Appropriate *Performance Requirements*:
Where an alternative stairway or ramp system is proposed as a *Performance Solution* to that described in Part 3.9.1, that proposal must comply with—
(a) *Performance Requirement P2.5.1*; and
(b) the relevant *Performance Requirements* determined in accordance with 1.0.7.

### 3.9.1.0 Explanation of terms

The following figures depict stairway members and associated terminology used to describe them in the *Housing Provisions*. Some items such as barriers and handrails have been omitted for clarity.

**Figure 3.9.1.0**

**STAIRWAY TERMS**

- Nosing line
- Quarter landing
- Landing
- Flight number 2
- Tread - Going (G)
- Riser (R)
- Max. 3 winders

(a) Quarter landing stairway - 2 flights
(b) Continuous stairway - 1 flight (90° change in direction)
Explanatory information:

1. **Alpine areas:**
   The requirements of this Part are to be read in conjunction with Part 3.7.5 where a building is located in an *alpine area* and contains an external stairway or ramp.

2. **Room heights:**
   3.8.2.2 contains the *required* height for a ceiling above a stairway, ramp or *landing*, measured vertically above the nosing line of stairway treads or the floor surface of a ramp or *landing*.

---

**Acceptable construction practice**

### 3.9.1.1 Application

Compliance with this acceptable construction practice satisfies *Performance Requirement P2.5.1* for stairway and ramp construction.

### 3.9.1.2 Stairway construction

(a) A stairway must be designed to take loading forces in accordance with AS/NZS 1170.1 and must have—
   
   (i) not more than 18 and not less than 2 *risers* in each *flight*; and
   
   (ii) *goings* (G), *risers* (R) and a slope relationship quantity (2R + G) in accordance with Table 3.9.1.1, except as permitted by (b) and (c); and

<table>
<thead>
<tr>
<th>STAIR TYPE</th>
<th>RISER (R) (see Figure below)</th>
<th>GOING (G) (see Figure below)</th>
<th>SLOPE RELATIONSHIP (2R+G)</th>
<th>Max</th>
<th>Min</th>
<th>Max</th>
<th>Min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stairs (other than spiral)</td>
<td>190  115</td>
<td>355  240</td>
<td>700  550</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spiral</td>
<td>220  140</td>
<td>370  210</td>
<td>680  590</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

125 mm sphere must not pass through treads
SAFE MOVEMENT AND ACCESS

(3.9.1.2)

(iii) constant *goings* and *risers* throughout each *flight*, except as permitted by (c) and (d), and the dimensions of *goings* (G) and *risers* (R) in accordance with (a), (b) and (c) are considered constant if the variation between—

(A) adjacent *risers*, or between adjacent *goings*, is no greater than 5 mm; and

(B) the largest and smallest riser within a *flight*, or the largest and smallest going within a *flight*, does not exceed 10 mm; and

(iv) *risers* which do not have any openings that would allow a 125 mm sphere to pass through between the treads; and

(v) treads of solid construction (not mesh or other perforated material) if the stairway is more than 10 m high or connects more than 3 storeys.

(b) In the case of a stairway serving only non-*habitable rooms*, such as attics, storerooms and the like that are not used on a regular or daily basis—

(i) the *going* (G), *riser* (R) and slope relationship quantity (2R + G) in accordance with *Table 3.9.1.1* may be substituted with those in *Table 3.9.1.2*; and

(ii) need not comply with *3.9.1.2(a)(iv).*

*Table 3.9.1.2 RISER AND GOING DIMENSIONS (mm) — STAIRWAYS SERVING NON-HABITABLE ROOMS USED INFREQUENTLY*

<table>
<thead>
<tr>
<th>RISER (R)</th>
<th>GOING (G)</th>
<th>SLOPE RELATIONSHIP (2R+G)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max</td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>225</td>
<td>130</td>
<td>355</td>
</tr>
</tbody>
</table>

*Note:* The *going* (G) shall be not more than the tread depth plus a maximum gap of 30 mm between the rear edge of one tread and the nosing of the tread above.

**Explanatory information:**

1. **Not more than 18 and not less than 2 risers:**

   *3.9.1.2(a)(i)* states that a stairway must have not more than 18 and not less than 2 *risers* in each *flight*. Where there are less than 2 *risers* in a *flight*, it does not comprise a stairway for the purpose of the BCA. 18 *risers* is considered to be the maximum reasonable number that an average person can negotiate before requiring a rest. Winders are counted as part of the maximum number of 18 *risers*. More than 1 *riser* is considered necessary for a person to observe and adjust to a change in level.

2. **Going and riser dimensions:**

   The purpose of *3.9.1.2* is to achieve constant *going* and *riser* dimensions deemed safe for people to walk up and down. This minimises the risk of people overstepping during descent on uneven stairs (due to short *goings*) and tripping on ascent (due to high *risers*). *Table 3.9.1.1* and *Table 3.9.1.2* express ratios between *going* and *riser* dimensions which are considered safe for use. *3.9.1.2(a)(iii)* accounts for conditions such as movement of materials due to atmospheric moisture changes or minor deviations related to variations in materials which affect finished stair dimensions.

   *Diagram a* illustrates adjacent *risers* within a *flight* with minor deviations in the materials affecting the finished stair dimensions. The nominated *riser* height is exceeded by *riser* A. As a consequence riser height B is less than the nominated riser height. The difference between riser A and riser B cannot exceed 5 mm.
Diagram b illustrates an entire flight with minor deviations in the materials affecting the finished riser dimensions. In addition to the 5 mm difference permitted between adjacent goings or risers, the maximum difference between the smallest and largest going or riser within a flight must not exceed 10 mm.

Despite the deviations shown in both Diagram a and Diagram b, the stairs in the flight are deemed constant.

Irrespective of any minor deviations permitted by 3.9.1.2(a)(iii), finished going and riser dimensions must not exceed the limitations stipulated in Table 3.9.1.1.

### MINOR DEVIATIONS IN A STAIRWAY

<table>
<thead>
<tr>
<th>Diagram a.</th>
<th>Deviation in adjacent risers</th>
</tr>
</thead>
</table>

#### Notes:

1. A = larger riser of two adjacent risers.
2. B = smaller riser of two adjacent risers.
3. This diagram only shows deviations in risers, however the same principle can apply for goings.

<table>
<thead>
<tr>
<th>Diagram b.</th>
<th>Deviations over a flight</th>
</tr>
</thead>
</table>

#### Notes:

1. C = largest riser of the flight.
MINOR DEVIATIONS IN A STAIRWAY

2. $D =$ smallest riser of the flight.
3. This diagram only shows deviations in risers, however the same principle can apply for goings.

3. Openings in stair risers:

   **3.9.1.2(a)(iv)** allows the use of open riser stairs. However, it limits the openings to 125 mm to minimise the risk of a person (especially a young child) falling through the opening created by the open riser.

4. Solid treads:

   **3.9.1.2(a)(v)** specifies a height where solid treads must be used so that people cannot see through them. This minimises the risk of people being affected by vertigo.

(c) In the case of a stairway with winders—

(i) a maximum of 3 consecutive winders in lieu of a quarter landing in a flight and a maximum of 6 consecutive winders in lieu of a half landing in a flight; and

(ii) the going (G) of all winders in lieu of a quarter or half landing may vary from the going of the straight treads within the same flight provided that the going (G) of such winders is constant.

Explanatory information:

Stairways with winders:

1. **3.9.1.2(c)** allows the use of winders in stairways. However, **3.9.1.2(c)** places a restriction on the number of allowable winders in a stairway flight, this restriction would apply equally to not permit a stairway incorporating a consecutive series of winders in a flight.

2. This also means the maximum number of consecutive winders in any stairway flight is 6.

(d) The point of measurement of the going (G) in the slope relationship quantity (2R + G) for tapered treads and treads in spiral stairways as described in **Table 3.9.1.1** (see **Figure 3.9.1.1**) must be—

(i) for tapered treads, other than treads in a spiral stairway—

   (A) not more than 1 m in width, the middle of the unobstructed width of the stairway (see **Figure 3.9.1.1, Diagram b**); and

   (B) more than 1 m in width, 400 mm from the unobstructed width of each side of the stairway (see **Figure 3.9.1.1, Diagram c**); and

(ii) for treads in spiral stairways, the point seven tenths of the unobstructed width from the face of the centre pole or support towards the handrail side (see **Figure 3.9.1.2**).
Figure 3.9.1.1

MEASUREMENT OF SLOPE RELATIONSHIP — Plan view

Diagram a. Stair with 2 flights

Slope relationship quantity not required for landing

Constant rise, going and slope relationship quantity for each stair flight

Unobstructed width of the stair flight - measured from innermost projection of handrail, newel post etc.

Flight number 2

Flight number 1

Diagram b. Tapered treads — not more than 1 m wide

Diagram c. Tapered treads — more than 1 m wide

Going for slope relationship measured at this point

Equal

Equal

More than 1 m in width

400 mm

400 mm
3.9.1.3 Ramps

An external ramp serving an external doorway or a ramp within a building must—

(a) be designed to take loading forces in accordance with AS/NZS 1170.1; and

(b) have a gradient not steeper than 1:8; and

(c) be provided with *landings* complying with 3.9.1.5 at the top and bottom of the ramp and at intervals not greater than 15 m.
Explanatory information:

In relation to external ramps, 3.9.1.3 applies to a ramp serving an external door. For the purpose of 3.9.1.3 a driveway is not considered to be a ramp.

3.9.1.4 Slip-resistance

The requirements for slip-resistance treatment to stair treads, ramps and landings are as follows:

(a) Treads must have—
   (i) a surface with a slip-resistance classification not less than that listed in Table 3.9.1.3 when tested in accordance with AS 4586; or
   (ii) a nosing strip with a slip-resistance classification not less than that listed in Table 3.9.1.3 when tested in accordance with AS 4586.

(b) The floor surface of a ramp must have a slip-resistance classification not less than that listed in Table 3.9.1.3 when tested in accordance with AS 4586.

(c) Landings, where the edge leads to the flight below, must have—
   (i) a surface with a slip-resistance classification not less than that listed in Table 3.9.1.3 when tested in accordance with AS 4586, for not less than 190 mm from the stair nosing; or
   (ii) a nosing strip with a slip-resistance classification not less than that listed in Table 3.9.1.3 when tested in accordance with AS 4586.

<table>
<thead>
<tr>
<th>Application</th>
<th>Dry</th>
<th>Wet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ramp not steeper than 1:8</td>
<td>P4 or R10</td>
<td>P5 or R12</td>
</tr>
<tr>
<td>Tread surface</td>
<td>P3 or R10</td>
<td>P4 or R11</td>
</tr>
<tr>
<td>Nosing or landing edge strip</td>
<td>P3</td>
<td>P4</td>
</tr>
</tbody>
</table>

Explanatory information:

1. To determine the appropriate surface of a tread or the floor surface of a ramp, it is necessary to determine the likely conditions the tread or ramp will be subject to over the life of the building. This can be either dry, wet or both. A dry surface is one that is not normally wet or likely to be made wet other than by an accidental spill. A wet surface is one that is normally wet or likely to be made wet, including areas exposed to the weather.

2. Under 3.9.1.4(a) stair treads must have a surface or nosing strip which minimises the risk of people slipping and injuring themselves. In each case the surface or nosing must have a slip-resistance classification when tested in accordance with AS 4586. There are two tests (the Wet Pendulum Test or the Oil-Wet Inclining Platform Test) and two conditions (dry or wet) to be considered.

3. Under 3.9.1.4(b) the floor surface of a ramp must be slip-resistant to minimise the risk of people slipping and injuring themselves. The surface must have a slip-resistance classification when tested in accordance with AS 4586.
3.9.1.5 Landings

Landings must—

(a) be not less than 750 mm long and where this involves a change in direction, the length is measured 500 mm from the inside edge of the landing (see Figure 3.9.1.3, Diagram a); and

(b) have a gradient not steeper than 1:50; and

(c) be provided where the sill of a threshold of a doorway opens onto a stairway or ramp that provides a change in floor level or floor to ground level greater than 3 risers or 570 mm (see Figure 3.9.1.3, Diagram b); and

(d) extend across the full width of a doorway; and

(e) in the case of a stairway serving only non-habitable rooms, such as attics, storerooms and the like that are not used on a regular or daily basis, the requirements of (a) may be substituted with a minimum length of landing being not less than 600 mm long.

Explanatory information:

1. **Purpose of a landing:**
   The purpose of a landing is to provide a rest area for people using the stairway or ramp, and to allow the stairway or ramp to change direction if needed.

2. **Minimum landing length:**
   The minimum length of a landing allows people using a stairway or ramp to rest, and reduces the risk of people falling more than one flight of stairs.

3. **Maximum grade of 1:50:**
   The maximum grade of 1 in 50 required under 3.9.1.5(b) makes sure that the landing is as level as possible, but still allows a slight slope for drainage if necessary.

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**Figure 3.9.1.3**

**LANDINGS**

**Diagram a.** Stairway landing

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3.9.1.6 Thresholds

Where the threshold of a doorway is more than 230 mm above the adjoining surface it must incorporate steps having *riser* (R) and *going* (G) dimensions in accordance with 3.9.1.2.