2012 BC Building Code
Items associated to Railings and Guards

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 (43”)		Stairs ≥ 1 100 mm Wide (43”)	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 dwelling unit	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.

Ie. The maximum width on a ramp is 32” without a grabbable rail

3. Handrails are not required for stairs and ramps serving a single dwelling unit, where
    A. a) interior stairs have not more than 2 risers,
    B. b) exterior stairs have not more than 3 risers, or
    C. c) ramps rise not more than 400 mm.

Ie. No exterior railing is required if you have 3 steps or less

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

Ie. As long as you don't have any open falling points, you only need 1 railing for the steps (Example, if you have a wall protecting the other side, you don't need a grab rail up that side)

9.8.7.2. Continuity of Handrails

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
    A. a) doorways, or
    B. b) 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
    A. doorways,
    B. landings, or

C. newel posts at changes in direction.

ie. On a front step or stairs of a deck, there should always be a railing extending from the bottom of the stairs to the landing that is fully connected. The continuous rail only needs to be present on one side of the step, as long there is a guard protecting an open falling point.

Figure 1: *The railing extends from the bottom step to the landing, indicating a pass of code*
Figure 2: *The grab rail extends from the bottom step to the landing, so even though the railing on the right does not extend all the way to the landing, it will still pass code because it is just acting as a guard.*

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

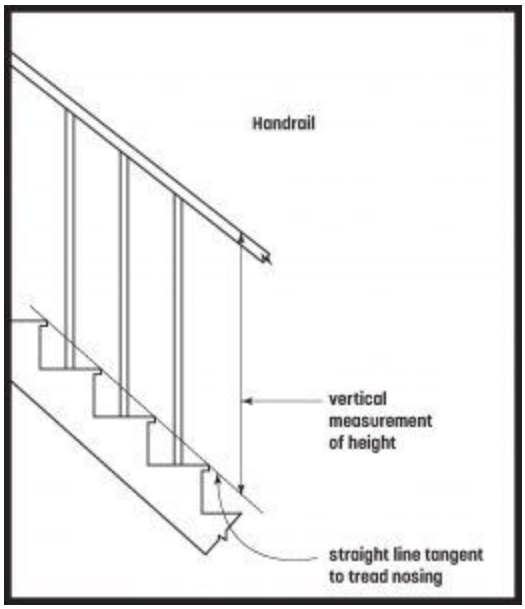
An end post for picket railings or end caps for handrails are considered safe and will not obstruct the travel of a pedestrian

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.

ie. In complexes with multiple units, the railing needs to extend horizontally past the bottom step and the landing edge by 1 foot each.

9.8.7.4. Height of Handrails

1. The height of handrails on stairs and ramps shall be measured vertically from the top of the handrail to
    A. a straight line drawn tangent to the tread nosings of the stair served by the handrail, or
    B. 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
    A. not less than 865 mm (34”), and
    B. not more than 965 mm (38”)

    This applies in cases when the falling point is 24”- 72”

3. Where guards are required, handrails required on landings shall be not more than 1070mm (42”) in height.

    This applies in cases when the falling point greater than 72”

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

    Case 2 also applies from 0”-24”

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.

Ie. There need to be 2 inches of space between a grab rail or railing from the wall

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.

Ie. Wrapping a railing around a post will no longer pass code, as the railings transitions to being perpendicular to the direction of travel, meaning that it will not be continually graspable

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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.)

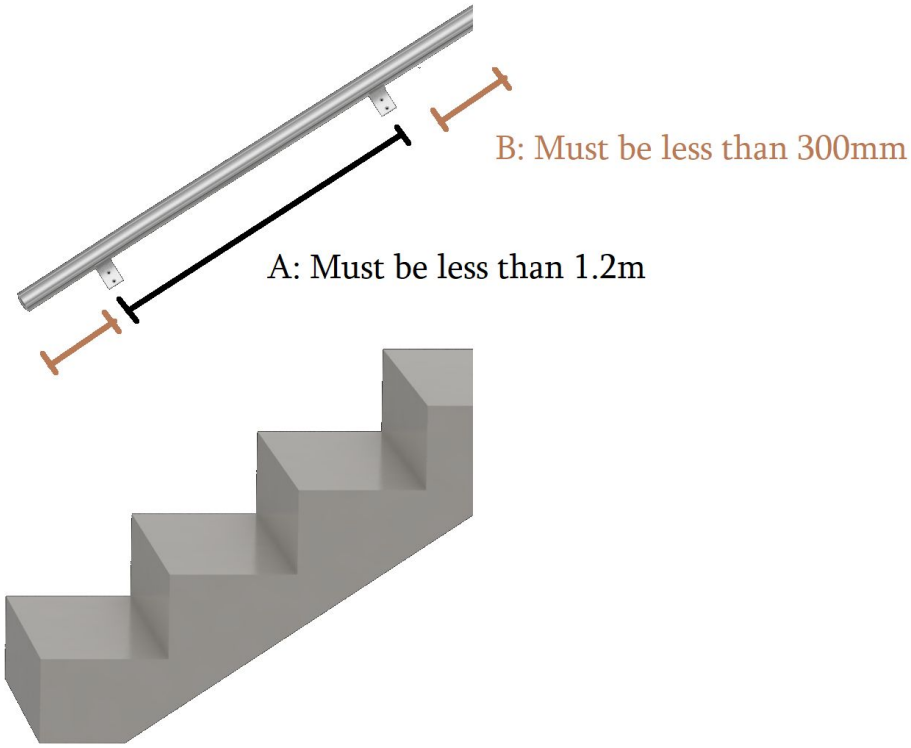
A stringer is the 2x12 wood that typically supports the stairs. Section 9.8.7.1. Point 1C can be modified to 900mm because of railings on each side projecting into the walking space.

9.8.7.7. Design and Attachment of Handrails (Load Requirements)

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) a concentrated load at any point of not less than 0.9 kN, and
    B. b) for handrails other than those serving a single dwelling unit, a uniformly distributed load of 0.7kN/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.

See diagram for clear explanation



9.8.8. Guards

9.8.8.1. Required Guards

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 (24”) 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.

Ie. Every space that has a fall point greater than 24” (2 risers) must be protected by a guard or if it is as steep a previously described

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.

This means that any falling point above 24” must be protected by a guard, which can be either a railing or a wall

9.8.8.2. Loads on Guards

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)

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

Minimum Design Loads			
Location of Guard	**Horizontal Load Applied Inward or Outward at any Point at the Minimum Required Height of the Guard**	**Horizontal Load Applied Inward or Outward on Elements Within the Guard, Including Solid Panels and Pickets**	**Evenly Distributed Vertical Load Applied at the Top of the Guard**
Guards within dwelling units and exterior guards serving not more than 2 dwelling units	0.5 kN/m OR concentrated load of 1.0 kN applied at any point	0.5 kN applied over a maximum width of 300mm and a height of 300 mm	1.5 kN/m
Guards 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 guards	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).

Notes to Table 9.8.8.2.:

1. The load that creates the most critical condition shall apply.

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 300mm 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.

This means that for a railing serving 1 or 2 units, the strengths in the table do not necessarily as long as the balusters provide effective performance

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9.8.8.3. Height of Guards

1. Except as provided in Sentences (2) to (4), all guards shall be not less than 1 070 mm high (42”)
2. All guards within dwelling units shall be no less than 900 mm high (36”).
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 (71”) above the finished ground level.

For a stair/landing elevation height of 2 feet to 6 feet, you must have a guard that is a minimum of 36”

4. Guards for flights of steps, except in required exit stairs, shall be not less than 900 mm high.

If it is a flight of steps, the minimum guard height is 36”

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.

See 9.8.7.7. Point #2

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 (4”) 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.)

The maximum picket spacing is 4” for residential

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.)

The maximum picket spacing is 8" for commercials in which there is no chance of children passing by. Mostly applies for industrial work spaces with only workers walking past.

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.

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.

Climbing can be facilitated by things like horizontal spindles or other horizontal components to grab on to.

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.

Details about the climbing points near the railing.

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."