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STANDARDS Australia

AS/NZS 2293.1:2018

Incorporating Amendment No. 1

AUSTRALIAN/NEW ZEALAND STANDARD

Emergency lighting and exit signs for buildings

Part 1: System design, installation and operation

AS/NZS 2293.1:2018

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This standard was published on 29 June 2018.

The following are represented on Committee LG-007:

Australasian Fire and Emergency Service Authorities Council
Australian Building Codes Board
Australian Industry Group
Business New Zealand
Electrical Trades Union
Employers Chamber of Commerce Central
Engineers Australia
Fire Protection Association Australia
IES: The Lighting Society
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Australian/New Zealand Standard

Emergency lighting and exit signs for buildings

Part 1: System design, installation and operation

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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 2293.1—2005, *Emergency escape lighting and exit signs for buildings*, Part 1: *System design, installation and operation*.

This Standard incorporates Amendment No. 1 (May 2021). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

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 (this Standard)
2293.2	Part 2:	Inspection and maintenance
2293.3	Part 3:	Emergency luminaires and exit signs*

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, installers and certifiers of emergency lighting and exit signage schemes with the relevant requirements and guidance for the provision of emergency lighting and exit signs to all designated spaces within a building in order to ensure an acceptable level of illumination for the safe evacuation of occupants from those spaces in an emergency situation.

The principal reason for this edition of the Standard is to specify updated installation requirements and adapt the Standard to current technologies, terminologies and delete out of date references or methods. Many of the section headings have been re-worded to better reflect their application and the sections re-ordered to assist in the reading of the document. Spacing tables have been moved to a normative appendix.

To assist with the application of this Standard, definitions have also been included for the following:

(a) Exit signs—Four types defined.

(b) High risk task area lighting.

(c) Light source(s).

(d) Remote self-contained emergency luminaire or exit sign.

(e) Stand-by lighting.

Further to these items some other definitions have been revised to support these new definitions or to clarify previous ambiguities.

The terminology now used recognizes the term ‘emergency lighting’ as including four categories of lighting, each provided with an alternative energy supply, as follows:

(i) Emergency evacuation and emergency escape lighting.

(ii) Illuminated emergency exit signs.

(iii) High risk task area lighting.

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(iv) Stand-by lighting.

Of these categories, Items (i) and (ii) refer to the two types of emergency lighting that are required by the deemed-to-satisfy provisions of the NCC and New Zealand Building Code and comprise the scope of the AS/NZS 2293 series of Standards. Items (iii) and (iv) are not covered by this series of Standards. However, definitions for these types of lighting have been added to this edition of the Standard.

Some clauses have been moved to assist reading and application of the Standard. For example, the clauses titled 'Avoidance of obstruction of light', 'Avoidance of glare' and 'Protection against unauthorized removal of lamps' have been moved into a 'General' clause in Section 4, which deals with installation requirements for emergency luminaires. The clause specifying the illumination requirements has been moved to Clause 4.2, titled 'Provision of emergency luminaires' rather than within the specific clauses dealing with illuminance calculations.

Clause 2.3.3, dealing with sensing of supply failure, has been simplified and the methodologies aligned for both central battery and single point emergency lighting systems.

AS/NZS 2293.3 requires an emergency luminaire to be classified according to its ability to achieve a luminous intensity up to a 70 degree cut off angle for Classification A-D (65 degrees for Classifications E). The calculations for the classification currently do not assess the contribution of luminance beyond this 70 degree geometric limit. AS 2293.1 contains spacing tables for common mounting heights for emergency luminaries based on their classification (derived from AS/NZS 2293.3) to achieve the current minimum at floor level. However, having regard only for the light assessed under the 70 degree geometric limitation used for the purpose of classifying the luminaire, calculations reveal the previous edition's spacing tables allow configurations that would result in the current minimum not being achieved. Further, with changing technology, unlike fluorescent and incandescent types typical of the available light sources at the time of publication of previous editions of this Standard, some luminaries including modern LEDs do not produce light beyond their assessed geometric limitation and therefore may not achieve the current minimum at all points on the floor.

A1

This edition contains a set of revised classification tables to reflect maximum spacing that does not exceed geometric limitations of 70 degrees for all Class A-D luminaires and 65 degrees for Class E luminaires assessed under AS/NZS 2293.3. Two sets of tables are contained within Appendix E and F. Appendix E contains tables based on 0.2lx minimum between emergency luminaires and Appendix F contains tables based on 1lx minimum between luminaires. It also includes, in the calculation method, a requirement to achieve a 'minimum average' of 0.5 lx in addition to the current minimum.

The use of spacing tables for stairwells has been revised and simplified. Rather than modifying spacings using a set of rules, to achieve the higher illumination levels required in stairs, and spacing tables based around 0.2lx minimum, emergency luminaires are selected using the conventional spacing table approach based on the new spacing tables in Appendix F based on 1lx minimum.

This edition of the Standard requires that emergency luminaires and exits signs are visibly labelled and previous inconsistencies between the information required for maintaining the system and references to requirements prescribed in AS/NZS 2293.2 have been identified and corrected.

Provisions and requirements for centrally supplied systems have been simplified and upgraded. Within buildings required to be constructed of fire-resisting elements there are no longer separate provisions for buildings supplied with automatic sprinkler systems compared to buildings without. The class of cable protection has been standardized to be WS4X protection and the fuse type within terminal boxes has been widened to include fuses

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of a higher grade than type gG making it easier the match the fuse with a ceramic fuse holder, as required in the Standard.

Committee LG-007 will continue to investigate new techniques, new or developing energy sources and illuminants, new approaches such as wayfinding systems and also the effects of smoke on emergency lighting, for possible inclusion in future editions of the AS/NZS 2293 series.

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.

This Standard distinguishes between documents cited as normative references and those referenced for information only. Those belonging to the former category are cited in the clause titled ‘Normative references’, and are listed in Appendix A, while those for information only are listed in the Bibliography.

In New Zealand, the New Zealand Building Code takes precedence over this Standard but cites the Standard in Acceptable Solutions F6/AS1 and F8/AS1 as a means of compliance with the requirements of the New Zealand Building Code, clauses F6, Visibility in Escape Routes, and F8, Signs.

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STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

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

Part 1: System design, installation and operation

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies requirements for the design and installation of emergency lighting and illuminated emergency exit signage systems for buildings. Central battery, single point and self-contained systems are included.

The scope of this Standard does not include the following:

(a) Constructional (including appearance) requirements for emergency luminaires and exit signs.

NOTE: These requirements can be found in AS/NZS 2293.3.

(b) Requirements for maintaining an emergency lighting installation once installed.

NOTE: These requirements can be found in AS/NZS 2293.2.

(c) Specification of the types of buildings or particular spaces that are required to be provided with emergency lighting.

NOTE: For Australia this is set out in the NCC.

(d) Requirements for emergency lighting of the interior of lift cars.

NOTE: For Australia these requirements can be found in the NCC. The NCC contains deemed-to-satisfy provisions for lift car emergency lighting.

(e) Requirements for high-risk task area lighting.

(f) Requirements for stand-by lighting.

(g) Requirements for emergency lighting on construction sites.

NOTE: These requirements can be found in AS/NZS 3012.

(h) Requirements for emergency lighting in vehicular sections of roadway tunnels.

NOTE: These requirements can be found in AS/NZS 1158.5 and further guidelines are published by Austroads, the association of Australasian road transport and traffic agencies.

(i) Requirements for rail tunnels, rail yards, concourse and platforms

NOTE: These requirements are specified by the relevant rail authority.

1.2 OBJECTIVE

The objective of this Standard is to provide designers, installers, manufacturers and consumers with the installation requirements for emergency lighting equipment and associated systems. Part 1 provides the requirements and specifications which are applicable to installations, where emergency luminaires and exit signs are used.

1.3 APPLICATION

This Standard becomes applicable upon publication.

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1.4 NORMATIVE REFERENCES

The normative documents referenced in this Standard are listed in Appendix A.

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

1.5 DEFINITIONS

For the purpose of this Standard, the definitions given in the NCC, as appropriate, and those below apply.

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1.5.1 Ambient temperature

The dry bulb temperature in still air, averaged over a period of 8 h.

1.5.2 Approved

Approved by the relevant regulatory authority.

1.5.3 Baseline data

Data derived from the approved design and commissioning, which serve as a basis for subsequent comparison with the data derived from inspection, test and survey.

1.5.4 Battery

A unit consisting of one or more cells connected in a series, parallel or series parallel arrangement to supply the voltage and current requirements of a connected load.

1.5.5 Boost charge

A system of charging adopted to recover the battery in accordance with the duty requirements of the system, the voltage of the system under these circumstances being outside the normal operational limits of the system.

1.5.6 Cell

The basic single unit consisting of case, electrolyte, positive and negative plates, and connecting terminals, used for storing electric energy by electrolytic processes.

1.5.7 Centrally supplied (emergency lighting) system

A system of emergency lighting in which a number of emergency luminaires, or exit signs, or both are supplied from a common power source.

Within a building there may be more than one power source, each of which supplies the emergency luminaires and exit signs in a particular section of the building.

1.5.8 Combined emergency luminaire

Luminaire containing two or more lamps or light sources, at least one of which is energized from the emergency lighting supply and the other(s) from the normal lighting supply. The emergency lamp(s) in a combined emergency luminaire is (are) either maintained or non-maintained (refer to Figure 1.1).

1.5.9 Combined illuminated emergency exit sign

Definition as for ‘combined emergency luminaire’.

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1.5.10 Designated area

A specific area within a building that is required to be provided with emergency lighting.

1.5.11 Direct lighting

A system of lighting in which most of the light emitted by the luminaires is directed towards the surfaces to be lit. The term usually refers to light emitted in a downward direction.

1.5.12 Electrolyte density

The density of the electrolyte measured in kilograms per cubic metre at a specific temperature.

1.5.13 Emergency evacuation lighting

That part of emergency lighting that provides illumination for the safety of people leaving an area or attempting to terminate a dangerous process before vacating an area.

1.5.14 Emergency lighting

Lighting for use when the supply to the normal lighting fails; it includes emergency evacuation lighting, illuminated emergency exit signage, high-risk task-area lighting and stand-by lighting.

NOTE: Only emergency evacuation lighting and illuminated emergency exit signage are addressed in this Standard.

1.5.15 Emergency luminaire

A luminaire designed for use in an emergency lighting system.

NOTES:

1 Emergency luminaires are required to be classified in accordance with AS/NZS 2293.3. A bare lamp unit may serve as an emergency luminaire provided that it has been appropriately classified.

2 An emergency luminaire may be integral with a normal lighting luminaire or may be a completely separate unit.

1.5.16 Exit signs

1.5.16.1 *Dual function 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, and having an emergency classification assigned in accordance with Appendix C of AS/NZS 2293.3:2018.

1.5.16.2 *Externally illuminated exit sign*

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

1.5.16.3 *Internally illuminated exit sign*

A sign consisting of white symbols on a green background both being light emitting and light transmitting, in accordance with Appendix D.

1.5.16.4 *Low illuminance area internally illuminated exit sign*

A sign consisting of light emitting or light transmitting green symbols on an opaque background, in accordance with Appendix D.

1.5.17 Exit signage

Those parts of an emergency lighting scheme intended to communicate the path of travel to a required exit by displaying appropriate images from those detailed in Appendix D.

NOTE: Throughout this Standard, the term ‘exit sign’ is used to refer to the types defined in this Standard.

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1.5.18 Final subcircuit

The wiring from the subcircuit protective device to the luminaires except that, in central systems, wiring originating from the distribution board to the fused terminal box and wiring between the fused terminal box and the emergency luminaire or exit sign is deemed to be part of the one final subcircuit.

NOTES:

1 See AS/NZS 3000 for a more detailed definition.

2 See Clause 7.4.2(b) and Appendix B for details of the fused terminal box and its installation.

1.5.19 Float charge

A system of charging adopted to maintain a battery in a fully charged state.

1.5.20 High risk task area lighting

That part of emergency lighting that provides illumination for the safety of people involved in potentially dangerous process or situation and to enable proper shutdown procedures for the operator and other occupants of the premises.

1.5.21 Illuminance

The luminous flux arriving at a surface divided by the area of the illuminated surface.

Unit: lux (lx). Symbol: *E*.

1.5.22 Illumination

A general expression for the quantity of light arriving at a surface. The physical measure of illumination is illuminance.

1.5.23 Indirect lighting

A system in which most of the light is provided by reflection from ceilings, walls or other surfaces.

1.5.24 Integral self-contained emergency luminaire or exit sign

An emergency luminaire or exit sign containing within it, a battery, battery charger, control gear (where used), and the controls necessary for sensing failure of the normal supply and for changing over to the emergency supply and vice versa.

1.5.25 Light loss factor (LLF)

The ratio of the illuminance produced by a lighting system at a specified time to the illuminance produced by the same system when new.

NOTE: The LLF combines the losses caused by lamp lumen depreciation, luminaire depreciation and room surface depreciation. Further information is available in AS/NZS 1680.1.

1.5.26 Light source(s)

Lamps, provided with a lamp cap, or modules (LED) or other luminous element, housed in the same enclosure or on the same structure, made in order to produce an optical visible radiation to be used or incorporated into a luminaire.

1.5.27 Luminaire

Apparatus which distributes, filters or transforms the light transmitted from one or more light source(s) and which includes, except the light source(s) themselves, all the parts necessary for fixing and protecting the light source(s) and, where necessary, circuit auxiliaries together with the means for connecting them to the electric supply. [IEV 845-10-1, modified]

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1.5.28 Luminance

The physical quantity corresponding to the brightness of a surface (e.g. a lamp, luminaire, sky or reflecting material) in a specified direction. It is the luminous intensity of an area of the surface divided by that area.

Unit: candela per square metre (cd/m^2). Symbol: *L*.

1.5.29 Luminous flux

The measure of the quantity of light. For a lamp or luminaire it normally refers to the total light emitted irrespective of the directions in which it is distributed.

Unit: lumen (lm). Symbol: *N*.

1.5.30 Luminous intensity

The concentration of luminous flux emitted in a specified direction.

Unit: candela (cd). Symbol: *I*.

1.5.31 Maintained emergency luminaire

Luminaire in which all emergency lighting lamps are energized at all times when normal or emergency lighting is required (refer to Figure 1.1). A maintained emergency luminaire may be switched or un-switched.

(a) *Switched* An emergency light or exit sign where the light source can be turned on and off when mains power is present (i.e. not in emergency mode). The term is used in conjunction with either ‘maintained’ or ‘combined maintained’. This switching function is independent of the operation of the battery charger.

(b) *Un-switched* An emergency light or exit sign that cannot be turned on and off when mains power is present (i.e. not in emergency mode). The term is used in conjunction with either ‘maintained’ or ‘combined maintained’.

NOTES:

1 See Figure C1 of Appendix C for a typical schematic arrangement for a maintained, self-contained emergency luminaire.

2 The term ‘maintained’ can be applied to individual lamps in a combined emergency luminaire.

1.5.32 Monitored supply

The electrical supply to normal lighting luminaires, failure of which is sensed by the emergency lighting system.

1.5.33 Mounting height

The vertical distance between the underside of a luminaire and the floor.

1.5.34 Nominal system voltage

A reference voltage which is used as a basis for the design of a central emergency lighting system.

NOTE: Preferred values of nominal system voltage are 12 V, 24 V, 32 V, 48 V, 110 V and 240 V.

1.5.35 Non-maintained emergency luminaire

Luminaire in which all emergency lighting lamps are in operation only when the supply to the normal lighting fails (refer to Figure 1.1).

NOTE: See Figure C1 of Appendix C for a typical schematic arrangement for a non-maintained, self-contained emergency luminaire.

1.5.36 Normal lighting

All installed electric lighting supplied from the designated normal power supply.

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1.5.37 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 D1 in Appendix D).

1.5.38 Reflectance (reflection factor)

The ratio of the total luminous flux reflected from a surface to the total luminous flux which arrives at the surface. Usually expressed as a decimal in the range 0 to 1, but may also be expressed as a percentage.

Symbol: ρ.

1.5.39 Regulatory authority

The body having statutory powers to administer an Act of Parliament, or the regulations of such an Act, pertaining to any matter covered by this Standard.

1.5.40 Remote self-contained emergency luminaire or exit sign

Emergency luminaire or exit sign, having a maximum of two light source(s), where the control gear and/or battery is separate to the light source(s).

1.5.41 Required in-service duration

The duration of operation of the emergency lighting system which the regulatory authority requires the system to be capable of providing at any time.

1.5.42 Reversible inverter

A device that functions as a battery charger while the normal electricity supply is available and which, on failure of the normal supply, assumes the function of an inverter supplying the emergency lighting from the emergency power source.

NOTE: This definition usually applies to central battery systems.

1.5.43 Single point (emergency lighting) system

An emergency lighting system employing only self-contained emergency luminaires and/or exit signs.

1.5.44 Stand-by lighting

That part of emergency lighting provided to enable normal activities to continue substantially unchanged. [Source: IEV 845-09-13]

1.5.45 Static inverter

A device capable of converting direct current to alternating current without utilizing moving parts.

1.5.46 Sustained emergency luminaire

Alternative name for a combined, non-maintained emergency luminaire (refer to Clause 1.5.8 and Figure 1.1).

1.5.47 Utilization factor (UF)

The proportion of the luminous flux emitted by the lamp(s) that reaches the reference plane.

NOTES:

1 In this Standard the reference plane for illuminance calculations is normally taken as a horizontal plane at floor level.

2 Requirements for the calculation and presentation of utilization factors are given in AS/NZS 1680.3.

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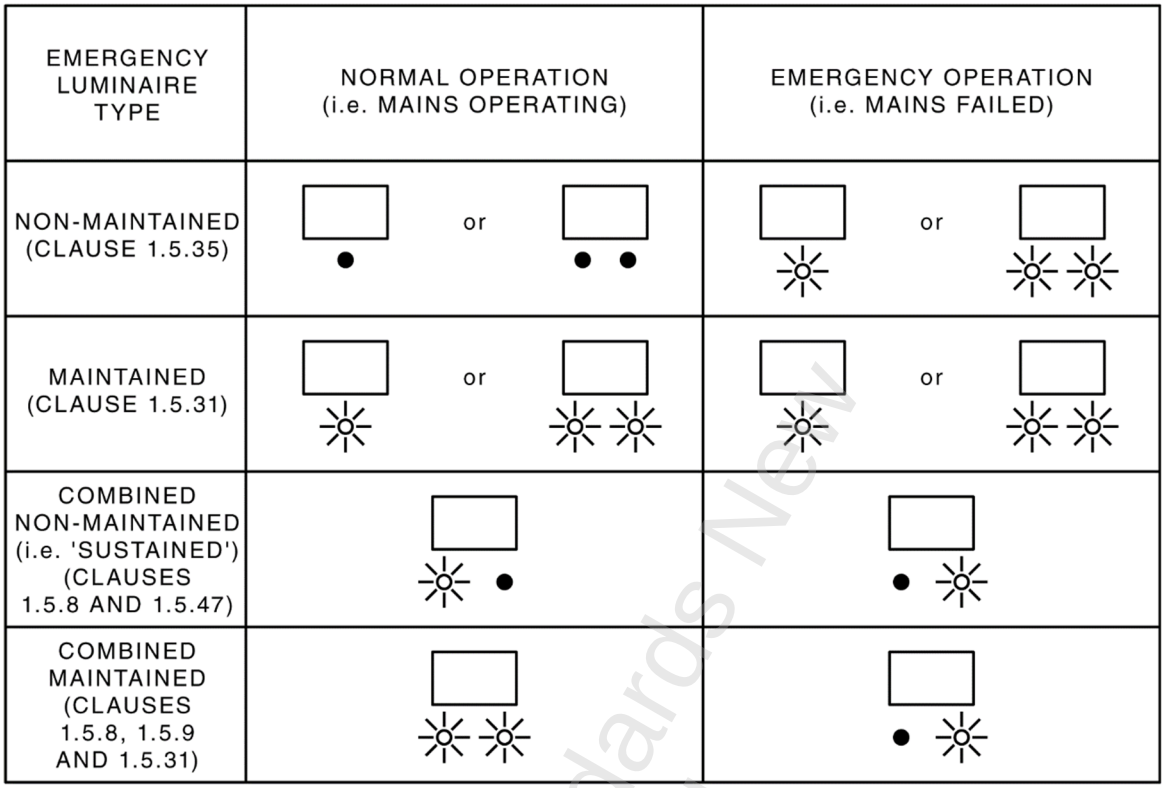


FIGURE 1.1 EXAMPLES OF EMERGENCY LUMINAIRE OPERATING TYPES

1.6 ALTERATIONS AND ADDITIONS

Where an addition or alteration to an existing installation will adversely affect the operation of the existing installation, the relevant portion of that installation shall conform to the relevant sections of this Standard.

NOTE: Emergency lighting systems and building alterations, modifications and additions such as changes in partitioning, provision of additional rooms and, for indirect lighting systems, changes to the surface finishes of ceilings and upper walls may necessitate modifications to the emergency lighting system for continued conformance to this Standard.

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SECTION 2 GENERAL REQUIREMENTS, SYSTEM DESIGN, OPERATION, ARRANGEMENT, CONTROL AND LABELLING

2.1 SCOPE OF SECTION

This Section sets out requirements for the operational performance, arrangement and control of emergency lighting and exit signage systems. These requirements include a specified minimum duration of operation to be provided at any time during the life of an installation.

NOTE: As it cannot be known when the normal lighting will fail, it is essential for their correct performance that emergency lighting and exit signage systems are regularly maintained. Refer to AS/NZS 2293.2.

2.2 DURATION OF OPERATION

2.2.1 Initial

At the time of commissioning of any emergency power supply or significant part thereof (e.g. battery cell) all emergency escape luminaires and exit signs powered from that supply shall operate satisfactorily on emergency power for 1.33 times the applicable duration required in Clause 2.2.2.

NOTE: The greater initial duration is required to allow for the depreciation in battery capacity that will occur with time.

2.2.2 In-service

At any time during the life of an installation, the duration of satisfactory operation on emergency power of every emergency escape luminaire or exit sign shall be not less than 90 min except where applicable building regulations specify a shorter minimum period.

2.3 OPERATION, ARRANGEMENT AND CONTROL

2.3.1 General

Upon failure of the electrical supply to the normal lighting in an area, irrespective of whether or not it is illuminated, each relevant emergency luminaire and exit sign shall be energized from its emergency supply in accordance with Clauses 2.3.2 and 2.3.3.

NOTES:

1 Where automatic lighting control systems are used for normal lighting, care should be taken to ensure that there are sufficient luminaires, not controlled by that system or configured to come on in the event of a system failure, to facilitate safe egress in the event of the malfunction or failure of the lighting control system.

2 It is recommended that exit signs be permanently illuminated.

3 In New Zealand, emergency stand-by generators are permitted to provide emergency lighting where the requirement for initiation times for the lighting required by New Zealand Building Code Acceptable Solution F6/AS1 Paragraph 1.5.1(c) conform to the start and acceptance of load of the generator concerned.

2.3.2 Normal lighting requiring cool-down

Where the combination of lamps and control gear utilized in the normal lighting luminaires is such that the lamps might not restrike immediately after restoration of the normal supply, one of the following measures shall be taken:

(a) Provision of a time delay or other suitable means to maintain the operation of the emergency lighting for the period necessary to allow the normal lighting lamps to restrike.

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(b) Installation of a proportion of normal lighting luminaires of a type that will provide immediate lighting to a level not less than that provided by complying emergency lighting.

NOTES:

1 The typical normal luminaire to which this Clause applies is a high intensity discharge luminaire with ordinary control gear. In the case of a loss of normal power for, say, 1 min it might be up to 10 min after restoration of power before such a luminaire restrikes and produces significant luminance.

2 Approach (b) will also address the situation of normal HID lights switching off due to a momentary drop in supply voltage that is not sufficiently large to be sensed by the emergency lighting system as a loss of power.

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2.3.3 Monitoring of supply failure

Within a designated area the failure of the normal supply to final subcircuits supplying lighting to that area shall cause each emergency luminaire and exit sign in the area served by the subcircuit to be automatically connected to its emergency power source.

NOTE: This requirement does not preclude other emergency luminaires and exit signs, connected to subcircuits that might not have lost supply, from also being automatically connected to their emergency power sources in response.

Where any part of a designated area is served by more than one normal lighting subcircuit, the arrangement and connection of the emergency luminaires and exit signs shall be such that the illuminance provided by the normal lighting luminaires on the circuits that are sensed for loss of supply is not inferior to that provided by the required emergency lighting.

In New Zealand, where non-maintained exit signage is used, it shall be configured to be energized in the event of activation of the fire alarm system.

NOTES:

1 See Figures C1, C2 and C3 of Appendix C for example circuit arrangements.

2 See Clause 3.3 for additional requirements which may impact upon the connection of emergency luminaires and exit signs for testing purposes.

3 In New Zealand, where generators are permitted to provide emergency lighting power supplies, refer to Clause F6 of the New Zealand Building code.

2.3.4 Installation and arrangement of a remote self-contained emergency luminaire or exit sign

Where the light source(s) is located more than 2 m from the control gear, cable parameters shall be determined that ensure correct operation of the luminaire to this Standard. If the interconnecting cable traverses more than one fire compartment of a building, or if the cable is longer than 10 m, the cable shall be provided with Class WS4X protection in accordance with AS/NZS 3013.

2.4 LABELLING OF DEVICES CONTROLLING THE OPERATION OF EMERGENCY LIGHTING

Every device (e.g. circuit breaker, fuse) which, if turned off or removed, will cause emergency lighting or exit signs to operate shall have the following notice clearly and durably affixed on or immediately adjacent to it:

WARNING: INTERRUPTING SUPPLY WILL DISCHARGE EMERGENCY LIGHTING BATTERIES.

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2.5 LABELLING OF EMERGENCY LUMINAIRES AND EXIT SIGNS

Each emergency luminaire shall be uniquely identifiable while attending the luminaire.

At the time of installation each emergency luminaire or exit sign shall be marked with the unique visual identifier unless alternate means of identifying the luminaire are provided.

If a label is used it shall be permanently fixed and indelible. The label shall be adjacent or attached to the luminaire and provide unique identification to aid in locating the emergency luminaire or exit sign during inspection and maintenance. The label shall be readily visible and lettering height shall be a minimum of 3 mm and in a contrasting colour.

NOTE: Consideration should be given to the use of a logical identifier to aid in determining a sequence or pattern when inspecting emergency luminaires or exit signs.

2.6 IDENTIFICATION AND MARKING OF EMERGENCY LUMINAIRES OR EXIT SIGNS

Each emergency luminaire or exit sign shall have its illumination classification in accordance with AS/NZS 2293.3 marked on the body of the luminaire.

Where an emergency luminaire or exit sign does not bear the identification symbol specified in Figure 2.1, the symbol shall be applied immediately adjacent to it but shall not be located on removable ceiling tiles.



FIGURE 2.1 IDENTIFICATION SYMBOL FOR EMERGENCY LUMINAIRES AND EXIT SIGNS

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SECTION 3 GENERAL REQUIREMENTS, PROVISION OF CHARGING INDICATION AND DISCHARGE TEST FACILITIES

3.1 SCOPE OF SECTION

This Section sets out requirements for checking battery charging and emergency operation of single point systems, and for the facilities used for conducting periodic discharge tests on all emergency lighting and exit signage systems.

NOTE: The relevant tests, the intervals at which they should be carried out and the criteria which should be satisfied are set out in AS/NZS 2293.2.

3.2 SINGLE POINT SYSTEMS

3.2.1 Test switch

NOTE: This Clause is based on the corresponding clause in AS/NZS 2293.3.

A switch shall be provided to permit the operation of each emergency luminaire or exit sign to be checked by simulating a supply circuit failure. The switch shall be—

(a) accessible on or adjacent to the emergency luminaire or exit sign and in a convenient position for operation; and

(b) of a type which cannot be maintained in the test position without the attendance of the person conducting the test.

Notwithstanding the above requirements, the following exemptions shall apply:

(i) An internal test switch may be provided for emergency luminaires or exit signs of a type for which it is impractical to incorporate an external test switch, e.g. vandal-resistant luminaires or recessed troffer luminaires which have separate body elements. The internal test switch shall be located in a position that is accessible during maintenance and lamp replacement under normal conditions.

(ii) No test switch need be provided for emergency luminaires or exit signs which are designed for use in hazardous locations, where the possibility of sparking resulting from operation of the switch would compromise safety features of the luminaire design.

(iii) For remote self-contained luminaires or exit signs the test switch may be located on either the luminaire or remote mounted control gear enclosure where the emergency luminaire or exit signs are located greater than 2 m apart from its control gear.

3.2.2 Visual indicator

NOTE: This Clause is based on the corresponding clause in AS/NZS 2293.3.

A1 Visual indication of battery charger operation shall be provided. The indicator shall conform with all of the following:

(a) Either red or green in colour under normal operating conditions.

(b) Arranged such that failure of the indicator device will not render the emergency luminaire or exit sign inoperative.

(c) Located in a position that will be visible when mounted in any designed attitude or adjacent to the test switch where the control gear is remote mounted.

(d) Visible without obstruction from an accessible position.

It is permissible to use this indicator to display additional information, e.g. by flashing.

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3.3 REQUIRED DISCHARGE TEST FACILITIES

3.3.1 General

A1 Facilities shall be provided for conducting a discharge test on all emergency luminaires and exit signs without requiring disconnection of supply to the normal lighting.

The arrangement adopted shall check the correct functioning of all elements normally involved in controlling the operation of the emergency luminaires and exit signs. The normal provision for sensing loss of supply (see Clause 2.3.3) may be overridden for the duration of the discharge test but shall be automatically reinstated at the conclusion of the test.

The test facility shall be arranged so that no charging current is supplied to the battery during the performance of a discharge test.

NOTE: It should be noted that, for part of the period during and immediately after a discharge test, the building may be without effective emergency lighting. When selecting a time for the discharge test, consideration should be given to the nature of the occupancy of the building in order to minimize the risk, e.g. conducting the test at a time which will permit recharging of the batteries when the building is unoccupied.

3.3.2 Manually operated testing facilities

Where manually operated test facilities are provided for discharge testing of the emergency luminaires and exit signs, these test facilities shall conform to the following:

(a) The test facility shall provide for the operation of the relevant group of emergency luminaires and exit signs by simulating a supply failure. For single point systems, separate test facilities may be provided to control specific groups of emergency luminaires and exit signs, e.g. related to particular areas of the building. For centrally supplied systems, the test facility shall ensure the simultaneous operation of all emergency luminaires and exit signs connected to the central battery.

NOTE: For some centrally supplied systems, it will be necessary to install linking control wiring to simulate a supply failure simultaneously at all points where monitoring for loss of normal supply occurs.

(b) The test facility shall be capable of being manually reset, but shall automatically revert to the normal state at the conclusion of the discharge test.

(c) The test facility shall be either key operated or located in a position with restricted access, e.g. in the switchboard enclosure supplying the normal lighting to the area concerned.

(d) The function of the test facility shall be clearly identified, e.g. ‘Emergency lighting and exit sign test switch’.

3.3.3 Automatically operated testing facilities

3.3.3.1 *System requirements*

All emergency luminaires and exit signs with an automatic timing and control system shall be automatically subjected to a discharge test.

The system used to time the interval between successive discharge tests shall not be affected during periods when the normal supply is interrupted.

The test facility shall be arranged so that, if the automatic timing and control system is rendered inoperative or malfunctions for any reason, the emergency luminaires and exit signs will still be capable of functioning in response to loss of supply in accordance with Clause 2.3.3.

Provision shall be made on an automatic testing facility for an operator to undertake a discharge test at any time.

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3.3.3.2 *Fully self-contained facilities*

Where individual emergency luminaires or exit signs incorporate facilities for automatic discharge testing, the system used shall conform to the applicable requirements in Section 4 of AS/NZS 2293.3.

3.3.3.3 *Centralized testing facilities*

Where provision is made for centralized control of the automatic discharge testing of a group of emergency luminaires or exit signs, the relevant requirements for self-contained automatic discharge testing facilities in Section 4 of AS/NZS 2293.3 shall apply, in addition to the following:

(a) Each emergency luminaire and exit sign within a controlled group shall be clearly identified in a manner that relates to a signal displayed on the central controller for easy identification of the affected fitting.

(b) The operation of each emergency luminaire and exit sign shall be monitored during the test. Notwithstanding Section 4 of AS/NZS 2293.3, the indications of operational state required at each emergency luminaire and exit sign need not be provided, subject to these indications being available at the central controller or other designated monitoring points. The indications may be in any appropriate form which is capable of being observed at those locations.

(c) For single point systems, provision may be made for varying the test program, in terms of the sequence and timing of the tests. However, the arrangement shall ensure that each emergency luminaire and exit sign in the group is tested at intervals of not more than that specified in AS/NZS 2293.2.

(d) The communication system utilized for control and data transfer between the central controller and each emergency luminaire and exit sign in the group may be of any appropriate type affording adequate reliability for the purpose. Indication shall be provided at the controller of any failure of the communication system.

NOTE: Consideration should be given to the need to safeguard against possible malfunction of centrally controlled automatic testing systems resulting from electromagnetic interference from other equipment or systems.

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SECTION 4 INSTALLATION REQUIREMENTS FOR EMERGENCY LUMINAIRES

4.1 SCOPE OF SECTION

This Section specifies requirements for the provision and installation of emergency luminaires.

NOTE: The types of buildings and specific areas of buildings that require emergency lighting should be determined by reference to: for Australia, the National Construction Code and, in New Zealand, by reference to New Zealand Building Code Acceptable Solution F6/AS1.

4.2 GENERAL

4.2.1 Avoidance of obstruction of light

Each luminaire shall be located so that the light that is directed to the portion of the designated area served by the luminaire is not obstructed, e.g. by structural members such as beams or elements of coffered ceilings.

4.2.2 Avoidance of glare

The emergency luminaire, if of the directional beam type, e.g. 'sealed beam', shall be either concealed from view or aimed in such a manner that the beam will not be directed into the eyes of persons moving through the designated area.

NOTE: Highly directional luminaires, if aimed incorrectly, may seriously impair the visual capabilities of persons using the route, because of the resulting glare.

4.2.3 Protection against unauthorized removal of lamps

Where an emergency luminaire is mounted in a public area at a height of 2.4 m or lower, or an area subject to easy access, provision shall be made to protect it from unauthorized removal.

NOTES:

1 A non-removable lamp, a wire guard or a diffuser would be considered to comply.

2 Premises such as schools, shopping centres, clubs and places of public entertainment are all considered to be public areas for the purposes of this Clause.

4.3 PROVISION OF EMERGENCY LUMINAIRES

Emergency luminaires conforming to AS/NZS 2293.3 shall be installed throughout the designated area in accordance with Clauses 4.5, 4.6, 4.7 and 4.8, as appropriate. However, a single emergency luminaire shall not serve an area of greater than 500 m^2.

NOTES:

1 As the reflectance of interior surfaces, especially vertical surfaces, will significantly influence the visual conditions provided by an emergency lighting installation, it is recommended that the colour of such surfaces be as light in tone as practicable.

2 In the installation of emergency luminaires (with respect to both mounting height and location), consideration should be given to the possible effects of smoke within the space reducing the effectiveness of the emergency lighting.

3 In New Zealand, emergency luminaires are required to be installed throughout the designated area in accordance with New Zealand Building Code Acceptable Solution F6/AS1.

4.4 ACCEPTABLE EMERGENCY LUMINAIRES

A dual function internally illuminated exit sign may be used to perform both roles of illuminated emergency exit signage and emergency luminaire, provided that it meets all requirements for both purposes.

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4.5 SPECIFIC LOCATIONS REQUIRING EMERGENCY LUMINAIRES

An emergency escape luminaire shall be sited within 2 m of the approach side of each doorway requiring an exit sign and at locations where it is necessary to emphasize the position of potential hazards within the designated area as follows:

(a) Within 2 m of the intersection of the centre-lines of intersecting corridors.

NOTE: See example in Figure C4, Appendix C.

(b) Within 2 m of the intersection of centre-lines at each change of direction (other than on a staircase); provided, however, that an emergency luminaire need not be installed where—

(i) in plan view, a straight line between emergency luminaires on either side of the change of direction does not intersect the wall or other (fixed or immovable) boundary defining the limits of the designated area;

NOTE: See example in Figure C5, Appendix C.

(ii) in plan view, each of the emergency luminaires are located less than half the recommended spacing distance from the point of intersection.

(c) Within 2 m of any change of floor level, on the low side.

Where the application of Items (a) and (b) together will result in two emergency luminaires being spaced at less than half the spacing permitted by Clause 4.6.1 but not greater than 2 m, only one emergency luminaire need be installed provided that it can be positioned so as to directly illuminate both areas.

NOTE: See example in Figure C6, Appendix C.

Emergency luminaires shall be installed in stairways in accordance with Clause 4.8.

NOTE: Particular care should be taken in the location of emergency luminaires with respect to escalators and moving walks to ensure that, in the event of loss of the normal lighting, persons using these facilities can safely alight.

A dual function internally illuminated exit sign may be classified as an emergency luminaire, in accordance with AS/NZS 2293.3, but without an associated spacing. This is represented as a 0.0 spacing in the spacing tables in Appendix E. This category of dual function exit sign will satisfy the requirement for an emergency luminaire to be sited at or within 2 m of locations where it is necessary to emphasize the position of potential hazards. If a dual function internally illuminated exit sign is of the type that does not have a spacing associated with its emergency classification then any adjacent emergency luminaire shall be positioned not greater than half the maximum spacing permitted by the spacing tables in Appendix E.

4.6 INSTALLATIONS EMPLOYING DIRECT LIGHTING

4.6.1 Spacing of emergency luminaires

4.6.1.1 *General*

Further to the location of emergency luminaires as required by Clause 4.4, additional emergency luminaires shall be installed within the designated area, either in accordance with—

(a) the spacing rules set out in Clause 4.6.1.2; or

(b) calculations of illuminance conforming to Clause 4.6.1.3.

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4.6.1.2 *Spacing rules*

The maximum spacings between adjacent emergency luminaires and between emergency luminaires and adjacent walls or other surfaces forming the boundary of the designated area shall not exceed the relevant values determined as follows:

(a) *Spacing between luminaires* The horizontal spacing between adjacent luminaires shall not exceed the maximum spacing given in Tables E1 to E5 of Appendix E, applicable to the luminaire classification* and mounting height. To cater for light source depreciation associated with maintained or combined maintained emergency luminaires a de-rating factor shall be applied. The de-rated classification shall be the next lower classification in the spacing tables in Appendix E.

NOTE: Although Tables E1 to E5 provide for a wide range of possible luminaire classifications, it should not be assumed that emergency luminaires corresponding to all of these classifications will necessarily be available. A check should be made with the suppliers of emergency luminaires to determine the available range of luminaire classifications.

Where adjacent luminaires have different classifications, the spacing shall not exceed the sum of half the maximum permissible spacings for the respective luminaires, determined in accordance with the above.

Where the luminaire has a different classification in the transverse (C_0) and longitudinal (C_{90}) planes*, the orientation of the luminaires shall be taken into account in determining the appropriate spacing.

Where adjacent luminaires are installed—

(i) other than parallel; or

(ii) at an angle of other than 90°,

with respect to each other, or to the boundaries of the designated area, the spacings adopted shall be such that, by juxtaposition of the effective areas served by each luminaire, as determined in accordance with Figure 4.1, the whole of the designated area will be covered.

(b) *Spacing between luminaires and walls* The spacing between emergency luminaires and any adjacent wall or other boundary defining the limits of the designated area shall be not greater than half the spacing determined in accordance with Item (a).

NOTES:

1 The purpose of this requirement is to ensure that vertical surfaces at the boundaries of the space are adequately lit as these assist in providing a sense of orientation and visual guidance.

2 The diagonal measurement to the corner of a floor area should be taken into consideration when using the spacing tables at the maximum luminaire spacing.

* See Appendix C of AS 2293.3—2005.

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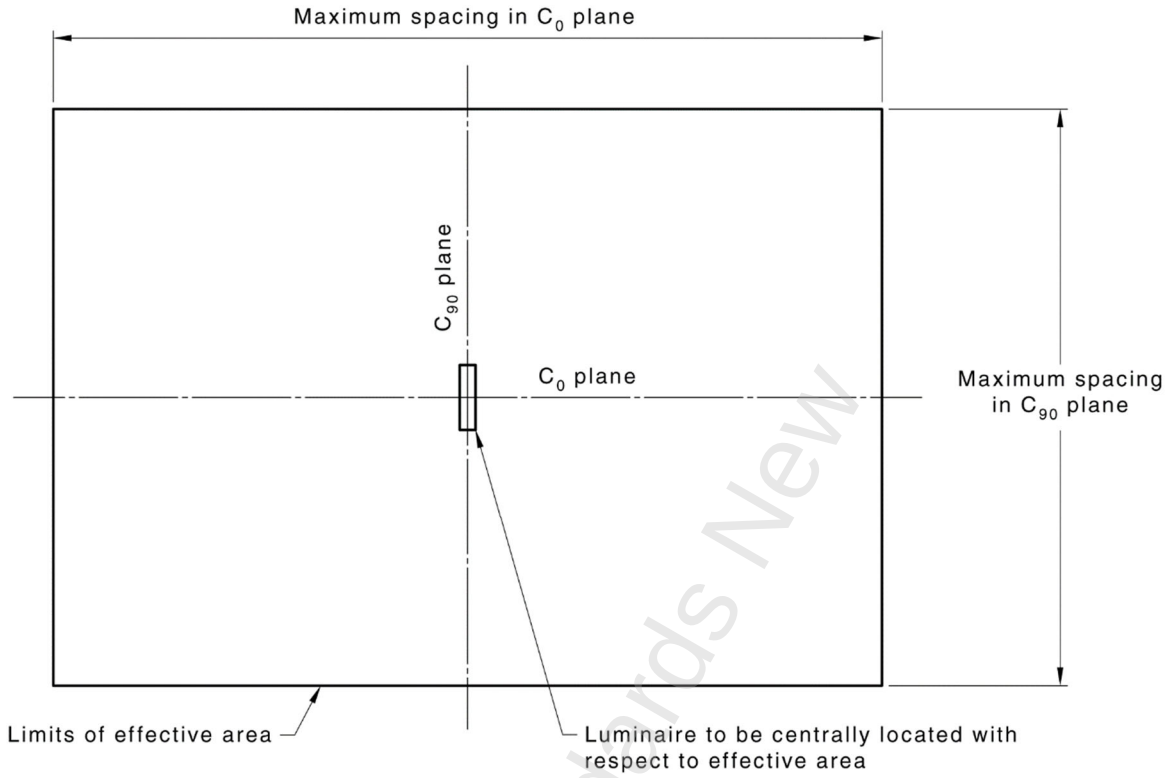


FIGURE 4.1 DETERMINATION OF THE EFFECTIVE AREA SERVED BY AN EMERGENCY LUMINAIRE

4.6.1.3 *Illuminance calculations*

Emergency luminaires shall be installed throughout the designated area in such a manner as to ensure that the calculated horizontal illuminance at floor level is not less than 0.2 lx with an associated minimum average of 0.5 lx.

The following conditions shall apply for the required illuminance calculations:

(a) The calculations shall be made either manually or by the use of computer software, from point-by-point calculations based on the inverse square law of illumination, taking into account only the light that reaches the floor directly from the emergency luminaires.

(b) To cater for light source depreciation associated with maintained or combined maintained emergency luminaires a light loss factor of 0.75 shall be assumed for the calculations. For all other types of emergency luminaires a light loss factor of 1 shall be assumed for the calculations.

(c) Calculations shall be made for a grid of points, spaced not more than 2 m apart, covering the designated area, excluding areas within 0.5 m of the walls or other surfaces forming the boundary of the designated area.

(d) Calculated illuminance values shall be presented to not less than two significant figures.

(e) Luminaire photometric data shall conform to AS/NZS 1680.3, and shall be applicable to the test conditions specified in Appendix C of AS/NZS 2293.3:2018. The data shall be for the specific lamp/luminaire combination tested and shall not be derived on a pro rata basis from data applicable to the use of other lamps.

NOTE: In New Zealand emergency luminaires are required to be installed throughout the designated area in such a manner as to ensure that the horizontal illuminance at floor level complies with the requirements of New Zealand Building Code Acceptable Solution F6/AS1 Paragraphs 1.3.1 or 1.3.2.

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4.7 INSTALLATIONS EMPLOYING INDIRECT LIGHTING

For indirect lighting systems, where direct lighting is not available, indirect lighting may be used. Emergency luminaires shall be installed throughout the designated area in such a manner as to ensure that the calculated horizontal illuminance at floor level is not less than the applicable value specified in Clause 4.5. The following conditions shall apply for the required illuminance calculations:

Conditions (c) to (f) of Clause 4.6.1.3 shall be observed.

4.8 LIGHTING OF STAIRWAYS

4.8.1 General

Emergency luminaires shall be installed as necessary to illuminate a stairway in accordance with one of the following methods:

(a) Direct lighting (spacing rules)—see Clause 4.8.2.

(b) Direct lighting (illuminance calculations)—see Clause 4.8.3.

(c) Indirect lighting, where direct lighting is not available indirect lighting may be used (illuminance calculations)—see Clause 4.8.4.

4.8.2 Direct lighting (spacing rules)

Emergency luminaires shall be installed in such a manner that each flight of stairs, including the associated landings, receives direct light.

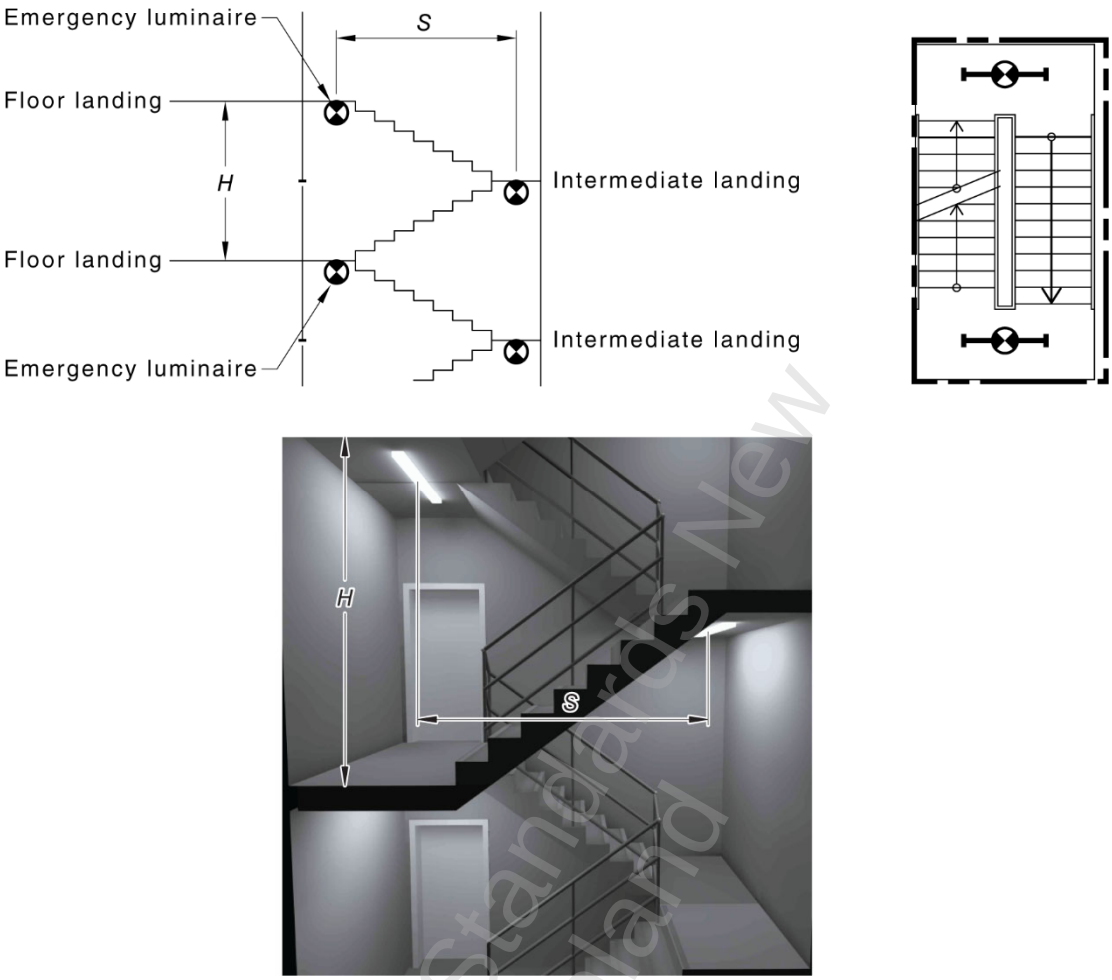
Except where otherwise stated in this Clause, an emergency luminaire shall be located at least at every landing, and additional luminaires shall be installed where required to ensure that the horizontal distance between adjacent luminaires shall not exceed the maximum spacing given in Tables F1 to F5 of Appendix F, applicable to the luminaire classification* and mounting height. Figure 4.2 illustrates this arrangement where the horizontal distance is *S* and mounting height to use with the spacing tables is *H*.

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* See Appendix C of AS/NZS 2293.3:2018.

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NOTE: In New Zealand, the placement of emergency lighting is covered by the requirements of the New Zealand Building Code Clause F6.

FIGURE 4.2 EXAMPLE OF EMERGENCY LUMINAIRES LOCATED ON INTERMEDIATE LANDINGS IN AN ENCLOSED STAIRWELL

In enclosed stairwells, Class C or Class D luminaires may be installed at every alternate landing, provided that the luminaire classification is not less than that determined from Table F3 or Table F4 of Appendix F, as appropriate, by entering—

(a) a spacing of twice the horizontal distance from the luminaire to the furthermost wall of the stairwell; and

(b) a mounting height equal to the vertical distance between the luminaire and the lowest landing which it serves.

Where a value of spacing or mounting height thus calculated does not coincide with those in the tables, the value in the table immediately above the calculated value shall be selected.

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To cater for light source depreciation associated with maintained or combined maintained emergency luminaires a de-rating factor shall be applied. The de-rated classification shall require selection of the next higher classification in the spacing tables in Appendix F.

NOTE: Although Tables F1 to F5 provide for a wide range of possible luminaire classifications, it should not be assumed that emergency luminaires corresponding to all of these classifications will be necessarily available. A check should be made with the suppliers of emergency luminaires to determine the available range of luminaire classifications.

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Example:

For an enclosed stairwell having the dimensions illustrated in Figure 4.3, a spacing, *S*, of 10 m (2 × 5 m) and a mounting height, *H*, of 5.8 m would be calculated. For a Class D emergency luminaire, the minimum classification is determined from Table F4 of Appendix F by choosing a mounting height of 6 m (the table value immediately above 5.8 m) and a spacing of 11.1 m (the table value immediately above 10 m). The required luminaire classification is then D50. However, for a maintained or combined maintained emergency luminaire required classification is D63 to allow for lumen depreciation.

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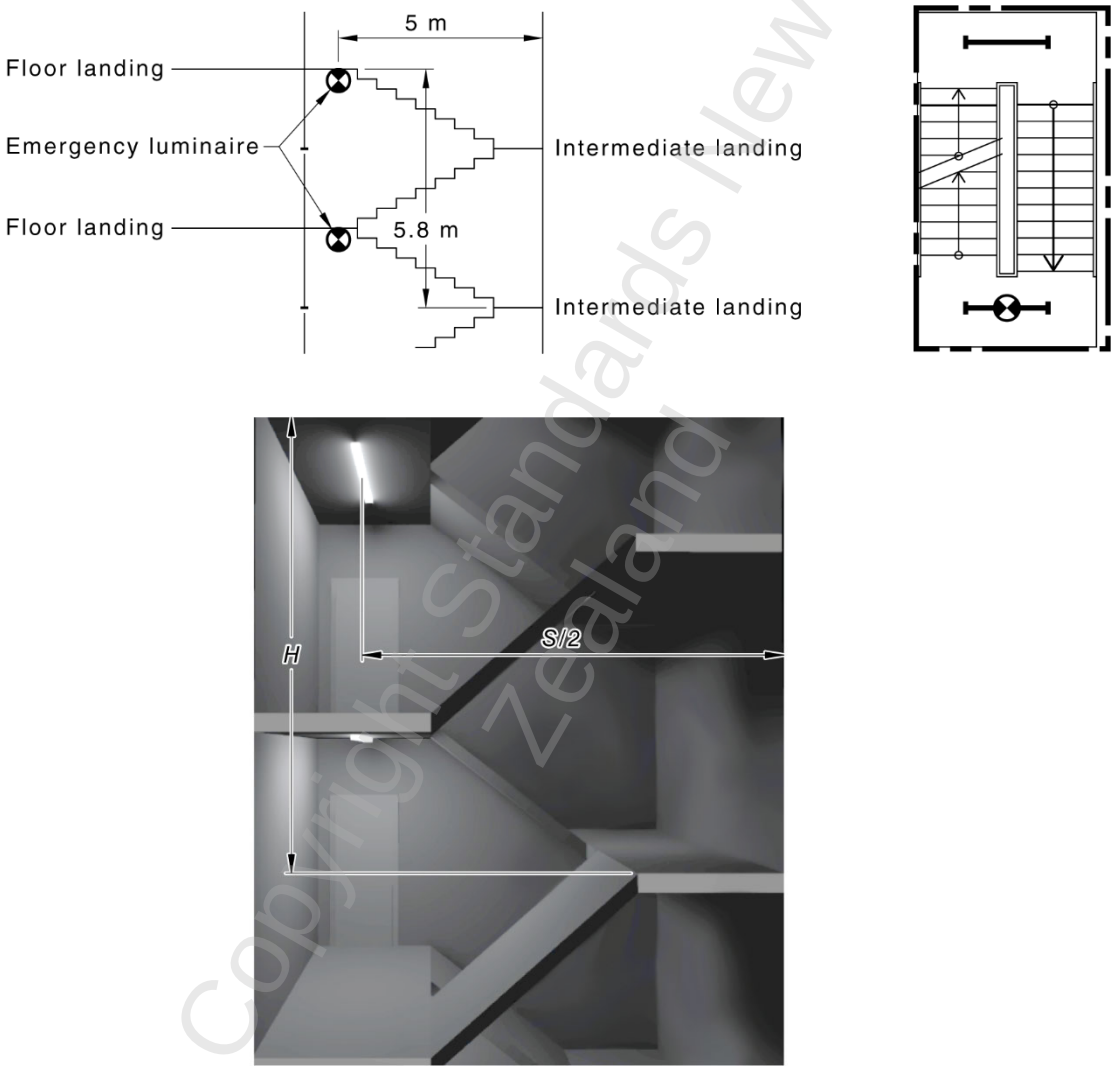


FIGURE 4.3 EXAMPLE OF EMERGENCY LUMINAIRES LOCATED ON ALTERNATE LANDINGS IN AN ENCLOSED STAIRWELL

Notwithstanding the requirements of this Clause, an intermediate landing in an enclosed stairwell need not receive direct light, provided that the section of the landing which does not receive direct light is no more than 2 m in length.

NOTES:

1 See example in Figure C7, Appendix C.

2 For short landings in enclosed stairwells, inter reflection of light from the surfaces within the stairwell will ensure that the area is adequately lit.

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3 In New Zealand the horizontal illuminance on each landing and over the surface of each tread, calculated for the condition specified in Clauses 4.8.2 and 4.8.3, is specified by New Zealand Building Code Acceptable Solution F6/AS1 Paragraphs 1.3.1 or 1.3.2.

4.8.3 Direct lighting (illuminance calculations)

Emergency luminaires shall be installed throughout the stairway in such a manner that each flight of stairs, including the associated landings, receives direct light. The horizontal illuminance on each landing and over the surface of each tread shall be not less than 1 lx. Calculations shall be in accordance with the conditions specified in Clause 4.6.1.3, however, Item (c) shall modified to use grid points spaced not more than 0.5 m apart, covering the stair tread and stair landings, excluding areas within 0.1 m of the walls or other surfaces forming the boundary of the stairwell.

4.8.4 Indirect lighting (illuminance calculations)

Emergency luminaires shall be installed throughout the stairway in such a manner that the calculated horizontal illuminance on each landing and on the surface of each tread is not less than 1 lx. The calculation conditions shall be as specified in Clause 4.7. Where Clause 4.7 references Clause 4.6.1.3, Item (c) shall modified to use grid points spaced not more than 0.5 m apart, covering the stair tread and stair landings, excluding areas within 0.1 m of the walls or other surfaces forming the boundary of the stairwell.

Lamps and light-emitting or reflecting parts of the luminaires shall be completely screened from the view of persons using the stairway.

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SECTION 5 INSTALLATION REQUIREMENTS FOR EXIT SIGNS

5.1 SCOPE

This Section specifies requirements for the provision and installation of exit signs.

5.2 REQUIRED LOCATIONS

Exit signs of appropriate type conforming to AS/NZS 2293.3 shall be installed in the locations determined as necessary in accordance with, for Australia, the NCC or for New Zealand, the New Zealand Building Code, Acceptable Solution F8/AS1 Paragraph 4.2 and C1 to C7.

5.3 USE OF EXTERNALLY ILLUMINATED SIGNS

Externally illuminated exit signs shall be used only in areas that are provided with appropriate means for automatically exhausting or excluding smoke.

NOTE: Externally illuminated exit signs have been found to be more affected by smoke than other types of exit sign and their use is therefore restricted as above.

5.4 SIGN COLOURS

5.4.1 Areas of normal illumination

Except in areas as specified in Clause 5.4.2, exit signs shall conform to all requirements of AS/NZS 2293.3 for either—

(a) an internally illuminated exit sign; or

(b) an externally illuminated exit sign (refer to Clause 5.3).

5.4.2 Areas of low illumination

Where the relevant room or area will be provided with low levels of illumination as part of its normal use, it shall be acceptable to install exit signs complying with the requirements of AS/NZS 2293.3 for low illuminance area internally illuminated exit signs.

NOTES:

1 Theatres, cinemas, auditoriums and lecture rooms are examples of where the use of this form of sign is appropriate.

2 In New Zealand, requirements for exit signs are specified in New Zealand Building Code Acceptable Solution F8/AS1 Paragraph 4.4.2. One means of conformance to this requirement is AS/NZS 2293.3.

5.5 CHOICE OF IMAGES

The pictorial elements displayed on an exit sign shall conform to Appendix D and be arranged to communicate one of the following messages:

(a) Straight on from here.

(b) Left from here.

(c) Right from here.

NOTE: In New Zealand requirements for exit signs are specified in New Zealand Building Code Acceptable Solution F8/AS1 Paragraph 4.4.2. Signs that conform to AS/NZS 2293.3 satisfy this requirement.

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5.6 SIZE OF PICTORIAL ELEMENT

The minimum allowable size of any pictorial element on an exit sign shall be determined by the maximum viewing distance intended under the design as follows:

(a) For viewing distances not greater than 32 m, in accordance with Table 5.1.

TABLE 5.1

MINIMUM PICTORIAL ELEMENT HEIGHTS

Maximum viewing distance m	Minimum pictorial element height mm
16	100
24	150
32	200

(b) For viewing distances greater than 32 m, in accordance with the following equation:

$$\text{Minimum element height} = \frac{\text{Maximum viewing distance}}{160}$$

NOTE: In New Zealand, the viewing distances of exit signs is detailed in New Zealand Building Code Acceptable Solution F8/AS1 Paragraph 4.3.1 and 4.3.2 referring to Tables 4 and 5.

5.7 ILLUMINATION

5.7.1 Internally illuminated signs

Internally illuminated exit signs shall be of a type which conforms to the applicable illumination requirements of AS/NZS 2293.3.

NOTE: In New Zealand, requirements for exit signs are specified in New Zealand Building Code Acceptable Solution F8/AS1 Paragraph 4.4.2. One means of conformance to this requirement is AS/NZS 2293.3.

5.7.2 Externally illuminated signs

Externally illuminated signs shall be provided with an illuminance of not less than 200 lx on the face of the sign. The variation in illuminance shall not exceed 3:1.

The light source used to illuminate the sign shall be located not more than 1.5 m from the face of the sign and shall be positioned relative to the sign in a manner that will ensure that there is no reduction in the contrast of the sign (due to reflection of the light source in the face of the sign) when viewed from within the required range of directions.

Any light source provided specifically for the purpose of illuminating the sign shall be screened from the view of persons moving through the designated area.

NOTES:

1 In New Zealand, requirements for exit signs are specified in New Zealand Building Code Acceptable Solution F8/AS1 Paragraph 4.4.2. One means of compliance with this requirement is AS/NZS 2293.3.

2 The NCC requires that exit signs be illuminated at a level sufficient for them to be clearly visible at all times when the building is occupied by any person having the right of legal entry to the building.

3 In New Zealand, exit signs are specified to be clearly visible at all times the building is occupied by either artificial lighting or daylight to comply with the requirement of the New Zealand Building Code Acceptable Solution F8/AS1 Paragraph 4.5.2.

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4 In New Zealand, non-maintained exit signs are specified to be connected to the automatic smoke detection system and loss of normal supply sensor such that in the event of an activation of the fire alarm system or loss of normal power supply the exit sign are energized to comply with New Zealand Building Code Acceptable Solution F8/AS1 Paragraph 4.5.5.

5 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.

5.8 PHYSICAL CONDITIONS OF INSTALLATION

5.8.1 Mounting height

Exit signs shall be mounted not less than 2 m and not more than 2.7 m above floor level, or immediately above the doorway if the doorway is higher than 2.7 m, unless variations to these heights are specifically permitted by the relevant regulatory authority.

NOTES:

1 The intent of the above requirement is that each exit sign is within the field of view of a person within the applicable viewing distance and looking at the relevant door or along the relevant exit path.

2 Where it is not practical to mount signs at 2 m to 2.7 m above floor level consideration should be given to increase the size of the exit sign to compensate for the adjustment in mounting height to ensure the exit sign is noticeable given it may be outside the normal field of view.

5.8.2 Maximum viewing distances

The maximum viewing distance that is to be provided by any exit sign shall be determined from the pictorial element height of the sign in accordance with Table 5.1 or the equation in Clause 5.6(a) as applicable.

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SECTION 6 CENTRALLY SUPPLIED SYSTEMS—EMERGENCY POWER SUPPLIES

6.1 SCOPE OF SECTION

This Section specifies requirements for components and facilities associated with emergency power supplies for centrally supplied systems.

6.2 EMERGENCY POWER SOURCE

6.2.1 Location

Except where otherwise permitted in this Clause, the emergency power source and associated equipment shall be located in a room or enclosure specifically provided for the purpose. The room or enclosure shall not be used for any other purposes except that spare parts and equipment required for maintenance of the emergency lighting system may be stored therein.

The emergency power source may be located in a room with battery systems associated with building monitoring, fire safety or evacuation systems provided that the room conforms to the requirements of Clauses 6.2.2 to 6.2.4 and the emergency power source is physically separated from the other equipment by a non-combustible barrier.

The emergency power source may be located external to the building that it serves, provided that the wiring from the power source to the building that it serves conforms to Clause 7.4 and is protected from physical damage.

For temporary structures such as those used in carnivals and shows, the power source need not be located in a special room or enclosure, provided that—

(a) the power source is located in an area accessible only to authorized persons, as required by Clause 6.2.3, and is protected from physical damage and the weather; and

(b) the area is free from obstructions and, if not naturally ventilated, is ventilated in accordance with Clause 6.2.4.

NOTES:

1 It is recommended that the normal electricity distribution centre and the emergency power source be located in different fire compartments of the building.

2 Attention is drawn to the fact that where a theatre or group of theatres is incorporated as part of a building complex, the regulatory authority may require the provision of separate emergency power sources for the theatre(s) and for the remainder of the building.

6.2.2 Fire resistance

Except where the emergency power source is located external to the building in its own separate enclosure, the materials and methods utilized in the construction of the room or enclosure provided in accordance with this Clause 6.2 shall have a fire resistance from the building to the room or enclosure housing the emergency power source of not less than the fire-resistance level required for the building structure in accordance with the NCC and the New Zealand Building Code.

6.2.3 Identification and access

The purpose of the room or enclosure shall be clearly identified by a label affixed on or adjacent to the access door. The label shall read ‘Emergency lighting power source’ and shall contain an instruction permitting entry to authorized persons only.

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6.2.4 Ventilation

6.2.4.1 *Limitation of temperatures*

The room or enclosure shall be of such dimensions or so ventilated that the temperature of electrical materials and equipment will not exceed the maximum values permitted by the manufacturer at any time, including during discharge testing.

NOTE: Particular consideration should be given to ensuring that adequate ventilation is provided during periods that the emergency lighting is called upon to operate, i.e. to limit temperatures attained in the absence of the normal supply.

6.2.4.2 *Maintenance of fire resistance*

Any ventilation provided shall be arranged so that the fire resistance required by Clause 6.2.2 is maintained.

6.2.5 Use of uninterruptible power supply (UPS) systems

Uninterruptible power supply (UPS) systems used as the emergency power source for central systems shall—

(a) be used solely for that purpose;

(b) conform to either—

  (i) AS 62040.1.1; or

  (ii) AS IEC 62040.3; and

(c) be in accordance with the requirements in this Section.

NOTE: Care is needed in the selection of the UPS system to ensure that it is capable of starting up the connected emergency lighting load solely on the supply from the inverter, i.e. to accommodate peak inrush currents associated with the switching of certain types of lamps from cold. The selection of the UPS system and of the fuses protecting the emergency supply conductors should be coordinated so that a fault in the emergency power distribution system will result in the operation of one or more of these fuses, not in the shutting down of the UPS.

6.2.6 Protection of emergency power wiring

All outgoing circuits from the battery to the load shall be protected in each conductor by a fuse or circuit-breaker positioned as close as practicable to, and in any case not more than 5 m from, the battery.

Circuit breakers directly controlling the reticulation of emergency power (including those internal to any applicable UPS) shall not incorporate residual current protection devices (RCDs).

6.3 BATTERIES AND THEIR INSTALLATION

6.3.1 Acceptable types of batteries

Batteries shall be of a type specifically designed for stand-by charging conditions and be compatible with the associated charging system.

NOTE: The following are examples of the types of batteries that are acceptable. The choice of battery is not limited to the types listed here:

(a) Lead-acid stationary batteries of the vented type conforming to AS 4029.1.

(b) Lead-acid stationary batteries of the sealed, valve-regulated type conforming to AS 4029.2.

(c) Lead-acid stationary batteries of the pure-lead, positive pasted-plate type conforming to AS/NZS 4029.3.

(d) Nickel-cadmium stationary batteries of the vented or sealed type conforming to AS 3731.1 or AS 3731.2, as applicable.

(e) Heavy duty lead acid batteries with tubular positive plates.

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Where the cells used are of a type which require maintenance of the electrolyte above a specified level, facilities shall be provided to permit visual inspection of the electrolyte level against reference marks. Lead acid batteries of the type designed for motor vehicle starting and home lighting applications do not conform to this requirement.

NOTE: Cells which incorporate dip sticks for checking the electrolyte level are acceptable.

6.3.2 Battery capacity

The capacity of the battery shall be such that it is capable of supplying an output final voltage of not less than the following:

(a) For d.c. reticulation systems—85% of the nominal system voltage.

(b) For a.c. reticulation systems—the minimum voltage recommended by the battery manufacturer, provided that the a.c. voltage is maintained in accordance with Clause 6.5.3.

The minimum voltage specified in Items (a) or (b), as applicable, shall be measured at the battery terminals and shall apply—

(i) when the total emergency lighting load is connected for the duration specified in Clause 2.2.1; and

(ii) at any temperature within the range of ambient temperatures which can be expected at the battery location.

The number of cells employed in the battery shall be such that the individual cell voltages will not fall below those recommended by the battery manufacturer, account being taken of the rate of discharge.

6.3.3 Installation requirements

6.3.3.1 *General*

The battery system shall be installed in accordance with AS 3011.1 or AS 3011.2, as applicable, and with the additional requirements of Clauses 6.3.3.2 to 6.3.3.5.

NOTE: Guidance on the installation, maintenance, testing and replacement of secondary batteries in buildings is provided in AS 2676.1 (for vented cells) and AS 2676.2 (for sealed cells).

6.3.3.2 *Battery enclosure/stand*

The materials used in the construction of the battery enclosure or stand shall be inherently resistant to the corrosive effects of the battery electrolyte or shall be treated to prevent corrosion.

6.3.3.3 *Unearthed supply system*

For d.c. reticulation systems, the battery system shall be unearthed. An earth fault detection system shall be installed to warn of the breakdown of either conductor to earth. The sensitivity of the earth fault detection system shall not exceed 10 mA.

6.3.3.4 *Battery connections*

All connections to the battery shall be made with bolted lugs or similar connectors based on the battery specification, to ensure secure connections, corrosion resistance and adequate current handling capabilities of the connection system.

Each conductor between the battery charger and the battery shall be fitted with an overcurrent protection device to protect the battery from discharging into the battery charger in the event of a fault condition. This device shall be located such that the battery is not prevented from supplying the emergency lighting after operation of the overcurrent device due to a fault in the charger.

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6.3.3.5 *Rating plate*

A rating plate bearing the following information shall be securely fixed on or adjacent to the battery enclosure/stand in such a position as to be readily seen upon gaining access to the enclosure or on approaching the battery stand, as appropriate:

(a) Manufacturer's brand name.

(b) Manufacturer's catalogue number.

(c) Number of cells and rated capacity, in ampere hours, of each cell at a specified rate of discharge.

(d) Duty ratings, as follows:

  (i) Amperes.

  (ii) Period.

  (iii) End volts.

  (iv) Temperature.

6.4 BATTERY CHARGER ASSEMBLY

6.4.1 General

Battery chargers for d.c. reticulation systems, shall conform to the requirements for a Type 1 battery charger in AS 4044 or IEC 60146-1-1 (semiconductor converters) and with the requirements of Clauses 6.4.2 to 6.4.8 of this Standard. The requirements for alarms in Clause 6.4.7 shall apply in place of those given in AS 4044 or IEC 60146-1-1 (semiconductor converters).

Where provision is made for automatic or manual selection of boost charging, the battery charger shall automatically reset to the float charge mode at the termination of boost charging.

6.4.2 Control of output voltage

The charging equipment arrangements shall be such that, during charging with any load connected, the voltage appearing at the origin of the emergency lighting distribution system will not exceed 116% of the nominal system voltage.

NOTE: The purpose of this requirement is to ensure that emergency luminaires and exit signs will not be subjected to voltages in excess of those for which they are designed.

6.4.3 Rating of battery charger

The rating of the battery charger shall be such that—

(a) after the battery has been discharged from the fully charged state by supplying the total connected emergency lighting load for the duration specified in Clause 2.2.1; and

(b) after recharging for a period of not more than 16 h,

the battery shall have recovered to the extent that it is capable of sustaining an additional discharge as specified in Item (a). The output voltage at the end of each discharge period shall be in accordance with Clause 6.3.2.

NOTE: For certain premises (e.g. theatres) a shorter recovery period than 16 h may be necessary to enable re-occupation of the premises after operation of the emergency lighting.

Where a maintained system is employed and the output of the battery charger is used to supply the standing load, the rating of the battery charger shall be such that, in addition to supplying the normal power requirements, it will be capable of maintaining the battery and recharging it as specified above.

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Where a separate inverter is employed, the rating of the battery charger shall take account of the need to operate the inverter on no load, in accordance with Clause 6.5.2.

6.4.4 Enclosure of battery charger

The enclosure shall have sufficient strength and rigidity to house the battery charger. The battery charger may be incorporated in the battery enclosure provided that it is housed in a separate compartment.

6.4.5 Battery low voltage alarms

Visible and audible alarms shall be provided which shall be actuated when the battery voltage falls below the relevant value specified in Clause 6.3.2. The alarms shall be energized from the battery and the visual alarm shall be of a type that requires manual resetting.

6.4.6 Means for disconnecting the emergency lighting or exit signage load

Where provision is made for manual disconnection of the battery from the emergency lighting or exit signage load, the isolating switch or device shall be either—

(a) arranged so that, when in the isolated position, it also isolates the normal lighting or a part of the normal lighting which is essential for the normal occupation of the building; or

(b) installed in a manner to ensure that the switch or device is not left in the isolated position when the building is in use.

NOTE: The manual isolating switch or device may be used to permit disconnection of the emergency lighting load—

(a) during periods when the building is unoccupied; or

(b) when the battery has been discharged to the low voltage alarm limit by operation of the emergency lighting; to protect the battery from damage which may result from being excessively discharged.

The requirements of Items (a) and (b) shall not apply to the battery isolator provided in accordance with AS 3011.1 or AS 3011.2.

Provision may be made for automatic disconnection of the battery from the load to protect the battery from damage due to excessively low voltage.

NOTE: The battery supplier should be consulted in the selection of the appropriate voltage setting for the protective device.

6.4.7 Instrumentation and controls

The battery charger assembly shall incorporate the following instrumentation and control equipment:

(a) Isolating switch for the a.c. supply.

(b) Indicating light for the a.c. supply.

(c) Voltmeter (d.c.) marked to indicate both the float and boost charge voltages.

(d) Charging ammeter (d.c.).

(e) Load ammeter (d.c.).

(f) A float/manual boost charge selector switch of the momentary operation type, where provision is made for manual selection of boost charging (see Clause 6.4.1).

(g) A device to prevent backfeed to the charger from the battery in the event of a fault occurring in the battery charger (see Clause 6.3.3.4).

(h) Fuses or circuit breakers for outgoing emergency lighting circuits.

(i) Battery earth fault alarm (see Clause 6.3.3.3).

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(j) Battery low voltage alarm (see Clause 6.4.5).

(k) Battery charger failure alarm, sensed from the output of the charger.

(l) An indicating light to provide warning of when the battery isolating switch is in the isolated position.

NOTE: The provision of an isolating switch is covered in AS 3011.1 and AS 3011.2.

Voltmeters and ammeters shall have an intrinsic error of not greater than permitted for instruments of Class Index 2 conforming to IEC 60051-1, IEC 60051-2 and IEC 60051-9.

NOTES:

1 An additional d.c. load ammeter may be located remotely from the battery charger.

2 Additional requirements for alarm systems are specified in Clause 6.6.

6.4.8 Rating plate

A rating plate bearing the following information shall be securely fixed on or adjacent to the battery charger:

(a) Manufacturer’s brand name.

(b) Manufacturer’s catalogue number.

(c) Manufacturer’s serial number.

(d) Float voltage at a specified battery temperature.

(e) Boost voltage.

(f) Charger output current.

(g) Date of manufacture.

Where the battery charger is incorporated within the battery enclosure, the information may be combined with that required by Clause 6.3.3.5, on a single rating plate.

6.5 INVERTERS

6.5.1 Reversible inverters

Reversible inverters shall be arranged so that major power components within the inverter are utilized in the battery charger mode to ensure that, upon operation due to mains failure, no ‘warm up’ breakdown will occur.

While the normal electricity supply is available to the inverter, the inverter shall function as a battery charger in accordance with Clause 6.4. On failure of the electricity supply, the inverter shall be automatically disconnected from the mains and function as an inverter in accordance with Clause 6.5.3. The inverter shall automatically resume the function of a battery charger on restoration of the supply.

NOTE: Disconnection of the inverter from the mains is required to prevent the inverter from feeding the mains as well as the emergency lighting.

6.5.2 Separate inverter

In systems that employ a separate inverter and battery charger, the inverter shall be continuously energized even if not carrying load. A mains failure changeover contactor shall be provided to switch the lighting load from the normal supply to the inverter output and vice versa.

6.5.3 Inverter rating

The inverter shall be capable of continuously supplying the total connected emergency lighting and exit signage and shall operate in accordance with the following requirements:

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(a) *Output frequency regulation* ±5% of rated frequency.

(b) *Output voltage regulation* ±5% for all values of load, up to and including 100% of the total connected emergency lighting load, over the permissible d.c. input voltage range [see Clause 6.3.2(b)].

6.5.4 Instrumentation and controls

The following instrumentation shall be provided with each inverter:

(a) Voltmeter (d.c.).

(b) Ammeter (d.c.).

(c) Output voltmeter (a.c.).

(d) Output ammeter (a.c.).

(e) Indicating light or other suitable means of indicating the presence of an a.c. input supply.

(f) Alarm to give warning of when there is no a.c. output from the inverter.

Voltmeters and ammeters shall have an intrinsic error of not greater than permitted for instruments of Class Index 2 conforming to IEC 60051-1, IEC 60051-2 and IEC 60051-9.

NOTE: Additional requirements for alarm systems are specified in Clause 6.6.

6.5.5 Inverter enclosure

The inverter shall be enclosed in accordance with the requirements of Clause 6.4.4. The enclosure shall be designed or arranged so as to provide ready access to all components.

6.6 ALARM SYSTEMS

Alarm systems capable of providing continuous visible and audible signals shall be provided to warn of any malfunction of the emergency lighting and exit signage supply. The alarm systems shall be—

(a) activated by the existence of any of the conditions listed in Items (i), (j), (k) and (l) of Clause 6.4.7 and Item (f) of Clause 6.5.4; and

(b) capable of responding to momentary and maintained activating signals.

Provision may be made for muting of the audible alarm signal, provided that the muting device will automatically reset when the alarm system is reset. Resetting of the alarm system shall be possible only if the actuating alarm signal is no longer present.

The alarm signalling devices shall be located so that the emitted signals may be seen and heard by persons responsible for the building during occupation.

Where a remote alarm panel is provided, a common visual alarm indication may be employed, provided that the alarm conditions listed in Items (i), (j), (k) and (l) of Clause 6.4.7 and Item (f) of Clause 6.5.4 are separately displayed at the battery charger assembly. The remote alarm panel shall be clearly marked and identified as to its title and function.

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SECTION 7 INSTALLATION OF ELECTRICAL WIRING AND EQUIPMENT FOR CENTRALLY SUPPLIED SYSTEMS

7.1 SCOPE OF SECTION

This Section sets out requirements for the installation of electrical wiring in centrally supplied systems, specifically for reticulating the emergency supply from the power source to the associated emergency luminaires and exit signs.

NOTES:

1 Comparable requirements are not specified for single point systems because each emergency luminaire and exit sign is provided with its own emergency power source and associated controls.

2 See Clause 2.3.3 for requirements for sensing and control.

3 In New Zealand, central systems, because of the way power is reticulated to remote luminaires, require the cabling and the power source to be protected against the effects of fire to ensure the system operates as designed. This is specifically necessary where the supply to remote luminaires runs through one or more fire cells. This Section (7) applies equally to New Zealand and Australia.

7.2 CIRCUIT VOLTAGE DROP

The fall in voltage from the output terminals of the emergency power supply to any point in the installation shall not exceed 5% when the total load served by the power source is connected.

NOTE: Although AS/NZS 3000 permits a voltage drop of 10% for extra low voltage installations, the 5% limit specified above applies irrespective of the voltage of the system, to minimize the reduction in light output from emergency luminaires and exit signs. The limit takes account of the fact that the voltage at the emergency power source may be as low as 85% of the nominal value at the end of the specified duration of operation (see Clause 6.3.2).

7.3 PROTECTION AGAINST OVERCURRENT

In addition to the requirements of AS/NZS 3000, all unearthed load circuit conductors of the emergency lighting and exit signage system shall be protected against overcurrent irrespective of the operating voltage of the emergency power supply.

NOTES:

1 For unearthed supply systems that operate at extra low voltage, AS/NZS 3000 only requires that overcurrent protection be provided in one less conductor than the number of conductors in the circuit.

2 The purpose of the above requirement is to ensure that a hazardous condition does not arise in the event of a second earth fault occurring.

7.4 PROTECTION OF THE ELECTRICAL INSTALLATION AGAINST FIRE

7.4.1 Forms of protection

Any element of the electrical distribution system supplying the emergency lighting or exit signs shall, unless specifically exempted, be protected against exposure to fire by the use of a fire protected wiring system utilizing components conforming to AS/NZS 3013, as specified in Clauses 7.4.2 or 7.4.3. A summary of the protection required for particular elements of the electrical distribution system is given in Table 7.1.

Sensing circuits need not be protected in accordance with this Clause, but shall be arranged so that any failure resulting from fire will result in operation of the associated emergency lighting and exit signs.

NOTE: AS/NZS 3013 only covers requirements for forms of protection that are not dependent on the use of fire resisting elements of building construction for thermal protection.

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TABLE 7.1

PROTECTION OF EMERGENCY LIGHTING CIRCUITS AGAINST EXPOSURE TO FIRE—SUMMARY OF REQUIREMENTS

Circuit and associated equipment	Required protection against exposure to fire (see Clause 7.4 and AS/NZS 3013)	
	Buildings required to be constructed of fire-resisting elements (see Clause 7.4.2)	Buildings not required to be constructed of fire-resisting elements (see Clause 7.4.3)
Submains and associated link boxes and distribution boards	Class WS4X	Class WS1X
Final subcircuits	Class WS4X*	Class WS1X*

* See Clause 7.4.4 for exemptions from the need for protection in specified circumstances.

7.4.2 Protective measures for buildings required to be constructed of fire resisting elements

For buildings that are required to be constructed of fire resisting elements but are not provided throughout with an approved automatic fire sprinkler system, the emergency lighting and exit sign distribution system shall be protected against exposure to fire in accordance with the following requirements:

(a) Submains and associated link boxes and distribution boards shall be provided with Class WS4X protection in accordance with AS/NZS 3013.

(b) Except as specified in Item (c) of this Clause, final subcircuits shall be provided with Class WS4X protection in accordance with AS/NZS 3013, from its origin (i.e. the distribution board) to each emergency luminaire and exit sign.

The connection to each emergency luminaire and exit sign shall be made via a fused terminal box as follows:

(i) The terminal box shall be of a type which provides Class WS4X protection in accordance with AS/NZS 3013 and including the requirements of Appendix B.

(ii) All unearthed load circuit conductors shall be fused with Type ‘gG’ fuse links, or higher specification e.g. HRC fuse, conforming to IEC 60269-1.

(iii) The terminal box shall be located in a position which is readily accessible for fuse replacement.

(c) Wiring to luminaire from the terminal box shall not exceed 2 m unless wiring is of a type which will provide Class WS4X protection in accordance with AS/NZS 3013.

7.4.3 Protective measures for buildings not required to be constructed of fire resisting elements

For buildings that are not required to be constructed of fire resisting elements, the emergency lighting and exit sign distribution system shall be protected against exposure to fire in accordance with the following requirements:

(a) Submains and associated link boxes and distribution boards shall be provided with Class WS1X protection in accordance with AS/NZS 3013.

A1 (b) Final sub-circuits shall be protected in accordance with Clause 7.4.2(b) except references to WS4X shall be replaced with WS1X.

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7.4.4 Exemptions from protection against exposure to fire

The protection against exposure to fire, specified for final subcircuits in Clauses 7.4.2 and 7.4.3, need not be provided in the following circumstances:

(a) For final subcircuits installed within fire isolated passageways, fire isolated ramps and fire isolated stairways.

(b) For sections of final subcircuits which are within 2 m of the emergency luminaires or exit signs supplied by the subcircuit, if such sections do not involve the continuation of supply to other emergency luminaires or exit signs.

NOTE: See example in Figure C8, Appendix C.

7.4.5 Protection of distribution boards and link boxes

Equipment used for the control or protection of emergency lighting circuits shall be installed in enclosures having a fire resistance level of not less than that specified in Clause 6.2.2. This requirement shall not apply to equipment such as sensing relays which, if caused to fail as a result of fire originating from the normal lighting distribution system, will actuate the emergency lighting.

The emergency lighting distribution board shall not be installed in the same enclosure as a normal lighting electrical distribution board.

7.4.6 Installation of wiring systems

Elements of the emergency lighting and exit sign distribution system which, in terms of Clauses 7.4.2 or 7.4.3, are required to be protected against exposure to fire shall be installed via a route which uses fire resisting building structure elements and supports. The supports and fixings used to attach the wiring to the structure shall either be of—

(a) the type recommended by the wiring system supplier as having achieved the relevant classification to AS/NZS 3013; or

(b) a type which satisfies the fire test for supports and fixings in AS/NZS 3013.

The cables used shall either be run without joints or, where joints are unavoidable because of the route length involved, such joints shall be made in a manner that will ensure that the specified protection against exposure to fire is maintained.

7.5 SEGREGATION OR IDENTIFICATION OF SUBMAINS

Emergency lighting and exit sign submains conductors shall not be installed in the same conduit, duct or troughing as wiring not associated with the emergency lighting and exit sign system. In addition, unless enclosed in conduit, ducts or troughing, they shall be identified by means of labels bearing the words ‘Emergency lighting’ securely fixed to the conductor at all normal access points and at intervals not exceeding 5 m.

7.6 ARRANGEMENT OF FINAL SUBCIRCUITS

Emergency lighting and exit sign final subcircuits shall be arranged in accordance with the following, as applicable:

(a) *Fire isolated passageways, ramps, stairways or the like* Emergency luminaires and exit signs located within fire isolated passageways, fire isolated ramps, fire isolated stairways or the like shall be on separate final subcircuits from emergency luminaires and exit signs in all other areas, and shall be arranged such that alternate emergency luminaires are supplied from separate final subcircuits and, similarly, alternate exit signs are supplied from separate final subcircuits.

(b) *Large undivided areas* Where an undivided area within a building exceeds 500 m^2, emergency luminaires and exit signs in that area shall be supplied by more than one final subcircuit and shall be arranged so that, in the event of the failure of one final

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subcircuit, a comprehensive and evenly spaced pattern of emergency luminaires and exit signs remains operable on another final subcircuit.

NOTE: For the purpose of this Clause the term ‘undivided area’ means an area bounded by partitions which are full height and which are generally opaque.

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APPENDIX A

NORMATIVE REFERENCES

(Normative)

AS

3000 Electrical installations (known as the Australian/New Zealand Wiring Rules)

3011 Electrical installations—Secondary batteries installed in buildings

3011.1 Part 1: Vented cells

3011.2 Part 2: Sealed cells

4044 Battery chargers for stationary batteries

62040 Uninterruptible power systems (UPS)

62040.1.1 Part 1.1: General and safety requirements for UPS used in operator access areas

AS IEC

62040 Uninterruptible power systems (UPS)

62040.3 Part 3: Method of specifying the performance and test requirements

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

2293.2 Part 2: Inspection and maintenance

2293.3 Part 3: Emergency luminaires and exit signs

3013 Electrical installations—Classification of the fire and mechanical performance of wiring system elements

IEC

60051 Direct acting indicating analogue electrical measuring instruments and their accessories

60051-1 Part 1: Definitions and general requirements common to all parts

60051-2 Part 2: Special requirements for ammeters and voltmeters

60051-9 Part 9: Recommended test methods

60146 Semiconductor converters—General requirements and line commutated converters

60146-1-1 Part 1-1: Specification of basic requirements

60269 Low-voltage fuses

60269-1 Part 1: General requirements

A1 **[Text deleted]**

ABCB (Australian Building Codes Board)

NCC National Construction Code

New Zealand Building Code

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APPENDIX B

TERMINAL BOX FOR THE CONNECTION OF EMERGENCY LUMINAIRES AND EXIT SIGNS IN CENTRALLY SUPPLIED SYSTEMS

(Normative)

B1 SCOPE

This Appendix specifies requirements for a terminal box for the connection of emergency luminaires and exit signs in final subcircuits of central systems that require protection against exposure to fire.

B2 CONNECTION

Connections within the terminal box shall be made via fuses conforming to the following:

(a) All unearthed load circuit conductors shall be fused with Type ‘gG’ fuse links, or higher specification e.g. HRC fuse, conforming to IEC 60269.1.

(b) Each fuse link shall be housed in a ceramic fuse carrier and base.

Cable entries to the terminal box shall be made by means of close fitting metallic bushes or glands.

For mineral insulated, metal sheathed cables, the cable seals shall be located within the terminal box. The sealing compound used shall be of a type which remains non-conductive, even though it may fail as a moisture seal under high temperature conditions.

Conductor tails shall be insulated over their entire length with natural silicone rubber sleeving, having a hardness of 74 ±5 (Durometer A) and a density of 1620 ±2 kg/m^3.

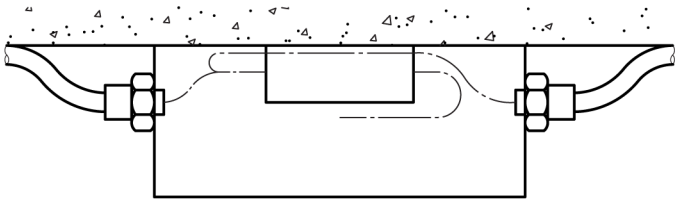
NOTE: Figures B1 and B2 illustrate typical arrangements of the terminal box for different wiring systems.

B3 INSTALLATION

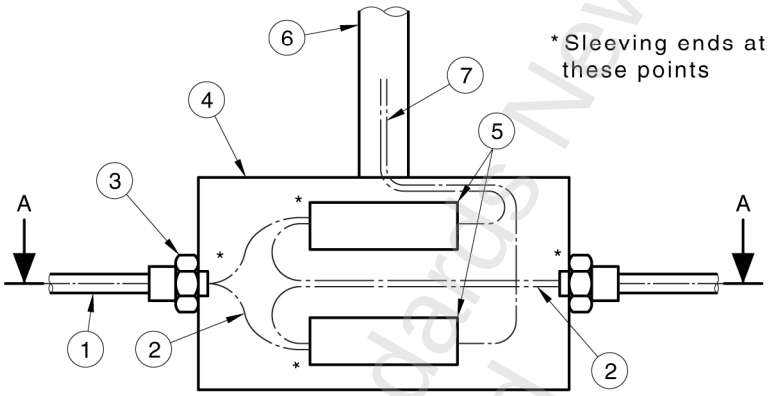
The terminal box should be installed in a manner applicable to the luminaire arrangement and type of wiring system employed. Examples are illustrated in Figures B3 to B7.

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SECTION A-A



View into box with cover removed

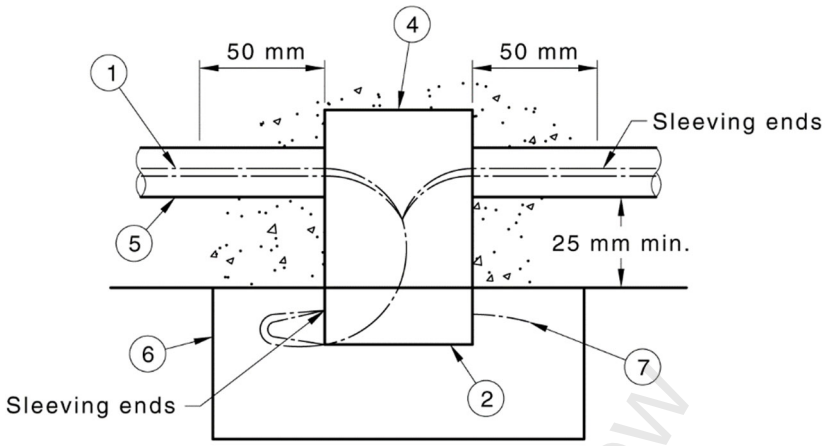
NOT TO SCALE

Item	Description
1	Surface-installed cable
2	Conductor tails, insulated or sleeved with silicone rubber
3	Metallic cable gland or bush
4	Terminal box
5	Ceramic fuse base and carrier with Type ‘gG’, or higher specification i.e. HRC fuse, fuse-link conforming to IEC 60269.1
6	Surface conduit to luminaire
7	Wiring to luminaire not to exceed 2 m unless wiring is of a type which will provide Class WS4X protection in accordance with AS/NZS 3013

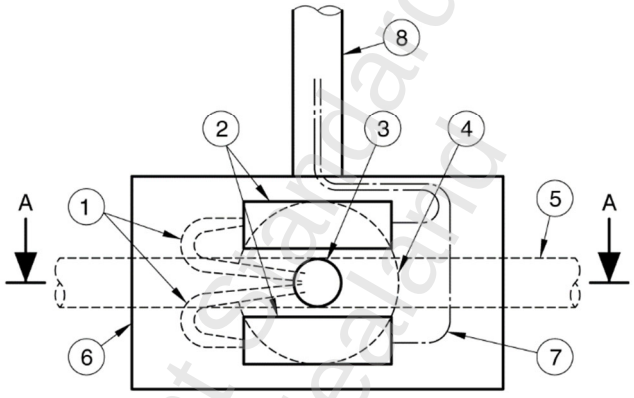
FIGURE B1 TYPICAL ARRANGEMENT OF TERMINAL BOX FOR USE WITH SURFACE-INSTALLED CABLE AND SURFACE-MOUNTED LUMINAIRE

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SECTION A-A



View into box with cover removed

NOT TO SCALE

Item	Description
1	0.6/1 kV PVC insulated building wires V75, sleeved with silicone rubber
2	Ceramic fuse base and carrier with Type ‘gG’ fuse-link, or higher specification i.e. HRC fuse, conforming to IEC 60269.1
3	Wire entry hole in base of metal terminal box
4	Embedded conduit junction box
5	Embedded conduit
6	Terminal box
7	Wiring to luminaire not to exceed 2 m unless wiring is of a type which will provide Class WS4X protection in accordance with AS/NZS 3013
8	Surface conduit to luminaire

FIGURE B2 TYPICAL ARRANGEMENT OF TERMINAL BOX FOR USE WITH EMBEDDED CONDUIT AND SURFACE-MOUNTED LUMINAIRE

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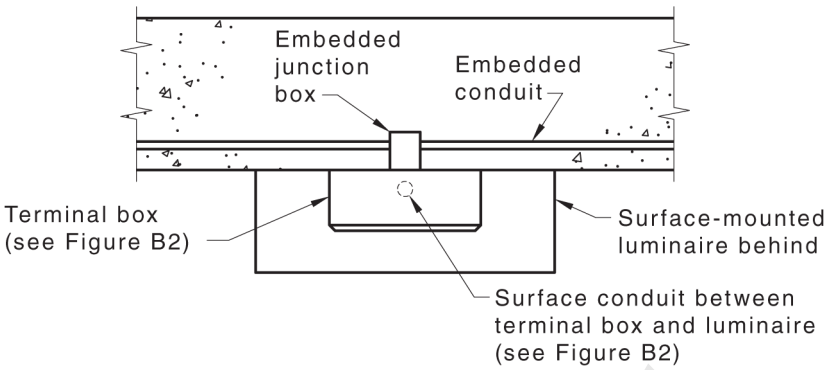


FIGURE B3 TYPICAL LAYOUT OF EMBEDDED CONDUIT, SURFACE-MOUNTED TERMINAL BOX AND SURFACE-MOUNTED LUMINAIRE

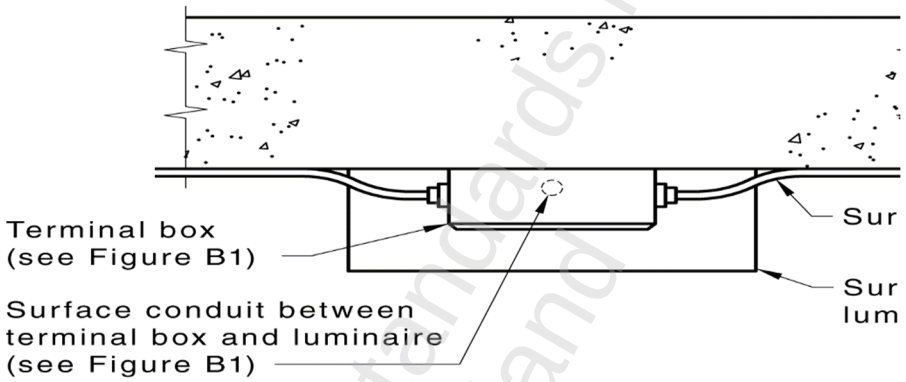


FIGURE B4 TYPICAL LAYOUT OF SURFACE INSTALLED CABLE, SURFACE-MOUNTED TERMINAL BOX AND SURFACE-MOUNTED LUMINAIRE

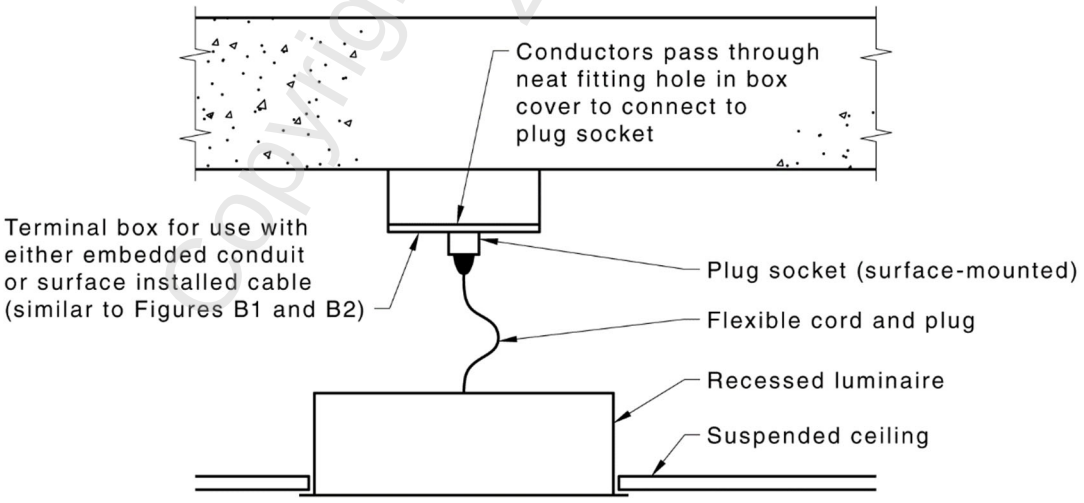


FIGURE B5 TYPICAL LAYOUT OF TERMINAL BOX AND RECESSED LUMINAIRE

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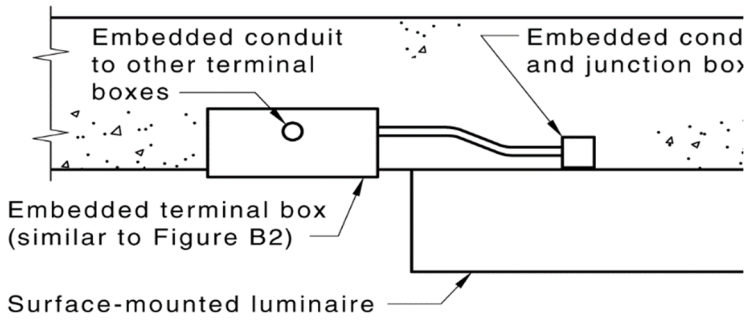


FIGURE B6 TYPICAL LAYOUT OF EMBEDDED TERMINAL BOX AND SURFACE-MOUNTED LUMINAIRE

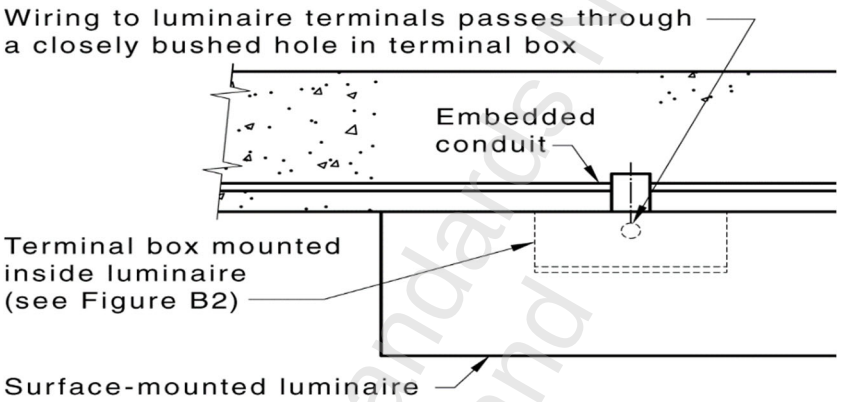


FIGURE B7 TYPICAL LAYOUT OF TERMINAL BOX MOUNTED INSIDE A SURFACE-MOUNTED LUMINAIRE

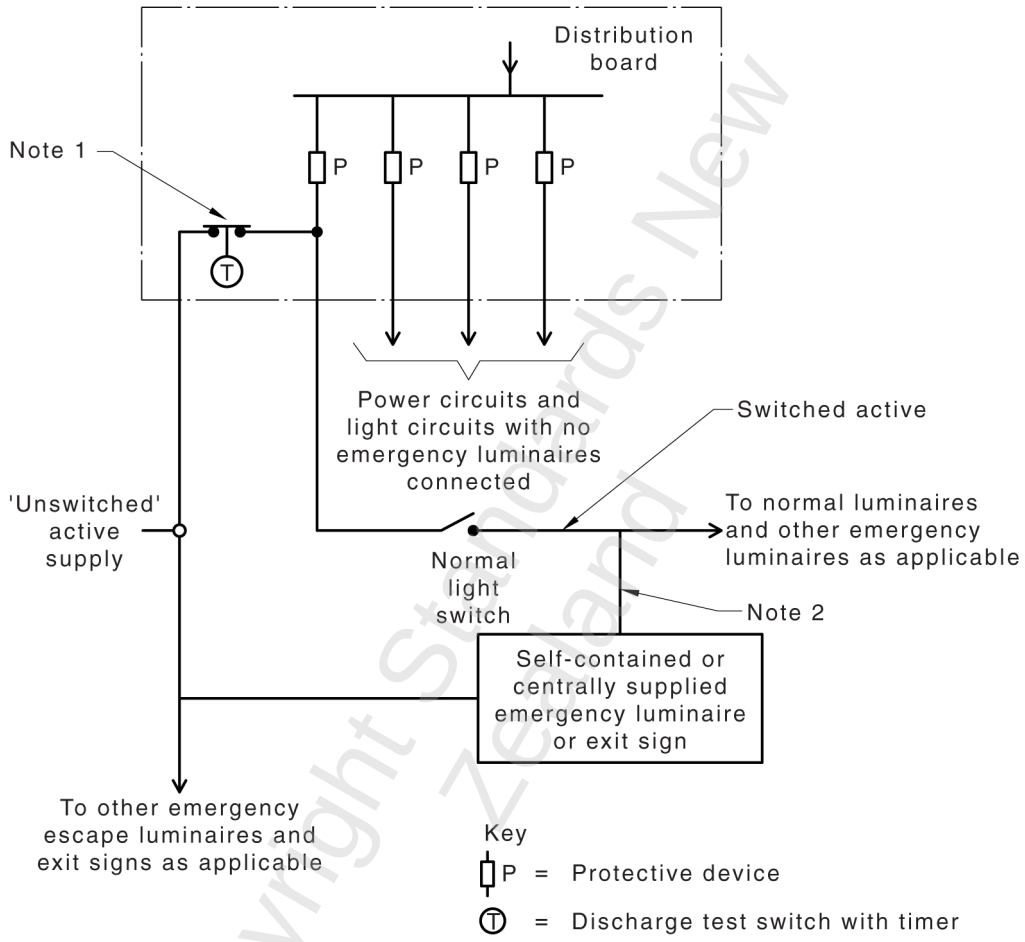
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APPENDIX C

EXAMPLE DIAGRAMS OF EMERGENCY LUMINAIRE AND EXIT SIGN SYSTEMS

(Informative)



NOTES:

1 Where more than one circuit has emergency luminaires connected, additional test switches or a multi-pole relay controlled by one switch will be required.

2 This connection not applicable to non-maintained luminaires.

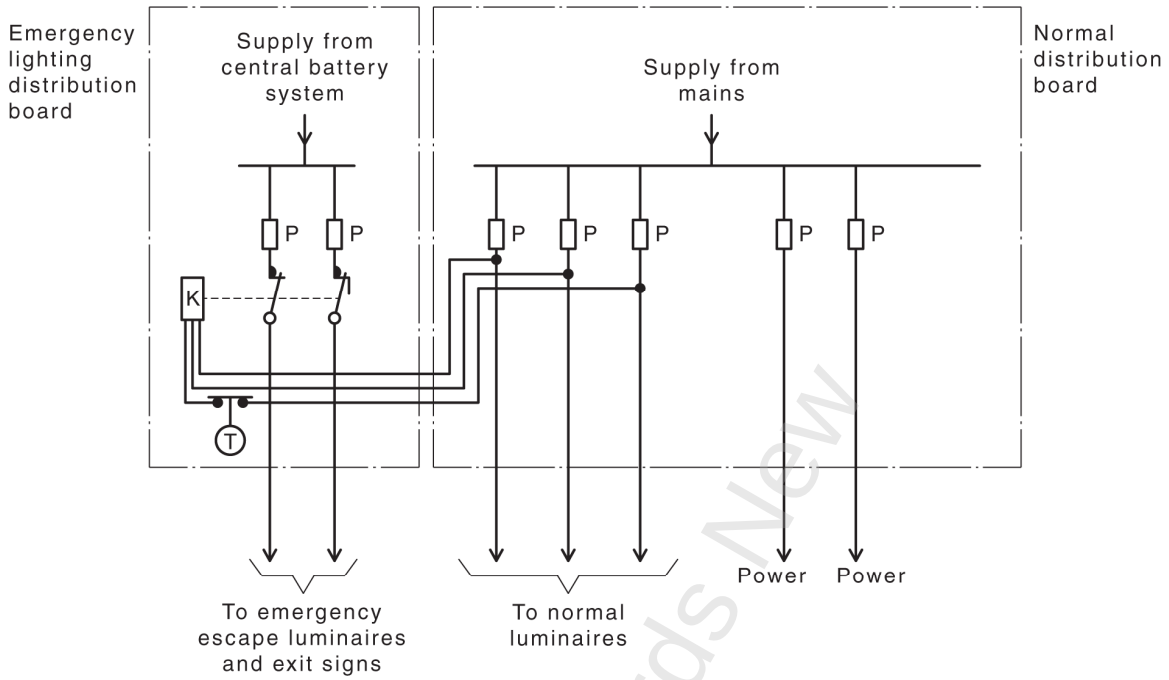
3 This example also applies to centrally supplied systems where a part of the emergency luminaire is powered from, or supply is sensed from, the same circuit as the normal lighting.

4 In New Zealand the power source for a central system may be a generator if the method of operation complies with New Zealand Building Code Acceptable Solution F6/AS1 Paragraph 1.5.1.

FIGURE C1 EXAMPLE SCHEMATIC FOR EMERGENCY LUMINAIRES AND EXIT SIGNS ARRANGED ON SAME CIRCUIT AS NORMAL LUMINAIRES

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Key

P = Protective device

T = Discharge test switch with timer

K = Sub-circuit sensing device

NOTES:

1 The emergency lighting system is shown in the operating condition, i.e. the normal lighting supply is not available.

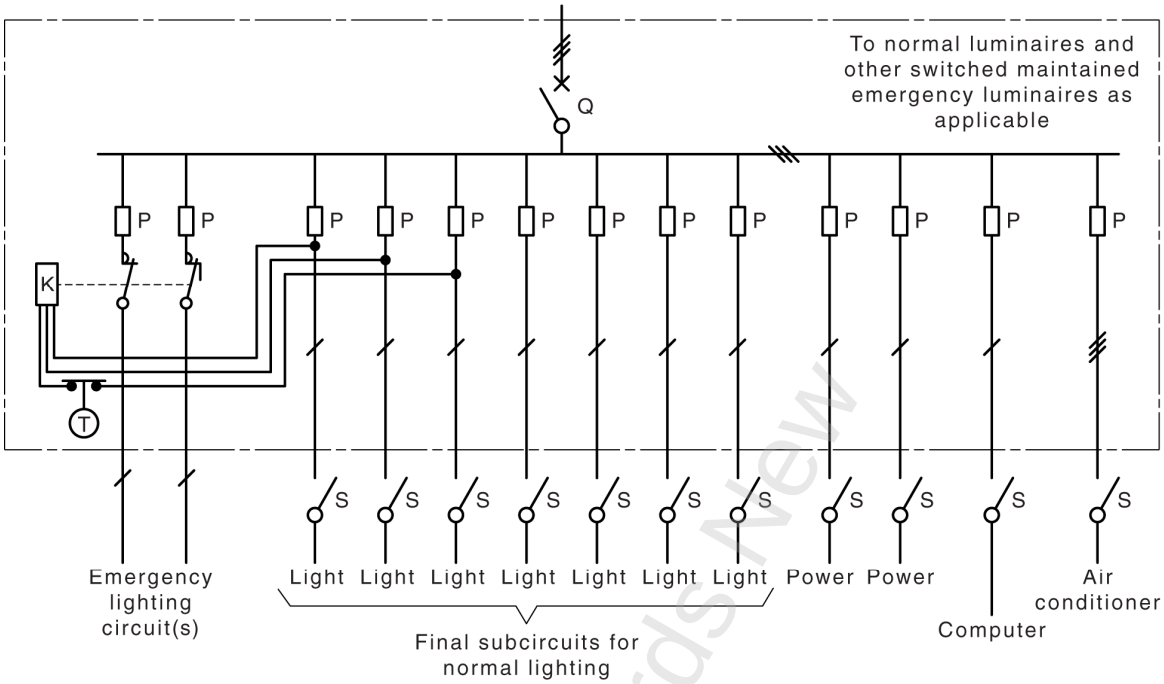
2 A similar arrangement for sensing loss of supply on any relevant circuit can be used where circuits dedicated to the supply of self-contained emergency luminaires are installed.

FIGURE C2 EXAMPLE SCHEMATIC FOR CENTRALLY SUPPLIED EMERGENCY LUMINAIRES AND EXIT SIGNS WHERE ADDITIONAL SENSING OF SUPPLY EQUIPMENT IS REQUIRED TO MEET THE REQUIREMENTS OF CLAUSE 2.3.3.

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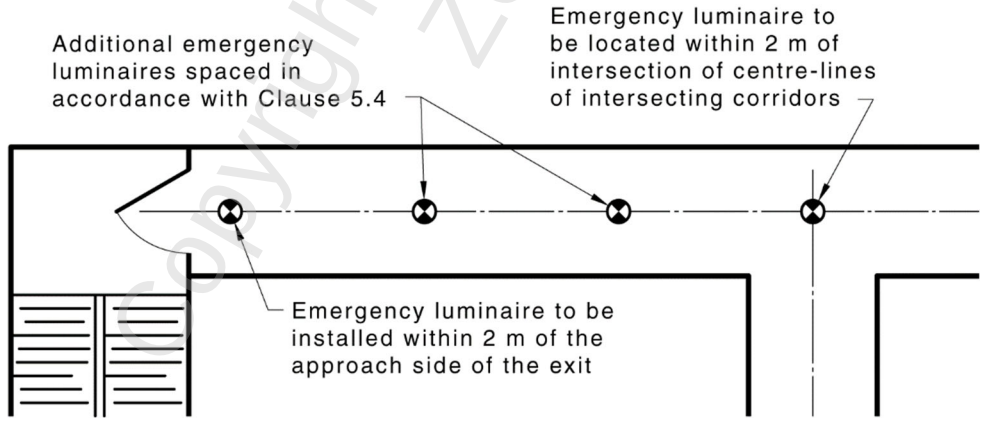
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A1



Key
S = Switch
Q = Isolator
P = Protective devices and equipment supply circuit switch
T = Manual test facility: incorporates self-resetting timer (open for test)
K = Sub-circuit sensing device

FIGURE C3 EXAMPLE OF SENSING AND CONTROL OF A DEDICATED CIRCUIT, SINGLE POINT EMERGENCY LIGHTING SYSTEM WHERE ADDITIONAL SENSING OF SUPPLY EQUIPMENT IS REQUIRED TO MEET THE REQUIREMENTS OF CLAUSE 2.3.3

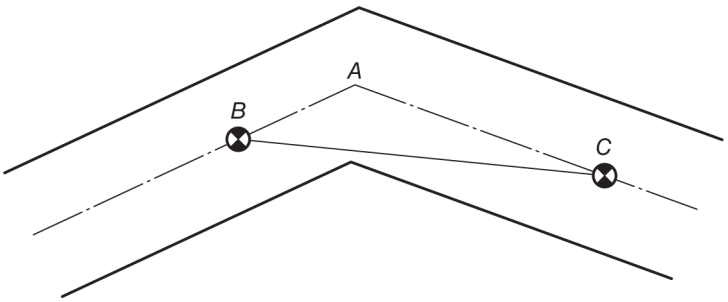


NOTE: In New Zealand, the placement of emergency lighting is covered by the requirements of the New Zealand Building Code Clause F6.

FIGURE C4 ILLUSTRATION OF REQUIREMENTS FOR THE SPACING OF EMERGENCY LUMINAIRES IN CORRIDORS

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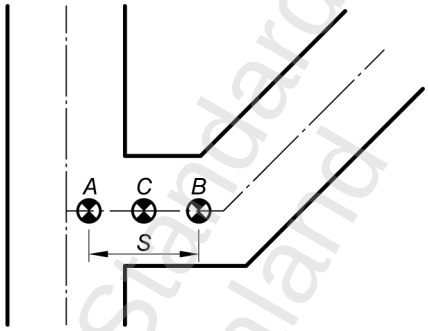


NOTES:

A1 1 An emergency luminaire is to be located within 2 m of the intersection of centre-lines at the change in direction (i.e. position A) except where a straight line between emergency luminaires on either side of the change of direction (i.e. between B and C) does not intersect the wall of the corridor (see Clause 4.5) and the spacing between these luminaires does not exceed the maximum value determined from Clause 4.6.1.

2 In New Zealand, the placement of emergency lighting is covered by the requirements of the New Zealand Building Code Clause F6.

FIGURE C5 ILLUSTRATION OF THE LOCATION OF EMERGENCY LUMINAIRES AT A CHANGE OF DIRECTION

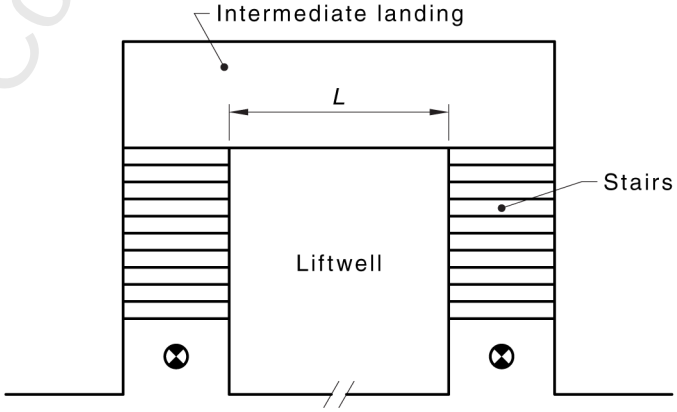


NOTES:

1 Only one emergency luminaire need be installed at C, in lieu of separate emergency luminaires at A and B, if S is not greater than half the maximum spacing permitted by Clause 4.5.1, but in any case not more than 2 m (see Clause 4.4).

2 In New Zealand, the placement of emergency lighting is covered by the requirements of the New Zealand Building Code Clause F6.

FIGURE C6 ILLUSTRATION OF REQUIREMENTS FOR THE LOCATION OF EMERGENCY LUMINAIRES WHERE AN INTERSECTION OF CORRIDORS AND A CHANGE OF DIRECTION OCCUR IN CLOSE PROXIMITY



NOTE: In New Zealand, the placement of emergency lighting is covered by the requirements of the New Zealand Building Code Clause F6.

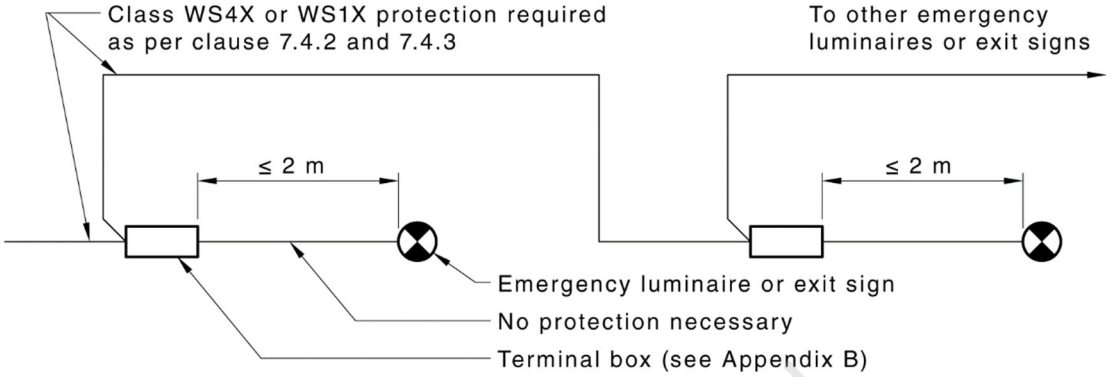
FIGURE C7 ILLUSTRATION OF REQUIREMENTS FOR THE LIGHTING OF AN INTERMEDIATE LANDING IN AN ENCLOSED STAIRWELL

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A1



NOTE: See Clauses 7.4.2 and 7.4.3.

FIGURE C8 ILLUSTRATION OF EXEMPTION FROM NEED FOR PROTECTION AGAINST EXPOSURE TO FIRE FOR SECTIONS OF FINAL SUBCIRCUITS

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APPENDIX D

VISUAL DETAILS OF EXIT SIGNS

(Normative)

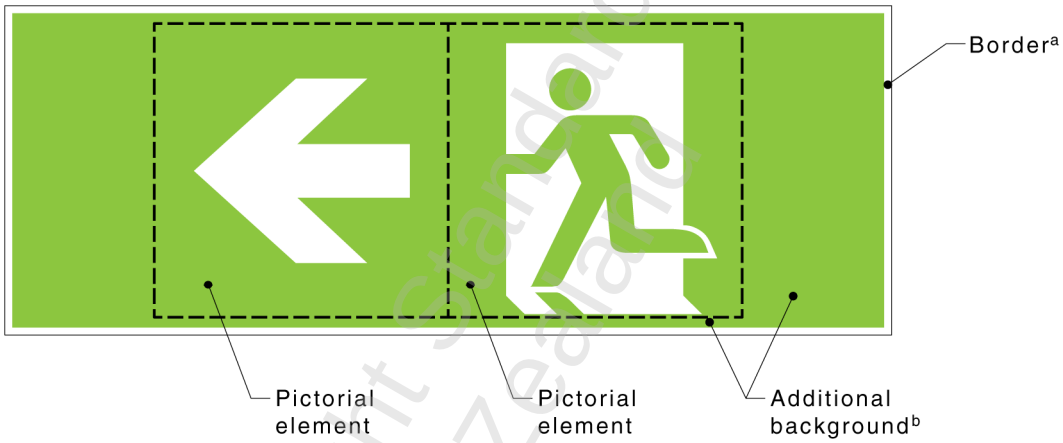
D1 SCOPE

This Appendix is referenced by the NCC and it is therefore normative. In the previous edition it was informative.

NOTE: Requirements for exit signs are set out in AS/NZS 2293.3:2018.

This Appendix specifies the visual appearance of exit signs, for designers, installers and inspectors of emergency lighting systems working with exit signs conforming to AS/NZS 2293.3:2018. It does not contain all of the requirements necessary for designing exit signs.

Constituent elements of an exit sign face are shown in Figure D1.



Key

[a] = Optional. Only allowed on self illuminated exit signs
[b] = Optional
---- = Boundary of pictorial element. (Notional only. Does not appear on sign)

FIGURE D1 CONSTITUENT ELEMENTS OF EXIT SIGN FACE

D2 TYPES OF EXIT SIGN

See Clause 1.5 for definitions of exit sign types.

D3 APPEARANCE OF EXIT SIGN FACE

D3.1 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 D2.

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 D3.

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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.

NOTE: This requirement is in keeping with the principles of the meaning of various sign shapes set out in ISO 3864-1.

In New Zealand requirements for exit signs are specified in New Zealand Building Code Acceptable Solution F8/AS1 Paragraph 4.3.

D3.2 Location of elements

Where a sign consists of one pictorial element [i.e. that displayed in Figure D2(b)] this element shall be located in the centre of any additional background (see also Paragraph D3.4).

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

D3.3 Additional background

Any areas of the face of a sign apart from pictorial elements and allowable borders shall be designated as additional background and shall conform to the requirements of Paragraph D3.6.

Where a standard 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 that of the pictorial element.

D3.4 Borders

For a standard 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;

(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 any additional background.

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

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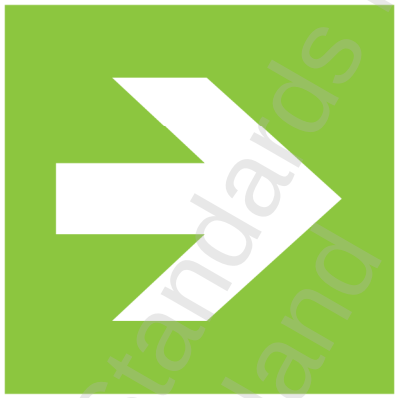
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(a) Left facing



(b) Right facing



(c) Arrow

FIGURE D2 PICTORIAL ELEMENTS

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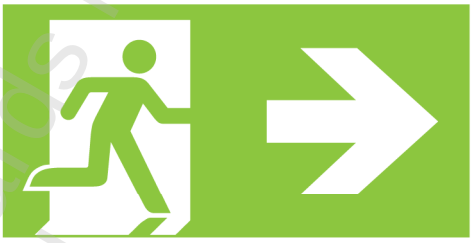




(a) Straight on from here
(Refer to paragraph D3.3)



(b) Left from here



(c) Right from here



(d) Left from here



(e) Right from here

NOTES:

1 Refer to Clause 3.4.2(d) of AS/NZS 2293.3:2018.

2 Within the optional additional background area luminance measurements are not required.

FIGURE D3 FORMATS AND MEANINGS OF PICTORIAL ELEMENTS

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(a) No additional background (b) With additional background

NOTE: Some black and white printers might produce a poor representation of this figure.

FIGURE D4 EXAMPLES OF COMPLYING 'LOW ILLUMINANCE' EXIT SIGN

D3.5 Colours

D3.5.1 *General*

For all types of sign, the colour of any additional background shall be identical to that of the background within the pictorial element/s.

D3.5.2 *Internally illuminated exit signs*

A1 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 D1.

TABLE D1

CHROMATICITY COORDINATES

Colour		Corner points of colour region above the points			
		1	2	3	4
White	*x*	0.290	0.265	0.370	0.460
	y	0.260	0.310	0.405	0.425
Green	*x*	0.285	0.285	0.170	0.026
	y	0.707	0.441	0.364	0.399

NOTES:

1 These chromaticity coordinates are based on ISO 3864-4:2011, Table 2—Colour regions: Chromaticity coordinates and luminance for maintained internally illuminated safety sign colours.

2 The boundary for the green colour is extended towards the yellow boundary such that x = 0.285. This results in the y co-ordinates shifting to 0.707.

3 Chromaticity should be measured when the sign is illuminated.

D3.5.3 *Low illuminance area exit signs*

The symbols on the face of a low illuminance self-illuminated sign shall be green as per the requirements specified in Paragraph D3.5.2.

The background shall be a colour other than green. A dark colour is recommended.

D3.5.4 *Externally illuminated exit sign*

The green and white portions of an externally illuminated exit sign shall conform to the relevant colour specification requirements specified in Paragraph D3.5.2.

D3.6 Size of pictorial elements

D3.6.1 *Minimum size*

The minimum pictorial element height for any exit sign shall be 100 mm.

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D3.6.2 *Maximum size*

There shall be no limit on the maximum pictorial element height.

D3.6.3 *Recommended sizes*

It is recommended that the pictorial element height on any exit sign correspond to one of the following discrete sizes:

Size mm
100
150
200
250

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APPENDIX E

SPACING TABLES BASED ON 0.2 lx MINIMUM

(Normative)

TABLE E1

MAXIMUM SPACINGS FOR CLASS A CLASSIFICATION (BASED ON 0.2 lx)

A1

Classification		Height, m															
		2.1	**2.4**	**2.7**	**3.0**	**3.3**	**3.6**	**4.0**	**4.5**	**5.0**	**6.0**	**7.0**	**8.0**	**9.0**	**10.0**	**15.0**	**20.0**
A	1	2.2	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A	1.25	2.5	2.4	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A	1.6	2.8	2.8	2.7	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A	2	3.1	3.1	3.1	3.0	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A	2.5	3.4	3.5	3.5	3.5	3.4	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A	3.2	3.7	3.8	3.9	4.0	4.0	3.9	3.7	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A	4	3.9	4.1	4.3	4.4	4.4	4.4	4.4	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A
A	5	4.2	4.4	4.6	4.8	4.9	4.9	5.0	4.9	4.7	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A
A	6.3	4.5	4.8	5.0	5.2	5.3	5.4	5.5	5.6	5.5	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A
A	8	4.8	5.1	5.4	5.6	5.8	5.9	6.1	6.2	6.3	6.1	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A
A	10	5.0	5.4	5.7	6.0	6.2	6.4	6.6	6.8	7.0	7.0	6.7	0.0 [4]	0.0 [4]	N/A	N/A	N/A
A	12.5	5.3	5.7	6.0	6.4	6.6	6.9	7.2	7.4	7.6	7.8	7.8	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A
A	16	5.6	6.0	6.4	6.8	7.1	7.4	7.7	8.1	8.4	8.7	8.9	8.8	0.0 [4]	0.0 [4]	N/A	N/A
A	20	5.9	6.4	6.8	7.2	7.5	7.8	8.2	8.7	9.0	9.5	9.8	9.9	9.8	9.4	N/A	N/A
A	25	6.2	6.7	7.1	7.6	7.9	8.3	8.7	9.2	9.6	10.3	10.8	11.0	11.1	10.9	0.0 [4]	N/A
A	32	6.5	7.0	7.5	8.0	8.4	8.8	9.3	9.9	10.4	11.2	11.8	12.2	12.5	12.6	0.0 [4]	N/A
A	40	6.8	7.4	7.9	8.4	8.9	9.3	9.8	10.4	11.0	11.9	12.7	13.3	13.7	13.9	0.0 [4]	N/A
A	50	7.1	7.7	8.3	8.8	9.3	9.8	10.3	11.0	11.6	12.7	13.6	14.3	14.9	15.3	15.2	0.0 [4]
A	63	7.4	8.1	8.7	9.2	9.8	10.3	10.9	11.6	12.3	13.5	14.5	15.4	16.1	16.6	17.5	0.0 [4]
A	80	7.8	8.4	9.1	9.7	10.3	10.8	11.5	12.3	13.0	14.3	15.5	16.5	17.3	18.0	19.8	18.7
A	100	8.1	8.8	9.5	10.1	10.7	11.3	12.0	12.9	13.7	15.1	16.4	17.5	18.4	19.3	21.9	21.9
A	125	8.4	9.2	9.9	10.6	11.2	11.8	12.6	13.5	14.3	15.9	17.3	18.5	19.6	20.6	23.9	24.8
A	160	8.8	9.6	10.3	11.1	11.7	12.4	13.2	14.2	15.1	16.8	18.3	19.7	20.9	22.0	26.0	27.9
A	200	9.1	10.0	10.8	11.5	12.2	12.9	13.8	14.8	15.8	17.6	19.2	20.7	22.0	23.3	27.9	30.6
	250	9.5	10.4	11.2	12.0	12.7	13.5	14.4	15.5	16.5	18.4	20.2	21.8	23.2	24.6	29.8	33.2
	320	9.9	10.8	11.7	12.5	13.3	14.1	15.1	16.2	17.3	19.4	21.2	23.0	24.5	26.0	32.0	36.0
	400	10.3	11.2	12.2	13.0	13.9	14.7	15.7	16.9	18.1	20.2	22.2	24.0	25.8	27.3	33.9	38.6
	500	10.7	11.7	12.6	13.5	14.4	15.2	16.3	17.6	18.8	21.1	23.2	25.2	27.0	28.7	35.8	41.1
	630	11.1	12.1	13.1	14.1	15.0	15.9	17.0	18.3	19.6	22.0	24.3	26.3	28.3	30.1	37.8	43.8
	800	11.5	12.6	13.7	14.6	15.6	16.5	17.7	19.1	20.5	23.0	25.4	27.6	29.7	31.6	40.0	46.5

NOTES:

1 Maximum spacings for mounting heights between the values given in the Table may be obtained by interpolation.

2 Refer to AS/NZS 2293.3 for details regarding classification of luminaires.

A1

3 Shaded areas indicate spacings greater than 22.3 m. Care should be taken when spacing luminaires at the distances indicated by the shaded regions to ensure that conformance to Clause 4.3 is maintained, e.g. a square room with sides 22.3 m long is 500 m2 which is the maximum allowable coverage for a single luminaire.

4 These spacings are applicable for dual function exit signs only, in accordance with Clause 4.5.

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TABLE E2

MAXIMUM SPACINGS FOR CLASS B CLASSIFICATION (BASED ON 0.2 lx)

A1

Classification		Height, m															
		2.1	2.4	2.7	3.0	3.3	3.6	4.0	4.5	5.0	6.0	7.0	8.0	9.0	10.0	15.0	20.0
B	1	2.4	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B	1.25	2.7	2.6	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B	1.6	3.1	3.1	3.0	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B	2	3.4	3.4	3.4	3.3	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B	2.5	3.7	3.8	3.8	3.8	3.7	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N /A	N/A
B	3.2	4.1	4.2	4.3	4.4	4.3	4.3	4.1	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B	4	4.4	4.6	4.7	4.8	4.9	4.9	4.8	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A
B	5	4.7	4.9	5.1	5.3	5.4	5.4	5.4	5.3	5.1	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A
B	6.3	5.0	5.3	5.5	5.7	5.9	6.0	6.1	6.1	6.0	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A
B	8	5.4	5.7	6.0	6.2	6.4	6.6	6.7	6.9	6.9	6.6	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A
B	10	5.7	6.1	6.4	6.7	6.9	7.1	7.3	7.5	7.7	7.6	7.3	0.0 [4]	0.0 [4]	N/A	N/A	N/A
B	12.5	6.0	6.4	6.8	7.1	7.4	7.6	7.9	8.2	8.4	8.6	8.5	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A
B	16	6.4	6.8	7.2	7.6	7.9	8.2	8.6	9.0	9.3	9.6	9.7	9.6	0.0 [4]	0.0 [4]	N/A	N/A
B	20	6.7	7.2	7.7	8.1	8.4	8.8	9.2	9.6	10.0	10.5	10.8	10.9	10.7	10.2	N/A	N/A
B	25	7.1	7.6	8.1	8.5	9.0	9.3	9.8	10.3	10.7	11.4	11.9	12.1	12.2	12.0	0.0 [4]	N/A
B	32	7.5	8.1	8.6	9.1	9.5	10.0	10.5	11.1	11.6	12.4	13.1	13.5	13.7	13.8	0.0 [4]	N/A
B	40	7.8	8.5	9.0	9.6	10.1	10.5	11.1	11.7	12.3	13.3	14.1	14.7	15.1	15.3	0.0 [4]	N/A
B	50	8.2	8.9	9.5	10.1	10.6	11.1	11.7	12.4	13.1	14.2	15.1	15.9	16.4	16.9	16.6	0.0 [4]
B	63	8.6	9.3	10.0	10.6	11.2	11.7	12.4	13.2	13.9	15.2	16.2	17.1	17.8	18.4	19.2	0.0 [4]
B	80	9.1	9.8	10.5	11.2	11.8	12.4	13.1	14.0	14.7	16.2	17.4	18.4	19.3	20.0	21.8	20.4
B	100	9.5	10.3	11.0	11.7	12.4	13.0	13.8	14.7	15.6	17.1	18.4	19.6	20.6	21.5	24.1	23.9
B	125	9.9	10.7	11.5	12.3	13.0	13.6	14.5	15.5	16.4	18.0	19.5	20.8	22.0	23.0	26.3	27.2
B	160	10.4	11.3	12.1	12.9	13.6	14.4	15.3	16.3	17.3	19.1	20.7	22.2	23.5	24.7	28.8	30.7
B	200	10.9	11.8	12.7	13.5	14.3	15.0	16.0	17.1	18.2	20.1	21.9	23.5	24.9	26.2	31.1	33.7
B	250	11.3	12.3	13.2	14.1	14.9	15.7	16.8	18.0	19.1	21.2	23.0	24.8	26.3	27.7	33.3	36.7
B	320	11.5	12.9	13.9	14.8	15.7	16.5	17.6	18.9	20.1	22.3	24.4	26.2	27.9	29.5	35.8	40.0
B	400	11.5	13.2	14.5	15.5	16.4	17.3	18.4	19.8	21.0	23.4	25.6	27.6	29.4	31.1	38.1	43.0
B	500	11.5	13.2	14.8	16.1	17.1	18.0	19.2	20.7	22.0	24.5	26.8	29.0	30.9	32.8	40.4	46.0
B	630	11.5	13.2	14.8	16.5	17.9	18.9	20.1	21.6	23.1	25.7	28.2	30.4	32.5	34.5	42.8	49.1
B	800	11.5	13.2	14.8	16.5	18.1	19.7	21.1	22.7	24.2	27.0	29.6	32.0	34.3	36.4	45.4	52.4

NOTES:

1 Maximum spacings for mounting heights between the values given in the Table may be obtained by interpolation.

2 Refer to AS/NZS 2293.3 for details regarding classification of luminaires.

A1

3 Shaded areas indicate spacings greater than 22.3 m. Care should be taken when spacing luminaires at the distances indicated by the shaded regions to ensure that conformance to Clause 4.3 is maintained, e.g. a square room with sides 22.3 m long is 500 m2 which is the maximum allowable coverage for a single luminaire.

4 These spacings are applicable for dual purpose exit signs only in accordance with Clause 4.5.

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TABLE E3
MAXIMUM SPACINGS FOR CLASS C CLASSIFICATION (BASED ON 0.2 lx)

A1

Classification		Height, m															
		2.1	2.4	2.7	3.0	3.3	3.6	4.0	4.5	5.0	6.0	7.0	8.0	9.0	10.0	15.0	20.0
C	1	2.8	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C	1.25	3.2	3.1	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C	1.6	3.7	3.6	3.5	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C	2	4.1	4.1	4.1	3.9	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C	2.5	4.5	4.6	4.6	4.5	4.4	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C	3.2	5.0	5.1	5.2	5.2	5.2	5.1	4.8	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C	4	5.4	5.6	5.7	5.8	5.8	5.8	5.7	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A
C	5	5.9	6.1	6.3	6.4	6.5	6.5	6.5	6.3	6.0	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A
C	6.3	6.3	6.6	6.8	7.0	7.2	7.3	7.3	7.3	7.1	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A
C	8	6.8	7.2	7.4	7.7	7.9	8.0	8.2	8.3	8.2	7.8	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A
C	10	7.3	7.7	8.0	8.3	8.6	8.8	9.0	9.1	9.2	9.1	8.6	0.0 [4]	0.0 [4]	N/A	N/A	N/A
C	12.5	7.8	8.2	8.6	8.9	9.2	9.5	9.8	10.0	10.2	10.3	10.1	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A
C	16	8.3	8.8	9.3	9.7	10.0	10.3	10.7	11.0	11.3	11.6	11.6	11.3	0.0 [4]	0.0 [4]	N/A	N/A
C	20	8.9	9.4	9.9	10.3	10.7	11.1	11.5	12.0	12.3	12.8	13.0	13.0	12.7	12.0	N/A	N/A
C	25	9.4	10.0	10.5	11.0	11.5	11.9	12.4	12.9	13.4	14.0	14.4	14.6	14.5	14.2	0.0 [4]	N/A
C	32	10.0	10.7	11.3	11.8	12.3	12.8	13.4	14.0	14.5	15.4	16.0	16.4	16.5	16.5	0.0 [4]	N/A
C	40	10.6	11.3	12.0	12.6	13.1	13.6	14.3	15.0	15.6	16.6	17.4	17.9	18.3	18.5	0.0 [4]	N/A
C	50	11.3	12.0	12.7	13.4	14.0	14.5	15.2	16.0	16.7	17.9	18.8	19.6	20.1	20.4	19.6	0.0 [4]
C	63	11.5	12.8	13.5	14.2	14.9	15.5	16.2	17.1	17.9	19.2	20.3	21.2	22.0	22.5	22.9	0.0 [4]
C	80	11.5	13.2	14.4	15.1	15.8	16.5	17.3	18.3	19.1	20.7	22.0	23.0	23.9	24.7	26.1	24.0
C	100	11.5	13.2	14.8	16.0	16.8	17.5	18.4	19.4	20.4	22.1	23.5	24.8	25.8	26.7	29.1	28.4
C	125	11.5	13.2	14.8	16.5	17.7	18.5	19.5	20.6	21.7	23.5	25.1	26.5	27.7	28.8	32.1	32.5
C	160	11.5	13.2	14.8	16.5	18.1	19.7	20.8	22.0	23.1	25.2	27.0	28.5	29.9	31.2	35.4	36.9
C	200	11.5	13.2	14.8	16.5	18.1	19.8	22.0	23.3	24.5	26.7	28.7	30.4	32.0	33.4	38.4	40.9
C	250	11.5	13.2	14.8	16.5	18.1	19.8	22.0	24.7	26.0	28.4	30.5	32.4	34.1	35.7	41.5	44.9
C	320	11.5	13.2	14.8	16.5	18.1	19.8	22.0	24.7	27.5	30.2	32.6	34.6	36.6	38.3	45.0	49.3
C	400	11.5	13.2	14.8	16.5	18.1	19.8	22.0	24.7	27.5	32.0	34.5	36.8	38.9	40.8	48.3	53.4
C	500	11.5	13.2	14.8	16.5	18.1	19.8	22.0	24.7	27.5	33.0	36.5	39.0	41.2	43.3	51.7	57.6
C	630	11.5	13.2	14.8	16.5	18.1	19.8	22.0	24.7	27.5	33.0	38.5	41.4	43.8	46.1	55.3	62.0
C	800	11.5	13.2	14.8	16.5	18.1	19.8	22.0	24.7	27.5	33.0	38.5	44.0	46.6	49.0	59.2	66.8

NOTES:

1 Maximum spacings for mounting heights between the values given in the Table may be obtained by interpolation.

2 Refer to AS/NZS 2293.3 for details regarding classification of luminaires.

A1

3 Shaded areas indicate spacings greater than 22.3 m. Care should be taken when spacing luminaires at the distances indicated by the shaded regions to ensure that conformance to Clause 4.3 is maintained, e.g. a square room with sides 22.3 m long is 500 m2 which is the maximum allowable coverage for a single luminaire.

4 These spacings are applicable for dual purpose exit signs only in accordance with Clause 4.5.

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TABLE E4

MAXIMUM SPACINGS FOR CLASS D CLASSIFICATION (BASED ON 0.2 lx)

A1

Classification		Height, m															
		2.1	2.4	2.7	3.0	3.3	3.6	4.0	4.5	5.0	6.0	7.0	8.0	9.0	10.0	15.0	20.0
D	1	3.4	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D	1.25	3.9	3.7	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D	1.6	4.6	4.4	4.2	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D	2	5.2	5.1	5.0	4.7	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D	2.5	5.8	5.8	5.7	5.6	5.3	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D	3.2	6.5	6.5	6.5	6.5	6.3	6.1	5.8	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D	4	7.1	7.2	7.3	7.3	7.2	7.1	6.9	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A
D	5	7.8	8.0	8.1	8.2	8.2	8.1	8.0	7.7	7.2	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A
D	6.3	8.5	8.8	8.9	9.1	9.1	9.2	9.1	9.0	8.7	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A
D	8	9.4	9.7	9.9	10.1	10.2	10.3	10.3	10.3	10.1	9.5	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A
D	10	10.2	10.5	10.8	11.0	11.2	11.4	11.5	11.5	11.5	11.1	10.3	0.0 [4]	0.0 [4]	N/A	N/A	N/A
D	12.5	11.0	11.4	11.8	12.1	12.3	12.5	12.7	12.8	12.9	12.8	12.2	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A
D	16	11.5	12.5	12.9	13.3	13.6	13.8	14.1	14.4	14.5	14.6	14.4	13.8	0.0 [4]	0.0 [4]	N/A	N/A
D	20	11.5	13.2	14.0	14.4	14.8	15.1	15.4	15.8	16.0	16.3	16.3	16.0	15.4	14.4	N/A	N/A
D	25	11.5	13.2	14.8	15.7	16.1	16.4	16.8	17.3	17.6	18.1	18.3	18.2	17.8	17.2	0.0 [4]	N/A
D	32	11.5	13.2	14.8	16.5	17.6	18.0	18.5	19.0	19.5	20.1	20.5	20.7	20.6	20.3	0.0 [4]	N/A
D	40	11.5	13.2	14.8	16.5	18.1	19.5	20.1	20.7	21.2	22.1	22.6	23.0	23.1	23.0	0.0 [4]	N/A
D	50	11.5	13.2	14.8	16.5	18.1	19.8	21.8	22.5	23.1	24.1	24.9	25.4	25.7	25.8	23.6	0.0 [4]
D	63	11.5	13.2	14.8	16.5	18.1	19.8	22.0	24.5	25.2	26.4	27.3	28.0	28.5	28.8	27.9	0.0 [4]
D	80	11.5	13.2	14.8	16.5	18.1	19.8	22.0	24.7	27.5	28.9	30.0	30.9	31.5	32.1	32.3	28.8
D	100	11.5	13.2	14.8	16.5	18.1	19.8	22.0	24.7	27.5	31.3	32.6	33.7	34.5	35.2	36.5	34.4
D	125	11.5	13.2	14.8	16.5	18.1	19.8	22.0	24.7	27.5	33.0	35.4	36.7	37.7	38.6	40.8	39.9
D	160	11.5	13.2	14.8	16.5	18.1	19.8	22.0	24.7	27.5	33.0	38.5	40.2	41.4	42.5	45.7	46.0
D	200	11.5	13.2	14.8	16.5	18.1	19.8	22.0	24.7	27.5	33.0	38.5	43.6	45.0	46.2	50.3	51.6
D	250	11.5	13.2	14.8	16.5	18.1	19.8	22.0	24.7	27.5	33.0	38.5	44.0	48.8	50.2	55.2	57.4
D	320	11.5	13.2	14.8	16.5	18.1	19.8	22.0	24.7	27.5	33.0	38.5	44.0	49.5	54.9	60.9	64.1
D	400	11.5	13.2	14.8	16.5	18.1	19.8	22.0	24.7	27.5	33.0	38.5	44.0	49.5	54.9	66.3	70.5
D	500	11.5	13.2	14.8	16.5	18.1	19.8	22.0	24.7	27.5	33.0	38.5	44.0	49.5	54.9	72.1	77.1
D	630	11.5	13.2	14.8	16.5	18.1	19.8	22.0	24.7	27.5	33.0	38.5	44.0	49.5	54.9	78.5	84.4
D	800	11.5	13.2	14.8	16.5	18.1	19.8	22.0	24.7	27.5	33.0	38.5	44.0	49.5	54.9	82.4	92.5

NOTES:

1 Maximum spacings for mounting heights between the values given in the Table may be obtained by interpolation.

2 Refer to AS/NZS 2293.3 for details regarding classification of luminaires.

A1 3 Shaded areas indicate spacings greater than 22.3 m. Care should be taken when spacing luminaires at the distances indicated by the shaded regions to ensure that conformance to Clause 4.3 is maintained, e.g. a square room with sides 22.3 m long is 500 m2 which is the maximum allowable coverage for a single luminaire.

4 These spacings are applicable for dual purpose exit signs only in accordance with Clause 4.5.

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TABLE E5

MAXIMUM SPACINGS FOR CLASS E CLASSIFICATION (BASED ON 0.2 lx)

A1

Classification		Height, m															
		2.1	2.4	2.7	3.0	3.3	3.6	4.0	4.5	5.0	6.0	7.0	8.0	9.0	10.0	15.0	20.0
E	1	3.7	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E	1.25	4.1	4.1	0.0 [4]	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E	1.6	4.6	4.7	4.6	0.0 [4]	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E	2	5.0	5.2	5.2	5.2	0.0 [4]	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E	2.5	5.4	5.6	5.8	5.8	5.8	0.0 [4]	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E	3.2	5.8	6.1	6.4	6.5	6.6	6.6	6.4	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E	4	6.2	6.6	6.9	7.1	7.3	7.4	7.4	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A
E	5	6.6	7.0	7.4	7.7	7.9	8.1	8.2	8.2	8.0	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A
E	6.3	6.9	7.4	7.9	8.2	8.5	8.8	9.1	9.2	9.3	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A
E	8	7.3	7.9	8.4	8.8	9.2	9.5	9.9	10.2	10.4	10.3	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A
E	10	7.7	8.3	8.8	9.3	9.8	10.2	10.6	11.1	11.4	11.7	11.4	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A
E	12.5	8.0	8.7	9.3	9.8	10.3	10.8	11.3	11.9	12.3	12.9	13.0	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A
E	16	8.3	9.1	9.8	10.4	11.0	11.5	12.1	12.8	13.4	14.2	14.7	14.7	0.0 [4]	0.0 [4]	N/A	N/A
E	20	8.7	9.5	10.2	10.9	11.5	12.1	12.8	13.6	14.3	15.3	16.1	16.5	16.5	16.1	N/A	N/A
E	25	8.9	9.8	10.6	11.4	12.1	12.7	13.5	14.4	15.1	16.4	17.4	18.0	18.4	18.4	0.0 [4]	N/A
E	32	9.0	10.2	11.1	11.9	12.6	13.3	14.2	15.2	16.1	17.6	18.8	19.7	20.4	20.8	0.0 [4]	N/A
E	40	9.0	10.3	11.4	12.3	13.1	13.9	14.9	16.0	16.9	18.7	20.1	21.2	22.1	22.8	0.0 [4]	0.0 [4]
E	50	9.0	10.3	11.6	12.7	13.6	14.5	15.5	16.7	17.8	19.7	21.3	22.7	23.8	24.7	25.8	0.0 [4]
E	63	9.0	10.3	11.6	12.9	14.1	15.0	16.1	17.4	18.6	20.7	22.6	24.1	25.5	26.6	29.3	0.0 [4]
E	80	9.0	10.3	11.6	12.9	14.2	15.4	16.7	18.1	19.4	21.8	23.8	25.6	27.2	28.5	32.6	32.1
E	100	9.0	10.3	11.6	12.9	14.2	15.4	17.2	18.8	20.2	22.7	25.0	27.0	28.7	30.3	35.5	36.9
E	125	9.0	10.3	11.6	12.9	14.2	15.4	17.2	19.3	20.9	23.7	26.1	28.3	30.3	32.0	38.3	41.1
E	160	9.0	10.3	11.6	12.9	14.2	15.4	17.2	19.3	21.4	24.6	27.3	29.7	31.9	33.9	41.4	45.5
E	200	9.0	10.3	11.6	12.9	14.2	15.4	17.2	19.3	21.4	25.5	28.4	31.0	33.4	35.5	44.0	49.3
E	250	9.0	10.3	11.6	12.9	14.2	15.4	17.2	19.3	21.4	25.7	29.4	32.2	34.8	37.2	46.7	53.0
E	320	9.0	10.3	11.6	12.9	14.2	15.4	17.2	19.3	21.4	25.7	30.0	33.5	36.3	38.9	49.5	57.0
E	400	9.0	10.3	11.6	12.9	14.2	15.4	17.2	19.3	21.4	25.7	30.0	34.3	37.6	40.4	52.0	60.6
E	500	9.0	10.3	11.6	12.9	14.2	15.4	17.2	19.3	21.4	25.7	30.0	34.3	38.6	41.8	54.5	64.0
E	630	9.0	10.3	11.6	12.9	14.2	15.4	17.2	19.3	21.4	25.7	30.0	34.3	38.6	42.9	56.9	67.5
E	800	9.0	10.3	11.6	12.9	14.2	15.4	17.2	19.3	21.4	25.7	30.0	34.3	38.6	42.9	59.4	71.1

NOTES:

1 Maximum spacings for mounting heights between the values given in the Table may be obtained by interpolation.

2 Refer to AS/NZS 2293.3 for details regarding classification of luminaires.

A1 3 Shaded areas indicate spacings greater than 22.3 m. Care should be taken when spacing luminaires at the distances indicated by the shaded regions to ensure that conformance to Clause 4.3 is maintained, e.g. a square room with sides 22.3 m long is 500 m2 which is the maximum allowable coverage for a single luminaire.

4 These spacings are applicable for dual purpose exit signs only in accordance with Clause 4.5.

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APPENDIX F

SPACING TABLES BASED ON 1 lx MINIMUM

(Normative)

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TABLE F1

A1

MAXIMUM SPACINGS FOR CLASS A CLASSIFICATION (BASED ON 1 lx)

Classification		Height, m															
		2.1	2.4	2.7	3.0	3.3	3.6	4.0	4.5	5.0	6.0	7.0	8.0	9.0	10.0	15.0	20.0
A	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A	1.25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A	1.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A	2.5	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A	3.2	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A	4	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A	5	2.2	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A	6.3	2.5	2.4	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A	8	2.8	2.8	2.7	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A	10	3.1	3.1	3.1	3.0	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A	12.5	3.4	3.5	3.5	3.5	3.4	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A	16	3.7	3.8	3.9	4.0	4.0	3.9	3.7	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A	20	3.9	4.1	4.3	4.4	4.4	4.4	4.4	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A
A	25	4.2	4.4	4.6	4.8	4.9	4.9	5.0	4.9	4.7	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A
A	32	4.5	4.8	5.0	5.2	5.4	5.5	5.6	5.6	5.6	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A
A	40	4.8	5.1	5.4	5.6	5.8	5.9	6.1	6.2	6.3	6.1	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A
A	50	5.0	5.4	5.7	6.0	6.2	6.4	6.6	6.8	7.0	7.0	6.7	0.0 [4]	N/A	N/A	N/A	N/A
A	63	5.3	5.7	6.1	6.4	6.6	6.9	7.2	7.5	7.7	7.9	7.8	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A
A	80	5.6	6.0	6.4	6.8	7.1	7.4	7.7	8.1	8.4	8.7	8.9	8.8	0.0 [4]	0.0 [4]	N/A	N/A
A	100	5.9	6.4	6.8	7.2	7.5	7.8	8.2	8.7	9.0	9.5	9.8	9.9	9.8	9.4	N/A	N/A
A	125	6.2	6.7	7.1	7.6	7.9	8.3	8.7	9.2	9.6	10.3	10.8	11.0	11.1	10.9	0.0 [4]	N/A
A	160	6.5	7.0	7.5	8.0	8.4	8.8	9.3	9.9	10.4	11.2	11.8	12.2	12.5	12.6	0.0 [4]	N/A
A	200	6.8	7.4	7.9	8.4	8.9	9.3	9.8	10.4	11.0	11.9	12.7	13.3	13.7	13.9	0.0 [4]	N/A
A	250	7.1	7.7	8.3	8.8	9.3	9.8	10.3	11.0	11.6	12.7	13.6	14.3	14.9	15.3	15.2	0.0 [4]
A	320	7.4	8.1	8.7	9.3	9.8	10.3	10.9	11.7	12.4	13.6	14.6	15.4	16.2	16.7	17.7	0.0 [4]
A	400	7.8	8.4	9.1	9.7	10.3	10.8	11.5	12.3	13.0	14.3	15.5	16.5	17.3	18.0	19.8	18.7
A	500	8.1	8.8	9.5	10.1	10.7	11.3	12.0	12.9	13.7	15.1	16.4	17.5	18.4	19.3	21.9	21.9
A	630	8.4	9.2	9.9	10.6	11.2	11.8	12.6	13.5	14.4	15.9	17.3	18.5	19.6	20.6	23.9	24.9
A	800	8.8	9.6	10.3	11.1	11.7	12.4	13.2	14.2	15.1	16.8	18.3	19.7	20.9	22.0	26.0	27.9

NOTES:

1 Maximum spacings for mounting heights between the values given in the Table may be obtained by interpolation.

2 Refer to AS/NZS 2293.3 for details regarding classification of luminaires.

A1 3 Shaded areas indicate spacings greater than 22.3 m. Care should be taken when spacing luminaires at the distances indicated by the shaded regions to ensure that conformance to Clause 4.3 is maintained e.g. a square room with sides 22.3 m long is 500 m2 which is the maximum allowable coverage for a single luminaire.

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TABLE F2

MAXIMUM SPACINGS FOR CLASS B CLASSIFICATION (BASED ON 1 lx)

Classification		Height, m															
		2.1	2.4	2.7	3.0	3.3	3.6	4.0	4.5	5.0	6.0	7.0	8.0	9.0	10.0	15.0	20.0
B	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B	1.25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B	1.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B	2.5	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B	3.2	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B	4	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B	5	2.4	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B	6.3	2.7	2.6	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B	8	3.1	3.1	3.0	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B	10	3.4	3.4	3.4	3.3	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B	12.5	3.7	3.8	3.8	3.8	3.7	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B	16	4.1	4.2	4.3	4.4	4.3	4.3	4.1	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A
B	20	4.4	4.6	4.7	4.8	4.9	4.9	4.8	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A
B	25	4.7	4.9	5.1	5.3	5.4	5.4	5.4	5.3	5.1	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A
B	32	5.0	5.3	5.6	5.8	5.9	6.0	6.1	6.2	6.1	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A
B	40	5.4	5.7	6.0	6.2	6.4	6.6	6.7	6.9	6.9	6.6	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A
B	50	5.7	6.1	6.4	6.7	6.9	7.1	7.3	7.5	7.7	7.6	7.3	0.0 [4]	0.0 [4]	N/A	N/A	N/A
B	63	6.0	6.4	6.8	7.1	7.4	7.7	8.0	8.2	8.5	8.6	8.5	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A
B	80	6.4	6.8	7.2	7.6	7.9	8.2	8.6	9.0	9.3	9.6	9.7	9.6	0.0 [4]	0.0 [4]	N/A	N/A
B	100	6.7	7.2	7.7	8.1	8.4	8.8	9.2	9.6	10.0	10.5	10.8	10.9	10.7	10.2	N/A	N/A
B	125	7.1	7.6	8.1	8.5	9.0	9.3	9.8	10.3	10.7	11.4	11.9	12.1	12.2	12.0	0.0 [4]	N/A
B	160	7.5	8.1	8.6	9.1	9.5	10.0	10.5	11.1	11.6	12.4	13.1	13.5	13.7	13.8	0.0 [4]	N/A
B	200	7.8	8.5	9.0	9.6	10.1	10.5	11.1	11.7	12.3	13.3	14.1	14.7	15.1	15.3	0.0 [4]	N/A
B	250	8.2	8.9	9.5	10.1	10.6	11.1	11.7	12.4	13.1	14.2	15.1	15.9	16.4	16.9	16.6	0.0 [4]
B	320	8.7	9.4	10.0	10.6	11.2	11.8	12.4	13.2	14.0	15.2	16.3	17.2	17.9	18.5	19.4	0.0 [4]
B	400	9.1	9.8	10.5	11.2	11.8	12.4	13.1	14.0	14.7	16.2	17.4	18.4	19.3	20.0	21.8	20.4
B	500	9.5	10.3	11.0	11.7	12.4	13.0	13.8	14.7	15.6	17.1	18.4	19.6	20.6	21.5	24.1	23.9
B	630	9.9	10.8	11.5	12.3	13.0	13.7	14.5	15.5	16.4	18.1	19.6	20.9	22.0	23.0	26.4	27.3
B	800	10.4	11.3	12.1	12.9	13.6	14.4	15.3	16.3	17.3	19.1	20.7	22.2	23.5	24.7	28.8	30.7

NOTES:

1 Maximum spacings for mounting heights between the values given in the Table may be obtained by interpolation.

2 Refer to AS/NZS 2293.3 for details regarding classification of luminaires.

A1 3 Shaded areas indicate spacings greater than 22.3 m. Care should be taken when spacing luminaires at the distances indicated by the shaded regions to ensure that conformance to Clause 4.3 is maintained, e.g. a square room with sides 22.3 m long is 500 m2 which is the maximum allowable coverage for a single luminaire.

4 These spacings are applicable for dual purpose exit signs only in accordance with Clause 4.5.

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TABLE F3
MAXIMUM SPACINGS FOR CLASS C CLASSIFICATION (BASED ON 1 lx)

Classification		Height, m															
		2.1	2.4	2.7	3.0	3.3	3.6	4.0	4.5	5.0	6.0	7.0	8.0	9.0	10.0	15.0	20.0
C	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C	1.25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C	1.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C	2.5	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C	3.2	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C	4	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C	5	2.8	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C	6.3	3.2	3.1	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C	8	3.7	3.6	3.5	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C	10	4.1	4.1	4.1	3.9	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C	12.5	4.5	4.6	4.6	4.5	4.4	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C	16	5.0	5.1	5.2	5.2	5.2	5.1	4.8	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A
C	20	5.4	5.6	5.7	5.8	5.8	5.8	5.7	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A
C	25	5.9	6.1	6.3	6.4	6.5	6.5	6.5	6.3	6.0	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A
C	32	6.3	6.6	6.9	7.1	7.2	7.3	7.4	7.4	7.2	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A
C	40	6.8	7.2	7.4	7.7	7.9	8.0	8.2	8.3	8.2	7.8	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A
C	50	7.3	7.7	8.0	8.3	8.6	8.8	9.0	9.1	9.2	9.1	8.6	0.0 [4]	0.0 [4]	N/A	N/A	N/A
C	63	7.8	8.2	8.6	9.0	9.3	9.5	9.8	10.1	10.3	10.4	10.1	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A
C	80	8.3	8.8	9.3	9.7	10.0	10.3	10.7	11.0	11.3	11.6	11.6	11.3	0.0 [4]	0.0 [4]	N/A	N/A
C	100	8.9	9.4	9.9	10.3	10.7	11.1	11.5	12.0	12.3	12.8	13.0	13.0	12.7	12.0	N/A	N/A
C	125	9.4	10.0	10.5	11.0	11.5	11.9	12.4	12.9	13.4	14.0	14.4	14.6	14.5	14.2	0.0 [4]	N/A
C	160	10.0	10.7	11.3	11.8	12.3	12.8	13.4	14.0	14.5	15.4	16.0	16.4	16.5	16.5	0.0 [4]	N/A
C	200	10.6	11.3	12.0	12.6	13.1	13.6	14.3	15.0	15.6	16.6	17.4	17.9	18.3	18.5	0.0 [4]	N/A
C	250	11.3	12.0	12.7	13.4	14.0	14.5	15.2	16.0	16.7	17.9	18.8	19.6	20.1	20.4	19.6	0.0 [4]
C	320	11.5	12.8	13.6	14.3	14.9	15.5	16.3	17.2	18.0	19.3	20.4	21.4	22.1	22.6	23.1	0.0 [4]
C	400	11.5	13.2	14.4	15.1	15.8	16.5	17.3	18.3	19.1	20.7	22.0	23.0	23.9	24.7	26.1	24.0
C	500	11.5	13.2	14.8	16.0	16.8	17.5	18.4	19.4	20.4	22.1	23.5	24.8	25.8	26.7	29.1	28.4
C	630	11.5	13.2	14.8	16.5	17.8	18.6	19.5	20.7	21.7	23.6	25.2	26.6	27.8	28.9	32.2	32.6
C	800	11.5	13.2	14.8	16.5	18.1	19.7	20.8	22.0	23.1	25.2	27.0	28.5	29.9	31.2	35.4	36.9

NOTES:

1 Maximum spacings for mounting heights between the values given in the Table may be obtained by interpolation.

2 Refer to AS/NZS 2293.3 for details regarding classification of luminaires.

A1 3 Shaded areas indicate spacings greater than 22.3 m. Care should be taken when spacing luminaires at the distances indicated by the shaded regions to ensure that conformance to Clause 4.3 is maintained. e.g. a square room with sides 22.3 m long is 500 m2 which is the maximum allowable coverage for a single luminaire.

4 These spacings are applicable for dual purpose exit signs only in accordance with Clause 4.5.

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TABLE F4

MAXIMUM SPACINGS FOR CLASS D CLASSIFICATION (BASED ON 1 lx)

Classification		Height, m														
		2.1	2.4	2.7	3.0	3.3	3.6	4.0	4.5	5.0	6.0	7.0	8.0	9.0	10.0	15.0	20.0
D	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D	1.25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D	1.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D	2.5	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D	3.2	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D	4	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D	5	3.4	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D	6.3	4.0	3.7	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D	8	4.6	4.4	4.2	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D	10	5.2	5.1	5.0	4.7	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D	12.5	5.8	5.8	5.7	5.6	5.3	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D	16	6.5	6.5	6.5	6.5	6.3	6.1	5.8	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D	20	7.1	7.2	7.3	7.3	7.2	7.1	6.9	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A
D	25	7.8	8.0	8.1	8.2	8.2	8.1	8.0	7.7	7.2	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A
D	32	8.6	8.8	9.0	9.1	9.2	9.2	9.2	9.0	8.8	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A
D	40	9.4	9.7	9.9	10.1	10.2	10.3	10.3	10.3	10.1	9.5	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A
D	50	10.2	10.5	10.8	11.0	11.2	11.4	11.5	11.5	11.5	11.1	10.3	0.0 [4]	0.0 [4]	N/A	N/A	N/A
D	63	11.1	11.5	11.8	12.1	12.3	12.5	12.7	12.9	13.0	12.8	12.3	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A
D	80	11.5	12.5	12.9	13.3	13.6	13.8	14.1	14.4	14.5	14.6	14.4	13.8	0.0 [4]	0.0 [4]	N/A	N/A
D	100	11.5	13.2	14.0	14.4	14.8	15.1	15.4	15.8	16.0	16.3	16.3	16.0	15.4	14.4	N/A	N/A
D	125	11.5	13.2	14.8	15.7	16.1	16.4	16.8	17.3	17.6	18.1	18.3	18.2	17.8	17.2	0.0 [4]	N/A
D	160	11.5	13.2	14.8	16.5	17.6	18.0	18.5	19.0	19.5	20.1	20.5	20.7	20.6	20.3	0.0 [4]	N/A
D	200	11.5	13.2	14.8	16.5	18.1	19.5	20.1	20.7	21.2	22.1	22.6	23.0	23.1	23.0	0.0 [4]	N/A
D	250	11.5	13.2	14.8	16.5	18.1	19.8	21.8	22.5	23.1	24.1	24.9	25.4	25.7	25.8	23.6	0.0 [4]
D	320	11.5	13.2	14.8	16.5	18.1	19.8	22.0	24.6	25.3	26.5	27.5	28.2	28.7	29.0	28.2	0.0 [4]
D	400	11.5	13.2	14.8	16.5	18.1	19.8	22.0	24.7	27.5	28.9	30.0	30.9	31.5	32.1	32.3	28.8
D	500	11.5	13.2	14.8	16.5	18.1	19.8	22.0	24.7	27.5	31.3	32.6	33.7	34.5	35.2	36.5	34.4
D	630	11.5	13.2	14.8	16.5	18.1	19.8	22.0	24.7	27.5	33.0	35.5	36.8	37.8	38.7	40.9	40.1
D	800	11.5	13.2	14.8	16.5	18.1	19.8	22.0	24.7	27.5	33.0	38.5	40.2	41.4	42.5	45.7	46.0

NOTES:

1 Maximum spacings for mounting heights between the values given in the Table may be obtained by interpolation.

2 Refer to AS/NZS 2293.3 for details regarding classification of luminaires.

A1 3 Shaded areas indicate spacings greater than 22.3 m. Care should be taken when spacing luminaires at the distances indicated by the shaded regions to ensure that conformance to Clause 4.3 is maintained, e.g. a square room with sides 22.3 m long is 500 m2 which is the maximum allowable coverage for a single luminaire.

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TABLE F5

MAXIMUM SPACINGS FOR CLASS E CLASSIFICATION (BASED ON 1 lx)

Classification		Height, m															
		2.1	2.4	2.7	3.0	3.3	3.6	4.0	4.5	5.0	6.0	7.0	8.0	9.0	10.0	15.0	20.0
E	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E	1.25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E	1.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E	2.5	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E	3.2	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E	4	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E	5	3.7	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E	6.3	4.1	4.1	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E	8	4.6	4.7	4.6	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E	10	5.0	5.2	5.2	5.2	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E	12.5	5.4	5.6	5.8	5.8	5.8	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E	16	5.8	6.1	6.4	6.5	6.6	6.6	6.4	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E	20	6.2	6.6	6.9	7.1	7.3	7.4	7.4	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A	N/A
E	25	6.6	7.0	7.4	7.7	7.9	8.1	8.2	8.2	8.0	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A
E	32	7.0	7.5	7.9	8.3	8.6	8.8	9.1	9.3	9.3	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A	N/A
E	40	7.3	7.9	8.4	8.8	9.2	9.5	9.9	10.2	10.4	10.3	0.0 [4]	0.0 [4]	N/A	N/A	N/A	N/A
E	50	7.7	8.3	8.8	9.3	9.8	10.2	10.6	11.1	11.4	11.7	11.4	0.0 [4]	0.0 [4]	N/A	N/A	N/A
E	63	8.0	8.7	9.3	9.9	10.4	10.8	11.4	11.9	12.4	13.0	13.1	0.0 [4]	0.0 [4]	0.0 [4]	N/A	N/A
E	80	8.3	9.1	9.8	10.4	11.0	11.5	12.1	12.8	13.4	14.2	14.7	14.7	0.0 [4]	0.0 [4]	N/A	N/A
E	100	8.7	9.5	10.2	10.9	11.5	12.1	12.8	13.6	14.3	15.3	16.1	16.5	16.5	16.1	N/A	N/A
E	125	8.9	9.8	10.6	11.4	12.1	12.7	13.5	14.4	15.1	16.4	17.4	18.0	18.4	18.4	0.0 [4]	N/A
E	160	9.0	10.2	11.1	11.9	12.6	13.3	14.2	15.2	16.1	17.6	18.8	19.7	20.4	20.8	0.0 [4]	N/A
E	200	9.0	10.3	11.4	12.3	13.1	13.9	14.9	16.0	16.9	18.7	20.1	21.2	22.1	22.8	0.0 [4]	N/A
E	250	9.0	10.3	11.6	12.7	13.6	14.5	15.5	16.7	17.8	19.7	21.3	22.7	23.8	24.7	25.8	0.0 [4]
E	320	9.0	10.3	11.6	12.9	14.1	15.0	16.2	17.5	18.7	20.8	22.6	24.2	25.6	26.7	29.5	0.0 [4]
E	400	9.0	10.3	11.6	12.9	14.2	15.4	16.7	18.1	19.4	21.8	23.8	25.6	27.2	28.5	32.6	32.1
E	500	9.0	10.3	11.6	12.9	14.2	15.4	17.2	18.8	20.2	22.7	25.0	27.0	28.7	30.3	35.5	36.9
E	630	9.0	10.3	11.6	12.9	14.2	15.4	17.2	19.3	20.9	23.7	26.2	28.3	30.3	32.1	38.4	41.3
E	800	9.0	10.3	11.6	12.9	14.2	15.4	17.2	19.3	21.4	24.6	27.3	29.7	31.9	33.9	41.4	45.5

NOTES:

1 Maximum spacings for mounting heights between the values given in the Table may be obtained by interpolation.

2 Refer to AS/NZS 2293.3 for details regarding classification of luminaires.

A1 3 Shaded areas indicate spacings greater than 22.3 m. Care should be taken when spacing luminaires at the distances indicated by the shaded regions to ensure that conformance to Clause 4.3 is maintained, e.g. a square room with sides 22.3 m long is 500 m2 which is the maximum allowable coverage for a single luminaire.

4 These spacings are applicable for dual purpose exit signs only in accordance with Clause 4.5.

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APPENDIX G

INFORMATION REQUIRED FOR MAINTAINING THE SYSTEM

(Informative)

G1 SCOPE

This Section sets out the information which should be supplied to facilitate the correct operation and maintenance of emergency lighting and exit signage systems.

NOTE: AS/NZS 2293.2 specifies the periodic inspection and maintenance procedures which should be conducted.

G2 OPERATING AND MAINTENANCE MANUAL

G2.1 Provision of a manual

An operating and maintenance manual should be provided for each emergency lighting and exit sign system and should contain the following:

(a) Baseline data including the designation and date of the standard the emergency lighting and exit sign system was designed to and the building classification as defined in the NCC.

(b) The data required to carry out the maintenance procedures specified in AS/NZS 2293.2:2018.

(c) The information required by Clauses G2.2 to G2.5, as appropriate.

(d) A list of the relevant activities from Appendix A of AS/NZS 2293.2:2018 for the guidance of maintenance personnel.

The operating and maintenance manual should be readily accessible. The operating and maintenance manual should be one, or a combination of, the following forms:

(i) Electronic.

(ii) Hard copy data and information with a durable cover.

G2.2 Information relating to central systems

For central systems, the operating and maintenance manual should contain the following information:

(a) *Battery data* Battery voltage, number and ampere hour rating of cells.

(b) *Battery charger data* Basic connection diagram; detailed description of operation; float and boost charge voltage settings and available ranges together with data on appropriate temperature compensation; rated maximum charging current; operation and adjustment procedures; recharge time at available boost charge voltages and currents; alarm settings; and a list of recommended spares.

(c) *Inverter data* Basic connection diagram; detailed description of operation; rated d.c. input voltage range; rated a.c. output voltage and specified tolerances; rated maximum output current; operation and maintenance procedures; alarm settings; and a list of recommended spares.

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(d) *Installation data* As installed plans showing the location of all emergency lighting and exit signage equipment including emergency luminaires and exit signs, their supply circuits, all submains cable routes, and luminaire/exit sign and lamp details. Each emergency luminaire and exit sign shown should list its identification label for identification purposes and a legend should be included to identify the type of luminaire or exit sign. Alternatively, a detailed schedule listing the required information may be supplied in lieu of installation plans. Each emergency luminaire and exit sign shown should list its unique identifier, for identification purposes, and a legend should be included to identify the type of luminaire or exit sign.

NOTE: Attention is drawn to AS 3702 which sets out a coordinated system for the designation of electrical equipment in diagrams, charts, tables and the like.

(e) *Wiring diagrams* As installed circuit diagrams covering the entire emergency lighting and exit signage installation external to the battery charger and inverter panels. These diagrams should show cable sizes, circuit breaker or fuse ratings, relay or contactor ratings and the total emergency lighting maximum demand.

G2.3 Information relating to single point systems

For single point systems, the operating and maintenance manual should contain the following information:

(a) *Installation data* As installed plans showing the location of all self-contained emergency luminaires and exit signs, and their supply circuits. Each emergency luminaire and exit sign shown should list its unique identifier, for identification purposes, and a legend should be included to identify the type of luminaire or exit sign. Alternatively, a detailed schedule listing the required information may be supplied in lieu of installation plans.

NOTE: Attention is drawn to AS 3702 which sets out a coordinated system for the designation of electrical equipment in diagrams, charts, tables and the like.

(b) *Connection diagram* As-installed circuit diagrams showing the typical external connections for each type of self-contained emergency luminaire and exit sign.

(c) *Luminaire data* Full technical data including lamp information for each type of self-contained emergency luminaire and exit sign.

G2.4 Additional information relating to automatic discharge testing systems

Where facilities are provided for automatic discharge testing, the operating and maintenance manual should contain the following information:

(a) The location of any control and indicating panels, if applicable.

(b) Details of the operation of the system, including the meanings given to the indications of system status that are provided.

(c) Where a centralized system of control is used, identification of the association between individual emergency luminaires and exit signs and the controllers to which they are connected.

G2.5 Additional information relating to indirect lighting systems

The reflectances of the major reflecting surfaces (e.g. walls, ceilings) on which the design of the indirect lighting system is based shall be recorded for reference in subsequent maintenance checks in accordance with AS/NZS 2293.2.

G3 PROVISION FOR THE RECORDING OF MAINTENANCE

The installer of the emergency lighting and exit sign system should provide a mechanism for the recording of the commissioning and associated testing records. The records may be in one of the following forms:

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(a) Electronic.

(b) A log book with a durable cover.

(c) Printed records held securely within a durable cover.

(d) An alternative system approved by the regulatory authority.

Provision should be made to enter—

(i) all details which are required to be logged in accordance with Section 2 or Section 3 of AS/NZS 2293.2:2018, as appropriate;

(ii) any corrective action taken; and

(iii) the name(s) and contact detail of person(s) and entity(s) responsible for carrying out the maintenance activities and the date the activity was undertaken.

Where automatic discharge test facilities are incorporated, provision should be made for the recording of the expected date of the next discharge test.

The logbook or alternative records system should be readily accessible.

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BIBLIOGRAPHY

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2676 Guide to the installation, maintenance, testing and replacement of secondary batteries in buildings
2676.1 Part 1: Vented cells
2676.2 Part 2: Sealed cells

3702 Item designation in electrotechnology

3731 Stationary batteries—Nickel-cadmium
3731.1 Part 1: Vented type
3731.2 Part 2: Valve-regulated type

4029 Stationary batteries—Lead-acid
4029.1 Part 1: Vented type
4029.3 Part 3: Pure lead positive pasted plate type

AS/NZS
1158 Lighting for roads and public spaces—Tunnels and underpasses
1158.5 Part 5: Tunnels and underpasses

1680 Interior and workplace lighting
1680.1 Part 1: General principles and recommendations

3012 Electrical installations—Construction and demolition sites

4029 Stationary batteries—Lead-acid
4029.2 Part 2: Valve-regulated type

ISO
3864 Graphical symbols—Safety colours and safety signs
3864-1 Part 1: Design principles for safety signs and safety markings
A1 | 3864-4 Part 4: Colorimetric and photometric properties of safety sign materials

7010 Graphical symbols—Safety colours and safety signs—Registered safety signs

Related documents for further information

AS
1170 Structural design actions
1170.4 Part 4: Earthquake actions in Australia

1735 Lift, escalators and moving walks (series)

2118 Automatic fire sprinkler systems (series)

3826 Strengthening existing buildings for earthquake

62040 Uninterruptible power systems (UPS)
62040.1.2 Part 1.2: General and safety requirements for UPS used in restricted access locations

AS/NZS
2785 Suspended ceilings—Design and installation

NZS
1170 Structural design actions
1170.5 Part 5: Earthquake actions—New Zealand

4219 Seismic performance of engineering systems in buildings

6104 Specification for emergency electricity supply in buildings

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AMENDMENT CONTROL SHEET

AS/NZS 2293.1:2018

Amendment No. 1 (2021)

REVISED TEXT

SUMMARY: This Amendment applies to the Preface, Clauses 2.3.3, 3.2.2, 3.3.1, 4.8.2, 7.4.3, D3.5.2, Figures 1.1, 4.2, 4.3, C3, C5, C8, Tables D1 (new), E1, E2, E3, E4, E5, F1, F2, F3, F4, F5, Appendix A and Bibliography.

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