

Inspecting Means of Egress in Residential Dwelling Units

Including Stairways, Ramps, Exterior Egress Balconies, Hallways,
Doors, and Emergency Escape and Rescue Openings



Course title: “Inspecting means of egress in residential dwelling units.”

Course objective: To obtain an understanding of how to inspect the means of egress in a single residential dwelling unit, including stairways, ramps, exterior egress balconies, hallways, doors, and emergency escape and rescue openings.

Completing this course should enable an inspector to identify defects and safety hazards in relation to modern standards and requirements.

This is not a code compliance course. There are many codes, and they change regularly. This level of inspection is beyond what an inspector would do on a general home inspection and exceeds InterNACHI's Standards of Practice, available at www.nachi.org/

We will read text from modern building standards including some Canadian text, we will apply those standards to a mock-up stairway and ramp in a studio setting, and then we will perform an inspection at an existing residential home.

At the end of the course, we will go over some suggested language that can be used in an inspection report. An inspection report should describe and identify in written format the inspected components of the dwelling and should identify defects that were observed.

“US” for United States and “CA” for Canada will be used throughout this course document.



EGRESS DOORS

Regardless of the size of the house, at least one egress door should be provided. The required door should provide access from the habitable portion of the home to the outside without going through a garage.

Measure the door.

The required door must be a side-hinged door, and it must be at least 3 feet wide and 6 feet 8 inches tall. Other doors do not need to meet these minimum dimensions. They can be of any size and need not be a swinging type.

All egress doors shall be readily openable from the inside without the use of a tool, a key, or special knowledge or effort. This standard permits a wide variety of hardware options.

Measure the landing width.

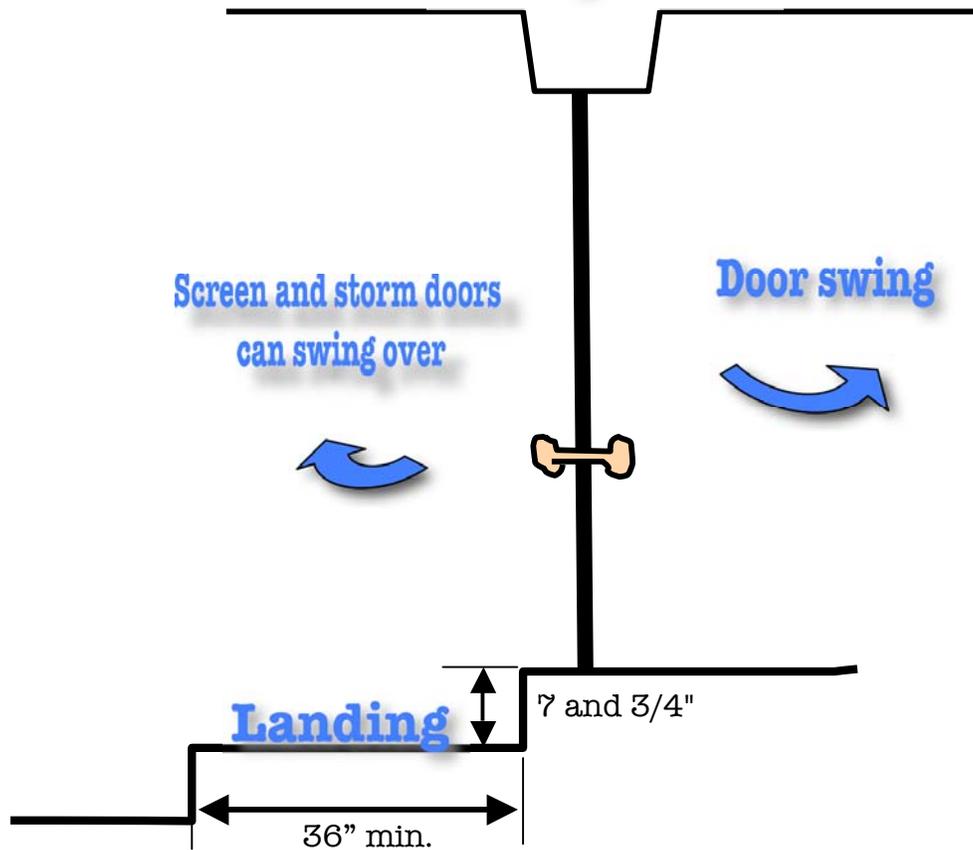
The width of a landing should not be less than the door width. The minimum dimension of every landing is 36 inches measured in the direction of travel.

Check the floors or landing at the doors.

On each side of each exterior door, there should be a floor or landing. The floor or landing should not be more than 1 and 1/2 inches below the top of the threshold. There are three exceptions:

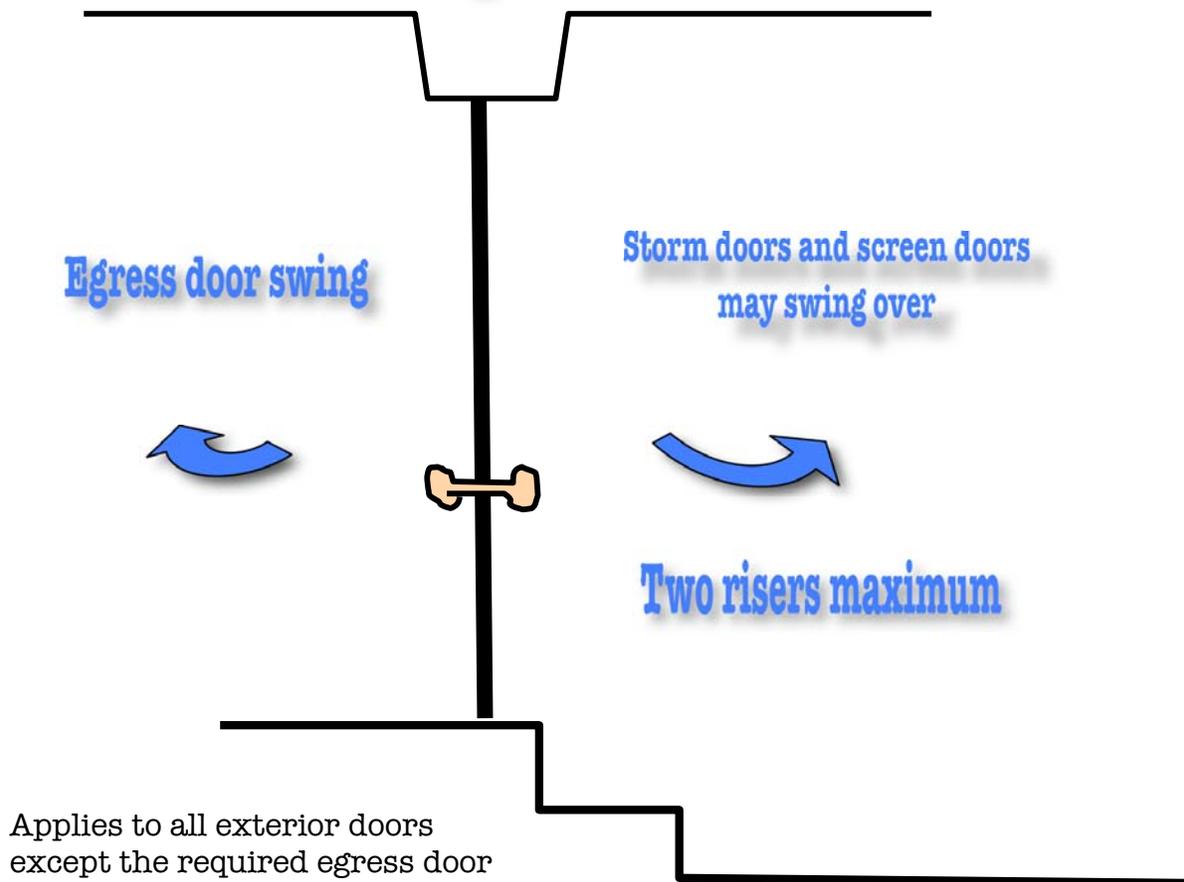
- 1) If the door does not swing over the landing, then the exterior landing can be at most 7 and 3/4 inches below the top of the threshold. This is applicable to all exterior doors including the required egress door. The screen and storm doors are allowed to swing over the landing. This is the most commonly used exception.
- 2) If a stairway with at most 2 risers is at the exterior-side of a door, other than the required egress door, a landing on the outside is not required provided the door does not swing over the stairway. Again, the screen or storm door is allowed to swing over the stairway.
- 3) A floor at all exterior doors, other than the required egress door, should not be more than 7 and 3/4 inches lower than the top of the threshold. It is also acceptable to raise the threshold of an exterior door, other than the egress door, up to 7 and 3/4 inches above the floor on the interior-side.

Exception 1



In this picture, you can see the exception to the rule for a landing at an exterior door. If the door does not swing over the landing, then the exterior landing can be at most 7 and 3/4 inches below the top of the threshold. This is applicable to all exterior doors including the required egress door. The screen and storm doors are allowed to swing over the landing. This is the most commonly used exception.

Exception 2



In *this* picture, you can see *another* exception to the rule for a landing at an exterior door. If a stairway with at most 2 risers is at the exterior side of a door (other than the required egress door) a landing on the outside is not required provided the door does not swing over the stairway. Again, the screen or storm door is allowed to swing over the stairway.



HALLWAYS

Measure the hallway width.

The minimum width of a hallway should be at least 36 inches.

STAIRWAYS and RAMPS

RAMPS

There are three main points to check at a ramp inspection. They are: 1) slope, 2) landings, and 3) handrails.

Check the ramp slope.

Ramps should not have a slope greater than one unit vertical in twelve units horizontal (8.3% slope).

Exception: In areas where it is not possible to comply with the 1:12 slope, ramps may have a maximum slope of 1:8 (12.3% slope).

Check the landings.

A minimum 3 foot by 3 foot landing should be installed in the following four locations: 1) at the top of the ramp, 2) at the bottom of the ramp, 3) where doors open onto ramps, and 4) where ramps change direction.

Check the handrails.

There should be a handrail on at least one side of all ramps that have a slope greater than the 1:12 slope maximum. What is typically found is that most installers have a handrail on all ramps regardless of the slope.

Check the handrail height.

The height of the ramp handrail is measured from the finished surface of the ramp. The minimum is 34 inches (864 mm), and the maximum is 38 inches (965 mm).

Check for continuity.

Handrails should be continuous for the full length of the ramp.

Check the termination.

Handrails should end at a newel post, wall, or safety terminal.

Measure the space.

Space between a handrail at a ramp and the wall should be at least 1 and 1/2 inches (38 mm).



STAIRWAYS

Stairways are one of the most hazardous areas of a home and stair falls are often fatal. Let's go over the standards and requirements of a stairway and ramp in detail, so that when you are on an inspection you will be able to recognize defects quickly and report them concisely.

THE STAIRWAY HANDRAIL:

Determine if the stairway should have a handrail.

US and CA: Any stairway of 4 or more risers should have a handrail on at least one side.

Measure the handrail height.

The height of a handrail is measured vertically from the sloped plane adjoining the tread nosing or leading edge.

US: The handrail height should be at least 34 inches and not more than 38 inches. (Exception: If there is a continuous handrail transition between flights, the handrail height at the transition can be greater than the maximum.)

CA: The handrail height should be at least 800 mm, and not more than 965 mm.

Inspect continuity.

The handrail should be continuous for the full length of the flight of stairs, measured from a point directly above the top riser to a point directly above the bottom riser of the flight. Continuity can be interrupted by a newel post at a turn.

US: A volute, starting easing, or turnout can be installed over the lowest tread.

CA: A doorway or landing can interrupt continuity.

Check the handrail termination.

US: Handrails should end at a newel post or a wall.

CA: Handrails shall terminate in a manner that will not obstruct travel or create a hazard.

Check the handrail clearance.

US: Handrails adjacent to a wall should have a space of not less than 1 1/2 inches between the wall and the handrails.

CA: Handrails adjacent to a wall should have a space of not less than 50 mm between the wall and the handrails, or 60 mm if the surface behind the handrail is rough or abrasive.

Check the handrail attachment to the wall.

US: The handrail should have attachment devices to transfer to the structural wall a concentrated load of 200 pounds applied at any point in any direction.

CA: The handrail should have attachment devices to transfer to the structural wall a concentrated load of CA: 0.9 kN applied at any point in any direction. The attachment points shall not be spaced more than 1.2 m apart. The first attachment point is no more than 300 mm from the end of the handrail. If attached to wooden structural components, the fasteners shall consist of at least 2 wood screws at each point, penetrating at least 32 mm into solid wood.

THE STAIRWAY WIDTH:

US: When a handrail is installed on only one side, the minimum clear width of the stairway at and below the handrail height should be at least 31 and 1/2 inches. When handrails are installed on both sides, the minimum clear width of the stairway at and below the handrail height should be at least 27 inches.

CA: A handrail shall be provided on at least one side of stairs less than 1,100 mm in width. A handrail shall be provided on both sides 1,100 mm in width or greater. A handrail shall be provided on both sides of curved stairs of any width, except those within a dwelling unit.

Measure the width of the stairway.

US: Stairways should be at least 36 inches wide. This is measured at all points above the handrail height and below the required headroom height. For spiral stairways, there should be a width of at least 26 inches measured at and below the handrail.

CA: Required exit stairs shall have a width of not less than 900 mm. 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.

Measure handrail projections.

US: Handrails should not project more than 4 1/2 inches on either side of the stairway.

CA: Handrails should not project more than 100 mm on either side of the stairway.

Be sure to measure projections other than the handrail.

Commentary: Typically, when a building standard requires a minimum width, it is expected that the width be the clear, net, usable, unobstructed width. However, the standard *here* is not concerned with components such as trim, stringers, or other items which may be found below the handrail, as long as they do not exceed the projection of the handrail. The stairway width limitations are based upon the body's movements as a person walks on a stairway.

US: Projections of 4 1/2 inches or less located below the handrail, including treads, trim, stringers or other items, are permitted.

CA: Projections of 100 mm or less below the handrail into the required width of the stairway are permitted.



THE RISERS AND TREADS:

Measure the riser height.

US: The minimum riser height is 4 inches, and the maximum is 7 3/4 inches. For spiral stairs, the maximum rise is 9 1/2 inches.

CA: The minimum riser height is 125 mm, and the maximum is 200 mm. For curved or spiral stairs, the rise shall be between 125 mm and 180 mm.

Measure the difference between the riser heights.

Any significant variation which would interfere with the rhythm of a person's natural stride should be avoided.

US: The greatest riser height within any flight of stairs should not exceed the smallest by more than 3/8 of an inch.

CA: The greatest riser height within any flight of stairs shall not exceed the smallest by more than 6 mm.

Measure the tread depth.

US: The minimum tread depth is 10 inches. For winders, this is measured at the 12 inch walk line.

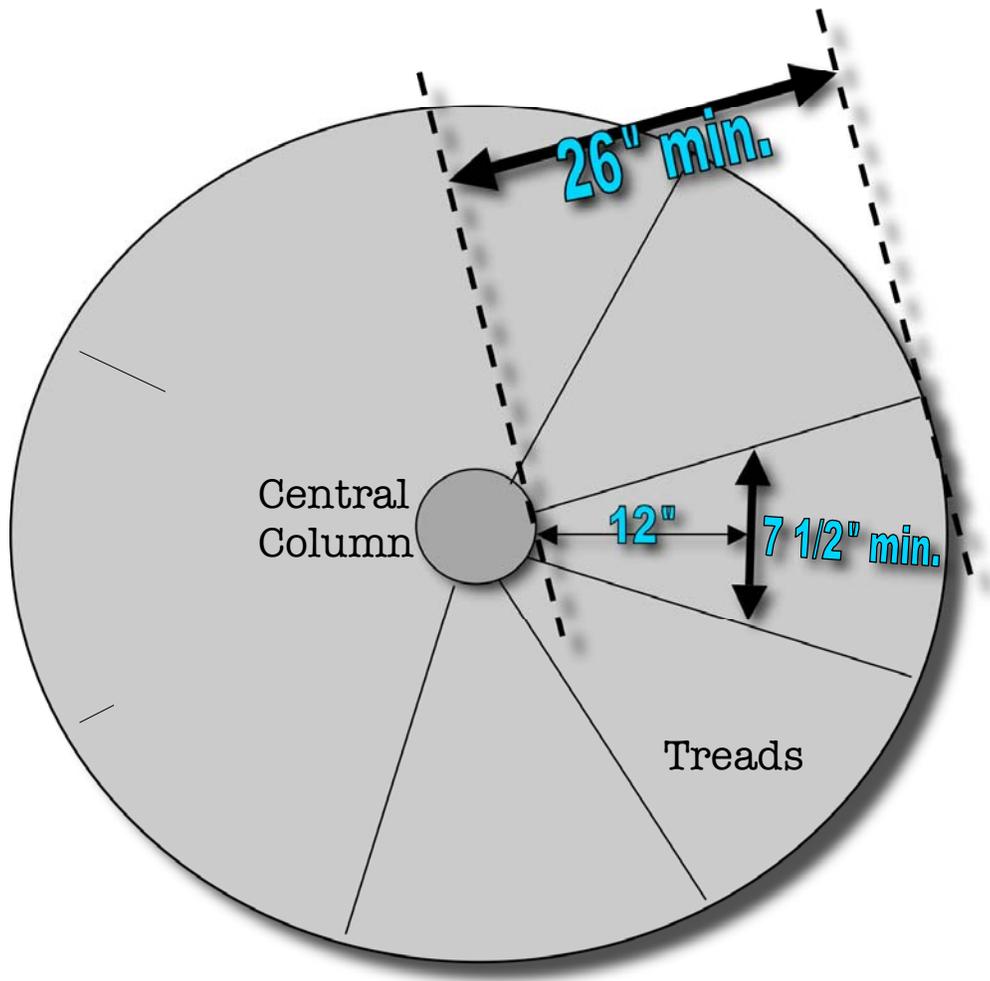
CA: The minimum tread depth is 235 mm, and the maximum tread depth is 355 mm. The minimum run is 210 mm, and the maximum is 355 mm.

Measure the difference between the tread depths.

US: The greatest tread depth within any flight of stairs should not exceed the smallest by more than 3/8 of an inch.

CA: The greatest tread depth within any flight of stairs should not exceed the smallest by more than 6 mm.

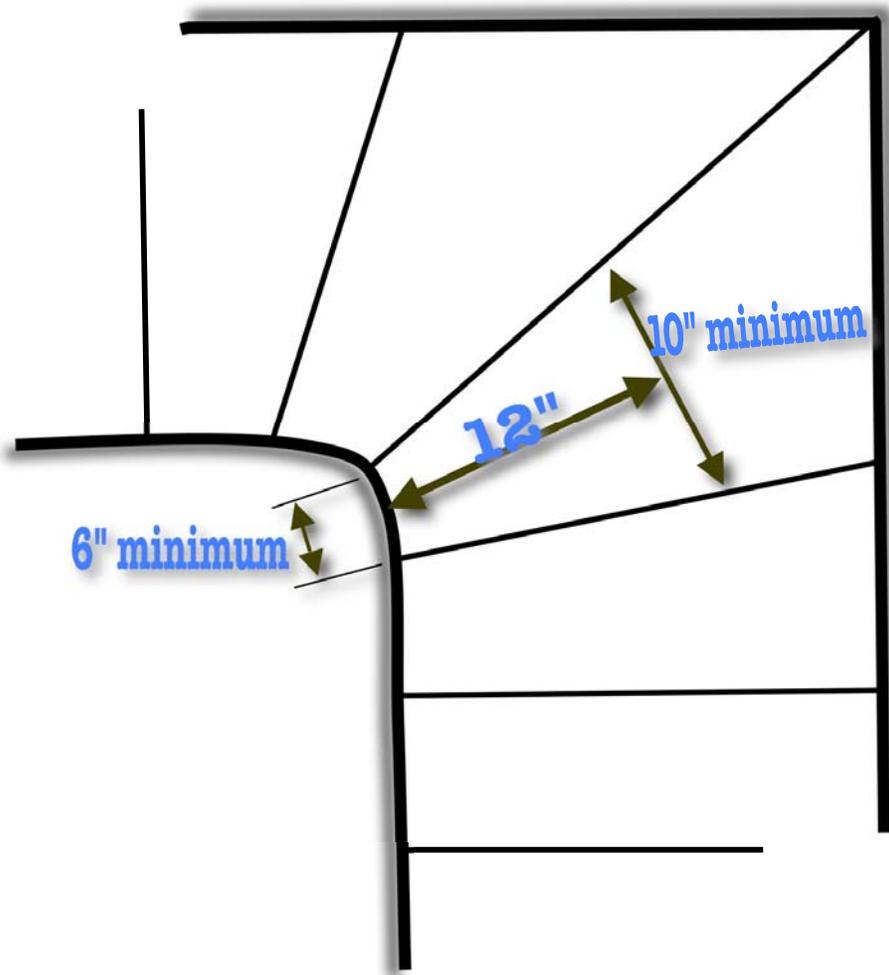
The tolerance allowed for risers and treads is recognition that construction practices make it difficult to make identical riser heights and identical tread dimensions in the field.



Inspect the spiral stair treads.

US: For spiral stairs, all treads should be identical. Each tread should have at least a 7 1/2 inch tread depth at 12 inches from the narrower edge.

CA: For spiral stairs, all treads should have minimum run not less than 150 mm, and an average run not less than 200 mm.



Inspect the winder stair treads.

US: For winder stairs, treads should have a depth of at least 10 inches measured at a point 12 inches from the side where the treads are narrowest. Winder treads should have a depth of at least 6 inches at any point.

CA: Where angled treads or winders are incorporated into a stair, the treads in sets of angled treads or winders within a flight shall turn in the same direction. A set of winders shall not turn through more than 90 degrees. Winder-type turns in stairs are limited to 30 or 45 degrees only. The run should be at least 280 mm measured 230 mm away from the handrail at the narrow end of the tread.

Check the slope.

US: The walking surface of the stairway treads and landings should be sloped no steeper than one unit vertical in twelve units horizontal, 1:12 ratio (a 2% slope).

CA: The cross-slope of treads and landings shall not exceed 1 in 100, 1:100 ratio (a 1% slope).

Check the loads.

US: The minimum concentrated load on stair treads (on an area of 4 square inches) is 300 pounds.

CA: The load on the stair shall be designed for strength and rigidity under uniform loading criteria to support 1.9 kPa (kilopascal) for stairs serving a dwelling unit.

US and CA: Check for cracked, damaged or loose treads.

THE NOSING OR LEADING EDGE:

Inspect the nose or leading edge.

US: On stairways with solid risers, there should be a nosing at least $\frac{3}{4}$ of an inch and not more than 1 and $\frac{1}{4}$ inches. The radius of a nosing curve should be no greater than $\frac{9}{16}$ of an inch. A nosing is not required when the tread depth is 11 inches or more.

CA: The nose of treads that are beveled or rounded shall not exceed 25 mm horizontally. The leading edge of the stair tread shall have a radius or bevel between 6 mm and 10 mm in the horizontal direction.

THE GUARDS:

Inspect the guards.

Guards should be constructed to prevent adults from falling over them and prevent children from crawling through them. The height of a guard is measured vertically from the sloped plane adjoining the tread nosing or leading edge.

Check the guard strength.

US: The design strength of a guard should resist a 200-pound concentrated load applied at any point in any direction along the handrail or the top of the guard.

CA: The design strength for a guard should resist a horizontal load of 0.5 kN/m (kilonewton) or concentrated load of 1.0 kN applied inward or outward at any point at the top of the guard. The top of the guard shall resist an evenly distributed vertical load of 1.5 kN/m.

US: Intermediate rails or balusters should be able to withstand a horizontal load of 50 pounds on an area equal to one square foot.

CA: The guard shall resist a horizontal load applied inward or outward on the elements within the guard, including solid panels and pickets, of 0.5 kN applied over a maximum width of 300 mm and a height of 300 mm imposed, engaging at least 3 balusters.

Measure the height of the elevated floor level.

All decks and porches, including those with insect screening, landings, balconies, mezzanines, galleries, ramps, or raised floor surfaces located more than 30 inches (US), 1.2 m (CA), above the floor or ground should have guards. A guard is necessary at those elevated floor areas, because a fall from that height can result in injury.

CA: Where an interior stair has more than 2 risers, the sides of the stair and the landing or floor level around the stairwell shall be protected by a guard on each side that is not protected by a wall.

CA: A guard is required where there is a difference in elevation of more than 600 mm between the walking surface or adjacent surface, or the adjacent surface within 1.2 m of the walking surface has a slope of more than 1 in 2.

CA: In dwelling units, openable windows over stairs, landings, and ramps that extend to less than 900 mm above the surface of the treads, ramp, or landing shall be protected by a guard.

Measure the guard height.

US: The minimum height of the horizontal guard should be 36 inches. Open sides of stairways with a total rise of more than 30 inches above the floor or ground should have guards not less than 34 inches in height.

CA: The minimum height for interior guards shall be 900 mm high. Where the walking surface served by a guard is not more than 1,800 mm above the finished ground level, the minimum height of an exterior guard shall be 900 mm high; otherwise, the minimum height for all exterior guards shall be 1,070 mm high. The maximum height of a required guard at a landing shall be not more than 1,070 mm.

Check for damage.

US and CA: Inspect for cracked, loose or missing intermediate rails.

Check for a ladder effect.

US and CA: Guards should not have horizontal or ornamental patterns, members, attachments, or openings that will facilitate climbing.

Inspect the glass in guards.

US: Glass used as a handrail assembly or a guard section should be constructed of either single fully tempered glass, laminated fully tempered glass, or laminated heat-strengthened glass. The minimal nominal thickness should be ¼ inch. Each pane of safety glazing installed shall be identified by a manufacturer's designation, which shall be acid etched, sand blasted, ceramic fired, laser etched, embossed, or of a type that once applied, can not be removed without being destroyed.

CA: Glass in guards shall be wired glass or safety glass of the laminated or tempered type.

THE SPHERES:

US: Horizontal guards at raised floor areas, balconies and porches should have intermediate rails or ornamental enclosures that do not allow passage of a 4-inch diameter sphere.

CA: Openings through any guard 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 will not represent a hazard.

US: Open risers should not allow the passage of a 4-inch diameter sphere. On stairs with a total rise of 30 inches or less, the size of the open riser is not limited.

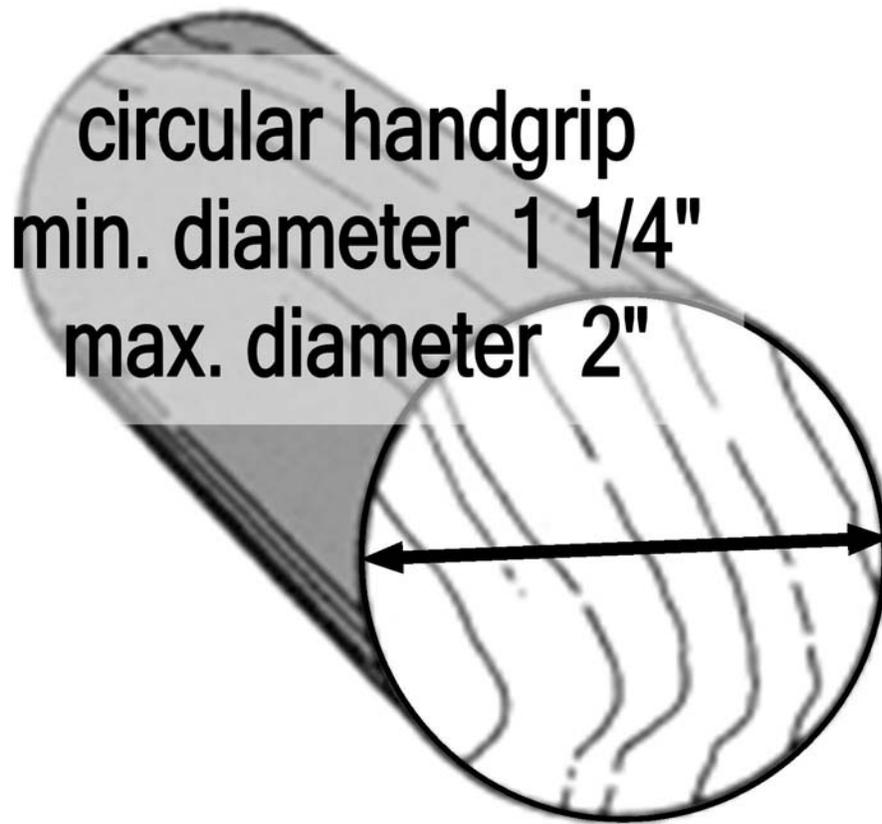
US: The triangular area formed by a tread, riser and guard should not allow passage of a 6-inch diameter sphere.

US: The opening at guards on the sides of stair treads should not allow the passage of a 4 3/8-inch diameter sphere.

THE HANDGRIP:

Inspect the handgrip portion of the handrail.

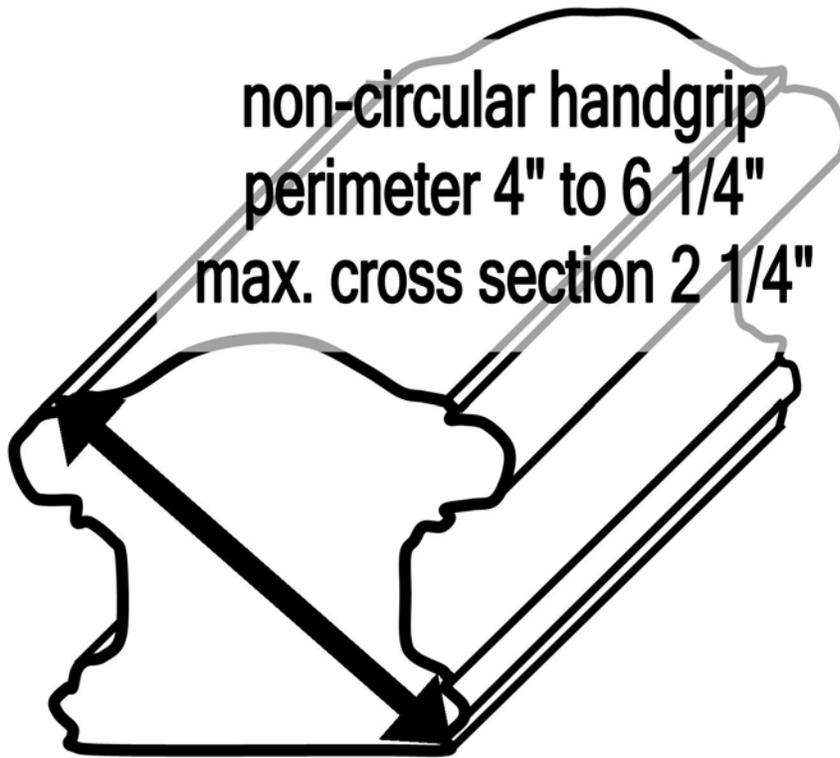
It should be graspable along the entire length of the handrail. The handgrip shape should provide a graspable surface. It should allow the user to maintain a consistently secure natural grasp on the handrail without twisting the fingers or requiring release. The handgrip can be circular or non-circular.



Inspect the circular handgrip.

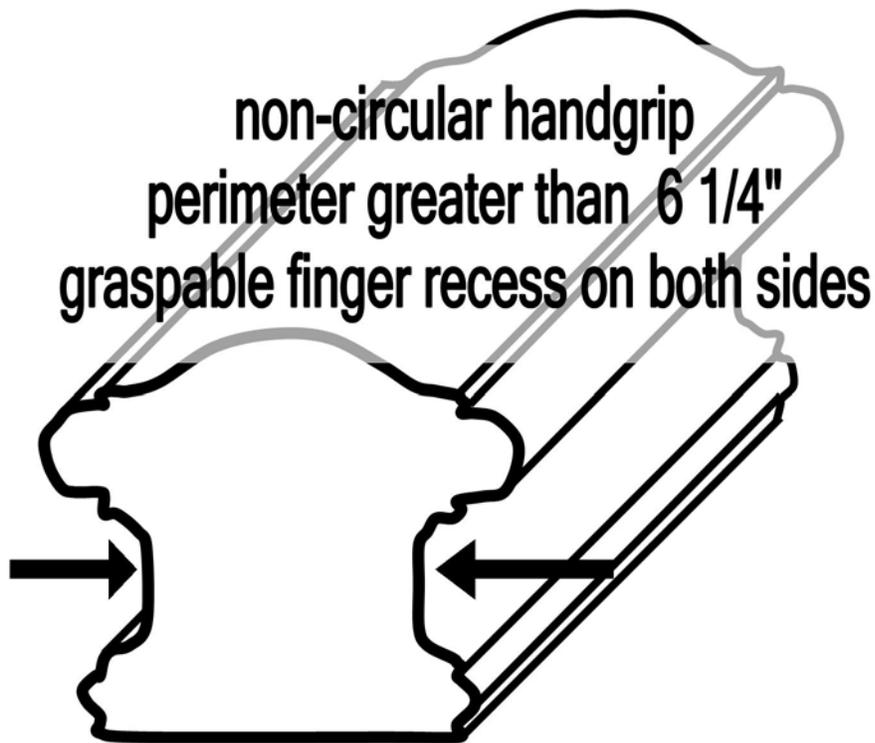
US: A circular handgrip should have a cross section minimum of 1 1/4 inches and a maximum of 2 inches. All handrails should be equivalently graspable to the 2-inch circular handgrip.

CA: A circular handgrip should have a cross section minimum of 30 mm and a maximum of 43 mm.



Inspect the non-circular handgrip.

US: A non-circular handgrip with a perimeter minimum of 4 inches and a maximum of 6 1/4 inches should have a maximum cross section of 2 1/4 inches.



Inspect the non-circular handgrip.

A non-circular handgrip with a perimeter greater than 6 and 1/4 inches should have a graspable finger recess on both sides.

CA: A non-circular handgrip with a perimeter minimum of 100 mm and a maximum of 125 mm should have a maximum cross section of 45 mm.

ABOVE AND BELOW:

Measure the headroom above the stairs.

It is measured vertically from the sloped plane adjoining the tread nosing or from the floor surface of the landing or platform.

US: The headroom in all parts of a stairway should not be less than 6 feet 8 inches. Spiral stairways should have headroom of at least 6 feet 6 inches.

CA: The headroom shall not be less than 1,950 mm for stairs within dwelling units, and 2,050 mm for stairs not within dwelling units.

Inspect below the stairs.

US: Enclosed accessible space under stairs should be protected on the enclosed side with 1/2-inch gypsum board.

US and CA: Check for water damage at the bottom of the stair stringer boards .

US and CA: Inspect below the stairs for mold and damage caused by insect infestation.

Check for ground contact.

CA: Exterior wood steps shall not be in direct contact with the ground unless suitably treated with a wood preservative.

US: Wooden stair components in contact with the ground or in contact with concrete exposed to the weather shall be of approved pressure-preservative-treated wood suitable for ground contact use.

THE LANDINGS:

Inspect the landings.

US and CA: A floor or landing is required at the top and bottom of a stairway. There is an exception: a floor or landing is not required at the top of an interior flight of stairs, including stairs in an enclosed garage, provided a door does not swing out over the stairs.

CA: A landing may be omitted at the top of an interior flight serving a secondary entrance, not including from an attached garage, provided the stair does not contain more than 3 risers.

Inspect the total rise of the stairway.

US: A stairway should not have a vertical rise larger than 12 feet between floor levels or landings.

CA: A stairway shall not exceed 3.7 m.

Inspect the width of the landing.

US: Every landing should be at least 36 inches measured in the direction of travel. The width of the landing should not be less than the width of the stairway.

CA: The landing should be at least the width of the stair. The landing length should be not less than 860 mm (for a landing turn of less than 30 degrees within the dwelling unit), and not less than 900 mm (for a landing turn of less than 30 degrees outside the dwelling unit). The length of the landing with a turn of 30 to 90 degrees should be not less than 230 mm measured at the inside edge of the landing, and not less than 370 mm measured 230 mm from the inside edge of the landing or handrail.

CA: A landing may be omitted at the bottom of an exterior stair provided there is not obstruction, such as a gate or door, within the 900 mm width for stairs serving the dwelling unit or within 1,100 mm width for stairs not serving the dwelling unit.

ILLUMINATION:

Check for lighting at the stairs.

US and CA: All interior and exterior stairways should have a means to illuminate the stairs, including landings and treads.

US: Interior stairways should have a light located at each landing, except when a light is installed directly over each stairway section.

Check the controls.

US and CA: Lights at an exterior stairway should be controlled from inside the property.

US: Interior stairways with at least 6 risers require wall switches at each floor level, unless the lights are continuously illuminated or automatically controlled.

CA: Interior stairways with 4 or more risers shall have 3-way wall switches located at the head and foot of every stairway to control at least one light fixture.

US: Exterior stairways should have a light located at the top of the stairway.

US: Exterior stairways from the outside ground level to a basement should have a light at the bottom of the stairway.

ATTACHMENT:

Check the attachment to the structure.

Required egress stairways, decks, balconies, and similar means of egress should be anchored to the primary structure to resist both vertical and lateral forces. The use of toenails or nails subject to withdrawal is not permitted.

EMERGENCY ESCAPE AND RESCUE OPENINGS

Definition: An exterior window, egress door, or similar component that can serve as a means of escape and access for rescue in case of an emergency.

THE OPENING:

Check for a required opening.

Basements and every sleeping room should have at least one emergency escape and rescue opening. Such openings should directly open into a public street, public alley, yard or court.

Check sleeping rooms.

Where basements contain one or more sleeping rooms, these openings should be installed in each sleeping room, but should not be required in adjoining areas of the basement.

Exception: Basements used for mechanical equipment only and not larger than 200 square feet need not have an emergency escape and rescue opening.

Measure sill height.

The sill height of the opening should not be more than 44 inches above the floor.

Measure opening minimum.

The minimum net clear opening requirement is 5.7 square feet.

Exception: Grade floor openings shall have a minimum net clear opening of 5 square feet.

Measure height and width of opening.

The minimum net clear opening height should be 24 inches.

The minimum net clear opening width should be 20 inches.

Check operability.

The emergency escape and rescue opening should be operational from the inside without the use of tools, keys, or special knowledge.

THE WINDOW WELL:

Measure the window well.

The horizontal area of the window well should be at least 9 square feet. It should have a horizontal projection and width of at least 36 inches each way.

Exception: Ladders or steps may project into the space 6 inches.

Measure the vertical depth and the ladder or steps.

Wells with a vertical depth of at least 44 inches should have a permanent ladder or steps, with an inside width of 12 inches minimum, and at least 3 inches from the wall, and should be spaced no greater than 18 inches apart vertically.

Open the bulkhead.

Bulkheads should open to a full open position, and they should meet the minimum net clear opening requirements.

Check the covers.

Bars, grills, covers, or screens are permitted over the opening, provided that the minimum net clear opening requirements are met. Such devices should be removable from the inside without the use of a key, tool, special knowledge, or force greater than that which is needed for normal operation of the emergency escape and rescue opening.

Check the decks or porches.

Emergency escape and rescue openings are allowed to be under decks and porches provided that the opening can still be fully opened, and there is an egress path of at least 36 inches in height to a yard or court.

SAMPLE REPORTING LANGUAGE

THE HANDRAIL:

Handrail needed.

US and CA: A handrail is needed. Any stairway of four or more risers should have a handrail on at least one side. Correction and further evaluation is recommended.

Handrail too low.

US: The handrail height is too low. The handrail height should be at least 34 inches, and no more than 38 inches. Handrail height is measured vertically from the sloped plane adjoining the tread nosing. Correction and further evaluation is recommended.

CA: The handrail height is too low. The handrail height should be at least 800mm, and no more than 965 mm. Handrail height is measured vertically from the sloped plane adjoining the tread nosing. Correction and further evaluation is recommended.

Handrail is too high.

US: The handrail height is incorrect. The handrail should be no higher than 38 inches, and no lower than 34 inches. Handrail height is measured vertically from the sloped plane adjoining the tread nosing. Correction and further evaluation is recommended.

CA: The handrail height is incorrect. The handrail should be no higher than 965 mm, and no lower than 800 mm. Handrail height is measured vertically from the sloped plane adjoining the tread nosing. Correction and further evaluation is recommended.

The handrail is not continuous.

US: The handrail is not continuous. The handrail should be continuous for the full length of the flight of stairs, measured from a point directly above the top riser to a point directly above the lowest riser of the flight. Continuity can be interrupted by a newel post at a turn. A volute, starting easing, or turnout can be installed over the lowest tread.

CA: The handrail is not continuous. The handrail should be continuous for the full length of the flight of stairs, measured from a point directly above the top riser to a point directly above the lowest riser of the flight. Continuity can be interrupted by a newel post at a turn. A doorway or landing can interrupted continuity.

The handrail termination is incorrect.

US: The handrail termination is incorrect. The handrail should end at a newel post or a wall. Correction and further evaluation is recommended.

CA: The handrail termination is incorrect. Handrails should terminate in a manner that will not obstruct travel or create a hazard.

The handrail clearance is incorrect.

US: The handrail clearance is incorrect. Handrails adjacent to a wall should have a space of not less than 1 1/2 inches between the wall and the handrails. Correction and further evaluation is recommended.

CA: The handrail clearance is incorrect. Handrails adjacent to a wall should have a space of not less than 50 mm between the wall and the handrail, or 60 mm if the surface behind the handrail is rough or abrasive. Correction and further evaluation is recommended.

The handrail attachment is a defect.

US: The handrail attachment is a defect. The handrail should have attachment devices to transfer to the structural wall a concentrated load of 200 pounds applied at any point in any direction.

CA: The handrail attachment is a defect. The handrail should have attachment devices to transfer to the structural wall a concentrated load of CA: 0.9 kN applied at any point in any direction. The attachment points shall not be spaced more than 1.2 m apart. The first attachment point is no more than 300 mm from the end of the handrail. If attached to wooden structural components, the fasteners shall consist of at least 2 wood screws at each point, penetrating at least 32 mm into solid wood.

THE STAIRWAY WIDTH:

The stairway width is incorrect.

US: Stairways should be at least 36 inches wide. This is measured at all points above the handrail height and below the required headroom height. For spiral stairways, there should be a width of at least 26 inches measured at and below the handrail.

CA: Required exit stairs shall have a width of not less than 900 mm. 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.

The stairway width with a handrail is incorrect.

US: When a handrail is installed on only one side, the minimum clear width of the stairway at and below the handrail height should not be less than 31 1/2 inches. When handrails are installed on both sides, the minimum clear width of the stairway at and below the handrail height should not be less than 27 inches.

CA: A handrail shall be provided on at least one side of stairs less than 1,100 mm in width. A handrail shall be provided on both sides 1,100 mm in width or greater. A handrail shall be provided on both sides of curved stairs of any width, except those within a dwelling unit.

The handrail projects too far.

US: Handrails should not project more than 4 1/2 inches on either side of the stairway.

CA: Handrails should not project more than 100 mm on either side of the stairway.

The projection is a defect.

The stairway width limitations are based upon the body's movements as a person walks on a stairway.

US: Projections of 4 1/2 inches or less located below the handrail, including treads, trim, stringers or other items, are permitted.

CA: Projections of 100 mm or less below the handrail into the required width of the stairway are permitted.

THE RISERS AND TREADS:

The riser height is incorrect.

US: The minimum riser height is 4 inches, and the maximum is 7 3/4 inches. For spiral stairs, the maximum rise is 9 1/2 inches.

CA: The minimum riser height riser height is 125 mm, and the maximum is 200 mm. For curved or spiral stairs, the rise shall be between 125 mm and 180 mm.

The difference between the riser heights is incorrect.

US: The greatest riser height within any flight of stairs should not exceed the smallest by more than 3/8 of an inch.

CA: The greatest riser height within any flight of stairs shall not exceed the smallest by more than 6 mm.

The tread depth is incorrect.

US: The minimum tread depth is 10 inches.

CA: The minimum tread depth is 235 mm, and the maximum tread depth is 355 mm. The minimum run is 210 mm, and the maximum is 355 mm.

The difference between the tread depths is incorrect.

US: The greatest tread depth within any flight of stairs should not exceed the smallest by more than 3/8 of an inch. For winders, this is measured at the 12 inch walk line.

CA: The greatest tread depth within any flight of stairs should not exceed the smallest by more than 6 mm.

The spiral stair tread measurement is incorrect.

US: For spiral stairs, all treads should be identical. Each tread should have at least a 7 1/2 inch tread depth at 12 inches from the narrower edge.

CA: For spiral stairs, all treads should have minimum run not less than 150 mm, and an average run not less than 200 mm.

The winder stair tread measurement is incorrect.

US: For winder stairs, treads should have a depth of at least 10 inches measured at a point 12 inches from the side where the treads are narrowest. Winder treads should have a depth of at least 6 inches at any point.

CA: Where angled treads or winders are incorporated into a stair, the treads in sets of angled treads or winders within a flight shall turn in the same direction. A set of winders shall not turn through more than 90 degrees. Winder-type turns in stairs are limited to 30 or 45 degrees only. The run should be at least 280 mm measured 230 mm away from the handrail at the narrow end of the tread.

The slope is a hazard.

US: The walking surface of the stairway treads and landings should be sloped no steeper than 1/4-inch vertical in 12 inches horizontal (a 2% slope).

CA: The cross-slope of treads and landings shall not exceed 1 in 100 (a 1% slope).

The load on the stair is a defect.

US: The minimum concentrated load on stair treads (on an area of 4 square inches) is 300 pounds.

CA: The load on the stair shall be designed for strength and rigidity under uniform loading criteria to support 1.9 kPa for stairs serving a dwelling unit.

THE NOSING OR LEADING EDGE:

The nosing or leading edge is incorrect.

US: On stairways with solid risers, there should be a nosing at least $\frac{3}{4}$ of an inch and not more than 1 and $\frac{1}{4}$ inches. The radius of a nosing curve should be no greater than $\frac{9}{16}$ of an inch. A nosing is not required when the tread depth is 11 inches or more.

CA: The nose of treads that are beveled or rounded shall not exceed 25 mm horizontally. The leading edge of the stair tread shall have a radius or bevel between 6 mm and 10 mm in the horizontal direction.

THE GUARDS:

The guard strength is a defect.

US: The design strength of a guard should resist a 200-pound concentrated load applied at any point in any direction along the handrail or the top of the guard.

CA: The design strength for a guard should resist a horizontal load of 0.5 kN/m or concentrated load of 1.0 kN applied inward or outward at any point at the top of the guard. The top of the guard shall resist an evenly distributed vertical load of 1.5 kN/m.

The strength of the intermediate rails, balusters, or elements within the guard is a defect.

US: Intermediate rails or balusters should be able to withstand a horizontal load of 50 pounds on an area equal to one square foot.

CA: The guard shall resist a horizontal load applied inward or outward on the elements within the guard, including solid panels and pickets, of 0.5 kN applied over a maximum width of 300 mm and a height of 300 mm imposed, engaging at least 3 balusters.

The guard height is incorrect.

US: The minimum height of the horizontal guard should be 36 inches. Open sides of stairways with a total rise of more than 30 inches above the floor or ground should have guards not less than 34 inches in height.

CA: The minimum height for interior guards shall be 900 mm high. Where the walking surface served by a guard is not more than 1,800 mm above the finished ground level, the minimum height of an exterior guard shall be 900 mm high; otherwise, the minimum height for all exterior guards shall be 1,070 mm high. The maximum height of a required guard at a landing shall be not more than 1,070 mm.

A ladder effect exists.

US and CA: Guards should not have horizontal or ornamental patterns, members, attachments, or openings that will facilitate climbing.

The glass in guard is a defect.

US: Glass used as a handrail assembly or a guard section should be constructed of either single fully tempered glass, laminated fully tempered glass, or laminated heat-strengthened glass. The minimal nominal thickness should be ¼ inch. Each pane of safety glazing installed shall be identified by a manufacturer's designation, which shall be acid etched, sand blasted, ceramic fired, laser etched, embossed, or of a type that once applied, cannot be removed without being destroyed.

CA: Glass in guards shall be wired glass or safety glass of the laminated or tempered type.

THE SPHERES:

The guard opening is incorrect.

US: Horizontal guards at raised floor areas, balconies and porches should have intermediate rails or ornamental enclosures that do not allow passage of a 4-inch diameter sphere.

CA: Openings through any guard 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 will not represent a hazard.

US: Open risers should not allow the passage of a 4-inch diameter sphere. On stairs with a total rise of 30 inches or less, the size of the open riser is not limited.

US: The triangular area formed by a tread, riser and guard should not allow passage of a 6-inch diameter sphere.

US: The opening at guards on the sides of stair treads should not allow the passage of a 4 3/8-inch diameter sphere.

THE HANDGRIP:

The circular handgrip is incorrect.

US: A circular handgrip should have a cross section minimum of 1 ¼ inches and a maximum of 2 inches. All handrails should be equivalently graspable to the 2-inch circular handgrip.

CA: A circular handgrip should have a cross section minimum of 30 mm and a maximum of 43 mm.

The non-circular handgrip is incorrect.

US: A non-circular handgrip with a perimeter minimum of 4 inches and a maximum of 6 ¼ inches should have a maximum cross section of 2 ¼ inches. A non-circular handgrip with a perimeter greater than 6 ¼ inches should have a graspable finger recess on both sides

CA: A non-circular handgrip with a perimeter minimum of 100 mm and a maximum of 125 mm should have a maximum cross section of 45 mm.

ABOVE AND BELOW:

The headroom is too low.

US: The headroom in all parts of a stairway should not be less than 6 feet 8 inches. Spiral stairways should have headroom of at least 6 feet 6 inches.

CA: The headroom shall not be less than 1,950 mm for stairs within dwelling units, and 2,050 mm for stairs not within dwelling units.

The stairs are in contact with the ground.

CA: Exterior wood steps shall not be in direct contact with the ground unless suitably treated with a wood preservative.

US: Wooden stair components in contact with the ground or in contact with concrete exposed to the weather shall be of approved pressure-preservative-treated wood suitable for ground contact use.

THE LANDINGS:

A landing is missing.

US and CA: A floor or landing is required at the top and bottom of a stairway.

The total rise of the stairway is too large.

US: A stairway should not have a vertical rise larger than 12 feet between floor levels or landings.

CA: A stairway shall not exceed 3.7 m.

The width of the landing is incorrect.

US: Every landing should be at least 36 inches wide, measured in the direction of travel. The width of the landing should not be less than the width of the stairway.

CA: The landing should be at least the width of the stair. The landing length should be not less than 860 mm (for a landing turn of less than 30 degrees within the dwelling unit), and not less than 900 mm (for a landing turn of less than 30 degrees outside the dwelling unit. The length of the landing with a turn of 30 to 90 degrees should be not less than 230 mm measured at the inside edge of the landing, and not less than 370 mm measured 230 mm from the inside edge of the landing or handrail.

ILLUMINATION:

The lighting at the stairs is inadequate.

US and CA: All interior and exterior stairways should have a means to illuminate the stairs, including landings and treads.

US: Interior stairways should have a light located at each landing, except when a light is installed directly over each stairway section.

There is a defect at the light controls.

US and CA: Lights at an exterior stairway should be controlled from inside the property.

US: Interior stairways with at least 6 risers require wall switches at each floor level, unless the lights are continuously illuminated or automatically controlled.

CA: Interior stairways with 4 or more risers shall have 3-way wall switches located at the head and foot of every stairway to control at least one light fixture.

There is a missing light.

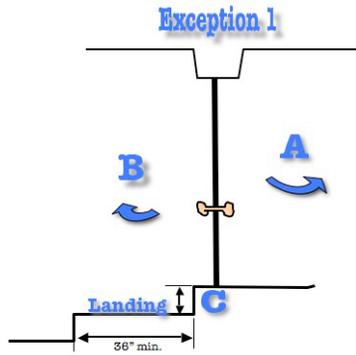
US: Exterior stairways should have a light located at the top of the stairway.

There is a missing light.

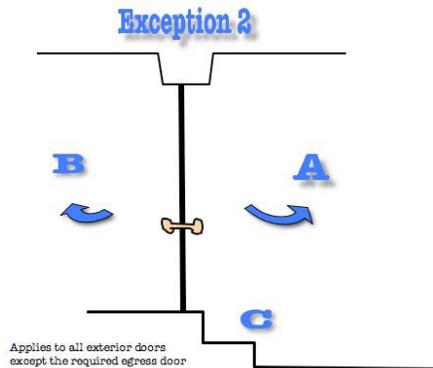
US: Exterior stairways from the outside ground level to a basement should have a light at the bottom of the stairway.

Exam Questions for Means of Egress Course

1. A crawlspace access panel can fulfill the requirement for an egress at a residential dwelling unit.
2. The required egress door can be a slider door provided the door is at least 3 feet 6 inches in width.
3. The required egress door can have an interior-keyed dead bolt.
4. The width of the landing should not be less than the door width.
5. Every landing should be at least ____ inches measured in the direction of travel.
6. If the egress door does not swing over the landing, then the exterior landing can be ____ inches below the top of the threshold.
7. Screen and storm doors are never allowed to swing over the landing.
8. If a stairway with at most two risers is at the exterior-side of a door, other than the required egress door, a landing on the outside is not required provided the door does not swing over the stairway.



9. In this picture, you can see an exception to a rule for a landing at an exterior door. What is in location A? Location B? Location C?



10. In this picture,
11. You can see another exception to the rule for a landing at an exterior door. What is in location A? Location B? Location C?
12. The width of a hallway must be at least ____ inches.
13. Ramps should not have a slope greater than a ____ unit vertical in 12 units horizontal.
14. In areas where it is not possible to comply with the 1:12 slope maximum, ramps can have a ____ slope.

15. A minimum 3 foot by 3 foot landing should be installed at the a) top of the ramp b) bottom of the ramp, c) where doors open onto the ramp, d) where the ramp changes direction, e) all the above
16. Handrails at ramps should be at least ___ inches in height, measured from the finished surface of the ramp.
17. Any stairway of ___ or more risers should have a handrail on at least one side.
18. The height of the handrail at a stairway is measured vertically from the _____.
19. A stairway handrail should be continuous from a point directly above the ___ riser to a point directly above the ___ riser of the flight.
20. A doorway that interrupts continuity is not permitted.
21. Handrails adjacent to a wall should have a space of at least _____ between the wall and the handrail.
22. The handrail should have attachment devices to transfer to the wall a concentrated load of ___ pounds applied at any point in any direction.
23. When a handrail is installed on only one side, the minimum clear width of the stairway at and below the handrail height should be at least _____.
24. When a handrail is installed on both sides, the minimum clear width of the stairway at and below the handrail height should be at least _____.
25. Stairways should be at least _____ wide. This is measured at all points above the height of the handrail and below the required headroom height.
26. Stringer trim boards are allowed to project more than 4 and 1/2 inches into the stairway width.
27. The minimum riser height is ___ inches.
28. The maximum riser height is ___ inches.
29. The greatest riser height within any flight of stairs should not be bigger than the smallest by more than _____.
30. The minimum tread depth is 11 inches.
31. For spiral stairs, each tread should have at least a 7 and 1/2 inch tread depth at ___ inches from the narrower edge.
32. For winder stairs, treads should have a depth of at least ___ inches measured at a point 12 inches from the narrower edge.
33. The walking surface of the stairway treads and landings should not be sloped steeper than ___ unit vertical in twelve units horizontal.
34. The minimum concentrated load on stair treads (on an area of 4 square inches) is ___ pounds.
35. On stairways with solid risers, there should be a nosing at least ___ and not more than 1 and 1/4 inches.
36. A nosing is not required when the tread depth is 11 inches or more.
37. Intermediate rails or balusters should be able to withstand a horizontal load of ___ pounds on an area equal to one square foot.
38. All decks and porches, including those with insect screening, landings, balconies, mezzanines, galleries, ramps, or raised floor surfaces located more than ___ inches (US), 1.2 m (CA), above the floor or ground should have guards.
39. The minimum height of the horizontal guard should be 38 inches.
40. Each pane of safety glazing installed shall be identified by a manufacturer's designation, which shall be acid etched, sand blasted, ceramic fired, laser etched, embossed, or of a type that once applied, can be removed without being destroyed.

41. Horizontal guards at raised floor areas, balconies and porches should have intermediate rails or ornamental enclosures that do not allow passage of a ____-inch diameter sphere.
42. The triangular area formed by a tread, riser and guard should not allow passage of a ____-inch diameter sphere.
43. The opening at guards on the sides of stair treads should not allow the passage of a ____-inch diameter sphere.
44. The handgrip portion of the handrail should be graspable along the entire length of the handrail.
45. It should allow the user to maintain a consistently secure natural grasp on the handrail with some twisting of the fingers or requiring release.
46. A non-circular handgrip with a perimeter greater than 6 and 1/4 inches should have a graspable finger recess on only one side.
47. The headroom in all parts of a stairway should not be less than _____.
48. Enclosed accessible space under stairs should be protected on the enclosed side with _____.
49. A stairway should not have a vertical rise larger than ____ feet between floor levels or landings.
50. The width of the landing can be less than the width of the stairway.
51. Interior stairways with at least ____ risers require wall switches at each floor level, unless the lights are continuously illuminated or automatically controlled.
52. Exterior stairways from the outside ground level to a basement should have a light at the bottom of the stairway.
53. Required egress stairways, decks, balconies, and similar means of egress should be anchored to the primary structure to resist both vertical and lateral forces. The use of toenails or nails subject to withdrawal is permitted.
54. _____ and every sleeping room should have at least one emergency escape and rescue opening.
55. Where basements contain one or more sleeping rooms, an emergency escape and rescue opening should be installed in _____.
56. Basements used for mechanical equipment only and not larger than ____ square feet need not have an emergency escape and rescue opening.
57. The sill height of the opening should not be more than _____ above the floor.
58. The minimum net clear opening height should be _____. The minimum net clear opening width should be _____.
59. The horizontal area of the window well of the emergency escape and rescue opening should be at least ____ square feet.
60. Wells with a vertical depth of at least 44 inches should have a permanent ladder or steps.
61. Emergency escape and rescue openings are allowed to be under decks and porches provided that the opening can still be fully opened, and there is an egress path of at least _____ in height to a yard or court.

SLIDE SHOW with Benjamin Gromicko

Introduction

“My name is Benjamin Gromicko. I am the director and editor of this Egress course. I am a home inspector. I have been performing home inspections since 1996.

Kenton, your course instructor, previously mentioned the importance of taking digital pictures at a home inspection.

Let’s go over a few of pictures that I’ve taken during inspections. We’ll look at some defects, and I will speak about the advantage of taking digital pictures at a home inspection.

There are three reasons to take digital pictures at an inspection. They are as follows: 1) they make the inspection report an affective marketing tool, 2) they can reduce post-inspection liability and complaints, and 3) they make communicating to your client easier (a picture is worth a thousand words).

Let’s go over some inspection pictures that I took at about 6 different houses.”

Bulkheads. Open the bulkhead. Bulkheads should open to a full open position, and they should meet the minimum net clear opening requirements.

Continuity. A handrail must be continuous for the entire length of the flight, without the release of the fingers.

For **winder** stairs, treads should have a depth of at least 10 inches measured at a point 12 inches from the side where the treads are narrowest. Winder treads should have a depth of at least 6 inches at any point.

When a **handrail** is installed on **only one side**, the minimum clear width of the stairway at and below the handrail height should be at least 31 and 1/2 inches. When handrails are installed on both sides, the minimum clear width of the stairway at and below the handrail height should be at least 27 inches.

The standard is not concerned with components such as trim, stringers, or other items which may be found below the handrail, as long as they do not exceed the maximum 4 and 1/2-inch projection of the handrail. The stairway width limitations are based upon the body’s movements as a person walks on a stairway. Projections of 4 1/2 inches or less located below the handrail, including treads, trim, stringers or other items, are permitted.

All egress doors shall be **readily openable** from the inside without the use of a tool, a **key**, or special knowledge or effort.

The **width of a landing** should not be less than the door width. The minimum dimension of every landing is 36 inches measured in the direction of travel.

If the door does not swing over the landing, then the exterior landing can be at most **7 and 3/4** inches below the top of the threshold. This is applicable to **all exterior doors including** the required egress door. The screen and storm doors are allowed to swing over the landing.