

# Building Code Comparison Chart

Guard Location Requirements	
International Residential Code	<p>30" above floor or grade below on open-sided walking surfaces.</p> <p>On open sides of stairs with a total riser of more than 30" above the floor or grade below.</p>
International Building Code	<p>30" above floor or grade below on open-sided walking surfaces, mezzanines, industrial equipment platforms, stairways, ramps and landings.</p> <p>30" above floor or grade below along glazed sides of stairways, ramps, and landings where the glazing provided does not meet the code's strength and attachment requirements.</p>
IRC 2009 IBC 2009	<p>Measurement for the 30" drop is to be taken at any point within 36" from the edge of the open surface.</p>
Height Requirements, Minimum for Guardrails	
IRC	<p>36" minimum on porches, balconies, raised floor surfaces.</p> <p>34" minimum on the open side of stairs.</p>

IBC	42" minimum except in Group R-3, and within individual dwelling units of Group R-2. In those applications, where the top rail also serves as a handrail, it shall have a height of not less than 34" and not more than 38" above stair nosing.
IBC 2001	Amended to add the following: The height in assembly areas shall be in accordance with Section 1008.12.
IBC 2009	Amended to add the following: In assembly seating where guards in accordance with Section 1025.14 are permitted and provided.
<h3>Height Requirements (Of Guards) For Balconies, Galleries and Bleachers</h3>	
IBC 2000	All portions of the stairway width required for egress capacity are within 30 inches (762mm) of a handrail.
IBC 2003	Intermediate handrails are required so that all portions of the stairway width required for egress capacity are within 30 inches of a handrail. On monumental stairs, handrails shall be located along the most direct path of egress travel.
<h3>Allowable Opening, Maximum</h3>	

<p style="text-align: center;">IRC</p>	<p>4" sphere—general.</p> <p>4-3/8" sphere for openings on the sides of stair treads.</p> <p>6" sphere—at the triangle formed by riser, tread and bottom rail.</p>
<p style="text-align: center;">IRC 2003</p>	<p>R312.2 Guard opening limitations. Required guards on open sides of stairways, raised floor areas, balconies and porches shall have intermediate rails or ornamental closures which do not allow passage of a sphere 4" or more in diameter.</p> <p><i>Exceptions:</i></p> <p>The triangular openings formed by the riser, tread and bottom rail of a guard at the open side of a stairway are permitted to be of such a size that a sphere 6 inches (152 mm) cannot pass through.</p> <p>Openings for required guards on the sides of stair treads shall not allow a sphere 4 3/8" to pass through.</p>
<p style="text-align: center;">IBC 2000</p>	<p>4" sphere—general—to a height of 34".</p> <p>6" sphere—at triangle formed by riser, tread and bottom rail.</p> <p>8" sphere from a height of 34" to 42".</p> <p><i>Exceptions:</i></p> <p>21" sphere for an elevated walk for electrical, mechanical and plumbing systems and Group I-3, F, H, or S occupancies, balusters,</p>

	horizontal intermediate rails or other construction.
IBC 2003	<p>In areas which are not open to the public within occupancies in Group I-3, F, H or S, balusters, horizontal intermediate rails or other construction shall not permit a sphere with a diameter of 21" to pass through any opening.</p> <p>In assembly seating areas, guards at the end of aisles—where they terminate at a fascia of boxes, balconies, and galleries—shall have balusters or ornamental patterns such that a 4" sphere cannot pass through any opening up to a height of 26". From a height of 26" to 42" above the adjacent walking surfaces, a sphere 8" in diameter shall not pass.</p>
IBC 2006	4-3/8" sphere for openings on the sides of stair treads in Group R-3 and within individual dwelling units of Group R-2.
<b>Glass Railing</b>	
IBC	<p>Each handrail or guard section shall be supported by a minimum of three glass balusters or shall be supported to remain in place should one baluster panel fail. Glass balusters shall not be installed without an attached handrail or guard.</p> <p>The panels and their support system shall be designed to withstand the uniform or concentrated load requirements—applied at the top—by a design factor of 4 for safety.</p>

<p>IBC 2012</p>	<p>If the top rail is only supported by the glass, the assembly shall be tested according to the impact requirements in ASTM E 1996. The impacted glass shall be able to support the top rail after impact.</p> <p>A top rail shall not be required where the glass balusters are laminated glass with two or more glass plies of equal thickness and the same glass type when approved by the building official. The panels shall be designed to withstand the structural load as required by code.</p> <p>Glass installed in exterior railing infill panels or balusters shall be laminated glass complying with Category II of CPSC 16 CFR 1201.</p>
<p>IBC 2015</p>	<p>Laminated, tempered glass is required in all glass railing applications.</p>
<h2 style="text-align: center;">Handrail Location Requirements</h2>	
<p>IRC 2000</p>	<p>Handrails required on at least one side of ramps exceeding a slope of 1:12.</p> <p>Handrail required on at least one side of stairway</p>
<p>IRC 2003</p>	<p>Handrail required on at least one side of the stairway with two or more risers.</p> <p>Handrails shall be provided on at least one side of each continuous run of treads or flight with four or more risers.</p>

<p>IBC 2000</p>	<p>Handrails required on both sides of stairs and ramps.</p> <p>All portions of the stairway width required for egress capacity are to be within 30" of a handrail.</p>
<p>IBC 2003</p>	<p>Aisle stairs provided with a center handrail need not have additional handrails.</p> <p>Stairways within dwelling units, spiral stairways and aisle stairs serving seating only on one side are permitted to have a handrail on one side only.</p> <p>Decks, patios, and walkways that have a single change in elevation where the landing depth on each side of the change of elevation is greater than what is required for a landing do not require handrails.</p> <p>In Group R-3 occupancies, a change in elevation consisting of a single riser at an entrance or egress door does not require handrails.</p> <p>Changes in room elevations of only one riser within dwelling units and sleeping units in Group R-2 and R-3 occupancies do not require handrails.</p> <p>Intermediate handrails are required so that all portions of the stairway width required for egress capacity are within 30" of a handrail. On monumental stairs, handrails shall be located along the most direct path of egress travel.</p>
<p>ANSI A117.1</p>	<p>Handrails required on both sides of stairs and ramps.</p>

	<p><i>Exception:</i> Aisle stairs and aisle ramps provided with a handrail either at the side or within the aisle width.</p>
ADASAD	<p>Ramps—both sides, if rise exceeds 6" or a horizontal length more than 72". Not required next to seating in assembly areas. Stairs—both sides.</p>
<h3>Intermediate Handrail Requirements</h3>	
IBC 2000	<p>All portions of the stairway width required for egress capacity are within 30" of a handrail.</p>
IBC 2003	<p>Intermediate handrails are required so that all portions of the stairway width required for egress capacity are within 30 inches (762 mm) of a handrail. On monumental stairs, handrails shall be located along the most direct path of egress travel.</p>
<h3>Grip Size, Handrail</h3>	
IRC	<p>Type I: Handrails with a circular cross section shall have an outside diameter of at least 1-1/4" and not greater than 2 inches. If the handrail is not circular it shall have a perimeter dimension of at least 4" and not greater than 6-1/4" with a maximum cross section dimension of 2-1/4".</p> <p>Type II: Handrails with a perimeter greater</p>

	<p>than 6-1/4" shall provide a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of 3/4" measured vertically from the tallest portion of the profile and achieve a depth of at least 5/16" within 7/8" below the widest portion of the profile. This required depth shall continue for at least 3/8" to a level that is not less than 1-3/4" below the tallest portion of the profile. The minimum width of the handrail above the recess shall be 1-1/4" to a maximum of 2-3/4". Edges shall have a minimum radius of .01".</p>
<p>IBC ANSI A117.1 ADASAD 2010</p>	<p>Circular shapes: 1-1/4" minimum; 2" maximum.</p> <p>Non-Circular: Perimeter dimension of 4" minimum and 6-1/4" maximum with a 2-1/4" maximum cross-section.</p> <p>Edges are noted as 1/8" minimum radius for IBC 2000; .01" minimum radius for IBC 2003 and later; and rounded for ADASAD.</p>
<p>IBC</p>	<p>For Group R-3 and within individual dwelling units of Group R-2, Type II handrail is also permitted as defined in IRC above.</p>
<h2>Clearance, Handrails</h2>	
<p>IRC IBC ANSI A117.1 ADASAD</p>	<p>1-1/2 inch from the wall, minimum.</p>



<p>NFPA OSHA</p>	<p>2-1/4" from the wall, minimum.</p> <p><i>Note:</i> Many jurisdictions have modified this requirement to 1-1/2" when adopted. Contact your local authority having jurisdiction to verify.</p>
<p>IBC</p>	<p>Handrail brackets or balusters attached to the bottom surface of the handrail that do not project horizontally beyond the sides of the handrail within 1-1/2" of the bottom of the handrail shall not be considered to be obstructions and provided further that for each 1/2" of additional handrail perimeter dimension above 4", the vertical clearance dimension of 1-1/2" shall be permitted to be reduced by 1/8".</p>
<p style="text-align: center;"><b>Project from Wall</b></p>	
<p>IRC IBC ANSI A117.1 ADASAD 2010</p>	<p>4-1/2" maximum.</p>
<p style="text-align: center;"><b>Height Requirements, Minimum for Handrails</b></p>	
<p>IRC IBC ANSI A117.1</p>	<p>Measured vertically above stair nosings and ramp surfaces: 34" minimum; 38" maximum.</p>

<p>IRC</p>	<p>Handrail height, measured vertically from the sloped plane adjoining the tread nosing, or finish surface of ramp slope, shall be not less than 34" and not more than 38".</p>
<p>IBC</p>	<p>Guards not less than 42".</p> <p><i>Exception:</i></p> <p>For Group R-3, and within individual dwelling units in R-2, whose top rail also serves as handrail shall have a height not less than 34 inches and not more than 38 inches.</p>
<p>ADASAD</p>	<p>38" maximum.</p> <p><i>ADAAG Advisory: The requirements for stair and ramp handrails in this document are for adults. When children are the principal users in a building or facility (e.g., elementary schools), a second set of handrails at an appropriate height can assist them and aid in preventing accidents. A maximum height of 28 inches (710 mm) measured to the top of the gripping surface from the ramp surface or stair nosing is recommended for handrails designed for children. Sufficient vertical clearance between upper and lower handrails, 9 inches (230 mm) minimum, should be provided to help prevent entrapment.</i></p>
<p style="text-align: center;"><b>Handrail Continuity Requirements</b></p>	
<p>IRC</p>	<p>Handrails for stairways shall be continuous for the full length of the flight, from a point directly above the top riser of the flight to a point directly above lowest riser of the flight. Handrail ends shall be returned or shall</p>

	<p>terminate in newel posts or safety terminals.</p> <p><i>Exceptions:</i></p> <p>Handrails shall be permitted to be interrupted by a newel post at the turn.</p> <p>The use of a volute, turnout, starting easing or starting newel shall be allowed over the lowest tread.</p>
IBC	<p>Handrail-gripping surfaces shall be continuous, without interruption by newel posts or other obstructions.</p> <p><i>Exceptions:</i></p> <p>Handrails within dwelling units are permitted to be interrupted by a newel post at a stair landing.</p> <p>Within a dwelling unit, the use of a volute, turnout or starting easing is allowed on the lowest tread.</p> <p>Handrail brackets or balusters attached to the bottom surface of the handrail that do not project horizontally beyond the sides of the handrail within 1-1/2" of the bottom of the handrail shall not be considered to be obstructions and provided further that for each 1/2" of additional handrail perimeter dimension above 4", the vertical clearance dimension of 1-1/2" shall be permitted to be reduced by 1/8".</p>

## Handrail Extension Requirements - Top of Stairs

IBC  
ANSI A117.1  
ADASAD

12" horizontally beyond top stair riser—  
measure to the inside face of the handrail  
return.

IRC

Not required.

## Handrail Extension Requirements - Bottom of Stairs

IBC  
ANSI A117.1  
ADASAD

Handrail shall extend at the slope of the stair  
flight for a horizontal distance equal to one  
tread depth beyond the last riser nosing—  
measure to the inside face of the handrail  
return.

IRC

Not required.

## Handrail Extension Requirements, Ramps

IBC  
ANSI A117.1  
ADASAD

12" horizontally at both top and bottom of  
ramp runs—measure to the inside face of the  
handrail return.

## End Details, Handrails

<p style="text-align: center;">IRC</p>	<p>Ends shall return or shall terminate in newel posts or safety terminals</p>
<p style="text-align: center;">IBC 2000 ANSI A117.1</p>	<p>Return to wall, guard or the walking surface or continuous to the handrail of an adjacent stair flight</p>
<p style="text-align: center;">ADASAD</p>	<p>Return smoothly to walls, posts or floors</p>
<h2>Live Load, Uniform</h2>	
<p style="text-align: center;">IRC</p>	<p>200 lb Uniform live load.</p> <p>50 lb/sq ft. horizontally applied normal load for guard in-fill components (all those except the handrail), balusters and panel fillers. This load need not be assumed to act concurrently with any other live load requirement.</p>
<p style="text-align: center;">IBC 2000</p>	<p>50 lb/ft. in any direction (handrails and guards).</p>
<p style="text-align: center;">IBC</p>	<p>Handrail assemblies and guards shall be designed to resist a load of 50 plf applied in any direction at the top and to transfer this load through the supports to the structure.</p> <p>Intermediate rails (all those except the handrail), balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 pounds on an area equal to 1 square foot, including openings and space between rails. Reactions due to this loading</p>

	are not required to be superimposed with those of Section 1607.7.1 or 1607.7.1.1.
<b>Live Load, Concentrated</b>	
IRC 2000	200 lbs.
IRC 2003	200 lbs. Uniform Live Load. A single concentrated load applied in any direction at any point along the top.
IBC 2000	200 lbs. in any direction (handrails and guards).
IBC 2003	Handrail assemblies and guards shall be able to resist a single concentrated load of 200 pounds applied in any direction at any point along the top and have attachment devices and supporting structure to transfer this loading to appropriate structural elements of the building.
ANSI A117.1	250 lbs. (grab bars for toilets, tubs, and showers).