

Section 9.8. Stairs, Ramps, Handrails and Guards

9.8.1. Application

9.8.1.1. General

- 1) This Section applies to the design and construction of interior and exterior stairs, steps, ramps, handrails and *guards*.

9.8.1.2. <Stairs, Ramps, Landings, Handrails and Guards in Garages

- 1) Where stairs, ramps, landings, handrails or *guards* are installed in garages that serve a single *dwelling unit*, the garage shall be considered to be part of the *dwelling unit* and the requirements for stairs, ramps, landings, handrails and *guards* within *dwelling units* shall apply.>

9.8.1.3. Exit Stairs, Ramps and Landings

- 1) Where a stair, ramp or landing forms part of an *exit*, the appropriate requirements in Sections 9.9. and 9.10. shall also apply.

9.8.1.4. Escalators and Moving Walkways

- 1) Escalators and moving *walkways* shall conform to the appropriate requirements in Part 3.

9.8.2. Stair Dimensions

9.8.2.1. Stair Width

- 1) <Except as provided in Sentence (2),> required *exit* stairs and public stairs <-serving *buildings* of *residential occupancy*> shall have a width of not less than 900 mm.
- 2) <Exit stairs serving a single *dwelling unit* shall have a width of not less than 860 mm.
- 3) Required *exit* stairs and public stairs serving *buildings* of other than *residential occupancy* shall have a width of not less than the greater of
 - a) 900 mm, or
 - b) 8 mm per person based on the *occupant load* limits specified in Table 3.1.17.1.>
- 4) At least one stair between each floor level within a *dwelling unit*, and exterior stairs serving a single *dwelling unit* except required *exit* stairs, shall have a width of not less than 860 mm.

9.8.2.2. Height over Stairs

- 1) The clear height over stairs shall be measured vertically<, over the clear width of the stair, from a straight line tangent to the tread and landing nosings to the lowest point above. (See A-3.4.3.4. in Appendix A.)>
- 2) <Except as permitted by Sentences (3) and (4), the clear height over stairs shall not be less than 2 050 mm.
- 3) The clear height over stairs serving a single *dwelling unit* shall not be less than 1 950 mm.
- 4) Reserved.>

9.8.3. Stair Configurations

9.8.3.1. Straight and Curved Runs in Stairs

- 1) Except as provided in Sentence (2), stairs shall consist of
 - a) straight-run flights, or
 - b) curved flights.
- 2) Stairs within *dwelling units* shall consist of
 - a) straight-run flights,
 - b) curved flights, or
 - c) straight runs with winders.
- 3) Only one set of winders described in Sentence (2) shall be permitted between floor levels.

9.8.3.2. Minimum Number of Risers

- 1) Except for stairs within a *dwelling unit*, at least 3 risers shall be provided in interior flights.

9.8.3.3. Maximum Height of Stairs

- 1) The vertical height of any flight of stairs shall not exceed 3.7 m.

9.8.4. Step Dimensions

(See Appendix A.)

9.8.4.1. Dimensions for Risers

(See A-9.8.4. in Appendix A.)

1) <Except for stairs serving areas only used as *service rooms* or *service spaces*,> the rise, <which is measured as the vertical nosing-to-nosing distance,> shall comply with Table 9.8.4.1.

Table 9.8.4.1.
Rise for Rectangular Treads
Forming part of Sentence 9.8.4.1.(1)

Stair Type	All Steps	
	Rise, mm	
	Max.	Min.
Private ⁽¹⁾	200	125
Public ⁽²⁾	<180>	125

Notes to Table 9.8.4.1.:

- (1) <Private stairs are exterior and interior stairs that serve single *dwelling units* or that serve garages that serve single *dwelling units*>
 (2) Public stairs are all stairs not described as service stairs or private stairs.

9.8.4.2. Dimensions for Rectangular Treads

(See A-9.8.4. in Appendix A.)

1) Except for stairs serving areas only used as *service rooms* or *service spaces*, the run<, which is measured as the horizontal nosing-to-nosing distance,> and the tread depth of rectangular treads shall comply with Table 9.8.4.2.

Table 9.8.4.2.
Run and Tread Depth for Rectangular Treads
Forming part of Sentence 9.8.4.2.(1)

Stair Type	Rectangular Treads			
	Run, mm		Tread Depth, mm	
	Max.	Min.	Max.	Min.
Private ⁽¹⁾	355	210	355	235
Public ⁽²⁾	<No limit>	<280>	<No limit>	<280>

Notes to Table 9.8.4.2.:

- (1) <Private stairs are exterior and interior stairs that serve single *dwelling units* or that serve garages that serve single *dwelling units*.>
 (2) Public stairs are all stairs not described as service stairs or private stairs.

2) The depth of a rectangular tread shall be not less than its run and not more than its run plus 25 mm.

9.8.4.3. Dimensions for Angled Treads

(See A-9.8.4. in Appendix A.)

- 1) Angled treads in required *exit* stairs shall conform to the requirements in Article 3.4.6.9.
 2) Except as provided in Article 9.8.4.5., angled treads in other than required *exit* stairs shall have an average run, <which is measured as the horizontal nosing-to-nosing distance,> of not less than 200 mm and a minimum run of 150 mm.
 3) The depth of an angled tread shall be not less than its run<, measured as the horizontal nosing-to-nosing distance,> at any point and not more than its run at any point plus 25 mm.

9.8.4.4. Uniformity and Tolerances for Risers and Treads

- 1) Except as provided in Sentence (2), risers shall be of uniform height in any one flight, with a maximum tolerance of
 a) <5 mm> between adjacent treads or landings, and
 b) <10 mm> between the tallest and shortest risers in a flight.

- 2) Except for required *exit* stairs, where the top or bottom riser in a stair adjoins a sloping finished walking surface, such as a garage floor, driveway or sidewalk, the height of the riser across the stair shall vary by not more than 1 in 12.
- 3) Treads shall have a uniform run with a maximum tolerance of
 - a) <5 mm> between adjacent treads, and
 - b) <10 mm> between the deepest and shallowest treads in a flight.
- 4) Where angled treads or winders are incorporated into a stair, the treads in all sets of angled treads or winders within a flight shall turn in the same direction.
- 5) The slope of treads shall not exceed <1 in 50>.

9.8.4.5. Winders

(See Appendix A.)

- 1) Stairs within *dwelling units* may contain winders provided
 - a) the winders turn through an angle of not more than 90°,
 - b) individual treads turn through
 - i) an angle of 30° with no deviation above or below 30°, or
 - ii) an angle of 45° with no deviation above or below 45°,
 - c) the run, measured at a point 200 mm from the narrow end, conforms to the run requirements for a private stair in Table 9.8.4.2., and
 - d) the run at the narrow end is not less than 150 mm.
- 2) Where winders are incorporated into a stair, each set shall not turn through more than 90°.

9.8.4.6. Tread <Nosings>

(See Appendix A and <A-9.8.4. in Appendix A>.)

- 1) <Except as permitted by Sentence (2), the top of the nosings of stair treads shall have a rounded or bevelled edge extending not less than 6 mm and not more than 14 mm measured horizontally from the front of the nosing.
- 2) If resilient material is used to cover the nosing of a stair tread, the minimum extension of the rounded or bevelled edge required by Sentence (1) is permitted to be reduced to 3 mm.>

9.8.4.7. <Tactile Warning

- 1) Stairs shall be provided with tactile warning strips conforming to Article 3.8.3.11., except for
 - a) stairs within or serving a *dwelling unit*,
 - b) *exit* stairs not normally used for access purposes, and
 - c) fire escapes.>

9.8.5. Ramps**9.8.5.1. Application**

- 1) This Subsection applies to pedestrian ramps, except ramps in an *accessible* path of travel.
- 2) Ramps in an *accessible* path of travel shall conform to the requirements in Section 3.8.

9.8.5.2. Ramp Width

(See also Article 9.9.3.2.)

- 1) Except <as provided in Sentence (2)>, *exit* ramps and public ramps <-serving buildings of residential occupancy> shall have a clear width of not less than <870 mm>.
- 2) <All ramps serving a single dwelling unit> shall have a width of not less than 860 mm.
- 3) <Exit ramps and public ramps serving buildings of other than residential occupancy> shall have a clear width of not less than the greater of
 - a) 870 mm, or
 - b) 8 mm per person based on the *occupant load* limits specified in Table 3.1.17.1.>

9.8.5.3. Height over Ramps

- 1) The clear height over ramps shall be not less than 2 050 mm.

9.8.5.4. Slope

- 1) The slope of ramps shall be not more than
 - a) 1 in 10 for exterior ramps,
 - b) 1 in 10 for interior ramps serving *residential occupancies*,
 - c) 1 in 6 for *mercantile or industrial occupancies*, and
 - d) 1 in 8 for all other *occupancies*.

9.8.5.5. Maximum Rise

- 1) Where the slope of the ramp is greater than 1 in 12, the maximum rise between floors or landings shall be 1 500 mm.

9.8.6. Landings**9.8.6.1. Application**

- 1) This Subsection applies to landings, except landings for ramps in an *accessible* path of travel.
- 2) Landings for ramps in an *accessible* path of travel shall conform to the requirements in Section 3.8.
- 3) Finished floors, and ground surfaces with a slope not exceeding $\langle 1 \text{ in } 50 \rangle$, at the top and bottom of stairs or ramps shall be considered as landings.

9.8.6.2. Required Landings

- 1) Except as provided in Sentences (2) to (4) and Sentence 9.9.6.6.(2), a landing shall be provided
 - a) at the top and bottom of each flight of interior and exterior stairs, including stairs in garages,
 - b) at the top and bottom of every ramp with a slope greater than 1 in 50,
 - c) where a doorway opens onto a stair or ramp,
 - d) where a ramp opens onto a stair, and
 - e) where a stair opens onto a ramp.
- 2) Where a door at the top of a stair within a *dwelling unit* swings away from the stair, no landing is required between the doorway and the stair.
- 3) A landing may be omitted at the top of an exterior flight serving a secondary entrance to a single *dwelling unit* provided
 - a) the stair does not contain more than 3 risers,
 - b) the principal door is a sliding door or swings away from the stair, and
 - c) only a storm or screen door, if any, swings over the stair and is equipped with hardware to hold it open.
- 4) A landing may be omitted at the bottom of an exterior stair or ramp provided there is no obstruction, such as a gate or door, within the lesser of the width of the stair or ramp or
 - a) 900 mm for stairs or ramps serving a single *dwelling unit*, and
 - b) 1 100 mm for stairs or ramps not serving a single *dwelling unit*.

9.8.6.3. Dimensions of Landings

(See Articles 9.9.6.1. and 9.9.6.6. regarding landings in *exits*.)

- 1) Except as provided in \langle Sentences (3) to (6) \rangle , the width and length of landings shall comply with Table 9.8.6.3. (See Appendix A.)
- 2) \langle Reserved. \rangle

Table 9.8.6.3.
Dimensions of Landings
 Forming part of Sentence 9.8.6.3.(1)

	Landing Configuration	Minimum Width, mm	Length, mm
Stairs and ramps serving a single <i>dwelling unit</i>	In straight-run stair or ramp, or landing turning through less than 30°, within a <i>dwelling unit</i>	Width of stair or ramp	Not less than 860
	In straight-run exterior stair or ramp, or exterior landing turning through less than 30°	Width of stair or ramp	Not less than 900
	Landing turning through an angle of 30° or more, but less than 90°	Width of stair or ramp measured at right angle to path of travel	(a) Not less than 230 measured at the inside edge of the landing, and (b) Not less than 370 measured 230 mm from inside edge of landing or handrail
	Landing turning through not less than 90°	Width of stair or ramp measured at right angle to path of travel	Not less than width of stair or ramp landing
Stairs and ramps serving other than single <i>dwelling units</i>	In straight-run stair or ramp, or landing turning through less than 30°	Width of stair or <clear width> of ramp	Lesser of required width of stair or <clear width> of ramp, or 1 100
	Landing turning through 30° or more	Width of stair or <clear width> of ramp measured at right angle to path of travel	Not less than width of stair or <clear width> of ramp

- 3) Where stair flights or ramps of different widths adjoin a single landing, the <minimum width> of the landing shall be
 - a) where one or more of the stair or ramp widths do not exceed their respective required widths, not less than the greater required stair or ramp width, or
 - b) where all of the widths of the stairs or ramps exceed their respective required widths, not less than the lesser actual stair or ramp width.
- 4) Where a door swings toward a stair, the full arc of the swing shall be over the landing.
- 5) <The slope of landings shall not exceed 1 in 50.>
- 6) Where a doorway or stairway opens onto the side of a ramp, the landing shall extend for a distance of not less than 300 mm on either side of the doorway or stairway, except on a side abutting an end wall.

9.8.6.4. Height over Landings

- 1) <Except as permitted by Sentence (2),> the clear height over landings shall be not less than 2 050 mm.
- 2) <The clear height over landings within *dwelling unit* shall be not less than 1 950 mm.>

9.8.7. Handrails

9.8.7.1. Required Handrails

- 1) Except as provided in Sentences (2) to (4), handrails shall be <installed on stairs and ramps in accordance with Table 9.8.7.1.>

Table 9.8.7.1.
<Number of Sides of Stair or Ramp Required to Have a Handrail
 Forming part of Sentence 9.8.7.1.(1)

Location of Stair or Ramp	Handrails Serving Stairs			Handrails Serving Ramps	
	Stairs < 1 100 mm Wide		Stairs ≥ 1 100 mm Wide	Ramps < 1 100 mm Wide	Ramps ≥ 1 100 mm Wide
	Straight	Curved	All	Straight or Curved	All
	Number of Sides Required to Have a Handrail				
Within a <i>dwelling unit</i>	1	1	1	1	2
All other locations ⁽¹⁾	1	2	2	2	2

Notes to Table 9.8.7.1.:

(1) See Sentences 9.8.7.1.(2), (3) and (4) for exceptions.

2) Where a stair or a ramp is required to be at least 2 200 mm wide due to the *occupant load*, a handrail shall be installed such that no position on the stair or ramp is more than 825 mm from a handrail.>

3) Handrails are not required for <stairs and ramps serving a single *dwelling unit*, where>

- interior stairs have not more than 2 risers,
- exterior stairs have not more than 3 risers, or
- ramps rise not more than 400 mm.

4) Only one handrail is required on exterior stairs having more than 3 risers provided such stairs serve not more than one *dwelling unit*.

9.8.7.2. Continuity of Handrails

(See Appendix A.)

1) Except as provided in Sentence (2), at least one required handrail shall be continuous throughout the length of the stair or ramp, including landings, except where interrupted by

- doorways, or
- newel posts at changes in direction.

2) For stairs or ramps serving a single *dwelling unit* at least one required handrail shall be continuous throughout the length of the stair or ramp, except where interrupted by

- doorways,
- landings, or
- newel posts at changes in direction.

9.8.7.3. Termination of Handrails

1) Handrails shall be terminated in a manner that will not obstruct pedestrian travel or create a hazard.
 (See Appendix A.)

2) Except for stairs and ramps serving only one *dwelling unit* at least one handrail at the sides of a stair or ramp shall extend horizontally not less than 300 mm beyond the top and bottom of each flight or ramp. (See Appendix A.)

9.8.7.4. Height of Handrails

(See Appendix A.)

- The height of handrails on stairs and ramps shall be measured vertically from the top of the handrail to
 - a <straight> line drawn <tangent to the tread nosings of the stair> served by the handrail, or
 - the surface of the ramp, floor or landing served by the handrail.

2) Except as provided in Sentences (3) and (4), the height of handrails on stairs and ramps shall be

- not less than <865 mm>, and
- not more than 965 mm.

3) Where *guards* are required, handrails required on landings shall be not more than 1 070 mm in height.

4) <Handrails installed in addition to required handrails need not comply with Sentence (2).>

9.8.7.5. Ergonomic Design

- 1) A clearance of not less than 50 mm shall be provided between a handrail and any surface behind it.
- 2) All handrails shall be constructed so as to be continually graspable along their entire length with no obstruction on or above them to break a handhold, except where the handrail is interrupted by newels at changes in direction.
(See Appendix A.)

9.8.7.6. Projections into Stairs and Ramps

- 1) Handrails and constructions below handrails, including handrail supports and stair stringers, shall not project more than 100 mm into the required width of a stair or ramp. (See also Articles 9.8.2.1. and 9.8.5.2.)

9.8.7.7. Design and Attachment of Handrails

(See Appendix A.)

- 1) Handrails and any *building* element that could be used as a handrail shall be designed and attached in such a manner as to resist
 - a) a concentrated load at any point of not less than 0.9 kN, and
 - b) for handrails other than those serving a single *dwelling unit*, a uniformly distributed load of 0.7 kN/m.
- 2) Where a handrail serving a single *dwelling unit* is attached to wood studs or blocking, the attachment shall be deemed to comply with Sentence (1) where
 - a) the attachment points are spaced not more than 1.2 m apart,
 - b) the first attachment point at either end is located no more than 300 mm from the end of the handrail, and
 - c) the fasteners consist of not less than 2 wood screws at each point, penetrating not less than 32 mm into solid wood.

9.8.8. Guards**9.8.8.1. Required Guards**

(See Appendix A.)

- 1) Except as provided in Sentences (2) and (3), every surface to which access is provided for other than maintenance purposes, including but not limited to flights of steps and ramps, exterior landings, porches, balconies, *mezzanines*, galleries and raised *walkways*, shall be protected by a *guard* on each side that is not protected by a wall for the length where
 - a) there is a difference in elevation of more than 600 mm between the walking surface and the adjacent surface, or
 - b) the adjacent surface within 1.2 m of the walking surface has a slope of more than 1 in 2.
- 2) *Guards* are not required
 - a) at loading docks,
 - b) at floor pits in *repair garages*, or
 - c) where access is provided for maintenance purposes only.
- 3) Where an interior stair has more than 2 risers or an interior ramp rises more than 400 mm, the sides of the stair or ramp and the landing or floor level around the stairwell or ramp shall be protected by a *guard* on each side that is not protected by a wall.
- 4) Doors in *buildings of residential occupancy*, where the finished floor on one side of the door is more than 600 mm above the floor or other constructed surface or ground level on the other side of the door, shall be protected by
 - a) a *guard*, or
 - b) a mechanism capable of controlling the free swinging or sliding of the door so as to limit any clear unobstructed opening to not more than 100 mm.
- 5) Except as provided in Sentence (6), openable windows in *buildings of residential occupancy* shall be protected by
 - a) a *guard*, or
 - b) a mechanism capable of controlling the free swinging or sliding of the openable part of the window so as to limit any clear unobstructed opening to not more than 100 mm measured either vertically or horizontally where the other dimension is greater than 380 mm.

<(See Appendix A.)>

- 6) Windows need not be protected in accordance with Sentence (5), where
- the window serves a *dwelling unit* that is not located above another *suite*,
 - Reserved.
 - the only opening greater than 100 mm by 380 mm is a horizontal opening at the top of the window,
 - the window sill is located more than 450 mm above the finished floor on one side of the window, or
 - the window is located in a room or space with the finished floor described in Clause 9.8.8.1.(6)(d) located less than 1 800 mm above the floor or ground on the other side of the window.

<(See A-9.8.8.1.(5) in Appendix A.)>

- 7) Except as provided in Sentence (8), <glazing installed> over *stairs*, ramps and landings that extends to less than 1 070 mm above the surface of the treads, ramp or landing shall be
- protected by *guards*, in accordance with this Subsection, or
 - non-openable and designed to withstand the specified lateral loads for balcony *guards* as provided in Article 4.1.5.14.
- 8) In *dwelling units*, <glazing installed> over *stairs*, ramps and landings that extends to less than 900 mm above the surface of the treads, ramp or landing shall be
- protected by *guards*, in accordance with this Subsection, or
 - non-openable and designed to withstand the specified lateral loads for balcony *guards* as provided in Article 4.1.5.14.
- 9) <Glazing installed> in public areas that extends to less than 1 m from the floor and is located above the second storey in *buildings of residential occupancy* shall be
- protected by *guards* in accordance with this Subsection, or
 - non-openable and designed to withstand the specified lateral loads for balcony *guards* as provided in Article 4.1.5.14.

9.8.8.2. Loads on Guards

(See Appendix A.)

- 1) *Guards* shall be designed to resist the specified loads prescribed in Table 9.8.8.2.

Table 9.8.8.2.
Specified Loads for Guards
Forming part of Sentence 9.8.8.2.(1)

Location of <i>Guard</i>	Minimum Design Loads		
	Horizontal Load Applied Inward or Outward at any Point at the <Minimum Required Height> of the <i>Guard</i>	Horizontal Load Applied Inward or Outward on Elements Within the <i>Guard</i> , Including Solid Panels and Pickets	Evenly Distributed Vertical Load Applied at the Top of the <i>Guard</i>
<i>Guards</i> within <i>dwelling units</i> and exterior <i>guards</i> serving not more than 2 <i>dwelling units</i>	0.5 kN/m OR concentrated load of 1.0 kN applied at any point ⁽¹⁾	0.5 kN applied over a maximum width of 300 mm and a height of 300 mm ⁽²⁾	1.5 kN/m
<i>Guards</i> serving access walkways to equipment platforms, contiguous stairs and similar areas	Concentrated load of 1.0 kN applied at any point	Concentrated load of 0.5 kN applied at any point on individual elements	1.5 kN/m
All other <i>guards</i>	0.75 kN/m OR concentrated load of 1.0 kN applied at any point ⁽¹⁾	Concentrated load of 0.5 kN applied at any point on individual elements	1.5 kN/m

Notes to Table 9.8.8.2.:

- (1) The load that creates the most critical condition shall apply.
(2) See Sentence (2).

- 2) Where the width and spacing of balusters in *guards* within *dwelling units* and in exterior *guards* serving not more than 2 *dwelling units* is such that 3 balusters can be engaged by a load imposed over a 300 mm width, the load shall be imposed so as to engage 3 balusters.
- 3) None of the loads specified in Table 9.8.8.2. need be considered to act simultaneously.
- 4) For *guards* within *dwelling units* and for exterior *guards* serving not more than 2 *dwelling units*, Table 9.8.8.2. need not apply where the *guard* construction used has been demonstrated to provide effective performance.

9.8.8.3. Height of Guards

(See Appendix A.)

- 1) Except as provided in Sentences (2) to (4), all *guards* shall be not less than 1 070 mm high.
- 2) All *guards* within *dwelling units* shall be not less than 900 mm high.
- 3) Exterior *guards* serving not more than one *dwelling unit* shall be not less than 900 mm high where the walking surface served by the *guard* is not more than 1 800 mm above the finished ground level.
- 4) *Guards* for flights of steps, except in required *exit* stairs, shall be not less than 900 mm high.
- 5) The height of *guards* for flights of steps shall be measured vertically from the top of the *guard* to a line drawn through the leading edge of the treads served by the *guard*.

9.8.8.4. Guards for Floors and Ramps in Garages

- 1) Except for floors of garages referred to in Section 9.35., where garage floors or ramps are 600 mm or more above the adjacent ground or floor level, every opening through a garage floor and the perimeter of floors and ramps that have no exterior walls shall be provided with
 - a) a continuous curb not less than 150 mm in height, and
 - b) a *guard* not less than 1 070 mm above the floor level.
- 2) <Vehicle guardrails shall be designed for a concentrated horizontal load of 22 kN applied outward at any point 500 mm above the floor surface. (See A-4.1.5.14. and 4.1.5.15.(1) in Appendix A.)>

9.8.8.5. Openings in Guards

- 1) Except as provided in Sentence (2), openings through any *guard* that is required by Article 9.8.8.1. shall be of a size that will prevent the passage of a spherical object having a diameter of 100 mm unless it can be shown that the location and size of openings that exceed this limit do not represent a hazard. (See A-9.8.8.5.(1) and (2) in Appendix A.)
- 2) Openings through any *guard* that is required by Article 9.8.8.1. and that is installed in a *building of industrial occupancy* shall be of a size that will prevent the passage of a spherical object having a diameter of 200 mm unless it can be shown that the location and size of openings that exceed this limit do not represent a hazard. (See A-9.8.8.5.(1) and (2) in Appendix A.)
- 3) Unless it can be shown that the location and size of openings that do not comply with the following limits do not represent a hazard, openings through any *guard* that is not required by Article 9.8.8.1. and that serves a *building of other than industrial occupancy*, shall be of a size that:
 - a) will prevent the passage of a spherical object having a diameter of 100 mm, or
 - b) will permit the passage of a spherical object having a diameter of 200 mm.(See Appendix A.)

9.8.8.6. Design <of Guards to Not Facilitate> Climbing

- 1) *Guards* required by Article 9.8.8.1., except those in *industrial occupancies* and where it can be shown that the location and size of openings do not present a hazard, shall be designed so that no member, attachment or opening facilitates climbing.
- 2) *Guards* shall be deemed to comply with Sentence (1) where all elements protruding from the vertical and located within the area between 140 mm and 900 mm above the floor or walking surface protected by the *guard* <conform to at least one of the following Clauses:>
 - a) they are located more than 450 mm horizontally and vertically from each other,
 - b) they provide not more than 15 mm horizontal offset,
 - c) they do not provide a toe-space more than 45 mm horizontally and 20 mm vertically, or
 - d) they present more than a <2-in-1> slope on the offset.

(See Appendix A.)

9.8.8.7. Glass in Guards

- 1) Glass in *guards* shall be
 - a) safety glass of the laminated or tempered type conforming to CAN/CGSB-12.1-M, "Tempered or Laminated Safety Glass," or
 - b) wired glass conforming to CAN/CGSB-12.11-M, "Wired Safety Glass."

9.8.9. Construction**9.8.9.1. Loads on Stairs and Ramps**

- 1) Except as specified in Articles 9.8.9.4. and 9.8.9.5., stairs and ramps shall be designed for strength and rigidity under uniform loading criteria to support specified loads of
 - a) 1.9 kPa for stairs and ramps serving not more than one *dwelling unit* and
 - b) 4.8 kPa for other stairs and ramps.

9.8.9.2. Exterior Concrete Stairs

- 1) Exterior concrete stairs with more than 2 risers and 2 treads shall be
 - a) supported on unit masonry or concrete walls or piers not less than 150 mm in cross section, or
 - b) cantilevered from the main *foundation* wall.
- 2) Stairs described in Sentence (1), when cantilevered from the *foundation* wall, shall be constructed and installed in conformance with Subsection 9.8.10.
- 3) The depth below ground level for *foundations* for exterior steps shall conform to the requirements in Section 9.12.

9.8.9.3. Exterior Wood Steps

- 1) Exterior wood steps shall not be in direct contact with the ground unless suitably treated with a wood preservative.

9.8.9.4. Wooden Stair Stringers

- 1) Wooden stair stringers shall
 - a) have a minimum effective depth of 90 mm, measured perpendicularly to the bottom of the stringer at the point of minimum cross-section, and an overall depth of not less than 235 mm,
 - b) be supported and secured top and bottom,
 - c) be not less than 25 mm actual thickness if supported along their length and 38 mm actual thickness if unsupported along their length, and
 - d) except as permitted in Sentence (2), be spaced not more than 900 mm o.c. in stairs serving not more than one *dwelling unit* and 600 mm o.c. in other stairs.
- 2) For stairs serving not more than one *dwelling unit* where risers support the front portion of the tread, the space between stringers shall be not more than 1 200 mm.

9.8.9.5. Treads

- 1) Stair treads of lumber, plywood or O-2 grade OSB within *dwelling units* shall be not less than 25 mm actual thickness, except that if open risers are used and the distance between stringers exceeds 750 mm, the treads shall be not less than 38 mm actual thickness.
- 2) Stair treads of plywood or OSB that are not continuously supported by the riser shall have their face grain or direction of face orientation at right angles to the stringers.

9.8.9.6. Finish for Treads and Landings

- 1) The finish for treads and landings of interior stairs in *dwelling units*, other than stairs to unfinished *basements*, shall consist of hardwood, vertical grain softwood, resilient flooring or other material providing equivalent performance.
- 2) Treads and landings of interior and exterior stairs and ramps, other than those within *dwelling units*, shall have a slip-resistant finish or be provided with slip-resistant strips that extend not more than 1 mm above the surface.

9.8.10. Cantilevered Precast Concrete Steps

9.8.10.1. Design

1) Exterior concrete steps and their anchorage system that are cantilevered from a *foundation* wall shall be designed and installed to support the loads to which they may be subjected.

9.8.10.2. Anchorage

1) Cantilevered concrete steps referred to in Article 9.8.10.1. shall be anchored to concrete *foundation* walls not less than 200 mm thick.

9.8.10.3. Prevention of Damage Due to Frost

1) Suitable precautions shall be taken during backfilling and grading operations to ensure that subsequent freezing of the *soil* will not cause uplift forces on the underside of cantilevered concrete steps to the extent that the steps or the walls to which they are attached will be damaged.

Section 9.9. Means of Egress

9.9.1. General

9.9.1.1. Application

1) Stairways, handrails and *guards* in a *means of egress* shall conform to the requirements in Section 9.8. as well as to the requirements in this Section.

9.9.1.2. Fire Protection

1) In addition to the fire protection requirements provided in Subsection 9.9.4., *flame-spread ratings*, *fire-resistance ratings* and *fire-protection ratings* for *means of egress* shall conform to Section 9.10.

9.9.1.3. Occupant Load

1) Except for *dwelling units*, the *occupant load* of a *floor area* or part of a *floor area* shall be the number of persons for which such areas are designed, but not fewer than that determined from Table 3.1.17.1., unless it can be shown that the area will be occupied by fewer persons.

2) The *occupant load* for *dwelling units* shall be based on 2 persons per bedroom or sleeping area.

9.9.2. Types and Purpose of Exits

9.9.2.1. Types of Exits

1) Except as otherwise provided in this Section, an *exit* from any *floor area* shall be one of the following used singly or in combination:

- a) an exterior doorway,
- b) an exterior passageway,
- c) an exterior ramp,
- d) an exterior stairway,
- e) a fire escape,
- f) a *horizontal exit*,
- g) an interior passageway,
- h) an interior ramp, or
- i) an interior stairway.

2) Fire escapes shall only be used as *exits* on existing *buildings* and shall be designed and installed in conformance with Subsection 3.4.7.

3) Where a *horizontal exit* is used, it shall conform to Sentence 3.4.1.6.(1) and Article 3.4.6.10.

9.9.2.2. Purpose of Exits

1) An *exit* shall be designed for no purpose other than for exiting except that an *exit* may also serve as an access to a *floor area*.

9.9.2.3. Elevators, Slide Escapes and Windows as Means of Egress

- 1) Elevators, slide escapes and windows shall not be considered as part of a required *means of egress*.

9.9.2.4. Principal Entrances

- 1) Except for doors serving a single *dwelling unit*, at least one door at every principal entrance to a *building* providing access from the exterior at ground level shall be designed in accordance with the requirements for *exits*.

9.9.3. Dimensions of Means of Egress**9.9.3.1. Application**

- 1) This Subsection applies to every *means of egress* except
 - a) *exits* that serve not more than one *dwelling unit*, and
 - b) *access to exits* within *dwelling units*.

9.9.3.2. Exit Width

- 1) Except for doors and corridors, the width of every *exit* facility shall be not less than 900 mm. (See Article 9.9.6.3. for doors, Article 9.8.2.1. for stairs, <and Article 9.8.5.2. for ramps.>)

9.9.3.3. Width of Corridors

- 1) The width of every *public corridor*, corridor used by the public, and *exit* corridor shall be not less than 1 100 mm. (See also Subsection 9.9.5. for obstructions in corridors.)

9.9.3.4. Clear Height

- 1) Except for stairways, doorways and *storage garages*, the minimum clear height in *exits* and *access to exits* shall be 2.1 m. (See Article 9.8.2.2. for stairs, Article 9.8.5.3. for ramps, Article 9.8.6.4. for landings and Article 9.9.6.2. for doorways.)
- 2) The clear height in *exits* and *access to exits* in *storage garages* shall be not less than 2 m.

9.9.4. Fire Protection of Exits**9.9.4.1. Application**

- 1) Except as provided in Articles 9.9.4.4. < and 9.9.4.6.>, this Subsection applies to the fire protection of all *exits* except *exits* serving not more than one *dwelling unit*.

9.9.4.2. Fire Separations for Exits

- 1) Except as provided in Sentences (2) and (5) and Article 9.9.8.5., every *exit* other than an exterior doorway shall be separated from each adjacent *floor area* or from another *exit*
 - a) <where there is a floor assembly above the *floor area*,> by a *fire separation* having a *fire-resistance rating* not less than that required for the floor assembly above the *floor area* (see Article 9.10.9.10.), and
 - b) <where there is no floor assembly above the *floor area*, by a *fire separation* having a *fire-resistance rating* not less than the greater of>
 - i) that required by Subsection 9.10.8. for the floor assembly below, or
 - ii) <45 min.>
- 2) <Reserved.>
- 3) A *fire separation* common to 2 *exits* shall be smoke-tight and not be pierced by doorways, duct work, piping or any other opening that may affect the continuity of the separation.
- 4) A *fire separation* that separates an *exit* from the remainder of the *building* shall have no openings except those for electrical wiring, *noncombustible* conduit and *noncombustible* piping that serve only the *exit*, and for standpipes, sprinkler piping, *exit* doorways and wired glass and glass block permitted in Article 9.9.4.3.
- 5) The requirements in Sentence (1) do not apply to an exterior *exit* passageway provided the passageway has not less than 50% of its exterior sides open to the outdoors and is served by an *exit* stair at each end of the passageway.

9.9.4.3. Wired Glass or Glass Block

(See A-3.1.8.17.(1) in Appendix A.)

- 1) This Article applies to wired glass in doors, and wired glass or glass block in sidelights, where these are installed in *fire separations* between *exit* enclosures and *floor areas*.
- 2) Except as provided in Sentence (3), the combined area of glazing in doors and sidelights shall not exceed 0.8 m².

3) Where an *exit* enclosure connects with a *floor area* through an enclosed vestibule or corridor separated from the *floor area* by *fire separations* having not less than a 45 min *fire-resistance rating*, the glazed areas described in Sentence (1) need not be limited as required in Sentence (2).

9.9.4.4. Openings Near Unenclosed <Exterior> Exit Stairs and Ramps

- 1) <Unprotected openings in exterior walls of the *building* shall be protected with wired glass in fixed steel frames or glass block conforming to Articles 9.10.13.5. and 9.10.13.7.,> where
- a) an unenclosed exterior *exit* stair or ramp provides the only *means of egress* from a *suite* and is exposed to fire from *unprotected openings* in the exterior walls of
 - i) another *fire compartment*, or
 - ii) <another *dwelling unit*, and>
 - b) <unprotected openings> in the exterior walls of the *building* are within 3 m horizontally and less than 10 m below or less than 5 m above the *exit* stair or ramp.

9.9.4.5. Openings in Exterior Walls of Exits

- 1) Either openings in exterior walls of an *exit* or openings in adjacent exterior walls of the *building* the *exit* serves shall be protected with wired glass in fixed steel frames or glass block installed in accordance with Articles 9.10.13.5. and 9.10.13.7., where
- a) the *exit* enclosure has exterior walls that intersect the exterior walls of the *building* at an angle of less than 135° measured on the outside of the *building*, and
 - b) the openings in the exterior walls of the *building* are within 3 m horizontally and less than 2 m above the openings in the exterior walls of the *exit*.

(See Appendix A.)

9.9.4.6. Openings Near Exit Doors

- 1) <Where an exterior *exit* door in one *fire compartment* is within 3 m horizontally of an *unprotected opening* in another *fire compartment* and the exterior walls of these *fire compartments* intersect at an exterior angle of less than 135°, the opening shall be protected with
- a) wired glass in fixed steel frames conforming to Article 9.10.13.5., or
 - b) glass block conforming to Article 9.10.13.7.>

9.9.4.7. Stairways in 2 Storey, Group D or E Buildings

- 1) Where a *suite* of Group D or E *occupancy* is located partly on the *first storey* and partly on the *second storey*, stairways serving the *second storey* of that *suite* need not be constructed as *exit* stairs provided,
- a) the *building* is not greater than 2 *storeys* in *building height*,
 - b) the *suite* is separated from other *occupancies* by at least a 45 min *fire separation*,
 - c) the area occupied by the *suite* is not greater than 100 m² per *storey*,
 - d) the maximum travel distance from any point in the *suite* to an exterior *exit* is not greater than 25 m,
 - e) the floor assemblies have a *fire-resistance rating* of not less than 45 min or are of *noncombustible construction*, and
 - f) the *basement* and *first storey* are separated by a *fire separation* having a *fire-resistance rating* of not less than 45 min.

9.9.5. Obstructions and Hazards in Means of Egress

9.9.5.1. Application

1) This Subsection applies to obstructions and hazards in every *means of egress* except those within a *dwelling unit* or serving not more than one *dwelling unit*.

9.9.5.2. Occupancies in Corridors

1) Where a corridor contains an *occupancy*, the *occupancy* shall not reduce the unobstructed width of the corridor to less than the required width of the corridor.

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.)

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*.

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.
- 3) Obstructions, such as counter gates, that do not satisfy Sentence (2), are permitted to be placed in a required *means of egress* from a part of a *floor area* in *mercantile occupancies* and *business and personal services occupancies*, provided that the part of the *floor area* served by the obstructed *means of egress* is not generally accessible to the public.

9.9.5.6. Mirrors or Draperies

- 1) No mirror shall be placed in or adjacent to any *exit* so as to confuse the direction of *exit*, and no mirror or draperies shall be placed on or over *exit* doors.

9.9.5.7. Fuel-Fired Appliances

- 1) Fuel-fired *appliances* shall not be installed in an *exit* or corridor serving as an *access to exit*.

9.9.5.8. Service Rooms

- 1) *Service rooms* containing equipment subject to possible explosion, such as *boilers* designed to operate at a pressure in excess of 100 kPa, and certain types of refrigerating and transformer equipment, shall not be located under required *exits*.

9.9.5.9. Ancillary Rooms

- 1) Ancillary rooms such as storage rooms, washrooms, toilet rooms, laundry rooms and *service rooms* shall not open directly into an *exit*.

9.9.6. Doors in a Means of Egress**9.9.6.1. Obstructions by Doors**

- 1) Except as provided in Sentence (4), obstructions created by doors shall be limited in accordance with Sentences (2) and (3)
 - a) at *exit* doors,
 - b) at doors that open into or are located within a *public corridor*, and
 - c) at doors that open into or are located within another facility that provides *access to exit* from a *suite*.
- 2) When fully open, doors described in Sentence (1) shall not decrease the required *exit* width by more than
 - a) 100 mm in *exit* corridors, and
 - b) 50 mm for other *exit* facilities.
- 3) The swing of doors described in Sentence (1) shall not reduce the width of the path of travel to less than
 - a) the required *exit* width in *exit* corridors and passageways, and
 - b) 750 mm on *exit* stairs or landings.
- 4) Doors serving a single *dwelling unit* need not comply with Sentences (2) and (3).

9.9.6.2. Clear Opening Height at Doorways

- 1) Except as provided in Sentences (2) and (3), the clear opening height of doorways shall be not less than 2 030 mm high at
 - a) *exit* doors,
 - b) doors that open into or are located within a *public corridor*, and
 - c) doors that open into or are located within another facility that provides *access to exit* from a *suite*.
- 2) The clear opening height under door closers and other devices in doorways described in Sentence (1) shall be not less than 1 980 mm.
- 3) Doorways serving a single *dwelling unit* need not comply with Sentences (1) and (2). <(See also Article 9.5.5.1.)>

9.9.6.3. Clear Opening Width at Doorways

- 1) Except as provided in Sentence (4), the clear opening width of doorways shall comply with Sentence (2) at
 - a) *exit* doors, and
 - b) doors that open into or are located within a *public corridor* or other facility that provides *access to exit* from a *suite*.
- 2) Doorways described in Sentence (1) shall be
 - a) not less than 800 mm wide where there is only one door leaf,
 - b) not less than 800 mm wide where multiple-leaf doors are installed with only one active leaf having a latching mechanism described in Article 9.9.6.7., and
 - c) not less than 1 210 mm wide where multiple-leaf doors are installed with two active leaves.
- 3) In doorways described in Sentence (1) that have multiple-leaf doors installed,
 - a) no active leaf shall be less than 810 mm wide where only one leaf is active, and
 - b) no single leaf shall be less than 610 mm wide where two leaves are active.
- 4) Doorways serving a single *dwelling unit* need not comply with Sentence (2). <(See also Article 9.5.5.1.)>

9.9.6.4. Door Action

- 1) Except as provided in Sentences (4) and (5), required *exit* doors and doors in required *means of egress*, except doors in *means of egress* within *dwelling units*, shall swing on the vertical axis.
- 2) Except as provided in Sentence (5), breakaway sliding doors, installed as required *exit* doors or required doors in *means of egress*, shall be identified as swinging doors by means of a label or decal affixed to the door.
- 3) Revolving doors shall comply with Article 3.4.6.15.
- 4) Movable *partitions* used to separate a *public corridor* from an adjacent *business and personal services occupancy* or a *mercantile occupancy* need not conform to Sentence (1), provided the partitions are not located in the only *means of egress*. (See A-3.3.1.12.(3) in Appendix A.)
- 5) *Exit* doors need not conform to Sentences (1) or (2), where
 - a) the doors serve accessory *buildings* where life safety is not adversely affected,
 - b) the doors serve *storage garages* or other accessory *buildings* serving not more than one *dwelling unit*, or
 - c) the doors
 - i) serve *storage suites* of not more than 20 m² in gross area that are in warehousing *buildings* of not more than one *storey*, and
 - ii) open directly to the exterior at ground level.

9.9.6.5. Direction of Door Swing

- 1) Except for doors serving a single *dwelling unit* *exit* doors that are required to swing shall swing in the direction of *exit* travel.
- 2) Doors that open onto a corridor or other facility that provides *access to exit* from a room or *suite* having an *occupant load* of more than 60 persons shall swing on the vertical axis in the direction of *exit* travel.
- 3) Doors that divide a corridor that is not wholly contained within a *suite* shall swing in the direction of *exit* travel.
- 4) Where a pair of doors is installed in a corridor that provides *access to exit* in both directions, the doors shall
 - a) swing in opposite directions, with the door on the right-hand side swinging in the direction of *exit* travel, or
 - b) swing in both directions.