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Emergency lighting –

Part 1: Code of practice for the emergency lighting of premises

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Contents

List of tables

Summary of pages

This document comprises a front cover, an inside front cover, pages i to vi, pages 1 to 64, an inside back cover and a back cover.

Foreword

Publishing information

This part of BS 5266 is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 31 May 2016. It was prepared by Subcommittee EL/1/1, *Emergency lighting*, under the authority of Technical Committee EL/1, *Light and lighting applications*. A list of organizations represented on these committees can be obtained on request to their secretary.

Supersession

This part of BS 5266 supersedes BS 5266-1:2011, which is withdrawn.

Relationship with other publications

This part of BS 5266 is intended for use in conjunction with BS EN 1838 and BS EN 50172.

BS EN 50172:2004, **4.1** specifies compliance with the wiring rules given in HD 384/HD 60364. The UK applicable parts of HD 384/HD 60364 are implemented in the IET Wiring Regulations (BS 7671).

BS 5266 is published in the following parts:

- Part 1: *Code of practice for the emergency lighting of premises*;
- Part 2: *Code of practice for electrical low mounted way guidance systems for emergency use;*
- Part 4: *Code of practice for design, installation, maintenance and use of optical fibre systems*;
- Part 5: *Specification for components parts of optical fibre systems*;
- Part 6: *Code of practice for non-electrical low mounted way guidance systems for emergency use – Photoluminescent systems*;
- Part 8: *Emergency escape lighting systems (also numbered BS EN 50172).*

The following topics are covered in BS EN 50172 and BS EN 1838:

- general requirements for emergency escape lighting;
- escape route lighting;
- open area (anti-panic) lighting;
- high risk task area lighting;
- standby lighting.

Detailed guidance on fire risk assessments is given in PAS 79, in a series of guides published by the Department for Communities and Local Government [1–11], and in guidance published by the Justice Department of the Scottish Government [12–21].

Guidance on risk assessments for health and safety is given in HSE publication INDG 163 [22].

A summary of the hierarchy of standards covering the different aspects of emergency lighting systems is given in Annex A.

Information about this document

This is a full revision of the standard. The principal change introduced is an expansion of the scope to cover emergency safety lighting and standby lighting, as well as emergency escape lighting.

The aim of this standard is to promote wider understanding of the different types of emergency lighting system which may be employed, and to give guidance on their correct application to the varied requirements of different categories of premises.

The recommendations given in this standard have been drawn up to encourage uniformity of application, based on providing adequate safety to people in the event of interruption of the normal lighting, and having due regard to the hazard level and degree of familiarity of occupants with particular premises. The standard recognizes that, in addition to ensuring safe unobstructed means of escape from the premises at all times, an important function of emergency lighting is to make possible the immediate location and operation of fire alarm call points and fire-fighting equipment, and another is to minimize the chance of panic arising in enclosed spaces, such as lifts. Although the standard makes recommendations for the provision of emergency lighting in a wide variety of premises, the fact that particular types of premises are mentioned in Clause **9** does not necessarily mean that all such premises are required by law to have emergency lighting installed. For certain types of premises, the provisions of this standard might be supplemented or replaced by alternative requirements at the discretion of the enforcing authority.

Use of this document

As a code of practice, this part of BS 5266 takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

Any user claiming compliance with this part of BS 5266 is expected to be able to justify any course of action that deviates from its recommendations.

BSI permits the reproduction by individual users of BS 5266-1:2016, Figures H.1, H.2, H.3, H.4, I.1, I.2, K.1, K.2, M.1, M.2 and M.3. This reproduction is only permitted where it is necessary for the user to use the sample certificates given in the figures during each application of the standard.

Presentational conventions

The provisions in this standard are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is “should”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. “organization” rather than “organisation”).

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

Particular attention is drawn to legal requirements in respect of emergency lighting. Further guidance is given in the Building Regulations 2010, Approved Document B [23] and its equivalents in Wales [24], Scotland [25] and Northern Ireland [26].

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Introduction

UK legislation imposes a duty on persons, including employers and other persons with control of premises, to carry out risk assessments and to take such precautions as to ensure as far as reasonably practicable the safety of the occupants. These measures include the provision of safe means of escape, including emergency escape routes and exits, together with, where necessary, signs indicating them. Legislation also states that suitable and sufficient emergency lighting needs are to be provided, where people are particularly exposed to danger, in the event of failure of the supply to the normal lighting.

There is increasing recognition of the application of emergency lighting to assist the safety of occupants who stay in a building during a mains supply failure. In many instances, particularly in places with frequently occurring power cuts, it might not be necessary or appropriate to evacuate the premises in the event of failure of the supply to the normal lighting, but precautions need to be taken to enable occupants to remain on the premises in safety. This revised edition of the standard covers the use of emergency lighting in premises that are not evacuated immediately, as well as conventional emergency escape lighting. Some guidance on new developments in emergency lighting application and technology is given in Annex B.

Emergency lighting can perform the following functions, some of which can be combined into a single system:

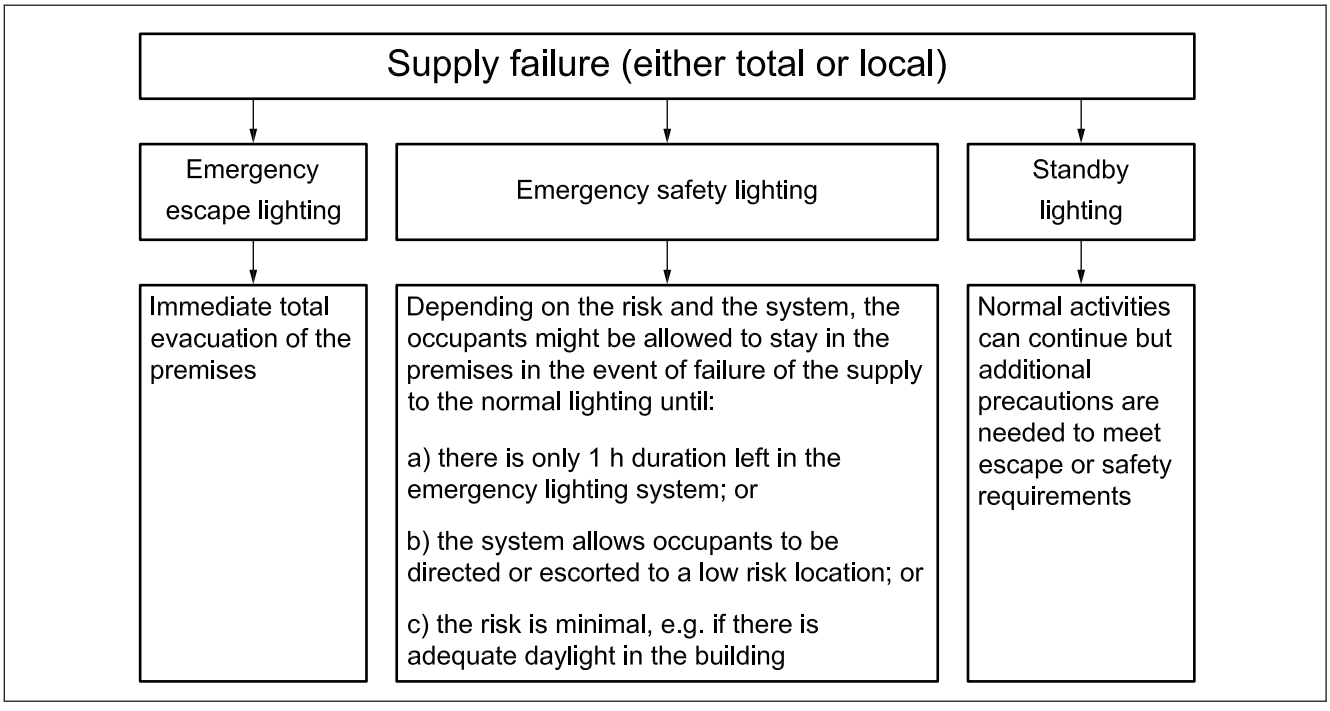
a) emergency escape lighting, which provides illumination of escape routes, signs and points of emphasis to assist occupants to evacuate the premises;

b) emergency safety lighting, which provides lighting for safe movement in the premises when the occupants need not evacuate the premises immediately;

c) standby lighting, powered by an alternative power supply, which provides sufficient lighting to operate the premises normally in the event of a total failure of the main power supply.

The different types of emergency lighting are illustrated in Figure 1. Guidance on the application of emergency lighting systems is given in Annex C.

Figure 1 **Types of emergency lighting**



1 Scope

This part of BS 5266 gives recommendations and guidance on the factors that need to be taken into account in the design, installation and wiring of electrical emergency lighting systems, in order to provide the lighting performance needed for safety of people in the building in the event of failure of the supply to the normal lighting.

This British Standard applies to emergency lighting systems used to:

a) assist occupants to leave a building during an emergency;

b) help protect occupants if they stay in a building during an emergency;

c) help occupants to continue normal operations in the event of failure of the supply to the normal lighting.

This part of BS 5266 also gives recommendations for lighting in areas with fixed seating.

This part of BS 5266 is not applicable to dwellings; however, its provisions are applicable to common access routes within blocks of flats or maisonettes.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 4678-4, *Cable trunking – Part 4: Specification for cable trunking made of insulating material*

BS 5499-4:2013, *Safety signs – Part 4: Code of practice for escape route signing*

BS 5499-10:2014, *Guidance for the selection and use of safety signs and fire safety notices*

BS 7273-4, *Code of practice for the operation of fire protection measures – Part 4: Actuation of release mechanisms for doors*

BS 7629-1, *Electric cables – Specification for 300/500 V fire resistant, screened, fixed installation cables having low emission of smoke and corrosive gases when affected by fire – Part 1: Multicore cables*

BS 7846, *Electric cables – Thermosetting insulated, armoured, fire-resistant cables of rated voltage 600/1 000 V for fixed installations, having low emission of smoke and corrosive gases when affected by fire – Specification*

BS 8434-2, *Methods of test for assessment of the fire integrity of electric cables – Part 2: Test for unprotected small cables for use in emergency circuits – BS EN 50200 with 930 deg flame and with water spray*

BS 8519, *Selection and installation of fire-resistant power and control cable systems for life safety and fire-fighting applications – Code of practice*

BS 8592, *Electric cables – Thermosetting insulated, non-armoured, fire-resistant, single core non-sheathed cables of rated voltage 450/750 V, having low emission of smoke and corrosive gases when affected by fire – Specification*

BS EN 81-20, *Safety rules for the construction and installation of lifts – Lifts for the transport of persons and goods – Part 20: Passenger and goods passenger lifts*

BS EN 1838, *Lighting applications – Emergency lighting* [1)]

BS EN 50171, *Central power supply systems* [2)]

BS EN 50172 (BS 5266-8), *Emergency escape lighting systems* [3)]

BS EN 50200:2015, *Method of test for resistance to fire of unprotected small cables for use in emergency circuits*

BS EN 60529, *Degrees of protection provided by enclosures (IP code)*

BS EN 60598-2-22:2014, *Luminaires – Part 2-22: Particular requirements – Luminaires for emergency lighting*

BS EN 60702-1, *Mineral insulated cables and their terminations with a rated voltage not exceeding 750 V – Part 1: Cables*

BS EN 60702-2, *Mineral insulated cables and their terminations with a rated voltage not exceeding 750 V – Part 2: Terminations*

BS EN 61386 (all parts), *Conduit systems for cable management*

BS EN ISO 7010:2012+A5:2015, *Graphical symbols – Safety colours and safety signs – Registered safety signs*

BS ISO 3864-4:2011, *Graphical symbols – Safety colours and safety signs – Part 4: Colorimetric and photometric properties of safety sign materials*

IEC 60331-3, *Tests for electric cables under fire conditions – Circuit integrity – Part 3: Test method for fire with shock at a temperature of at least 830 °C for cables of rated voltage up to and including 0,6/1,0 kV tested in a metal enclosure*

3 Terms and definitions

For the purposes of this part of BS 5266, the terms and definitions given in BS EN 1838, BS EN 50171, BS EN 50172, BS EN 60598-2-22:2014 and the following apply.

3.1 borrowed light
light obtained from an adjacent reliable source that is expected to be available at all material times

NOTE For example, from a local emergency luminaire.

3.2 centrally supplied emergency luminaire
luminaire for maintained or non-maintained operation which is energized from a central emergency power system that is not contained within the luminaire

[SOURCE: BS EN 60598-2-22:2014, **22.3.9**]

3.3 competent person
person with the relevant current training and experience, and with access to the requisite tools, equipment and information, and capable of carrying out a defined task

3.4 emergency exit
way out that is used during an emergency

[SOURCE: BS EN 50172:2004, **3.8**]

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1) This part of BS 5266-1 also gives informative references to BS EN 1838:2013.
2) This part of BS 5266-1 also gives an informative reference to BS EN 50171:2001.
3) This part of BS 5266-1 also gives an informative reference to BS EN 50172:2004.

3.5 emergency escape lighting
that part of emergency lighting that provides illumination for the safety of people leaving a location or attempting to terminate a potentially dangerous process before doing so

[SOURCE: BS EN 1838:2013, **3.3**]

3.6 emergency lighting
lighting provided for use when the supply to the normal lighting fails

[SOURCE: BS EN 1838:2013, **3.1**]

3.7 emergency safety lighting
that part of emergency lighting that provides illumination for the safety of people staying in a premises when the supply to the normal lighting fails

3.8 escape route
route designated for escape to a place of safety in the event of an emergency

[SOURCE: BS EN 50172:2004, **3.2**]

3.9 final exit
terminal point of an escape route

[SOURCE: BS EN 50172:2004, **3.9**]

3.10 high risk task area lighting
that part of emergency escape lighting that provides illumination for the safety of people involved in a potentially dangerous process or situation and to enable proper shut-down procedures for the safety of the operator and other occupants of the premises

[SOURCE: BS EN 1838:2013, **3.6**]

3.11 maintained emergency luminaire
luminaire in which emergency lighting lamps are energized at all times when normal or emergency lighting is required

[SOURCE: BS EN 60598-2-22:2014, **22.3.5**]

3.12 material times
times at which the premises are occupied

3.13 non-maintained emergency luminaire
luminaire in which the emergency lighting lamps are in operation only when the supply to the normal lighting fails

[SOURCE: BS EN 60598-2-22:2014, **22.3.6**]

3.14 open area lighting
that part of emergency escape lighting provided to avoid panic and provide illumination allowing people to reach a place where an escape route can be identified

Note 1 to entry: In some countries this is known as anti-panic lighting.

[SOURCE: BS EN 1838:2013, **3.5**]

3.15 place of safety
place in which persons are in no danger

[SOURCE: BS EN 50172:2004, **3.5**]

3.16 responsible person
delegated individual who is responsible for the provision and operation of appropriate emergency escape lighting

NOTE This might not necessarily be the same as the responsible person as defined in the Regulatory Reform (Fire Safety) Order 2005 [27].

3.17 sign height
diameter of a circular geometric shape or height of a rectangular or triangular geometric shape

[SOURCE: BS ISO 3864-1:2011, **3.13**]

3.18 standby lighting
that part of emergency lighting provided to enable normal activities to continue substantially unchanged

[SOURCE: BS EN 1838:2013, **3.7**]

4 Consultation and records

4.1 Consultation

Consultation between the responsible person, the owner/developer and/or occupier of the premises, the architect, the lighting engineer, the installation contractor, the enforcing authorities (e.g. the building control body), the electricity supplier/distributor and any others concerned, should be arranged at a very early stage.

The consultation stage should define the way in which the system is intended to operate, including information as to whether the premises are to be evacuated immediately in the event of failure of the supply to the normal lighting, or whether occupants are likely to stay in the building.

If a "stay put" strategy is agreed as part of the emergency plan for the premises, procedures for maintaining safety should be determined, including:

a) actions to be taken as the end of emergency duration approaches;

b) how to warn the occupants if they then need to evacuate the premises;

c) how to direct or escort the occupants to safe refuges, if these are to be used.

Appropriate testing procedures should be agreed that meet the recommendations in Clause **12** and are suitable for the premises.

Other relevant factors, such as the areas and types of premises to be covered, the numbers and location of occupants and the location of exit routes, should be given to the system designer.

An assessment should be made of potential risks to occupants in a building that could occur in the event of failure of the supply to the normal lighting, and suitable compensating safety provisions should be determined.

NOTE 1 Some guidance on developments in emergency lighting application and technology, which might assist in determining the most appropriate design option, is given in Annex B.

NOTE 2 There might be statutory requirements and/or local conditions that apply to the premises in question, including the need for a risk assessment (see Introduction).

NOTE 3 It is strongly advised that in premises where occupants are expected to stay in place through a supply failure, an automatic test system is used.

NOTE 4 Where the escape route leaves the building, the escape route may continue to a place of safety.

4.2 Supply of plans

Plans of the premises should be available at an early stage to assist the consultation stage and system design. These should include:

a) escape routes;

b) open areas;

c) high risk task areas;

d) safety equipment, including fire safety equipment, safety signs and any other aspects identified by risk assessment;

e) details of normal lighting and its control system.

*NOTE The supply of plans is specified in BS EN 50172:2004, **5.1**.*

4.3 Records

Records of the emergency lighting system should be kept, including the location and type of emergency lighting system components, e.g. luminaires, test devices and any central power units.

Copies of these records should be passed to the responsible person to assist with future investigations, and to assist in the design of any extensions or modifications to the premises or the emergency lighting system.

*NOTE 1 The supply of drawings and log book is specified in BS EN 50172:2004, **6.1**.*

NOTE 2 Records need to be archived in an electronic format wherever possible.

5 Illumination for emergency lighting conditions

*COMMENTARY ON CLAUSE **5***

The safe movement of people along escape routes towards and through the exits provided to a place of safety depends upon the illumination and the ability to see hazards, changes of level and direction.

The stimulus for vision is not the light which falls on objects but the light reflected to the eyes. Different objects are distinguished by contrast of the changes in light reflected to the eyes. A light coloured object on a dark background can be made conspicuous with far less light than a dark coloured object on a dark background.

The amount of light falling on an object (illuminance) is affected not merely by the power and position of the lamps used for illumination, but also by reflection from the surroundings. In many interior spaces, a high proportion of the light falling on any surface comes from the light sources reflected by other surfaces in the room. Where the walls, floor and ceiling are light in colour, up to 60% of the illuminance at floor level might have been reflected from the walls or ceiling.

In a room where the decorative finishes are dark in colour (i.e. have low reflectance), the contribution of reflected light to the illuminance is much smaller. The reflected light might be negligible in, say, a club or restaurant, where the carpets, walls and ceiling have been deliberately kept dark in colour to produce a feeling of intimacy and relaxation.

In restricted spaces such as corridors, light coloured decoration throughout is an advantage. Prominent edges to vertical surfaces at changes of direction can assist emergency evacuation.

All potential obstructions or hazards on an escape route need to be light in colour with contrasting surround. Such hazards include the nosings of stair treads, barriers and walls at right angles to the direction of movement.

5.1 General

For all premises offering escape or safety protection, the building should be protected in accordance with BS EN 1838 and the relevant recommendations given in BS 5266-1.

5.2 Illumination for safe escape – Emergency escape lighting

*COMMENTARY ON **5.2***

Visual acuity varies considerably from one person to another with regard to the amount of light required to perceive an object clearly and the time taken to adapt to changes in the illuminance (visual adaptation). In general, older people, and those with impaired vision, need more light to follow an escape route and have longer visual adaptation times.

The maximum period which needs to be allowed to elapse between failure of the normal supply and the switch-on of the emergency lighting depends upon:

a) whether panic could arise amongst a significant number of people, which in turn depends upon factors such as the type of building and the people themselves (knowledge, training, physical and mental conditions); and

b) the time taken to adapt to the new, and normally much lower, illuminance provided by the emergency lighting.

The illuminances in this standard have been determined from experience and practical test.

Further guidance is given in BRE Information Paper 9/97 [28], which identifies conditions that benefit from a minimum illuminance of 3 lx on the centre line of the escape route.

Guidance on the application of emergency lighting systems is given in Annex C.

5.2.1 General

In the event of a failure of the supply to the normal lighting, emergency escape lighting should be available to assist occupants to evacuate a building safely by:

a) locating and identifying exit signs at doors and escape route direction signs;

b) using the escape routes;

c) conducting safety measures prior to evacuation, such as shutting equipment down safely or checking that all personnel have vacated the premises.

The duration of the emergency escape lighting should include time to evacuate disabled occupants or to release anyone trapped in a lift.

If evacuation is not immediate in the event of a failure of the supply to the normal lighting, emergency safety lighting should be provided in accordance with **5.3**, as well as standby lighting in accordance with **5.4**.

5.2.2 Design conditions

The recommended illuminances that are given as a minimum (escape routes and open areas) or average (high risk task areas) should be regarded as the lowest value acceptable during the rated duration, taking into account the effects of reduction in voltage, voltage drop in the system wiring, battery ageing, lamp ageing and the accumulation of dirt and dust.

Calculations of illuminance should be made ignoring reflectance. However, with lighting systems such as indirect luminaires and uplights, where the luminaire works in conjunction with a reflecting surface, the first reflection should be taken as the direct light output and subsequent reflections should be ignored.

NOTE 1 Guidance on the measuring of illuminance of emergency lighting is given in Annex D.

NOTE 2 Further guidance on design can be found in CIBSE/SLL publication LG 12 [29] and BS EN 1838:2013.

5.2.3 Uniformity and diversity of illuminance

Care should be taken to avoid abrupt variation between excessively bright and dark areas on the floor of the escape route and open areas, and the locations of high risk hazards.

NOTE Uniformity and diversity of illuminance are specified in BS EN 1838:2013.

5.2.4 Disability glare

High luminous intensity emergency luminaires can interfere with observation of emergency exit signs, routes and obstructions (disability glare), so such luminaires should be located at least 30° out of direct line of sight when observing the escape route. Directional luminaires should be directed such that they do not cause disability glare.

NOTE Limitation of disability glare is specified in BS EN 1838:2013.

5.2.5 Defined escape routes

To assist escape routes to be used at all times, the horizontal illuminance on the floor along the centre line of an escape route up to 2 m in width should be not less than 1 lx.

*NOTE 1 Illuminances, including the provision of appropriate illuminance near each exit door and other positions to be emphasized, and response times, are specified in BS EN 1838:2013, **4.2.1**.*

NOTE 2 Some existing installations might have been engineered to a previous minimum of 0.2 lx along the centre line of an escape route. These installations need to be reviewed to check that their illumination level continues to be acceptable for the application.

5.2.6 Open areas

Rooms with a floor area greater than 60 m^2, or those having been risk assessed as needing emergency lighting, should be provided with horizontal illuminance of not less than 0.5 lx at the floor level of the area, excluding a border of 0.5 m around the perimeter.

NOTE 1 Illuminances for open areas are given in BS EN 1838:2013.

NOTE 2 Typical factors for consideration in a risk assessment are underground or windowless areas, high levels of occupancy, an escape route passing through the area or the need to switch off other equipment before leaving.

NOTE 3 Figure 2 shows an example of areas requiring emergency lighting.

5.2.7 High risk task areas

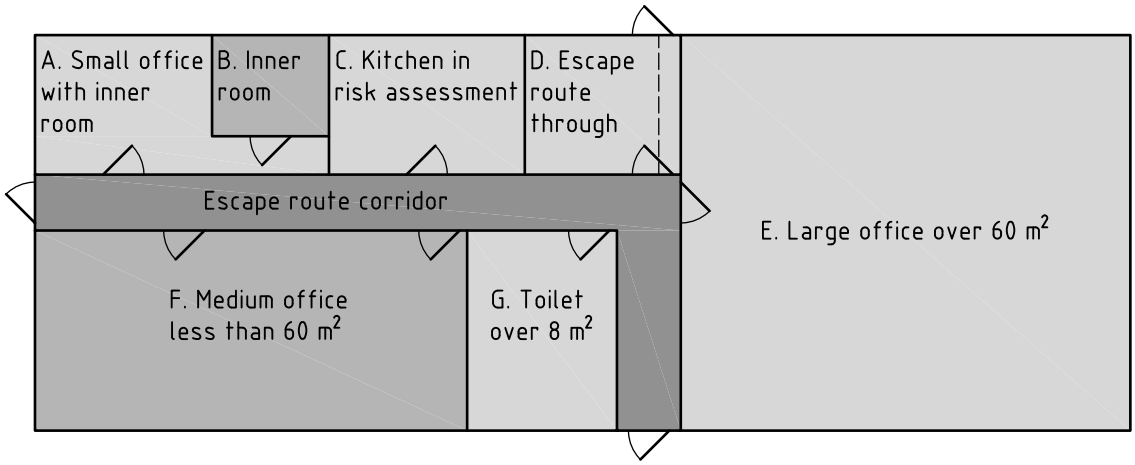
If emergency escape lighting is required to provide illumination for the safety of people involved in a potentially dangerous process or situation, and to enable proper shut-down procedures for the safety of the operator and other occupants, the illuminance value should be not less than 10% of the average of the normal lighting at the location of the point of the risk.

NOTE 1 Some activities might need considerably higher illuminances than the minimum value. Requirements for high risk task area lighting are specified in BS EN 1838:2013.

Because the presence of dangerous processes makes the initial period important, the time taken for the full emergency escape lighting to activate should be not more than 0.5 s.

NOTE 2 Guidance on appropriate levels for activities that need to be terminated but are not assessed as potentially dangerous is given in Annex E.

Figure 2 **Example of rooms requiring emergency lighting**



Key

Area	Dimensions	Function and relevant considerations	Emergency lighting needed
Escape route	(2 × 17) m	Corridor leading to exits; luminaires required at change of direction, exits and outside building to place of safety	Yes
Room A with inner room	(3 × 9) m = 27 m²	Small office in which the office becomes the escape route of the inner room and needs emergency lighting	Yes
Room B	(2 × 4) m = 8 m²	Inner room with no risks	No
Room C	(3 × 4) m = 12 m²	Kitchen needing emergency lighting in the risk assessment for the premises	Yes
Room D	(3 × 4) m = 12 m²	Small office, escape route passes through this open area	Yes
Room E	(10 × 8) m = 80 m²	Main office larger than 60 m² floor area	Yes
Room F	(5 × 11) m = 55 m²	Medium office smaller than 60 m² floor area	No
Room G	(5 × 6) m = 30 m²	Toilet larger than 8 m² floor area	Yes

5.2.8 Siting of luminaires

*COMMENTARY ON **5.2.8***

Emergency lighting luminaires not only provide illumination, but their presence acts as beacons over points of emphasis of both safety equipment and hazard points in the building. Consequently, their physical location is important both for the use of the escape route and for safe occupation prior to evacuation.

*Subclause **5.2.8.1** gives general recommendations for siting of luminaires, and subclauses **5.2.8.2** to **5.2.8.7** give recommendations for siting of luminaires in specific locations. Other hazards might be present in locations where activities that are safe with normal mains illumination can be a risk in a supply failure and activities need to be illuminated prior to evacuation. Typical levels of emergency lighting for such hazards are given in Annex E.*

5.2.8.1 General

Siting and illuminance levels of emergency escape lighting luminaires should be in accordance with BS EN 1838.

Emergency escape lighting should be provided in escape routes, open areas, high risk task areas, and points of emphasis including:

a) near (see Note 1) each exit door intended to be used in an emergency;

b) near (see Note 1) stairs so that each flight of stairs receives direct light;

c) near (see Note 1) any other change in level;

d) externally illuminated escape route signs, escape route direction signs and other safety signs needing to be illuminated under emergency lighting conditions;

e) at each change of direction (see Note 2);

f) at each intersection of corridors (see Note 2);

g) near (see Note 1) to each final exit and outside the building to a place of safety;

h) near (see Note 1) each first aid post;

i) near (see Note 1) each piece of fire-fighting equipment and call point;

j) near (see Note 1) escape equipment provided for disabled people;

k) near (see Note 1) refuges and call points, including two-way communication systems and disabled toilet alarm call position;

l) near (see Note 1) manual release controls provided to release electronically locked doors as recommended in BS 7273-4.

NOTE 1 For the purpose of this subclause, "near" is normally considered to be within 2 m measured horizontally.

NOTE 2 For the purpose of this subclause, "at" means that the emergency luminaire would illuminate in both directions at the change of direction or intersection.

5.2.8.2 External areas in the immediate vicinity of exits

Emergency illumination should be provided outside the building and near to each final exit. If occupants have to travel to reach a place of safety, this route should form an integral part of the escape route.

NOTE Illumination of these areas is specified in BS EN 1838:2013 and BS EN 50172.

Existing installations might have used external street lighting to illuminate external exits. These applications should be reassessed to confirm whether the street lights will still be illuminated at all times the premises is in use; if they will not, alternative arrangements should be made.

5.2.8.3 Evacuation lift cars

Emergency illumination within evacuation lift cars should be provided as specified in BS EN 81-20.

NOTE BS 9999 gives guidance on lifts used as a means of escape.

5.2.8.4 Moving stairways and walkways

Moving stairways and walkways should be illuminated as if they were part of an escape route.

5.2.8.5 Toilet facilities and changing rooms

Facilities for use by disabled people, and/or any multiple closet facilities without borrowed light, should have emergency illumination from at least one luminaire.

All facilities exceeding 8 m^2 gross area should be provided with emergency lighting as if they were open areas (see **5.2.6**).

NOTE Provision of emergency lighting in accordance with this subclause does not necessitate the provision of emergency lighting in toilets designed to accommodate only a single able-bodied person, or in en suite toilets or bathrooms in hotel bedrooms.

5.2.8.6 Motor generator, control, plant and switch rooms

Emergency lighting should be provided for all motor generator rooms, control rooms, plant rooms and switch rooms, and adjacent to main control equipment associated with the provision of normal and emergency lighting to the premises.

Where motor generators are used for emergency lighting, battery-powered emergency luminaires should be provided in the vicinity of the control gear to allow for start-up time.

5.2.8.7 Covered car parks

Pedestrian escape routes from covered and multi-storey car parks should be provided with emergency lighting. The risk assessment should identify the extent and location of the pedestrian escape route.

5.2.9 Safety signs

5.2.9.1 Escape route signs

5.2.9.1.1 General

Escape route signs should be located and operated in accordance with BS 5499-4:2013. The signs designated as E001 and E002 in BS EN ISO 7010:2012+A5 should be used, with the appropriate directional arrow in accordance with BS 5499-4:2013, Table 1.

5.2.9.1.2 Colorimetric and photometric characteristics

Escape route signs should have the following colorimetric and photometric characteristics.

a) **Internally illuminated escape route signs, when powered**. The following recommendations should be met for internally illuminated escape route signs when powered.

   1) The colorimetric and photometric requirements specified in BS ISO 3864-4:2011, Table 2, and the luminance contrast requirements specified in BS ISO 3864-4:2011, Table 3 should be met.

   2) The minimum luminance of the safety colour green should be at least 2 cd/m^2 and the luminance of the contrast colour white five to fifteen times that of the luminance of the adjacent green.

   3) The ratio of maximum luminance to minimum luminance within either white or green should be not greater than 10:1.

   4) In the application of powered internally illuminated escape route signs in normal lighting conditions, higher luminance values of the signs should be appropriate to the luminous environment for identifiability. The criteria for luminance contrast and the ratio of luminances within each colour should be met.

5) The response time for escape route signs should conform to BS EN 1838.

6) The duration should be the same as the installed emergency lighting.

b) **Internally illuminated escape route signs, when unpowered**. An internally illuminated escape route sign when unpowered, as might be the case during normal lighting conditions, should meet the colorimetric and photometric requirements of BS ISO 3864-4:2011, Table 1 for externally illuminated escape route signs.

c) **Externally illuminated escape route signs**. Externally illuminated escape route signs should meet the colorimetric and photometric requirements of BS ISO 3864-4:2011, Table 1. During emergency lighting conditions, the illuminance on any part on the face of externally illuminated escape route signs should be not less than 5 lx.

5.2.9.1.3 Sign height and viewing distance

The maximum viewing distance normal to escape route signs should be determined from the sign height, using the recommendations given in BS 5499-4:2013, Clause **6** and factor of distance in BS 5499-4:2013, Table 3 for powered internally illuminated escape route signs, or BS 5499-4:2013, Table 2 for externally illuminated escape route signs.

NOTE 1 The E001 and E002 originals in BS EN ISO 7010:2012+A5 are in a uniform 70 mm size with corner marks to enable accurate enlargement and reduction scaling. A border is not shown.

NOTE 2 The height of E001 and E002 is a scaled size of the 70 mm template size. For the supplementary direction arrow, the height is scaled from the size of the image given under "Additional information for E001 and E002".

*NOTE 3 For powered internally illuminated escape route signs, the value of distance factor of 200 given in BS EN 1838:2013, **5.5** is applicable when the mean luminance of the white contrast colour is at least 100 cd/m^2.*

*NOTE 4 For externally illuminated escape route signs, the value of distance factor of 100 given in BS EN 1838:2013, **5.5** is applicable when the vertical illuminance on the sign is at least 5 lx.*

Where the angle of viewing of the escape route sign is not predominantly normal to the sign, the effect of angle of viewing should be taken into account, using the recommendations given in BS 5499-4:2013, and the factor of distance reduced by a multiplying factor of cosine of the angle of viewing to the normal to the sign.

5.2.9.2 Other safety signs

5.2.9.2.1 General

NOTE The provision of safety signs, other than escape route signs, their format and meaning using BS EN ISO 7010:2012+A5, is covered by BS 5499-10:2014 for normal and emergency lighting conditions.

Safety signs should be located and operated in accordance with BS 5499-10:2014.

The need for specific safety signs to be illuminated under emergency lighting conditions should be established during the risk assessment of the premises using the recommendations given in BS 5499-10:2014.

5.2.9.2.2 Colorimetric and photometric characteristics

Safety signs other than escape route signs should have the following colorimetric and photometric characteristics.

a) **Internally illuminated safety signs, when powered**. The following recommendations should be met for internally illuminated safety signs when powered.

1) The colorimetric and photometric requirements specified in BS ISO 3864-4:2011, Table 2, and the luminance contrast requirements specified in BS ISO 3864-4:2011, Table 3 should be met.

2) The minimum luminance of the safety colour (green, red, yellow or blue) should be at least 2 cd/m^2 and the luminance of the contrast colour white five to fifteen times that of the luminance of the green, red, or blue measured according to BS ISO 3864-4.

3) The ratio of maximum luminance to minimum luminance within either white or safety colour should be not greater than 10:1.

4) In the application of powered internally illuminated safety signs in normal lighting conditions, higher luminance values of the signs should be appropriate to the luminous environment for identifiability. The criteria for luminance contrast and the ratio of luminances within each colour should be met.

5) The response time for safety signs should conform to BS EN 1838.

6) The duration should be the same as the installed emergency lighting.

b) **Internally illuminated safety signs, when unpowered**. An internally illuminated safety sign when unpowered, as might be the case during normal lighting conditions, should meet the colorimetric and photometric requirements of BS ISO 3864-4:2011, Table 1 for externally illuminated safety signs.

c) **Externally illuminated safety signs**. Externally illuminated safety signs should meet the colorimetric and photometric requirements of BS ISO 3864-4:2011, Table 1. During emergency lighting conditions, the illuminance on any part on the face of externally illuminated safety signs should be not less than 5 lx.

5.2.9.2.3 Sign height and viewing distance

The maximum viewing distance normal to safety signs should be determined from the sign height using the recommendations given in BS 5499-10:2014, **4.8.2** and factor of distance in BS 5499-10:2014, Table 1 for externally illuminated safety signs, or a factor of distance of 60 under emergency and normal lighting conditions for powered internally illuminated safety signs.

Where the angle of viewing of the safety sign is not predominantly normal to the sign, the effect of angle of viewing should be taken into account, using the recommendations given in BS 5499-10:2014, and the factor of distance reduced by a multiplying factor of cosine of the angle of viewing to the normal to the sign.

5.3 Illumination for safety in the building – Emergency safety lighting

*COMMENTARY ON **5.3***

*If a building is not evacuated immediately, additional measures to those recommended in **5.2** might need to be included in the risk assessment. These might include, for example, a need for emergency lighting in rooms where occupants are able to stay put, and also higher light levels.*

If the risk assessment allows occupants to stay in the building, it is also necessary to take measures to maintain safety as the end of the emergency approaches.

Guidance on the application of emergency lighting systems is given in Annex C.

5.3.1 General

If a risk assessment shows that emergency safety lighting is needed, it should meet the recommendations given in **5.3.2** and **5.3.3**.

5.3.2 Minimum illuminance

The minimum illuminance over the area where people might have to move during a failure of the supply to the normal lighting should be not less than 1 lx on the floor area.

NOTE 1 The minimum illuminance required for safe movement in the building overall under normal conditions is specified in the Health and Safety Executive publication HSG 38 [30].

*NOTE 2 A higher illuminance might assist people with visual impairments. Guidance is given in BRE information paper 9/97 [28]; see also the Commentary on **5.2**.*

5.3.3 Safety signs

Escape route signs should be identifiable and in accordance with **5.2.9.1**.

Other safety signs should be identifiable and in accordance with **5.2.9.2**.

5.4 Illumination for continued activity – Standby lighting

NOTE Some premises use standby power supplies to replace the input power to the luminaires if the normal mains supply fails.

Standby lighting powered by an alternative power supply source, such as a generator, should provide the same lighting conditions as those provided by the normal lighting system. This lighting should permit occupants to operate the premises normally.

If standby lighting is to form the emergency escape or emergency safety lighting, the equipment, wiring and installation should be in accordance with the recommendations given in Clause **6**, Clause **7** and Clause **8**.

6 Emergency lighting design

*COMMENTARY ON CLAUSE **6***

Emergency lighting is provided for use when the power supply to normal lighting fails and has therefore to be powered from a source independent of that supplying the normal lighting.

6.1 System integrity

To ensure that emergency lighting will be provided when required, failure of the final circuit supply to the normal lighting should activate non-maintained emergency luminaires.

*NOTE System integrity is specified in BS EN 50172:2004, **5.3**.*

6.2 Failure of individual normal lamp

Wherever possible, the condition of individual normal lighting lamps or luminaires or their failure should not prejudice the safety of occupants, so their condition does not need to activate the emergency lighting. If failure of an individual normal luminaire could prejudice safety, maintained emergency luminaires should be used in the area.

*NOTE This is covered by BS EN 50172:2004, Note to **5.3**.*

6.3 Failure of emergency lighting luminaire

The risk of occupants being in total darkness in the event of failure of individual emergency lighting luminaires should be minimized by ensuring that illumination from at least two luminaires or emergency exit signs with a usable downward light element is visible in:

a) each room (open areas) requiring emergency lighting; and

b) the escape route.

This should be determined on the basis that all doors will be shut; however, glazed panels allowing sufficient illumination from an adjacent part of the escape route might be acceptable.

*NOTE System integrity is specified in BS EN 50172:2004, **5.3**.*

6.4 Mounting height of luminaires

The normal height for luminaires should be at least 2 m, but the mounting height might need to be adjusted for the application, taking into account the effects of glare, the need to be below the possible build-up of smoke in smoke reservoirs, conditions in specific buildings (e.g. heritage buildings), or to highlight specific hazards such as stairs.

NOTE System mounting heights are specified in BS EN 1838:2013.

6.5 Spacing between luminaires

The provision of a highly reliable illuminance on escape routes is essential. A larger number of low light output luminaires placed close together should therefore be used in preference to a few high light output units spaced further apart, in case a single light source fails and to minimize glare.

6.6 Classification of operation of emergency lighting systems

For inspection and to assist those working on emergency lighting systems, the systems should be identified with their classification (see Annex F).

6.7 Choice of appropriate emergency lighting systems

6.7.1 Selection of appropriate emergency lighting luminaires

Emergency lighting luminaires can be either self-contained emergency luminaires or centrally supplied emergency luminaires. Both may be used for escape route signs or emergency lighting. For certain applications, the luminaire itself should have satisfactory protection against the ingress of foreign bodies or moisture, using the appropriate IP classification as defined in BS EN 60529.

Details of the approvals and performance should be confirmed with the user and full documentation added to the system records.

NOTE 1 If used in hazardous areas, where luminaires are certified to national or international standards by a recognized certification authority, compliance with temperature limits and explosion protection might be required. (See BS EN 60079-14.)

*NOTE 2 BS EN 50172:2004, **5.5.1** specifies a requirement for emergency escape lighting luminaires to be designed and constructed in accordance with BS EN 60598-2-22. It also specifies a requirement for them to be selected to be appropriate for their location.*

NOTE 3 A number of locations might be identified as needing emergency lighting to conduct specific tasks in the event of a supply failure prior to evacuation. Guidance on these locations is given in Annex E, and guidance on illuminance measurements and calculations for these locations is given in Annex G.

6.7.2 Classification of system

The type, mode of operation, facilities and duration of the system to be used should be selected on the basis of the size, function and risk assessment of the premises.

*NOTE 1 The available options for emergency lighting systems are described in Clause **5** and Clause **10**. Classifications are given in Annex F.*

NOTE 2 For many types of premises there are regulatory requirements relating to emergency lighting.

6.7.3 Duration

*COMMENTARY ON **6.7.3***

The time required to evacuate premises depends upon their size and complexity. The duration is dependent not only on the time to evacuate the premises but also on whether they are evacuated immediately on a supply failure and whether they will be reoccupied immediately that the supply is restored.

*BS EN 1838:2013, **4.2.5** and **4.3.5** specify a minimum duration of the emergency escape lighting of 1 h.*

A minimum duration of 3 h should be used for emergency lighting if premises are not expected to be evacuated immediately in the event of a supply failure, such as sleeping accommodation or places of entertainment, or if the premises are expected to be reoccupied when the supply is restored without waiting for batteries to recharge.

A minimum duration of 1 h should be used only if the premises are expected to be evacuated immediately on supply failure and not reoccupied until full capacity has been restored to the batteries.

7 Power supplies and equipment

7.1 Power supplies

The appropriate type of power source should be operated, tested and serviced in accordance with the supplier's instructions.

NOTE 1 It is important that batteries are correctly used, and at the end of life replaced with an equivalent and compatible battery type, to ensure that the performance of the emergency lighting is not affected.

NOTE 2 Attention is drawn to legislative requirements concerning the disposal of batteries at the end of their service life.

7.2 Battery supplied systems

7.2.1 Self-contained luminaires

Self-contained luminaires should use batteries of a type having declared life expectancy of at least 4 years when operated in the luminaire.

Batteries for self-contained systems should be in accordance with BS EN 60598-2-22:2014.

NOTE It is important that batteries are correctly used, and at the end of life replaced with an equivalent and compatible battery type, to ensure that the performance of the emergency lighting is not affected.

7.2.2 Batteries in centrally supplied systems

Central power supply systems (CPS systems) that supply the required emergency power to essential safety equipment without any restriction in power output should use batteries of a type having declared life expectancy of at least 10 years at 20 °C ambient temperature.

Central low power supply systems (LPS systems) with a limitation of the power output of the system at 500 W for 3 h or 1 500 W for 1 h duration should use batteries of a type having declared life expectancy of at least 5 years at 20 °C ambient temperature.

Batteries for central power supply systems should be in accordance with BS EN 50171.

7.2.3 Location of central power supply systems

Central power supply systems and the associated batteries should be located in an area of low fire risk.

Their location should be separated from the normal mains power incoming control room.

7.3 Generators

Generators that are used to supply the emergency lighting should be able to supply the emergency lighting load automatically within 5 s for normal applications or 0.5 s for high risk task areas.

The generator should be located in a low fire risk area, and tested and maintained in accordance with the manufacturer's instructions.

If the generator is used for emergency escape lighting and/or emergency safety lighting, the distribution wiring system should meet the same fire integrity requirements as for central battery systems. If the generator is used only for standby duty, the normal safety wiring requirements for a low voltage (LV) supply system should be met.

NOTE If the generator is only used for standby duty and does not form part of either escape or safety emergency lighting, then fire-resisting wiring systems are not required.

7.4 Lamps and luminaires for emergency lighting

Emergency lighting lamps and luminaires should conform to BS EN 60598-2-22:2014.

Emergency lighting central power supply systems should conform to BS EN 50171.

8 Wiring systems and circuits

8.1 Wiring for self-contained systems

Self-contained emergency luminaires do not require fire-protected cable supplies. They should be installed to the same standard as normal luminaires, and both should be part of the periodic inspection and testing of the electrical installation at intervals appropriate to the type of building in question.

*NOTE 1 Wiring of emergency escape lighting is specified in BS EN 50172:2004, **4.1**, which specifies compliance with the wiring rules given in HD 384/IHD 60364. The UK applicable parts of HD 384/IHD 60364 are implemented in the IET Wiring Regulations (BS 7671).*

NOTE 2 There might be statutory requirements and/or local conditions that apply to the particular building containing the emergency lighting installation.

8.2 Wiring for central power supply systems

8.2.1 Quality of installation

Cables or cable systems used for the connection of an emergency lighting luminaire to the central power supply should adequately resist the effects of fire and mechanical damage and retain circuit integrity. This should be achieved through the use of cables or cable systems with an inherently high resistance to the effects of fire, and either with inherently high resistance to mechanical damage, or with additional mechanical protection in any areas in which physical damage or rodent attack is likely.

Cables or cable systems should be routed through areas of low fire risk wherever practicable.

If the emergency supply cable is looped in and out of a luminaire, the integrity of supply to other luminaires should be protected. Porcelain terminal blocks should be used for the emergency cable, and a circuit protective device should be installed in the supply to each luminaire to safeguard the emergency supply.

*NOTE 1 The importance of reliability of an emergency lighting system makes a high standard of wiring essential and limits the permissible systems to those described in **8.2.2**.*

NOTE 2 Wiring from a fused spur to a single luminaire, and internal wiring within a luminaire, are excluded from this clause and are covered separately in the appropriate luminaire standard.

8.2.2 Types of cables and cable systems

The following cables or cable systems should be used with appropriate methods of support and jointing depending on the application.

a) **Emergency lighting cables with an inherently high resistance to attack by fire**. The cables should, as a minimum, have a duration of survival of 60 min when tested in accordance with BS EN 50200:2015.

NOTE 1 This corresponds to class PH 60 as detailed in BS EN 50200:2015, Annex D.

In addition the cables should meet the 30 min survival time when tested in accordance with BS EN 50200:2015, Annex E.

They should also conform to one of the following standards:

1) BS EN 60702-1, with corresponding terminations conforming to BS EN 60702-2; or

2) BS 7629-1; or

3) BS 7846.

b) **Enhanced emergency lighting cables with an inherently high resistance to attack by fire**. The cables should, as a minimum, have a duration of survival of 120 min when tested in accordance with BS EN 50200:2015.

NOTE 2 This corresponds to class PH 120 as detailed in BS EN 50200:2015, Annex D.

In addition the cables should meet the 120 min survival time when tested in accordance with BS 8434-2.

They should also conform to one of the following standards:

1) BS EN 60702-1, with corresponding terminations conforming to BS EN 60702-2; or

2) BS 7629-1; or

3) BS 7846.

c) **Emergency lighting cable systems with an inherently high resistance to attack by fire**. The cable system should comprise fire-resistant single core or multi-core cables enclosed in screwed steel conduit, such that the cable system has a duration of survival of 60 min. The cable should meet the requirements of IEC 60331-3 for a flame application time of 60 min.

Single core cables should conform to BS 8592.

d) **Enhanced emergency lighting cable systems with an inherently high resistance to attack by fire**. The cable system should comprise fire-resistant single core or multi-core cables enclosed in screwed steel conduit, such that the cable system has a duration of survival of 120 min. The cable should meet the requirements of IEC 60331-3 for a flame application time of 120 min.

Single core cables should conform to BS 8592.

NOTE 3 Emergency lighting systems for certain large and complex buildings might require enhanced emergency lighting cables or cable systems capable of longer fire survival times. Applications where the use of enhanced cables would be recommended include any buildings in which the designer, specifier or regulatory authority, on the basis of a fire risk assessment that takes fire engineering considerations into account, deems that the use of enhanced cables is necessary. Such applications might include:

a) unsprinklered buildings (or parts of buildings) in which the fire strategy involves evacuation of the occupants in four or more phases;

b) unsprinklered buildings of greater than 30 m height;

c) unsprinklered premises and sites in which a fire in one area could affect cables associated with areas remote from the fire, in which it is envisaged that people will remain in occupation during the course of the fire.

8.2.3 Cable support

Methods of cable support and fixings should be non-combustible and such that circuit integrity will not be reduced below that afforded by the cable used, and should be able to withstand a similar temperature, duration and water application to that of the cable, while maintaining adequate support.

NOTE In effect, this recommendation precludes the use of plastic cable clips, cable ties or trunking where these products are the means of cable support. Steel and copper are examples of materials that are likely to be suitable.

Fixings and clipping distances should be in accordance with the manufacturer's recommendations.

Where cable management system support is provided by drop rods, either alone or in conjunction with other support methods, the drop rod size should be calculated in accordance with BS 8519.

8.2.4 Joints

Joints in cables for emergency lighting should be made only when circuit rewiring is not practicable. Where joints are unavoidable, they should be located in an area of low fire risk identified in the risk assessment to minimize the probability of early failure in the event of a fire.

Joints, other than those made in system components such as luminaires, control units, etc., should:

a) have an insulating material that is able to withstand the same temperature, water application and mechanical shock as the cable without loss of properties; and

b) be contained in an enclosure that is able to withstand the same temperature, water application and mechanical shock as the cable without loss of properties. This enclosure should be labelled externally "EMERGENCY LIGHTING" or "STANDBY LIGHTING" as appropriate, to avoid confusion with other services, and also with the warning "MAY BE LIVE".

NOTE In effect, this recommendation precludes the use of plastic insulated connector blocks and plastic enclosures unless they meet the above criteria. Examples of suitable joints include metal terminal components mounted in ceramic terminal blocks in steel enclosures.

8.2.5 Conduit, ducting, trunking and channel

If an emergency lighting system cable is to be run in conduit, ducting, trunking or channel in order to provide additional mechanical protection, the material of the conduit, ducting, trunking or channel may be either metallic or non-metallic provided that it is of adequate strength. Non-flame propagating trunking conforming to BS 4678-4 may be used, bearing in mind that the non-flame propagating test does not indicate the suitability of the trunking to maintain the circuit integrity under fire conditions. Where cables are run in conduit, if metal or rigid PVC conduit is used, it should conform to the relevant part of BS EN 61386.

Where the conduit or trunking provides the method of support, the recommendations in **8.2.3** should be followed.

Ducting, trunking or channel reserved for emergency lighting system cables should be marked to indicate this reservation.

8.2.6 Segregation

The wiring of emergency lighting installations should be exclusive to the installation and separate from the wiring of any other circuits. Normal lighting dimming control circuits may have common elements, but should not interfere with the operation of the emergency lighting.

Where multi-core cable is used for the emergency lighting, none of the conductors should be used for any other circuit.

Where cables for emergency lighting circuits are installed in a common containment system such as trunking, ducting, cable basket or cable tray, with cables of other services, they should be segregated from each other by a partition which:

a) is of the same base material as the common containment system, e.g. metal, and permanently and securely fixed by the same fastenings used to assemble the common containment system, e.g. metal screws and nuts, pop rivets;

b) is rigid, mechanically strong, and continuous for the whole length of the emergency lighting cable installation;

c) is without perforation and the same height as the sides of the common containment system.

NOTE This is in order to avoid the risk of mechanical damage to the emergency lighting cables.

8.2.7 Cable sizes

In selecting cable sizes, due regard should be paid to limitations imposed by voltage drop and physical strength. Each conductor should be of copper having a nominal cross-sectional area of not less than 1.5 mm^2.

The voltage drop in cables connecting a central battery or generator to a centrally supplied luminaire should not exceed 4% of the system nominal voltage at maximum rated current and at the highest working ambient temperature likely to be experienced (see also **8.3.5** regarding the compatibility of centrally supplied luminaires with central battery systems).

8.2.8 Overhead lines

Overhead lines for an emergency lighting system should be avoided wherever possible. If it is unavoidable for a particular application, the overhead installation should be designed by a suitably qualified person.

8.2.9 Damp, corrosive or underground locations

Where an appraisal of the installation location indicates that cables for emergency lighting circuits are to be installed in locations or atmospheres that are wet, damp, or contaminated by corrosive solid or liquid materials, they should where possible have a sheath which protects the cable against such conditions.

Where a suitable sheath cannot be obtained, then over-wrapping with, or containment within, a material that will provide suitable protection should be provided.

8.2.10 Ambient temperatures

Cables should not be installed in locations where the combination of ambient temperature and temperature rise due to load currents results in a conductor temperature exceeding the rated temperature of the cables.

8.2.11 Protection against physical damage in arduous conditions

Where an appraisal of installation conditions indicates that cables for emergency lighting circuits are to be installed in arduous situations, they should be provided with additional robust mechanical protection.

NOTE Examples of such conditions include:

a) where impact by road vehicles, fork lift trucks, hand carts, etc. is likely; or

b) where damage by people or conveyor machinery carrying unsteady goods might be likely; or

c) where damage might occur from ladders/plant for maintenance of adjacent equipment.

Where cables are to be installed in locations where they might be subjected to low temperatures, e.g. high roof locations and cold/freezer rooms, they should be constructed to withstand the particular operating temperature(s) and installed in accordance with the manufacturer's instructions.

8.2.12 Wiring to emergency lighting supply power sources

Where the emergency lighting supply source is a secondary battery/battery charger combination, the wiring from the normal supply to the battery charger should be a fixed installation, not incorporating plugs and sockets unless they are of a type requiring a tool to separate them or are sited so as to prevent unauthorized interference.

*NOTE BS EN 50171:2001, **6.9.1** requires internal wiring used to carry a.c. supply and safety equipment circuits to be separated from each other, either by running through separate compartments or by double insulation.*

8.3 Wiring circuits

8.3.1 General

The normal supply to the emergency lighting system should be so arranged that continuity of supply is assured. Where it is the practice to switch off large sections of electrical power in the premises, e.g. when unoccupied or for economy in the use of electricity, the electrical design should be such as to ensure that such switching off does not interrupt the normal supply to the emergency lighting.

Circuits incorporating rest mode and/or inhibiting mode facilities should conform to BS EN 60598-2-22:2014 and BS EN 50171.

8.3.2 Isolators, switches and protective devices

NOTE 1 Inadvertent operation of an isolator, switch or protective device causing prolonged interruption of the normal supply could result in the premature failure of the emergency lighting standby power source. To reduce this risk, the number of such devices needs to be kept to a minimum.

Each isolator, switch and protective device associated with the normal supply to an emergency lighting system should be situated in a position inaccessible to unauthorized persons or be protected against unauthorized operation.

Each isolator switch, protective device, key and operating device should be marked "EMERGENCY LIGHTING" or "STANDBY LIGHTING" as appropriate, and the marking should indicate its use.

NOTE 2 If an emergency lighting system is supplied from a standby source, other than a safety source installed in accordance with the supplies for safety sources detailed in BS 7671, additional earth leakage and protective measures might be required.

8.3.3 Test facility

Each emergency lighting system should have an appropriate means for simulating failure of the normal supply for test purposes (e.g. manual isolating device or automatic testing).

The test facility should be able to be used for both monthly short tests and annual full duration tests.

The test facility should be protected from unauthorized operation.

The test device should not interrupt power to any other electrical equipment that could cause a hazard.

NOTE An automatic test system for battery powered emergency lighting is specified in BS EN 62034.

8.3.4 Isolation and maintenance hazards

Warning labels should be provided in positions where they can be readily seen and read. The labels should state that switching off the normal supply to an emergency lighting system might make it unsafe for maintenance purposes.

NOTE Such warnings are necessary because, for example, non-illumination of a lamp does not always indicate that a circuit is dead, and a circuit that is still live could present a hazard to maintenance personnel.

A test for voltage should be made before touching parts which might be live.

8.3.5 Voltage compatibility of a centrally supplied emergency luminaire and a central battery system

Centrally supplied emergency luminaires should be selected to be compatible with the central power supply to which they are to be connected. The centrally supplied luminaires selected should be compatible with an a.c. or a d.c. voltage, as applicable, and with the input voltage range, taking into account load voltage regulation, end of duration battery voltage and cable voltage drop.

*NOTE The luminaires to be used for emergency lighting are specified in BS EN 50172:2004, **5.5.1**.*

8.4 Electromagnetic compatibility

The interface between central power supplies and centrally supplied luminaires should be designed by a competent person to ensure that power factor and harmonics are compatible.

9 Application of emergency escape and safety lighting for typical premises

*COMMENTARY ON CLAUSE **9***

*The premises to which this standard applies can be divided into the broad classes described in **9.2** to **9.11**. Examples of premises falling within each of these classes are given but these are not necessarily comprehensive.*

9.1 General

In case of doubt, the appropriate class as described in **9.2** to **9.11** should be agreed with the enforcing authority.

9.2 Premises used as sleeping accommodation

NOTE 1 This class includes such premises as hospitals, care homes, hotels, guest houses, certain clubs, colleges and boarding schools.

NOTE 2 Guidance for hospitals is given in the Health Technical Memorandum series of publications ([31] to [35]).

People using premises of this kind might be unfamiliar with their overall layout and/or might be disabled. Furthermore, particularly in the case of hospitals and similar premises, large hotels on busy thoroughfares, etc., it might be desirable to reoccupy the premises as soon as the normal lighting has been restored, or to delay evacuation after the initial failure of the normal supply, if this is permitted.

Based on these considerations, 3 h duration emergency lighting should be installed.

9.3 Non-residential premises used for treatment or care

NOTE This class includes such premises as special schools, clinics, dental practices and similar premises.

The nature of the occupants and staffing levels determine that in some cases evacuation times will be extended and in others occupants will be retained in the premises during a supply failure.

Based on these considerations, 3 h minimum duration systems should be used.

9.4 Non-residential premises used for recreation

NOTE 1 This class includes such premises as theatres, cinemas, concert halls, exhibition halls, sports halls, public houses and restaurants.

People using such premises can be expected to be unfamiliar with the layout. Also, it might be desirable to reoccupy the premises once the normal lighting has been restored, or to delay evacuation after the initial failure of the normal supply, if this is permitted.

Based on these considerations, 3 h duration emergency lighting should be installed.

Where the normal lighting might be dimmed or turned off, a maintained or combined emergency escape lighting system should be installed. However, it is not necessary for the full emergency lighting level to be provided when the normal lighting system is functioning. In other premises used for recreation, where there is no dimming, it is necessary only for exit signs to be maintained or combined and internally illuminated.

For some cinema and theatre auditoria where the recommended maintained illuminance of 1 lx is likely to affect normal working, it is considered acceptable to reduce this level to not less than 0.02 lx, provided the system is so arranged that, in the event of failure of the supply to the normal lighting within the auditorium, the emergency escape lighting illuminance is automatically restored to a minimum of 1 lx within 5 s.

NOTE 2 Full details of lighting requirements for places of entertainment are given in Technical standards for places of entertainment *[36].*

For areas of cinema and theatre auditoria with seating which is fixed to the floor, the minimum illuminance of emergency lighting should be 0.1 lx on a plane 1 m above the floor. All other emergency lighting parameters should be as required for open areas. However, the gangways should be treated as escape routes.

NOTE 3 Provided that cinema and theatre seating is fixed to the floor, the seating rows direct people to the aisles, so these do not need to be treated as open areas. This includes seating fixed to the floor which is removable with the aid of a tool, for example to provide access for wheelchair users.

9.5 Non-residential premises used for teaching, training and research, and offices

NOTE This class includes such premises as schools, colleges, technical institutes and laboratories.

In general, people using this class of premises can be expected to be reasonably familiar with the layout, and safety provisions and orderly evacuation can normally be expected in the event of an emergency. Also, except possibly in some types of process laboratories, there is not normally any safety requirement for early reoccupation after an emergency, and the minimum duration of emergency escape lighting is therefore expected to be adequate.

Based on these considerations, emergency lighting systems of 1 h duration should be used in premises of this class, unless there is a particular requirement for early reoccupation, in which case a longer duration might be necessary. Where any part of a building is used outside of normal weekday office hours then a 3 h duration should be used for the entire building.

9.6 Non-residential public premises

NOTE This class includes such premises as town halls, libraries, shops, shopping malls, art galleries and museums.

The majority of people present in this class of premises can be expected to be unfamiliar with the layout, and evacuation might involve discharging large numbers of people (e.g. from large shops) or gathering together smaller numbers of people from large dispersed areas. Early reoccupation is likely after restoration of the supply.

Based on these considerations, 3 h duration systems should be used.

9.7 Industrial premises used for manufacture, processing or storage of products

NOTE 1 This class includes such premises as factories, workshops, warehouses and similar establishments.

In general, people using this class of premises can be expected to be reasonably familiar with the layout and safety provisions, and orderly evacuation can normally be expected in the event of an emergency.

Based on these considerations, a 1 h duration system should be used for these premises.

NOTE 2 In certain industrial processes, a break in the power supply of even 5 s might constitute a hazard to personnel. In such circumstances, a supplementary battery system is always necessary for use with a generator, even where the generator can be run up to its required output within a period of 5 s.

9.8 Multiple use of premises

Where any premises fall into more than one of the broad classes of **9.2** to **9.7**, the whole premises should be treated in accordance with the most stringent of the applicable recommendations.

Where, however, the differing uses are contained within separate fire compartments having independent escape routes, different durations may be chosen as appropriate for each separate compartment.

9.9 Common access routes within blocks of flats or maisonettes

In general, people using this class of premises can be expected to be reasonably familiar with the layout and safety provisions, and orderly evacuation can normally be expected in the event of an emergency.

Based on these considerations, a 3 h duration system should be used in common access routes within blocks of flats or maisonettes, because these are escape routes from sleeping risk premises.

9.10 Covered car parks

The pedestrian escape routes from covered and multi-storey car parks should be easily identifiable and should be provided with emergency lighting (see **5.2.8.7**). The emergency lighting should be to the same standard as that on escape routes within non-residential public premises.

9.11 Sports stadia

Emergency lighting for spectators should be provided for 3 h.

NOTE Normal lighting for indoor and outdoor sports events, and emergency lighting levels and duration for the participants in dangerous sports, is specified in BS EN 12193.

10 Emergency lighting design procedure

10.1 General

Before any detailed design work commences, consultation should be carried out in accordance with Clause **4**. The design procedure should then proceed as set out in **10.2** to **10.6**.

10.2 Determine requirements

The following actions should be carried out to determine the requirements for the emergency lighting, by consultation (see Clause **4**) when necessary.

a) Verify escape routes.

b) Establish positions of fire alarm call points (see **5.2.8.1** and BS EN 1838:2013, **4.1**).

c) Establish position of fire-fighting equipment (see **5.2.8.1** and BS EN 1838:2013, **4.1**).

d) Establish position of escape route signs (emergency exit signs at doors and escape route direction signs) (see **5.2.9.1** and BS 5499-4:2013) and other safety signs (see **5.2.9.2** and BS 5499-10:2014).

e) Investigate potential hazards on escape routes.

f) Establish open areas that require emergency lighting (see BS EN 50172:2004, **4.4**).

g) Establish requirements for external emergency escape lighting (see **5.2.8.2**).

h) Establish position of lifts (see **5.2.8.3**).

i) Establish position of moving stairways and walkways (see **5.2.8.4**).

j) Establish position of toilet, lobby and closet accommodation over 8 m^2 gross area, facilities less than 8 m^2 without borrowed light and those for use by disabled people (see **5.2.8.5**).

k) Establish position of motor generator, control, plant and switch rooms (see **5.2.8.6**).

l) Establish position of covered car parks (see **5.2.8.7**).

m) Establish areas that require standby lighting (see BS EN 50172:2004, **4.6** and BS EN 1838:2013, **4.5**).

n) Establish areas for the location of central power supply units and routes of low fire risk for distribution cables.

o) Establish high risk task areas and specific locations that require emergency lighting (see **5.2.7,** Annex E and BS EN 1838).

p) Establish areas that require emergency safety lighting (see **5.3**).

10.3 Design of illuminance

Having determined the positions and areas which need to be illuminated from the emergency lighting system, the detailed design should commence, as follows.

a) Position emergency luminaires on the plan (see **10.2**).

b) Verify mounting height of luminaires (see **6.4**).

c) Investigate possible deterioration of luminaire light output due to dirt and dust (see **5.2.2**).

d) Check voltage and possible voltage drop (see Clause **8**).

e) Determine the duration (see **6.7.3**).

f) Determine the mode of operation (see **6.6**, **6.7.2** and Annex F).

g) Choose emergency lighting luminaires.

h) Obtain authenticated photometric data from manufacturers, as spacing tables, computer data or detailed light distribution and output performance.

i) Calculate the illuminance (see **5.2.2** and Annex D).

j) Check uniformity (see **5.2.3**).

NOTE Because the design uses specific luminaire product data, if another luminaire is to be used as a substitute, the photometric performance and product quality need to be re-assessed to ensure that the substitute luminaire still meets the system design requirements.

10.4 Design of system

The design of the electrical installation involves additional consultation with various organizations in order to verify certain facts, e.g. the facilities for maintenance of the system when installed. This should include the following actions.

NOTE Items c) through to k) apply only to central systems, as self-contained systems do not have special wiring requirements.

a) Determine the type of system of emergency lighting (see **6.7.2**) (e.g. central battery, self-contained) and whether automatic or manual testing will be required.

b) Establish the mode of operation (see **6.6**, **6.7.2** and Annex F).

c) Choose the wiring system (see Clause **8**).

d) Determine the routes of cable installation (see Clause **8**).

e) Ensure correct fire protection of cables (see **8.2.2**).

f) Ensure that wiring is segregated (see **8.2.6**).

g) Check suitability of wiring and circuit components for use in any damp, corrosive or underground locations (see **8.2.9**).

h) Check protection of wiring and circuit components against mechanical damage (see **8.2.11**).

i) Check joints in cables (see **8.2.4**).

j) Check warning labels (see **8.3.4**).

k) Establish voltage drop calculations (see **8.3.5**).

l) Ensure electromagnetic compatibility (see **8.4**).

10.5 Design of circuit protection and controls

The design of the circuit protection and controls requires consultation with those responsible for the continued operation and maintenance of the system. This should include the following actions.

a) Establish siting of equipment (see **7.2.3** and **8.3.2**).

b) Choose isolators, switches and protective devices (see **8.3.2**).

c) Determine, and establish the siting for, test facilities (see **8.3.3**).

d) Specify warning notices relating to isolation and maintenance hazards (see **8.3.4**).

10.6 Installation, operating and commissioning instructions

The designer should include the preparation of instructions on the installation, operation and maintenance of the system in the design schedule. The instructions should preferably be in the form of a manual for retention by the occupier.

10.7 Handover

The competent person handing over the system to the responsible person(s) should train that person or persons on the regular monthly tests and inspections (see Clause **12**) and how to use the test facilities, or to check the automatic test facilities. The system documentation (including design, installation and verification declarations), certification, log book (see Clause **11**) and any other relevant information should be handed over. In particular, the importance of keeping the documents up to date by completing the log book regularly and storing the documents in a safe place for reference as necessary should be explained.

The contact details of the competent person or organization should be given to the responsible person and entered prominently, for example on the log book.

11 Certificates and log book

On completion of the work of installing an emergency lighting system, or part thereof, or of a major alteration to an existing installation, a commissioning test should be performed to check that the system meets the design requirements, and a completion certificate and log book should be supplied to the occupier/owner of the premises.

NOTE 1 A copy of this certificate might be required by the enforcing authority. A model completion certificate suitable for all installations is given in Annex H. A concise model certificate is given in Annex I which is suitable for small installations with up to 25 luminaires.

*NOTE 2 Provision of a log book is specified in BS EN 50172:2004, **6.3**. Additional guidance, together with an example of a typical comprehensive log book, is given in Annex J.*

Where a log book or similar document already exists for an installation which is to be modified, the information it contains should be integrated into the revised document.

If the original completion certificates are not available for an existing premises, an inspection of the installation should be conducted, and if this is satisfactory then a certificate of verification for existing premises should be supplied to the occupier/owner of the premises.

NOTE 3 Some existing premises no longer have a valid completion certificate, either because one was not issued, or because it was lost. A substitute completion certificate can be supplied after inspection by a competent person and the issuing of a compliance checklist and report for an existing site. The model certificate in Annex K is suitable for use where it is necessary to verify existing installations for which the original completion certificates are not available. Additional notes and guidance for existing installations are given in Annex L.

12 Routine inspections and tests

Emergency lighting systems should be inspected and tested at regular intervals in accordance with BS EN 50172.

NOTE 1 The testing may be performed manually, but if the responsible person is unable to ensure that this will be done, it is advisable to use an automatic test system to perform the tests at the required intervals.

*NOTE 2 Provision of a periodic inspection and test certificate is specified in BS EN 50172:2004, **6.2**. An example of a suitable inspection and test certificate, which can be used for all new installations, major alterations and existing premises, is given in Annex M.*

Functional operation should be checked at least every month (see **13.1**).

Testing for full rated duration should be performed on each luminaire at least annually. One of the following precautions should be taken during the full rated duration tests:

a) perform the test while the building is empty or at times of minimal risk; or

b) only test alternate luminaires at any one time, so that the building has a charged luminaire next to the unit under test.

A visual inspection should be performed on each luminaire at least annually.

NOTE 3 These precautions are needed because as the full rated duration tests require discharging the batteries, the emergency lighting system is not fully functional until the batteries have had time to recharge.

*NOTE 4 The minimum duration periods of the system are given in **6.7.3**.*

In the event of failure of any parts of the system, a competent person should be used to repair the fault. Alternative safety procedures should be introduced until the repair is complete and the system has been retested satisfactorily. The responsible person for the building should decide on the appropriate action to be taken for their premises to maintain occupants' safety during this time.

NOTE 5 Examples of possible actions include:

- *warning occupants to be extra vigilant until the system is rectified;*
- *initiating extra safety patrols;*
- *issuing torches as a temporary measure;*
- *in a high risk situation, limiting use of all or part of the building.*

The results of tests and any repair action should be recorded in the log book.

If safety patrols are likely to be needed to assist evacuation in the event of equipment failure, suitable rechargeable portable hand lamps should be provided, such as those conforming to BS EN 60598-2-22:2014, Annex E.

*NOTE 6 It is expected that advice on conducting routine tests will have been given to the user as part of the handover procedure given in **10.7**.*

*NOTE 7 Routine inspections and tests are specified in BS EN 50172:2004, **7.2**. An automatic test system for battery powered systems is specified in BS EN 62034.*

13 Servicing and repair of emergency lighting systems

13.1 Actions to be taken by the responsible person

The responsible person should appoint a competent person to perform the monthly test schedules.

Any servicing required to maintain the system's performance should be carried out as follows.

a) If the indicator is not illuminated, the supply should be checked.

b) In the maintained mode, fluorescent lamps have finite lives and should be replaced when black ending has reached levels that are anticipated to reduce lamp output significantly, or when the lamp fails to operate.

NOTE The lamp holders are designed to pass the finger insulation test so lamp replacement does not need a skilled engineer, but vandal-resistant luminaires need a special tool to gain access to the lamp.

c) The optical components of the luminaire should be cleaned or changed where necessary.

If a fluorescent lamp is used and is lasting less than 7 000 h to 9 000 h, the competent person should be asked at their next visit to check why short lamp life is occurring.

13.2 Action to be taken by the competent person to repair luminaires

A competent person should ensure that the luminaire is isolated from all supplies before working on the circuit components. Particular care should be taken with maintained and combined luminaires, which might have more than one supply.

NOTE 1 If the indicator of a self-contained luminaire is not illuminated, this is likely to be caused by one of the following conditions:

- *the a.c. supply has failed;*
- *the charge circuit has failed;*
- *the battery is disconnected or open circuit.*

NOTE 2 If the duration is reduced it is likely that the battery needs replacement.

The supplier's or manufacturer's guidance should be followed.

For self-contained luminaires, the correct replacement battery should always be used. Where possible, this should be the battery recommended by the luminaire's supplier or manufacturer. If this is not possible, an equivalent cell should be used, which should:

a) have the same cell chemistry;

b) be rated for the same operating temperature;

c) have the same rated amp hour capacity and number of cells;

d) be of the same physical layout.

After replacement and at least 24 h on charge, the luminaire should be retested to check that the duration has been restored to the system design requirements.

*NOTE 3 Supervision of servicing is specified in BS EN 50172:2004, **7.1**.*

Any repair actions should be recorded in the log book.

13.3 Servicing of specialist components

13.3.1 General

Where maintenance procedures require equipment to be taken offline, these should be carried out at periods of minimum risk wherever practicable.

13.3.2 Central batteries

In all cases the manufacturer's instructions should be followed. The following specific recommendations should be met where applicable.

a) The tops of batteries and their terminals should be kept clean and unobstructed, and the battery cases should be regularly checked for leaks.

b) The electrolyte should, at all times, be kept at the correct level as recommended by the manufacturer.

c) Any replacement battery should be compatible with the battery charger.

d) Any replacement cell should be compatible with the battery.

e) Any replacement battery charger should be compatible with the battery.

f) Automotive batteries should not be used as replacement batteries.

13.3.3 Generators

The manufacturer's testing and operating instructions, as given in the associated instruction manual or other literature, should be followed.

Testing procedures often require generators to reach operating temperatures as part of the monthly test, which can include running the equipment for 1 h on a proportion of full load. In such instances, the manufacturer's testing and servicing instructions should be followed to facilitate future starting.

After each test, consumables such as fuel should be replenished.

NOTE The failure of engines to start up readily often arises from poor maintenance or defects in the starting battery or in electromechanical apparatus, e.g. relays incorporated in the starting system.

Dust and damp, singly or in combination, can have an adverse effect on electromechanical apparatus, so a system of regular cleaning and, where necessary, adjustment should be carried out.

Some parts of the starting system might be sited where they are subject to vibration, and great care should therefore be taken in such instances to ensure that all connections are mechanically and electrically sound.

Air intakes and exhausts should be unobstructed.

13.4 Emergency lighting system service spares

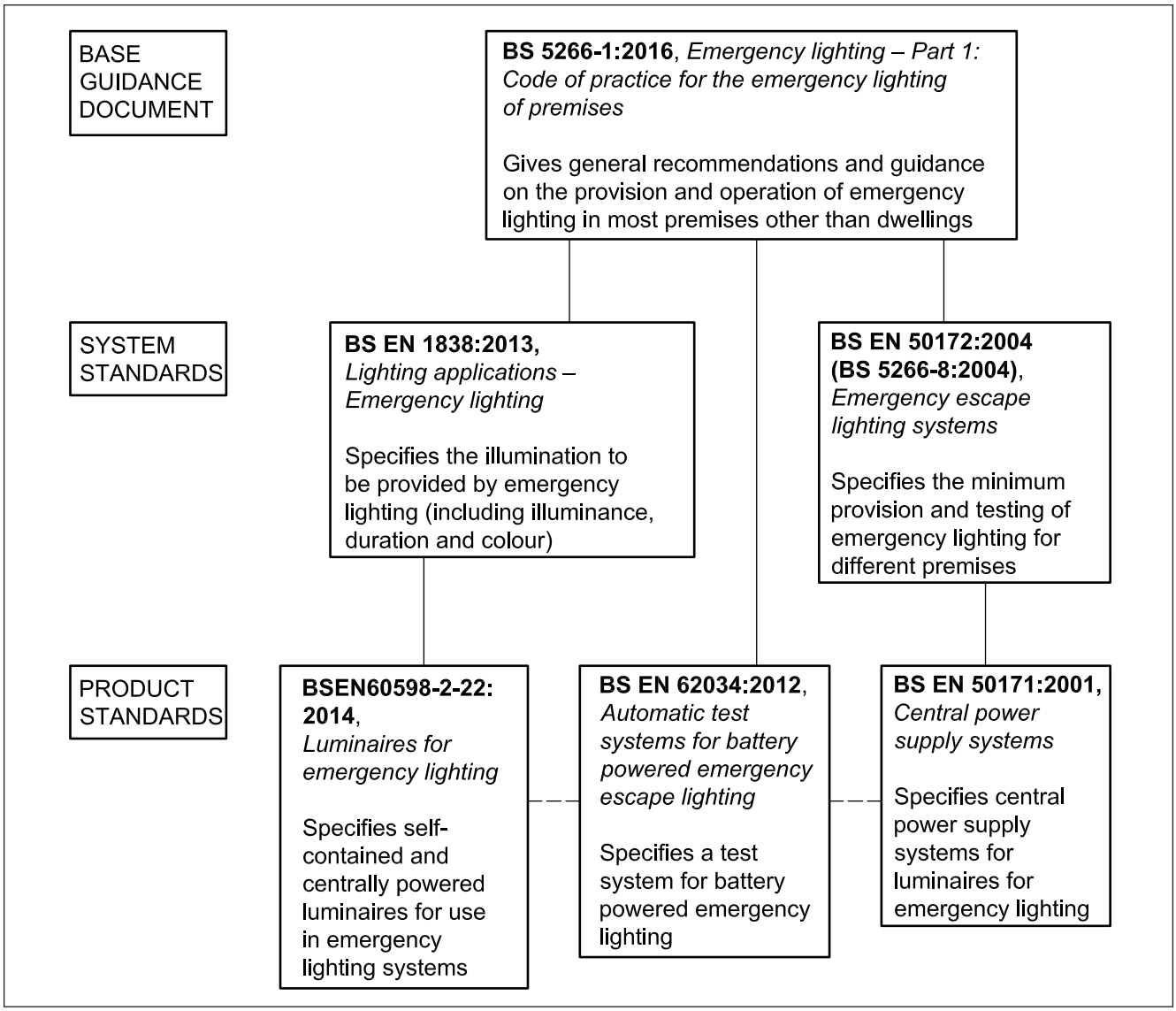
To reduce the time taken to repair a system, a supply of essential spares and consumables should be kept on site so that systems can be restored to working condition as quickly as possible.

NOTE This is particularly important for consumables that might be difficult to obtain at short notice, such as central power system replacement lamps, load fuses and battery fuses.

Annex A (informative) Summary of standards covering emergency lighting

Emergency lighting is covered by a series of interdependent standards, which can be seen as forming a hierarchy as shown in Figure A.1.

Figure A.1 **Summary of standards covering emergency lighting**



Annex B (informative) Developments in emergency lighting application and technology

B.1 General

The risk to occupants staying in the building during extended supply failures, as well as those caused by sudden failures of the normal lighting supply, can be compensated for by appropriate controls and operation of the emergency lighting system. Additionally, warning of fire hazards on escape routes can be used to direct occupants to safe routes when evacuation is required.

Suitable systems that may be used include systems where the discharge duration can be split into two separate intervals. After an initial period during which occupants can be moved to safe refuges, the emergency lighting systems may be switched off until required for emergency evacuation, when the remainder of the duration can be switched back on either by manual control or by operation of a fire alarm system.

This form of operation can be performed either by centrally supplied systems with appropriate remote switching devices or by self-contained luminaires with rest mode or inhibiting circuits.

Some activities might require high levels of illumination, either for shutting down processes prior to evacuation or during activities carried out by people staying in the building. Luminaires with high outputs can provide suitable levels of emergency illumination to enable essential tasks to be performed.

If staff are required to guide other occupants to places of safety, they can be provided with hand lamps conforming to BS EN 60598-2-22:2014 with monitored charging circuits and which activate automatically on failure of the supply to the normal lighting. They can be used to conduct occupants to safety, and to check that locations have been totally evacuated.

Occupants such as residents in care homes might be difficult to evacuate and might be subject to a "stay put" strategy, in which case the locations selected as their refuges need to be assessed for emergency lighting.

In other areas it might be decided that occupants can stay either to work or for leisure activities, in which case it is important to check that their evacuation route will still be viable even if the supply failure continues for an extended period.

Automatic testing is an important function, particularly if occupants are staying in the building. It is important that the operator of the premises can be confident of the emergency duration available from their emergency lighting system.

Addressable fire detection systems give precise information of the location of smoke in a building. This can be used to input information to the controls of emergency lighting systems, which can enable smoke contaminated escape routes to be identified and avoided.

Communication between components and systems is increasingly important, not only to monitor and test operation but also to control operation. For example, when a building is empty it might be desirable to switch off maintained exit signs from a remote location, and then to ensure that the exit signs are reactivated when the building is occupied again.

Self-contained emergency luminaires incorporating a rest mode facility are a category of emergency lighting luminaires where the illumination is provided automatically. If occupants are in safe locations, it can be switched off to retain the remainder of the emergency duration to provide illumination if required in an emergency evacuation (BS EN 60598-2-22:2014, facility B).

Self-contained emergency luminaires incorporating a remote inhibiting facility might be inhibited from operating by a remote device while the normal supply is on. In the event of a failure of the supply to the normal lighting, the luminaire does not change over automatically to emergency mode, and its operation requires manual control (BS EN 60598-2-22:2014, facility C).

Both the rest mode and the inhibit functions can be provided by control switching devices (CSD) on central battery systems (see BS EN 50171).

Guidance of the application of emergency lighting systems is given in Annex C.

B.2 Developments in component technology

LEDs offer high operating efficiency and extended life, thereby reducing lifetime maintenance costs. They are also compact and can be produced as attractive luminaires.

Lithium batteries are being used and other power storage sources such as capacitors are being evaluated.

B.3 Intelligent lighting control systems

These use addressed monitors and luminaires to check the presence of normal supplies to the mains lighting, and control the operation and testing of individually addressed emergency luminaires. This can be achieved by lighting control systems such as digital addressable lighting interface (DALI) or by low voltage loop systems.

B.4 Energy saving

Not only are emergency light sources improving in total efficiency, but the control of their output directs the light produced to the emergency reference plane where it is required.

Improved life of emergency light sources makes them suitable to be used as maintained systems, offering a low light output, low power consumption alternative to the normal lighting system (e.g. at night in hotel corridors).

Annex C (informative) Guidance on the application of emergency lighting systems

C.1 General

Recommendations for emergency lighting in earlier editions of BS 5266-1 were developed largely to assist occupants to evacuate a building in the event of a failure of the supply to the normal lighting.

NOTE Supply failures can be caused by both equipment failures, and blackouts caused by excess electrical loads being placed on the supply system.

There are now options for occupants staying in the premises in the event of a supply failure, so protection for these occupants and for the emergency escape evacuation routes needs to be taken into account in the risk assessment.

To compensate for this increased and different form of risk, it is necessary to determine the best format of emergency lighting and suitable controls to meet the specific application needs.

For all installations, it is necessary to determine how to:

- protect the occupants in the initial period when the normal supply has just failed;
- provide the occupants with a protected or low-risk environment when they do not evacuate immediately during a supply failure;

- assist the occupants to evacuate the building where necessary.

If it is intended for full activities to continue, standby lighting is needed.

C.2 Examples of typical installations

The following are examples of typical installations.

a) **Premises where it is decided to evacuate the premises totally and immediately in the event of a failure of the supply to the normal lighting**. A typical example would be premises such as a production unit that requires a mains supply to be able to be used.

b) **Premises where the occupants stay in the building in the event of failure of the supply to the normal lighting**. This could encompass several scenarios.

   1) Situations where the emergency lighting is adequate for the safe protection of the occupants in a premises, and where the occupants are evacuated before the emergency lighting is exhausted. A typical example would be premises such as a theatre, in which occupants can remain for up to 2 h before conducting an evacuation using the last hour of emergency duration.

   2) Premises that are in daylight and can continue in use. A typical example would be premises such as an office block used during daylight hours. In such a premises, evacuation routes would need to be usable during this occupation.

   3) Premises with a dual evacuation policy. A typical example would be premises such as a department store, where the customers might be evacuated immediately in the event of a supply failure, but the staff are retained in a safe location until the mains are restored to ensure that they are available to restart trading on mains restoration.

c) **Premises which remain occupied even during extended supply failures**. This could encompass several scenarios.

   1) Premises where the occupants might not be evacuated in the event of a supply failure, but where they can be evacuated in an emergency such as a fire. A typical example would be premises such as hotels, where it would not be practicable to evacuate occupants during a supply failure. In these premises, evacuation could be either by retaining a proportion of emergency duration for use if evacuation is required, or by the use of trained staff providing patrols to escort occupants.

   2) Premises where it is decided to retain occupants in the premises, and in the event of a fire in a sub-compartment it is totally evacuated into an adjacent sub-compartment (progressive horizontal evacuation). This relates to premises where the risk assessment determines that during a fire it is safer to keep occupants in the building and use a progressive horizontal evacuation procedure.

Annex D (informative) Measuring illuminance of emergency lighting

Where authenticated data, as mentioned in BS EN 1838:2013, is not available, the following measurement method may be used.

Measurement of illuminance of emergency lighting installations can be very difficult and needs to be carried out with good instrumentation and great care. All site test work needs to be carried out by simulating a failure of the normal electrical supply or, where practicable, by using the test facilities provided.

It is essential that the light meter used has a photocell having good cosine correction, as a large proportion of the incident light is at glancing angles. To ensure accuracy a photometer with a good spectral correction value, f_1', is required. The meter needs to be suitable for taking readings at the low illuminances involved, with a minimum range of 0.01 lx to 100 lx and sensitivity of 0.01 lx. Care has to be taken not to overshadow the light sensor, and for this reason a sensor remote from the readout is preferable.

The measurement of the illuminance needs to be made on the same plane as that used for design (see Clause **10**).

The effect of stray light (e.g. street lighting or moonlight) can be substantial and, as far as practicable, it needs to be masked out. Where it cannot be excluded, the illuminance from the emergency lighting is obtained by taking readings at appropriate positions inside the building with all interior lighting, including the emergency lighting, switched off. The readings so obtained are then deducted from readings taken at the same positions with the emergency lighting switched on.

The light output of the emergency lighting system varies with time. The tests therefore need to be completed as quickly as is practicable within the rated duration.

This is particularly relevant in an occupied building or one in daily use as, with discharged batteries, the building could have reduced emergency lighting cover for up to 24 h following the test.

For measurement of emergency lighting on emergency escape routes it is advisable to select for test a number of specific areas likely to have minimum illuminance. Suggested locations are:

a) half-way between luminaires, especially in stairwells;

b) where highest luminaire mounting height occurs;

c) where widest spacing of luminaires occurs;

d) at changes in direction of route;

e) at thresholds of doorways forming part of the exit route;

f) at face of externally illuminated safety signs.

In open areas, tests need to be carried out over the whole of the relevant area (see BS EN 1838:2013, **4.3.1**) and paths lit by emergency safety lighting.

The results of the measurements then need to be checked against design data.

The rated duration of self-contained luminaires needs to be checked individually. For a central system it is only necessary to carry out the test at one luminaire, preferably that luminaire subject to the highest voltage drop.

On-site testing can only prove or indicate to some degree the accuracy of the design data, and in most cases the illuminance measured is higher than the minimum design level. The minimum value of illuminance is deemed to occur either at 5 s after switch-on or at the end of the battery discharge when the voltage is at a minimum value, and also at the end of useful lamp life.

Such combinations are not usually encountered on site, except where unsatisfactory equipment has been used or maintenance has been poor. When carrying out these tests it is therefore necessary to have data which relates to the lumen output of the luminaire during the lamp/battery life cycle.

Annex E (informative) Typical illuminance for specific locations

E.1 General

A number of locations require higher light levels, and in some cases the emergency illumination is required in specific positions to enable normal activities to be terminated safely.

The applications in **E.2** to **E.10** are normal activities and less arduous than those requiring high risk task illumination. This is not an exhaustive list, but examples are given of the methodology that can be applied for specific hazard areas.

Guidance on illuminance measurements and calculations for these applications is given in Annex G.

Illuminances for high risk task areas are given in BS EN 1838:2013.

E.2 Kitchens

The illumination in areas where people are preparing or transporting hot food needs to be sufficient for them to be able to leave equipment in a safe condition, e.g.:

a) gas powered equipment needs to be turned off to ensure that a fully safe condition exists whilst the area is evacuated;

b) electric appliances need to be isolated to ensure that they do not turn on once the supply is reinstated and cause a possible unsafe condition.

Table E.1 shows the typical minimum emergency lighting level to be used on sudden failure of the normal lighting in kitchens.

E.3 First aid rooms

The illumination needs to be sufficient to enable simple medical procedures to be completed, e.g. applying a bandage.

Table E.1 shows the typical minimum emergency lighting level to be used on sudden failure of the normal lighting in first aid rooms. The specific level to be used depends on the nature of the task(s) being undertaken.

E.4 Examination and treatment rooms

The illumination needs to be sufficient to enable complex procedures to be completed, e.g. minor operations.

NOTE Operating theatres are outside the scope of this standard.

Table E.1 shows the typical minimum emergency lighting level to be used on sudden failure of the normal lighting in examination and treatment rooms. The specific level to be used depends on the nature of the task(s) being undertaken.

E.5 Refuge areas for people with mobility impairments

Designated people within the premises have a responsibility to check and collect people with mobility impairments from designated refuge areas. At any refuge emergency voice communication system, and in the area for transfer of people from wheelchairs to evacuation sleds as applicable, a higher level of illumination than for escape route lighting is likely to be needed.

Table E.1 shows the typical minimum illumination for communication devices and relevant instruction signs within designated refuge areas.

E.6 Plant rooms, switch rooms and means of emergency operation for lifts

In the event of a power supply failure, maintenance or duty engineers are likely to be required to enter plant rooms and switch rooms, and to access means of emergency operation for lifts.

Table E.1 shows the typical minimum emergency lighting level to be used on sudden failure of the normal lighting in plant rooms, switch rooms and means of emergency operation for lifts.

In certain circumstances it might be more appropriate to use a portable self-contained emergency lighting unit.

E.7 Inspection of the condition of fire alarm control and indicating equipment

To carry out inspection of the condition of fire alarm panels and repeaters, and fire alarm zone diagrams and instructions, the illumination needs to be sufficient to:

a) enable displays to be read accurately;

b) enable staff to locate the source of the fire;

c) operate controls.

Table E.1 shows the typical minimum emergency lighting level to be used on sudden failure of the normal lighting in the vicinity of fire alarm control and indicating equipment. This also applies to any repeater panels or building plans that might be used.

E.8 Reception areas

The reception area used to contact the fire and rescue service needs to have sufficient illumination for the telephone number to be dialled correctly.

Table E.1 shows the typical minimum emergency lighting level to be used on sudden failure of the normal lighting in reception areas.

E.9 Panic bars and pads or security devices at exit doors

Panic bars and pads or security devices at exit doors, e.g. a break glass manual release control, need to be sufficiently illuminated to enable them to be easily seen and operated. Exit signs above them need to have downward light panels or a normal emergency luminaire is needed to provide additional illumination. Any operational instructions also need to be readily visible.

NOTE Recommendations for manual release controls, provided to release electronically locked doors, are given in BS 7273-4.

Table E.1 shows the typical minimum emergency lighting level to be used on sudden failure of the normal lighting in the vicinity of panic bars, pads and security devices.

E.10 Surrounds of swimming pools, swimming areas and diving platforms or flumes

The surrounds of pools, and the access routes to diving boards or flumes, are areas that need to be cleared safely in the event of a supply failure; the high likelihood of the surfaces being wet increases the slipping hazard.

Table E.1 shows the typical minimum emergency lighting level to be used on sudden failure of the normal lighting in the vicinity of swimming pools, swimming areas and diving platforms or flumes.

Table E.1 **Typical illuminance for specific locations**[A)]

Location	Response time	Minimum illuminance	Minimum duration	Reference plane
	s	lx		
Kitchens	0.5 [B)]	15	30 min	Horizontal on working plane, switches and cut-outs readily visible
First aid rooms	5 [C)]	15	30 min	Horizontal on working plane
Treatment rooms	0.5 [B)]	50	30 min	Horizontal on working plane
Refuges	5 [C)]	5	Full rated [D)]	Horizontal on floor, vertical at wall-mounted communication devices and sign
Plant rooms, switch rooms and means of emergency operation for lifts	5 [C)]	15	Full rated [D)]	In plane of visual task
Fire alarm control and indicating equipment	5 [C)]	15	Full rated [D)]	In plane of visual task
Reception areas	5 [C)]	15	Full rated [D)]	In plane of visual task
Panic bars and pads or security devices	5 [C)]	5	Full rated [D)]	Horizontal on plane of panic bar/pad; vertical at vertically mounted/wall-mounted security devices
Swimming pool surrounds, swimming areas and diving areas	0.5 [B)]	5	Full rated [D)]	Horizontal on floor and treads

[A)] The illuminances given in this table are typical values. Any individual locations that would be at increased risk in a failure of the normal lighting supply need to be assessed to determine the actual values to be used.

[B)] Full illuminance needs to be achieved in this time.

[C)] 5 s for 50% of rated illuminance then 100% of rated illuminance to be available from 60 s to end of rated duty.

[D)] The term "full rated" indicates that the minimum duration at these locations needs to be at least that of the normal emergency lighting in the building.

Annex F (informative)

Emergency lighting classifications

In this part of BS 5266, emergency lighting systems are classified according to the following parameters, as given for luminaires in BS EN 60598-2-22:2014, Annex B:

a) type:

X self-contained;

Z central supply;

b) mode of operation:

0 non-maintained;

1 maintained;

2 combined non-maintained;

3 combined maintained;

4 compound non-maintained;

5 compound maintained;

6 satellite;

c) facilities:

A including test device;

B including remote rest mode;

C including inhibiting mode;

D high risk task area luminaire;

E with non-replaceable lamp(s) and/or battery;

F automatic test gear conforming to BS EN 61347-2-7 denoted EL-T;

G internally illuminated safety sign;

d) duration of emergency mode (in minutes) for a self-contained system:

10 to indicate 10 min duration;

60 to indicate 1 h duration;

120 to indicate 2 h duration;

180 to indicate 3 h duration.

NOTE Prior to the 2011 edition of BS 5266-1, emergency lighting systems were categorized by the prefix "M" for maintained and "NM" for non-maintained systems, followed by an "/" and the number of hours duration claimed for the installation, e.g. for self-contained systems:

- *M/1 was a maintained 1 h duration system; this is now*

X	1	****	60

- *NM/3 was a non-maintained 3 h duration system; this is now*

X	0	****	180

***** in the third box stands for the facilities [see item c)], details of which are added, as applicable, at the time of installation.*

Annex G (informative)

Guidance on illuminance measurements and calculations

The photometric design principles are established in BS EN 1838:2013 and BS EN 13032-3.

Some of the hazards identified in Annex E have their own specific working planes and appropriate illumination values, which can be calculated as follows:

a) for escape routes and open areas, treat the floor as the working plane (see Figure G.1);

b) when handling hazards such as hot foods on the top of the stove, treat the top surface as the working plane (see Figure G.2);

c) when there is a need to read fire alarm control panels, etc., use a vertical working plane (see Figure G.3).

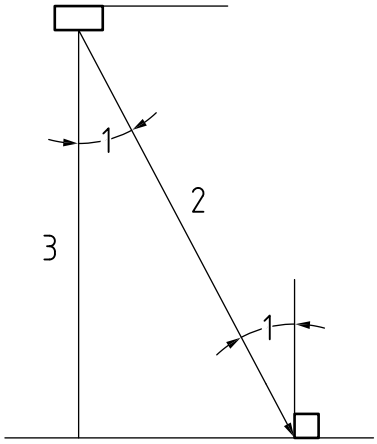
The safety risk assessment for the premises can be used to establish the location lighting intensity, working plane and area of the hazard that needs protecting.

Designs can either be calculated from authenticated data by a competent person, or determined using an appropriate computer program with the correct de-rating applied for the appropriate maintenance and service factors.

NOTE In Figure G.1, Figure G.2 and Figure G.3, the light intensity reaching a working plane is normalized to give the value at 90° to the plane. This is calculated as:

$$\frac{I}{h^2}\cos^3 y$$

Figure G.1 – Conventional escape route where the floor is the working plane



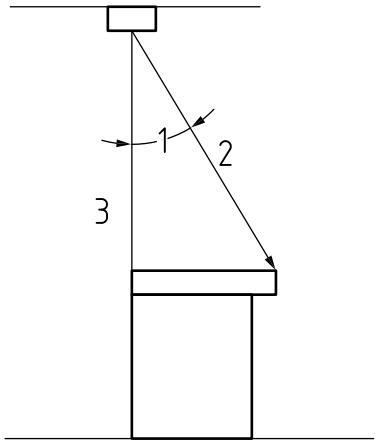
Key

1 Angle (*y*) that the light leaves the luminaire so the value can be read from the normalized intensity table (it is also the angle from a right angle of light hitting the working plane)

2 Intensity (*I*) of the light from luminaire

3 Vertical distance from luminaire to the working plane (*h*)

Figure G.2 **Cooking stove where the surface of the stove is the working plane**



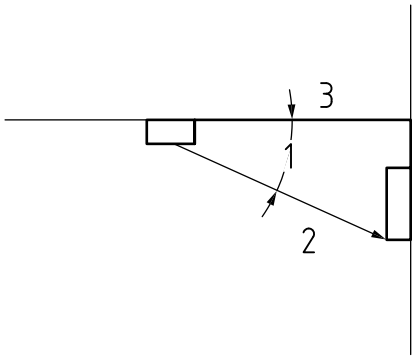
Key

1 Angle (*y*) that the light leaves the luminaire so the value can be read from the normalized intensity table (it is also the angle from a right angle of light hitting the working plane)

2 Intensity (*I*) of the light from luminaire

3 Vertical distance from luminaire to the working plane (*h*)

Figure G.3 **Fire panel needing to be read on the vertical plane**



Key

1 Angle (*y*) that the light leaves the luminaire so the value can be read from the normalized intensity table (it is also the angle from a right angle of light hitting the working plane)

2 Intensity (*I*) of the light from luminaire

3 Horizontal distance from luminaire to the working plane (*h*)

Annex H (informative) Model completion certificate

A model completion certificate is shown in Figure H.1 to Figure H.4.

The general declaration shown in Figure H.1 is completed by the responsible person, after the separate design, installation and verification certificates shown in Figure H.2, Figure H.3 and Figure H.4 have been completed by the competent person who carried out the work.

Figure H.1 **Model completion certificate – General declaration**

Serial Number:……..

EMERGENCY LIGHTING COMPLETION CERTIFICATE

For New Installations

Occupier/owner.....

Address of premises .....

.....

Declaration of Conformity

In consequence of acceptance of the appended declarations, I/we* hereby declare that the emergency lighting system installation, or part thereof, at the above premises conforms, to the best of my/our* knowledge and belief, to the appropriate recommendations given in BS 5266-1:2016, *Emergency lighting – Part 1: Code of practice for the emergency lighting of premises*, BS EN 1838:2013 *Lighting applications – Emergency lighting* and BS EN 50172:2004, *Emergency escape lighting systems*, as set out in the accompanying declarations, except as stated below/overleaf.

* Delete as appropriate.

Signed, on behalf of owner/occupier .....

Name.....

Deviations from standards

Declaration (Design, installation or verification)	**Clause number**	**Details of deviation**

This Certificate is only valid when accompanied by current:

a) Signed declaration(s) of design, installation and verification, as applicable (see overleaf).

b) Photometric design data. This can be in any of the following formats but in all cases appropriate de-rating factors must be used and identified to meet worst case requirements.

- Authenticated spacing data such as ICEL 1001 registered tables**.
- Calculations as detailed in BS 5266-1:2016, Annex D, and CIBSE/SLL Guide LG12***.
- Appropriate computer print-out of results.

c) Test log book.

**Available from Industry Committee for Emergency Lighting, Stafford Park 7, Telford TF3 3BQ.

***Available from Chartered Institution of Building Services Engineers, Delta House, 222 Balham High Road, London SW12 9BS.

Figure H.2 **Model completion certificate – Design – Declaration of conformity** *(1 of 2)*

Serial Number:……...

Design – Declaration of conformity

BS 5266-1: 2016 clause ref.	Recommendations	System conforms (if NO, record a deviation)		
		YES	NO	N/A
4.2	**D1** Accurate plans available showing escape routes, fire alarm control panel, call points and fire extinguishers			
5.2.9	**D2** Escape route signs in accordance with BS EN ISO 7010 and BS 5499-4 and other safety signs in accordance with BS EN ISO 7010 and BS 5499-10, clearly identifiable and adequately illuminated			
6.7	**D3** The luminaires conform to BS EN 60598-2-22			
5.2.8.1	**D4** Luminaires located at following positions: NOTE Near means within 2 m horizontally. a) At each exit door intended to be used in an emergency b) Near stairs so each tread receives direct light c) Near any other change in level d) Externally illuminated escape route signs, escape route direction signs and other safety signs needing to be illuminated under emergency lighting conditions e) At each change of direction f) At intersections of corridors g) Near to each final exit and outside the building to a place of safety h) Near each first aid post i) Near each piece of fire-fighting equipment and call point j) Near escape equipment provided for disabled people k) Near refuges and call points, including include two-way communication systems and disabled toilet alarm call position l) Near manual release controls provided to release electronically locked doors			
6.3	**D5** Each room (open area) and escape route has visible light from at least two emergency luminaires			
5.2.8 **5.2.8.3** **5.2.8.4** **5.2.8.5** **5.2.8.6** **5.2.8.7**	**D6** Additional emergency lighting provided where needed to illuminate: a) Evacuation lift cars b) Moving stairways and walkways c) Toilet facilities larger than 8 m^2 floor area or without borrowed light, and those for use by disabled people d) Motor generator, control, plant and switch rooms e) Covered car parks			
6.7.3	**D7** Design duration adequate for the application			
10.6; **10.7**; Clause **11**	**D8** Operation and maintenance instructions and a suitable log book produced for retention and use by the building occupier			
5.2.5; 5.2.6; 5.2.7 **5.3.2**	**D9** At least the minimum illuminance provided for escape routes, open areas and high risk task areas **D10** At least the minimum illuminance provided for emergency safety lighting			

Figure H.2 **Model completion certificate – Design – Declaration of conformity** *(2 of 2)*

Deviations from standards (to be entered on Completion Certificate)	
Clause number	**Details of deviation**

Name of competent person making the design declaration of conformity (please print)

.....

Signature of competent person .....

For and on behalf of ..... Date.....

Figure H.3 **Model completion certificate – Installation – Declaration of conformity**

Serial Number:……..

Installation – Declaration of conformity

BS 5266-1: 2016 clause ref.	Recommendations	System conforms (if NO, record a deviation)		
		YES	NO	N/A
Clause **6**	**IN1** The system installed conforms to the agreed design			
6.1	**IN2** All non-maintained luminaires fed or controlled by the final circuit supply of their local normal mains lighting			
6.4	**IN3** Luminaires mounted at least 2 m above the floor			
6.4	**IN4** Luminaires mounted at a suitable height to avoid being located in smoke reservoirs or other likely area of smoke accumulation			
5.2.9 **5.2.9.1** **5.2.9.2**	**IN5** Safety signs provided as follows: a) Escape route signs in accordance with BS EN ISO 7010 and BS 5499-4, adequately illuminated and identifiable b) Other safety signs in accordance with BS EN ISO 7010 and BS 5499-10, adequately illuminated and identifiable			
8.2	**IN6** The wiring of central power systems has adequate fire protection and is appropriately sized			
8.3.5	**IN7** Output voltage range of the central power system is compatible with the supply voltage range of the luminaries, taking into account supply cable voltage drop			
8.2.12	**IN8** All plugs and sockets protected against unauthorized use			
8.3.3	**IN9** The system has suitable and appropriate testing facilities for the specific site			
Clause **11**	**IN10** The equipment manufacturers' installation and verification procedures satisfactorily completed			
Clause **8**	**IN11** The system conforms to BS 7671			

Deviations from standards
(to be entered on Completion Certificate)

Clause number	Details of deviation

Name of competent person making the installation declaration of conformity (please print)

……

Signature of competent person ……

For and on behalf of …… Date……

Figure H.4 **Model completion certificate – Verification – Declaration of conformity** *(1 of 2)*

Serial Number:……..

Verification – Declaration of conformity

BS 5266-1: 2016 clause ref.	Recommendations	System conforms (if NO, record a deviation)		
		YES	NO	N/A
4.2	**V1** Plans available and correct			
8.3.3	**V2** System has a suitable test facility for the application			
5.2.9	**V3** All escape route safety signs and fire-fighting equipment location signs, and other safety signs identified from risk assessment, visible with the normal lighting extinguished			
Clause **5**	**V4** Luminaires correctly positioned and oriented as shown on the plans			
6.7.1	**V5** Luminaires conform to BS EN 60598-2-22			
6.7.1	**V6** Luminaires have an appropriate category of protection against ingress of moisture or foreign bodies for their location as specified in the system design			
Clause **12**	**V7** Luminaires tested and found to operate for their full rated duration			
Clause **12**	**V8** Under test conditions, adequate illumination provided for safe movement on the escape route and the open areas, paths under emergency safety lighting, and operations within high risk task areas NOTE This can be checked by visual inspection and checking that the illumination from the luminaires is not obscured and that minimum design spacings have been met.			
Clause **12**	**V9** After test, the charging indicators operate correctly			
8.2	**V10** Fire protection of central wiring systems satisfactory			
8.2.6	**V11** Emergency circuits correctly segregated from other supplies			
10.6; **10.7**; Clause **11**	**V12** Operation and maintenance instructions together with a suitable log book showing a satisfactory verification test provided for retention and use by the building occupier			

Additional recommendations for verification of an existing installation

10.7 and Clause **12**	**V13** Building occupier and their staff trained on suitable maintenance, testing and operating procedures, or a suitable maintenance contract agreed			
Clause **11**	**V14** Test records in the log book complete and satisfactory			
Clause **12**	**V15** Luminaires clean and undamaged with lamps in good condition			
Clause **6**	**V16** Original design still valid NOTE If the original design is not available this needs to be recorded as a deviation.			

Figure H.4 **Model completion certificate – Verification – Declaration of conformity** *(2 of 2)*

Deviations from standards
(to be entered on Completion Certificate)

Clause number	Details of deviation

Name of competent person making the verification declaration of conformity (please print)

.....

Signature of competent person .....

For and on behalf of ..... Date.....

Annex I (informative) Model certificate for completion of small new installations

A model certificate for the completion of small new installations is shown in Figure I.1 and Figure I.2.

The general declaration shown in Figure I.1 is completed by the responsible person, after the separate certificate shown in Figure I.2 has been completed by the competent person who carried out the work.

Figure I.1 **Model certificate for completion of small new installations – General declaration**

Serial Number:……..

EMERGENCY LIGHTING SMALL NEW INSTALLATIONS COMPLETION CERTIFICATE

For Small New Installations up to 25 self-contained luminaires

Occupier/owner.....

Address of premises .....

.....

Declaration of Conformity

In consequence of acceptance of the appended declaration, I/we* hereby declare that the emergency lighting system installation, or part thereof, at the above premises conforms, to the best of my/our* knowledge and belief, to the appropriate recommendations given in BS 5266-1:2016, *Emergency lighting – Part 1: Code of practice for the emergency lighting of premises*, BS EN 1838:2013 *Lighting applications – Emergency lighting* and BS EN 50172:2004, *Emergency escape lighting systems*, as set out in the accompanying declarations, except as stated below/overleaf.

* Delete as appropriate.

Signed, on behalf of owner/occupier .....

Name.....

Deviations from standards

Declaration (Design, installation or verification)	**Clause number**	**Details of deviation**

This Certificate is only valid when accompanied by current:

a) Signed declaration (see overleaf).

b) Photometric design data. This can be in any of the following formats but in all cases appropriate de-rating factors must be used and identified to meet worst case requirements.

- Authenticated spacing data such as ICEL 1001 registered tables**.
- Calculations as detailed in BS 5266-1:2016, Annex D, and CIBSE/SLL Guide LG12***.
- Appropriate computer print-out of results.

c) Test log book.

**Available from Industry Committee for Emergency Lighting, Stafford Park 7, Telford TF3 3BQ.

***Available from Chartered Institution of Building Services Engineers, Delta House, 222 Balham High Road, London SW12 9BS.

Figure I.2 **Model certificate for completion of small new installations – Declaration of conformity** *(1 of 2)*

Serial Number:……...

Site Address			Responsible Person		
BS 5266-1: 2016 clause ref.	Competent person function D-Designer, I-Installer, V-Verifier		Inspection Date		
	D,I,V	**Check of categories and documentation**	**YES**	**NO**	**N/A**
4.2	D,V	Are plans of the system available and correct?			
6.7	D,V	Has the system been designed for the correct mode of operation category?			
6.7	D,V	Has the system been designed for the correct emergency duration period?			
Clause **11**	D,V	Is a completion certificate available with photometric design data?			
Clause **11**	D,I,V	Is a test log book available and are the entries up to date?			
		Check of design			
4.1; **5.2.8**	D,I,V	Are the correct areas of the premises covered to meet the risk assessment?			
5.2.8	D,I,V	Are all hazards identified by the risk assessment covered?			
5.2.8	D,I,V	Are there luminaires sited at the "points of emphasis"?			
5.2.2	D,I,V	Is the spacing between luminaires compliant with authenticated spacing or design data?			
5.2.9	D,I,V	Are the emergency exit signs and escape route direction signs correct and the locations of other safety signs to be illuminated under emergency conditions identified?			
6.1	D,I,V	Do all non-maintained luminaires operate on local final circuit failure?			
6.3	D,V	Is there illumination from at least two luminaires in each section of the escape route?			
6.4	I,V	Are luminaires at least 2 m above floor and avoiding smoke reservoirs?			
5.2.8.5; **5.2.8.6**	D,V	Are additional luminaires located to cover toilets, lifts, plant rooms, etc.?			
		Check of the quality of the system components and installation			
6.7	D,I,V	Do the luminaires conform to BS EN 60598-2-22?			
6.7	D,I,V	Do any converted luminaires conform to BS EN 60598-2-22?			
6.7	D,I,V	Do luminaires have a suitable degree of protection for their location?			
Clause **8**	I,V	Does the installation conform to the good practice defined in BS 7671?			
8.2.12	D,I,V	Are any plugs or sockets protected against unauthorized use?			

Figure I.2 **Model certificate for completion of small new installations – Declaration of conformity** *(2 of 2)*

		Test facilities	**YES**	**NO**	**N/A**
8.3.3	D,V,I	Are the test facilities suitable to test function and duration?			
8.3.3	D,I,V	Are the test facilities safe to operate and do not isolate a required service?			
8.3.3	D,I,V	Are the test facilities clearly marked with their function?			
8.3.3	D,I,V	If an automatic test system is installed, does it conform to BS EN 62034?			
10.7	D,V	Is the responsible person trained and able to operate the test facilities and record the test results correctly?			
		Final acceptance to be conducted at completion			
Clause **12**	D,I,V	Does the system operate correctly when tested?			
10.7	D,I,V	Has adequate documentation been provided to the user?			
10.7	D,I,V	Is the user aware of action they should take in the event of a test failure?			

Action recommended or deviation to be reported:

Name of competent person making the declaration of conformity (please print)

.....

Signature of competent person .....

For and on behalf of ..... Date.....

Annex J (informative)

Emergency lighting log book

Every emergency lighting installation needs to be provided with a log book.

The information that the log book contains varies from installation to installation, e.g. the content provided for an installation comprising a single self-contained luminaire is likely to be considerably less than for a shopping centre or factory complex. In the former, a single page of installation-specific explanation and a manufacturer's data sheet might suffice, whilst in the latter, many volumes might be required. The log book may also be a component part of a much larger operation and maintenance document covering the whole building.

Before embarking on the production of a log book, it is advisable to determine the presentation format required; for example, is it to be a stand-alone document or fully or partially included in a larger document; is it to be presented in paper or electronic format; if it is to be electronic, does any particular software need to be used.

Every emergency lighting installation is unique, but whatever its size and complexity, the technical design and practical aspects of its installation are common to a large extent. The general format and contents of a typical emergency lighting installation log book, as set out in this annex, can be used in the daily maintenance and operation of the installation and inform future modification to, or removal and disposal of, the installation.

A typical emergency lighting installation log book contains the following information.

a) Part 1: Contractual and legal details. This section includes:

   1) name and address of the installation;

   2) details of premises ownership (landlord, developer, tenant, third party, etc.) and extent of responsibility for the emergency lighting installation;

   3) details of leases, wayleaves, covenants, etc. affecting the premises and considered during the design stage;

   4) details of adjacent premises, common areas, surrounding public or private spaces, etc. which influenced the design;

   5) details of local authority consents applicable to the premises (planning requirements or restrictions, building control sign-off, etc.);

   6) details of who owns the copyright of the finished log book.

b) Part 2: Project brief. This section includes details of the brief provided, setting out the reasons for commissioning a new emergency lighting installation or modifying an existing installation. It also includes details of any specific requirements which affected the design or installation.

c) Part 3: Risk analysis. This section provides a record of the risk analysis carried out and the specific risks which were addressed in the design. It covers risks identified both inside and outside the premises, which might include:

   1) details of toxic or noxious materials present in the premises;

   2) hot surfaces;

   3) processes which might be dangerous;

   4) dangerous machinery, etc., which might have warning signs or safety instructions that need to be highlighted by emergency lighting.

d) Part 4: Equipment details. This section gives details of the manufacturer, type, model/part number, serial number and similar information for all components forming the installation.

e) Part 5: Design and/or modification. This section sets out details of the installation design or modification, including:

   1) reasons for selecting particular items of equipment;

   2) considerations relating to the choice of luminaires;

   3) why the chosen wiring methods were selected;

   4) other relevant information which might be required for an understanding of the system design and its future modification.

f) Part 6: Calculations. This section sets out details of the calculations carried out and results obtained.

g) Part 7: Drawings. This section includes all drawings, schematics, etc.

h) Part 8: Commissioning data. This section includes the results of all commissioning works and any remedial works carried out.

i) Part 9: Operation. This section gives instructions for the safe and efficient operation of the installation, under both normal conditions and emergency conditions, cross-referring to manufacturers' information where appropriate.

j) Part 10: Maintenance. This section provides schedules for all preventative maintenance, such as inspections, tests, adjustments/re-calibration and lubrication, that are to be carried out on the installation and its component parts.

k) Part 11: Spare parts and special tools. This section includes the following information:

   1) a list identifying replaceable assemblies, sub-assemblies, and components;

   2) identification of manufacturers' recommended replacement periods for components that have a low mean time between failures (MTBF), e.g. cooling fans and filters;

   3) a recommended list of spare parts to be held on site, if components are not readily available;

   4) information relating to the diagnosis of faults and their correction, where this is not obvious;

   5) where special tools not normally carried by service personnel are required, information on where they can be obtained.

l) Part 12: Disposal. This section provides details of how the installation is to be de-commissioned, de-constructed and disposed of safely.

Annex K (informative) Model certificate for verification of existing installations

A model certificate for the verification of existing installations is shown in Figure K.1 and Figure K.2.

The general declaration shown in Figure K.1 is completed by the responsible person, after the separate checklist and report shown in Figure K.2 has been completed by the competent person who carried out the work.

Figure K.1 **Model certificate for completion of existing installations – General declaration**

Serial Number:.....

EMERGENCY LIGHTING EXISTING SITE COMPLIANCE CERTIFICATE

For Verification of Existing Installations

Occupier/owner.....

Address of premises .....

.....

Declaration of Conformity

In consequence of acceptance of the appended checklist and report, I/we* hereby declare that the emergency lighting system installation, or part thereof, at the above premises conforms, to the best of my/our* knowledge and belief, to the appropriate recommendations given in BS 5266-1:2016, *Emergency lighting – Part 1: Code of practice for the emergency lighting of premises*, BS EN 1838:2013 *Lighting applications – Emergency lighting* and BS EN 50172:2004, *Emergency escape lighting systems*, as set out in the accompanying declarations, except as stated below/overleaf.

* Delete as appropriate.

Signed, on behalf of owner/occupier .....

Name.....

Deviations from standards

Declaration (Design, installation or verification)	**Clause number**	**Details of deviation**

This Certificate is only valid when accompanied by current:

a) Signed checklist and report, as applicable (see overleaf).

b) Photometric design data. This can be in any of the following formats but in all cases appropriate de-rating factors must be used and identified to meet worst case requirements.

- Authenticated spacing data such as ICEL 1001 registered tables**.
- Calculations as detailed in BS 5266-1:2016, Annex D, and CIBSE/SLL Guide LG12***.
- Appropriate computer print-out of results.
- Site test light readings.

c) Test log book.

**Available from Industry Committee for Emergency Lighting, Stafford Park 7, Telford TF3 3BQ.

***Available from Chartered Institution of Building Services Engineers, Delta House, 222 Balham High Road, London SW12 9BS.

Figure K.2 **Model certificate for verification of existing installations – Checklist and report** *(1 of 2)*

Serial Number:……...

Site Address			Responsible Person		
BS 5266-1: 2016 clause ref.	Competent person function D-Designer, I-Installer, V-Verifier		Inspection Date		
	D,I,V	**Check of categories and documentation**	**YES**	**NO**	**N/A**
4.2	D,V	Are plans of the system available and correct?			
6.7	D,V	Has the system been designed for the correct mode of operation category?			
6.7	D,V	Has the system been designed for the correct emergency duration period?			
Clause **11**	D,V	Is a completion certificate available with photometric design data?			
Clause **11**	D,I,V	Is a test log book available and are the entries up to date?			
		Check of design			
4.1; 5.2.8	D,I,V	Are the correct areas of the premises covered to meet the risk assessment?			
5.2.8	D,I,V	Are all hazards identified by the risk assessment covered?			
5.2.8	D,I,V	Are there luminaires sited at the "points of emphasis"?			
5.2.2	D,I,V	Is the spacing between luminaires compliant with authenticated spacing or design data?			
10.3	D,I,V	If authenticated spacing data is not available for existing installations, are estimates attached and acceptable?			
5.2.9	D,I,V	Are the emergency exit signs and escape route direction signs correct and the locations of other safety signs to be illuminated under emergency conditions identified?			
6.1	D,I,V	Do all non-maintained luminaires operate on local final circuit failure?			
6.3	D,V	Is there illumination from at least two luminaires in each section of the escape route?			
6.4	I,V	Are luminaires at least 2 m above floor and avoiding smoke reservoirs?			
5.2.8.5; **5.2.8.6**	D,V	Are additional luminaires located to cover toilets, lifts, plant rooms, etc.?			
		Check of the quality of the system components and installation			
6.7	D,I,V	Do the luminaires conform to BS EN 60598-2-22?			
6.7	D,I,V	Do any converted luminaires conform to BS EN 60598-2-22?			
6.7	D,I,V	Do luminaires have a suitable degree of protection for their location?			
Clause **8**	I,V	Does the installation conform to the good practice defined in BS 7671?			
8.2.1	D,I,V	For centrally powered systems, is the wiring fire-resistant?			
8.2.12	D,I,V	Are any plugs or sockets protected against unauthorized use?			
7.2	D,I,V	If a central power supply unit is used, does it conform to BS EN 50171?			

Figure K.2 **Model certificate for verification of existing installations – Checklist and report** *(2 of 2)*

		Test facilities	**YES**	**NO**	**N/A**
8.3.3	D,V,I	Are the test facilities suitable to test function and duration?			
8.3.3	D,I,V	Are the test facilities safe to operate and do not isolate a required service?			
8.3.3	D,I,V	Are the test facilities clearly marked with their function?			
8.3.3	D,I,V	If an automatic test system is installed, does it conform to BS EN 62034?			
10.7	D,V	Is the responsible person trained and able to operate the test facilities and record the test results correctly?			
		Final acceptance to be conducted at completion			
Clause **12**	D,I,V	Does the system operate correctly when tested?			
10.7	D,I,V	Has adequate documentation been provided to the user?			
10.7	D,I,V	Is the user aware of action they should take in the event of a test failure?			

Action recommended or deviation to be reported:

Name of competent person completing the checklist and report (please print)

.....

Signature of competent person .....

For and on behalf of..... Date.....

Annex L (informative) Additional guidance on the compliance checklist and report for an existing site

L.1 General

Responsible persons are required to demonstrate that emergency lighting is appropriate to protect occupants. New buildings are well provided for; the checklist and report in Annex K covers existing premises where current valid documentation is not available.

Typical reasons for use of this substitute system documentation include the following.

a) The use of the building might have changed, for example, equipment that was satisfactory for a warehouse would probably not be adequate if the premises were turned into a bar, so the original documentation would not be relevant.

b) Small premises that previously did not require a fire certificate might now need to be assessed as safe for their occupants.

c) Equipment ages and might no longer perform as well as it needs to. Correct design builds in reasonable degradation factors but these can be exceeded.

d) With improved knowledge and understanding of risks, safety standards have improved. Emergency lighting levels now highlight specific hazard areas, and equipment requirements take advantage of improved products such as LED luminaires, fluorescent luminaires and the use of fire-resistant cables.

e) The original documentation might never have been provided or could have become lost.

Advice is given in **L.2**, **L.3** and **L.4** on the procedures to be used to fill in the checklist report.

L.2 Design

The location of escape routes has to conform to guidance given in the relevant risk assessment guide.

In earlier editions of BS 5266-1, a reduced light level of a minimum of 0.2 lx on the centreline of escape routes was allowable for routes that were permanently unobstructed. They now need to be reported to the responsible person to assess if they are acceptable or if they need to be upgraded to the current value of 1 lx.

Prior to 1988, open areas were not classified as needing coverage. However, since then BS 5266-1 has recommended that rooms should have emergency lighting if:

a) they are larger than 60 m^2;

b) they have an escape route passing through them; or

c) they have a hazard that is identified by the site risk assessment.

If these routes and areas are not provided with adequate emergency lighting, the report needs to recommend that this omission be defined in the risk assessment.

Safety signs have to be adequately illuminated, either as an internally illuminated sign or by having an emergency luminaire produce a vertical illuminance of at least 5 lx at the face of the safety sign (see **5.2.9**).

Emergency luminaires have to be located at specific hazard and safety locations, i.e. “points of emphasis”.

The original site design data will ideally contain the design spacing calculations, which can be checked against the installation. In practice, obtaining the data for existing installations can be difficult. If authenticated spacing tables are not available, the nearest luminaire format with a similar battery voltage/Ah capacity and diffuser type can be used to estimate acceptability. Authenticated spacing tables are produced by test houses and the products checked for conformity under BS EN ISO 9001; this is preferable to verifying actual levels on site, which is difficult and time-consuming. Failures or estimations in this area need to be reported and, depending on the site, the installation rectified by adding luminaires or replacing them with better performing systems.

Care has to be taken when testing systems that do not have approved luminaires installed, as they often ignore derating factors and can therefore fail prematurely.

L.3 Quality of the system components and installation

If non-maintained luminaires are not supplied from the final lighting circuit, a failure of the lighting circuit will not activate the emergency lighting. In this case, either the wiring needs to be corrected or the fittings changed for the maintained type.

If the central system wiring does not offer adequate fire resistance, either the cable can be supplied with additional fire protection, or the cores of a conduit system can be withdrawn and replaced by appropriate silicon insulated cable.

If self-contained luminaires fail to reach their rated duration, they or their batteries need to be replaced. It is essential that replacement batteries are of the correct type, or they could cause sudden premature failure. Central battery systems need to be checked first, to see that the system has not been overloaded. If this is not the case, the battery needs to be replaced.

If luminaires are dirty, they need to be cleaned. If the diffusers are badly discoloured (i.e. yellow or brown), this is likely to be a result either of ageing or of excessive exposure to ultra violet light; modern diffusers use plastics that are highly UV stable, so it tends to apply to old-style luminaires. Either the diffuser or the complete luminaire needs to be replaced.

If a luminaire fluorescent lamp shows signs of serious blackening at the tube ends, this is either because it is old and needs replacing, or it can be a sign that the luminaire is subject to excessive switching. Either condition needs rectifying.

L.4 Records, test facilities and training

If site plans and test log records (see **4.2** and **4.3**) are not available, blank record sheets can be used. If site plans cannot be provided, blank drawings can be marked up.

It is important that testing and maintenance are carried out regularly to identify any possible faults at an early stage (see **8.3.3** and Clause **12**).

The test facilities recommended in **8.3.3** might not be available in existing sites. If the procedures do not enable the system to be tested completely and safely, additional facilities are needed.

The responsible person needs to be trained to:

a) perform the testing function;

b) keep the premises safe; and

c) obtain action to rectify any faults found.

Annex M (informative) Model periodic inspection and test certificate

A model periodic inspection and test certificate is shown in Figure M.1 to Figure M.3.

Figure M.1 **Model emergency lighting inspection and test certificate**

Emergency Lighting Inspection and Test Certificate For systems designed to BS 5266-1 and BS EN 50172/BS 5266-8			
WARNING **Full duration tests involve discharging the batteries, so the emergency lighting system will not be fully functional until the batteries have had time to recharge. For this reason, always carry out testing at times of minimal risk, or only test alternate luminaires at any one time.**			
System manufacturer Contact phone number			
System installer Contact phone number			
Competent person responsible for verification and annual tests Name …….. Signature ……..			Phone number
Site address			
Responsible person			
Date the system was commissioned			
Details of system mode of operation	Non-maintained		
	Non-maintained luminaires, maintained signs		
	Maintained		
	Other		
Duration of system	..... Hours	Is automatic test system fitted?	Y/N
Details of additions or modifications to the system or the premises since original installation			
Addition or modification			**Date**
Action to be taken on finding a failure • The supplier of the system or a competent person should be contacted to rectify the fault. • A risk assessment of the failure should be conducted; this should evaluate the people who will be at increased risk and the level of that risk. Based on this data and, if necessary, advice from the Fire Authority, the appropriate action should be taken. • Action may be: To warn occupants to be extra vigilant until the system is rectified To initiate extra safety patrols To issue torches as a temporary measure In a high risk situation, to limit use of all or part of the building Test programs for identifying early failures can reduce the chances of failure of two adjacent luminaires at the same time.			

Figure M.2 **Model emergency lighting inspection and test record**

Emergency Lighting Inspection and Test Record **Sheet number:** **Site:**				
Test types:	C = Commissioning and verification test			
	M = Monthly test (see BS EN 50172:2004/BS 5266-8:2004, **7.2.3**)			
	A = Annual test (see BS EN 50172:2004/BS 5266-8:2004, **7.2.4**)			
Date of test	**Test type**	**Result – Test passed No action needed**	**Result – Test failed**	
			Need for repair of system notified	**Need for safeguarding of premises notified**
		Name	Name	Name
	C			
	M – 1st month			
	M – 2nd month			
	M – 3rd month			
	M – 4th month			
	M – 5th month			
	M – 6th month			
	M – 7th month			
	M – 8th month			
	M – 9th month			
	M – 10th month			
	M – 11th month			
	A – 1st year			
	M – 1st month			
	M – 2nd month			
	M – 3rd month			
	M – 4th month			
	M – 5th month			
	M – 6th month			
	M – 7th month			
	M – 8th month			
	M – 9th month			
	M – 10th month			
	M – 11th month			
	A – 2nd year			
	M – 1st month			
	M – 2nd month			
	M – 3rd month			
	M – 4th month			
	M – 5th month			
	M – 6th month			
	M – 7th month			
	M – 8th month			
	M – 9th month			
	M – 10th month			
	M – 11th month			
	A – 3rd year			

Figure M.3 **Model emergency lighting fault action record**

Emergency Lighting Fault Action Record		**Sheet number:**	
Contact references	**Contact name**	**Phone number**	
Equipment supplier:			**For replacement parts**
Maintenance engineer:			**Competent person**
Responsible person:			**Site control**

Date of failure	**Action taken to safeguard the premises** (Details and signature)	**Action taken to rectify the system** (Details and signature)	**Date system repaired**

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