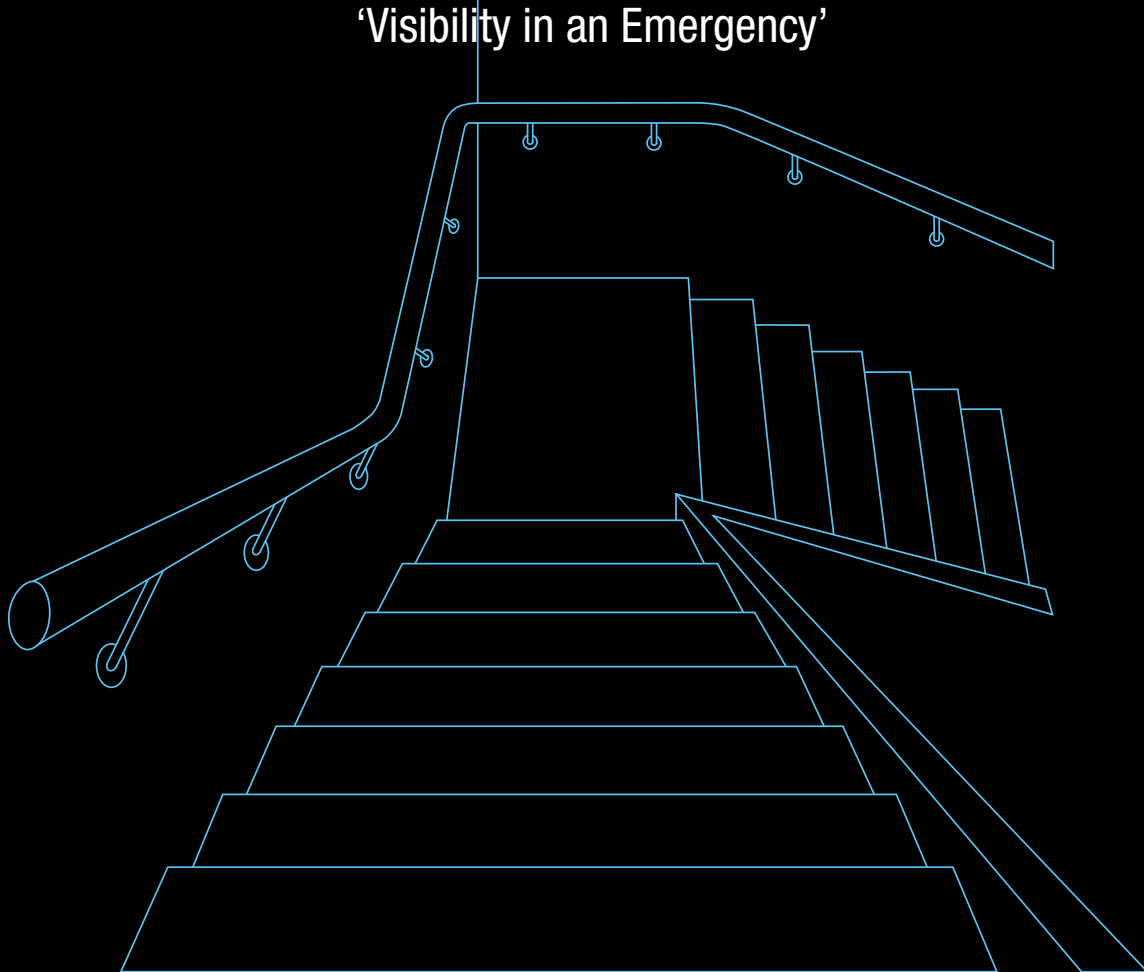


ECOGLO INTERNATIONAL LIMITED

# Designers' Handbook for **Ecoglo Markings**

To meet the requirements of NCC 2016 BCA EP4.1  
'Visibility in an Emergency'



 **ecoglo**<sup>®</sup>

VISIBLY BETTER

This handbook provides guidance for designing systems using Ecoglo photoluminescent markings to meet the requirements of NCC 2016 EP4.1 'Visibility in an Emergency'.

[www.ecoglo.com.au](http://www.ecoglo.com.au)

## Introduction

This document is aimed at those wishing to design photoluminescent path marking systems to meet NCC 2016 BCA EP4.1 'Visibility in an Emergency'.

### This document explains:

- Where Ecoglo path marking systems are appropriate to use;
- Which Ecoglo markings should be used and where they should be installed;

- What ongoing inspections should be carried out.

For more detail explaining how Ecoglo markings meet the requirements of Clause EP4.1, please refer to the Technical Justification document. Go to [www.ecoglo.com.au](http://www.ecoglo.com.au). From Homepage, select Technical, then Code compliance.

## Where can Ecoglo path markings be used?

Ecoglo produces high performance, high durability photoluminescent products for step edges, handrails, paths, doors, and other obstacles.

There are two basic requirements for Ecoglo markings to be appropriate:

1. There needs to be a clearly definable escape path that can be marked;
2. There needs to be sufficient charging light (natural or electrical) on the markings to ensure they will remain visible to the degree necessary for occupants to travel safely to an exit as specified in EP4.1.

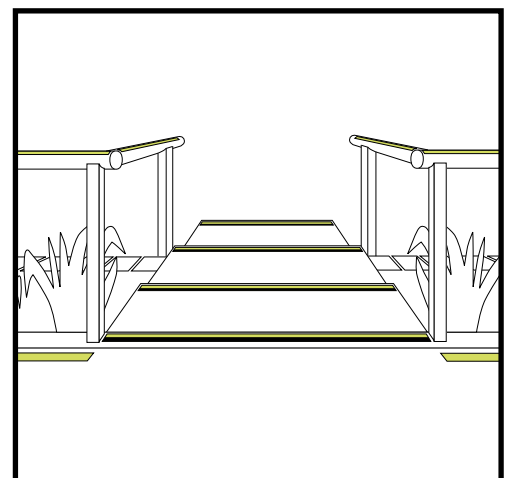
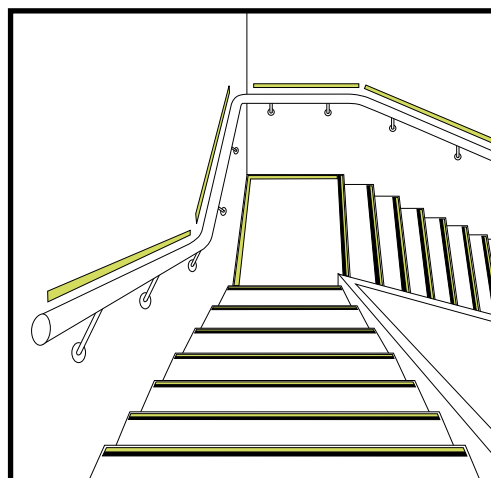
If these requirements cannot be met, an

electrical emergency lighting system will be needed.

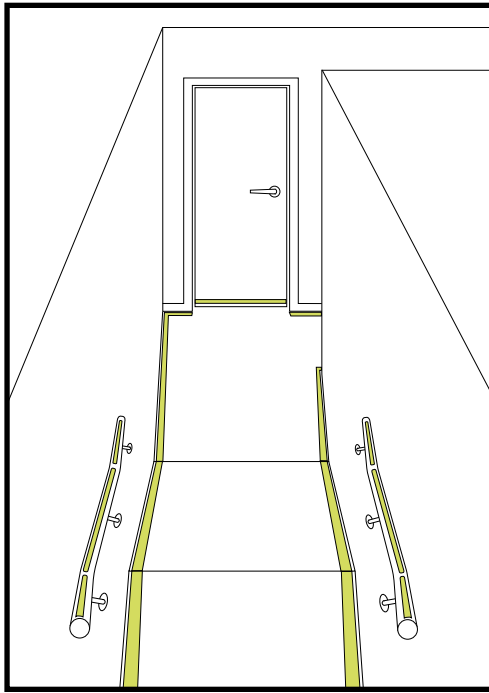
In some buildings the most appropriate complete solution may be a combination of Ecoglo markings and electrical emergency lighting.

### 1. Clearly Definable Escape Path

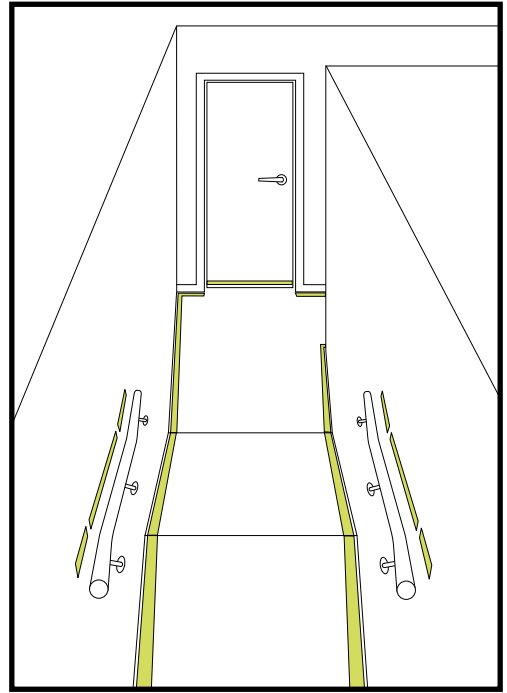
The illustrations below show examples of clearly definable evacuation paths that are suitable for highlighting with Ecoglo markings. In many small and medium size buildings the complete evacuation route that is required to be made visible in an emergency (ie to meet Clause EP4.1) is a clearly definable path.



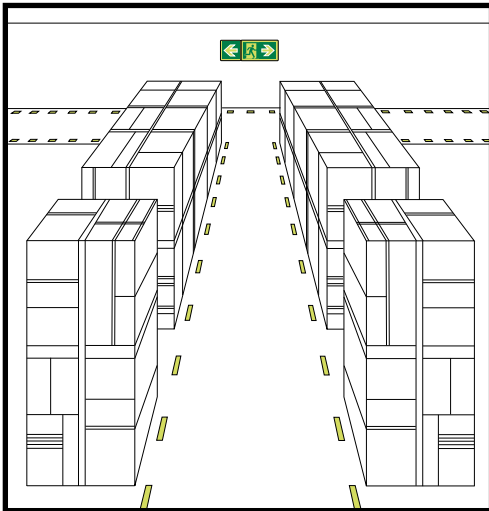
Steps and Stairways



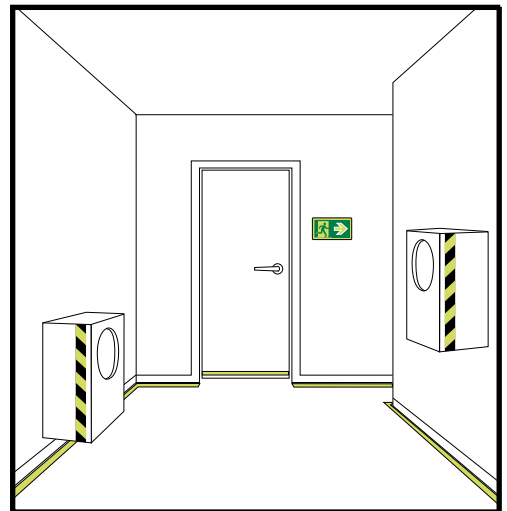
Corridors and Ramps



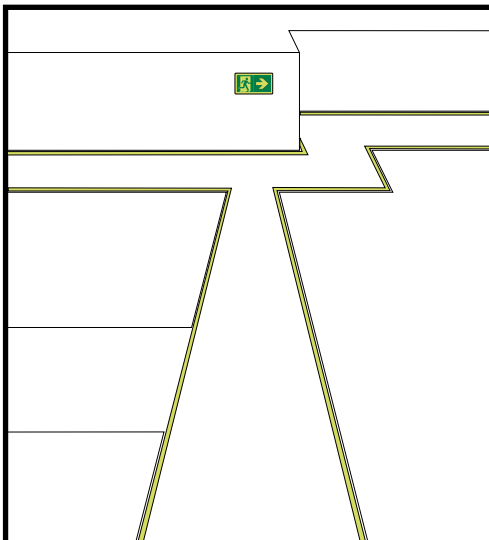
Corridors and Ramps



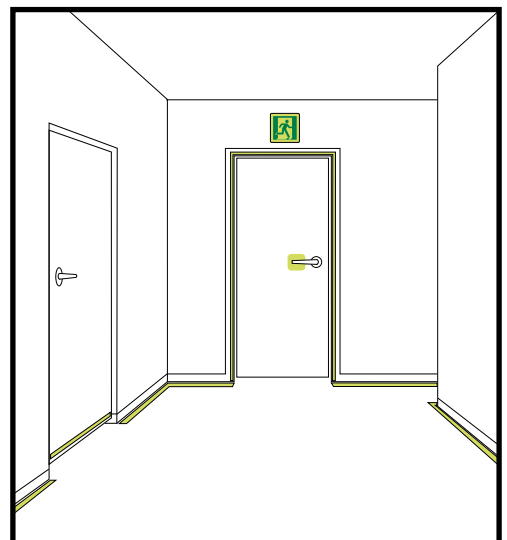
Open Spaces



Obstacles



Open Spaces



Doorways and entries to a safe place

## Limitations

### Obstructions

Evacuation routes are required to be kept unobstructed. However it may still be foreseeable that obstructions may be inadvertently left in an evacuation route. Where the evacuation route consists of stairs, the likelihood is that an obstruction large enough to cause a trip hazard would be highlighted by the step edge markings. However, on a level evacuation route where the markings are only on the sides of the path, there is potential for an obstruction to remain unseen. It is important for the system designer to be aware of this risk, and consider factors such as public access, familiarity of the users with the evacuation route, and likelihood of obstructions.

### Dangerous Machinery

If it can be foreseen that, in the event of failure to the normal lighting, machinery or equipment could present an unseen danger to people in the area, and that hazard marking would not alleviate that danger, then emergency electrical lighting should be used to illuminate the danger.

### Open Spaces

Where an evacuation route is required through an open space, the perimeter of the escape path can be marked, as previously shown.

If the open space acts like a concourse, with multiple routes rather than one or more clear paths through it, path marking is not appropriate and lighting is a better option.

## 2. Sufficient Charging Light

EP4.1 specifies that the level of visibility must be appropriate for the distance of travel to an exit.

To ensure that Ecoglo markings meet the required visibility duration, they must be charged with natural or electric lighting at a sufficient brightness and for sufficient time.

### Outdoor use

(That part of an evacuation route between the building shell and a safe place)

There is no need for charging with any electric lighting: Ecoglo markings will absorb enough natural light to remain visible throughout the longest winter night.

### Indoor use

How to ensure charging is at sufficient brightness and for sufficient time to meet the requirements of EP4.1.

### What lamps can be used?

In general, any lamp with a colour temperature of 4000K or more is a suitable charging light. 4000K colour temperature is the norm for offices, commercial, and most industrial lighting.

The main source of lower colour temperature lamps is halogen downlights, or “mood” lighting where lamps may be specified at around 3000K “warm white”. These lamps will need to have greater brightness to charge Ecoglo markings as much as 4000K lamps.

### How long do Ecoglo markings need to be charged for?

Ecoglo markings are designed to meet EP4.1 following no more than 5 minutes charging.

It is usually acceptable to design a system where a building (or building space) has no lights turned on prior to occupation. This is appropriate where it is reasonable to assume that if a building space is dark, the first occupier will turn on the lights.

Assuming the worst case where the building is first entered while it is still dark, or the markings are in a room with no windows, for every second that the lights have been turned on, the markings will accumulate several seconds of operational charge.

Therefore the time the markings will remain visible is greater than the time since first occupation. This allows for safe evacuation.

Designers should be aware of scenarios where this rationale may not be appropriate, such as a tall building with elevators which can rapidly take someone to an upper floor, from where their escape time could be much more than the time since first occupancy.

Also, in crowd occupancies, it is recommended that the public not be allowed entry to the building until the markings have full operational charge.

### What illuminance is needed to charge Ecoglo markings?

A 30 minute visibility time is sufficient for buildings with no more than 1000 occupants and an evacuation time of no more than 10 minutes.

Ecoglo markings require a minimum of 20 lux (for a period of 5 minutes) to ensure a 30 minute visibility time.

A 90 minute visibility time is sufficient for buildings with more than 1000 occupants and/or an evacuation time of no more than 90 minutes.

Ecoglo markings require a minimum of 60 lux (for a period of 5 minutes) to ensure a 90 minute visibility time.

Note that in most practical situations there is a lot more than 20 lux or even 60 lux and therefore the Ecoglo markings obtain full operational charge more quickly, and remain visible for a lot longer than EP4.1 requires. (See Appendix A for typical illuminances in buildings.) Therefore for most buildings all occupied spaces will have enough light to charge the Ecoglo markings sufficiently.

### Will the prescribed charging light be on whenever the markings may need to be charged?

The designer should check those parts of the evacuation route that are not normally occupied and lit when the markings need to be charged. For example an enclosed stairwell used only in emergencies and not normally lit.

For these spaces a management process must be implemented to make sure that markings in these spaces are at operational charge whenever needed.

Suitable management processes include:

- The evacuation route is daylight, and the only non-daylight use of the building is for up to 2.5 hours after sunset;
- Lights will be switched on automatically by the building's security system whenever the building is able to be occupied;
- Lights will be controlled by a master switch that will be switched on by the first occupier of the building;
- Lights will be kept on 24/7 and controlled by a smart sensor system that allows the lighting to reduce to 10 lux while the space is unoccupied, and turns the lighting off when daylight provides at least 10 lux;
- Lights will be kept on 24/7 and controlled by a smart sensor system that allows the lighting to reduce to 10 lux while the space is unoccupied;
- Lights will be on common switches so that when lights are switched on in an occupied space all Ecoglo components in all escape paths from the occupied space are lit; (This is only suitable if the occupied spaces will not have more natural light than their escape paths;)
- Lights will be switched on manually by people occupying the building: A sign shall be placed by the light switch(es) stating "Light must be on whenever this building is occupied".

# Which Ecoglo path markings should be used and where should they be installed?

The following information specifies the recommended Ecoglo product in each situation where Clause EP4.1 may require path marking.

All stairways (both internal and external); ramps; and fire isolated passageways; that provide egress to a road or open space, need to be made sufficiently visible with Ecoglo markings.

Buildings with no more than 1000 occupants, and an evacuation time of no more than 10 minutes need to have Ecoglo path markings leading to exits after the first 20 metres of travel to the closest exit. All doorways opening to a road or open space after the first 20 metres of travel also need to be made sufficiently visible.

Note that buildings with more than 1000 occupants and/or more than 10 minutes evacuation time, and rooms with more than 250 occupants, will also need electrical emergency lighting for the first 20 metres of travel to an exit. They will also require all doorways opening to a road or open space to be made sufficiently visible.

There are alternative Ecoglo products that may also be appropriate to meet specific architectural requirements. Contact Ecoglo for details. (Telephone +61 3 8691 5288). To ensure that the Ecoglo markings will remain in place once installed, installers must follow the most recent installation instructions for each product.

## Steps and Stairways

Ecoglo F14-175 nosings along the horizontal leading edge of all steps including the landing step at the top of any flight of stairs.

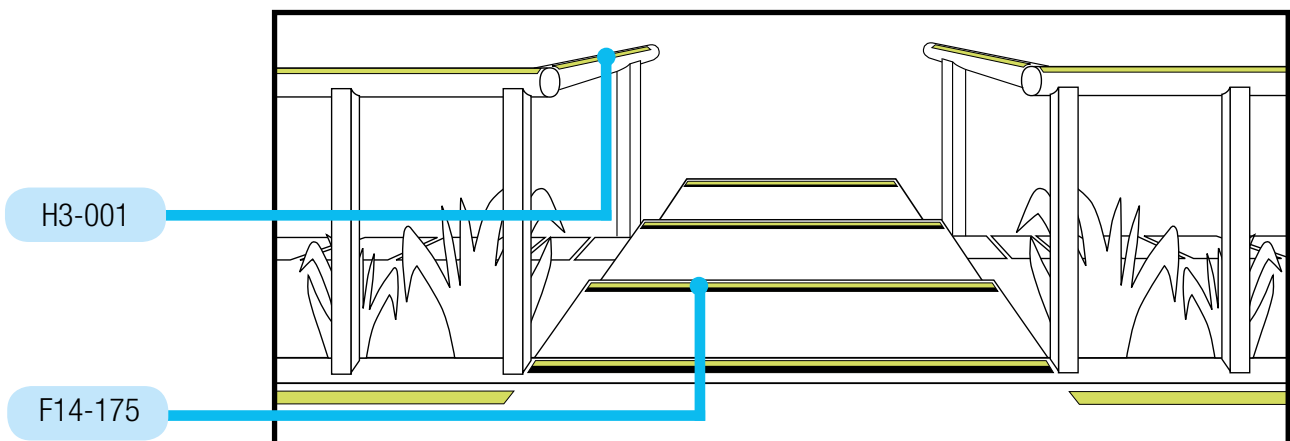
The nosings should normally be set back from the sides of the stairway by 50-100mm at each side. Ecoglo stocks F14-175 in 100mm increments from 600mm to 1500mm to suit all step widths from 650mm upwards. For step widths greater than 1600mm, multiple nosings should be installed with a 5mm drainage/ thermal expansion between the nosings.

Ecoglo H3-001 handrail strip along the top of all handrails adjacent to the steps or Ecoglo MS26 on the wall beside the handrail. Up to 100mm gaps are allowed where there are bends or curves in the handrail.

## Handrail Alternatives

Handrails facilitate safe evacuation in an emergency and therefore should be marked.

Where it is considered inappropriate or impractical to install H3-001 on a handrail, a wider and brighter strip (MS26) can be installed on the wall next to the handrail. The strip must be within 100mm horizontal and 50mm vertical of the handrail.



Steps

### Stairway Landings

Ecoglo T6-101 (usually for exterior use) or G3-001 (16mm wide, interior use) path marking strips along the complete perimeter of the landing.

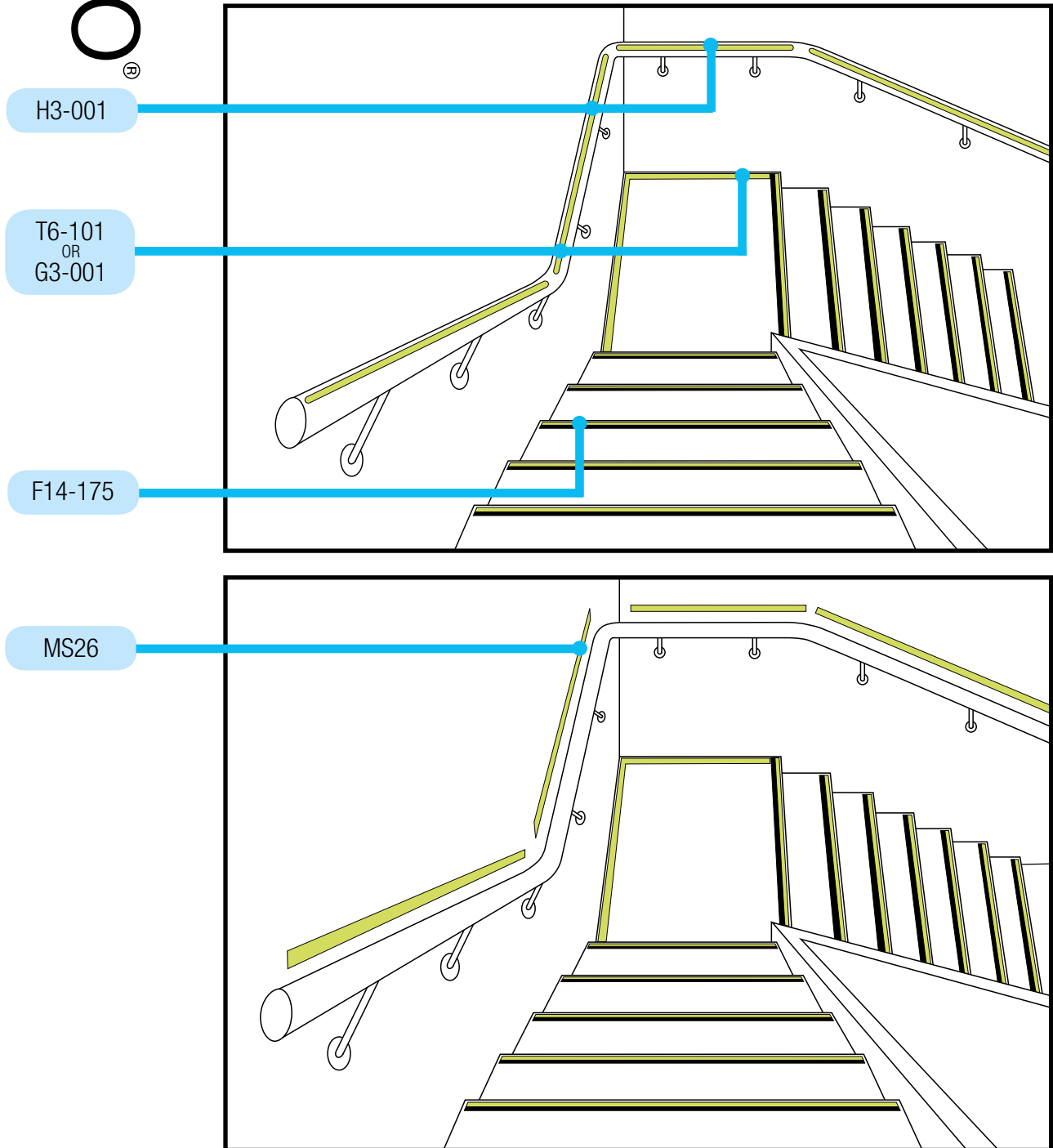
The markings should be mounted either on the floor within 100mm of the wall, or on the wall or skirting board within 100mm of the floor.

Any doorways that should not be entered should have markings running past the door

on the floor within 100mm of the door or on the door within 100mm of the floor.

Up to 100mm gaps are allowed where continuous marking would be impractical.

Ecoglo H3-001 handrail strip along the top of all handrails or MS26 on the wall beside the handrail. Up to 100mm gaps are allowed where there are bends or curves in the handrail.



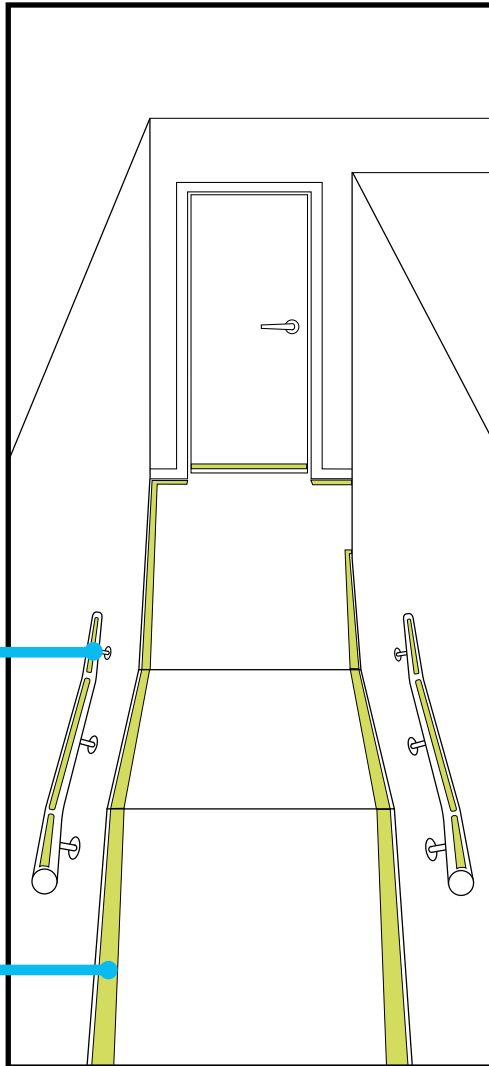
Stairways and landings

### Ramps and Decks

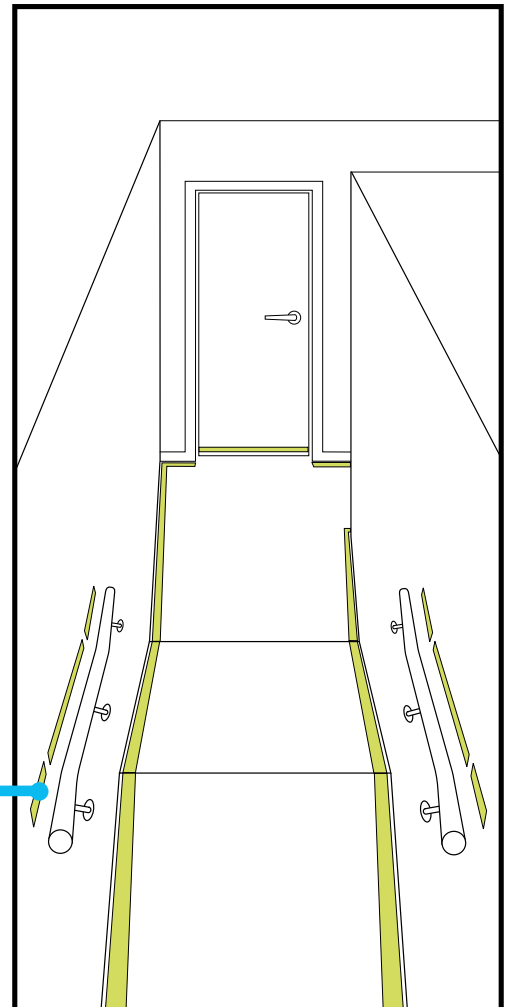
Ecoglo T6-101 path marking strip along both sides of the ramp or deck. The strip can be placed on top of an upstand edging as long as it is within 100mm of the walking surface.

Ecoglo H3-001 along the top of all handrails adjacent to the path needing to be marked or Ecoglo MS26 on the wall beside the handrail. Up to 100mm gaps are allowed where there are bends or curves in the handrail.

*While not currently a requirement, Ecoglo recommends that ALL accessible ramps be made visible.*



Ramps



H3-001

T6-101

MS26

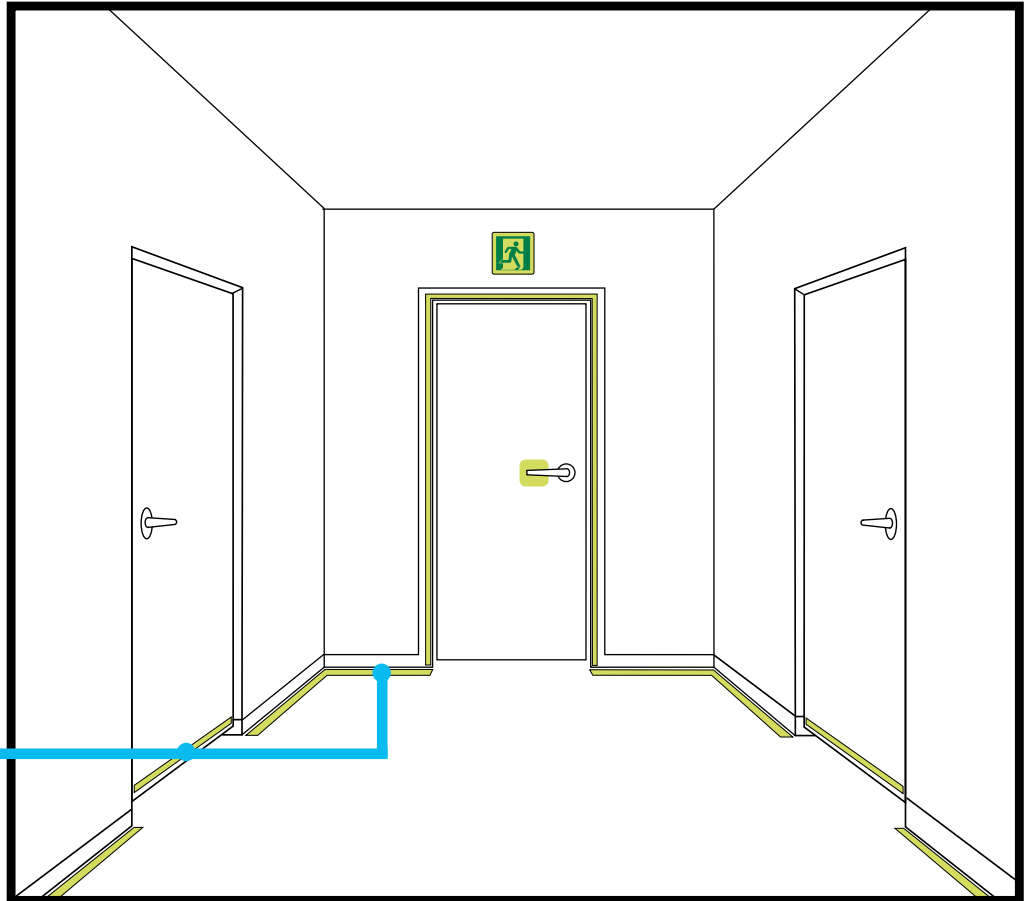


**Corridors**

Ecoglo T6-101 or G3-001 (16mm wide) path marking strips along both sides of the corridor.

The markings should be mounted either on the floor within 100mm of the wall, or on the wall or skirting board within 100mm of

the floor. Any doorways that should not be entered should have markings running past the door on the floor within 100mm of the door or on the door within 100mm of the floor. Up to 100mm gaps are allowed where continuous marking would be impractical.



Corridor

**Paths through Open Spaces**

Ecoglo T5-101 path marking strips along both sides of the designated path.

Up to 100mm gaps are allowed where continuous marking would be impractical.

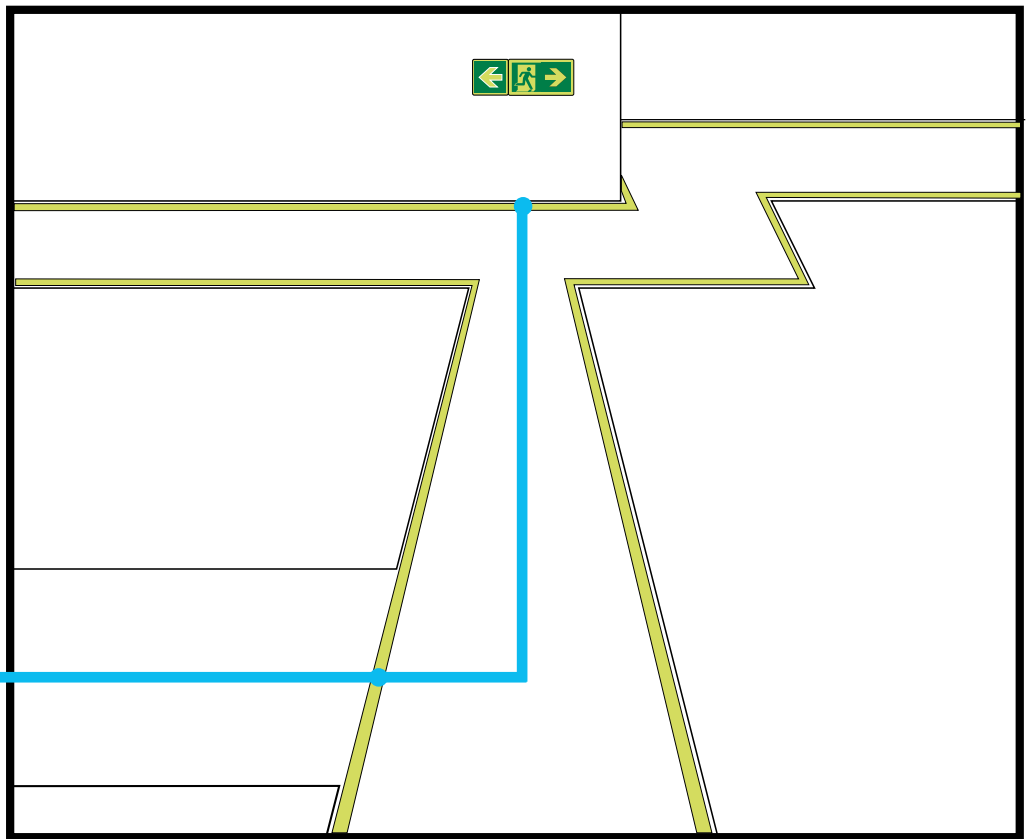
Ecoglo G7-100 path markers can be applied as discontinuous markings in the following circumstances:

- Where it is not practical to install continuous markings (for example because of uneven ground or floor surfaces, or the presence of working forklifts); and
- Where all occupants are familiar

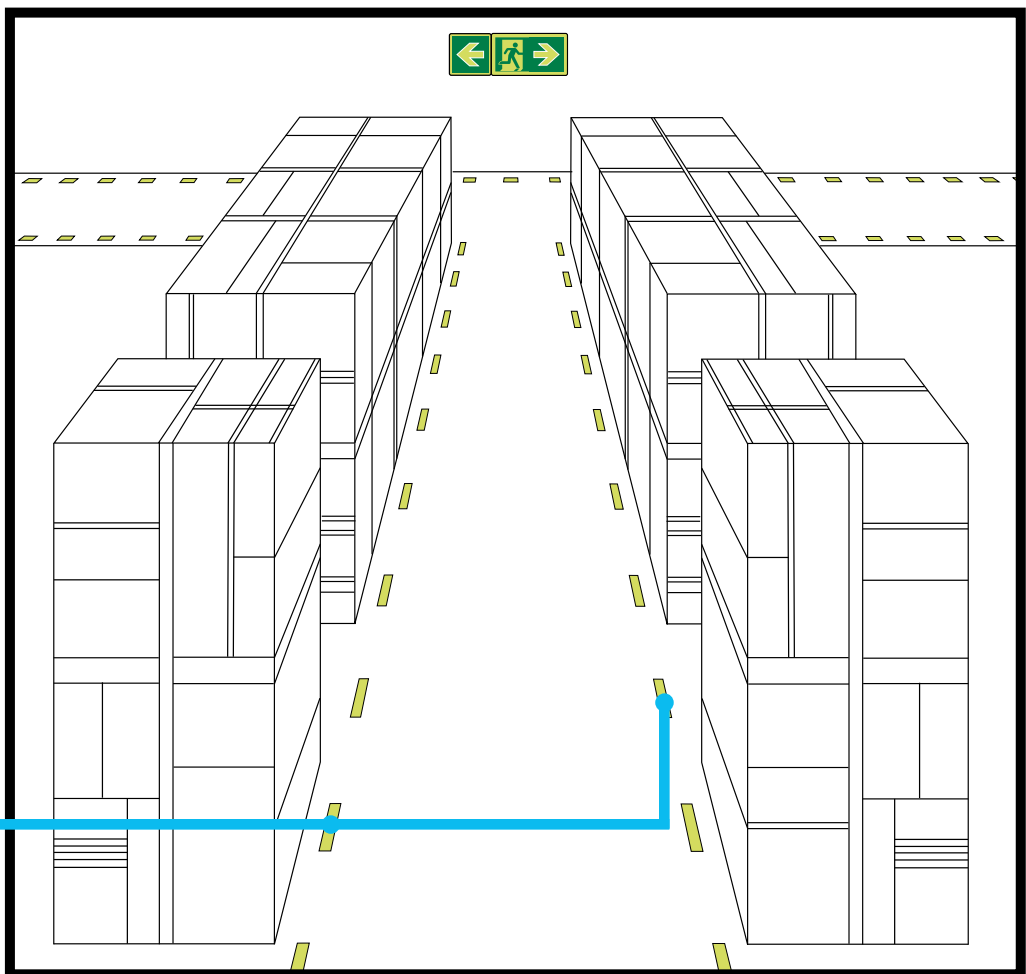
with the evacuation route and the escape path markings; and

- Where the spacing between centres is no more than 0.75m for a 1m wide path;
- Where the evacuation route has many changes in direction and few straight runs of 10 metres or more, the spacing between centres should be no more than 0.5m.

To emphasise the importance of the marked egress path remaining clear, the marked egress path should also be painted with a safety yellow border and hatching.



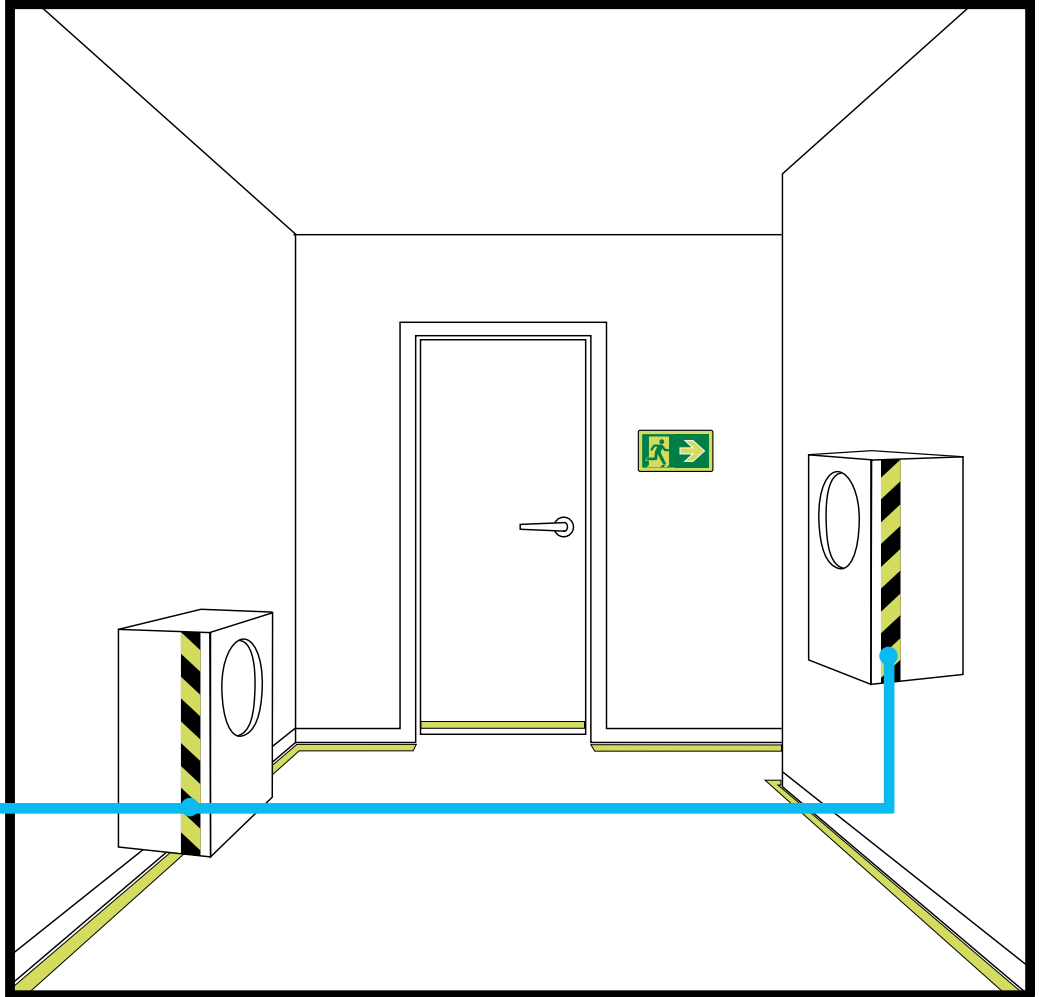
Path through open space



Path through open space (where occupants are familiar with the escape route)

**Obstacles**

Ecoglo Hazard marking tape applied to any obstacles at or below 2 metres in height and projecting more than 100mm into an evacuation route.



Hazard  
Marking  
Tape

Obstacles

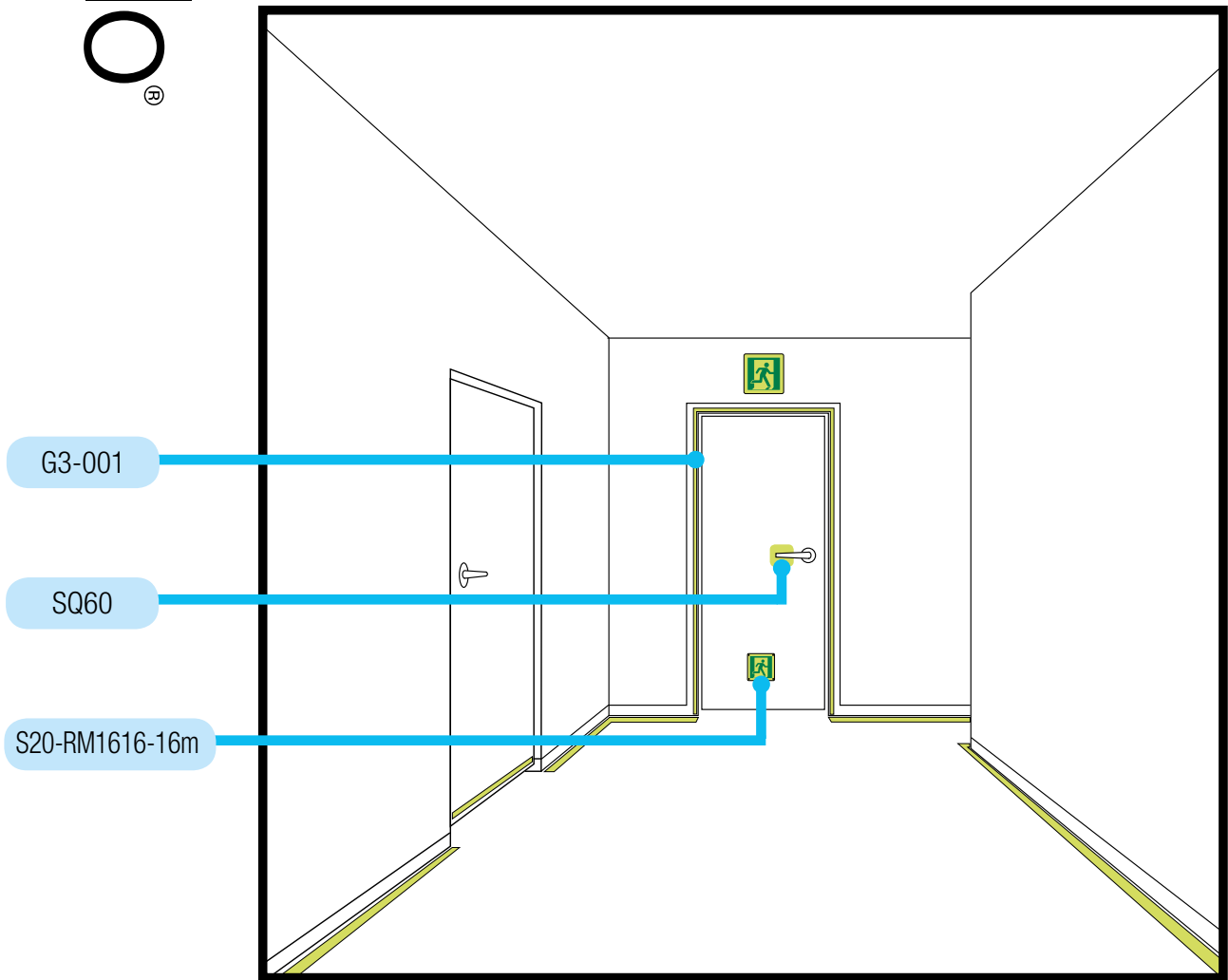
**Escape Doors and Entries to a Safe Place**  
Ecoglo G3-001 strips to mark the complete door surround.

Ecoglo SQ60 door handle marker on the door as close to the handle mechanism as possible to highlight its position.

In areas where there is a reasonably foreseeable risk of smoke obscuring the top of the

doorway and/or the installed exit sign at the door, a pictogram exit sign (S20-RM1616-16m) should be placed on the door, centred horizontally, and with the top of the sign no higher than 450mm above floor level.

Note that this is in addition to the requirements under Clause E4.8 Design and Operation of Exit Signs.



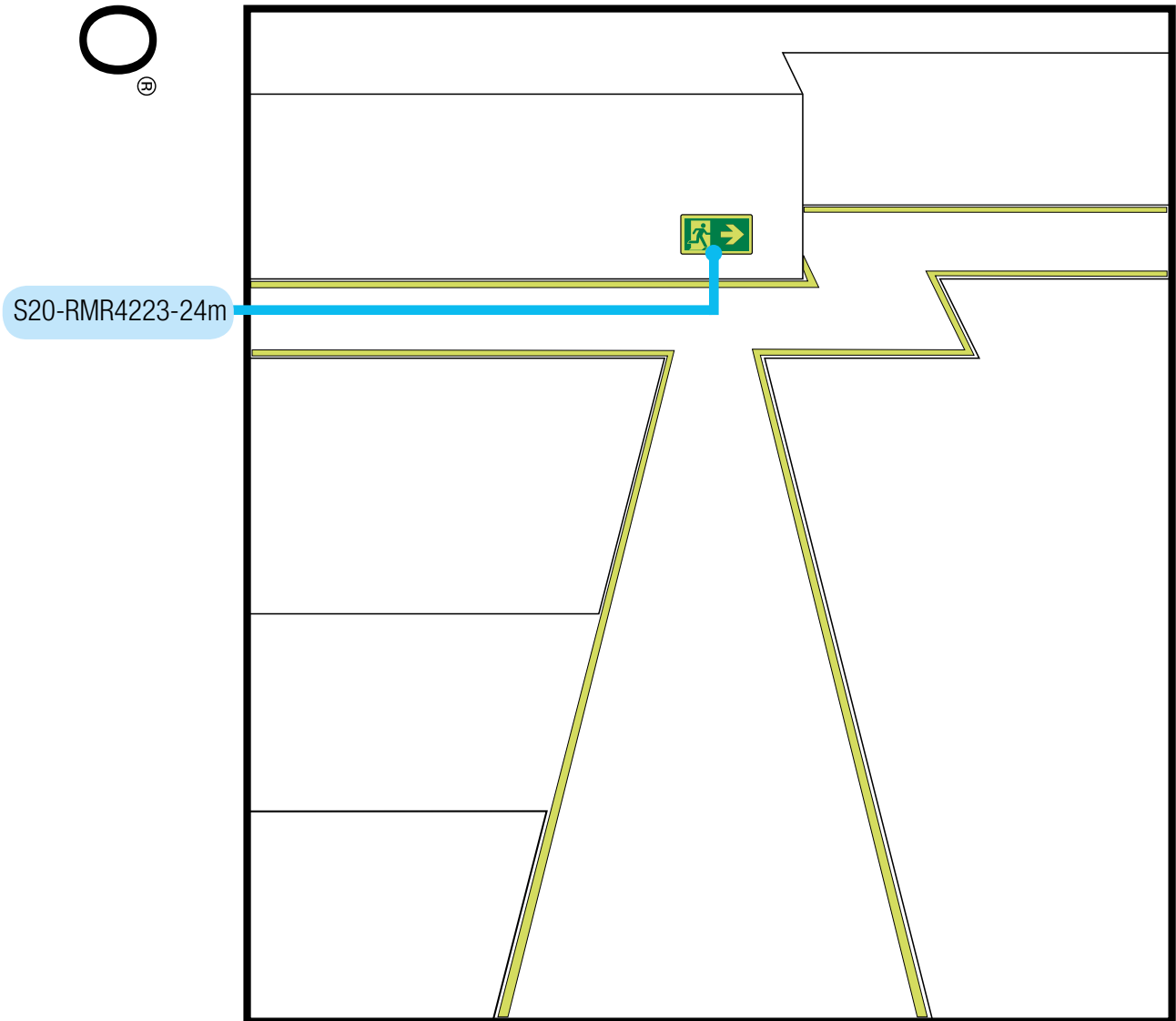
Escape door

### Unexpected Direction Changes and Merging Routes

Ecoglo S20-RML2916-16m and S20-RMR2916-16m (for up to 16 metre viewing distance), or S20-RML4223-24m and S20-RMR4223-24m (for up to 24m viewing distance) where there are direction changes which may seem surprising or sudden to someone escaping, or intersec-

tions where one way is a dead end. They should be mounted on a vertical surface, the top of the signs no more than 450mm above floor level.

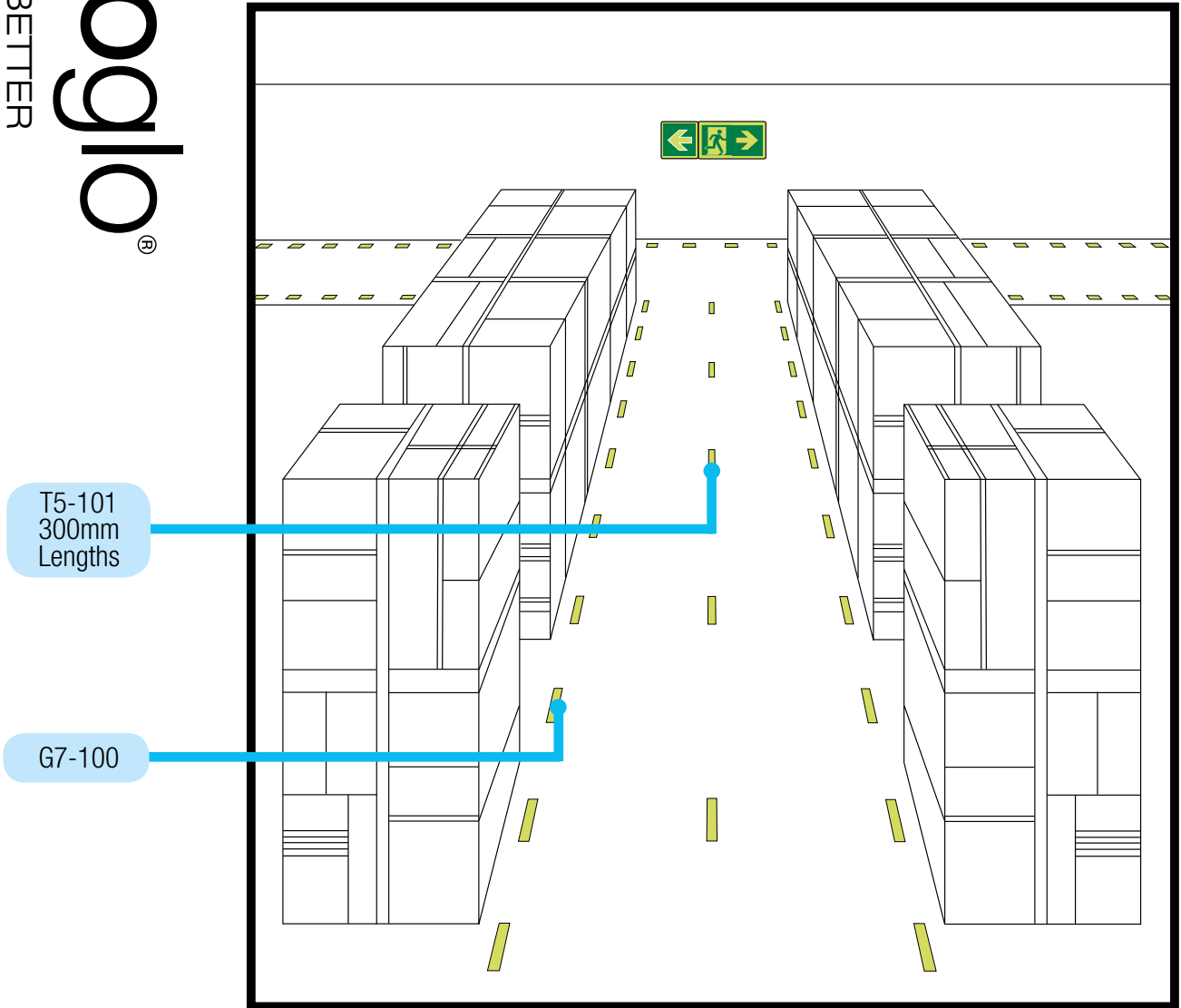
Note that this is in addition to the requirements under Clause E4.8 Design and Operation of Exit Signs.



Merging routes

### Wide Paths

T5-101, 300mm lengths with a frequency of 1 per 3m, to form "lane markings" where the evacuation route is required to be 3m wide or greater, and spaced to ensure that no individual lane is wider than 3m.



Wide path (greater than 3m)

## What ongoing inspection should be carried out?

Ongoing luminance verification is not required, but inspection is still required to make sure that the markings as installed have not been damaged or removed, that any electrical light needed to charge the markings is still functioning as intended,

and that the marked escape route is still an appropriate path.

The following inspections are recommended to ensure ongoing compliance with EP4.1.

### 6 Monthly Inspection / Maintenance Check

Action	Complete
There has been no change in the configuration of the building which renders the marked evacuation route unusable.	
All products are still configured as at installation and there is no material damage to any of these products.	
All products are clean from general dust build up and any other specific obscuring deposits.	
All products mark a clear path and have not been obstructed by physical hazards such as trolleys, machinery, partitions, etc.	
All lights checked that the positions have not altered from design.	
All lights are in working order and clean.	
All automated lighting control systems are operational as per design.	

APPENDIX A  
Recommended maintained illuminances\* in buildings

Corridors	40 lux
Loading bays, staff changing rooms	80 lux
Waiting rooms, simple manufacturing work, checking stock	160 lux
Offices, classrooms, general inspection of work	320 lux
Proof reading, fine inspection/work	640 lux

\*maintained illuminance is the minimum expected before the electric light should be cleaned or replaced.



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