

Seattle Permits

— part of a multi-departmental City of Seattle series on getting a permit

Getting a Grip on Handrails

Updated March 2, 2007

PURPOSE OF HANDRAILS

Handrails are for safety. On stairs and ramps, they provide something to grasp for support. If someone trips or needs help with balance, handrails are there to be grasped. They are particularly important at the top and bottom of a stair or ramp, where pedestrians may need extra help in orienting themselves.

The size, placement and number of handrails are governed by either the Seattle Residential Code (SRC for single family, duplex or townhouses – all with 3 or fewer stories) or the Seattle Building Code (SBC – all other residences and other buildings). The type of building determines which code to use. Each of these codes gives the minimum requirements for handrails, but designers should always keep in mind the purpose of handrails, and consider adding additional ones if safety warrants them.

The following rules apply equally to stairs and ramps, unless noted otherwise. (Guardrails and areas with tiered seating are not discussed here.)

Projects Under the Seattle Residential Code (Section R311.5.6 Handrails)

Single family houses, duplexes and townhouses have the following requirements:

Number of handrails – Handrails shall be provided on at least one side of each continuous flight with four or more risers. (This rule also applies to exterior stairs.) On ramps, a handrail is required on at least one side if the ramp slope exceeds 1 unit vertical to 12 units horizontal (8.33 percent slope). See Figures A.2, C.2.

Height – Handrails shall be mounted so that the top of the handrail is between 34 and 38 inches above the stair tread at the nosing. See Figure A.1.

Continuity – Handrails shall be continuous the full length of the flight or ramp. They cannot be interrupted by newel posts, except at a turn. They shall start at least directly above the top riser, and extend to at least the top of the lowest riser. The most dangerous places on stairways, where people are the most likely to trip, are at the top and bottom. Having a handrail extend beyond the end of a stair or ramp provides a great deal of extra safety and is required on ramps. See Figures A.2. and C.2.

Figure A.1
Handrail height and minimum length

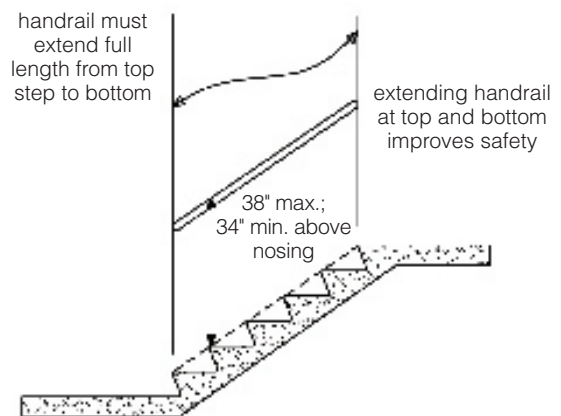
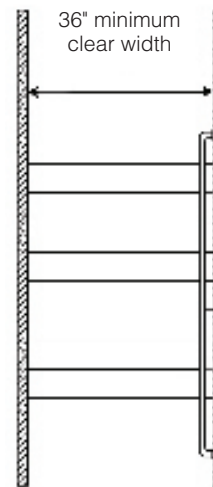


Figure A.2



Handrail configuration – The ends of the handrails must either be “returned,” or end in safety terminals. (A “return,” for example, is where the end of the handrail turns into the adjacent wall.) These returns and safety stops prevent items such as sleeves, packages or briefcases from getting caught by the ends of the rail, or prevent the end of the rail from poking someone approaching the rail. At the lowest tread, a newel post, volute, turnout or starting easing is permitted in the handrail. See Figures B.1 and A.2.

Figure B.1

SRC Section R311.5.6.2

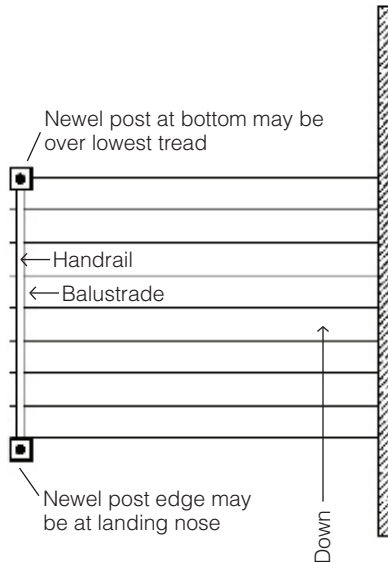
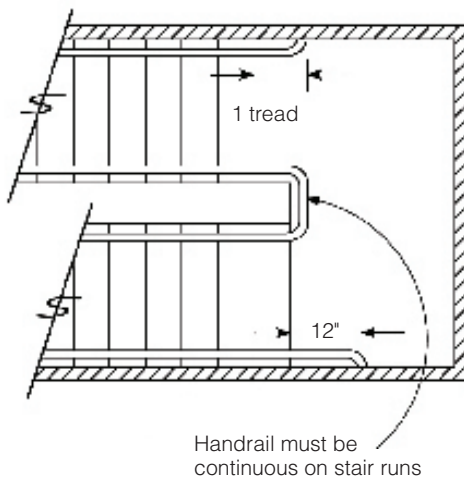


Figure B.2

SBC Section 1009.11.5



Handrail grip size – The handrail must be easily grasped. To meet code, a handrail that is round in cross section must be between 1¼ to 2 inches in diameter. If a handrail is not round, it must provide an equivalent surface that is easily grasped. There are two alternate types:

- Handrails with a perimeter dimension between 4 and 6¼ inches, with a maximum cross section of 2¼ inches.
- Handrails with a perimeter dimension greater than 6¼ inches must have a graspable finger recess area. For specific dimensions of this recess, see SRC Section R311.5.6.3.2.

See Figure E (pg. 5) for some acceptable handrail profiles.

Clearance – The handrail must also be far enough away from the wall so it can be easily grasped. The minimum clear distance is 1½ inches between the handrail and the wall.

Projects Under the Seattle Building Code

(Section 1009.11 Handrails)

Projects that are not single family houses, duplexes or townhouses (3 or fewer stories) are governed by the Seattle Building Code (SBC) and have slightly different requirements. (Residential units in larger buildings are also under the SBC.)

NUMBER OF HANDRAILS

Generally, all stairs and ramps for projects falling under the SBC are required to have handrails on both sides. Below are the exceptions:

NO HANDRAILS are required in the following situations:

- Inside any dwelling or sleeping unit with only one riser elevation change (R2 or R3 classifications)
- At each residence (R3 classification) that has only one riser change at an egress or entrance door landing
- On decks, patios and walkways with only one riser elevation change, provided there is an area equivalent to the required landing size on each side of the riser
- On ramps with a rise of 6 inches or less

ONE HANDRAIL is sufficient for:

- Stairs within an individual dwelling unit
- Spiral stairs

MORE THAN TWO HANDRAILS

The code specifies that every part of the required width of a stair or ramp be within 30 inches of a handrail. Below is a chart showing when intermediate handrails are required, and how many. Remember, it is the required width of a stair or ramp that matters, not the actual width.

Required egress width	# of intermediate handrails required
less than 5 feet	0
between 5 feet up to 10 feet	1
between 10 feet up to 15 feet	2
between 15 feet up to 20 feet	3
between 20 feet up to 25 feet	4
between 25 feet up to 30 feet	5

A 20-foot wide stair could have only two handrails, if the required width was only 60 inches. The handrails must be located on the most used path of travel on a stair. Designers can always place extra handrails if safety warrants it. See Figure D (pg. 4) for some options on how to place multiple handrails.

HANDRAIL HEIGHT, LENGTH, AND SHAPE

Handrails must be easy to grasp, be at a comfortable and safe height, and extend beyond the ends of stairs and ramps for extra safety. They must also be continuous along a stairway or ramp.

Length – Handrails must be continuous along the length of a stair. Handrails must also be continuous between flights – that is, they cannot stop and start again between adjacent stair runs. See Figure B.2 (pg. 2).

Exception – Handrails on stairs that are not a required means of egress are not required to be continuous.

Mounting Height – The handrail must be mounted with the top of the rail between 34 and 38 inches above the nosing of the stair tread, or above the walking surface of the ramp. See Figure C.

Extensions – The most dangerous places on stairways and ramps, where people are the most likely to trip, are at the top and bottom. Having a handrail extend beyond the end of a stair or ramp is very important for this reason. The handrails must extend at least 12 inches beyond the top riser, and a minimum of 12 inches one tread beyond the bottom riser. The extensions must return. See Figure C.

Figure C

Handrail extensions and allowable mounting heights

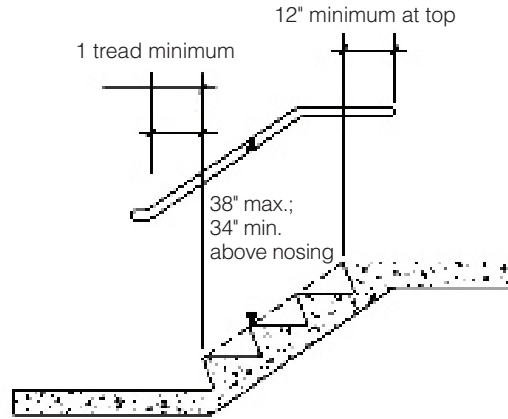


Figure C.1 - Stair

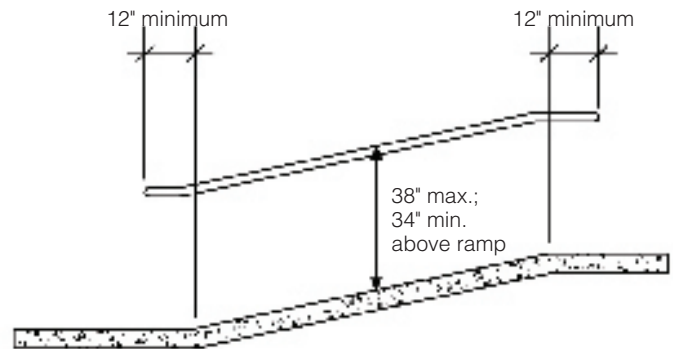


Figure C.2 - Ramp

Exceptions – Handrails in dwelling units not required to be accessible for people with disabilities are not required to have extensions. Stairways that are not required means of egress also do not require extensions.

Safety Stops and Returns – The ends of the handrails must either be “returned” or end in newel posts or safety terminals. A newel post can only be used on the lowest point of the handrail (A “return” is where the end of the handrail turns into the adjacent wall or turns back on itself.) These returns and safety stops prevent items such as sleeves, packages or briefcases from getting caught by the ends of the rail, or prevent the end of the rail from poking someone approaching the rail.

Exceptions – Handrails in dwelling units are permitted to have a newel post at a landing as well as at the lowest tread.

Size and Shape of Handrails – The size and shape of handrails must be easily graspable. If the handgrip is too large, too small, or too close to the wall, it will not be effective.

A clear space of at least 1½ inches is required between the handrail and the wall. There can be a projection of up to 4½ inches below each handrail into the required stair or ramp width. See Figure D.

To meet code, a handrail that is round in cross section must be from 1¼ to 2 inches in diameter. If a handrail is not round, it must have a perimeter dimension from 4 to 6¼ inches, with a maximum diameter thickness of 2¼ inches. All edges must be eased with a minimum radius of 1/100th inch. See Figure E (pg. 5) for some acceptable handrail profiles.

Projections into Stairs and Ramps – The code requires ramps and stairs to be specific widths so that there is enough room for people to leave quickly in

case of an emergency. This width must be clear, and free from obstructions such as door swings, posts, columns and protrusions. These features could get in the way of people trying to leave the building.

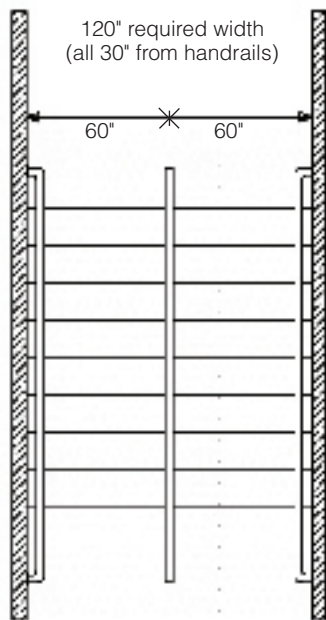
The code allows handrails to project into this required width by a small amount. In general, a handrail can extend into the required width by a maximum of 4½ inches on each side of the stair or ramp.

Handrails generally cannot protrude into the required width of an intersecting corridor or other passageway. In an existing building having new handrails installed, the building official may allow the handrail extensions to be omitted if they would reduce the required width or compromise safety in other ways. The designer should check with the plans examiner or building inspector before planning any projection into a passageway. See Figure F (pg. 5).

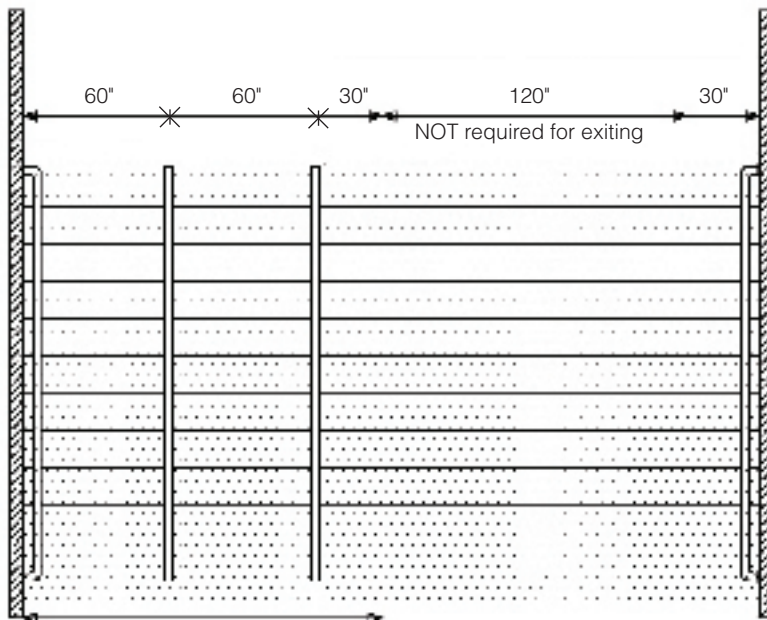
Figure D

There are several different options for placing handrails on a stair depending on the calculated exit width and most probable path of travel.

Example: 120" required;
120" provided



Example: Calculated required exit
Width = 180"
Monumental stair width = 300"



most direct route
required exit width calculation
 $60" + 60" + 30" + 30" = 180" \Rightarrow \text{okay}$

Figure E.1

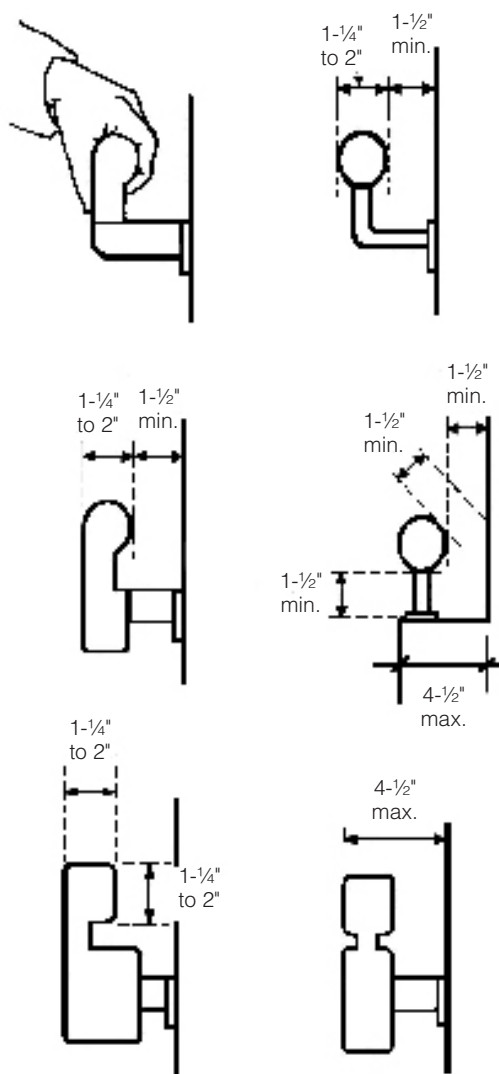


Figure E.2

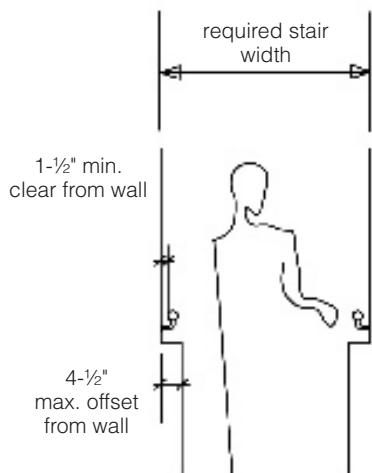
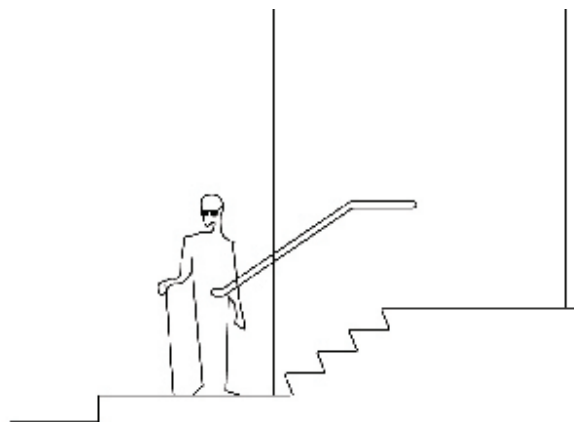


Figure F

Exemption for handrail extensions where safety is compromised



SUMMARY

Handrails are meant to provide a safe and practical aid to those using stairways and ramps. Effective handrails have an easily grasped size and shape, are mounted at a comfortable height, and are available along the entire length of a stair. They extend beyond the stair or ramp at the crucial top and bottom in nonresidential buildings and buildings containing several residences. The handrails are also sufficient enough in number to make users feel they can be easily grasped from all points. The codes list the minimum standards for handrails, but good design often provides more than the minimum, to make users safe and secure.

Relevant building code sections include the Seattle Residential Code (SRC 2003) - Section R311.5.6 Handrails; Section R311.5.6.3 Handgrip, for single family, duplex, and townhouses; and Seattle Building Code (SBC 2003) - Section 1009.11 (1 through 5) Handrails; Section 1010 Handrails (ramps).

Access to Information

Links to electronic versions of Seattle DCI **Tips**, **Director's Rules**, and the **Seattle Municipal Code** are available on the "Tools & Resources" page of our website at www.seattle.gov/sdci. Paper copies of these documents, as well as additional regulations, are available from our Public Resource Center, located on the 20th floor of Seattle Municipal Tower at 700 Fifth Ave. in downtown Seattle, (206) 684-8467.