

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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Electrical Trades Union
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This Standard was issued in draft form for comment as DR AS/NZS 2293.1:2018.

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*.

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to specify updated installation requirements and adapt the Standard to current technologies, terminologies and delete out of date references or methods.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.
- (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 luminaires 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 luminaires including modern LEDs do not produce light beyond their assessed geometric limitation and therefore may not achieve a the current minimum at all points on the floor.

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 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.

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'.

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.

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]

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.

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: IEC 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

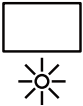
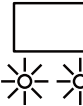
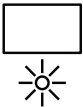
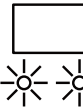
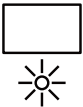
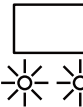
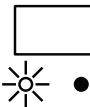
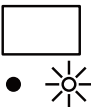
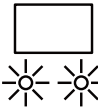
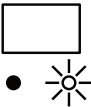
Alternative name for a combined, non-maintained emergency luminaire (refer to Clause 1.5.8 and Figure 1.1).

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.

EMERGENCY LUMINAIRE TYPE	NORMAL OPERATION (i.e. MAINS OPERATING)	EMERGENCY OPERATION (i.e. MAINS FAILED)
NON-MAINTAINED (CLAUSE 1.5.35)	 or 	 or 
MAINTAINED (CLAUSE 1.5.31)	 or 	 or 
COMBINED NON-MAINTAINED (i.e. 'SUSTAINED') (CLAUSES 1.5.8 AND 1.5.47)		
COMBINED MAINTAINED (CLAUSES 1.5.8, 1.5.9 AND 1.5.31)		

LEGEND:

- = Non-energized lamp
- ☀ = Energized lamp

FIGURE 1.1 EXAMPLES OF EMERGENCY LUMINAIRE CONNECTION 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.

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.

- (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.

2.3.3 Sensing 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.

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

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.

Visual indication of battery charger operation shall be provided. The indicator shall be—

- (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; and
- (c) located in a position which will be visible when mounted in any designed attitude or adjacent to the test switch where the control gear is remote mounted.

It is permissible to use this indicator to display additional information—for example, by flashing.

3.3 REQUIRED DISCHARGE TEST FACILITIES

3.3.1 General

Facilities shall be provided for conducting a discharge test on all emergency luminaires and exit signs without necessitating disconnection of supply to the normal lighting. Such facilities shall be either manually operated or automatically operated and shall conform to the requirements of Clause 3.3.2 or Clause 3.3.3, as applicable.

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.

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.

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 m².

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.

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.

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.