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Tactile Indicators Compliance Guide





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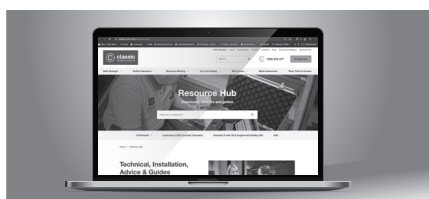
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Why is compliance important?

Stairways, ramps, escalators, and moving walks are essential elements in improving efficiency and traffic flow. However, for individuals with vision impairment, navigating these features can be challenging. Tactile indicators serve as crucial navigational aids for individuals with vision impairment. They provide tactile and visual cues, signalling changes in elevation, the presence of potential hazards, or the termination of a path.

What codes and standards are relevant?

The Disability Discrimination Act (DDA) mandates that buildings and facilities in Australia ensure reasonable access for individuals with disabilities. This encompasses the safety and accessibility of stairways, walkways, and all communal areas. While the DDA doesn't explicitly outline specific requirements for this, it provides the overarching goal of guaranteeing safe access for people with disabilities.

In Australia, the National Construction Code (NCC) and Building Code of Australia (BCA) incorporate Australian Standards that detail specific requirements for designing accessible environments, including provisions for mobility and access. The NCC is a uniform set of technical provisions for the design and construction of buildings and other structures throughout Australia. The BCA forms chapters 1 and 2 of the NCC. Under the NCC 2022, all building classifications must be accessible to people with disabilities with reference to the Australian Standard.

AS/NZS 1428.4.1:2009 is the Australian Standard that outlines the requirements for tactile indicators, ensuring consistency and effectiveness across various built environments. The standard addresses the placement of warning indicators at the top and bottom of stairs, escalators, ramps, and moving walks.

AS 4586:2013 is the Australian Standard that outlines the criteria for testing and classifying tactile indicators for appropriate slip resistance qualities. Materials used for tactile installation must meet the slip resistance test criteria specified in the standard to ensure safe and secure footing for pedestrians, especially in wet or slippery conditions. It sets out suitable testing methods as well as resulting classifications ie. P5, P4 etc.

The BCA also sets out comprehensive requirements for fire safety in buildings, including specifications for the fire resistance of building materials.

Where are these applicable?

The above-mentioned standards are applicable in various environments where public

access is provided, including but not limited to;

- Public streets and sidewalks
- Pedestrian crossings
- Public transportation facilities such as train stations, bus stops, and airports
- Public buildings such as government offices, schools, hospitals, and libraries
- Recreational facilities such as parks, sports stadiums, and entertainment venues
- Commercial premises like shopping centres, malls, and retail stores

Types of Tactile Indicators

In general, there are two main types of tactile indicators, namely Warning Tactile Indicators and Directional Tactile Indicators. While both tactile types provide important directional and orientation cues for the blind and vision impaired, they serve slightly different but complementary purposes.

Warning Tactile Indicators

Warning tactile indicators, also commonly referred to as hazard tactile indicators, are textured features installed onto walking surfaces to function as a 'stop' sign. These warning TGSIs alert any pedestrians who may be blind or vision-impaired of potential hazards in their path of travel, prompting them to stop and assess the situation before moving forward.

Commonly installed at;

- Ramps or ramp landings
- Kerb ramps
- Escalators
- Steps and stairs

Directional Tactile Indicators

Directional tactile indicators, also commonly referred to as leading tactile indicators, are textured features comprising directional bars, installed onto walking surfaces to provide directional orientation. These directional TGSIs assist blind and vision-impaired pedestrians to determine and navigate their next best accessible path of travel.

Commonly installed in open areas to assist with continuous navigation, directional tactile indicators also guide people to safely deviate from one path of travel to another.

Commonly installed at;

- Crossing points and intersections
- Kerb ramps
- Open areas
- Building entrances
- Public transportation access points

Outline of AS/NZS 1428.4.1:2009 requirements:

Warning Tactile Indicators

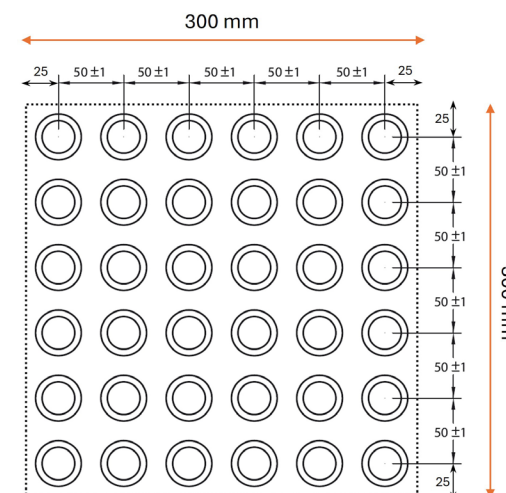
Installation

All warning tactile indicators should be installed as follows;

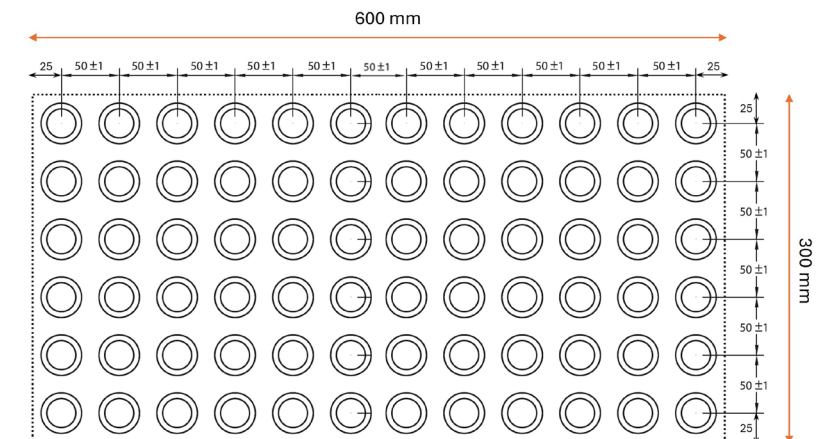
- Across the full width of the path of travel
- Place them perpendicular to the direction of travel towards the hazard
- Set them back 300 ± 10 mm from the edge of the hazard, except at railway platforms and wharves
- Where discrete warning tactiles are used over a pad depth of 300mm to 400mm the arrangement shall be as shown below, with a minimum of 6 discrete truncated cones in the direction of travel, a pad depth of 600 to 800mm shall have a minimum of 12 discrete truncated cones.

Please note: The measurement of the pad includes 50mm spacing for each individual tactile (as shown below) ie. both a 300-400mm pad, and a 600-800mm pad includes a 25mm space on either end.

Example of 300mm pad, using rows of 6 discrete tactiles, including 50mm spacings between each.



Example of 600mm pad, using rows of 12 discrete tactiles, including 50mm spacings between each.



Setback Distance:

- Where the top of the stairs, escalators, ramps, or moving walks leads to an open area and the bottom landing is enclosed, and is less than 3000mm wide :
 - o Warning indicators must be set back from the top of stairs, escalators, ramps, and moving walks by 300 ± 10 mm, and form a 600 to 800mm 'pad' (see Figure 3A and 4A).
 - o This setback distance is carefully specified to provide users with adequate warning and preparation time before encountering the change in elevation or transition.

NOTE: Handrails must be located on both sides of the stairway, ramp or escalator

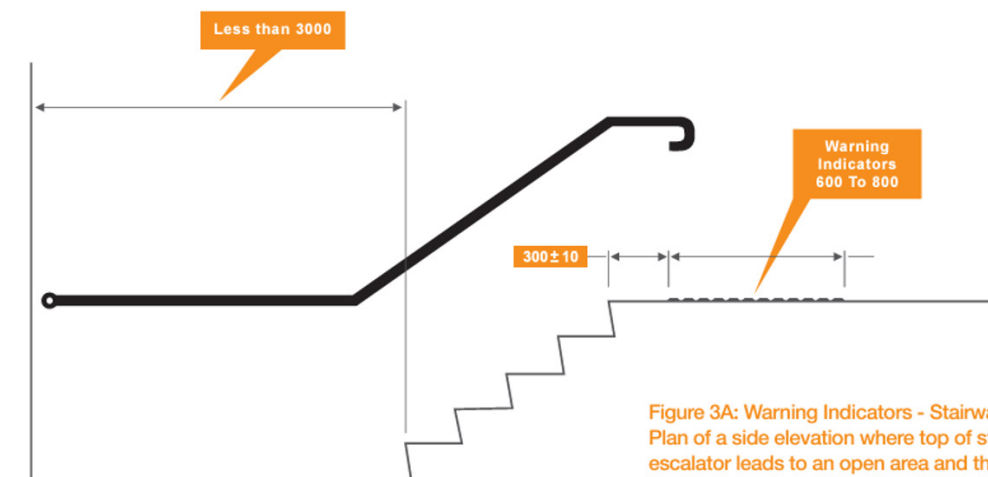


Figure 3A: Warning Indicators - Stairways
Plan of a side elevation where top of stairway or escalator leads to an open area and the bottom landing is enclosed, less than 3000 wide

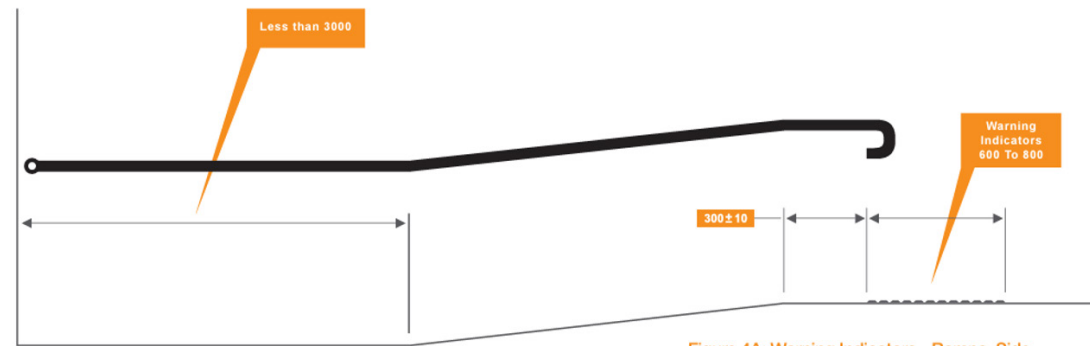


Figure 4A: Warning Indicators - Ramps. Side elevation where top of ramp leads to an open area and the bottom landing is enclosed, less than 3000 wide and handrail is continuous

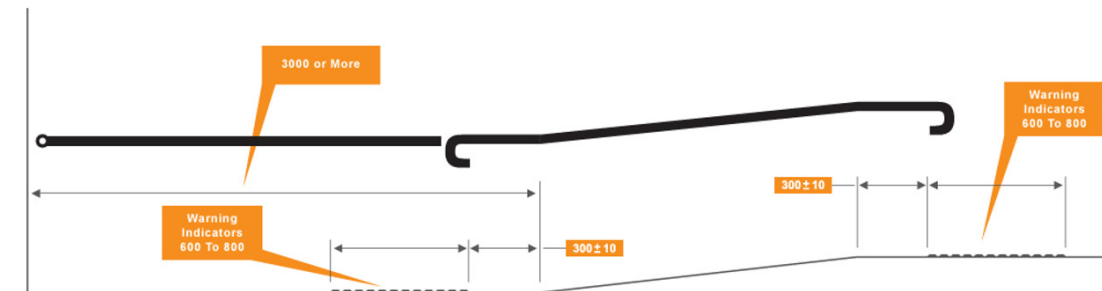


Figure 4B: Warning Indicators - Ramps. Side elevation where top of ramp leads to an open area and the bottom landing is enclosed, 3000 or more wide and/or handrail is discontinuous

- Placement of Warning Indicators at both ends is also required where the top and bottom of the stairs, escalator, ramp, and moving walk, both lead to an open area (see Figure 4C & 3C).

Placement at Both Ends:

- Warning indicators must also be included at the bottom of stairs, escalators, ramps, and moving walks, where the top the stairs, escalators, ramps, or moving walks leads to an open area and the bottom landing is enclosed, is more than 3000mm wide and/or the handrail is discontinuous:
 - The warning indicators at both the top and the bottom, must be set back from the start/end of the stairs, escalators, ramps, and moving walks by 300 ± 10 mm, and form a 600 to 800mm 'pad' (see Figure 3B & 4B).

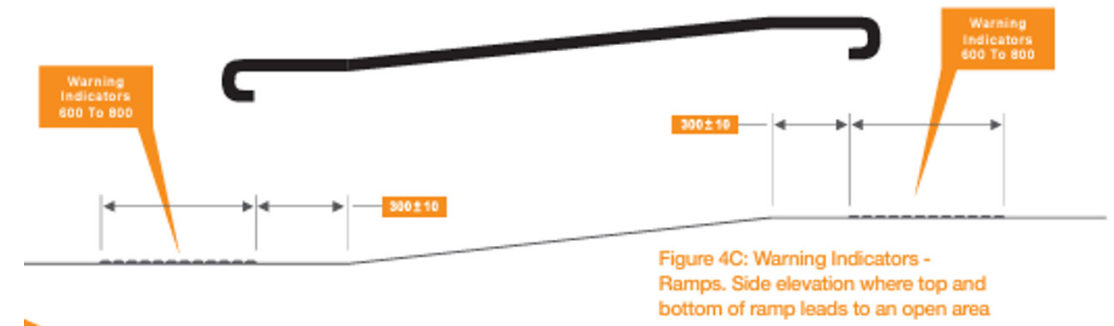


Figure 4C: Warning Indicators - Ramps. Side elevation where top and bottom of ramp leads to an open area

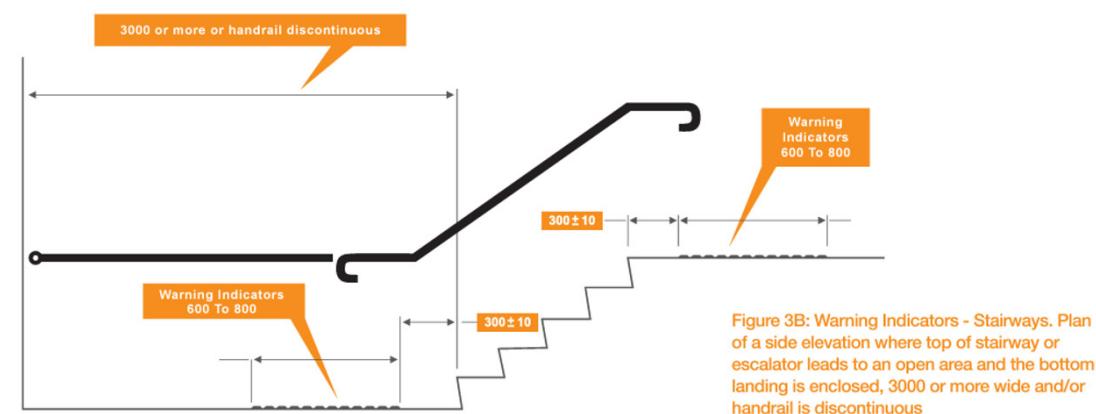


Figure 3B: Warning Indicators - Stairways. Plan of a side elevation where top of stairway or escalator leads to an open area and the bottom landing is enclosed, 3000 or more wide and/or handrail is discontinuous

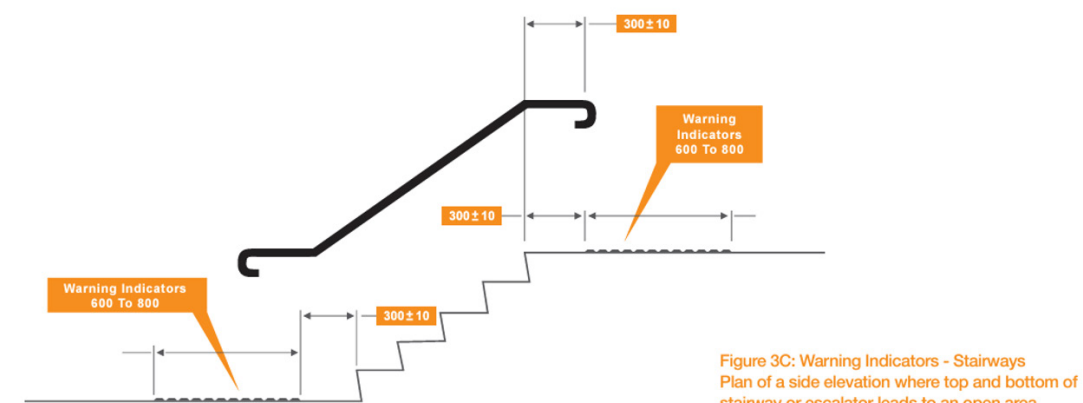
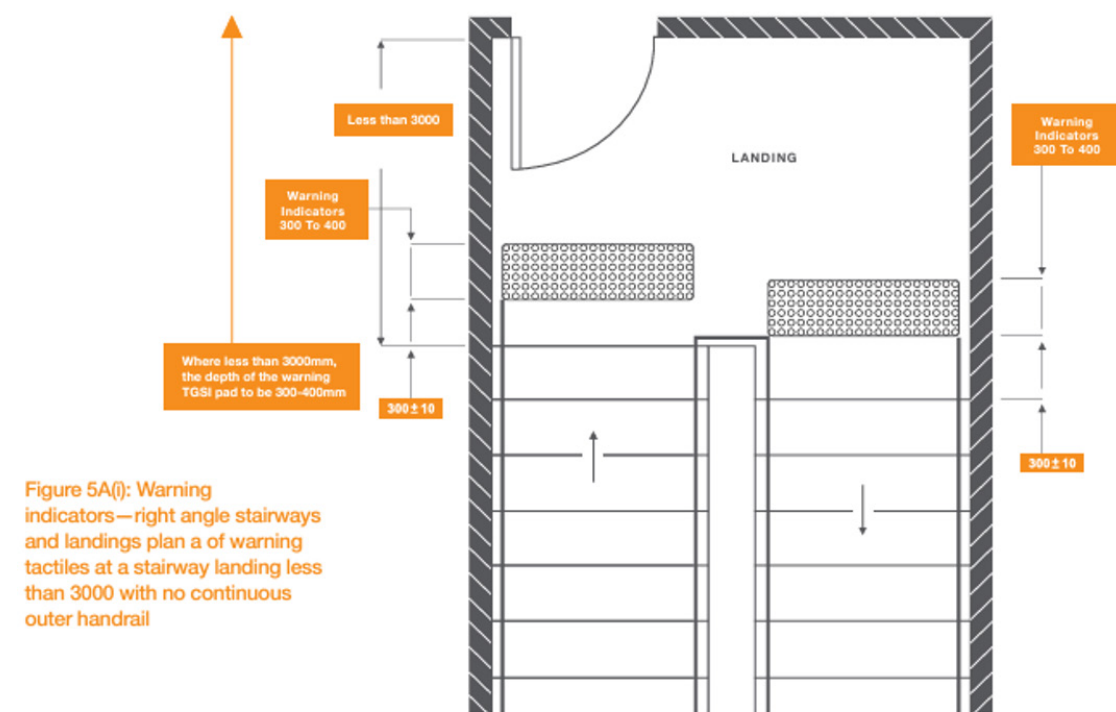


Figure 3C: Warning Indicators - Stairways. Plan of a side elevation where top and bottom of stairway or escalator leads to an open area

Right Angle Stairways Placement:

Right Angle Stairways with a landing of less than 3000mm, without a continuous outer handrail;

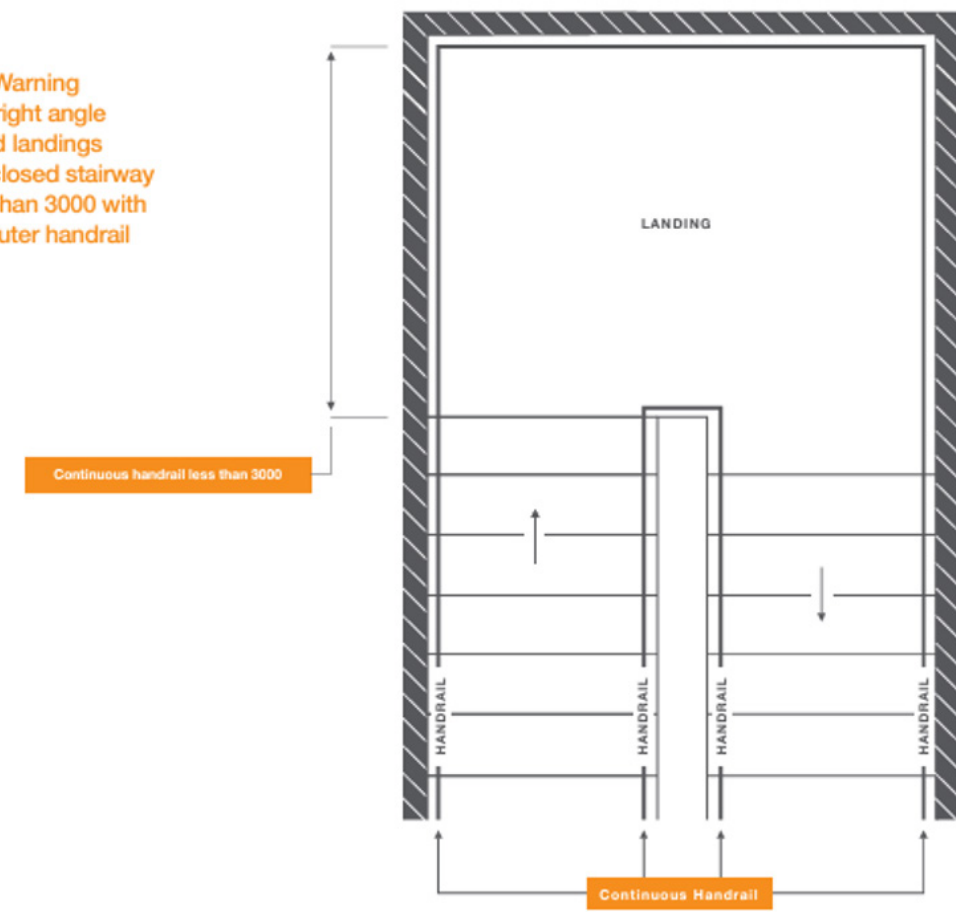
- Warning tactile indicators are required at each stairway landing, at the top and bottom of the stairs.
- The warning indicators at both the top and the bottom, must be set back from the start/end of the stairs, escalator, ramp, and moving walks by 300 ± 10 mm, and form a 300 to 400mm pad (see Figure 5A).



Right Angle Stairways with a landing of less than 3000mm, with a continuous outer handrail;

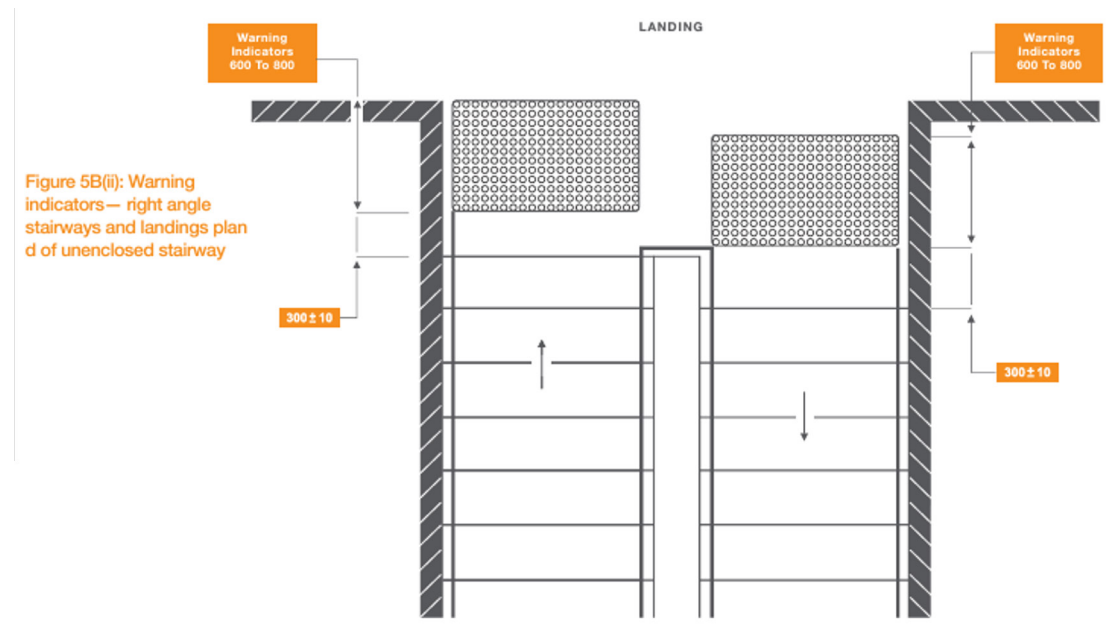
- No warning tactile indicators are required at the top and bottom of the stairs (see Figure 5B(i)).

Figure 5B(i): Warning indicators— right angle stairways and landings Plan C of enclosed stairway landing less than 3000 with continuous outer handrail



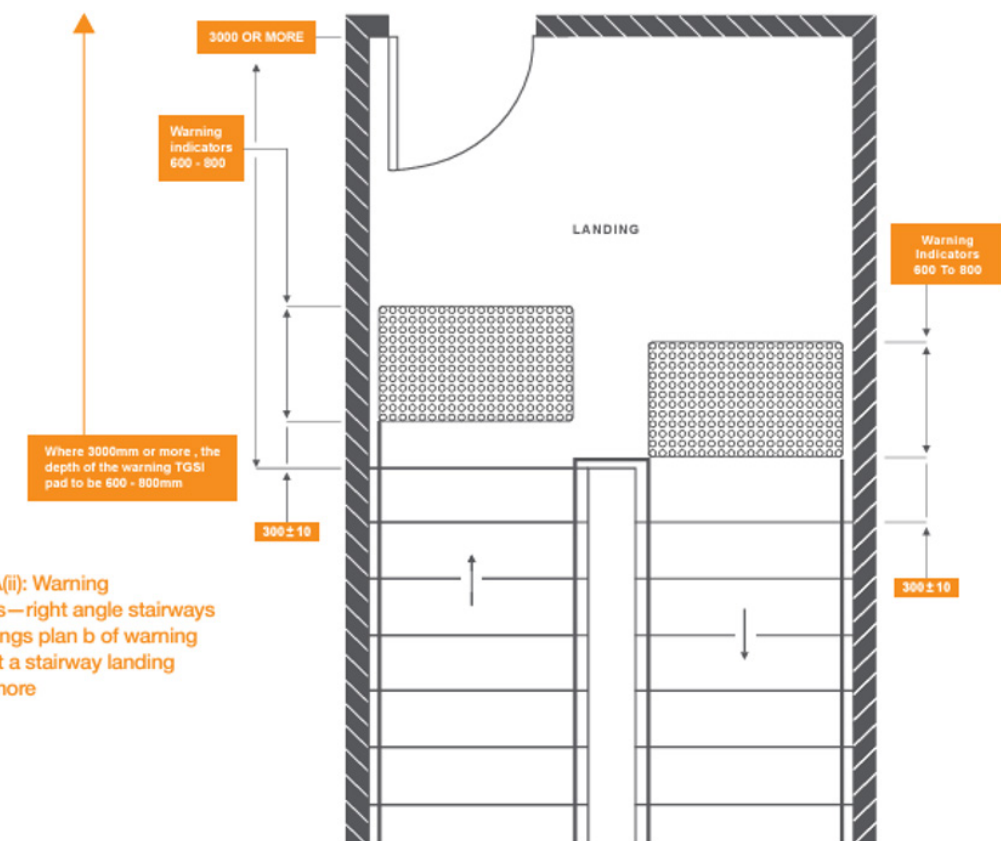
Right Angle Stairways with an unenclosed landing, without a continuous handrail;

- Warning tactile indicators are required at each stairway landing, at the top and bottom of the stairs.
- The warning indicators at both the top and the bottom, must be set back from the start/end of the stairs, escalator, ramp, and moving walks by 300 ± 10 mm, and form a 600 to 800mm pad (see Figure 5B(ii)).



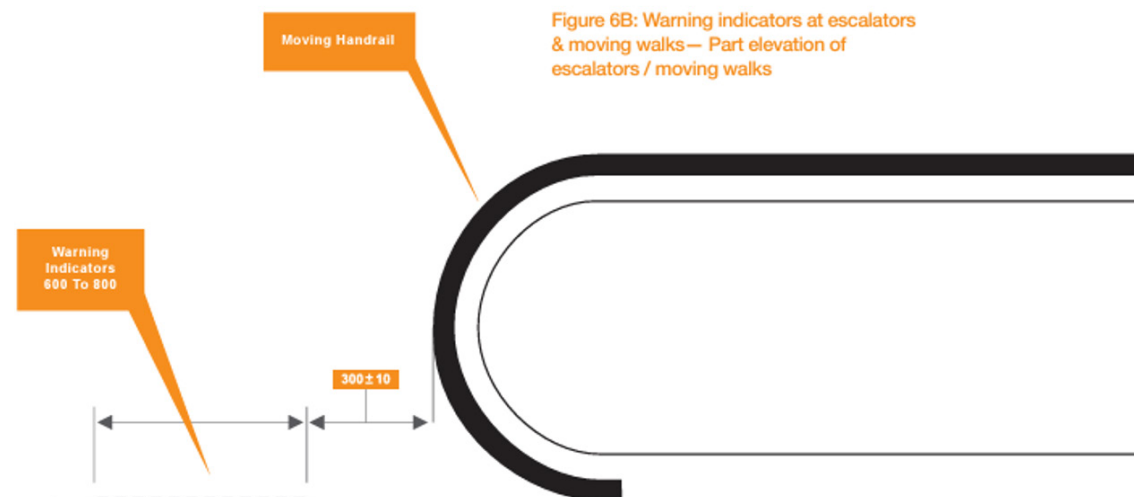
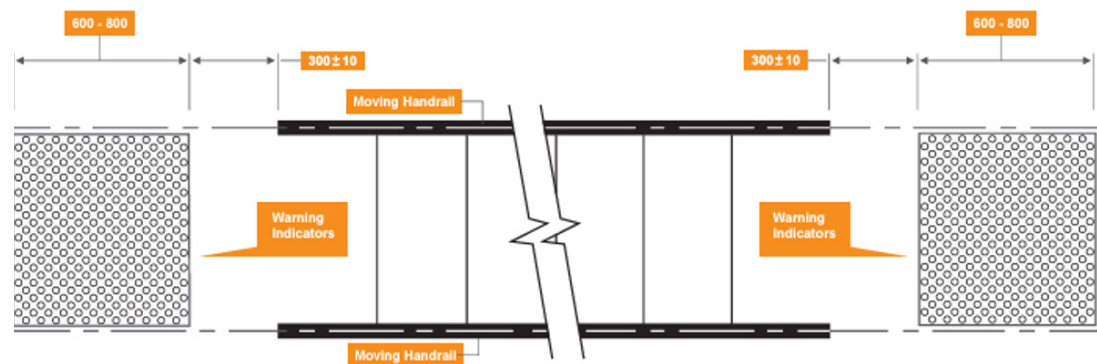
Right Angle Stairways with an unenclosed landing of more than 3000mm, without a continuous outer handrail;

- Warning tactile indicators are required at each stairway landing, at the top and bottom of the stairs.
- The warning indicators at both the top and the bottom, must be set back from the start/end of the stairs, escalator, ramp, and moving walks by 300 ± 10 mm, and form a 600 to 800mm pad (see Figure 5A(ii)).

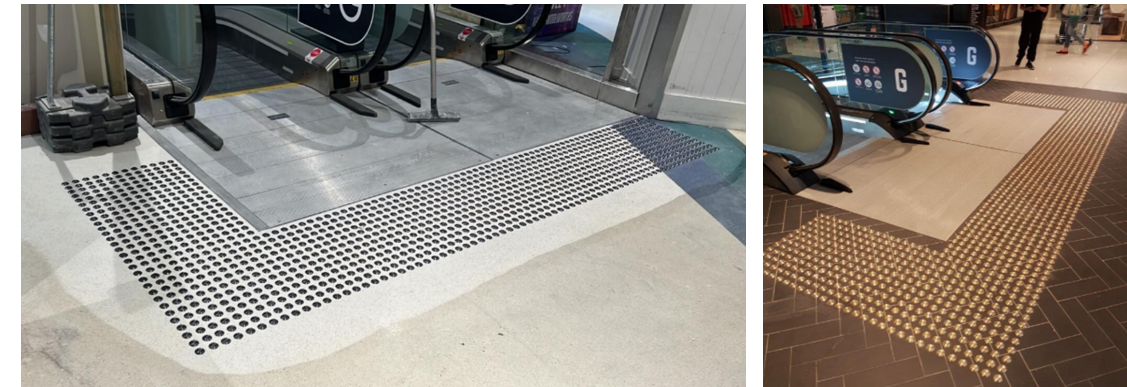


Escalator and Moving Walks Placement:

- Warning tactile indicators are required at each end of the escalator or moving walk.
- The warning indicators at both ends, must be set back from the start/end of the escalator or moving walk by 300 ± 10 mm, and form a 600 to 800mm pad.



Due to escalator motors and their access panels being located at the start and end of the escalator, the ability to add tactiles to these areas can be difficult, or in some cases, not possible. An alternative approach is to position warning indicators at both ends of the escalator, in a U-shape arrangement around the motor access panel. The width of this U-shaped pad should be between 600 to 800mm. This approach should be signed off by an access consultant.



Ramps and Landing Stairway Placement:

- Warning tactile indicators are required at the bottom or start of the ramp or stairs, at the width of the path of travel.
- The warning indicators must be set back from the start of the ramp or stairs by 300 ± 10 mm and form a 600 to 800mm pad, see Figure 7A).

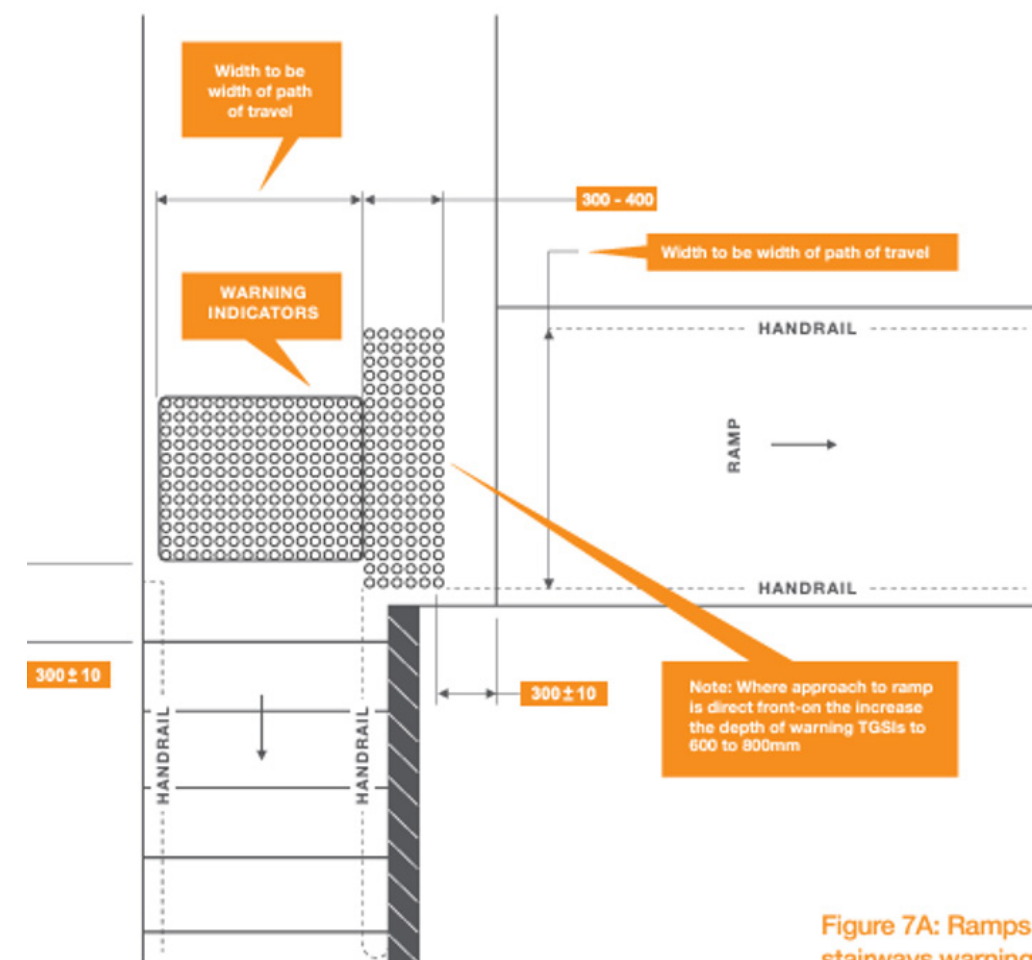
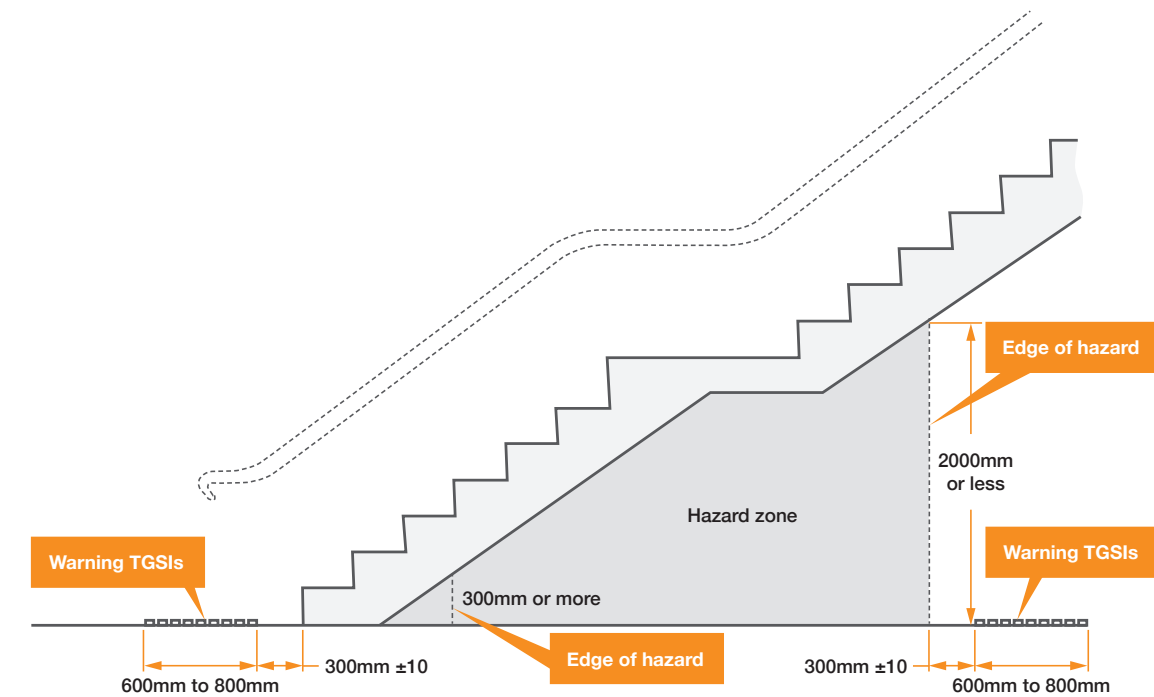
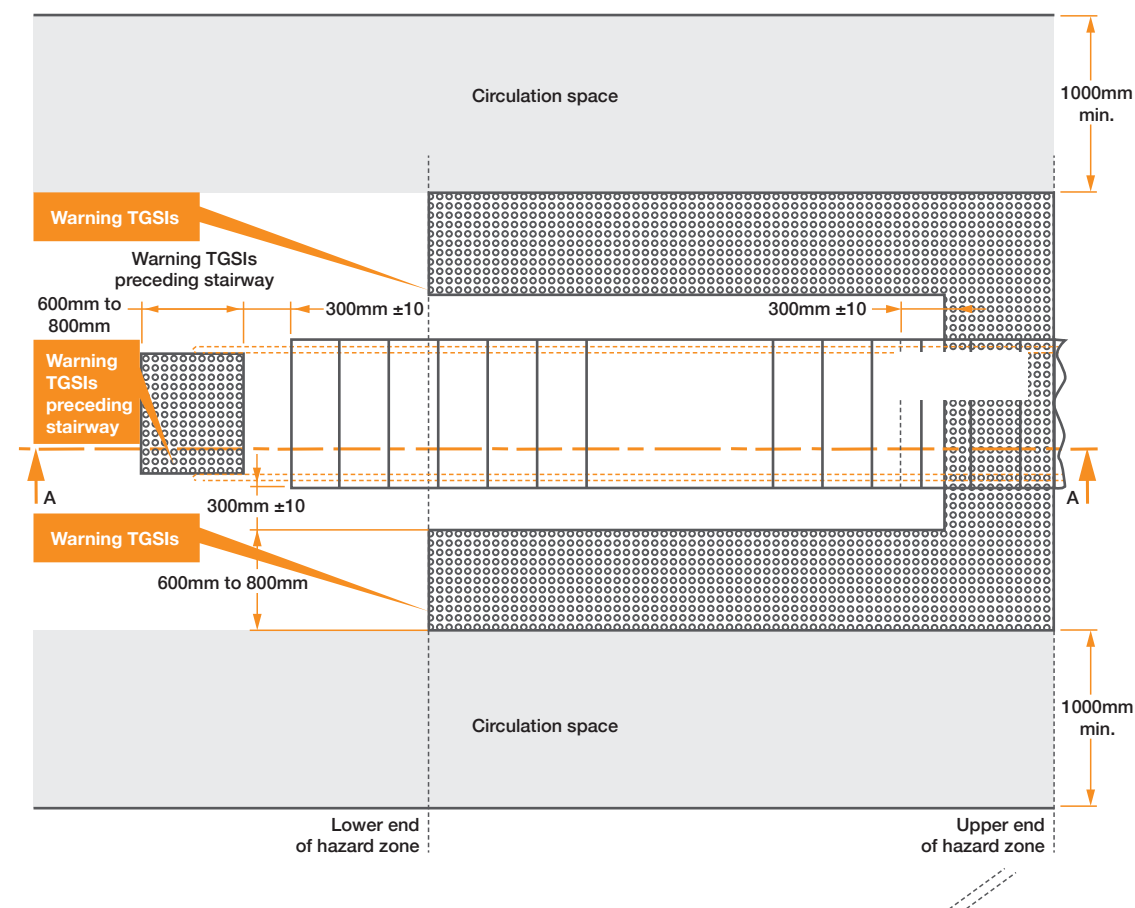


Figure 7A: Ramps and landing stairways warning indicators

Vertical Height Obstruction

Where there is an open staircase, vertical impediment or hazard in an accessible open space, with less than 2000mm clearance, and no clearly defined continuous accessible path of travel (eg. areas under a stairway), contact with the overhead hazard should be prevented by;

- Enclosing the area; or
- Providing a handrail; or
- In the absence of a suitable barrier, tactile warning indicators should be installed in a 600 to 800mm pad, as shown;

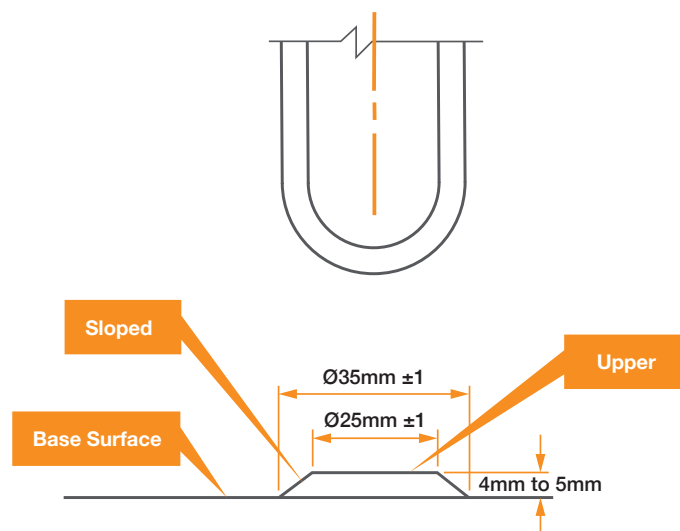


Directional Tactile Indicators

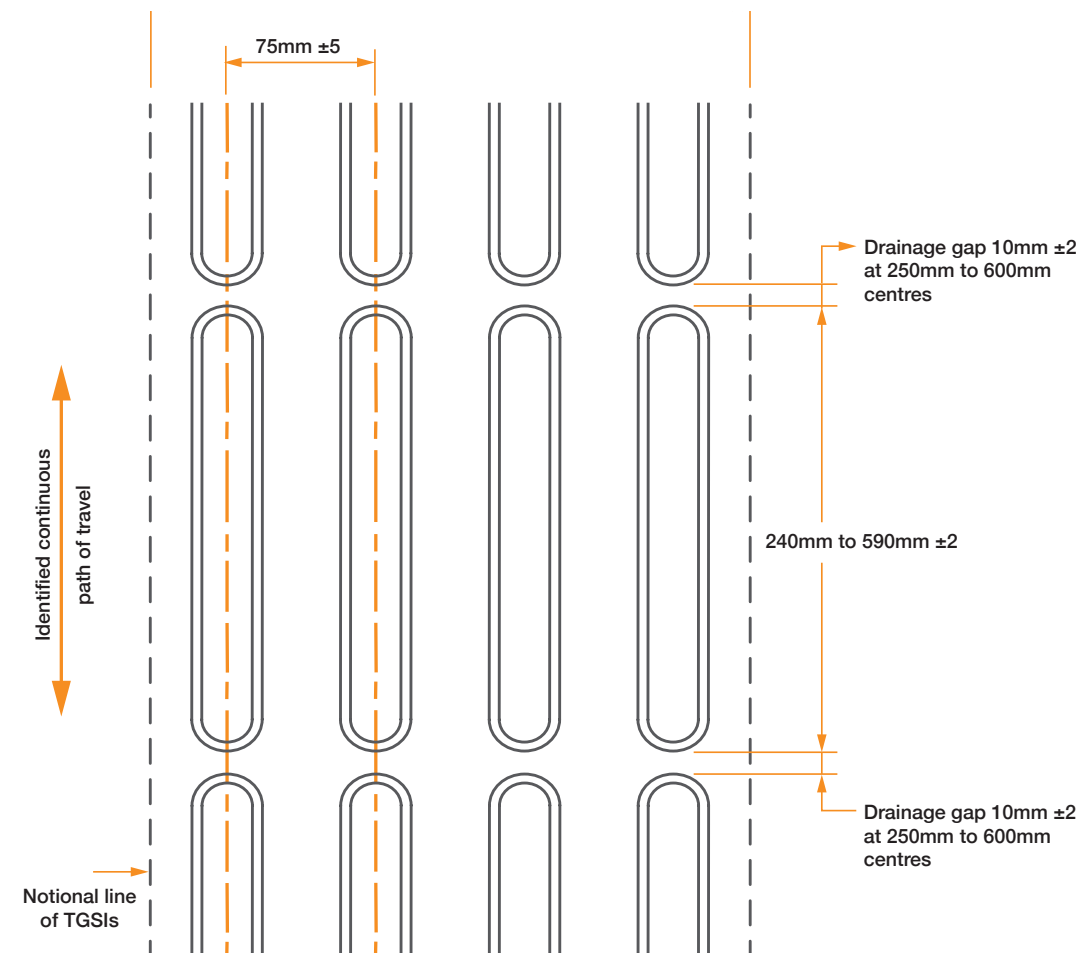
Installation

All directional tactile indicators should be installed as follows;

- Parallel with and along the centre-line of the required direction of travel
- Integrated directional tactiles indicating the continuous accessible path should be arranged with a depth of 300mm – 400mm, as shown.
- Where integrated directional tactiles need to be detected by a person approaching at an angle to the continuous accessible path of travel, the directional tactiles should be arranged as shown below, with a minimum depth of 600mm - 800mm from the direction of approach.

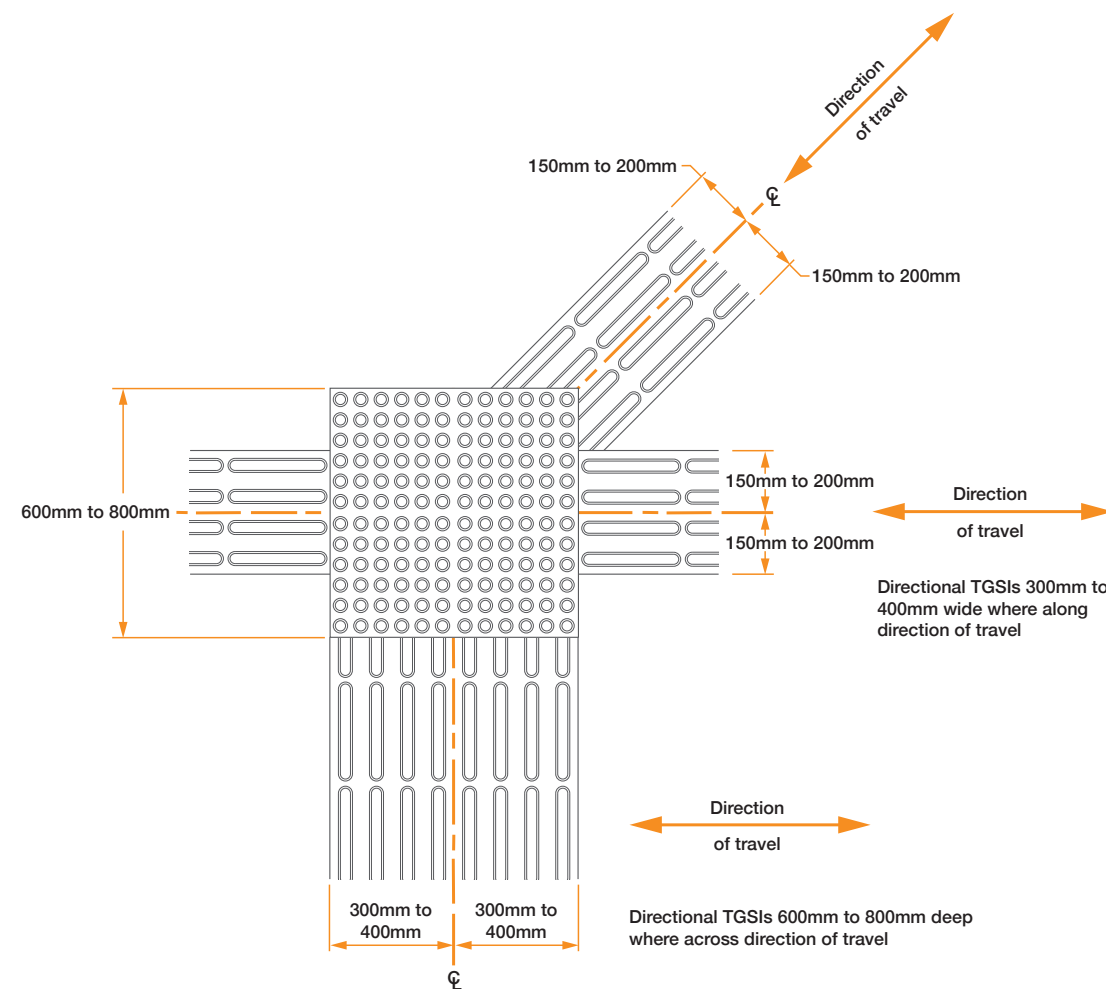


- Where discrete directional tactiles are used to indicate a continuous accessible path of travel, they should be arranged with a minimum of 4 discrete directional tactiles, as shown.
- Where discrete directional tactiles need to be detected by a person approaching at an angle to the continuous accessible path of travel, they should be arranged with a minimum of 8 discrete directional tactiles, as shown.



Change of direction:

Where a continuous accessible path of travel denoted by directional tactiles reaches a point of change in direction, this point shall be indicated by warning indicators 600mm – 800mm x 600mm to 800mm, see example on following page.



Luminance Contrast Requirements

AS/NZS 1428.4.1:2009 outlines specific requirements for the Luminance Reflectance Value (LRV) of tactile indicators. LRV refers to the level of contrast between tactile indicators and their surrounding surfaces, making them more visible to individuals with vision impairments (see pg 12 for further explanation on LRV).

- The LRV of tactile indicators should differ from the LRV of the adjacent walking surface by a specified amount to ensure sufficient contrast.
- Integrated (tile) type tactiles must meet a minimum luminance contrast standard of 30% to the floor surface.
- For individual (discrete) tactiles of one colour, a minimum of 45% contrast is required, while for two colours, it should be a 60% contrast (to the top surface).
- Tactile indicators should have a distinct colour and finish that contrasts effectively with the surrounding surface.

Singular Step

A singular step is not considered 'stairs' and therefore does not require tactiles under the AS/NZS 1428.4.1:2009 standard.

Kerb Ramps

Warning Tactile Indicators

Warning tactile indicators must be installed on kerb ramps with gradients shallower than 1 in 8.5. Install them as follows:

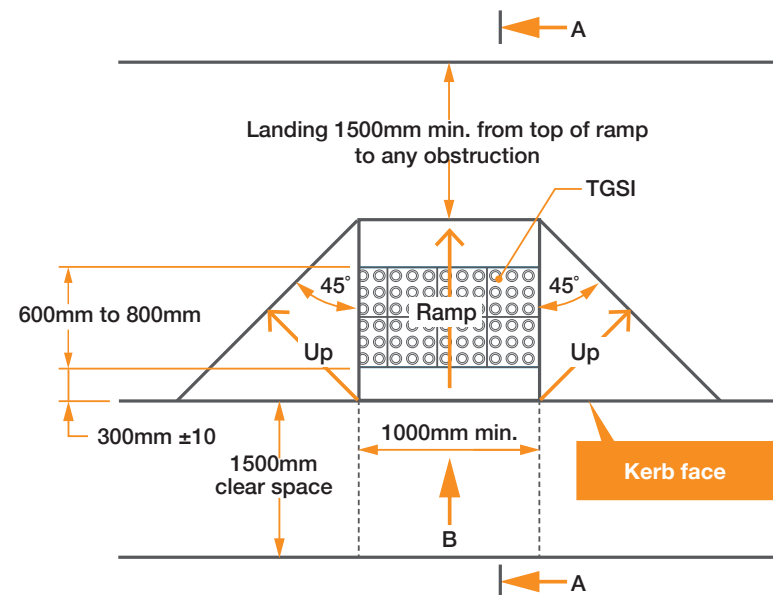
- TGSIs should be placed perpendicular to the path of travel, with a minimum width of 1000 mm, and 600 mm to 800 mm along the direction of travel.
- They should be set back 300±10 mm at the nearest point from the beginning of the roadway.

Warning tactile indicators are required at crossing entry points and should cover the entire width of the path of travel, including:

- Hazardous crossings.
- Kerb ramps that do not meet AS 1428.1 requirements.

Warning tactile indicators are not necessary on a kerb ramp if:

- The distance from the building line/boundary to the top of the kerb ramp is less than 3m.
- The gradient change between the pedestrian surface at the top and the ramp surface is between 1 in 8 to 1 in 8.5.
- The kerb ramp aligns with the building line and the direction of travel across the roadway.



Directional Tactile Indicators

Directional tactile indicators should be provided:

- From the property line to the top of AS 1428.1 compliant ramps if the top is more than 3 m from the property line or not aligned with the building line.
- To guide towards warning indicators at crossing entry points if the kerb ramp is not directly part of the accessible path of travel or lacks clear orientation cues like a building frontage.

Important considerations:

- Ensure ramp grades align with the direction of travel.
- Ramps on both sides of a roadway should align with each other and the direction of travel.

Outline of AS4586:2013:
Slip Resistance Classifications

AS4586:2013 classifies pedestrian surfaces into five categories based on their slip resistance properties: P1, P2, P3, P4, and P5.

These values indicate the level of slip resistance required to minimise the risk of slips and falls under typical pedestrian conditions. Certification and documentation of slip resistance test results may be required to demonstrate compliance with the standard.

Slip Resistance Testing

- Tactile materials must undergo slip resistance testing to ensure correct classification in accordance with the standard.
- Slip resistance values are determined through pendulum testing, which measures the dynamic coefficient of friction (DCOF) of pedestrian surfaces under specified conditions. The Pendulum Test Value (PTV) indicates the level of slip resistance exhibited by a surface, with higher values indicating greater slip resistance.
- A tactile indicators Slip Resistance Value (SRV) will indicate what category of pedestrian surface it is most suited too, see table below:

Pendulum Classification	Slip Resistance Value (SRV)	Slip Risk
P0	Below 12	Very high
P1	12-24	Very high
P2	25-34	High
P3	35-44	Moderate
P4	45-54	Low
P5	Over 54	Very Low

Slip Rating Requirements

- Stairway landings, and ramps in buildings covered by NCC Volumes One and Two, must meet or exceed, the following slip classifications for dry and wet surfaces;

	Dry Surface	Wet Surface
Ramp steeper than 1:14	P4 or R11	P5 or R12
Ramp steeper than 1:20 but not steeper than 1:14	P3 or R10	P4 or R11
Tread or landing surface	P3 or R10	P4 or R11
Nosing or landing edge strip	P3	P4

Outline of NCC 2022 - Fire safety requirements

Testing

The Building Code of Australia (BCA) assigns fire resistance ratings (FRR) to building materials based on their ability to withstand exposure to fire without failure. These ratings indicate the duration for which a material or assembly can maintain structural adequacy, integrity, and insulation during a fire. Building materials (including stair nosings) must undergo fire resistance testing in accordance with recognised testing standards referenced in the BCA.

Requirements

Fire resistance levels (FRL) are assigned to building elements, such as walls, floors, roofs, doors, and windows, based on their fire resistance ratings for structural adequacy, integrity, and insulation. The BCA specifies minimum FRL requirements for different building types and occupancies, these are measured using results from the Critical Radiant Flux (CRF) test. This test measures the radiant energy required to sustain burning as determined by AS ISO 9239.1. The CRF is basically the lowest energy a fire requires to keep burning, hence the higher the value the better.

The NCC states (in S7C3) that a floor lining or floor covering must have:

- A Critical Radiant Flux (CRF) not less than that listed in the Table S7C3 below; and
- in a building not protected by a sprinkler system (other than a FPAA101D or FPAA101H system) complying with Specification 17, a maximum smoke development rate of 750 percent-minutes; and
- a group number complying with S7C6(b) for any portion of the floor covering that is continued more than 150mm up a wall.

Table S7C3 CRITICAL RADIANT FLUX (CRF in kW/m 2) OF FLOOR MATERIALS AND FLOOR COVERINGS Class of Building	Building not fitted with a sprinkler system (other than a FPAA101D or FPAA101H system) complying with Specification 17	Building fitted with a sprinkler system (other than a FPAA101D or FPAA101H system) complying with Specification 17	Fire-isolated exits and fire control rooms
Class 2, 3, 5, 6, 7, 8 or 9b, excluding: (i)Class 3 accommodation for the aged; and (ii)Class 9b as specified below.	2.2	1.2	2.2
Class 3 Accommodation for the aged.	4.5	2.2	4.5
Class 9a Patient care areas. Areas other than patient care areas.	4.5 2.2	2.2 1.2	4.5 4.5
Class 9b auditorium or audience seating area used mainly for— (i)indoor swimming or ice skating; and (ii)other sports or multi-purpose functions.	1.2 2.2	1.2 1.2	2.2 2.2
Class 9c Resident use areas. Areas other than resident use areas.	-- --	2.2 1.2	4.5 4.5

Fire Exit Stairs

The BCA (Clause D3.8(a)(iii)) states that all stairways, escalators, moving walks and ramps (except a fire-isolated stairway – see below) must incorporate tactile indicators, and must comply with sections 1 and 2 of AS/NZS1428.4.1 (also outlined in this guide on pages 6-21).

A fire-isolated stairway, is a stairway within a fire-resisting shaft and includes the floor and roof or top enclosing structure.

According to the NCC 2019 Volume One Amendment (Section D – Construction of exits, D2.13 Goings and Risers), landings on all stairs fire exit stairs must have a slip resistance classification not less than those listed under AS4586:2013 (see table on pg 23).

GLOSSARY

What is Luminance contrast?

Luminance contrast is defined in AS1428.1 as ‘the light reflected from one surface or component, compared to the light reflected from another surface or component’. It is not the difference in the colour or the colour contrast, but the difference in the light reflective properties of each colour.

What is Luminance Contrast Testing?

Luminance Contrast Testing is carried out to determine the sensation experienced or cause by reflected light of a surface. It’s important to note the type of finish and surface itself influences this sensation.

What is a Slip Resistance Rating?

The slip resistance rating is a measure of the slip resistance of a surface. This rating indicates the surface’s ability to provide traction and is measured using pendulum slip resistance tester. Pendulum testing measures the dynamic coefficient of friction (DCOF) of pedestrian surfaces under specified conditions. The Pendulum Test Value (PTV) indicates the level of slip resistance exhibited by a surface, with higher values indicating greater slip resistance.

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