the pressure differential exerted on the door results in forces above the values in Sentence 3.8.3.3.(7), it indicates that a power door operator should be used. Doors to dwelling units are exempt from the limits on force. Many dwelling units with doors to the exterior are exempt from barrier-free requirements pursuant to Sentence 3.8.1.1.(1). Residential buildings in which barrier-free provisions are mandated usually have the doors to the dwelling units leading from corridors and excessive pressure differences should not occur. In the event that there are pressure differences that make it difficult to open the doors, power door operators might be considered.

A small spring scale could be used to check a 22 N force [Clause 3.8.3.3.(7)(b)]. It is a relatively small force, similar to that exerted on a hand while holding a 2.2 kg weight (about 5 lb). Sentence 3.8.3.3.(8) exempts a door at the entry to a dwelling unit from complying with this force value. Without this exemption, many doors in residential suites in high apartment buildings could not comply with Sentence 3.8.3.3.(7) because of the stack effect in the building as well as the corridor pressurization to prevent movement of air from the dwelling units into the corridor.



Figure A-2-3-8 Power door operator

Although the Appendix note refers to pressure plates of the type shown in Figure A-2-3-9 and these are seen in some building entrances, buildings with substantial traffic through the entrances use motion detectors on each side of the door to keep the traffic flowing. The pads on the floor of entrances that open the door in response to detecting pressure on the pad are increasingly being replaced by detectors mounted above the entrance. Mercantile premises often have one set of doors for customers to enter and a

different set of doors for customers to leave after having passed through cash register locations.

Figure A-2-3-10 is typical of small buildings with a series of individual suites or stores each having its own entrance and exit. An isolated suite with an area less than 500 m² is exempt from the requirement to install power-operated devices to open and close the entrance door.



Figure A-2-3-9 Individual stores each with its own entrance and exit

3.8.3.3. Doorways and Doors

9) Except for a door at the entrance to a *dwelling unit*, a closer for an interior door in a *barrier-free* path of travel shall have a closing period of not less than 3 s measured from when the door is in an open position of 70° to the doorway, to when the door reaches a point 75 mm from the closed position, measured from the leading edge of the latch side of the door. (See Appendix A.)

A-3.8.3.3.(9) Delayed Action on Door Closers. In some circumstances, closers with a delay feature which keeps the door open for several seconds before it begins to close might be desirable. However, closers with this feature have limited back-check, a feature of a normal door closer where resistance to opening increases as the door reaches the full arc of swing. Doors equipped with a delayed action closer are therefore more susceptible to damage should the door be opened with too much force or should someone try to force it closed, thinking the closer has failed to operate. Delayed action closers are not recommended for such occupancies as schools.

The requirements for self-closing devices (door closers) are set out in Sentences 3.1.8.11.(1) and 9.10.13.10.(1). The primary need for a door closer is in a fire separation to maintain the integrity of the fire separation and to control fire spread. Some doors in fire separations are excluded [3.1.8.11.(2) and 9.10.13.10.(2)]. Most doors within a suite would not be in a fire separation and thus would not need closers. However, some owners might include them for other purposes, including privacy.

If a door closed too quickly, it could hit a person in the back, hit a following person in the face, or trap a wheelchair occupant or person using a walker between the edge of the door leaf and the door jamb.

A typical interior closer has a minimum of two valves to control the speed of the door. The first valve controls the sweep. This is the point from where the door is fully open until it reaches about 10° remaining to close. At 10°, another valve, called the latch speed, takes over to control the final speed, which can be increased to provide enough momentum and pressure to actuate the latch mechanism. The valves are adjusted to control the closing time. When adjusting a closer, the ideal target time needed for the door to close is about six seconds. The first part (sweep) consumes the majority of this time, about 4.5 to 5 seconds. Most commercial door closers should be adjustable to meet the conditions of Sentence 3.8.3.3.(9) (see Figure A-3-4-4).

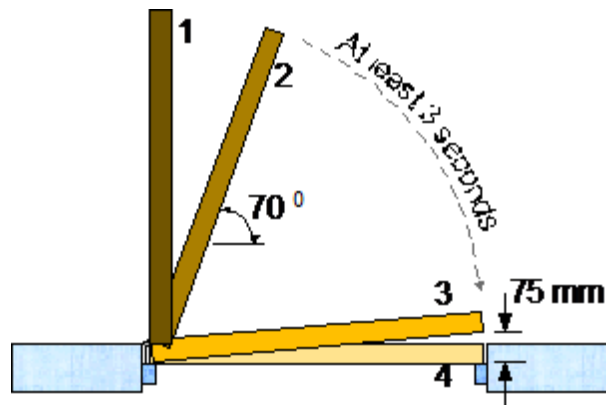


Figure A-2-3-10 Timing for an interior door closer

3.8.3.3. Doorways and Doors

10) Unless equipped with a power door operator or within a *suite*, a door in a *barrier-free* path of travel shall have a clear space on the latch side extending the height of the doorway and not less than

- a) 600 mm beyond the edge of the door opening if the door swings toward the approach side, and
- b) 300 mm beyond the edge of the door opening if the door swings away from the approach side.

(See Appendix A.)

The space on the latch side of the door allows a person in a wheelchair to approach and open a door while remaining out of the swing path of the door. Less space is required if the door swings away from the wheelchair (see Figure A-2-3-11). This space is also beneficial to persons who use walkers.

Doors equipped with power operators swing open and do not restrict movement of a wheelchair from either side of the

doorway. If a pressure pad is used to initiate the door opening, the pad should be located sufficiently in advance of the door so that the wheelchair is not in the path of the door.

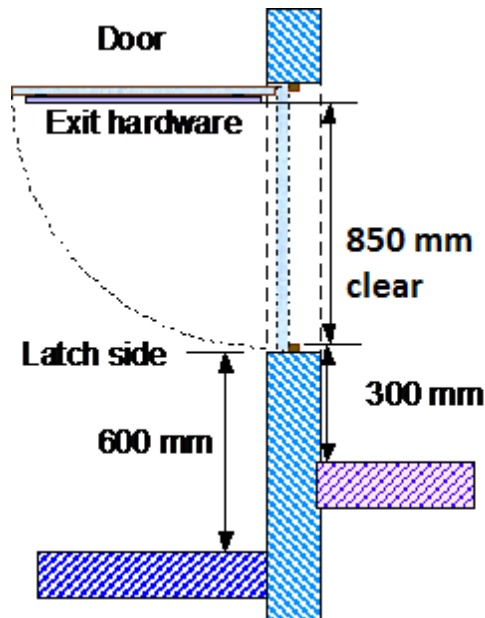


Figure A-2-3-11 Clear space on latch side depends on whether the door swings toward or away from the approach

Vestibules

3.8.3.3. Doorways and Doors

11) A vestibule located in a *barrier-free* path of travel shall be arranged to allow the movement of wheelchairs between doors and shall provide a distance between 2 doors in series of not less than 1 200 mm plus the width of any door that swings into the space in the path of travel from one door to another.

Some existing buildings may have vestibules with insufficient space to allow a wheelchair to be maneuvered. If door 1 (on the left in Figure A-2-3-12) closes behind a wheelchair while moving towards door 2 (on the right), there has to be sufficient space to open door 2. This is critical if the doors are power operated and the 600 mm space beside the door is omitted.

Although vestibules are usually encountered at building entrances, they are also located between indoor parking and the remainder of a building to control migration of fumes and gases. The route from the barrier-free parking spaces into the rest of the building would be through a vestibule.

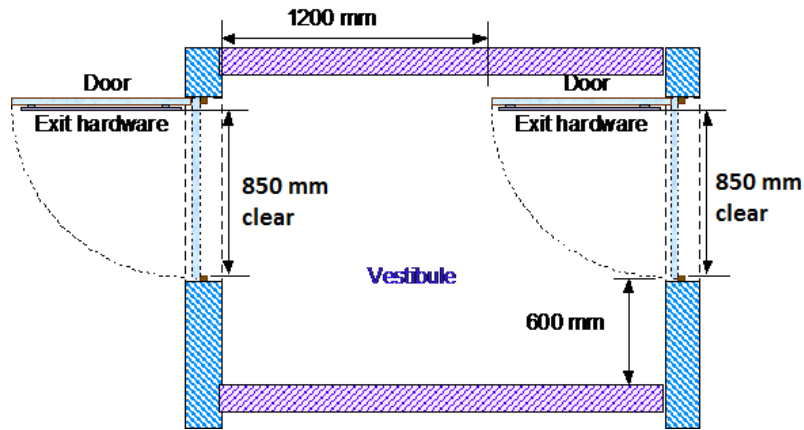


Figure A-2-3-12 Measurements for vestibules with two doors

Active and Inactive (fixed) Leaves of Doors

3.8.3.3. Doorways and Doors

- 12) Only the active leaf in a multiple leaf door in a *barrier-free* path of travel need conform to the requirements of this Article.

Door openings requiring more than one door leaf are used in assembly occupancies to move large numbers of persons quickly, and in assembly, industrial, and other occupancies to move large objects through an opening. The normally fixed door leaf is usually held in place by bolts on the top and the bottom. It is only opened if a large item has to be moved through the doorway and the active leaf does not provide enough width. The active leaf must meet all barrier-free requirements (see Figure A-3-4-7).

Some doorways require more than one active leaf to provide sufficient exit capacity for a large number of persons. In these situations, both leaves are active, but only the principal leaf needs to be barrier-free. The principal active leaf should be clearly marked to indicate that it is barrier-free.

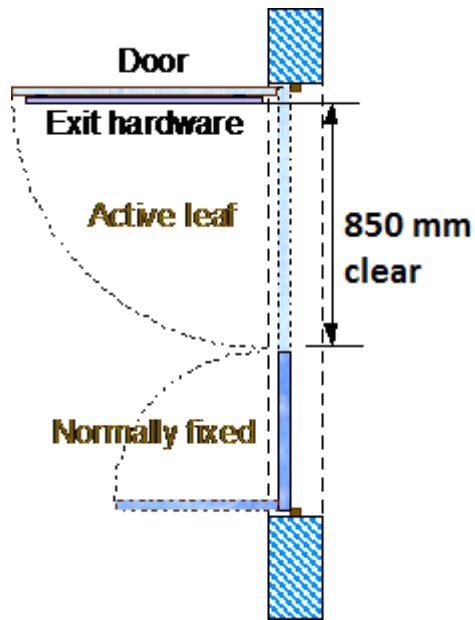


Figure A-2-3-13 Measurements with an active leaf doorway

Level Areas at Sides of Doorways

3.8.3.3. Doorways and Doors

13) Except as provided in Clause 3.8.3.4.(1)(c), the floor surface on each side of a door in a *barrier-free* path of travel shall be level within a rectangular area

- a) as wide as the door plus the clearance required on the latch side by Sentence 3.8.3.3.(10), and
- b) whose dimension perpendicular to the closed door is not less than the width of the *barrier-free* path of travel but need not exceed 1 500 mm.

At the top and bottom of a ramp, the level area is required to be 1500 by 1 500 mm [Clause 3.8.3.4.(1)(c)]. This also governs the dimensions of the level area beside the doorway if it leads to a ramp.

Exterior walks have to be at least 1100 mm wide, whereas interior paths of travel do not have to exceed 920 mm. The width may be more if other requirements in Sections 3.3., 3.4., and 9.9. apply.

The appropriate maximum of the three values—1500 mm, 1100 mm, or 920 mm—would govern the length of the level area (see Figure A-2-3-14). In accordance with Sentence 3.4.6.1.(1), the surface of this level area must be slip resistant. Also, the level at the top or bottom of a ramp must have a colour contrast or a distinctive pattern.

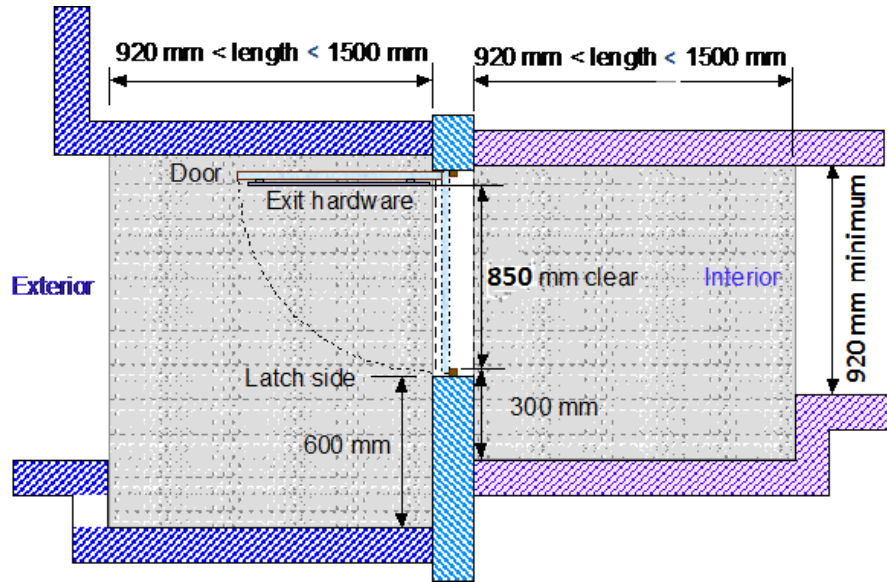


Figure A-2-3-14 Measurements of a level area



A-2, SELF-TEST #3

1. What indicators are required to show that the lock on a door in a barrier-free path of travel has been released?
 - a. _____
 - b. _____

2. What is the minimum clear width of a doorway in a barrier-free path of travel?
 - a. 750 mm
 - b. 850 mm
 - c. 920 mm
 - d. 1 200 mm

3. The only doorways required to have a clear opening not less than 850 mm are those in a barrier-free path of travel.
 - a. True
 - b. False

4. Lever-type door release devices are the only type of hardware permitted on all doors in a barrier-free path of travel.
 - a. True
 - b. False

5. A power door operator is required for every exit door serving a barrier-free floor area.
 - a. True
 - b. False

6. A fixed door leaf in a doorway serving a barrier-free floor area is permitted to be equipped with hardware that does not allow the door to open quickly during an emergency.
 - a. True
 - b. False

MODULE A-3

CIRCULATION WITHIN A BUILDING

Introduction

In the early days of developing barrier-free access rules, the main focus was on enabling access to a building and being able to enter the building. Provided that some features on the main floor were accessible, little effort was made to require barrier-free circulation throughout a building. This module examines the provisions of the ABC 2014 that allow a person with a disability to circulate throughout a building.

Learning Objectives

- Describe the extent to which barrier-free interior circulation is required.
- Describe the provisions that address barrier-free circulation within the entrance floor space.
- Describe the provisions that enable persons to move from the entry storey to other storeys using a barrier-free path of travel.

A-3, OBJECTIVE #1

Describe the Extent to which Barrier-free Interior Circulation is Required

Extent of Interior Circulation within a Building

3.8.2.1. Areas Requiring a Barrier-Free Path of Travel

(See Appendix A.)

1) Except as permitted by Sentences (2), (4) and (5), a *barrier-free* path of travel from the entrances required by Sentences 3.8.1.2.(1) and (2) shall be provided throughout all normally occupied *floor areas*. (See Article 3.3.1.7. for additional requirements regarding *floor areas* above or below the *first storey* to which a *barrier-free* path of travel is required.)

A-3.8.2.1. Access to Rooms and Facilities. If barrier-free access is required into suites or rooms in Subsection 3.8.2., it is intended that access be provided, with some exceptions identified in Sentence 3.8.2.1.(2), throughout each room or suite. Some examples of where barrier-free access is required are as follows:

- within each suite (subject to Clauses 3.8.2.1.(2)(j) to (l),
- within rooms or areas that serve the public or are designated for use by visitors, including areas in assembly occupancies with fixed seats, display areas and merchandising departments,
- within rooms or areas for student use in assembly occupancies,
- within general work areas, including office areas,
- within general use or general service areas, including shared laundry areas in residential occupancies, recreational areas, cafeterias, lounge rooms, lunch rooms and infirmaries,
- within sleeping rooms in hospitals and nursing homes,
- (if installed), into at least one passenger elevator or elevating device conforming to Articles 3.5.2.1. and 3.8.3.5.,
- into washrooms described in Article 3.8.2.3.,
- to any facility required by this Section to be designed to accommodate persons with physical disabilities,
- onto every balcony provided in conformance with Clause 3.3.1.7.(1)(c), and
- to service counters used by the general public (examples include ticket counters, refreshment stands, drinking fountains, cafeteria counters, checkout counters and bank service counters).

The permission to waive a barrier-free path of travel for wheelchair access to certain specified areas of a building is not intended to waive accessibility requirements for persons whose physical disabilities do not require special provision for access to raised or sunken levels. Persons with visual or hearing disabilities that do not require the use of a wheelchair can be expected to move throughout a building.

The concept of providing similar amenities and facilities applies, among other things, to food, beverage, and entertainment facilities within restaurants, to smoking and non-smoking areas permitted in accordance with local regulations, and to window areas providing a view of an exterior attraction.

Availability of specific spaces depends on reservation policy and the sequence in which patrons arrive at a restaurant or other facility, and therefore is beyond the scope of this Code.

Accessibility “within” a floor area means that in general all normally occupied spaces are to be accessible, except those areas which are deemed not to require barrier-free access. Examples of excluded floor areas are small raised office areas in retail and industrial premises and storage platforms in industrial and other occupancies.

The concept of wheelchair accessibility does not extend to building service facilities, nor to all floor levels within a storey, e.g., mezzanines not served by an elevator. Mezzanines that are accessible by an elevator are therefore not excluded.

3.8.2.1. Areas Requiring a Barrier-Free Path of Travel

- 2) A *barrier-free* path of travel for persons using wheelchairs is not required
- a) to *service rooms*,
 - b) to elevator machine rooms,
 - c) to janitors' rooms,
 - d) to *service spaces*,
 - e) to crawl spaces,
 - f) to *attic or roof spaces*,
 - g) to *mezzanines* not served by a passenger elevator, a platform-equipped passenger-elevating device, an escalator, or an inclined moving walk,
 - h) to *high-hazard industrial occupancies*,
 - i) within portions of a *floor area* with fixed seats in an *assembly occupancy* where those portions are not part of the *barrier-free* path of travel to spaces designated for use by persons using wheelchairs,
 - j) within floor levels of a *suite of residential occupancy* that are not at the same level as the entry level to the *suite*,
 - k) within a *suite of residential occupancy* that has not been required by other provisions of this Code to be *barrier-free*, or
 - l) within those parts of a *floor area* that are not at the same level as the entry level, provided amenities and uses provided on any raised or sunken level are accessible on the entry level by means of a *barrier-free* path of travel.

Sentences 3.8.2.1.(1) and (2) apply to those buildings that are not excluded by Sentence 3.8.1.1.(1).

Clauses 3.8.2.1.(2)(a) to (f) clarify the expression “normally occupied” in Sentence 3.8.2.1.(1) by listing spaces that are intermittently occupied during maintenance activities.

Section 3.8. does not require installing a mechanical vertical transportation in a building; however, if provided, a transportation device and the floor levels that are served should provide a barrier-free path of travel. The Appendix notes clearly indicate that the absence of a means of transporting persons using wheelchairs and mobility assistive devices to a floor area does not exclude those areas from requirements intended to assist persons with hearing, visual, and similar disabilities that do not restrict movement throughout a building.

Although Clause 3.8.2.1.(2)(h) excludes a high-hazard industrial occupancy from requirements for a barrier-free path of travel for

persons in wheelchairs, Clause 3.8.1.1.(1)(c) states that provision must be made for persons with hearing disabilities.

Assembly occupancies with raked floors to enable patrons to view the screen of a movie theatre, the stage of a live theatre, or the action in a sporting venue could not function if all seats were wheelchair accessible. A proportion of wheelchair accessible spaces is required in accordance with Sentence 3.8.2.1.(3).

Clause 3.8.2.1.(2)(k) excludes all residential suites that are not within the category of dwelling units referred to in Sentence 3.8.1.1.(3). Clause 3.8.2.1.(2)(j) applies to adaptable dwelling units referred to in Sentence 3.8.1.1.(3) and would exempt any lower or upper levels from barrier-free requirements but would not waive the application to the main entry level.

Appendix note A-3.8.2.1. provides guidance in applying Clause 3.8.2.1.(2)(l).

3.8.2.1. Areas Requiring a Barrier-Free Path of Travel

4) Except as provided in Sentence (5), Sentence (1) does not apply to a *storey*, not more than 600 m² in area, above or below the *first storey* of a *building* that does not exceed two *storeys* in *building height*.

5) Sentence (1) does not apply to any *storey* above or below the *first storey* in a *building* of *residential occupancy* that is

- a) not more than 3 *storeys* in *building height*,
- b) not more than 600 m² in *building area*, and
- c) is not served by a passenger-type elevator or other platform-equipped passenger-elevating device.

Sentence 3.8.2.1.(4) waives barrier-free requirements in basements and second storeys of some small buildings (not over two storeys in building height) regardless of their occupancy.

Sentence 3.8.2.1.(5) expands Sentence 3.8.2.1.(4) to the third storey of an apartment building, without an elevator, that falls within the scope of Part 9. It is essentially the same as Sentence 9.5.2.3.(1) but written in the context of Part 3.

9.5.2.3. Exception for Apartment Buildings

1) Except as provided in Sentence (2), if the *building* is not equipped with an elevator, the barrier-free path of travel described in Section 3.8. need only be provided on the entrance level of an apartment *building*.

2) The *barrier-free* path of travel on the entrance level described in Sentence (1) need not be provided where the difference in floor elevation between the entrance level and every *dwelling unit* exceeds 600 mm.

Walk-up apartment buildings do not include an elevator. Occupants of suites on upper storeys gain access to their suites

by stairs leading up from the entrance storey. If adaptable suites are required in the building, they must be in the entrance storey and served by a barrier-free path of travel.

Many small apartment buildings that do not have an elevator have a split-level entry. A landing immediately inside the entrance has a flight of stairs leading down half a storey to a lower level and another flight of stairs leading up half a storey to the storey above. There may be additional higher storeys. Apart from a review of the plans or an examination of the building interior, these buildings can often be recognized by windows around the lowest storey with their sills approximately level with the surrounding ground. The waiver in Sentence 9.5.2.3.(2) allows the building to be built without an elevator or other mechanical vertical transportation.



A-3, SELF-TEST #1

Compare your answers with the answer key in Appendix A.

1. A platform-equipped passenger-elevating device is required to provide a barrier-free path of travel to a balcony in a small arena to supplement a flight of stairs.
 - a. True
 - b. False

2. In a private two-storey apartment building, with a building area of 500 m² and a split entry leading to an upper and a lower storey, is the upper storey required to be barrier-free?
 - a. Yes
 - b. No

A-3, OBJECTIVE #2

Describe the Provisions that Address Barrier-free Circulation within the Entrance Floor Space

Circulation within the Entrance Floor Area

The requirements in Sentences 3.8.1.3.(2) and (4) apply to both interior and exterior barrier-free paths of travel. The explanation of these requirements for exterior paths of travel previously covered in Module A-2 will be repeated in this objective with emphasis on interior application.

3.8.1.3. Barrier-Free Path of Travel

- 1) Except as required elsewhere in this Part or as permitted by Article 3.8.3.3. pertaining to doorways, the unobstructed width of a *barrier-free* path of travel shall be not less than 920 mm.
- 2) Interior and exterior walking surfaces that are within a *barrier-free* path of travel shall
 - a) have no opening that will permit the passage of a sphere more than 13 mm diam,
 - b) have any elongated openings oriented approximately perpendicular to the direction of travel,
 - c) be stable, firm and slip-resistant,
 - d) be bevelled at a maximum slope of 1 in 2 at changes in level not more than 13 mm, and
 - e) be provided with sloped floors or ramps at changes in level more than 13 mm.
- 3) A *barrier-free* path of travel is permitted to include ramps, passenger elevators or other platform-equipped passenger-elevating devices to overcome a difference in level.
- 4) The width of a *barrier-free* path of travel that is more than 30 m long shall be increased to not less than 1 500 mm for a length of 1 500 mm at intervals not exceeding 30 m.

Although Sentence 3.8.1.3.(1) requires an unobstructed width of 920 mm for a barrier-free path of travel, there are several modifications to this value. Some substantially increase the minimum width. Examples are:

- exterior walks for which the minimum width is 1100 mm [Clause 3.8.3.2.(1)(b)]
- public corridors and corridors serving classrooms or patients' sleeping rooms require a minimum 1100 mm unobstructed width [Sentences 3.3.1.9.(1) and (2)]

- corridor in a large shopping centre may require portions that are not less than 3000 mm in unobstructed width [Clause 3.3.1.9.(6)(a)]

Doorways and ramps are permitted an unobstructed width of less than 920 mm.

The size of any opening through a walking surface is limited so that a spherical object of more than 13 mm in diameter cannot pass through [Clause 3.8.1.3.(2)(a)]. This small opening restricts the possibility of the tip of a cane or the leg of a walker getting stuck in the opening.

Elongated openings must be less than 13 mm wide [Clause 3.8.1.3.(2)(b), and also compliant with Clause 3.8.1.3.(2)(a)]. The length is not controlled but must be oriented approximately perpendicular to the normal direction of travel. There should be no elongated openings at changes of direction over landings because there is not a single direction of movement at those locations. The spacing between slots is not stipulated. Figure A-3-2-1 shows the controls on the size of openings.

Holes and elongated openings are often used to drain water away and are more likely to be encountered in outside walks and at the entrance to a building than in interior surfaces.

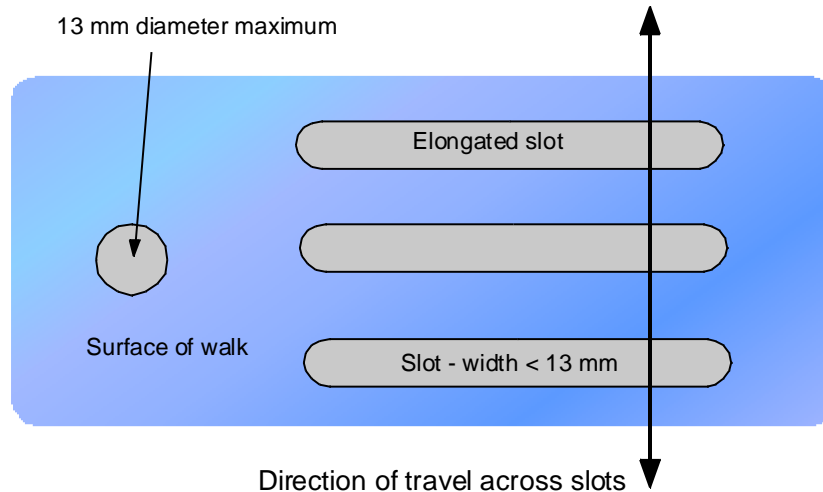


Figure A-3-2-1 Opening restrictions for walking surfaces

Carpeting with high pile or very soft underlay makes it difficult to maneuver a wheelchair or walker over the thickness of the pile. Loose scatter rugs and carpets are not stable. There is no specific measure of slip-resistance; a highly polished floor would not be acceptable, but most common floor finishes are satisfactory.

Usually, a bevel is used on each side of a threshold at a doorway, whereas a slope is used where there is a difference in elevation between two different areas of a floor. Slopes that exceed 1:20 need to be treated as a ramp and would require several other features. Figure A-3-2-2 shows the impact on the length required between a bevel and a sloped floor for a minor difference in the height. If the floor on either side of a doorway has to be level, a sloped floor is not acceptable and another means of addressing the difference is needed.

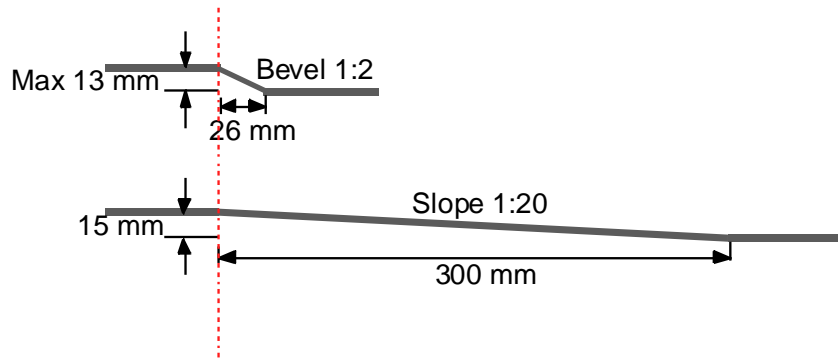


Figure A-3-2-2 Changes in level not more than 13 mm and more than 13 mm

To travel to upper and lower floors in a building, a barrier-free path of travel may include ramps, passenger elevators, or other platform-equipped passenger-elevating devices [Sentence 3.8.1.3.(3) confirms the obvious intent of Section 3.8].

Interior barrier-free paths of travel in most buildings are rarely more than 30 m long. Unlike exterior paths of travel, there are usually public spaces that would satisfy the dimensions of Sentence 3.8.1.3.(4). Figure A-3-2-3 shows the 1 500 mm by 1 500 mm space in comparison to principal widths of 920 mm, 1 100 mm, 2 400 mm, and 3 000 mm.

The width of an interior barrier-free path of travel is 920 mm [see Sentence 3.8.1.3.(1)]. The minimum width for most public corridors and corridors used by the public is 1 100 mm. The width of a hospital corridor, in which it might be necessary to move a patient in a bed, is 2 400 mm and easily satisfies the 1 500 mm by 1 500 mm dimensions [see Sentence 3.3.3.3.(2)]. The minimum width of certain paths of travel in a wide public corridor is 3 000 mm [required by Clause 3.3.1.9.(6)(a)].

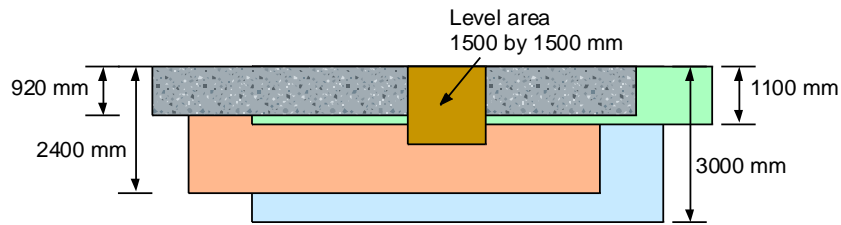


Figure A-3-2-3 1 500 mm by 1 500 mm space in comparison to principal widths

3.8.3.4. Ramps

- 1) A ramp located in a *barrier-free* path of travel shall
 - a) have a width not less than 870 mm (see A-3.4.3.4. in Appendix A),
 - b) have a slope not more than 1 in 12 (see Appendix A),
 - c) have a level area not less than 1 500 by 1 500 mm at the top and bottom and at intermediate levels of a ramp leading to a door, so that on the latch side the level area extends not less than
 - i) 600 mm beyond the edge of the door opening where the door opens towards the ramp, or
 - ii) 300 mm beyond the edge of the door opening where the door opens away from the ramp
 (see Appendix A),
 - d) have a level area not less than 1 200 mm long and at least the same width as the ramp at intervals not more than 9 m along its length,
 - e) except as permitted by Sentence (2), be equipped with handrails and *guards* conforming to Articles 3.4.6.5. and 3.4.6.6.,
 - f) have a level area not less than 1 200 by 1 200 mm where a ramp makes a 90° turn, and
 - g) have a level area not less than 1 500 by 1 500 mm where a ramp makes a 180° turn.
- 2) The requirement for handrails in Clause (1)(e) need not apply to a ramp serving as an aisle for fixed seating.
- 3) Floors or walks in a *barrier-free* path of travel having a slope steeper than 1 in 20 shall be designed as ramps.

A-3.8.3.4.(1)(b) Ramp Slopes. Ramps with a slope of more than 1 in 16 can be very difficult for persons with physical disabilities to negotiate. Although Article 3.8.3.4. permits slopes on ramps as great as 1 in 12 for distances of up to 9 m, slopes of 1 in 20 are safer and less strenuous. Ramps with a slope of 1 in 12 should be restricted to lengths not exceeding 3 m whenever possible. A tactile warning strip, contrasting in colour, should be used at the top of ramps to warn blind and visually impaired persons of the change in elevation.

A ramp is useful in overcoming a medium difference in elevation that would not justify a mechanical device. The maximum slope for a barrier-free ramp is 1:12 and the minimum slope is 1:20. An elevation difference of 1 m requires a ramp between 12 m and 20 m long. To go from the floor of one storey to the floor of the storey above (at least 2.5 m) requires a ramp between 30 m and

50 m long. The length increases by the 1 200 mm long level areas required at intervals of 9 m in a straight ramp.

To accommodate such long ramps, many designers use dogleg ramps with a 1 500 mm by 1 500 mm landing at every change of direction. Figure A-3-2-4 shows the arrangement for a ramp with a slope of 1:15 with four segments to go from one storey to the storey above.

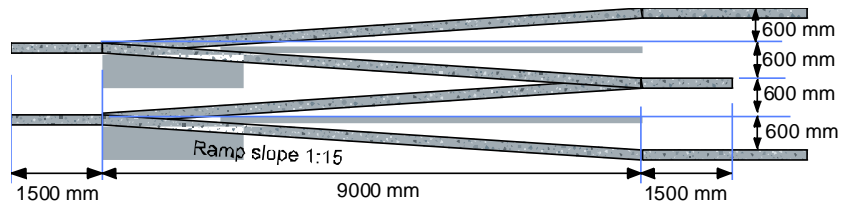


Figure A-3-2-4 Dogleg ramp

Figure A-3-2-5 shows a slope that is classified as a ramp. The inclined slope is between 1:12 and 1:20. Any segment of the ramp cannot exceed 9 m and a landing is required at the ends of each segment. The minimum headroom clearance for an interior ramp is 2 100 mm. This contrasts with an exterior ramp for which the minimum clearance is 1 980 mm. A handrail is required on each side of a ramp. The handrails can be free-standing or attached to a guard. As with all other handrails, there should be no bracket or other support for the handrail that prevents a continuous grip along the complete length. The handrail must end in a manner that does not injure a person with a visual disability.

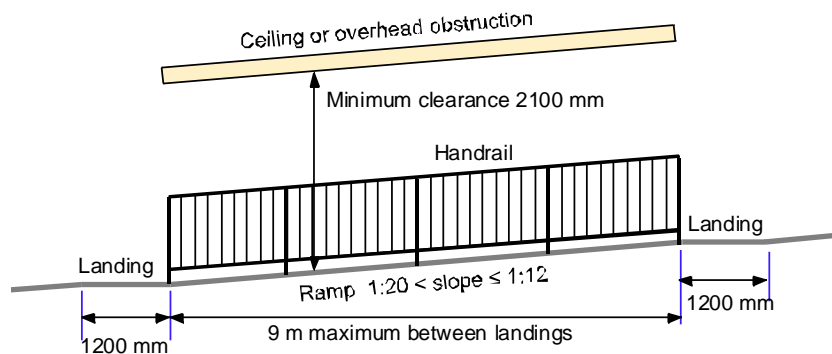


Figure A-3-2-5 Slope classified as a ramp

If it is necessary for the handrails to intrude into the minimum 920 mm width of an interior barrier-free path of travel, the intrusion must not reduce the width between handrails to less than 870 mm (see Figure A-3-2-6).

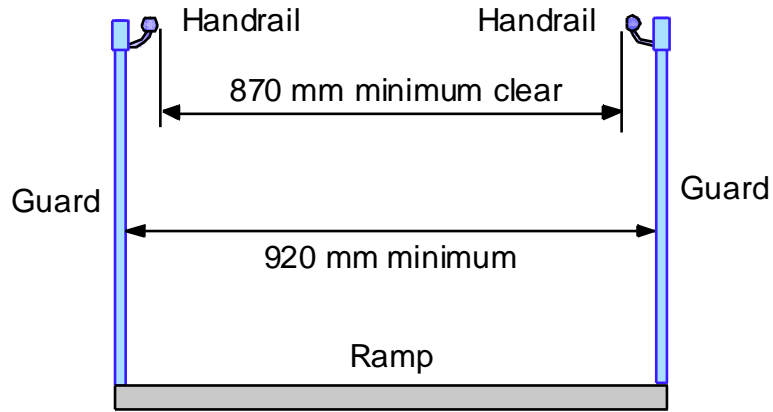


Figure A-3-2-6 Interior barrier-free path of travel with handrail intrusion

A landing must contain sufficient room for a wheelchair to be moved aside while the door is opening. The 600 mm space beside the latch side of the door provides space for the wheelchair occupant to reach the handle and open the door while backing away before passing through the door. If the door opens away from the landing, the 600 mm dimension can be reduced to 300 mm (see Figure A-3-2-7).

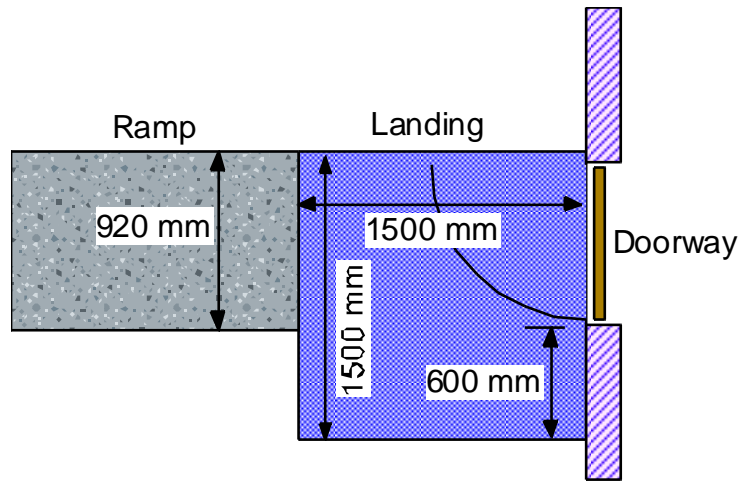


Figure A-3-2-7 Measurements for an interior landing



A-3, SELF-TEST #2

Compare your answers with the answer key in Appendix A.

1. The minimum width of a barrier-free path of travel within a floor area, subject to some exceptions, is:
 - a. 750 mm
 - b. 920 mm
 - c. 1 100 mm
 - d. 1 200 mm

2. A slot is permitted to have a width exceeding 15 mm provided the slot is aligned perpendicular to the direction of barrier-free travel.
 - a. True
 - b. False

A-3, OBJECTIVE #3

Describe the Provisions that Enable Persons to Move from the Entry Storey to Other Storeys Using a Barrier-free Path of Travel

Moving from the Entry Storey to Other Storeys

3.8.1.3. Barrier-Free Path of Travel

3) A *barrier-free* path of travel is permitted to include ramps, passenger elevators or other platform-equipped passenger-elevating devices to overcome a difference in level.

Sentence 3.8.1.3.(3) permits the use of ramps, passenger elevators, or other platform-equipped passenger-elevating devices to move from one level to another level in the building, but it is not mandatory to use any specific method.

3.8.1.4. Access to Storeys Served by Escalators and Moving Walks

1) In a *building* in which an escalator or inclined moving walk provides access to any floor level above or below the entrance floor level, an interior *barrier-free* path of travel shall also be provided to that floor level. (See Appendix A.)

A-3.8.1.4.(1) Access to Storeys Served by Escalators and Moving Walks. In some buildings, escalators and inclined moving walks are installed to provide transportation from one floor level to another floor level so as to increase the capacity to move large numbers of persons. Some buildings located on a sloping site are accessible from street level on more than one storey and an escalator or inclined moving walk is provided for internal movement from floor to floor. In both these situations, a person with a physical disability must be provided with an equally convenient means of moving between the same floor levels within the building. This can be accomplished by providing elevators or a platform-equipped passenger-elevating device.

An escalator has the same impediment as stairs for accessing another floor because the escalator's treads are not large enough to accommodate a wheelchair. Even if the treads were sufficiently large, it would be unsafe to transport wheelchairs using the escalator. The wheelchair could slip and fall down the escalator—a hazard to the wheelchair occupant as well as to other persons using the escalator.

Although occupants using a conventional wheelchair would not, or could not, use an inclined moving walk, occupants using a self-propelled cart might be able to use one. It depends on the occupant's capabilities and the control features on the cart.

Measuring the convenience of different modes of transport is not possible. What is required is a means to transport the wheelchair

to the floor served by the escalator and to access the features on the floor.

3.8.1.4. Access to Storeys Served by Escalators and Moving Walks

2) The route from the escalator or inclined moving walk to the *barrier-free* path of travel that leads from floor to floor as required by Sentence (1) shall be clearly indicated by appropriate signs.

If an elevator entrance or the location of a platform-equipped passenger-elevating device is not clearly visible from both the top and bottom of an escalator or inclined moving walk, directional signs with appropriate information should be provided at or near the top and bottom of the escalator or inclined moving walk. A sign similar to that shown in Figure A-3-3-1, together with an arrow, should meet the intent. Note that the information on the sign includes Braille. It may be necessary to mount an additional sign at a lower height so that it can be reached by a wheelchair user who has a visual disability.



Figure A-3-3-1 Sign showing route to barrier-free path of travel

3.5.2.1. Elevators, Escalators and Dumbwaiters

3) Passenger elevators shall conform to Appendix E of ASME A17.1/CSA B44, “Safety Code for Elevators and Escalators.”

The in-car features of a passenger elevator specified in Appendix E of ASME A17.1/CSA B44 are built into the elevator car at the time of manufacture. Although CSA B44 is adopted by elevator regulations under the Safety Codes Act, Appendix E is not a mandatory part of that standard and thus is not adopted under those regulations. Ensuring compliance with Appendix E requires consultation and cooperation between safety codes officers responsible for each Code.

The following items are outside the elevator car and can be checked by a building safety codes officer:

- The smallest dimension of call buttons is 19 mm and their centre line must be located between 890 mm and 1 220 mm above the floor.
- A clear floor space in front of call buttons must be not less than 760 mm by 1 220 mm to allow the approach of a wheelchair.
- Visual signals are required to show the status of a call.

Appendix E has extensive rules concerning the shape and size of the characters and the Braille. The sign makers are aware of the rules, which are extremely precise and normally beyond the ability of a safety codes officer to check after installation.

The height of controls for elevators required by Appendix E of CSA B44 overrides the 400 mm to 1 200 mm range otherwise required for controls by Sentence 3.8.1.5.(1).

3.5.4.2. Floor Numbering

1) Arabic numerals indicating the assigned floor number shall be mounted permanently on both jambs of passenger elevator hoistway entrances in conformance with Appendix E of ASME A17.1/CSA B44, "Safety Code for Elevators and Escalators."

Figure A-3-3-2 shows a typical number plate for an elevator entrance jamb with a raised numeral to provide tactile information as well as the Braille designation beneath the number. The tactile number must be raised at least 0.8 mm above its surround.

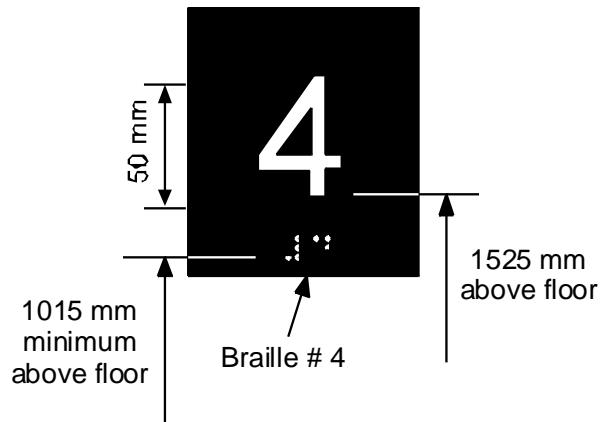


Figure A-3-3-2 Typical elevator number plate



A-3, SELF-TEST #3

Compare your answers with the answer key in Appendix A.

1. The only acceptable method of providing transportation between storeys for a person in a wheelchair is through the installation of a passenger elevator.
 - a. True
 - b. False

2. A building SCO is not required to check any features of an elevator car because they are all addressed by references to the elevator regulations under the Safety Codes Act.
 - a. True
 - b. False

3. It has been observed that the hall call buttons for an elevator have been located 1 525 mm above the floor in line with the floor designation numbers on the entrance jambs. Is this acceptable?
 - a. Yes
 - b. No

MODULE A-4

BARRIER-FREE WASHROOMS

Introduction

All buildings are expected to provide sanitary facilities for occupants and visitors.

Learning Objectives

- Describe the washrooms that must include barrier-free facilities.
- Describe the requirements for water closets suitable for use by persons with disabilities.
- Describe the features of water closet stalls.
- Describe the features of urinals.

A-4, OBJECTIVE #1

Describe the Washrooms that Must Include Barrier-free Facilities

Washrooms

3.8.2.3. Washrooms Required to be Barrier-Free

(See Appendix A.)

- 1) Except as permitted by Sentence (2), all washrooms in a *barrier-free* path of travel shall be *barrier-free* in accordance with the appropriate requirements in Articles 3.8.3.8. to 3.8.3.12.
- 2) A washroom need not conform to the requirements of Sentence (1) provided it is located
 - a) within a *suite of residential occupancy* or a *suite of care occupancy* that has not been designated by Sentence 3.8.4.1.(1) to be accessible, or
 - b) in an individual *suite* having an area less than 500 m² and there are *barrier-free* washrooms on the same *floor area* within 45 m.
- 3) In a *building* in which water closets are required in accordance with Subsection 3.7.2., at least one *barrier-free* water closet shall be provided in the entrance *storey*, unless
 - a) a *barrier-free* path of travel is provided to *barrier-free* water closets elsewhere in the *building*, or
 - b) the water closets required by Subsection 3.7.2. are for *dwelling units* only.
- 4) If *alterations* are made to an existing *building*, universal toilet rooms conforming to Article 3.8.3.12. are permitted to be provided in lieu of facilities for persons with physical disabilities in washrooms used by the general public.
- 5) In addition to the requirements of Sentence (1), at least one universal toilet room conforming to Article 3.8.3.12. shall be provided in a regional transportation terminal.
- 6) If more than one water closet is provided in a washroom, a *barrier-free* stall shall be provided for every 10 stalls or part thereof.
- 7) For temporary uses, such as outdoor fairs and festivals, a *barrier-free* stall shall be provided for every 10 stalls or part thereof.

A-3.8.2.3. Washrooms. The primary intent of this requirement is that all regular washrooms be made accessible to all persons, including persons with disabilities, primarily those who use a wheelchair. Well-designed washrooms that can accommodate such persons need not be much larger than conventional washrooms.

Clause 3.8.2.3.(2)(b) is intended to address “strip malls” (a shopping mall with no public corridor). Section 3.7., which requires plumbing facilities, does not address the concept of suite and could permit, for instance, a shopping mall containing only Group E occupancies (assuming the mall is more than 100 m²) to have only one washroom for each sex located in any one of the suites. It is desirable, however, that washrooms be located so as to be accessible at all times, since the owner or tenant of one suite has no control over the activities of another. These buildings may have either public barrier-free washrooms in a central location or washrooms that can accommodate persons with physical disabilities in each suite. This arrangement relieves any one tenant from having to provide “public” washrooms. Hence, the exception for suites of less than 500 m² is meant as a relaxation to avoid an unnecessary burden on small facilities but should not be construed as meaning that these buildings need not provide accessible washrooms.

Sentence 3.8.2.3.(4) clarifies that universal toilet rooms (“unisex”) should not be used as a substitute for making regular washrooms accessible. These washrooms are an alternative which the authority having jurisdiction could require in the course of renovations to an existing building to satisfy the requirements of Sentence 3.8.2.3.(1), in cases where modifying existing washrooms proves impracticable or where Section 3.7. permits the use of a single washroom for both sexes. This does not preclude the provision of special washrooms in addition to barrier-free regular washrooms; “unisex” washrooms are desirable in large shopping complexes and multiple use complexes, as well as transportation terminals, in cases where persons must be accompanied by an attendant because of their degree of disability. These facilities are convenient because they may be used regardless of the gender of the person with disabilities or the attendant.

Although the term washroom is used in Article 3.8.2.3., the installation of water closets is no longer restricted to a fully enclosed space considered as a room. The removal of doors to reduce obstructions and impediments to movement of persons with disabilities has resulted in spaces that are similar to corridors with plumbing fixtures along the walls. Clause 3.3.1.4.(4)(c) is an example of this concept. The space containing the fixtures is visually screened to provide privacy for persons using the fixtures.

Section 7.2. sets the rules for provision of water closets in buildings and the only exception relates to buildings that do not have a sanitary drainage system because there is no water supply. These buildings must provide outdoor privies, chemical toilets, or other means for the disposal of human waste. This applies to outdoor fairs and festivals if there are no facilities with piped water; one barrier-free privy or similar facility must be provided for every 10 units [Sentence 3.8.2.3.(7)].

Apart from large assembly occupancy buildings and major shopping centres, there are few washrooms that have more than 10 water closets. Even in those large buildings, the washrooms are usually spaced throughout the building, and few of these washrooms have an occupant load requiring more than 10 water closets. It is unusual to encounter two separate barrier-free stalls for the requirement of at least one barrier-free stall for every 10 stalls [Sentence 3.8.2.3.(6)].

Article 3.8.2.1 determines the extent of barrier-free paths of travel in a building. If a washroom is served by a barrier-free path of travel, that washroom has to provide barrier-free plumbing fixtures and ancillary items in accordance with the remainder of Section 3.8. unless Sentence 3.8.2.3.(2) applies. Figure A-4-1-1 shows signs indicating that a single-sex washroom is barrier-free.



Figure A-4-1-1 Single-sex barrier-free washroom signs

Washrooms that do not need to be barrier-free include the washroom in an individual residential suite that is not required to be adaptable [Sentence 3.8.1.1.(3)], which applies to residential buildings funded in whole or in part by the Government of Alberta.

A washroom with an area of less than 500 m² in an individual suite of any occupancy is exempt from barrier-free requirements provided there is a barrier-free washroom within 45 m. Although it might be assumed to be applicable if there is a barrier-free washroom on the same storey as the suite, there is no requirement in the ABC 2014 that there has to be a washroom on every storey of a multi-storey building.

Sentence 3.8.2.3.(3) requires a barrier-free water closet within the entrance storey unless there is a barrier-free washroom on another storey. This Sentence applies primarily to a building that requires a barrier-free path of travel on the main storey but exempts the other storeys. Sentences 3.8.2.1.(4) and (5) give examples of buildings for which only the first storey is required to be barrier-free. Provided washrooms are on the other storeys to serve the occupants of those storeys, the single water closet should be installed in a universal toilet room complying with the requirements of Article 3.8.3.12. A barrier-free water closet is not required in the first storey of a residential building in which the only suites are dwelling units.

Conversions of washrooms to meet barrier-free requirements in an existing building have always led to difficulties.

Recommendations to convert two water closet stalls to a single barrier-free water closet stall result in a deficiency in the total number of water closets. An acceptable solution is to add a universal toilet room to serve persons with disabilities because this room can be used by both males and females.

A universal toilet room is identified by a sign similar to those shown in Figure A-4-1-2. The wheelchair symbol indicates that it is barrier-free and the rest of the information indicates that it is available to either sex and can be used by family groups or by a person requiring the assistance of a person of the opposite sex.



Figure A-4-1-2 Universal toilet room signs

The only type of building in which a universal toilet room is specifically required is a regional transportation terminal. This includes airports and intercity bus terminals. In some cases (specifically Calgary and Edmonton International Airports), federal regulations might differ from Alberta legislation, but it is unlikely that this would result in omitting barrier-free facilities.



A-4, SELF-TEST #1

Compare your answers with the answer key in Appendix A.

1. All water closets on a second (topmost) storey of a building with a building area of 500 m² and containing only dwelling units must conform to all requirements for barrier-free access.
 - a. True
 - b. False

2. A universal toilet room is permitted as an option only for renovations involving washrooms in an existing building.
 - a. True
 - b. False

3. The ABC 2014 requires separate washrooms for males and females in a building that is required to be barrier-free.
 - a. True
 - b. False

4. The ABC 2014 makes no provision for family-oriented washrooms with changing tables for infants. This is a discretionary item for a building owner.
 - a. True
 - b. False

5. Signs indicating that a washroom is barrier-free are no longer required because all washrooms are required to be barrier-free.
 - a. True
 - b. False

A-4, OBJECTIVE #2

Describe the Requirements for Water Closets Suitable for Use by Persons with Disabilities

Water Closets

3.8.3.9. Water Closets

- 1) A water closet for a person with physical disabilities shall
 - a) be equipped with a seat located at not less than 400 mm and not more than 460 mm above the floor,
 - b) be equipped with hand-operated flushing controls that are easily accessible to a wheelchair user or be automatically operable,
 - c) be equipped with a seat lid or other back support, and
 - d) not have a spring-actuated seat.

(See Appendix A.)

The required seat height of 430 ± 30 mm provides sufficient latitude that most water closets meet the requirement, including those with low flow 6 L per flush capability (see Figure A-4-2-1). The seat lid, if provided, should be capable of supporting the back of a person using the water closet. If there is no seat lid, another form of back support is required. Most water closets in residential applications include a storage tank that can provide back support even in the absence of a seat lid—provided the tank is supported by the wall behind the tank.

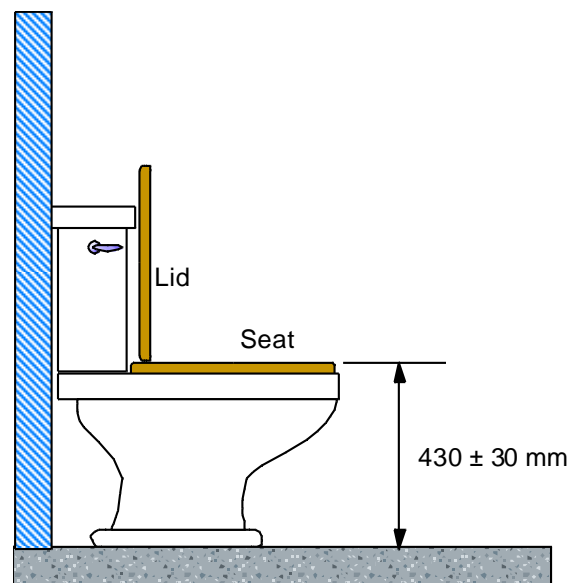


Figure A-4-2-1 Floor model water closet with receding base

A-3.8.3.9.(1) Water Closets. Wall-mounted water closets or floor models with receding bases are preferable because they provide the least amount of obstruction.

Figure A-4-2-2 shows a wall-mounted water closet. These are most likely found in commercial applications. Although they might provide an advantage for some persons with disabilities, there are potential difficulties if they are installed in buildings without adequate maintenance staff. The forces exerted on the wall are substantial due to the cantilever effect, so these models require a strong wall to support the weight of the water closet and a user. If the fastening to the wall becomes loose and is not tightened, effluent from the water closet can seep onto the floor—an unsanitary effect. In buildings in which a person heavier than average is likely to use the water closet, a floor-mounted model is more reliable than a wall-mounted unit.

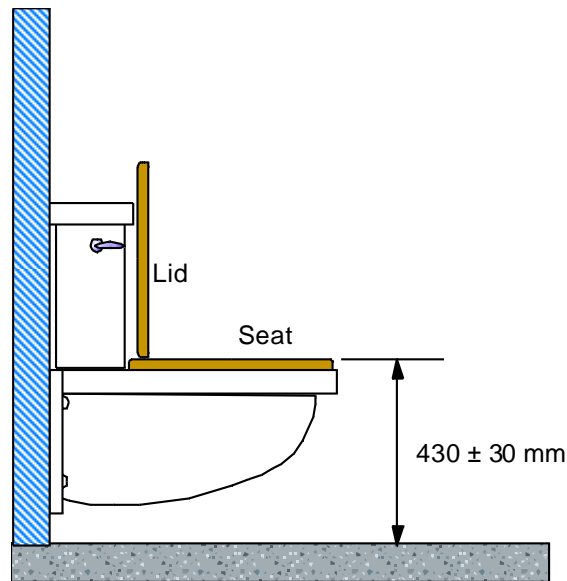


Figure A-4-2-2 Wall-mounted water closet



A-4, SELF-TEST #2

Compare your answers with the answer key in Appendix A.

1. An adequate back support is required for a barrier-free water closet.
 - a. True
 - b. False

2. The ABC 2014 does not distinguish between a wall-mounted water closet and a floor-mounted water closet.
 - a. True
 - b. False

A-4, OBJECTIVE #3

Describe the Features of Water Closet Stalls

Water Closet Stalls

The water closets in most washrooms are separated from one another by partitions and have doors to provide privacy. The dimensions and features of a special stall must be sized to permit the entry and turning of wheelchairs [Sentence 3.8.3.8.(1)].

3.8.3.8. Water Closet Stalls

- 1) A water closet stall or enclosure in a washroom required by Article 3.8.2.3. to be *barrier-free* shall
 - a) be designed to allow a person using a wheelchair to turn in an open space that has a diameter of not less than 1 500 mm,
 - b) be equipped with a door that
 - i) can be latched from the inside with a closed fist,
 - ii) provides a clear opening of not less than 800 mm wide with the door in the open position,
 - iii) swings outward, unless sufficient room is provided within the stall or enclosure to allow the door to be closed without interfering with the person using a wheelchair (see Appendix A),
 - iv) is provided with a door pull on the inside not less than 140 mm long located so that its midpoint is not less than 200 mm and not more than 300 mm from the hinged side of the door and not less than 900 mm and not more than 1 000 mm from the floor (see Appendix A), and
 - v) is provided with a door pull on the outside, near the latch side of the door,
 - c) have a water closet located so that its centre line is not less than 460 mm and not more than 480 mm from an adjacent side wall on one side,
 - d) be equipped with knurled finished grab bars as described in Sentence (2),
 - e) be equipped with a coat hook mounted not more than 1 200 mm above the floor on a side wall and projecting not more than 50 mm from the wall, and
 - f) have a clearance of not less than 1 700 mm between the outside of the stall face and the face of an in-swinging washroom door and 1 400 mm between the outside of the stall face and any wall-mounted fixture.

A-3.8.3.8.(1)(b)(iii) Water Closet Stalls. Doors to water closet stalls for persons with physical disabilities should swing outward, preferably against a side wall.

A-3.8.3.8.(1)(b)(iv) Door Pulls. The door pull should consist of a D-shaped handle mounted either horizontally or vertically. The centre lines are the lines drawn through the long axis and the short axis of the handle. If the handle is installed in the horizontal position, the short or transverse axis is the centre line which must be located at between 200 and 300 mm from the hinged side of the door, and the long or longitudinal axis is the one which is located between 900 and 1 000 mm from the floor. If the handle is installed in the vertical position, the distance is measured from the longitudinal axis to the hinged side of the door, while the distance from the floor is measured to the transverse axis.

Figure A-4-3-1 shows the handle location on the inside of the door to the barrier-free water closet stall. Although there is no dimension given for the clearance between the handle and the door, a value between 35 mm and 45 mm would be appropriate, which is the value behind a grab bar. The 140 mm minimum length allows a hand to be inserted behind the pull.

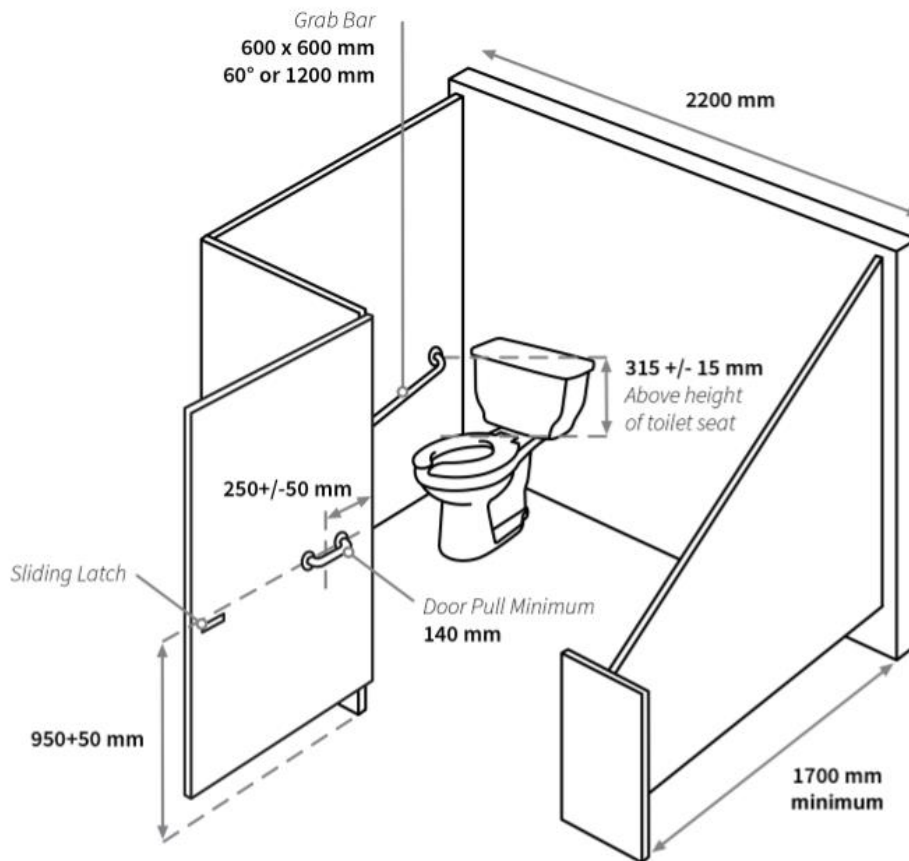


Figure A-4-3-1 Handle location on inside of door to barrier-free water closet stall

Figure A-4-3-2 shows the features of a barrier-free water closet stall (the shaded area). The door to the barrier-free stall swings outward; however, an inward swinging door can be installed if there is sufficient space within the stall. The figure shows the entry door to the washroom opposite the door to the stall; many designs locate the barrier-free stall at the other end of the washroom.

Although some designers include a barrier-free lavatory within the stall, a lavatory is not required within the stall provided there is a barrier-free lavatory within the washroom.

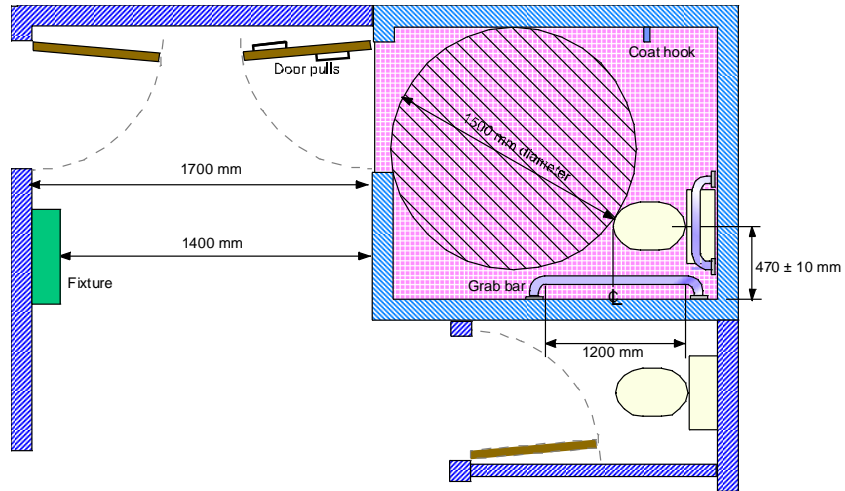


Figure A-4-3-2 Features of barrier-free water closet stall

3.8.3.8. Water Closet Stalls

- 2) A grab bar required by Sentence (1) shall
 - a) be mounted
 - i) horizontally on the wall beside the water closet, and be not less than 1 200 mm in length, located with its centre line between 300 mm and 330 mm above the height of the water closet seat and with its midpoint located in line with the front edge of the water closet, or
 - ii) on the wall beside the water closet and have a horizontal portion 600 mm in length with a 600 mm extension extending upwards to the front and away from the horizontal portion at an angle of 60° to the horizontal, with the centre line of the horizontal portion between 300 mm and 330 mm above the height of the water closet seat, and the intersection of the horizontal and sloping portions located in line with the front edge of the water closet
 - b) be mounted horizontally on the wall behind the water closet, if the water closet does not have an attached water tank, centred on the toilet bowl, and be not less than 600 mm in length,
 - c) be installed to resist a load not less than 1.3 kN applied vertically or horizontally,
 - d) be not less than 30 mm and not more than 40 mm in diameter, and
 - e) have a clearance not less than 35 mm and not more than 45 mm from the wall.

(See Appendix A.)

A-3.8.3.8.(2) Additional Grab Bars. The required grab bars referred to in Clause 3.8.3.8.(1)(d) must be mounted as specified in Sentence 3.8.3.8.(2). It is the designer's prerogative to exceed the minimum requirements found in this Code and specify the installation of additional grab bars in other locations. These additional grab bars may be of different configurations and can be installed in other orientations.

Figure A-4-3-3 shows a typical installation for a water closet with a tank behind the water closet. The tank and/or the cover/lid provide a back support. The grab bar can be either fully horizontal or have a horizontal 600 mm portion towards the back with an inclined 600 mm portion to the front.

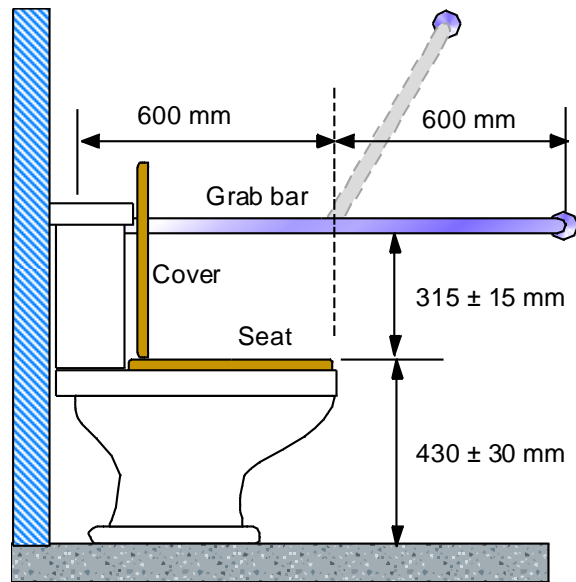


Figure A-4-3-3 Measurements for water closet with a tank

Commercial installations often use a flush valve, usually mounted behind the toilet seat and many do not include a seat cover/lid. In this case, a grab bar should be provided behind the toilet. The grab bar should be provided and located approximately 400 mm above the seat. The grab bar should project sufficiently from the wall that it is above the back of the seat. The only dimension given in the ABC 2014 is that the grab bar be at least 600 mm long. Figure A-4-3-4 shows this type of installation.

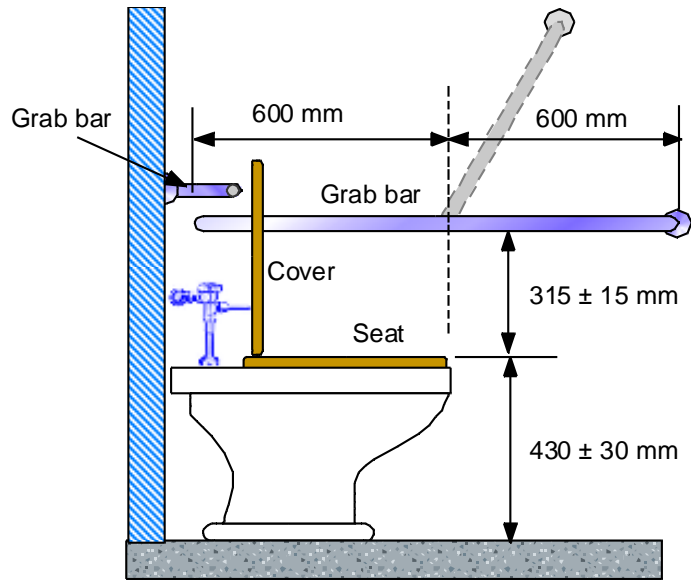


Figure A-4-3-4 Measurements for water closet without a tank

Although Clause 3.8.3.8.(2)(a) states that there is a choice of three versions of the grab bar, the option in Subclause (iii) for a grab bar behind the water closet provides assistance for a person transferring from a wheelchair to the seat of the water closet. Most designers install side grab bars as well as a bar behind the water closet.

The Appendix note acknowledges that other arrangements of grab bars are installed and this is permitted provided the minimum requirements of the ABC 2014 are met. Any additional grab bars must meet the minimum strength requirements.



A-4, SELF-TEST #3

Compare your answers with the answer key in Appendix A.

1. Every barrier-free water closet must be located in a barrier-free water closet stall.
 - a. True
 - b. False

2. The clearance behind a grab bar in a barrier-free water closet stall is the same as that required between a handrail and a wall: 50 mm for smooth surfaces and 60 mm for rough surfaces.
 - a. True
 - b. False

A-4, OBJECTIVE #4

Describe the Features of Urinals

Urinals

3.8.3.10. Urinals

- 1) If urinals are provided in a *barrier-free* washroom, at least one urinal shall be
 - a) wall mounted, with the rim located between 488 mm and 512 mm above the floor, or
 - b) floor mounted, with the rim level with the finished floor.
- 2) The urinal described in Sentence (1) shall have
 - a) a clear width of approach of 800 mm centred on the urinal,
 - b) no step in front, and
 - c) installed on each side a vertically mounted grab bar that is not less than 300 mm long, with its centre line 1 000 mm above the floor, and located not more than 380 mm from the centre line of the urinal.

(See Appendix A.)

A-3.8.3.10.(2) Urinals. Men with physical disabilities are often able to use the urinal in a public washroom. Grab bars on both sides of the urinal are essential for those who are able to support themselves in a standing position. Grab bars are also very useful for the elderly, men who have had a stroke, and those who use a cane. In addition, some men using wheelchairs use a leg storage bag and require a draining location. The draining is often electronically controlled from a valve near the ground. It is best that the bottom of the urinal be flush with the floor to facilitate the draining of the leg bag. In no case should it be more than 20 mm above the floor.

Except for a urinal that is required to be installed in a restaurant washroom serving more than 20 males, urinals are not required but are allowed to substitute for a percentage of the water closets required for males. If urinals are provided, at least one of the urinals in a barrier-free washroom has to conform to Article 3.8.3.10. However, it does not replace the barrier-free water closet which is also required.

Figure A-4-4-1(A) shows a wall-mounted urinal and (B) shows a floor-mounted urinal. The wall-mounted urinal allows a frontal approach for a person in a wheelchair. A urinal that extends to the floor has an advantage for persons who need to empty a leg storage bag [Appendix note A-3.8.3.10.(2)].

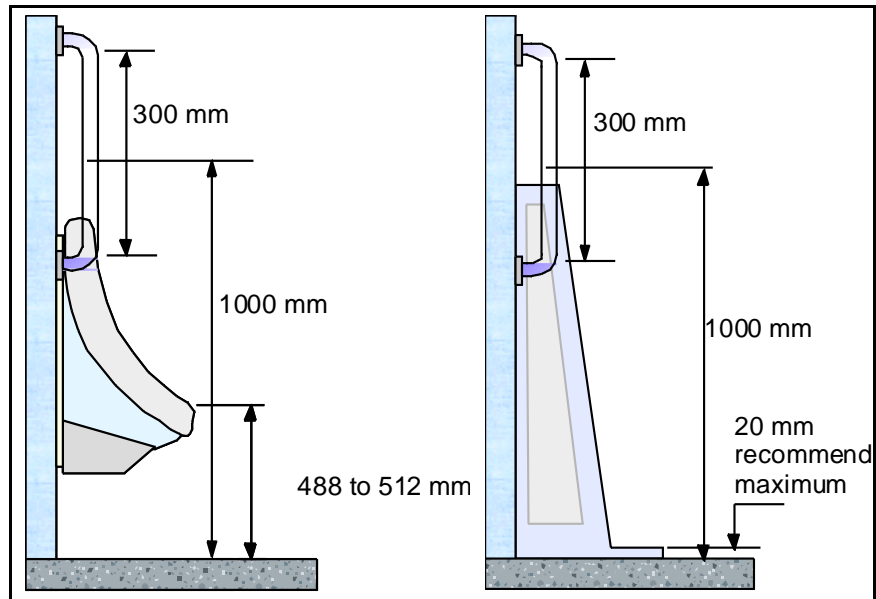


Figure A-4-4-1 (A) Wall-mounted urinal (B) Floor-mounted urinal

A vertical grab bar is required on each side of the urinal [Article 3.8.3.10.]. Figure A-4-4-2 shows a typical installation with a grab bar on each side of a wall-mounted urinal. Some barrier-free urinals include an extra horizontal bar (not shown in the figure). The purpose of the horizontal bar is to permit a person to rest his chest against the bar for additional support if he has difficulty in standing up for some time.



Figure A-4-4-2 Wall-mounted urinal



A-4, SELF-TEST #4

Compare your answers with the answer key in Appendix A.

1. A barrier-free urinal is required in every barrier-free washroom in which more than one water closet is required for males.
 - a. True
 - b. False

2. A grab bar is required only on the right side of a urinal.
 - a. True
 - b. False

3. The ABC 2014 requires a chest support bar immediately above a urinal.
 - a. True
 - b. False

4. A grab bar for a barrier-free urinal must be centred a distance of _____ above the floor.
 - a. 850 mm
 - b. 920 mm
 - c. 1 000 mm
 - d. 1 070 mm

MODULE A-5

UNIVERSAL TOILET ROOMS

Introduction

A washroom designated for a specific sex could be inconvenient or embarrassing for opposite sex persons who provide assistance to a person with a disability while using a washroom. A universal toilet room is a room in which a single set of facilities is provided and sufficient space is provided for persons of the opposite sex to assist another person.

These toilet rooms are of value not only to a person with a disability who needs assistance, but also to parents who assist a child of the opposite sex using the washroom. Many buildings term these rooms as family rooms and provide them to supplement other single-sex washrooms.

A universal toilet room is required in regional transportation terminals. It would also be appropriate for small buildings in which a single water closet is permitted for both sexes. If the occupant load is sufficiently small that a single water closet is required for each sex, it would be appropriate that the water closet be in a room that essentially complies with the features of a universal toilet room.

Learning Objective

- Describe the features that are associated with a universal toilet room.

A-5, OBJECTIVE #1

Describe the Features that are Associated with a Universal Toilet Room

Universal Toilet Rooms

3.8.3.12. Universal Toilet Rooms

(See Appendix A.)

- 1) A universal toilet room shall
 - a) be served by a *barrier-free* path of travel,
 - b) have a door capable of being locked from the inside and released from the outside in case of emergency and having
 - i) a latch-operating mechanism that is operable with a closed fist, located not less than 900 mm and not more than 1 000 mm above the floor,
 - ii) if it is an outward swinging door, a door pull not less than 140 mm long located on the inside so that its midpoint is not less than 200 mm and not more than 300 mm from the hinged side of the door and not less than 900 mm and not more than 1 000 mm above the floor (see A-3.8.3.8.(1)(b)(iv) in Appendix A), and
 - iii) if it is an outward swinging door, a door closer, spring hinges or gravity hinges, so that the door closes automatically,
 - c) have one lavatory conforming to Article 3.8.3.11.,
 - d) have one water closet conforming to the requirements of Article 3.8.3.9. that has a clearance to the walls of
 - i) not less than 285 mm and not more than 305 mm on one side, and
 - ii) not less than 875 mm on the other side,
 - e) have grab bars conforming to Clause 3.8.3.8.(1)(d),
 - f) have no internal dimension between the walls that is less than 1 700 mm,
 - g) have a coat hook conforming to Clause 3.8.3.8.(1)(e) and a shelf located not more than 1 200 mm above the floor,
 - h) be designed to permit a wheelchair to back in alongside the water closet in the space referred to in Subclause (d)(ii), and
 - i) be designed to permit a wheelchair to turn in an open space not less than 1 500 mm in diameter.

A universal toilet room is intended for use by all persons in a building, including those who use a wheelchair or other mobility assistive device.

It is difficult for a person in a wheelchair to reach behind them to close an outward swinging door, even with a door pull. Once the door has closed automatically behind the wheelchair, the person can use the door pull to keep the door shut while the latch is being secured. The closing characteristics of the door must meet the requirements of Sentence 3.8.3.3.(9) so that it is not difficult to open the door and keep it open for sufficient time to pass

through the opening into or out of the room. Although gravity hinges are listed as acceptable, they should be checked after installation to ensure they can be opened and closed with a force not exceeding 22 N in accordance with Sentence 3.8.3.3.(7).

Although Clause 3.8.3.12.(1)(b) uses the term locked, Subclause (i) clarifies the reference to a latching mechanism. The ability to release the latching mechanism from outside is critical in an emergency. However, the release tools should be available to and used only by emergency responders and not by the general public so that the occupant has a sense of privacy and security.

If the room is designed for parents to attend to and change infants, the changing table should be where a person can stand in front of the table. Also, the table should be arranged to fold up against the wall when not in use so that it does not interfere with the movement of a wheelchair.

Although Clause 3.8.3.12.(1)(g) requires the installation of a shelf, there are no dimensions for the size or location within the room. The only specification is that the shelf cannot be more than 1 200 mm above the floor. If the shelf is placed above the lavatory, it should not project far enough from the wall to be a hazard to any person. The hazard can occur as a person lifts and hits the back of his or her head on the shelf. Article 3.7.2.3. applies to the installation of a shelf above a lavatory in any space, not just in a facility that is barrier-free.

3.7.2.3. Lavatories

3) Any shelf or projection above a lavatory shall be located so that it will not be a hazard.

Other items not stated in Sentence 3.8.3.12.(1) that must be included in the universal toilet room for reasons of hygiene include a soap tray [Clause 3.8.3.11.(1)(e)], a toilet paper dispenser [Sentence 7.2.2.3.(3)], and a hand dryer or towel dispenser [Clause 3.8.3.11(1)(f)]. If paper towels are used, a container for used towels is needed [Clause 7.2.4.1.(6)(b)]. These items must be installed so that they are accessible to persons with disabilities but are not liable to injure a person with a visual disability. If a mirror is installed, it must comply with Sentence 3.8.3.11.(2).

A-3.8.3.12. Universal Toilet Rooms. Unobstructed areas in front of the lavatory, in front of the water closet, and on one side of the water closet are necessary for manoeuvrability of a person using a wheelchair. Although outward swinging doors are preferable for accessibility, inward swinging doors are also permitted. Figures A-

3.8.3.12.-A and A-3.8.3.12.-B show design options that meet the intent of Article 3.8.3.12.

These figures are included in the printed and electronic copies of the ABC 2014.

Figure A-5-1-1 illustrates the fixtures and their clearances. It doesn't indicate the best or only arrangement.

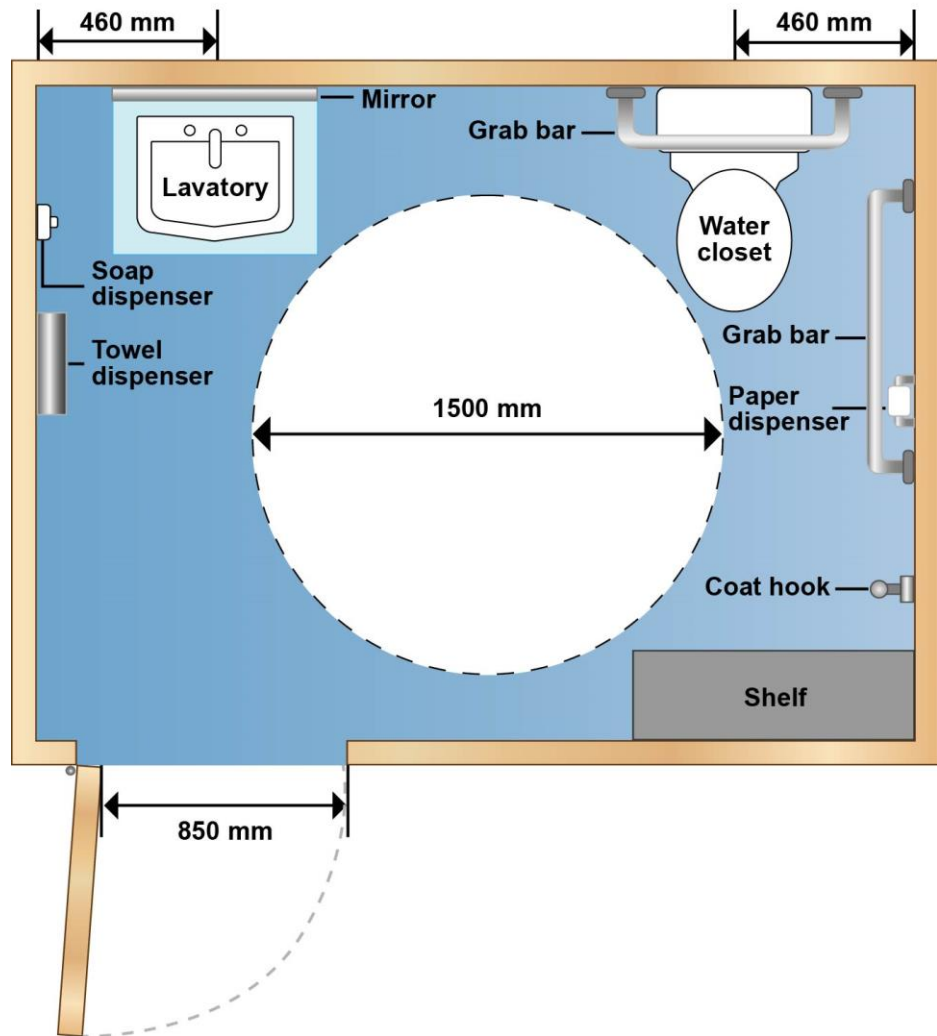


Figure A-5-1-1 Universal toilet room fixtures and their clearances



A-5, SELF-TEST #1

Compare your answers with the answer key in Appendix A.

1. A larger clear turning circle is required in a universal toilet room compared to a barrier-free water closet stall to allow for a wider range of mobility assistive devices.

- a. True
- b. False

2. What security feature is specified for a universal toilet room but not for a barrier-free water closet stall?

3. Is a urinal required in a universal toilet room?

- a. Yes
- b. No

4. Name a convenience feature required in a universal toilet room that is not required in a barrier-free water closet stall.

5. The 875 mm clear space alongside a water closet in a universal toilet room is provided so that:

MODULE A-6

ANCILLARY ITEMS IN WASHROOMS

Introduction

Additional fixtures are required in a washroom so persons who have used the water closet can clean their hands. The main fixture is a lavatory, supplemented by soap dispensers and hand drying facilities. The building operator supplies the soap and, if appropriate, the towels.

Learning Objectives

- Describe the requirements for lavatories.
- Describe the requirements for grab bars.

A-6, OBJECTIVE #1

Describe the Requirements for Lavatories

Lavatories

At least one lavatory has to be installed with water closets. Whenever a water closet is required to be barrier-free, at least one of the lavatories must comply with Sentence 3.8.3.11.(1).

3.8.3.11. Lavatories

- 1) A *barrier-free* washroom shall be provided with a lavatory that
 - a) is located so that the distance between the centre line of the lavatory and the side wall is not less than 460 mm,
 - b) has a rim height not more than 865 mm above the floor,
 - c) has a clearance beneath the lavatory not less than
 - i) 760 mm wide,
 - ii) 735 mm high at the front edge,
 - iii) 685 mm high at a point 205 mm back from the front edge, and
 - iv) 230 mm high over the distance from a point 280 mm to a point 430 mm back from the front edge(see Appendix A),
 - d) has insulated pipes where they would otherwise present a burn hazard (see Appendix A),
 - e) has a soap dispenser located close to the lavatory, not more than 1 200 mm above the floor and accessible to persons in wheelchairs, and
 - f) has a towel dispenser or other hand-drying equipment located close to the lavatory, not more than 1 200 mm above the floor in an area that is accessible to persons in wheelchairs.
- 2) If mirrors are provided in a *barrier-free* washroom, at least one mirror shall be
 - a) mounted with its bottom edge not more than 1 000 mm above the floor, or
 - b) be inclined to the vertical to be usable by a person in a wheelchair.

The front of a lavatory must have sufficient space to allow a person in a wheelchair to directly approach the lavatory. Figure A-6-1-1 shows a profile of the zone that is to be kept free of any obstructions that would prevent a close approach to the lavatory by a person in a wheelchair. If there is a side wall, the distance should be measured to the face of the wall. The space parallel to the wall should have no obstructions that would impede movement of the wheelchair.

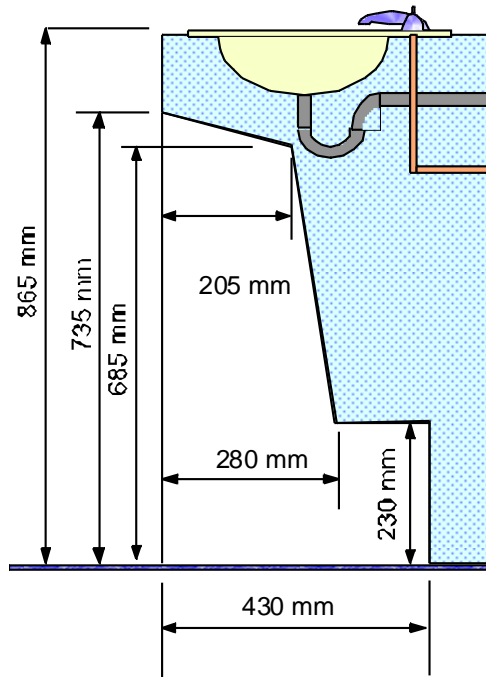


Figure A-6-1-1 Clear zone in front of and underneath counter to allow direct approach to lavatory

The majority of lavatories are set into a counter, but this is not a requirement. The counter for the barrier-free lavatory must have sufficient space underneath to allow a person in a wheelchair to move up to and use the lavatory. The 760 mm clear side-to-side space beneath the lavatory should be centred on the lavatory (see Figure A-6-1-2).

A-3.8.3.11.(1)(d) Pipe Protection. Persons who have lost the sense of touch in their limbs cannot feel hot or cold and are susceptible to burns without knowing. The pipes referred to in Clause 3.8.3.11.(1)(d) include both supply and waste pipes. The hazard can be prevented by insulating the pipes, by locating the pipes in enclosures, or avoided by limiting the temperature of the hot water to a maximum of 45°C.

Hot water flowing through metallic pipes can conduct the heat through to the surface and could cause a contact burn to a person touching the surface. The supply pipes and the drainage pipes should be kept out of the clear space and if there is any possibility of a person coming into contact with pipes that carry hot water, the pipes should be insulated, or protected by other means, to ensure that no person could contact these pipes. This addresses a sensory disability that is not mentioned elsewhere: the loss of sensation in skin cells that warn an individual that

they are encountering an object at an elevated or lowered temperature. Even in systems that have limits on hot water temperature, pipe protection is needed to guard against accidental failure of the temperature limits and the release of overheated water into the system.

It is preferable to install the soap dispenser above the lavatory or the counter to prevent soap from falling onto the floor and causing a slipping hazard. Figure A-6-1-2 shows the towel dispenser close to the lavatory. Many installations place the towel dispenser on a different wall so that other persons have access to the lavatory while the first person is using the towels or other hand-drying item. Access to the towel dispenser should not be obstructed by other fixtures in the space.

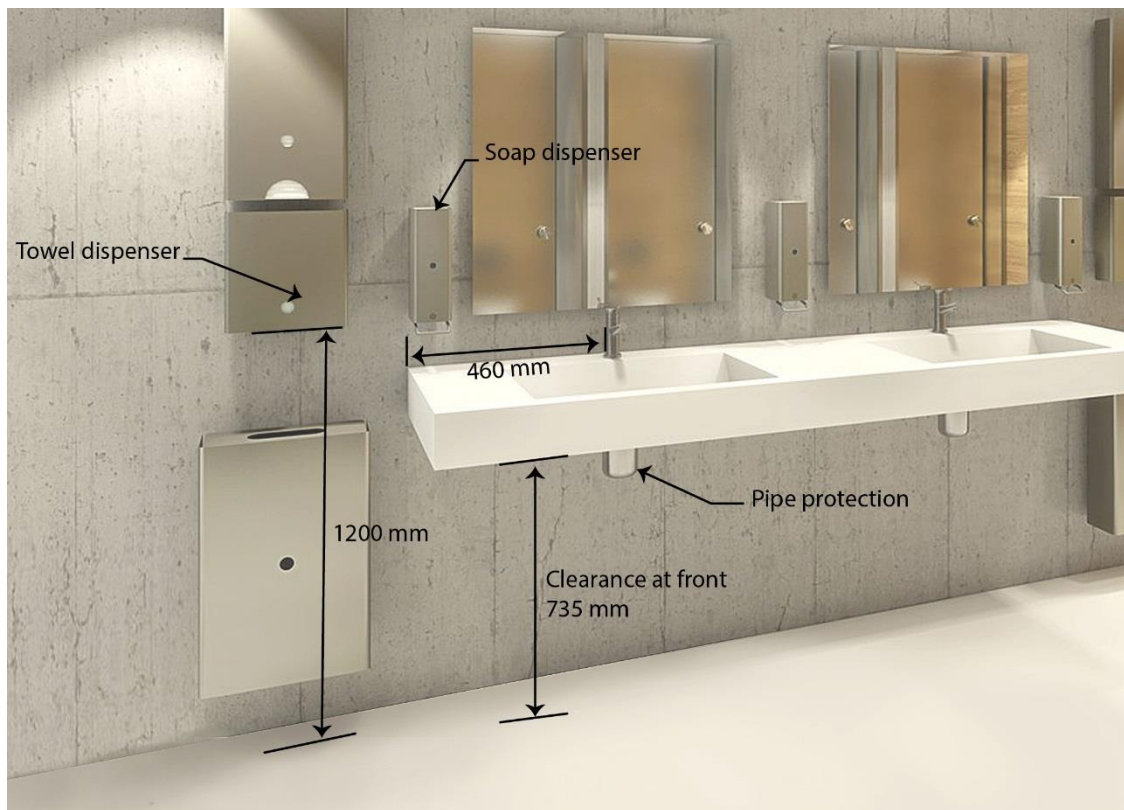


Figure A-6-1-2 Measurements of a lavatory (facing the counter and wall)

There is no obligation to provide a mirror in the washroom. If a mirror is provided, however, it has to be usable by persons with disabilities. The mirror can be set with its lower edge within 1000 mm of the floor, or it can be set higher but sloped so that it can be used by a person in a wheelchair. Some public buildings omit mirrors in washrooms because the mirror could be broken, and glass could injure users.



A-6, SELF-TEST #1

Compare your answers with the answer key in Appendix A.

1. What is the maximum height for the bottom of a mirror that is provided for the use of a person sitting in a wheelchair?
 - a. 865 mm
 - b. 900 mm
 - c. 1 000 mm
 - d. 1 150 mm

A-6, OBJECTIVE #2

Describe the Requirements for Grab Bars

Grab Bars

3.7.2.8. Grab Bar Installation

1) Grab bars that are installed shall resist a load not less than 1.3 kN applied vertically or horizontally.

A grab bar must be strong enough that it can support the weight of most persons who need to use it. The specified 1.3 kN force represents an applied mass of 132 kg. This would represent the point of failure. The grab bar and its fastening hardware should support the heaviest weight that might be expected (an appropriate factor of safety should be applied).

Sentence 3.7.2.8.(1) applies to all grab bars, whether installed for barrier-free requirements or for any other reason. The failure of a grab bar that is not sufficiently strong could result in falls and injuries.

Figure A-6-2-1 shows a typical grab bar with a diameter of 38 mm and a roughened or knurled surface for most of its length. Roughening helps everyone, but it especially improves the grip of a person whose hands may be wet after bathing or showering.



Figure A-6-2-1 Typical grab bar with roughened surface

The gripping surface of the grab bar must be knurled for some grab bar locations. Figure A-6-2-2 shows one type of knurled surface on a bar. A knurled surface is achieved by cutting grooves in reverse spiral directions leaving a raised diamond pattern. Other types of knurling include longitudinal grooves

parallel to the length of the bar and spiral grooves in one direction.

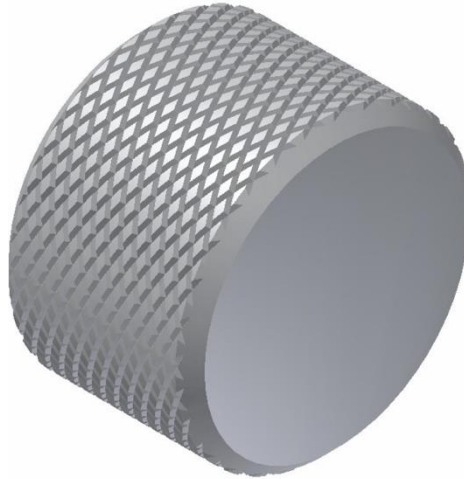


Figure A-6-2-2 Knurled surface

Although not explicitly stated in every reference to grab bars, the diameter must be between 30 mm and 40 mm. The clearance between the grab bar and the surface to which it is attached must be between 35 mm and 45 mm.

Grab bars for barrier-free toilet rooms are described in detail in association with requirements for water closets, showers, and bathtubs.

Grab bars for bathtubs in hotels and motels are in Article 3.7.2.9.

Table A-6-2-1 summarizes the location, orientation, length, and mounting height for grab bars. The references should be consulted for additional details.

Table A-6-2-1 Grab Bar Details Summary

Reference	Location	Orientation	Length (mm)	Mounting Height (mm) to Centre or to Bottom
Universal – includes barrier-free				
3.7.2.9.	End of bathtub	Vertical	1 200	180 to 280 above rim
	Behind bathtub	Horizontal	1 200	180 to 280 above rim
Barrier-free fixtures				
3.8.3.8.(2)(a)	Beside WC	Horizontal	1 200 ¹	300 to 330 above seat
	Beside WC	Horizontal then 60°	600 ¹ and 600 ¹	300 to 330 above seat
	Behind WC	Horizontal	600 ¹	
3.8.3.10.(2)(c)	Each side of urinal	Vertical	300	1000 above floor
3.8.3.12.(1)(e)	See 3.8.3.8.(2)(a)			
3.8.3.13.(1)(f)	Back wall of shower	Horizontal	900 ¹	750 to 850 above floor
3.8.3.17.(1)(d)	End of bathtub	Vertical	1 200	180 to 280 above rim
	Behind bathtub	Horizontal	1 200	180 to 280 above rim

1. Knurled finish required



A-6, SELF-TEST #2

Compare your answers with the answer key in Appendix A.

1. Is there a difference between the forces to be carried by a grab bar in a barrier-free universal toilet room and a grab bar in a washroom in a private residential suite?
 - a. Yes
 - b. No

2. Is a smooth-surfaced grab bar permitted to be installed beside a urinal?
 - a. Yes
 - b. No

MODULE A-7

SHOWERS AND BATHTUBS

Introduction

A bathtub or shower is required in every suite of residential occupancy. Depending on the category of the suite, the shower might have to be barrier free. Showers are required at recreation camps and at swimming pools.

Learning Objectives

- Describe the requirements for showers.
- Describe the requirements for bathtubs.

A-7, OBJECTIVE #1

Describe the Requirements for Showers

Showers

The installation of showers varies: some situations require showers, others require a choice between showers or bathtubs, and sometimes showers are optional. Regardless of the situation, showers must be barrier free. A review of manufacturers' literature indicates that many manufactured shower enclosures meet United States accessibility requirements, but few of them meet all the requirements of the ABC 2014. Therefore, modifications may be needed unless the shower enclosure is customized on-site.

3.7.2.4. Service Buildings for Manufactured Home Parks and Campgrounds

- 3) If a service *building* is required by Sentence (1), it shall contain lavatories as required by Sentence 3.7.2.3.(1) and at least
 - a) one laundry tray or similar facility, and
 - b) one bathtub or shower for each sex.

The residential buildings in the majority of manufactured home parks include their own sanitary facilities. Sentence 3.7.2.4.(3) applies primarily to provincial and private campgrounds. Persons using tents and small trailers need sanitary facilities within the campground and the service buildings within the campground are required to include at least one bathtub or shower for each sex. These bathtubs or showers have to be barrier free.

A shower is required for each 30 persons of each sex and one shower for each sex must be barrier-free. The route to each of these two showers must be barrier-free. Many of these camps provide a swimming pool and the pool must have shower facilities in accordance with Sentence 7.3.2.2.(1).

7.2.4.7. Showers

- 1) A water heater and thermostatically controlled mixing valve accessible only to authorized staff shall be installed and shall be capable of providing 0.15 L/s of water to each shower head with a temperature range of 35°C to 49°C.
- 2) The number of showers provided in each dressing room shall be one for each 50 *bathers* and not less than 3 showers per dressing room.
- 3) Floor drains shall be so designed that waste water from one shower head shall not pass over the floor area of another shower.
- 4) The lower 2.4 m of walls in a shower area shall have a smooth and impervious finish.
- 5) Dressing room facilities shall have a shower area at the entrance to a *swimming pool* or *water spray park* or adjoining the entrance located so that no *bather*

can enter the *swimming pool* or *water spray park* area without passing through the shower area.

Aquatic facilities are required to have showers in each dressing room, one for each 50 bathers but no fewer than three shower per dressing room. A shower area is required at the entry to a swimming pool or water spray park to help prevent contaminating the pool or spray park water. The shower area must include provisions for barrier-free showering. If a wheelchair is to be taken into the water, the shower must be sufficient in coverage to clean the wheelchair as well as its occupant. In accordance with Sentence 7.2.4.7.(3), the water from one shower location must not flow over the floor of an adjacent shower.

3.8.3.13. Showers

1) Except as provided in Sentence (2), if showers are provided in a *barrier-free* path of travel, at least one shower stall shall be *barrier-free* and shall

- a) be not less than 1 500 mm wide and 900 mm deep,
- b) have a clear floor space at the entrance to the shower, not less than 900 mm deep and the same width as the shower, except that fixtures are permitted to project into that space provided they do not restrict access to the shower

(see Appendix A),

- c) have a slip-resistant floor surface,
- d) have a bevelled threshold not more than 13 mm higher than the finished floor,
- e) have a hinged seat that is not spring-loaded or a fixed seat that is
 - i) not less than 450 mm wide and 400 mm deep,
 - ii) mounted approximately 450 mm above the floor, and
 - iii) designed to carry a minimum load of 1.3 kN,
- f) have a horizontal or L-shaped grab bar with a knurled finish conforming to Clauses 3.8.3.8.(2)(c), (d) and (e) that is
 - i) not less than 900 mm long located on the wall 100 mm from the back of the seat,
 - ii) mounted between 750 mm and 850 mm above the floor, and
 - iii) located on the wall opposite the entrance to the shower so that not less than 300 mm of its length is at one side of the seat,

(see Appendix A,)

- g) have a pressure-equalizing or thermostatic-mixing valve controlled by a lever or other device operable with a closed fist from the seated position, located on the side wall between 200 mm and 300 mm in front of the seat,
- h) have a hand-held shower head with not less than 1 800 mm of flexible hose, located so that it can be reached from the seated position and equipped with a support so that it can operate as a fixed shower head, and
- i) have fully recessed soap holders that can be reached from the seated position and located on the side wall between 100 mm and 200 mm in front of the seat.

Additional requirements for showers in certain residential suites are required in accordance with Sentence 3.8.3.13.(2).

Figure A-7-1-1 shows the requirements of Sentence 3.8.3.13.(1). The floor surface within the shower area must be slip resistant. The space at the entrance to the shower must also be slip resistant because the threshold is insufficient to control water splashing onto the floor outside the shower. A door should not be installed at the entrance to the shower because it would block easy access. A curtain could be used, but it does not control water splashing onto the floor at the approach to the shower.

A-3.8.3.13.(1)(b) Clear Space at Entrances to Showers. The clear space at the entrance to a shower may be encroached upon by fixtures such as a wall hung sink which does not interfere with the leg rests of the wheelchair. However, this sink could restrict movement for persons who need to make a lateral transfer if it were installed at the seat end of the shower.

The seat is required to withstand a force of 1.3 kN which is the force exerted by a mass of 132 kg. The Appendix note clarifies that fixtures that encroach into the floor space at the entry to the shower should not be placed at the seat end of the enclosure.

The wording of Clauses 3.8.3.13.(f) to (i) is not clear concerning the designation of the walls. It would be logical to assume that the opening is at the front, opposite the back wall, with side walls to the left and right. In this configuration, the grab bar would be on the back wall opposite the entrance. There is no defined location for the seat, but many designs place it in the position shown in Figure A-7-1-1.

Clause 3.8.3.13.(1)(g) states that the mixing valve should be on the side wall between 200 and 300 mm in front of the seat. However, the wall on the left side would be 1100 mm in front of the seat and out of reach for a person on the seat. Placing the mixing valve on the back wall as shown makes more sense.

The placement of a soap holder on the side wall between 100 mm and 200 mm from the seat places it on the right side as shown. Clause 3.8.3.13.(1)(i) states soap holders (i.e., more than one) because some commercial designs include two or more soap holders arranged at different heights to allow for persons sitting on the seat or in a wheelchair as well as for persons who are standing in the shower. The height is not specified in this Clause.

The shower head has to be located where it can be reached from a sitting position. A location approximately above the mixing valve would be suitable. Both the mixing valve and the shower head bracket should be above the grab bar.



Figure A-7-1-1 Measurements of shower requirements [Sentence 3.8.3.13.(1)]



A-7, SELF-TEST #1

Compare your answers with the answer key in Appendix A.

1. A hand-held shower head is required in a barrier-free shower enclosure. What length of hose is required?
 - a. 1 500 mm
 - b. 1 600 mm
 - c. 1 800 mm
 - d. 2 000 mm

2. Would separate barrier-free showers be required for males and females at a summer recreation camp for teens?
 - a. Yes
 - b. No

A-7, OBJECTIVE #2

Describe the Requirements for Bathtubs

Bathtubs

3.7.2.9. Bathtubs

- 1) Where a bathtub is installed in a hotel or a motel, it shall
 - a) notwithstanding the presence of a water closet or a lavatory, have a clear floor space at least 900 mm wide along its length,
 - b) have faucets that conform to Clause 3.7.2.3.(4)(b),
 - c) have grab bars that
 - i) conform to Sentence 3.7.2.8.(1),
 - ii) are 1 200 mm long located vertically at the end of the bathtub that is adjacent to the clear floor space, with the lower end between 180 mm and 280 mm above the bathtub rim, and
 - iii) are 1 200 mm long located horizontally along the length of the bathtub at 180 mm to 280 mm above the bathtub rim, and
 - d) be open along its length with no tracks mounted on the bathtub rim.

Article 3.7.2.9. applies to all hotels and motels. It is not restricted to suites that are required to be barrier-free. The features ensure safety for all persons using the bathtub and, in addition, make it more usable by persons with disabilities (see Figure A-7-2-1).

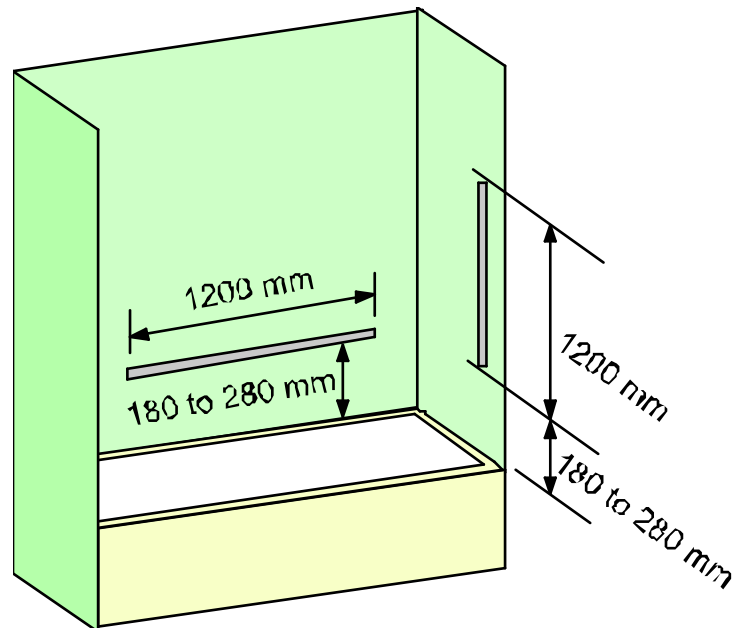


Figure A-7-2-1 Measurements for bathtubs

Clause 3.7.2.9.(1)(b), by reference to Clause 3.7.2.3.(4)(b), requires lever handles that do not close under spring action because that would require a person to hold the lever for the entire time that water was flowing through the faucet.

Subclause 3.7.2.9.(1)(c)(i), by reference to Sentence 3.7.2.8.(1), requires that the grab bar can withstand a force of 1.3 kN applied either horizontally or vertically. The grab bar needs to be fastened to a supporting structure (wall studs) by adequate fasteners unless it is supplied as a part of the bathtub enclosure and the manufacturer's literature is available to confirm the strength of the attachment.

Although not stated, the grab bars should be knurled to ensure adequate grip and should have a diameter between 30 mm and 40 mm. Figure A-7-2-1 shows the location of the grab bars.

A person with a mobility disability might have to sit on the rim of the bathtub if they are unable to get into the bathtub or need to rest while entering or leaving the bathtub. Any track on the rim would make it difficult to grasp the rim and would be very uncomfortable to sit on. The front should be fully open with no doors that could obstruct entry.

3.8.3.17. Bathtubs

- 1) If a bathtub is installed in a *suite of residential occupancy* required to be *barrier-free*, it shall
 - a) be located in a room complying with the dimensions stated in Sentence 3.8.3.12.(1),
 - b) conform to Article 3.7.2.9., and
 - c) be equipped with a hand-held shower head mounted on a vertical slide bar not less than 760 mm long and with the bottom of the slide bar at a height not less than 1 200 mm above the floor, and controls and flexible hose conforming to Article 3.8.3.13.

The bathtubs in the adaptable dwelling units should be installed at the time of construction and comply with Sentence 3.8.3.17.(1). Two dimensions are relevant to the application of Clause 3.8.3.17.(1)(a), by reference to Article 3.7.2.9.: (1) there must be a clear area not less than 1500 mm in diameter in which a wheelchair can turn around, and (2) the minimum dimension between walls is 1 700 mm.

3.8.4.1. Application

- 1) Residential *projects* of 10 or more units funded in whole or in part by the Government of Alberta are required to provide adaptable *dwelling units* which could be made to meet *barrier-free* design principles and shall be provided as follows:
 - a) 1 per 10 *dwelling units*, based on the total number of units in a *project*, and

- b) adaptable *dwelling units* shall conform to the requirements of this Subsection.

A proportion of dwelling units in a project funded in whole or in part by the government of Alberta has to be adaptable for conversion to barrier-free units.

3.8.4.3. Bathrooms

- 1) An adaptable *dwelling unit* shall be provided with a bathroom containing either a *barrier-free* shower or bathtub, in accordance with the following:
- where there is an even number of adaptable *dwelling units* required, 50% of the *dwelling units* shall have a bathroom containing a *barrier-free* shower, and the remaining 50% shall have a bathroom containing a *barrier-free* bathtub, and
 - where there is an odd number of adaptable *dwelling units* required, the number of *dwelling units* with a bathroom containing a *barrier-free* shower shall exceed the number of *dwelling units* with a bathroom containing a *barrier-free* bathtub by 1.

With an even number of adaptable dwelling units, showers must be installed in 50% of the units and bathtubs in the other 50% [Sentence 3.8.4.3.(1)].

Figure A-7-2-2 shows a possible arrangement of fixtures in a barrier-free room that includes bathtub, toilet, and lavatory. A standard bathtub is 1500 mm by 900 mm and the clear floor space in front of the tub has to be at least 900 mm. The 1500 mm diameter clear turning circle and the 900 mm by 1500 mm space can overlap.

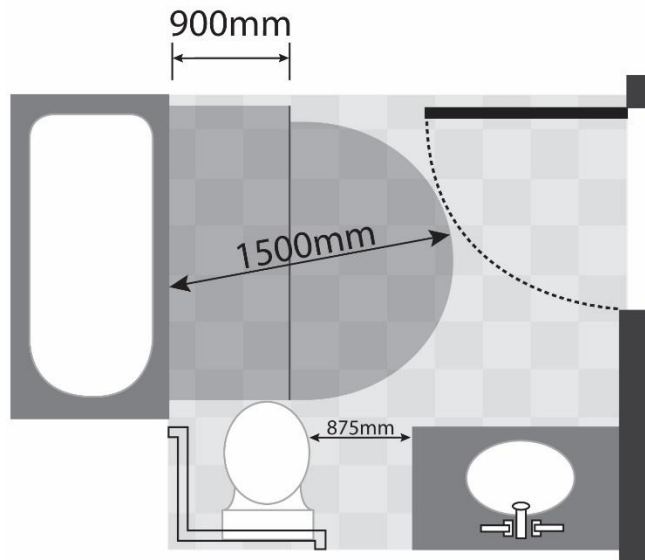


Figure A-7-2-2 Barrier-free room with bathtub, toilet, and lavatory

Figure A-7-2-3 shows a hand-held shower head mounted on a vertical slide bar. Although Article 3.8.3.17 makes reference to Article 3.8.3.13., only two items are relevant: (1) the control of the water flow has to be by means of a pressure-equalizing or a thermostatic-mixing valve controlled by a lever or other device operable with a closed fist, and (2) that the hose length is at least 1800 mm. The location dimensions that refer to a shower seat are not relevant for a bathtub.



Figure A-7-2-3 Hand-held shower head mounted on vertical slide bar

Plumbing regulations made pursuant to the Safety Codes Act apply to the installation of the hand-held shower head to reduce the potential for backflow from the bathtub through the hose into the potable water system.



A-7, SELF-TEST #2

Compare your answers with the answer key in Appendix A.

1. What is the minimum number of grab bars required for a bathtub that is NOT in a barrier-free washroom?
 - a. None
 - b. One
 - c. Two
 - d. Three

MODULE A-8

ASSEMBLY OCCUPANCY REQUIREMENTS

Introduction

It makes no sense to enable a person with one or more disabilities to enter and circulate within a building if that person is unable to make use of facilities and equipment in the building. It is of particular importance to ensure that spaces are set aside in assembly halls for persons who use wheelchairs.

Although current technology does not enable a visually disabled person to see performances, there is equipment that describes the action using voice-over options to these persons. As well, technology can distribute sound to enable persons with partial hearing loss to hear performances.

Learning Objectives

- Describe the requirements for seating in assembly occupancies.
- Describe the requirements for assistive listening devices.

A-8, OBJECTIVE #1

Describe the Requirements for Seating in Assembly Occupancies

Seating in Assembly Occupancies

Assembly occupancies include many types of buildings, including theatres to view performing arts, arenas, and university and college lecture halls. The seating within these buildings can be fixed or non-fixed. For example, large university lecture halls usually have fixed seating, whereas small lecture halls usually have level floors and non-fixed seating.

The slope from front to back of most assembly occupancies requires the use of steps between the rows of seats and makes it difficult to include wheelchair spaces other than at the front or back, depending on the access to the space as a whole.

3.8.2.1. Areas Requiring a Barrier-Free Path of Travel

3) Unless a *barrier-free* path of travel is not required in an *assembly occupancy* by Clause (2)(i), the number of spaces designated for use by persons using wheelchairs within rooms or areas with fixed seats shall conform to Table 3.8.2.1. and be dispersed

- a) in each floor level of seating,
- b) in each price range of seating, and
- c) in each viewing section of seating.

(See Article 3.8.3.6. for the design requirements.)

Table 3.8.2.1.
Designated Wheelchair Spaces
 Forming Part of Sentence 3.8.2.1.(3)

Number of Fixed Seats in Seating Area	Number of Spaces Required for Wheelchairs
2 - 100	2
101 - 200	3
201 - 300	4
301 - 400	5
401 - 500	6
501 - 900	7
901 - 1 300	8
1 301 - 1 700	9
each increment of up to 400 seats in excess of 1 700	one additional space

3.8.3.6. Spaces in Seating Area

1) Spaces designated for use by persons using wheelchairs referred to in Sentence 3.8.2.1.(3) shall be

- a) clear and level, or level with easily removable seating,

- b) not less than 900 mm wide and 1 525 mm long to allow a person using a wheelchair to enter from a side approach and 1 220 mm long where the person using a wheelchair enters from the front or rear of the space,
- c) arranged so that at least 2 designated spaces are side by side,
- d) located adjoining a *barrier-free* path of travel without infringing on egress from any row of seating or any aisle requirements, and
- e) situated, as part of the designated seating plan, to provide a choice of viewing locations and a clear view of the event taking place.

Although spaces for wheelchairs are to be dispersed throughout the seating area [Sentence 3.8.2.1.(3)], at least two designated spaces must be side by side [Clause 3.8.3.6.(1)(c)]. This means that any space with an occupant load less than 101 has the two designated spaces side by side; an occupant load between 100 and 200 has two designated spaces together and one in another part of the room.

Figure A-8-1-1 shows a theatre’s seating plan with the accessible (wheelchair) seating locations. This website also stated, “Yes, wheelchair accessible seating is available, as well as sight and hearing impaired. Please visit our seating chart for designated wheelchair seating.”



Figure A-8-1-1 Theatre-seating plan

The slope of the aisles—up to 8%—and steps on steeper slopes make it problematic to provide a barrier-free path for wheelchairs, but it does allow for ambulatory persons with other disabilities to select seats throughout the seating area.

Many seating plans show wheelchair locations at the ends of rows, but this could conflict with Clause 3.8.3.6.(1)(d) if any part of the wheelchair protrudes into the egress path from the row. A wheelchair placed in front of other rows raises difficulties with sightlines for persons in fixed seats. The back row of seating blocks provides a location where the wheelchair can be moved into position without blocking other egress routes and can provide a clear view.

New facilities have greater flexibility in determining wheelchair spaces. In small- to medium-sized halls, however, the task is to determine the optimal placement of the small number of spaces required by Table 3.8.2.1.

Figure A-8-1-2 shows a schematic seating plan of a theatre with more than one level, and asterisks showing fourteen spaces for “handicapped” seating. As with most theatre facilities, these seating spaces are located along the sides and back.

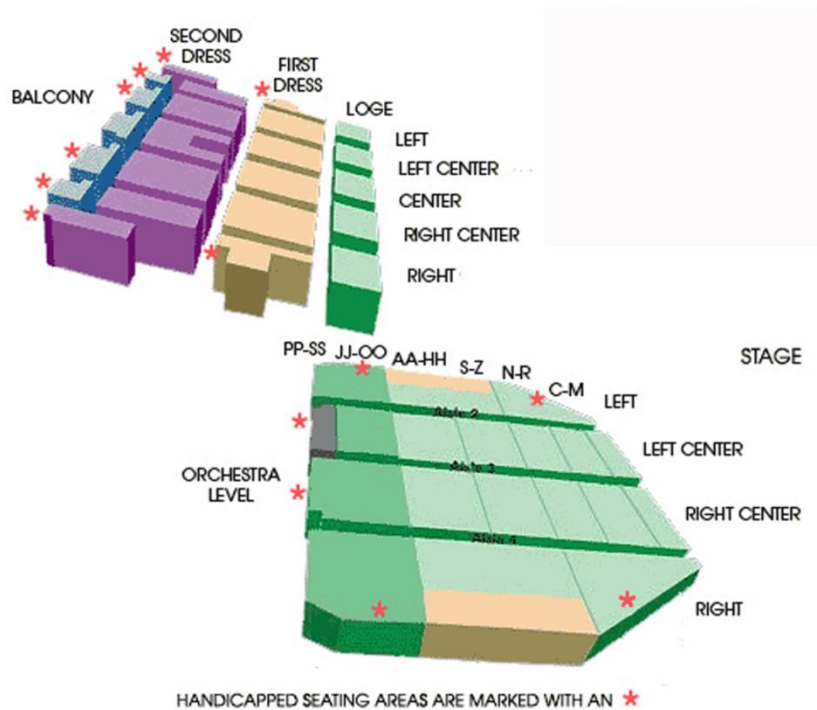


Figure A-8-1-2 Theatre-seating plan with more than one level

Although many theatres and arenas publish seating diagrams on websites, few show the location of the accessible seats as a guide for other designers and building officials. In the absence of this information, you must discuss this subject with the designers, and input from wheelchair users would be useful.



A-8, SELF-TEST #1

Compare your answers with the answer key in Appendix A.

1. Every seat in a theatre must be available to a person using a wheelchair.
 - a. True
 - b. False

2. Suppose a small concert hall has 260 fixed seats. To obtain maximum dispersal of the spaces for wheelchairs, how many barrier-free locations for wheelchairs must be provided?
 - a. One
 - b. Two
 - c. Three
 - d. Four

A-8, OBJECTIVE #2

Describe the Requirements for Assistive Listening Devices

Assistive Listening Devices

3.8.3.7. Assistive Listening Devices

(See Appendix A.)

- 1) Except as permitted by Sentence (2), in a *building of assembly occupancy*, all assembly areas with an area of more than 100 m² shall be equipped with an assistive listening system encompassing the entire seating area.
- 2) If the assistive listening system required by Sentence (1) is an induction loop system, only half the seating area in the room need be encompassed.

A-3.8.3.7. Assistive Listening Devices. Although the Alberta Building Code does not regulate the purchase of appliances, televisions used for public notices should be designed for closed captioning. Where the public relies on information for directions or on public announcements, provisions should be made to broadcast these both audibly and visually. For instance, public announcements at sports events could be displayed visually on the scoreboard; schedules for trains and planes should be available audibly as well as visually.

Wireless sound transmission systems, including FM, infrared or magnetic induction loop systems, improve sound reception for persons with hearing disabilities by providing amplification which can be adjusted by each user while blocking out unwanted background noise. These systems transmit a signal that is picked up by a special receiver available for use by a person with a hearing disability, whether or not a hearing aid is used. Neither system interferes with the listening enjoyment of others.

The transmitter can be jacked into an existing P.A. system amplifier or used independently with microphones. The induction loop system requires users to sit in the area circumscribed by the loop; though installation of the loop is relatively simple, the installer should be knowledgeable about these systems if proper functioning is to be achieved. FM or infrared systems can be designed to broadcast signals which cover the entire room and thus do not restrict seating to any one area. Figures A-3.8.3.7.-A and A-3.8.3.7.-B show the general configuration of FM and infrared systems. Although portable systems (FM in particular) are available, these are best suited to small audiences. Generally, the systems installed in church halls, auditoria, theatres and similar places of assembly are not easily portable, as they are installed in a fixed location by a sound technician and form an integral part of the P.A. system of the room or building.

Hard-wired systems (where a jack is provided at a particular seat) will not meet this requirement unless adequate provisions are made to accommodate persons with hearing aids. In choosing the most appropriate system, a number of factors must be taken into account including cost, installation and maintenance, suitability to the audience, ease of operation and the need for privacy. Information on designers and suppliers of these systems may be obtained from the Canadian Hearing Society.

Unlike the need to set aside specific locations for wheelchairs in an assembly area with fixed seating, assistive listening devices are required in any assembly area over 100 m² regardless of the use of the space. It is assumed that Sentence 3.8.3.7.(1) applies to each room or enclosed space that is used for seating in an

assembly building and not to the building as a whole. If there is a public address system in the building as a whole (for example, a school with an address system that allows messages to be sent to all the rooms from a central location), it is possible to broadcast the same information to be heard by individuals with hearing disabilities.

Although some assembly meeting rooms have a built-in audio system including microphones, amplifiers, and speakers, many other assembly rooms do not have built-in public address systems. For those with built-in audio systems, transmitters can be connected to the public address system so that a broadcast signal can be received throughout the space by either headphones or earphones. Persons with a hearing disability can use the headphones or earphones, allowing them to sit anywhere in the seating area. A large ballroom that can be spilt into smaller individual spaces requires a complex system that can broadcast to the whole space or any individual space.

Induction loop technology is based on electromagnetic transmission. The advantage is that the signal is received directly by hearing aids that are equipped with a T-coil (tele-magnetic pickup coil). A basic induction loop system consists of an amplifier and a loop (a single-stranded hookup wire) that runs around the perimeter of the seating area. When the loop amplifier is fed a signal from a microphone or the public address system, the sound is received wirelessly by the user's hearing aid without the need for an additional receiver as is required by all other technologies. Therefore, the induction loop technology is a popular method for T-coil users for providing assisted listening in stand-alone public facilities. Induction loop receivers can be made available for hearing impaired persons who do not have their own hearing aids or if their own hearing aids do not have the T-coil feature.

An induction loop system needs to cover only half the seating area [Sentence 3.8.3.7.(2)]. This portion of the seating area should include a sufficient variety of seating locations to address the needs of most individuals. For temporary setups, the placement of the loop can varied for each setup.



A-8, SELF-TEST #2

Compare your answers with the answer key in Appendix A.

1. Suppose a flexible-plan meeting room has three full wall dividers to subdivide the room into four compartments, none of which have an area exceeding 95 m^2 . Is an assistive listening system required?
 - a. Yes
 - b. No

2. Which type of listening system is most likely to be used in a large open interior space that is used for occasional meetings if only 40% of the space is used for seating?
 - a. FM system
 - b. Infrared system
 - c. Induction-loop system

MODULE A-9 ANCILLARY FACILITIES

Introduction

To ensure meeting the needs of occupants, a building includes many items. The ABC 2014 does not require many of these items. However, if an owner voluntarily installs them to provide a service to occupants, the items must be accessible and useable by persons with disabilities.

Learning Objectives

- Describe the requirements for counters.
- Describe the requirements for telephones.
- Describe the requirements for drinking fountains.
- Describe the requirements for controls for building services.
- Describe the requirements for directional and informational signs.

A-9, OBJECTIVE #1

Describe the Requirements for Counters

Counters

3.8.3.14. Counters

- 1) Every counter more than 2 m long, at which the public is served, shall have at least one *barrier-free* section not less than 760 mm long centred over a knee space conforming to Sentence (3). (See Appendix A.) (See also A-3.8.2.1. in Appendix A.)
- 2) A *barrier-free* counter surface shall be not more than 865 mm above the floor.
- 3) Except as permitted in Sentence (4), the knee space beneath a *barrier-free* counter intended to be used as a work surface shall be not less than
 - a) 760 mm wide,
 - b) 685 mm high, and
 - c) 485 mm deep.

A-3.8.3.14.(1) Counters with Work Surfaces. It is not intended that all counters be barrier-free, but that sufficient barrier-free counter space be available. Examples of counters that should be barrier-free include check-in counters and those in financial institutions and reception areas as well as any counter at which processing and signing of documents takes place. The provision is not intended to apply to work surfaces in industrial occupancies.

Figure A-9-1-1 shows a counter with a lowered portion that is adapted for wheelchair users. Lowered counters are typical at a nursing station in a hospital or nursing home. The lowered portion should allow for wheelchair users on both sides so an employee who uses a wheelchair is able to work behind the counter.



Figure A-9-1-1 Counter with lowered portion

Source: <http://www.dbh.govt.nz/accessible-reception>

Figure A-9-1-2 shows a similar reception counter in an office. Sufficient leg space must be provided for persons who work seated behind the counter.



Figure A-9-1-2 Counter with lowered portion

Source: <http://www.dbh.govt.nz/accessible-reception>

Figure A-9-1-3 shows a barrier-free section of a counter, including the knee space beneath the counter. The knee space allows for the knees of a seated person as well as for extended footrests and feet. The widths of most counters range from 750 mm to 900 mm. Even a 900 mm counter would not provide sufficient width for 485 mm knee spaces from both sides. Counters wider than 900 mm become too wide to comfortably conduct business. If the knee space were to extend for the full width of the counter, some compromises would be needed if the persons on both sides of the counter were in wheelchairs or sitting down. The required depth of 485 mm does not provide enough knee space if persons on both sides of the counter used wheelchairs.

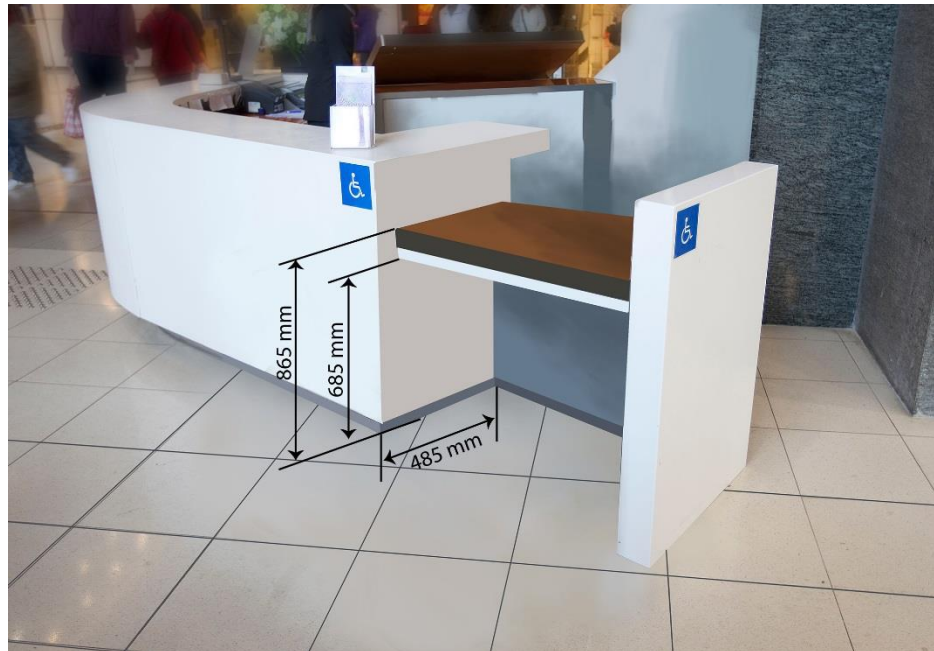


Figure A-9-1-3 Height and depth of barrier-free counter

3.8.3.14. Counters

4) A counter that is used in a cafeteria, or one that performs a similar function whereat movement takes place parallel to the counter, need not provide a knee space underneath it.

Although knee space is not required under a counter referred to in Sentence 3.8.3.14.(4), the upper surface of the counter should be not more than 865 mm above the floor.



A-9, SELF-TEST #1

Compare your answers with the answer key in Appendix A.

1. The top of a 760 mm long portion of a counter with a total length of 1 780 mm is lowered to 900 mm above the floor. Is this acceptable under the ABC 2014?
 - a. Yes
 - b. No

2. A countertop that is 30 mm thick is located above a section of panelling above a knee space opening of a counter in an office. What is the maximum height of panelling acceptable under the ABC 2014?
 - a. 685 mm
 - b. 165 mm
 - c. 150 mm
 - d. 215 mm

A-9, OBJECTIVE #2

Describe the Requirements for Telephones

Telephones

3.8.3.15. Shelves or Counters for Telephones

(See Appendix A.)

- 1) If built-in shelves or counters are provided for public telephones, they shall be level and shall
 - a) be not less than 265 mm deep, and
 - b) have, for each telephone provided, a clear space adjacent to the phone, not less than 265 mm wide, having no obstruction within 265 mm above the surface.
- 2) The top surface of a section of the shelf or counter described in Sentence (1) serving at least one telephone shall be not more than 865 mm above the floor.
- 3) If a wall-hung telephone is provided above a shelf or counter section described in Sentence (2), it shall be located so that the receiver and coin slot are not more than 1 370 mm above the floor.
- 4) At least one telephone with a built-in telecommunication device for the deaf (TTY/TDD) shall be provided where public telephones are installed.

A-3.8.3.15. Telephone Equipment, Shelves or Counters. Generally, pay phone booths are pre-manufactured by a limited number of suppliers. There is often little choice in regard to the dimensions. The intent of the various dimension requirements of Article 3.8.3.15. is to ensure that persons using wheelchairs will be able to conveniently use the pay phones. The current industry standard for the height of the coin slot is 1 370 mm; however 1 200 mm would be the preferred height. The shelf dimensions ensure that there is a convenient usable shelf for all persons that will also accommodate a portable TTY/TDD for persons who are deaf or hard of hearing. A typical portable TTY/TDD is approximately 265 mm by 265 mm. The pay phone can be mounted to the side of the booth to allow for the open area above the shelf.

There is no requirement that a shelf or counter be provided in conjunction with a public telephone. Many public telephones are hung on a wall and some have a telephone directory suspended beneath the telephone.

If the building owner installs a shelf or counter at a public telephone, the dimensions given by Sentences 3.8.3.15.(1) and (2) ensure the shelf or counter height is convenient for use by a person in a wheelchair. Sentence 3.8.3.15.(3) provides directions for installing a wall-hung telephone. If there is no shelf or counter, the telephone height is not regulated by Section 3.8.

Figure A-9-2-1 shows an arrangement of two public telephones with a shelf beneath. The telephone on the left is arranged for convenient use by a person in a wheelchair, whereas the telephone on the right is arranged for a person with a hearing

disability. A portable teletypewriter is shown in use on the right side.

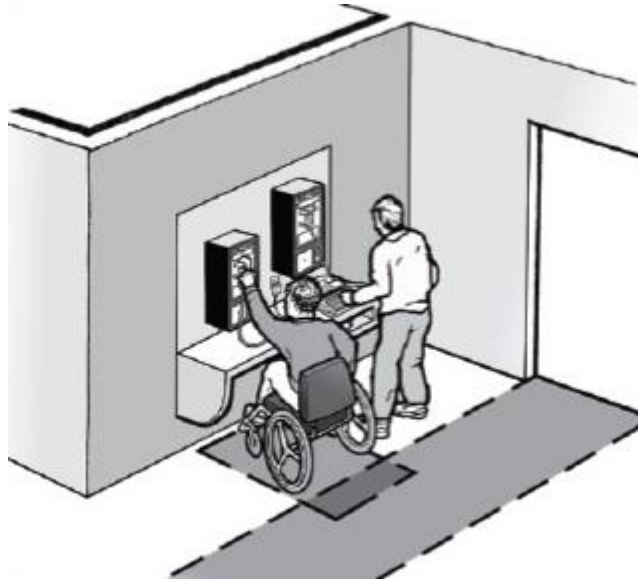


Figure A-9-2-1 Two public telephones with a shelf beneath

Source: U.S. Department of Justice; Civil Rights Division; Disability Rights Section

Figure A-9-2-2 shows a portable teletypewriter (TTY), which is also known as a telecommunications device for the deaf (TDD) or a text telephone (TT). The device (i.e., keyboard and display) is carried by the person who needs to use it. In use, the handset from a phone is placed on the cups of the teletypewriter. After a connection is made, the conversation occurs by typing the messages.



Figure A-9-2-2 Portable teletypewriter (TTY)

Some building owners provide a phone with a built-in teletypewriter (see Figure A-9-2-3). This is more convenient, but vandalism may occur in public places.

Of note is the symbol just above the instrument and also above the phone installation. This is the symbol for a telephone that has an attachment for a TTY or has an attached TTY. The wheelchair symbol on the upper sign indicates that the phone can be used by a person in a wheelchair as well.



Figure A-9-2-3 Phone with built-in teletypewriter

Source: MTA New York

Figure A-9-2-4 shows three signs that are associated with facilities for persons with hearing disabilities. The left sign shows that facilities are available for persons who have hearing disabilities (an arrow would be included to show the direction). The centre sign marks a telephone with either an attached teletypewriter or with the component for attaching a portable teletypewriter. The right sign indicates a telephone with a volume amplifier. This is suitable for persons who are not deaf but who can use a telephone with an adequate degree of amplification.



Figure A-9-2-4 Signs for persons with hearing disabilities



A-9, SELF-TEST #2

Compare your answers with the answer key in Appendix A.

1. Which of the following signs would indicate the presence of a telephone complying with Sentence 3.8.3.15.(4)?



2. A telephone with a built-in telecommunication device for the deaf is required in the entrance lobby of an apartment building.
 - a. True
 - b. False

A-9, OBJECTIVE #3

Describe the Requirements for Drinking Fountains

Drinking Fountains

The ABC 2014 does not require that drinking fountains be installed in a building. Owners or operators of a building make that decision. If the decision is to install a drinking fountain, the needs of all persons in the building must be considered.

3.8.3.16. Drinking Fountains

- 1) If drinking fountains are provided, at least one shall be *barrier-free* and shall
 - a) have a spout located near the front of the unit not more than 915 mm above the floor, and
 - b) be equipped with controls that are easily operable from a wheelchair using one hand with a force of not more than 22 N or be automatically operable.

Although free-standing drinking fountains are encountered in many buildings, most are not easy to use by a person in a wheelchair. The wheelchair and its footrests prevent a close approach to the fountain.

Drinking fountains that cantilever are preferable. They allow a person to get sufficiently close so they can reach the water discharge spout. A disadvantage, however, is that they protrude into the path of travel for a person with a visual disability. Rounded edges (see Figure A-9-3-1) should minimize the potential for injury.

The fountain in Figure A-9-3-1 has its spout set at 915 mm above the floor. The double fountain shown in Figure A-9-3-2 allows a convenient height for a range of users. Taller individuals can use the upper fountain without having to bend down excessively, whereas persons using a wheelchair or very short individuals benefit from the lower setting of the additional fountain.

The large buttons on both fountains can be used by most persons. They operate with a push and do not need any special manipulation.



Figure A-9-3-1 Cantilevered drinking fountain with rounded edges



Figure A-9-3-2 Double fountain with two spouts at different heights

Water fountain locations need to be decided during the planning and design phases of construction. Each water fountain must be connected to the cold water supply and requires a drain line to carry water away. If water fountains are shown on the plans, they should be checked carefully during plan review to determine that they are correctly located and that a barrier-free unit is included.



A-9, SELF-TEST #3

Compare your answers with the answer key in Appendix A.

1. Does the ABC 2014 require the installation of a drinking fountain in the lobby of an arena building for a soccer league?
 - a. Yes
 - b. No

2. If a drinking fountain is not automatically operable, what is the maximum force allowed to operate the fountain?
 - a. 1.3 kN
 - b. 50 N
 - c. 36 N
 - d. 22 N

A-9, OBJECTIVE #4

Describe the Requirements for Controls for Building Services

Controls for Building Services

3.8.1.5. Controls

1) Except as required by Sentence 3.5.2.1.(3) and Article 3.8.3.5. for elevators and platform-equipped passenger-elevating devices, controls for the operation of *building* services or safety devices, including electrical switches, thermostats and intercom switches, that are intended to be operated by the occupant and are located in or adjacent to a *barrier-free* path of travel shall be accessible to a person in a wheelchair, operable with one hand, and mounted between 400 mm and 1 200 mm above the floor.

Figure A-9-4-1 shows two electrical switches and a thermostat. The typical electrical light switch with a small toggle (shown on the left) might be difficult to use by a person with a lack of joint and hand dexterity. The switch shown in the centre has a large plate that requires little dexterity and could be operated with a clenched fist.

Some thermostats for residential use have small levers to adjust the temperature and would be difficult to adjust by a person with little dexterity in their hands and fingers. The type with a large knob (shown on the right) should be operable by most persons.

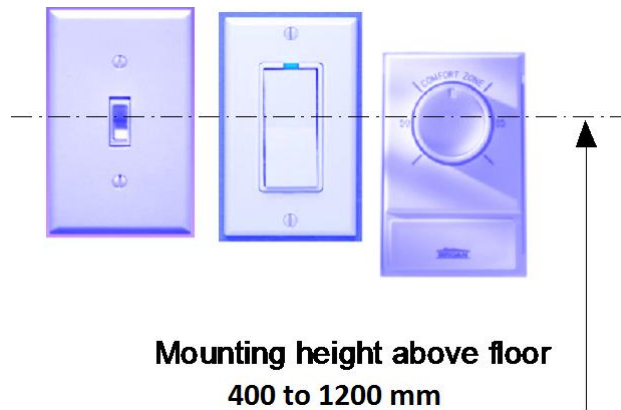


Figure A-9-4-1 Mounting height for electrical switches and thermostat

The 400 mm to 1 200 mm range of mounting height is acceptable for a person in a wheelchair, but the lower value might be difficult for a person standing. The 1 200 mm height is a convenient height for most individuals. Sufficient clear floor

space in front of the control is needed to allow a person in a wheelchair to approach and operate the control.

A thermostat on a baseboard heater would be below the 400 mm height. If the thermostat needs to be adjusted by a person in a wheelchair, an additional thermostat must be installed between 400 mm and 1 200 mm above the floor.

Another control to consider is intercoms. Figure A-9-4-2 shows a simple intercom station. The switch is a large button that can be easily pressed during use.

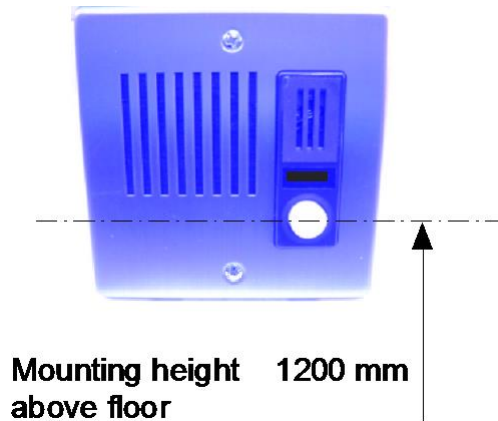


Figure A-9-4-2 Mounting height for intercom station

Many new intercom units for large residential buildings incorporate visual monitoring that includes a camera at the entrance of the building and a screen in the apartment unit. If the intercom with a screen is in an adaptable dwelling unit, the screen in the dwelling unit should be at a height that a person in a wheelchair can view it.



A-9, SELF-TEST #4

Compare your answers with the answer key in Appendix A.

1. The height of a duplex electrical outlet must be not less than 400 mm above the floor.
 - a. True
 - b. False

2. The bottom of a light switch cover plate can be located 1 200 mm above the floor.
 - a. True
 - b. False

A-9, OBJECTIVE #5

Describe the Requirements for Directional and Informational Signs

Directional and Informational Signs

3.8.1.4. Access to Storeys Served by Escalators and Moving Walks

2) The route from the escalator or inclined moving walk to the *barrier-free* path of travel that leads from floor to floor as required by Sentence (1) shall be clearly indicated by appropriate signs.

A single sign or a combination of signs (see Figure A-9-5-1) is needed close to the top and bottom of escalators to direct persons to an elevator. An arrow sign is added to indicate the direction to be taken.



Figure A-9-5-1 Escalator signs to direct persons to an elevator (an arrow would be included to show the direction)

3.8.2.2. Access to Parking Areas and Stall Design

- 4) A parking stall intended for use by persons using a wheelchair or other mobility aid shall
- be designed as a 2.4 m wide parking stall adjacent to a 2.4 m wide access aisle where the access aisle is demarcated to indicate no parking,
 - have a firm, slip-resistant and level surface,
 - be clearly marked and identified by
 - a vertically mounted sign, located near the centre line of each designated stall, with the centre of the sign between 1 600 to 2 500 mm from the finished surface, and
 - the International Symbol of Access painted on the pavement,
 - be located near to or adjoining a *barrier-free* path of travel leading to the nearest *barrier-free* entrance, and
 - be designed so that parked vehicles shall not obstruct access onto an elevated and level surface.

(See Appendix A.)

A sign indicating that a parking stall is reserved for use by persons with physical disabilities should be placed on a post at the back of the stall (see Figure A-9-5-2). A marking on the pavement should not be the only indication of the stall because the pavement can be obscured by snow and ice during the winter and at other times by dirt and debris.



Figure A-9-5-2 Permit Required sign

3.8.3.1. Accessibility Signs

- 1) Signs incorporating the international symbol of accessibility for persons with physical disabilities shall be installed to indicate the location of a *barrier-free* entrance. (See Appendix A.)

Although the international symbol of accessibility, shown in Figure A-9-5-3, has widespread use around the world, it is a copyright symbol of the International Commission on Technology and Accessibility. Also known as the wheelchair symbol, it should be used primarily to indicate access for individuals with limited mobility, including wheelchair users. For example, the symbol can be used to indicate an accessible entrance or bathroom, or that a phone is lowered for wheelchair users.



Figure A-9-5-3 International symbol of accessibility

The international symbol of accessibility is used in combination with other symbols or words to designate that a specific facility is accessible to persons with mobility difficulties. Figure A-9-5-4 shows the symbol being used in combination with words and an arrow to indicate the location of a barrier-free entrance.



Figure A-9-5-4 International symbol of accessibility combined with words and an arrow

3.8.3.1. Accessibility Signs

2) A washroom, shower, elevator or parking space designed to be *barrier-free* shall be identified by a sign consisting of the international symbol of accessibility for persons with physical disabilities and by appropriate graphic or written directions to indicate clearly the type of facility available. (See Appendix A.)

A-3.8.3.1.(1) and (2) Accessibility Signs. The official symbol, shown in Figure A-3.8.3.1.(1) and (2), indicates to persons with physical disabilities that they will have reasonable freedom of movement within a building so signed. The symbol is usually white on a blue background; where these colours do not stand out, the sign can be set on a white background. An arrow can be added to indicate direction or the location of an accessible space or facility.

Signs indicating facilities that are accessible to persons with disabilities have easily recognizable graphics and tend to be white on either a blue or black background. Sometimes other colours are used for the background. Alberta Transportation has used the sign on the far right (see Figure A-9-5-5) to designate the presence of a teletypewriter.



Figure A-9-5-5 Signs indicating accessible facilities

3.8.3.1. Accessibility Signs

3) Facilities and services for persons with a specific disability shall be identified using nationally recognized symbols. (See Appendix A.)

A-3.8.3.1.(3) Accessibility Signs. The location of special facilities or services for persons with a specific disability should be indicated by an internationally recognized sign: facilities for the hard of hearing are identified by a stylized ear; telecommunication devices for the deaf are identified by a stylized keyboard; the location facilities and services for persons with vision impairments or persons who are blind are denoted by a stylized person walking with a cane.

Most individuals may not recognize the special symbols in Figure A-9-5-6, but the symbols are readily recognized by persons with specific disabilities.

The symbol on the left is intended to represent a white cane user and indicate facilities that are available for persons with visual disabilities. To complement the graphic, raised lettering or the graphic itself supplemented by Braille is needed for persons who cannot see the graphic. These signs need to be placed at a level that the person can check the sign with the hand.

The centre sign indicates that a telephone has teletypewriter capabilities.

The sign on the right indicates facilities for persons with hearing disabilities.



Figure A-9-5-6 Signs indicating accessible facilities

3.8.3.1. Accessibility Signs

4) Accessibility signs for universal toilet rooms shall be installed in accordance with Clause (5)(b).

The sign in Figure A-9-5-7 indicates the direction to washrooms for all genders. A universal toilet room must be indicated by the sign in Figure A-9-5-8; the sign can be attached to the door or on a wall beside the doorway if there is no door.



Figure A-9-5-7 Direction to washrooms for both males and females



Figure A-9-5-8 Universal toilet room sign

3.8.3.1. Accessibility Signs

- 5) Where tactile signage is installed, it shall
- be not less than 60 mm high, raised approximately 0.7 mm above the surface,
 - be located not more than 1 200 mm above the finished floor,
 - begin not more than 150 mm from the door or entrance,
 - be contrasting in colour with the surface on which it is applied, and
 - include Braille identification by use of Braille dots not less than 1 mm in relief, located directly below the tactile signage.

Tactile signs are needed to provide information for persons with visual disabilities who are unable to read graphic signs. Sentence 3.8.3.1.(5) gives details about the surface to ensure the information is available by touching with the fingers.

Not all persons with visual disabilities can read Braille, so raised letters or graphics provide information to them. Figure A-9-5-9 shows Braille symbols at the bottom of the sign. The height of the information that has to be at least 60 mm high applies to the text. The graphic should be sized for easy understanding and matched to the remainder of the sign.



Figure A-9-5-9 Tactile sign with Braille

Figure A-9-5-10 shows where the sign should be located.



Figure A-9-5-10 Measurements for tactile sign with Braille

If the sign is located by a door, it should be placed on the latch side of the door.



A-9, SELF-TEST #5

Compare your answers with the answer key in Appendix A.

1. The ABC 2014 clearly states which barrier-free signs need to include raised information and Braille characters.
 - a. True
 - b. False

2. The use of the International Symbol of Accessibility is under the control of which organization?
 - a. Canadian Standards Association
 - b. Standards Council of Canada
 - c. International Commission on Technology and Accessibility
 - d. National Research Council of Canada

MODULE A-10

ADAPTABLE DWELLING UNITS

Introduction

Adaptable dwelling unit requirements incorporate provisions to facilitate a potential future conversion of a dwelling to meet barrier-free accessibility requirements. An adaptable dwelling unit already has many of the features of a barrier-free accessible unit in addition to other adaptable features. All these enable an easy and swift conversion to a fully barrier-free accessible unit.

Learning Objective

- Describe the requirements for adaptable dwelling units.

A-10, OBJECTIVE #1

Describe the Requirements for Adaptable Dwelling Units

Adaptable Dwelling Units

A private owner or developer of a residential building that is not exempt by Clause 3.8.1.1.(1)(b) has to make the building as a whole accessible, but does not have to make special provisions within the individual dwelling units.

3.8.4.1. Application

- 1) Residential *projects* of 10 or more units funded in whole or in part by the Government of Alberta are required to provide adaptable *dwelling units* which could be made to meet *barrier-free* design principles and shall be provided as follows:
 - a) 1 per 10 *dwelling units*, based on the total number of units in a *project*, and
 - b) adaptable *dwelling units* shall conform to the requirements of this Subsection.

If a residential project with 10 or more dwelling units receives funding for any portion of the building's cost from the Government of Alberta, there is an obligation to provide a number of adaptable dwelling units that can be made barrier-free. The number of dwelling units is stipulated in Sentence 3.8.4.1.(1). An adaptable dwelling unit is one that can be easily modified to meet barrier-free principles.

General Accessibility Requirements for Adaptable Dwelling Units

3.8.4.2. General Accessibility

- 1) At least one entrance serving an adaptable *dwelling unit*, including *walkways* leading to the entrance from a public thoroughfare and from on-site parking areas, shall be *barrier-free*. (See also Article 3.8.3.12. for common entrances to *buildings* and Article 3.8.2.2. for parking stalls.)
- 2) A *barrier-free* path of travel shall be provided between the interior living space of the *dwelling unit* and any ancillary space serving it, including the garage, balcony or deck.
- 3) Entryways, kitchens, washrooms, laundry rooms and other areas of a *dwelling unit* shall be designed with an unobstructed turning diameter of not less than 1 500 mm.
- 4) Windows shall
 - a) be equipped with opening devices located not more than 60 mm above the window sill and of a design that does not require tight grasping, pinching or twisting of the wrist as the only means of operation, and
 - b) be located so that the sill is not more than 865 mm above the floor level.

5) Controls for the operation of *building* services or safety devices, including electrical switches, electrical panels, thermostats and intercom switches, shall be mounted between 400 mm and 1 200 mm above the finished floor.

6) Electrical receptacles shall be mounted between 400 mm and 1 200 mm above the finished floor.

7) Every doorway into rooms within the *dwelling unit* shall have a clear width not less than 850 mm when the door is in the open position.

8) A doorway referred to in Sentence (7) or present in the *barrier-free* path of travel referred to in Sentences (1) and (2) shall conform to Sentences 3.8.3.3.(4) and (10).

9) Structural support shall be provided in at least one bedroom and one washroom to accommodate a ceiling track lift.

10) Door and window frames and baseboards shall be contrasting in colour to doors, walls and floors.

The general accessibility provisions that are required for adaptable dwelling units are covered in Article 3.8.4.2. and include:

- at least one barrier-free entrance
- a barrier-free path of travel from the living space and any ancillary spaces, such as a garage, balcony, or deck
- functional areas require an unobstructed turning area of at least 1 500 mm
- windows require accessible opening devices and a lower sill
- building controls and switches must be accessible
- electrical outlets must be accessible
- door clear widths must be not less than 850 mm
- doorways must have a threshold designed to accommodate wheelchair accessibility and have an automatic opener or accessible latches and spaces
- structural support for a ceiling track lift is required in at least one bedroom and washroom
- trim and baseboards must be in a contrasting colour to doors, walls, and floors

Bathroom Requirements for Adaptable Dwelling Units

3.8.4.3. Bathrooms

- 1) An adaptable *dwelling unit* shall be provided with a bathroom containing either a *barrier-free* shower or bathtub, in accordance with the following:
 - a) where there is an even number of adaptable *dwelling units* required, 50% of the *dwelling units* shall have a bathroom containing a *barrier-free* shower, and the remaining 50% shall have a bathroom containing a *barrier-free* bathtub, and
 - b) where there is an odd number of adaptable *dwelling units* required, the number of *dwelling units* with a bathroom containing a *barrier-free* shower shall exceed the number of *dwelling units* with a bathroom containing a *barrier-free* bathtub by 1.

A bathroom in an adaptable unit is required to have a barrier-free shower or bathtub. The number of showers and bathtubs in the building is based on the number of required adaptable dwelling units. If the project requires an even number of adaptable units, half must have barrier-free showers and the other half must have barrier-free bathtubs. If an odd number of adaptable units are required, the extra unit is required to be a barrier-free shower.

3.8.4.3. Bathrooms

- 2) The *barrier-free* bathroom referred to in Sentence (1) shall have the
 - a) shower conform to Clauses 3.8.3.13.(1)(a), (b), (c), (d) and (g) where a shower is provided, and
 - b) bathtub conform to Clauses 3.7.2.9.(1)(a) and (d) and Clause 3.8.3.17.(1)(a) where a bathtub is provided.

A shower or bathtub in an adaptable washroom in an adaptable dwelling unit must comply with most of the requirements for barrier-free accessibility—except for those that can easily be retrofitted afterwards.

3.8.4.3. Bathrooms

- 3) The bathroom referred to in Sentence (1) shall be provided with a lavatory conforming to Clauses 3.8.3.11.(1)(a) to (d).

A lavatory in an adaptable bathroom in an adaptable dwelling unit must comply with the dimensions and pipe-burn protection requirements for a barrier-free lavatory.

3.8.4.3. Bathrooms

- 4) The bathroom referred to in Sentence (1) shall be provided with a water closet conforming to Sentence 3.8.3.9.(1) and Clause 3.8.3.12.(1)(d).

A water closet in an adaptable bathroom in an adaptable dwelling unit must comply with the dimensional, accessible flushing, seat lid, and clearance requirements for a barrier-free water closet.

3.8.4.3. Bathrooms

- 5) The bathroom referred to in Sentence (1) shall be designed to allow for the installation of grab bars conforming to
- a) Sentence 3.8.3.8.(2) to serve the water closet,
 - b) Clause 3.8.3.13.(1)(f) to serve the shower where one is provided, and
 - c) Clause 3.7.2.9.(1)(c) to serve the bathtub where one is provided.

An adaptable bathroom in an adaptable dwelling unit must be designed to accommodate the installation of grab bars for the water closet and shower or bathtub where provided. The design includes appropriate space to position the grab bars and solid blocking for their securement.

Kitchen Requirements for Adaptable Dwelling Units

3.8.4.4. Kitchens

- 1) Every kitchen counter shall have at least one *barrier-free* section not less than 760 mm long centred over a knee space conforming to Sentence (3).
- 2) The top surface of the *barrier-free* section referred to in Sentence (1) shall be not more than 865 mm above the finished floor.
- 3) The knee space beneath the *barrier-free* section referred to in Sentence (1) shall be not less than
- a) 760 mm wide,
 - b) 685 mm high, and
 - c) 485 mm deep.

An adaptable kitchen in an adaptable dwelling unit must have at least one 760 mm long barrier-free section not more than 865 mm above the finished floor and with knee space below to accommodate wheelchair access.

3.8.4.4. Kitchens

- 4) Counters intended for the installation of a kitchen sink or a *cooktop* shall be provided with a means of adjusting their height so that the counter surface is
- a) not less than 710 mm above the finished floor, and
 - b) not more than the height of the adjacent counter surface.
- 5) The kitchen sink or *cooktop* referred to in Sentence (4) shall be provided with a clearance beneath the sink or *cooktop* of not less than
- a) 760 mm wide,
 - b) 685 mm high at a point 205 mm back from the front edge, and
 - c) 230 mm high over the distance from a point 280 mm to a point 430 mm back from the front edge.

The counter for the kitchen sink or cooktop in an adaptable kitchen must be adjustable to a height of not less than 710 mm above the floor and not more than the height of the adjacent counter surface. Clearance must be provided beneath the sink or cooktop to accommodate wheelchair access.

3.8.4.4. Kitchens

6) Overhead kitchen cabinets shall be provided with a means of adjusting their height by not less than 500 mm, provided the minimum clearances for *cooktops* specified in Subsection 9.10.22. are not reduced at the lowered height.

The overhead cabinets in an adaptable kitchen must be adjustable to a height by not less than 500 mm without contravening the minimum required clearances to cooktops.



A-10, SELF-TEST #1

Compare your answers with the answer key in Appendix A.

1. Suppose a residential project consisting of 50 dwelling units is partly funded by the Government of Alberta. What is the minimum number of dwelling units required to be adaptable units?
 - a. Two
 - b. Five
 - c. Ten
 - d. Thirty

2. In an adaptable dwelling unit, which of the following is a requirement for the light switches?
 - a. They must have a motion sensor to turn the lights on automatically.
 - b. They must be located between 400 mm and 1 200 mm above the floor.
 - c. They must be located at least 900 mm above the floor.
 - d. They must have a time delay that shuts them off automatically after 30 minutes.

3. A project has 15 adaptable units. How many barrier-free showers must be installed?
 - a. 15
 - b. 9
 - c. 8
 - d. 7

Introduction

Fire safety for persons with disabilities is particularly difficult to address. The primary egress routes from upper storeys involve stairs, which are not easily accessed and used by persons with mobility difficulties—especially if they need wheelchairs and other assistive devices. Even the use of temporary refuge areas is based on the assumption that firefighters are able to locate a person in a specific refuge area and provide assistance to leave the building.

Sound-emitting devices are used to alert the building occupants to danger and the need to take action. Persons with hearing disabilities are unlikely to hear the signals and will not know they need to evacuate if other persons are not in their vicinity.

Persons with visual disabilities might not know the direction to take in an emergency if they are not familiar with the building layout.

Learning Objectives

- Describe the fire safety provisions related to persons with mobility disabilities.
- Describe the fire safety provisions related to persons with hearing disabilities.

A-11, OBJECTIVE #1

Describe the Fire Safety Provisions Related to Persons with Mobility Disabilities

Fire Safety Provisions: Mobility Disabilities

3.3.1.7. Protection on Floor Areas with a Barrier-Free Path of Travel

- 1) Every *floor area* above or below the *first storey* that is not *sprinklered* throughout and that has a *barrier-free* path of travel shall
 - a) be served by an elevator
 - i) conforming to Sentences 3.2.6.5.(6) to (8),
 - ii) protected against fire in conformance with Clauses 3.2.6.5.(5)(b) or (c), and
 - iii) in a *building* over 3 *storeys* in *building height*, protected against smoke movement so that the hoistway will not contain more than 1% by volume of contaminated air from a fire floor during a period of 2 h after the start of a fire, assuming an outdoor temperature equal to the January design temperature on a 2.5% basis determined in conformance with Subsection 1.1.3.,
 - b) be divided into at least 2 zones by *fire separations* conforming to Sentences (2), (3) and (4) so that
 - i) persons with physical disabilities can be accommodated in each zone, and
 - ii) the travel distance from any point in one zone to a doorway leading to another zone shall be not more than the value for travel distance permitted by Sentence 3.4.2.5.(1) for the *occupancy* classification of the zone,
 - c) in the case of *residential occupancies*, be provided with balconies conforming to Sentence (5), except on the *storey* containing the *barrier-free* entrance required by Article 3.8.1.2.,
 - d) have an exterior *exit* at ground level, or
 - e) have a ramp leading to ground level.(See Appendix A.)
- 2) Except as permitted by Sentence (3), the *fire separations* referred to in Clause (1)(b) shall have a *fire-resistance rating* not less than 1 h.
- 3) The *fire-resistance rating* of the *fire separations* referred to in Clause (1)(b) is permitted to be less than 1 h but not less than 45 min provided the *fire-resistance rating* required by Subsection 3.2.2. is permitted to be less than 1 h for
 - a) the floor assembly above the *floor area*, or
 - b) the floor assembly below the *floor area*, if there is no floor assembly above.
- 4) A door acting as a *closure* in a *fire separation* referred to in Clause (1)(b) shall be weatherstripped or otherwise designed and installed to retard the passage of smoke. (See A-3.3.3.5.(6) in Appendix A.)
- 5) A balcony required by Clause (1)(c) shall
 - a) have direct *barrier-free* access from the *suite* or *floor area*
 - b) be not less than 1.5 m deep from the outside face of the exterior wall to the inside edge of the balcony, and

- c) provide not less than 1.5 m² of balcony space for each nonambulatory occupant and 0.5 m² for each ambulatory occupant.
- 6) In a *barrier-free* path of travel, a downward change in elevation shall be signalled by the use of a 600 mm wide tactile warning strip placed 250 mm from the edge and for the full width of a stair, escalator, moving *walkway*, ramp or platform, and identified using colour and brightness contrast.

A-3.3.1.7.(1) Temporary Refuge for Persons with Disabilities. These measures are intended to provide temporary refuge for persons with disabilities. It is acknowledged, however, that the measures cannot provide absolute safety for all occupants in the fire area. It may, therefore, be necessary to develop special arrangements in the fire safety plan to evacuate persons with disabilities from these areas. Details for a suitable plan are contained in the Alberta Fire Code.

The protected elevator referred to in Clause 3.3.1.7.(1)(a) is intended to be used by firefighters as a means for evacuating persons with disabilities. It is not intended that this elevator be used by persons with disabilities as a means of egress without the assistance of firefighters.

If an estimate is to be made of the number of persons with disabilities in a floor area who can be accommodated in each zone in Clause 3.3.1.7.(1)(b), this estimate may be based on Table 3.8.2.1., which is used to determine the minimum number of spaces to be provided for wheelchair occupants in fixed seating areas. If more precise information is available, it should be used for sizing the zones.

Earlier editions of building codes were primarily concerned with evacuation in the event of fire or structural failure. It was assumed that the owner would provide adequate entrances for everyday functioning of the building even if the fire exits were not designed for entry. As the building codes were augmented to provide barrier-free entry, the provision of barrier-free exits was rarely considered. Eventually it was realized that safety during fire was as relevant to persons with disabilities as it was to other persons. Before sprinklers became mandated in high buildings, the measures for providing safety for persons with physical disabilities were based on provision of refuge areas. It was assumed that firefighters would check the refuge areas and help any occupants to leave the building, even though this might place the firefighters in danger from the fire spreading into their paths of search and rescue. The refuge areas were often located off a stairway landing and could be compromised by fire in the exit stairway.

Review and examination of the methods of providing safety for the occupants of high buildings led to the conclusion that a reliable, quick-acting sprinkler system would provide a level of safety above that of any methods in the older editions of building codes. Accordingly, the ABC 2014 mandates the installation of an automatic sprinkler system in any building over three storeys in building height, in all residential occupancy buildings regulated by Division B, Part 3, and in all care or detention occupancy buildings.

Because the options stated in Clauses 3.3.1.7.(1)(a) to (e) apply only to buildings that are not sprinklered and that include an elevator to serve the storeys above the first storey, there are few buildings that have to conform to these Clauses. In the absence of an elevator, Clause 3.3.1.7.(1)(a) is not relevant. Unless the building is on a steeply sloping site, it would be difficult to apply Clauses 3.3.1.7.(1)(c) and (d). The only realistic approach is to subdivide the floor area into zones. The route from one zone to another zone must be barrier-free and appropriate barrier-free facilities must be provided in each zone.

To provide a safe refuge in an adjacent zone, the zones must be separated from one another by a fire separation with a 45 minute fire-resistance rating. Any door penetrating the fire separation is a closure: it requires a 45 minute fire-protection rating as well as weatherstripping (or otherwise designed) to retard smoke from a fire in one zone passing through the fire separation to the other zone.

Most buildings that are not more than three storeys in building height and do not require an automatic sprinkler system do not require a fire-resistance rating exceeding 45 minutes. The only exception in Part 3 is a large two-storey arena type building classified as Group A, Division 3.

9.5.2.2. Protection on Floor Areas with a Barrier-Free Path of Travel

1) Where a *barrier-free* path of travel required in Article 9.5.2.1. is provided to any *storey* above the *first storey*, the requirements in Article 3.3.1.7. shall apply.

Division B, Part 9, is different in its approach to protecting persons with disabilities on the upper floors of a three-storey building. As in the case of a Part 3 building, installation of an automatic sprinkler system is considered to be an appropriate measure for protecting all persons including those with physical disabilities.

If a sprinkler system is not installed, all floor areas above the first floor with a barrier-free path of travel must comply with the options of Article 3.3.1.7.

If the building is classified as a residential occupancy and is not sprinklered, additional features are required. All storeys, except the first storey, are required to provide balconies to act as an area of refuge. The balconies are an additional item in the ABC 2014 and not an alternative to the options of Clauses 3.3.1.7.(1)(a) to (e).

Figure A-11-1-1 shows a balcony required to serve a residential suite in a storey above or below the first storey.

The doorway leading out from the suite to the balcony should have a clear width not less than 800 mm and swing as shown to provide as much access as possible. A guard must be installed around all edges of the balcony. The length L must be sufficient for the area of the balcony to provide 1.5 m^2 for each wheelchair occupant and 0.5 m^2 for each other occupant of the suite. This requirement assumes two occupants for each bedroom or sleeping space, and that at least one occupant may be nonambulatory.

Access from the floor area or suite should be satisfied by providing a balcony for each residential suite. If there is a basement containing suites below the first storey, instead of a balcony, a patio leading directly to the exterior is an equivalent solution.

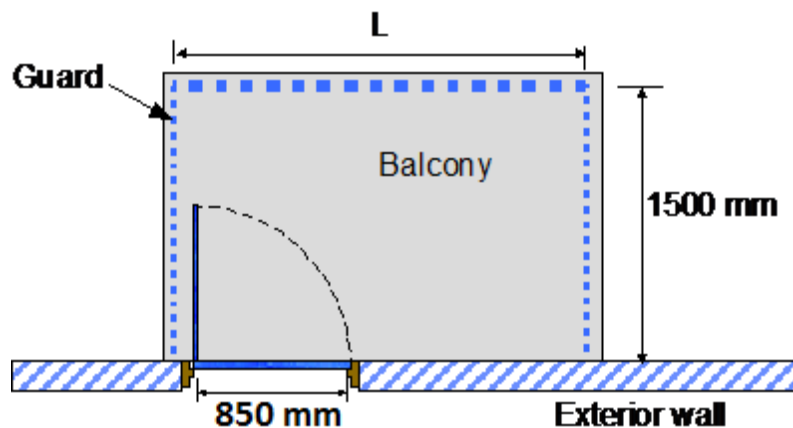


Figure A-11-1-1 Required balcony of a residential suite in a storey above or below the first storey



A-11, SELF-TEST #1

Compare your answers with the answer key in Appendix A.

1. Is a platform-equipped passenger-elevating device an acceptable option for providing fire safety to persons with physical disabilities on the second storey of a building?
 - a. Yes
 - b. No

2. What installation allows omitting balconies for suites on a barrier-free second storey of an apartment building that is three storeys in building height with a 500 m² building area?

3. Fire safety provisions in a Part 9 residential building that is not sprinklered is _____ compared to a Part 3 building.
 - a. More stringent
 - b. Less stringent
 - c. The same

4. What is a realistic area required for a balcony serving a barrier-free three-bedroom dwelling unit?
 - a. 1 m²
 - b. 3 m²
 - c. 4 m²
 - d. 6 m²

A-11, OBJECTIVE #2

Describe the Fire Safety Provisions Related to Persons with Hearing Disabilities

Fire Safety Provisions: Hearing Disabilities

Sentence 3.2.4.20.(1) states that buildings required to have a fire alarm system must also have visual signaling devices installed.

3.2.4.20. Visual Signals

(See Appendix A.)

- 1)** Visual signal devices shall be installed in addition to audible signal devices in *buildings* required to have a fire alarm system and shall conform to CAN/ULC-S526, “Visible Signal Devices for Fire Alarm Systems Including Accessories.”
- 2)** Visual signal devices required by Sentence (1) shall be installed so that the signal from at least one device is visible within a *suite* in which they are installed.

A-3.2.4.20. Visual Alarm Signal. CAN/ULC-S526, “Visible Signal Devices for Fire Alarm Systems, Including Accessories,” published by Underwriters’ Laboratories of Canada, applies to visual signalling units. This document is referenced by the most recent standard for the installation of fire alarm systems and would automatically apply. Current Canadian technology does not integrate visual and audible alarms to have the same temporal pattern. Visual and audible alarms should have as close a temporal pattern as possible but without interference beats that might have a deleterious effect on some persons. Visual signalling devices with the same temporal pattern as required for audible devices are available from some sources and they should become available in Canada. Not all units that comply with the ULC standard will have sufficient power to adequately cover large areas; care will have to be taken to specify units with adequate power when large spaces are being designed.

Visual signal devices must be installed so that the signal light can be seen throughout the portion of the floor area in which they are installed. The visual signal appliance must be installed in close proximity to each required audible signal device. Although two separate devices could be installed, combined units are available (see Figure A-11-2-1).

The Appendix note alludes to the potential for causing seizures in persons with epilepsy in response to certain frequencies of light pulses.



Figure A-11-2-1 Device with combined visual and audible signals

Source: © Edwards Signalling & Security Systems



A-11, SELF-TEST #2

Compare your answers with the answer key in Appendix A.

1. Are visual signalling devices required in a high school that have a few students with hearing impairment enrolled at various times?
 - a. Yes
 - b. No

2. Is the installation of combined visual and audible signalling capabilities in one device sufficient to meet the intent of the ABC 2014 that persons with hearing impairment must be aware of the need to evacuate during an emergency?
 - a. Yes
 - b. No

MODULE A-12

GENERAL SAFETY

Introduction

Safety provisions for all persons, including persons with specific disabilities, are distributed throughout Part 3 and Part 9. This module examines some of those provisions that relate to visual, mobility, and other, less obvious disabilities.

Learning Objectives

- Describe the general safety provisions related to persons with visual disabilities.
- Describe the general safety provisions related to persons with mobility disabilities.
- Describe the general safety provisions related to persons with miscellaneous disabilities.

A-12, OBJECTIVE #1

Describe the General Safety Provisions Related to Persons with Visual Disabilities

General Safety Provisions: Visual Disabilities

3.3.1.7. Protection on Floor Areas with a Barrier-Free Path of Travel

6) In a *barrier-free* path of travel, a downward change in elevation shall be signalled by the use of a 600 mm wide tactile warning strip placed 250 mm from the edge and for the full width of a stair, escalator, moving *walkway*, ramp or platform, and identified using colour and brightness contrast.

Figure A-12-1-1 shows the application of Sentence 3.3.1.7.(6) as it applies to a barrier-free path of travel. The 600 mm wide strip occupies more than half of the landing.

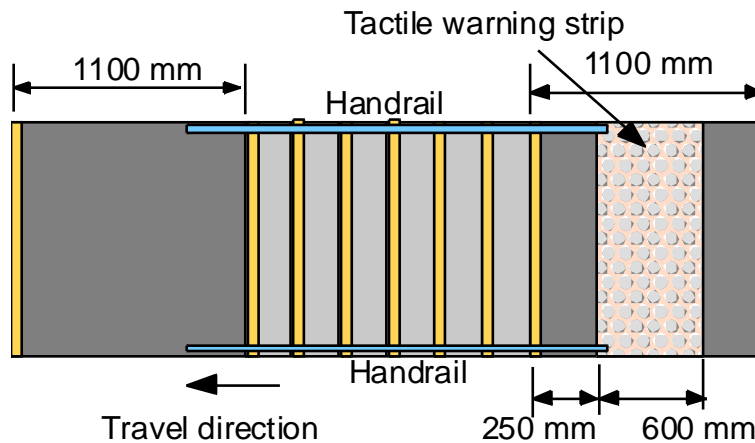


Figure A-12-1-1 Warning strip signals a downward change in elevation (image shows travel direction from right to left)

3.4.6.1. Slip Resistance of Ramps and Stairs

- 1) The surfaces of ramps, and landings and treads
 - a) shall have a finish that is slip resistant, and
 - b) if accessible to the public, shall have either a colour contrast or a distinctive pattern to demarcate the leading edge of the tread and the leading edge of the landing, as well as the beginning and end of a ramp.

Slip-resistant contrast strips are required for ramps, landings, and treads in exit stairs [Clause 3.4.6.1.(1)(b)] and to essentially all stairs and ramps in any building regulated by Division B, Part 3 [Sentence 3.3.1.14.(1)]. Figure A-12-1-2 shows the contrast strip markings on the leading edge of the landing and the treads. Yellow is a colour often used because it stands out in many

lighting conditions. In some buildings, yellow photoluminescent strips are used to increase visibility in low-light conditions.

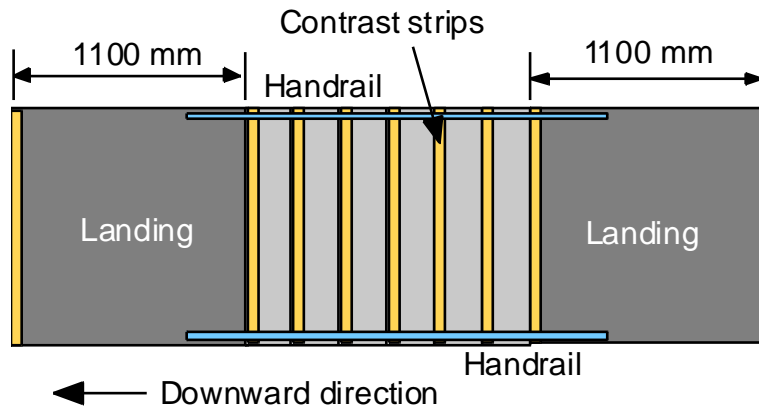


Figure A-12-1-2 Yellow contrast strips to demarcate the leading edge of treads and the leading edge of the landing (image shows travel direction from right to left)

The exclusion of stairs that are not accessible to the public applies generally to stairs in individual dwelling units and suites, in production and storage areas of industrial buildings, and in locations restricted to employees.

Note that there are no marking requirements for stairs in a building regulated by Division B, Part 9, except for a tactile strip in a barrier-free path of travel at the top of a flight of stairs, escalator, moving walkway, ramp, or platform.

3.3.1.9. Corridors

3) Except as permitted by Sentence (4), obstructions located within 1 980 mm of the floor shall not project more than 100 mm horizontally into an *exit* passageway, a *public corridor*, a corridor used by the public or a corridor serving classrooms or patients' sleeping rooms in a manner that would create a hazard for a person with a visual disability traveling adjacent to the walls.

4) The horizontal projection of an obstruction referred to in Sentence (3) is permitted to be more than 100 mm provided the clearance between the obstruction and the floor is less than 680 mm. (See Appendix A.)

A-3.3.1.9.(4) Obstruction in Corridor. The sweep of a cane used by blind or visually impaired persons normally detects obstructions that are within 680 mm of the floor. Any obstruction above this height would not normally be detected and can, therefore, create a hazard if it projects more than 100 mm into the path of travel.

9.9.5.3. Obstructions in Public Corridors

1) Except as permitted in Sentence (2), obstructions located within 1 980 mm of the floor shall not project horizontally more than 100 mm into *exit* passageways, corridors used by the public or *public corridors* in a manner that would create a hazard for visually impaired persons travelling adjacent to walls.

2) The horizontal projection of an obstruction referred to in Sentence (1) is permitted to exceed 100 mm where the obstruction extends to less than 680 mm above the floor. (See A-3.3.1.9.(4) in Appendix A.)

Although Sentences 3.3.1.9.(3) and (4) and Sentences 9.9.5.3 (1) and (2) slightly differ, the intent is the same. This is illustrated by Figures A-12-1-3 and A-12-1-4.

3.3.1.8. Headroom Clearance

1) Except within the *floor area* of a *storage garage*, the minimum headroom clearance in every *access to exit* shall conform to the requirements of Article 3.4.3.4. for *exits*. (See also Sentence 3.3.5.4.(5).)

Sentence 3.3.1.8.(1) states that the minimum headroom clearance in an access to exit in a Part 3 building must conform to Article 3.4.3.4. for exits. Because access to an exit is the path of egress from any part of a floor area, the headroom clearance must be at least 2 100 mm throughout every floor area except for a reduction to 2030 mm at doorways and a further reduction to 1 980 mm for a door closer at a doorway. There are no other exceptions to reduce the 2100 mm minimum headroom clearance. The minimum clear height in an access to exit in a building regulated by Part 9 is 2.1 m and applies in corridors.

The clear height in an access to exit allows a person with a visual disability to move about in the building without having his or her head contact an overhead obstruction.

In Figures A-12-1-3 and A-12-1-4, note the following: (1) an item projecting 100 mm from the side wall; (2) an item projecting more than 100 mm but extending down to at less than 680 mm above the floor; and (3) a doorway with a door closer extending down to 1 980 mm above the floor. A door closer is normally on the hinge side of the door and does not extend the full width of the doorway.

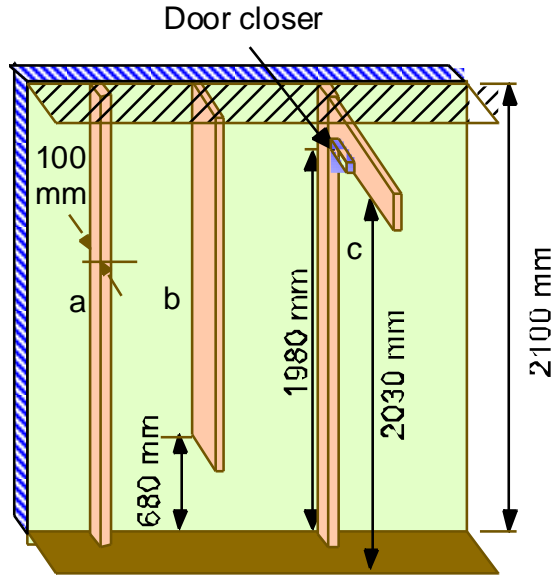


Figure A-12-1-3 Measurements of projecting items

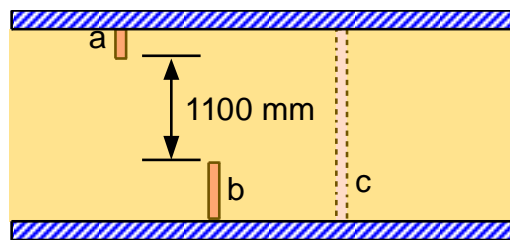


Figure A-12-1-4 Measurements of projecting items

3.4.6.5. Handrails

8) Except where interrupted by doorways or newels at changes in direction, at least one handrail shall be continuous throughout the length of a stairway or ramp, including landings. (See Appendix A.)

A-3.4.6.5.(8) Continuity of Handrail. Blind or visually-impaired persons rely on handrails to guide them on stairways. A continuous handrail will assist them in negotiating stairs at changes in direction. The extended handrail is useful to persons with physical disabilities to steady themselves before using the stairs. Handrails should, however, return to the wall, floor or post, so as not to constitute a hazard to blind or visually-impaired persons.

3.4.6.5. Handrails

9) Handrails shall be terminated in a manner which will not obstruct pedestrian travel or create a hazard. (See A-3.4.6.5.(8) in Appendix A.)

10) At least one handrail at the side of a stairway or ramp shall extend horizontally not less than 300 mm beyond the top and bottom of the stairway or ramp. (See A-3.4.6.5.(8) in Appendix A.)

Extensions are required at the top and bottom of a handrail beside a ramp (see Figure A-12-1-5). The same extensions are required for a handrail serving a stairway. The handrail termination shown is acceptable; however, other designs also meet the requirement. Some designs return the handrail horizontally to an adjacent wall whereas others return the end of the handrail downward to the floor.

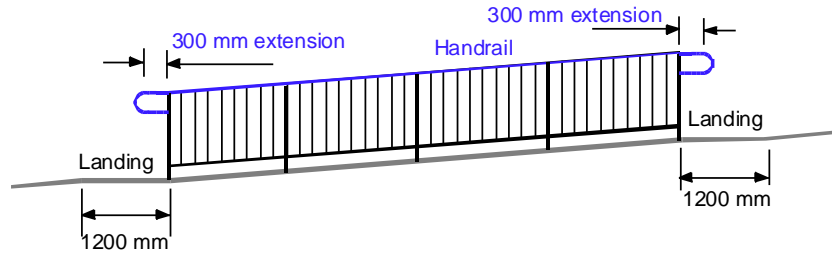


Figure A-12-1-5 Measurements of required extensions at the top and bottom of a handrail beside a ramp

Although Appendix note A-3.4.6.5.(8) refers to blind or visually impaired persons, many persons use the handrail to steady themselves and prevent a fall and serious injury. A discontinuity at a newel forces an individual to release his or her grip on the handrail and increases the potential for a misstep, especially where there is a change in direction.

Figure A-12-1-6 shows a handrail extension, marking strips on the leading edge of the treads, and a tactile surface on the landing. All these elements help persons who are visually impaired to use stairs safely.

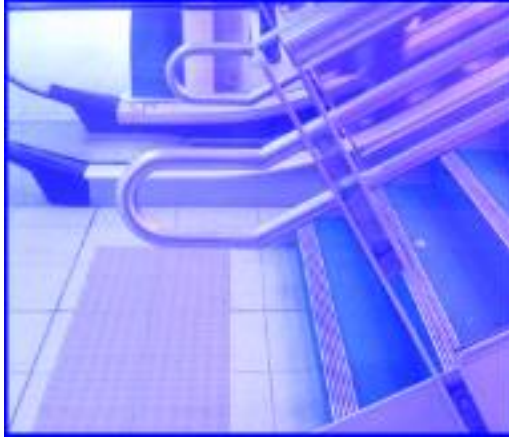


Figure A-12-1-6 Handrail extension, marking strips on leading edge of treads, and tactile surface on landing to aid visually impaired persons

3.4.6.19. Floor Numbering

- 1) Arabic numerals indicating the assigned floor number shall
 - a) be mounted permanently on the stair side of the wall at the latch side of doors to *exit* stair shafts,
 - b) be not less than 60 mm high, raised approximately 0.7 mm above the surface,
 - c) be located 1 350 mm from the finished floor and beginning not more than 150 mm from the door, and
 - d) be contrasting in colour with the surface to which they are applied (see Appendix A).

Figure A-12-1-7 shows the details of the number sign that must be placed on the stair side of a doorway exiting the stairway. The number sign enables persons using the stairway to determine the storey level that has been reached. The number is raised to allow a person to detect the value of the number through touch. Braille symbols should be included on the sign.

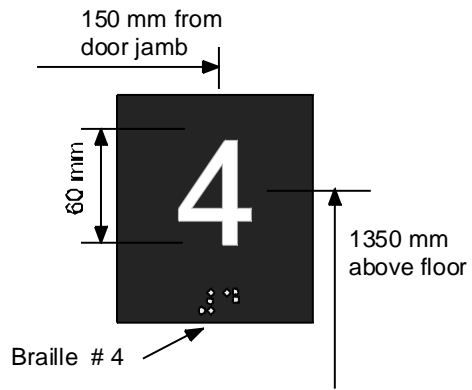


Figure A-12-1-7 Floor-numbering sign to exit stairways



A-12, SELF-TEST #1

Compare your answers with the answer key in Appendix A.

1. An obstruction is permitted to project 250 mm into a public corridor 1100 mm wide provided it is less than 680 mm above the floor.
 - a. True
 - b. False

A-12, OBJECTIVE #2

Describe the General Safety Provisions Related to Persons with Mobility Disabilities

General Safety Provisions: Mobility Disabilities

Regardless of Section 3.8. requirements for barrier-free paths of travel, certain minimum widths are required for egress facilities that may or may not be part of a barrier-free path of travel. These values apply even if the facility is exempt from Section 3.8. requirements.

If the facility is in a barrier-free path of travel, the designer and the safety codes officer should check Section 3.8. to determine if there are more restrictive values.

3.3.1.13. Doors and Door Hardware

- 1) Except as required by Article 3.3.3.4., a door that opens into or is located within a *public corridor* or other facility that provides *access to exit* from a *suite* shall
 - a) provide a clear opening of not less than 800 mm if there is only one door leaf,
 - b) in a doorway with multiple leaves, have the active leaf providing a clear opening of not less than 800 mm, and,
 - c) not open onto a step.

The minimum 800 mm width for all doors in an egress route from a suite of any occupancy type enables wheelchairs to move into and out of the suite. The absence of a step eliminates a potential obstacle.

3.3.1.23. Obstructions

- 1) No obstruction shall be permitted in any *occupancy* that would restrict the width of a normal *means of egress* from any part of a *floor area* to less than 750 mm unless an alternative *means of egress* is provided adjacent to, accessible from, and plainly visible from the obstructed *means of egress*. (See Appendix A.)

A-3.3.1.23.(1) Obstructions in Means of Egress. Obstructions including posts, counters or turnstiles should not be located in a manner that would restrict the width of a normal means of egress from a floor area or part of a floor area unless an alternative means of egress is provided adjacent to and plainly visible from the restricted means of egress.

9.9.5.5. Obstructions in Means of Egress

- 1) No obstructions such as posts or turnstiles shall be placed so as to restrict the width of a required *means of egress* from a *floor area* or part of a *floor area* to less

than 750 mm unless an alternate unobstructed *means of egress* is provided adjacent to and plainly visible from the restricted egress.

2) Except as provided in Sentence (3), no obstructions, such as counter gates, that do not meet the requirements for *exit* doors, shall be placed in a required *means of egress* from a *floor area* or part of a *floor area* unless an alternate unobstructed *means of egress* is provided adjacent to and plainly visible from the restricted egress.

9.9.5.4. Obstructions in Exits

1) Except as permitted in Subsection 9.9.6. and Article 9.8.7.6., no fixture, turnstile or construction shall project within the required width of an *exit*.

Article 3.3.1.23. and Sentences 9.9.5.5.(1) and (2), and 9.9.5.4.(1) address a problem in which control devices would prevent a wheelchair from access and egress. Turnstiles, posts, and other restrictions are often installed for security reasons and narrow an egress route for surveillance purposes. Many stores install stock control tags that sound an alarm if a person moves past the control post with a marked item. If the gap between the posts is less than 750 mm, another egress route must be provided. Similarly, turnstiles do not allow a wheelchair to pass through so an alternative egress route is needed. If the alternative route is not clearly visible, directions signs need to be installed.

3.3.1.14. Ramps and Stairways

1) Except as permitted by Sentence (2), Article 3.3.4.7. and Subsection 3.3.2., ramps and stairways that do not serve as *exits* shall conform to the dimensional, *guard*, handrail and slip-resistance requirements for *exit* ramps and stairways stated in Sentence 3.4.3.2.(8) and Articles 3.4.3.4., and 3.4.6.1. to 3.4.6.9.

Although Sentence 3.3.1.14.(1) extends the relevant requirements of Section 3.4. to all ramps and stairways, some dimensions are inappropriate for a barrier-free path of travel and would be overridden by values in Section 3.8. An example is the slope of ramps.

9.8.5.1. Application

1) This Subsection applies to pedestrian ramps, except ramps in a *barrier-free* path of travel.

2) Ramps in a *barrier-free* path of travel shall conform to the requirements in Article 3.8.3.4.

9.8.6.1. Application

1) This Subsection applies to landings, except landings for ramps in a *barrier-free* path of travel.

2) Landings for ramps in a *barrier-free* path of travel shall conform to the requirements in Article 3.8.3.4.

Sentences 9.8.5.1.(2) and 9.8.6.1.(2) make it quite clear that ramps and landings in a barrier-free path of travel must comply with Article 3.8.3.4.

3.4.3.3. Exit Width Reduction

- 1) Except as permitted by Sentences (2) and (4), no fixture, turnstile or construction shall project into or be fixed within the required width of an *exit*.
- 2) Swinging doors in their swing shall not reduce the required width of *exit* stairs or landings to less than 750 mm or reduce the width of an *exit* passageway to less than the minimum required width.
- 4) Handrails and construction below handrails are permitted to project into the required width of *means of egress* but the projections shall be not more than 100 mm on each side of the required width.

Sentence 3.4.3.3.(1), by reference to Sentence 3.4.3.3.(2) and (4), allows certain items to intrude into the width of an exit route. The application of Sentence 3.8.3.3.(2) to exit stairs and landings has little impact on the movement of wheelchairs.

Sentence 3.4.3.3.(4) allows construction below handrails to intrude by 100 mm on each side of the exit route. For ambulatory persons, this is reasonable because the maximum width of most persons is at the shoulders and the width below the waist is substantially less.

By contrast, the width of a wheelchair is usually below normal waist height and construction below handrails would impact the use of hands and arms to propel a wheelchair. Section 3.8. allows the handrails to intrude but does not permit construction below the handrail to intrude. Wall brackets supporting the handrail are usually below the handrail and considered part of the handrail. Accordingly, the permission for construction below the handrail to intrude into the means of egress width applies only to handrails in or adjacent to a barrier-free path of travel.

If a ramp is not a part of a barrier-free path of travel, the landing dimensions in Article 3.4.6.4. apply. However, if the landing is part of a barrier-free path of travel, the landing must be larger to manoeuvre a wheelchair and must provide the 600 mm clear space on the latch side of a door opening towards the landing.

3.4.6.5. Handrails

- 2) If the required width of a ramp or flight of stairs is more than 2 200 mm, one or more intermediate handrails continuous between landings shall be provided, and located so that there will be not more than 1 650 mm between handrails.
- 13) A ramp shall have handrails on both sides.

If a ramp's width requires intermediate handrails, the spacing between handrails must be sufficient to maintain the minimum

width for a barrier-free path of travel. Although the handrails at the sides should be continuous for the full length of the ramp including landings, the intermediate handrails are not required to be continuous over the landings.

3.4.6.10. Horizontal Exits

1) The *floor area* on each side of a *horizontal exit* shall be sufficient to accommodate the occupants of both *floor areas*, allowing not less than 0.5 m² of clear floor space per person, except that 1.5 m² shall be provided for each person in a wheelchair and 2.5 m² for each bedridden patient.

Excluding hospitals and nursing homes, there should be no need to make provision for bedridden patients. In other occupancies, the number of wheelchairs could be based on the numbers specified in Table 3.8.2.1. for seating spaces in assembly occupancies unless more accurate information is available.

In hospitals and nursing homes, many patients are moved in wheelchairs or in beds or gurneys; previous experience of similar buildings can provide a reasonable estimate.



A-12, SELF-TEST #2

Compare your answers with the answer key in Appendix A.

1. A turnstile is permitted to control entry to and exit from a sports arena provided it is not in a barrier-free path of travel.
 - a. True
 - b. False

2. What is the minimum unobstructed width in a normal access to exit?
 - a. 1 200 mm
 - b. 1 100 mm
 - c. 750 mm
 - d. 650 mm

A-12, OBJECTIVE #3

Describe the General Safety Provisions Related to Persons with Miscellaneous Disabilities

General Safety Provisions: Miscellaneous Disabilities

Many provisions in Section 3.8. benefit persons with different disabilities as well as a specific disability. However, sometimes a variety of disabilities are implied but not specifically addressed. For example, Sentence 3.8.1.1.(2) mentions developmental disabilities but Section 3.8. has no provisions that directly relate to these disabilities. The needs of these individuals are best addressed during development and application of a fire safety plan under the Alberta Fire Code 2014.

Persons who have no sense of smell (anosmia) are unable to detect the presence of smoke during the early phase of fire development. Alarm signals from smoke alarms or from fire alarm system sounds should alert them to the need for action and evacuation.

Very short persons may be unable to reach the controls even at the height specified in Sentence 3.8.1.5.(1). Unusually tall persons would have to duck at doorways and in parts of a building with the ceiling at the minimum 2100 mm headroom clearance. Although not considered to be disabilities, these height variations may make it difficult to move easily throughout a building.

3.3.1.13. Doors and Door Hardware

2) A door in an *access to exit* shall be readily openable in travelling to an *exit* without requiring keys, special devices or specialized knowledge of the door opening mechanism, except that this requirement does not apply to a door serving a *contained use area*, or an *impeded egress zone*, provided the locking devices conform to Sentence (6).

3) Except as permitted by Sentence (4), door release hardware shall be operable by one hand and the door shall be openable with not more than one releasing operation. (See also Sentence 3.8.3.3.(3).)

4) An egress door from an individual *dwelling unit* or from a *suite of residential occupancy* is permitted to be provided with additional devices that require a releasing operation additional to the main door release hardware, provided the devices are readily operable from the inside without the use of keys, special devices or specialized knowledge. (See Appendix A.)

5) Door release hardware shall be installed not more than 1 200 mm above the finished floor.

A-3.3.1.13.(4) Door Hardware. The permission to have additional door releasing devices is intended to allow the use of a security chain, night latch or dead bolt to supplement the normal door latching device. These are permitted for dwelling units and locations where guests in a hotel or motel require additional security. The height of these items is also governed by the maximum height stipulated in Sentence 3.3.1.13.(5) to ensure that they can be operated by persons with physical disabilities. This additional hardware should not require appreciable dexterity by the user and the general requirements on the ability to operate the device without the use of keys, special tools or specialized knowledge still apply.

Stiffness and swelling of the joints, especially those of the hands, make it difficult to grasp and manipulate controls or to grasp small objects. This lack of dexterity is addressed in acceptable types of door hardware and of handrails. Sentences 3.3.1.13.(2) to (5) benefit individuals with arthritis and other joint mobility restrictions.

Even if a key were left in the lock, it would be difficult to grasp and turn. By requiring that not more than one hand is needed to release the door hardware, a person using a cane or a walker to steady themselves would be able to open the door while still holding on to the cane or the walker.

Appendix note A-3.3.1.13.(4) explains the intent of Sentence 3.3.1.13.(4) with regard to additional hardware on a door. This additional hardware is restricted to an egress door leading directly from a dwelling unit or suite and should not be on any other doors in the egress route.

The 1 200 mm height restriction for the door release hardware applies to active door leaves. It is not intended to apply to non-active leaves in doorways that have multiple door leaves. Although no minimum height is specified for door hardware, a height of 800 mm (appreciably below the lowest 865 mm value permitted for handrails) would be a realistic minimum. This suggested range of 800 mm to 1 200 mm gives room for the principal and additional hardware devices, in the case of dwelling units and residential suites.

3.4.6.1. Slip Resistance of Ramps and Stairs

- 1) The surfaces of ramps, and landings and treads
 - a) shall have a finish that is slip resistant, and
 - b) if accessible to the public, shall have either a colour contrast or a distinctive pattern to demarcate the leading edge of the tread and the leading edge of the landing, as well as the beginning and end of a ramp.

Slip-resistant surfaces of ramps, landings, and stair treads benefit all users. These surfaces reduce the potential for slips and falls

that could contribute to injuries resulting in disabilities. Slip-resistant surfaces also are of value to persons using mobility assistive devices by giving them sufficient traction to move the devices. If the surfaces were excessively slippery, it would be difficult to control the wheels of wheelchairs and prevent them from slipping.

3.4.6.5. Handrails

- 3) Handrails shall be continuously graspable along their entire length and shall have
- a) a circular cross-section with an outside diameter not less than 30 mm and not more than 43 mm, or
 - b) a non-circular cross-section with a graspable portion that has a perimeter not less than 100 mm and not more than 125 mm and whose largest cross-sectional dimension is not more than 45 mm.

Handrail size limits prevent handrails from being too small and too large. Persons with limited ability to clench a fist could not close a hand around the handrail that is too small. Handrails that are too large prevent persons from getting a firm hold on the handrail.



A-12, SELF-TEST #3

Compare your answers with the answer key in Appendix A.

1. Suppose a handrail has been trimmed from a 2 x 2 piece of lumber. The final shape is a square with sides of 30 mm. Is this an acceptable handrail?
 - a. Yes
 - b. No

2. Is a door chain that is set 1 350 mm above the floor permitted on a door leading out of a dwelling unit?
 - a. Yes
 - b. No



Appendices

APPENDIX A—SELF-TEST ANSWER KEYS

APPENDIX A SELF-TEST ANSWER KEYS

Band A

Module A-1, Self-Test #1

1. b.
2. c.
3. a.
4. b.

Module A-1, Self-Test #2

1. a.
2. b.
3. b.

Module A-2, Self-Test #1

1. b.
2. b.
3. b.
4. c.

Module A-2, Self-Test #2

1. b.
2. b.
3. b.

Module A-2, Self-Test #3

1. a. audible
b. visual
2. b.
3. b.

4. b.
5. b.
6. a.

Module A-3, Self-Test #1

1. b.
2. b.

Module A-3, Self-Test #2

1. b.
2. b.

Module A-3, Self-Test #3

1. b.
2. b. The reference to CSA B44 Appendix E occurs in the ABC 2014.
3. b. The height range for the hall buttons is 890 mm to 1 220 mm.

Module A-4, Self-Test #1

1. b.
2. b.
3. b.
4. a.
5. b.

Module A-4, Self-Test #2

1. a.
2. a.

Module A-4, Self-Test #3

1. b.

2. b.

Module A-4, Self-Test #4

1. b.
2. b.
3. b.
4. c.

Module A-5, Self-Test #1

1. b.
2. A lock on the door.
3. b.
4. A shelf.
5. A wheelchair can back in beside the water closet.

Module A-6, Self-Test #1

1. c.

Module A-6, Self-Test #2

1. b.
2. a.

Module A-7, Self-Test #1

1. c.
2. a.

Module A-7, Self-Test #2

1. c.

Module A-8, Self-Test #1

1. b.

2. d. Four spaces required in accordance with Table 3.8.2.1. These must be in three different locations to satisfy Clause 3.8.3.6.(1)(c).

Module A-8, Self-Test #2

1. a.
2. c.

Module A-9, Self-Test #1

1. a.
2. c.

Module A-9, Self-Test #2

1. b.
2. b.

Module A-9, Self-Test #3

1. b.
2. d.

Module A-9, Self-Test #4

1. b. Duplex outlets are not regulated by Section 3.8.
2. b. Measurement is to the operating element on the switch.

Module A-9, Self-Test #5

1. b. There is no specific requirement for tactile signs even though there are specifications for some signs.
2. c.

Module A-10, Self-Test #1

1. b.
2. b.
3. c.

Module A-11, Self-Test #1

1. b.
2. A sprinkler system.
3. a. Balconies are an additional requirement.
4. c. 1 @ 1.5 m², 5 @ 0.5 m².

Module A-11, Self-Test #2

1. b. There have to be significant numbers gathered in a location that would not have hearing persons at the same time.
2. a.

Module A-12, Self-Test #1

1. b. An obstruction must not reduce the minimum required width of a public corridor.

Module A-12, Self-Test #2

1. b. A turnstile is not allowed in an exit route.
2. c.

Module A-12, Self-Test #3

1. a.
2. b.