

Australian/New Zealand Standard™

**Emergency lighting and exit signs for
buildings**

**Part 3: Emergency luminaires and exit
signs**



AS/NZS 2293.3:2018

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Electrical Trades Union
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Australian/New Zealand Standard™

Emergency lighting and exit signs for buildings

Part 3: Emergency luminaires and exit signs

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee LG-007, Emergency Lighting in Buildings, to supersede AS 2293.3—2005, *Emergency escape lighting and exit signs for buildings, Part 3: Emergency escape luminaires and exit signs*.

The AS/NZS 2293 series comprises three Parts as follows:

AS/NZS

- 2293 Emergency lighting and exit signs for buildings
- 2293.1 Part 1: System design, installation and operation
- 2293.2 Part 2: Routine service and maintenance
- 2293.3 Part 3: Emergency luminaires and exit signs (this Standard)

The objective of the AS/NZS 2293 series of Standards is to provide those associated with the design, construction, installation, certification and maintenance of all the individual components of an emergency lighting and exit signage scheme, and the scheme as a whole, with the requirements and guidelines to provide an installation that will ensure an acceptable level of illumination to the nominated areas for the safe evacuation of occupants from those areas in an emergency situation.

The objective of this Standard is to provide designers, manufacturers and certifiers of emergency luminaires and exit signs with the relevant requirements for such products in order to facilitate the production of luminaires that will provide an acceptable level of emergency lighting to a space when installed to conform with AS/NZS 2293.1.

Changes in this edition of the Standard include the following:

- (a) Introduction of requirements for alternative light sources (i.e. LED) and allowance for the use of emerging battery technologies.
- (b) Inclusion of New Zealand requirements (for publication as AS/NZS Standard).
- (c) Updated references to new pictogram standards.
- (d) Added definition and requirements for dual function exit signs.
- (e) Replacement of AS 3137 with AS/NZS 60598.2.22.

Electronic files of all basic pictorial elements are grouped under the heading 'Image files for exit signs specified in AS/NZS 2293.3' and attached to this document as a CD Rom in the case of a paper copy of the Standard and as a zip file in the case of an electronic copy. These files reproduce the contents of Figure 3.1 in a form suitable for directly creating complying pictorial elements over a range of sizes. These files are provided as an assistance to the user only and do not form part of this Standard.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the appendix to which they apply. A 'normative' appendix is an integral part of a Standard, whereas an 'informative' appendix is only for information and guidance.

Statements expressed in mandatory terms in footnotes to tables are deemed to be requirements of this Standard.

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STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard
Emergency lighting and exit signs for buildings

Part 3: Emergency luminaires and exit signs

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies requirements for the design, construction, performance and testing of emergency luminaires and exit signs. It applies both to emergency luminaires and exit signs that are centrally supplied, and to emergency luminaires and exit signs of the self-contained type.

NOTES:

- 1 Appendix A lists the essential data and preferred format of test reports for emergency luminaires and exit signs.
- 2 A sample declaration of the conformance of emergency luminaires and exit signs with this Standard is given in Appendix B.

1.2 APPLICATION

It is anticipated that this Standard will be indirectly referenced, via a direct reference to AS/NZS 2293.1, in the National Construction Code, and in New Zealand to the New Zealand Building Code, Clauses F6 and F8, thereby superseding the previous edition of the AS 2293 series.

Dual function exit signs shall firstly comply with all the requirements of the subsequent clauses 3.3 and 3.4 of this Standard in order to then be classified as an emergency luminaire.

Specific requirements relating to Clauses F6 and F8 of the New Zealand Building Code have been added where it is necessary to alter clauses of this Standard to comply with New Zealand requirements.

1.3 NORMATIVE REFERENCES

The following are the normative documents referenced in this Standard.

NOTE: Documents referenced for informative purposes are listed in the Bibliography.

AS/NZS

1680	Interior and workplace lighting
1680.3	Part 3: Measurement, calculation and presentation of photometric data
2293	Emergency lighting and exit signs for buildings
2293.1	Part 1: System design, installation and operation
2293.2	Part 2: Routine service and maintenance
60598	Luminaires
60598.1	Part 1: General requirements and tests (IEC 60598-1, Ed.8.0 (2014) MOD)
60598.2.22	Part 2.22: Particular requirements—Luminaires for emergency lighting (IEC 60598-2-22, Ed. 3.1(2002) MOD)

IEC	
61951	Secondary cells and batteries containing alkaline or other non-acid electrolytes—Secondary sealed cells and batteries for portable applications
61951-1	Part 1: Nickel-cadmium
61951-2	Part 2: Nickel-metal hydride
60896	Stationary lead-acid batteries
60896-21	Part 21: Valve regulated types—Methods of test
62133	Secondary cells and batteries containing alkaline or other non-acid electrolytes—Safety requirements for portable sealed secondary lithium cells, and for batteries made from them, for use in portable applications
62133-2	Part 2: Lithium systems
62620	Secondary cells and batteries containing alkaline or other non-acid electrolytes—Secondary lithium cells and batteries for use in industrial applications
CIE	
S025	Test Method for LED Lamps, LED Luminaires and LED Modules
IES	
LM-80-08	Approved Method for Measuring Lumen Maintenance of LED Light Sources
LM-79	Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products
TM-21-11	Projecting Long Term Lumen Maintenance of LED Light Sources
IES/ANSI	
LM-80-15	Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules
NZBC	New Zealand Building Code

NOTE: It is anticipated that IEC 63013, when published, will be referenced in this Standard.

1.4 DEFINITIONS

For the purpose of this Standard, the definitions given in AS/NZS 2293.1 and those below apply.

NOTE: Some of the definitions below appear in AS/NZS 2293.1 but, being specific to exit signs, are repeated here for convenience.

1.4.1 Exit signs

1.4.1.1 Internally illuminated exit sign

A sign consisting of white symbols on a green background, in accordance with Figure 3.1, both being light emitting or light transmitting.

1.4.1.2 Dual function internally illuminated exit sign

This type of exit sign is also referred to as a 'dual function exit sign' for the purposes of this series. A sign consisting of white symbols on a green background, in accordance with Figure 3.1, both being light emitting or light transmitting, or a sign consisting of light emitting or light transmitting green symbols on an opaque background in accordance with Figure 3.3 either having an emergency classification assigned in accordance with Appendix C.

1.4.1.3 Low illuminance area internally illuminated exit sign

Referred to as a 'low illuminance area exit sign' in accordance with Figure 3.3. A sign consisting of light emitting or light transmitting green symbols on an opaque background.

1.4.1.4 Externally illuminated exit sign

A sign consisting of white symbols on a green background, in accordance with Figure 3.1, illuminated by an incident source comprising an emergency luminaire located in front of the plane of the sign face.

1.4.2 Definitions specific to exit sign appearance

1.4.2.1 Additional background and optional additional background

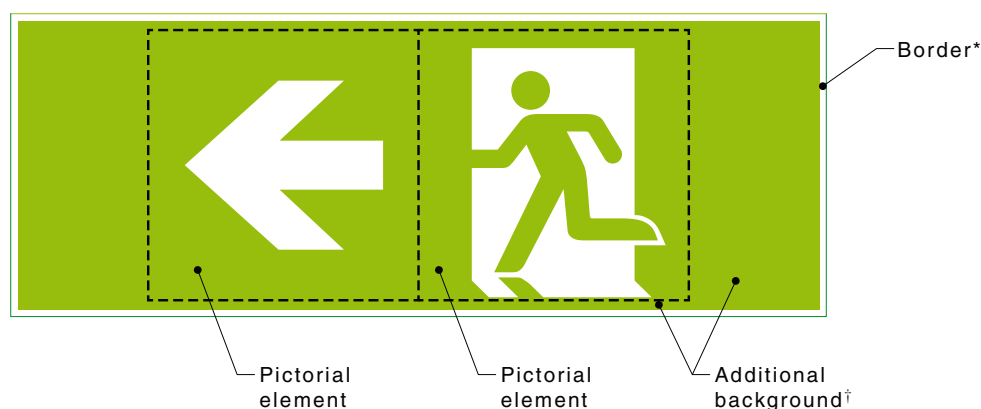
Additional background areas are those areas on the face of an exit sign that are not part of any pictorial element but are of the same colour as the background portion(s) of the pictorial element(s). Additional background forms part of a single element sign to ensure that the minimum size of a single element sign is consistent in proportion with dual element signs. Any areas of the face of a sign apart from the pictorial elements, additional background as defined above and allowable borders is designated as optional additional background. Refer to Figures 1.1 and 3.4(b).

1.4.2.2 Border

Any transilluminated white area of the face of the sign outside both the elements and any additional green background. Refer to Figure 1.1 and Clause 3.3.5.

1.4.2.3 Pictorial element

A combined symbol (i.e. arrow or figure in doorway) and contrasting background, forming a visual 'building block', one or more such building blocks being used with or without other elements to create an exit sign display. Refer to Figure 1.1.



LEGEND:

- * = Optional. Only allowed on internally illuminated exit signs
- † = Optional on two element sign
- = Boundary of pictorial element. (Notional only. Does not appear on sign)

FIGURE 1.1 CONSTITUENT ELEMENTS OF EXIT SIGN FACE

SECTION 2 GENERAL REQUIREMENTS FOR EMERGENCY LUMINAIRES AND EXIT SIGNS

2.1 APPLICATION AND CONFORMANCE

2.1.1 General

Emergency luminaires and exit signs covered by this Standard may be either specifically designed for the application or a composite of an emergency power supply unit and a normal lighting luminaire provided that the complete assembly satisfies the relevant requirements of this Standard.

2.1.2 Application

Luminaires for emergency lighting of the self-contained or centrally supplied type shall comply with this Section and any additional requirements of Sections 3, 4 or 5 as applicable.

2.1.3 Conformance for electrical safety

All emergency luminaires and exit signs shall comply with AS/NZS 60598.2.22 unless otherwise varied in this Standard.

2.2 LUMINAIRE CLASSIFICATION

Emergency luminaires and dual function exit signs shall be classified in accordance with Appendix C and shall be marked in accordance with Clause 2.7.

2.3 SUITABILITY FOR OPERATING CONDITIONS

Emergency luminaires and exit signs shall start and operate as nominated in Appendix D (e.g. voltages between 94% and 106% of rated supply voltage, ambient air temperature of between 10°C and 40°C) and comply with AS/NZS 60598.2.22.

Where a product states suitability for operation at different conditions (for instance, at higher or lower voltage, temperature or humidity) then it shall be tested under these conditions in order to confirm that it will—

- (a) start and operate satisfactorily under these different conditions; and
- (b) meet the performance requirements of this Standard as applicable.

2.4 ILLUMINATION AT SWITCH ON

2.4.1 Maximum delay—Australia only

This Clause (2.4.1) applies in Australia only.

Emergency luminaires shall provide a light output of at least—

- (a) 10% of the reference value within 1 s of energization; and
- (b) 80% of the reference value within 15 s of energization.

The reference value shall be taken as the luminous intensity assigned in accordance with the classification procedure of Paragraph C3.2 of Appendix C.

The requirements of Items (a) and (b) shall apply both when the emergency luminaires and exit signs are initially switched on (i.e. cold start) and when the emergency luminaires and exit signs are switched on immediately after operation for a period of 15 min (i.e. hot start).

NOTES:

- 1 The provision of a light output of at least 10% of the reference value within 1 s of energization is specified to minimize the possibility of panic occurring among the occupants of the building.
- 2 In New Zealand, the maximum delay times are detailed in the New Zealand Building Code, Clause F6/AS1 Section 1.5.1.

2.4.2 Conditions for assessing conformance with Clause 2.4.1

For the purpose of assessing conformance with the requirements of Clause 2.4.1, the following conditions shall apply:

- (a) Before the emergency luminaires or exit signs are operated they shall be conditioned by connection to the normal supply in an ambient atmosphere at $25 \pm 2^\circ\text{C}$ for a period of at least 1 h.
- (b) Centrally-supplied emergency luminaires or exit signs shall be operated at their rated voltage or, where marked for operation within a range of voltages, the lowest marked voltage.
- (c) Self-contained emergency luminaires or exit signs shall utilize their in-built battery supply but the battery shall be in the fully charged state at the commencement of each assessment.

For the assessment of light output required following a 15 min period of operation, the battery shall be in the fully charged state at the commencement of that period of operation. Loss of supply shall be simulated immediately afterwards for assessment of conformance with the light output criteria.

2.5 LIGHT SOURCES

Where LED light sources are used as the emergency light source in emergency luminaires and exit signs, they shall comply with all of the following requirements:

- (a) The LED(s) used shall have an LM80 test report.
- (b) For maintained emergency luminaires or exit signs, the LED(s) shall fall within the parameters of the LM80 test report whilst operating within the luminaire or exit sign at an ambient temperature of 40°C .
- (c) For non-maintained emergency luminaires (and for New Zealand exit signs), the LED(s) shall fall within the maximum operating parameters of the LED data sheet (or as advised by the LED manufacturer) whilst operating within the luminaire or exit sign at an ambient temperature of 40°C .

Conformance shall be demonstrated by testing in accordance with the provisions detailed in Appendix D, Paragraph D4.

2.6 CONVERSION PACKS

When embodying an emergency module (also known as a conversion pack) within a luminaire in order to convert it to an emergency luminaire, the converted luminaire shall be subjected to all the requirements of this Standard.

2.7 MARKING

In addition to the information required by AS/NZS 60598.2.22, each emergency luminaire and exit sign shall be legibly and durably marked with the following information, as applicable.

The following information shall be marked on a non-detachable part of the luminaire and not on the diffuser or other optical control media (where this may affect the optical performance of the luminaire):

- (a) Luminaire classification(s) determined in accordance with Appendix C in respect of the following factors, as applicable:
 - (i) Differences in the luminous intensities emitted in the transverse (C_0) and longitudinal (C_{90}) vertical planes (see Paragraph C3.1).
 - (ii) Light sources of differing lumen output with which it may be used (see Paragraph C3.1).
 - (iii) Alternative forms in which the luminaire may be used (see Paragraph C2.2).
 - (iv) Designed mounting positions and orientation (see Paragraph C2.3).
- (b) Where the luminaire has a different classification in the C_0 and C_{90} planes and the C_0 plane is not obvious, luminaires shall be marked to identify the orientation of the C_0 plane through the luminaire (see Appendix C.) This marking shall be clearly visible during installation and subsequent inspection of the completed lighting system.
 NOTE: The C_0 plane may be designated by the location of the identification symbol of Figure 2.1 at the appropriate position on the surroundings of the luminaire body, i.e. by placing the symbol on the C_0 axis relative to the light source.
- (c) The identification symbol specified in Figure 2.1. The symbol shall be black and white in colour and not less than 10 mm in diameter. It shall be located in a position where it will be visible from below when the luminaire is installed, except in cases where no appropriate surface exists on the luminaire, e.g. where only diffusing media or similar are visible below the ceiling.



FIGURE 2.1 IDENTIFICATION SYMBOL FOR EMERGENCY LUMINAIRES

- (d) Information necessary to ensure correct light source replacement where the light source is removable. This shall include the following as applicable:
 - (i) A statement of acceptable light source technologies that will not detrimentally affect such aspects as lumen output or the life of control gear. Statements of unacceptable technologies may also be included. Examples of technologies to be considered include tri-phosphor and 'amalgam' fluorescent light sources.
 - (ii) For incandescent light sources, a statement of the minimum acceptable nominal lumen output.
 - (iii) The colour temperature of acceptable light sources.
 NOTE: This will typically be designated by the colour temperature, e.g. '4000 K'.
- (e) Warning notice regarding isolation of the electrical supply or supplies, if necessary, to ensure the safety of persons working on the emergency luminaire or the integrity of operation of the emergency luminaire.
 (See also Clauses 3.6 and 4.6).

- (f) Where combined or sustained emergency luminaires are used, the location of the emergency light source shall be clearly marked, together with any information necessary to ensure correct light source replacement.
- (g) Designed mounting positions and orientation (related to luminaire position/safety IP rating, etc.). This information shall be marked on the luminaire to enable identification of the classification for each mounting position.

NOTE: Marking on the luminaire to relate the classification to the mounting position is not required where the luminaire is designed for mounting only in the horizontal plane.

SECTION 3 PARTICULAR REQUIREMENTS FOR EXIT SIGNS

3.1 APPLICATION

Exit signs, in addition to complying with the requirements of Sections 2, 4 or 5 as applicable, shall comply with the requirements of this Section.

NOTE: Photometric classification in accordance with Appendix C in itself does not indicate conformance with this Section.

3.2 TYPES OF EXIT SIGN

Exit signs shall be classified as one of four types, as follows:

- (a) Internally illuminated exit sign.
- (b) Dual function internally illuminated exit sign.
- (c) Low illuminance area exit sign.
- (d) Externally illuminated exit sign.

NOTE: In New Zealand:

- (a) Non-maintained exit signs are allowed in New Zealand, provided they comply with the requirements of New Zealand Building Code, Clause F8/AS1, for such signs.
- (b) Photoluminescent sign complying with the requirements of New Zealand Building Code, Clause F8/AS1.

3.3 APPEARANCE OF EXIT SIGN FACE

3.3.1 Basic pictorial elements and shape

The basic pictorial elements from which the face of any exit sign is constructed shall be in direct proportion to the applicable elements displayed in and specified by Figure 3.1.

NOTE: These elements are as per ISO 7010.

An exit sign shall consist of one or more of these elements, combined only in accordance with one of the combinations specified in Figure 3.2 or Figure 3.3.

The green section of an exit sign shall be in the shape of a rectangle or square. The use of variations to these basic shapes (e.g. large-radius corners proposed due to manufacturing considerations) shall be acceptable only where specifically agreed by the relevant regulatory authority. The green section of an exit sign shall not be in the shape of a circle, nor of a triangle.

NOTES:

- 1 This requirement is in keeping with the principles of the meaning of various sign shapes set out in ISO 3864-1.
- 2 Consideration should be given to the specular reflectance of the face of an exit sign in order to prevent or minimize obscuration of the sign face at certain viewing angles due to reflections from adjacent light sources. It is anticipated that future editions of this Standard will provide requirements for maximum allowable specular reflectance.

3.3.2 Optional additional elements

As well as the basic pictorial elements, an exit sign face may also contain additional background and optional additional background in accordance with Clause 3.3.4, and in the case of a standard self-illuminated exit sign only, a white border in accordance with Clause 3.3.5.

3.3.3 Location of elements

Where a sign consists of one pictorial element [i.e. Figure 3.1(a) or (b)] this element shall be located in the centre of the additional background. (See also Clause 3.3.4.)

Where a sign consists of two pictorial elements, these shall be immediately adjacent to each other and located in the centre of any optional additional background.

3.3.4 Additional background

Where a standard or dual function internally illuminated or externally illuminated exit sign has only a single pictorial element, the face of the sign shall include additional background of an area at least equal to the total area of the pictorial element and this additional background shall comply with the requirements of Clause 3.4.2(d).

Both additional background and optional additional background shall comply with the requirements of Clause 3.3.6.

3.3.5 Borders

For a standard or dual function self-illuminated sign and for an externally illuminated sign, white transilluminated areas lying outside the areas of green background shall be acceptable on condition that any such areas—

- (a) form a continuous border around the green background; or
- (b) form lines of even thickness either at the sides or above and below the green background areas; or
- (c) comprise a total projected area not more than 20% of the combined area of the pictorial elements plus additional background.

Borders shall not be used on low illuminance area exit signs.



(a) Left facing



(b) Right facing



(c) Arrow

FIGURE 3.1 PICTORIAL ELEMENTS



(a) Straight on from here
(Refer to Clause 3.3.4)



(b) Left from here



(c) Right from here



(d) Left from here



(e) Right from here

FIGURE 3.2 FORMATS AND MEANINGS OF PICTORIAL ELEMENTS

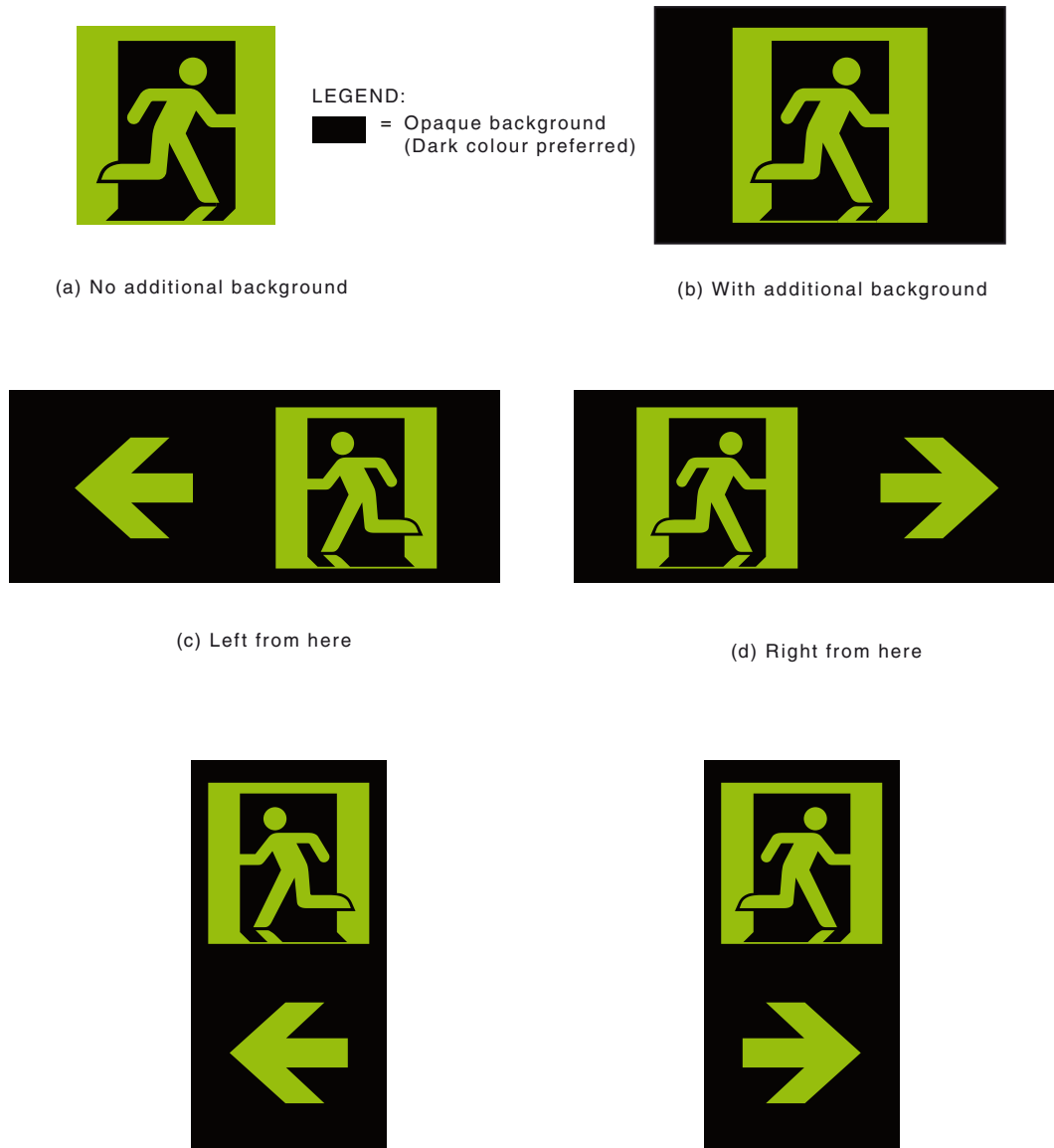


FIGURE 3.3 LOW ILLUMINANCE AREA EXIT SIGNS

3.3.6 Colours

3.3.6.1 General

For all types of exit sign, the colour of any additional background shall be identical to that of the background within the pictorial element(s), and there shall be no other color or marking present in either of these backgrounds except where allowed for under Clause 3.6.2.

3.3.6.2 Standard and dual function internally illuminated exit signs

The white and green colour portions of the face of a self-illuminated exit sign shall lie within the areas defined by the chromaticity coordinates specified in Table 3.1.