IEC 60598-2-22

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REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

Luminaires –
Part 2-22: Particular requirements – Luminaires for emergency lighting

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LUMINAIRES –

Part 2-22: Particular requirements – Luminaires for emergency lighting

FOREWORD

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IEC 60598-2-22 has been prepared by subcommittee 34D: Luminaires of IEC technical committee 34: Lighting. It is an International Standard.

This fifth edition cancels and replaces the fourth edition published in 2014 and Amendment 1:2017. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) update of requirements for rest mode and inhibiting mode;
b) clarification of high temperature operation tests;
c) introduction of new requirements for lithium batteries;
d) introduction of new requirements for electric double layer capacitors (EDLCs);
e) clarification of resistance to heat, fire and tracking;
f) clarification of test facilities for self-contained luminaires;
g) clarification of the test method for contrast measurements of exit signs.

The text of this International Standard is based on the following documents:

Draft	Report on voting
34D/1635/FDIS	34D/1642/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

This Part 2-22 is to be used in conjunction with the latest edition of IEC 60598-1 and its amendment(s). It was established on the basis of the ninth edition (2020) of that standard.

NOTE 1 When "Part 1" is mentioned in this document, it refers to IEC 60598-1.

NOTE 2 In this document, the following print type is used:

– compliance statements: *in italic type.*

A list of all parts in the IEC 60598 series, published under the general title *Luminaires*, can be found on the IEC website.

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The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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~~INTRODUCTION to Amendment 1~~

~~The light output of LED light sources depends also on the temperature at which it is operated. Typically the temperature is controlled by a heat sink on which it is mounted (e.g. luminaire surface).~~

~~For this reason, the calculation of the ratio of the electrical parameter (EOF_x) will be introduced in the LED controlgear standards IEC 61347-2-13 and IEC 61347-2-7, as the direct measurement of EBLF is not practicable.~~

~~In particular EOF_I is defined as the ratio of the current in emergency mode from constant current controlgear divided by the nominal current of LED ($I_{normal\ mode}$):~~

$$EOF_I = I_{emergency} / I_{normal\ mode}$$

~~Knowing that the light output of an LED light source is nearly[1] directly proportional with the forward current flowing through it, it is possible to calculate the luminous flux of the luminaire in emergency mode by using the EOF_I or $I_{emergency}$ from constant current controlgear.~~

~~This document contains a proposal for the modification of IEC 60598-2-22 to use the factor EOF_I or $I_{emergency}$ in the luminaire.~~

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[1] ~~*Any non-linearity due to the increased efficacy at lower operation temperature leads to an increased tolerance of the light output in the emergency mode but always positive.*~~

LUMINAIRES –

Part 2-22: Particular requirements – Luminaires for emergency lighting

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22.1 Scope

This part of IEC 60598 specifies requirements for emergency luminaires for use with electrical lamps on emergency power supplies not exceeding 1 000 V.

This document does not cover the effects of non-emergency voltage reductions on luminaires incorporating high pressure discharge lamps.

This document gives general requirements for emergency lighting equipment.

In this document, the term "lamp" which also includes "light source(s)" where appropriate, is used.

22.2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60073, *Basic and safety principles for man-machine interface, marking and identification – Coding principles for ~~indication devices~~ indicators and actuators*

IEC 60155, *Glow-starters for fluorescent lamps*

IEC 60598-1, *Luminaires – Part 1: General requirements and tests*

IEC 60896-21, *Stationary lead-acid batteries – Part 21: Valve regulated types – Methods of test*

IEC 61032:1997, *Protection of persons and equipment by enclosures – Probes for verification*

IEC 61056-1, *General purpose lead-acid batteries (valve-regulated types) – Part 1: General requirements, functional characteristics – Methods of test*

IEC TR 61341, *Method of measurement of centre beam intensity and beam angle(s) of reflector lamps*

IEC 61347-2-2, *Lamp controlgear – Part 2-2: Particular requirements for d.c. or a.c. supplied electronic step-down convertors for filament lamps*

IEC 61347-2-3:2011, *Lamp control gear – Part 2-3: Particular requirements for a.c. and/or d.c. supplied electronic control gear for fluorescent lamps*

IEC 61347-2-7:2011, *Lamp controlgear – Part 2-7: Particular requirements for battery supplied electronic controlgear for emergency lighting (self-contained)*
IEC 61347-2-7:2011/AMD1:2017
IEC 61347-2-7:2011/AMD2:2021

IEC 61347-2-12, *Lamp controlgear – Part 2-12: Particular requirements for d.c. or a.c. supplied electronic ballasts for discharge lamps (excluding fluorescent lamps)*

IEC 61347-2-13, *Lamp controlgear – Part 2-13: Particular requirements for d.c. or a.c. supplied electronic controlgear for LED modules*

IEC 61951-1, *Secondary cells and batteries containing alkaline or other non-acid electrolytes~~.~~ ~~Portable sealed rechargeable single cells~~ – Secondary sealed cells and batteries for portable applications – Part 1: Nickel-Cadmium*

IEC 61951-2, *Secondary cells and batteries containing alkaline or other non-acid electrolytes~~.~~ ~~Portable sealed rechargeable single cells~~ – Secondary sealed cells and batteries for portable applications – Part 2: Nickel-metal hydride*

IEC 62034, *Automatic test systems for battery powered emergency escape lighting*

IEC 62133-2:2017, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary lithium cells, and for batteries made from them, for use in portable applications – Part 2: Lithium systems*

IEC 62391-1:2015, *Fixed electric double-layer capacitors for use in electric and electronic equipment – Part 1: Generic specification*

IEC 62391-2:2006, *Fixed electric double-layer capacitors for use in electronic equipment – Part 2: Sectional specification – Electric double-layer capacitors for power application*

IEC 62620:2014, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Secondary lithium cells and batteries for use in industrial applications*

~~ISO 3864-1:2011, *Graphical symbols — Safety colours and safety signs. Part 1: Design principles for safety signs and safety markings*~~

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

ISO 30061:2007, *Emergency lighting*

CIE 121 SP1, ~~*The photometry of emergency luminaires*~~ *The Photometry and Goniophotometry of Luminaires – Supplement 1: Luminaires for Emergency Lighting*

CIE S025, *Test Method for LED Lamps, LED Luminaires and LED Modules*

22.3 Terms and definitions

For the purposes of this document, the terms and definitions given in Part 1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/

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- ISO Online browsing platform: available at http://www.iso.org/obp

22.3.1
emergency lighting
lighting for use when the supply to the normal lighting fails

Note 1 to entry: Emergency lighting includes emergency escape lighting, high-risk task-area lighting and standby lighting.

22.3.2
emergency escape lighting
that part of emergency lighting that provides illumination for the safety of people leaving an area or attempting to terminate a dangerous process before vacating an area

22.3.3
standby lighting
that part of emergency lighting that enables normal activities to continue substantially unchanged

22.3.4
high-risk task-area lighting
part of emergency lighting provided to ensure 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 occupants of the premises

22.3.5
maintained emergency luminaire
luminaire in which the emergency lighting lamps are energized at all times when normal or emergency lighting is required

22.3.6
non-maintained emergency luminaire
luminaire in which the emergency lighting lamps are in operation only when the supply to the normal lighting fails

22.3.7
combined emergency luminaire
luminaire containing two or more lamps, at least one of which is energized from the emergency lighting supply and the others from the normal lighting supply

Note 1 to entry: A combined emergency luminaire is either maintained or non-maintained.

22.3.8
self-contained emergency luminaire
luminaire providing maintained or non-maintained emergency lighting in which all the elements, such as ~~the battery~~ the electric source for safety services (ESSS), the lamp, the control unit and the test and monitoring facilities, where provided, are contained within the luminaire or adjacent to it (that is, within 1 m cable length)

22.3.9
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

22.3.10
compound self-contained emergency luminaire
self-contained luminaire providing maintained or non-maintained emergency lighting and also providing emergency supply for operating a satellite luminaire

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22.3.11
satellite emergency luminaire
luminaire for maintained or non-maintained operation which derives emergency operation supply from an associated compound self-contained emergency luminaire

22.3.12
control unit
unit or set of units comprising a supply changeover system, ~~a battery~~ an electric source for safety services (ESSS) charging device and, where appropriate, a means for testing

Note 1 to entry: This unit ~~may~~ can also contain the lamp controlgear.

22.3.13
normal supply failure
condition in which the normal lighting can no longer provide a minimum illuminance for emergency escape purposes and when the emergency lighting should become operative

22.3.14
emergency luminaire rated luminous flux
lumen output as claimed by the luminaire manufacturer, 60 s (0,5 s for high-risk task-area luminaires) after failure of the normal supply, and continuously maintained to the end of the rated duration of operation

22.3.15
rated duration of emergency operation
time, as claimed by the manufacturer, during which the rated emergency lumen output is provided

22.3.16
normal mode
state of a self-contained emergency luminaire that is ready to operate in emergency mode while the normal supply is on

Note 1 to entry: In the case of a normal supply failure, the self-contained luminaire automatically changes over to the emergency mode.

22.3.17
emergency mode
state of a self-contained emergency luminaire that provides lighting when energized by its internal power source, the normal supply having failed

22.3.18
rest mode
state of a self-contained emergency luminaire that has been intentionally extinguished while the normal supply is off and that, in the event of restoration of the normal supply, automatically reverts to normal mode

22.3.19
maximum overcharge rate
maximum continuous charge rate (e.g. current or voltage) that ~~may~~ can be applied to a fully charged ~~battery~~ electric source for safety services (ESSS)

22.3.20
remote inhibiting facility
means for inhibiting remotely a luminaire associated with an emergency lighting system

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22.3.21
remote inhibiting mode
state of a self-contained emergency luminaire which is inhibited from operating by a remote device while the normal supply is on and in the case of a normal supply failure when the luminaire does not change over to emergency mode

22.3.22
internally illuminated safety sign
self-contained or centrally supplied emergency luminaire intended to provide a specific safety message obtained by a combination of colour and geometric shapes

Note 1 to entry: Details are given in ISO 3864-1 and ISO 3864-4.

22.3.23
practical emergency lamp flux
PELF
minimum luminous flux of the lamp observed during the rated duration of the emergency mode

Note 1 to entry: PELF = LDL × EBLF
where LDL is the rated luminous flux of fluorescent or discharge lamp; this is taken as the initial lighting design lumens at 100 h.

~~Note 2 to entry: This note applies to the French language only.~~

22.3.24
self-contained portable emergency luminaire
portable luminaire providing emergency lighting where all of the elements, such as ~~the battery~~ the electric source for safety services (ESSS), the lamp(s), the control unit, a manual switch for switching on or off one or more lamp and the test and monitoring facilities, where provided, are contained within the luminaire which can be detached from its base unit for use in the emergency mode

22.3.25
emergency ballast lumen factor
EBLF
ratio of the emergency luminous flux of the lamp supplied by the emergency controlgear to the luminous flux of the same lamp operated with the appropriate reference ballast at its rated voltage and frequency

Note 1 to entry: The emergency ballast lumen factor is the minimum of the values measured at the appropriate time after failure of the normal supply and continuously to the end of the rated time duration.

~~Note 2 to entry: This note applies to the French language only.~~

[SOURCE: IEC 61347-2-7:2011, 3.13]

22.3.26
emergency luminaire mounted on lighting track system
emergency luminaire specifically designed to be used on luminaire track systems

22.3.27
~~**emergency**~~ **remote box**
box complying with the same requirements as the emergency luminaire

Note 1 to entry: Its purpose is to contain any of the components e.g. battery, controlgear that will not be fitted into the emergency luminaire.

22.3.28
practical emergency light source flux
PELSF
minimum luminous flux of the light source observed during the rated duration of the emergency mode

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Note 1 to entry: For LED light sources:

a) if EOF_l is given: PELSF = LDL × EOF_l

b) if $I_{emergency}$ from constant current controlgear is defined: PELSF = LDL × ($I_{emergency}$ / $I_{normal\ mode}$)
where LDL is the lumen output of the LED module under the condition corresponding to the operation in the luminaire (identical t_p) operated at the same current ($I_{normal\ mode}$).

~~Note 2 to entry: This note only applies to the French language.~~

22.3.29
battery manufacturer's declaration of design
document issued by the battery manufacturer that provides technical information necessary to evaluate the safe use of the battery and its operating regime in accordance with the requirements of this document

Note 1 to entry: Examples of the battery manufacturer's declaration of design for a lithium battery is given in IEC 61347-2-7.

22.3.30
rated capacity
capacity value of a battery determined under specified conditions and declared by the manufacturer

[SOURCE: IEC 60050-482:2004, 482-03-15]

22.3.31
electric source for safety services
ESSS
energy source for self-contained emergency luminaire, intended to supply the emergency lighting luminaire in emergency mode

Note 1 to entry: The ESSS can also supply the luminaire in rest mode and inhibiting mode.

22.3.32
electric double-layer capacitor
EDLC
device that stores electrical energy using a double-layer in an electrochemical cell

22.4 General test requirements

The provisions of Section 0 of Part 1 shall apply. The tests described in each appropriate section of Part 1 shall be carried out in the order listed in this document.

When testing combined emergency luminaires in accordance with the requirements of this document, the tests shall cover those parts of the luminaire which are involved with providing emergency lighting taking into account the influence of all other luminaire parts and components. The components and parts of the luminaires designed to provide only normal lighting shall be subjected to the tests in accordance with the requirements of the relevant part of IEC 60598-2 (for example, if the luminaire is recessed, it shall be tested in accordance with the requirements of the part dealing with recessed luminaires).

If some elements of an emergency luminaire are adjacent (within a 1 m cable length) to the main part of the luminaire, all the elements of the luminaire, including the means of inter-connection, shall satisfy the relevant requirements of this document.

The additional requirements covering self-contained portable emergency luminaires are given in Annex E.

The photometric tests of Clause 22.17 shall be made on a separate sample luminaire.

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Derating factors should be applied during the emergency lighting installation scheme design which is relevant to the application. These factors are normally defined by the relevant application standard.

22.5 Classification of luminaires

Emergency luminaires shall be classified in accordance with the provisions of Section 2 of Part 1 except that all emergency luminaires shall be classified as suitable for direct mounting on normally flammable surfaces.

Emergency luminaires shall also be classified as specified in Annex B.

22.6 Marking

The provisions of Section 3 of Part 1 shall apply together with the requirements of 22.6.1 to 22.6.20 below.

22.6.1 Luminaires shall be clearly marked with the rated supply voltage or voltage range(s).

22.6.2 Luminaires shall be clearly marked with details of their classification in accordance with Clause 22.5 (see Annex B).

22.6.3 Luminaires with replaceable lamps shall be clearly marked with details of the correct replacement lamp in a position visible during lamp replacement. This ensures that the emergency luminaire's rated luminous flux can be achieved.

NOTE The information relating to correct lamp replacement can include the number, type, rated voltage and rated wattage, etc.

22.6.4 Where appropriate, in addition to t_a marking, the range of ambient temperature shall be marked or given in the instruction leaflet supplied with the luminaire.

22.6.5 Emergency luminaires employing replaceable fuses and/or replaceable indicator lamps shall be marked with the details of fuse ratings and/or details of the indicator lamps.

22.6.6 For manual testing only, test facilities to simulate normal supply failure, where provided, shall be clearly marked so that the marking is visible during routine testing.

22.6.7 ~~Self-contained emergency luminaires shall be clearly marked with the details of correct battery replacement including the battery technology (e.g. NiMH), rated voltage, capacity, temperature rating, temperature classification and charge regime.~~

Self-contained luminaires shall be clearly marked with details about the nature of the ESSS it contains as follows.

22.6.7.1 Self-contained emergency luminaires with replaceable batteries shall be clearly marked with the details of the correct battery replacement. If the manufacturer indicates that the battery is only replaceable with a specific type, the battery technology (e.g. NiMH) and the type reference or the code of the replaceable battery shall be indicated. If the battery is replaceable with another type, the details shall include the battery technology (e.g. NiMH), rated voltage, capacity, temperature rating, and temperature classification.

Luminaires containing a non-replaceable battery(s) shall be marked to indicate that the battery is non-replaceable.

22.6.7.2 In self-contained luminaires with batteries, the batteries shall be marked with the year and month or year and week of manufacture.

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In self-contained luminaires with replaceable batteries, space shall be provided on the battery label to ~~permit~~ allow the marking, by the installer or commissioning engineer, of the date of commissioning of the battery.

For luminaires with non-replaceable batteries, the space for marking the date of commissioning shall be provided on the battery or on a label ~~to be observed~~ visible during maintenance.

22.6.7.3 Self-contained emergency luminaires with an EDLC shall be clearly marked with the details for correct EDLC replacement. If the manufacturer indicates that the EDLC is only replaceable with a specific type, it shall indicate the type reference or the code of the replaceable EDLC. If the EDLC is replaceable with another type, the details shall include the type of EDLC (according to the applicable IEC standard), (e.g. rated voltage, capacity, temperature rating, temperature classification, dimensions).

Luminaires containing a non-replaceable EDLC shall be marked to indicate that the EDLC is non-replaceable.

22.6.8 Void.

22.6.9 Combined emergency luminaires shall be marked with details relating to correct lamp replacement for all lamps. If the lamps used in the emergency circuit and the normal supply circuit differ, the respective types shall be clearly identified.

Lampholders for emergency lighting lamps in combined luminaires shall be identified by a green dot, at least 5 mm in diameter, which shall be visible when replacing the lamp.

22.6.10 In the instruction leaflet supplied with the self-contained emergency luminaire, the manufacturer shall state that the replacement of the ~~battery~~ ESSS or of the whole luminaire (if ~~having~~ equipped with a non-replaceable ~~lamp(s) and/or battery~~ ESSS) is needed when they no longer meet their rated duration of operation after the corresponding recharge period.

All details for correct replacement of the ESSS shall be included in the instruction leaflet supplied with the self-contained emergency luminaire. If the manufacturer indicates that the ESSS is only replaceable with a specific type, the type reference or the code of the replaceable ESSS shall be indicated. If the ESSS is replaceable with another type, the instructions shall include: ESSS technology or type (battery, e.g. NiMH), applicable IEC standard (EDLC), rated voltage, capacity, temperature rating, temperature classification.

In addition, the instruction leaflet supplied with the self-contained emergency luminaire shall contain the substance of the following information: "The electric source for safety service is not a user serviceable item and shall only be replaced by the manufacturer service agent or a similar qualified person".

22.6.11 In the instruction leaflet supplied with the luminaire, the manufacturer shall give details of test facilities incorporated in the luminaire or appropriate instructions if these test facilities are supplied separately. The instructions shall include details of test procedures.

22.6.12 In the instruction leaflet supplied with the luminaire, the manufacturer shall give details of the connection leads to be used between a compound self-contained luminaire and an associated satellite luminaire. The maximum length of cables that limits the voltage drop to 3 % shall be specified.

22.6.13 Void.

22.6.14 In the instruction leaflet supplied with self-contained emergency luminaires, the manufacturer shall give details of any device which changes the mode of operation.

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22.6.15 The manufacturer shall make available the photometric data in accordance with Clause 22.17.

22.6.16 Any normal preparation procedure for use of the luminaire shall be stated in the manufacturer's installation instructions. This preparation shall be carried out before type tests are made.

22.6.17 The marking required by 22.6.1, 22.6.2, 22.6.7.1 2nd paragraph, 22.6.7.3 2nd paragraph and 22.6.20 shall be in a position such that the information can be seen when the luminaire has been installed.

The marking in 22.6.5, 22.6.7.1 1st paragraph, 22.6.7.3 1st paragraph and 22.6.9 shall be visible during the maintenance of the relevant component.

NOTE For recessed luminaires, this information can be marked on the interior of the luminaire so that it is visible when the light controlling cover is removed.

22.6.18 The mounting instructions for luminaires intended for external plug and socket connections, without provisions to prevent accidental disconnection, shall be provided with the warning: "This luminaire is intended only for mounting in locations where the plug and socket are protected from unauthorized disconnection".

22.6.19 In the instruction leaflet supplied with the luminaire, the manufacturer shall specify if the lamp(s) and/or the ~~battery~~ ESSS is/are non-replaceable.

22.6.20 For emergency luminaires mounted on lighting track systems, they shall be marked to indicate that they are an emergency luminaire and shall not be adjusted by unauthorized persons. In the instruction leaflet supplied with the adjustable emergency track mounted luminaire, the manufacturer shall provide the photometric data.

22.6.21 In self-contained luminaires, the rated charge time, if lower than 24 h, can be declared in the instruction leaflet.

22.6.22 Where applicable, for self-contained luminaires, the manufacturer shall make available information for the allowed time for the luminaire to stay in rest mode or remote inhibiting mode after a full charging period, in order for the luminaire to provide at least 50 % of its rated duration of emergency operation.

The time shall be declared in the instruction leaflet supplied with the luminaire in days and calculated according to the procedure in IEC 61347-2-7:2011/AMD2:2021, 25.6.2.

NOTE 1 Examples of declared periods are 7, 30 or 90 days.

NOTE 2 The characteristics of rest mode and inhibiting mode are explained in Annex D.

22.6.23 *Compliance with the requirements of 22.6.1 to 22.6.~~20~~22 is checked by inspection.*

22.7 Construction

The provisions of Section 4 of Part 1 shall apply together with the requirements of 22.7.1 to 22.7.23 below. In addition, emergency luminaires with automatic testing systems shall comply with the additional requirements of IEC 62034 as identified in Annex K of IEC 61347-2-7:2011 and Annex K of IEC 61347-2-7:2011/AMD1:2017.

22.7.1 In emergency luminaires, fluorescent lamps used to provide emergency lighting shall start in the emergency mode without the aid of glow starters as specified in IEC 60155. Such starters shall not be in circuit during the emergency mode. The emergency lighting shall not be provided by means of fluorescent lamps with built-in glow starters.

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Compliance is checked by inspection.

22.7.2 Lamp controlgear for operating the emergency lamp(s) and control units incorporated into emergency luminaires shall comply with IEC 61347-2-2, IEC 61347-2-3, IEC 61347-2-7, IEC 61347-2-12 and IEC 61347-2-13 as appropriate and with the additional safety requirements for electronic controlgear for emergency lighting in the appropriate annex of the standards (e.g. Annex J of IEC 61347-2-3:2011).

Compliance is checked by the relevant tests specified in these standards.

22.7.3 Emergency luminaires shall be equipped with a protection device which disconnects the luminaire from the supply in case of any failure within that luminaire affecting the circuit (short circuit or overcurrent consumption).

Compliance is checked by measurement and inspection.

22.7.4 For emergency luminaires, the mechanical strength tests given in Part 1 shall be applied with a minimum impact energy of 0,35 Nm to all external parts.

22.7.5 Whilst connected to a live supply, self-contained emergency luminaires shall have adequate separation between the normal supply and live parts in the circuit for ~~battery~~ ESSS charging. When there are exposed live parts, double insulation, reinforced insulation, earth screen or other equivalent techniques can be used.

Additionally, in the event of bare contacts in the ~~battery~~ ESSS charging circuit, a safety isolating transformer shall be used. If a separating transformer is used as insulation between the normal supply and the ~~battery~~ ESSS charging circuit, the insulation in the ~~battery~~ ESSS charging circuit shall consist of at least basic insulation.

Compliance is checked by inspection and by the tests of Clauses 22.8 and 22.15.

22.7.6 In centrally supplied combined emergency luminaires, electrical separation between normal and emergency supplies shall be ensured by double insulation, reinforced insulation, earthed screen or other equivalent means.

EXAMPLE The use of basic insulation only, for both circuits, or double~~/~~ or reinforced insulation on the normal supply circuit fulfils this requirement. The connection of both circuits to a terminal block where the required creepage~~/~~ and clearances are obtained by leaving one terminal free, without the possibility of connection between the circuits, is also acceptable.

Compliance is checked by inspection.

22.7.7 Self-contained emergency luminaires shall have adjacent to them or incorporated in them a device for charging the ~~battery~~ ESSS from the normal supply and an indicator visible in normal use, for example a lamp, which shows the following conditions:

a) the luminaire is connected and the charge of the ~~battery~~ ESSS is being maintained;

b) circuit continuity exists through the tungsten filament of emergency lighting lamps where appropriate.

Where an electrical light source indicator is used, it shall comply with the colour requirements of IEC 60073 and be green.

For emergency luminaires with tungsten filament lamp(s) both a) and b) apply at the same time, and for other emergency luminaires without tungsten filaments, such as fluorescent and LED lamps, only a) applies.

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For emergency luminaires with tungsten filament lamps, compliance that circuit continuity exists through the tungsten filament is checked in the following manner: disconnection of one of the lamps, or all the lamps when connected in parallel, causes the indicator to extinguish or change colour in accordance with IEC 60073.

For all emergency luminaires, compliance that the charge indicator is correctly connected to the circuit is checked in the following manner: disconnection of the ~~battery~~ ESSS during the charging phase, causes the indicator to extinguish or change colour in accordance with IEC 60073.

22.7.8 Self-contained emergency luminaires shall incorporate ~~a battery~~ an ESSS that meets the requirements of Annex A and is designed to provide the rated duration for at least four years of normal operation. This ~~battery~~ ESSS shall be used only for emergency related functions within the luminaire or its satellite.

Compliance is checked by inspection and the tests of Annex A.

22.7.9 Void

22.7.10 In self-contained emergency luminaires, there shall be no manual or non-self-resetting circuits between the ~~battery~~ ESSS and emergency lighting lamps other than the changeover device.

Self-contained emergency luminaires and centrally supplied emergency luminaires shall not contain any manual or non-self-resetting switch isolating the emergency circuit(s) from the mains supply other than facilities enabling rest mode or ~~inhibition~~ inhibiting mode.

NOTE Installation details can be found in IEC 60364-5-56.

Compliance is checked by inspection.

22.7.11 Lamp failure. Any lamp failure (emergency or normal operating lighting lamps) shall not interrupt the charging current to the ~~battery~~ ESSS and shall not cause an overload that could impair the operation of the ~~battery~~ ESSS.

Compliance is checked by the test of Clause 22.6 of IEC 61347-2-7:2011 and Clause 22.6 of IEC 61347-2-7:2011/AMD2:2021.

22.7.12 ~~Self-contained emergency luminaires using a battery of one or more lead-acid cells, or a battery of three of more nickel cadmium cells in series, or a battery of one or more NiMH (or other types) cells shall comply with the requirements of Clause 23 of IEC 61347-2-7.~~

Self-contained emergency luminaires using a rechargeable battery as the emergency safety source shall comply with the requirements of Clause 23 of IEC 61347-2-7:2011 and Clause 23 of IEC 61347-2-7:2011/AMD2:2021.

22.7.13 The operation of a self-contained emergency luminaire in the emergency mode shall not be influenced by a short-circuit, a contact to earth or an interruption, in the wiring of the normal supply.

Compliance is checked by the test of Clause 28.2 of IEC 61347-2-7:2011.

22.7.14 Self-contained emergency luminaires with a remote inhibiting and/or rest mode function shall meet the requirements of Clause 25 of IEC61347-2-7:2011 and Clause 25 of IEC61347-2-7:2011/AMD2:2021.

22.7.15 Void. (The requirements in this clause were moved to IEC 61347-2-7:2011.)

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22.7.16 Void. (The requirements in this clause were moved to IEC 61347-2-7:2011.)

22.7.17 Void. (The requirements in this clause were moved to IEC 61347-2-7:2011.)

22.7.18 Void. (The requirements in this clause were moved to IEC 61347-2-7:2011.)

22.7.19 In self-contained emergency luminaires providing emergency lighting by means of tungsten filament lamps, the lamp voltage, which, after 30 % of rated duration of operation, has elapsed in the emergency mode, shall not exceed 1,05 times the rated lamp voltage.

Compliance is checked by measuring the lamp voltage during the first 10 cycles of the endurance tests given in 22.13.1.

22.7.20 Self-contained emergency luminaires shall use a rechargeable battery in accordance with the technical specification provided by the controlgear manufacturer (see Clause 7 of IEC 61347-2-7:2011, Clause 7 of IEC 61347-2-7:2011/AMD1:2017 and Clause 7 of IEC 61347-2-7:2011/AMD2:2021) and Annex A of this document.

22.7.21 In self-contained emergency luminaires, ~~batteries~~ the ESSS and chargers shall be contained within the emergency luminaire or a remote box.

22.7.22 In self-contained emergency luminaires, remote boxes shall comply with the same requirements for mechanical, thermal and resistance to heat, fire and tracking as for the emergency luminaire.

22.7.23 Emergency luminaires and adjustable emergency luminaires, mounted on lighting track systems which are intended to be used for display lighting applications, shall include a system for locking the luminaire in a fixed aiming direction and fixed position on the track. The locking system shall ensure that the luminaire can be locked in its final aiming position and location and that it cannot be adjusted or moved without the aid of a tool.

NOTE The tool does not include a ladder or other means required to gain access to the luminaire.

22.7.24 A luminaire incorporating an EDLC shall provide an adequate space around the capacitor free from other components, in order to allow the correct operation of the overpressure device.

After the operation of the overpressure device, creepage distances and clearances shall not be reduced below the required limits.

The capacitor manufacturer shall be consulted to define the increased dimensions of the capacitor after operation of the overpressure device.

Compliance shall be checked by inspection with reference to the dimensional information provided by the capacitor manufacturer.

22.8 Creepage distances and clearances

The provisions of Section 11 of Part 1 shall apply.

22.9 Provision of earthing

The provisions of Section 7 of Part 1 shall apply.

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22.10 Terminals

The provisions of Sections 14 and 15 of Part 1 shall apply.

22.11 External and internal wiring

The provisions of Section 5 of Part 1 shall apply together with the requirements of 22.11.

22.11.1 Electrical connections to the mains, between separate parts of the luminaire (e.g. remote controlgear box) and between luminaire components shall be protected against the risk of accidental disconnection. Electrical connections shall be permanent or have a provision to prevent accidental disconnection. Internal plug and socket connections not having a provision against accidental disconnection are accepted if direct access to them is prevented (e.g. protected by a cover that cannot be removed by a single action with one hand). External plug and socket connections not having a provision against accidental disconnection are accepted if the luminaire is provided with a warning as required by 22.6.18.

NOTE In France and Denmark a permanent connection is required by the safety lighting regulation.

Compliance is checked by inspection.

22.12 Protection against electric shock

The provisions of Section 8 of Part 1 shall apply.

22.13 Endurance test and thermal test

The provisions of Section 12 of Part 1 shall apply together with the requirements of 22.13.1 to 22.13.7.

22.13.1 For self-contained emergency luminaires, the endurance test shall be as specified in Part 1 except that the requirements of items c) and d) shall be replaced by the following.

The luminaire shall be tested in the enclosure for a total duration of 390 h, made up of 10 successive cycles of 36 h and a final normal operation for 30 h, at maximum rated supply voltage. The luminaire shall be operated normally from maximum supply voltage for 30 h and for 6 h in the emergency mode, in each of the 10 cycles. In the case of durations longer than 6 h, the emergency period shall be extended until the lamp extinguishes and the total duration shall be increased accordingly. For both combined and maintained emergency luminaires, the normal lamp shall be operated during the 30 h periods.

Luminaires with an IP classification greater than IP20 shall be subjected to the relevant tests given in Clauses 12.4, 12.5, 12.6 and 12.7 of Section 12 of Part 1 after the test(s) given in 9.2 of Part 1 but before the test(s) given in 9.3 of Part 1 specified in 22.14 of this document. The test in 22.13.7 shall be carried out after the endurance test in 22.13.1 but before the thermal tests in 22.13.2 to 22.13.6.

Compliance is checked by the requirements of 12.3.2 of Part 1.

Additionally the luminaire shall operate satisfactorily during 50 supply voltage switching operations after the endurance test. Each switching operation shall consist of connection to the normal rated supply for 60 s and disconnection from the supply for 20 s.

Compliance is checked by inspection.

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For luminaires with short-rated durations or with an inbuilt delay, after restoration of the normal supply and before the emergency lamp extinguishes, the duration of the 50 switching operations test should be modified as follows, to ensure that the batteries are not fully discharged before the completion of the test:

– mains off = 20 s;
– mains on = *delay* + {(20 + *delay*) × I_{dmax}} ÷ (0,65 × I_c);
– delay = time of delay [s];
– I_{dmax} = maximum discharge current [A], in accordance with item d) of A.4.2;
– I_c = charge current [A].

For luminaires with an inbuilt delay, the emergency lamp may be switched off after 20 s using the appropriate device, for example rest mode facility, switch, push-button~~, etc~~.

NOTE The 11th 30 h charge at the end of the endurance test is such that the 50 switching operations test can be started with the batteries fully charged. The luminaire could not otherwise be expected to perform satisfactorily with discharged batteries.

22.13.2 The thermal tests given in Clauses 12.4 and 12.5 of Part 1 shall be carried out in both the normal operating mode and the emergency lighting mode. Luminaires designed to have pictograms applied to translucent parts shall be tested with those pictograms applied that give the most unfavourable thermal effect.

22.13.3 The conditions of test for luminaires in the emergency mode shall be as follows:

– for self-contained emergency luminaires: the temperature limits of Section 12 of Part 1 shall apply at any time between switch-on of the emergency mode and complete ~~battery~~ ESSS discharge;
– for combined emergency luminaires: the two circuits shall be tested together unless it is evident from the construction that the two circuits are not designed for operation together.

22.13.4 For the purposes of 22.13.3, voltage limits for discharge durations in Table 1 shall be used.

~~**Table 1 – Voltage limits for discharge durations up to the end of declared battery life**~~

	~~Discharge conditions~~	
~~Battery type~~	~~Up to 1 h duration V/cell~~	~~Greater than 1 h duration V/cell~~
~~Nickel cadmium~~	~~1,0~~	~~1,0~~
~~Lead acid~~	~~1,75~~	~~1,80~~
~~Nickel metal hydride~~	~~1,0~~	~~1,0~~
~~The values given apply at an ambient temperature of (20 ± 5) °C.~~		

Table 1 – Voltage per cell to which the battery is discharged

Battery type	Discharge condition per cell V	
	Up to 1 h duration	Greater than 1 h duration
NiCd	1,0	1,0
Pb	1,75	1,8
NiMH	1,0	1,0
$Li(NiCoMn)O_2$	3,0	3,0

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$LiFePO_4$	2,0	2,0
LTO	1,5	1,5
The values given apply at an ambient temperature of (20 ± 5) °C. The above-mentioned limits may be modified if supported by the battery manufacturer's declaration of design.		

For other battery types, these values are given by the battery manufacturer.

For EDLCs, the value is the lowest value measured at the end of the emergency operation, immediately before the light source extinguishes.

22.13.5 The temperature allowance of 5 °C specified in the first sentence of item a) of 12.4.2 of Part 1 shall be reduced to 2 °C for the limiting temperature of ~~batteries~~ the ESSS.

22.13.6 Self-contained emergency luminaires shall be subjected to an additional thermal test in accordance with Clause 12.5 of Part 1 except that the abnormal service condition shall be the replacement of the internal ~~batteries~~ ESSS with a short-circuit link across the ~~battery~~ ESSS charger output.

The luminaire shall comply with 12.5.2 of Part 1 and shall not become unsafe. After removal of the short circuit link, reconnection of the ~~batteries~~ ESSS and replacement of user serviceable fuse-links where necessary, the luminaire shall continue to function as intended. Internal component failures within the controlgear caused by the ~~battery~~ ESSS short circuit should not be repaired unless user servicing of these parts is intended. In these cases, the luminaire should continue to function as intended following replacement of the complete item of controlgear.

22.13.7 On completion of the endurance test, aftera complete ~~battery~~ ESSS discharge in accordance with 22.13.4, a self-contained emergency luminaire shall be allowed to cool to its rated ambient temperature (t_a) or to 25 °C, whichever is the higher and shall be subjected to a 24 h charging cycle, or the charging time declared by the manufacturer as in 22.6.21, at 0,9 times the rated supply voltage after which the luminaire, with the lamp as tested, shall, at the end of the rated duration with the lamp operating, provide the V_{min} value established in Clause 20 of IEC 61347-2-7:2011, Clause 20 of IEC 61347-2-7:2011/AMD1:2017 and Clause 20 of IEC 61347-2-7:2011/AMD2:2021.

22.14 Resistance to dust and moisture

The provisions of Section 9 of Part 1 shall apply. For luminaires with IP classification greater than IP20, the order of tests specified in Section 9 of Part 1 shall be as specified in Clause 22.12 of this document.

22.15 Insulation resistance and electric strength

The provisions of Section 10 of Part 1 shall apply.

22.16 Resistance to heat, fire and tracking

The provisions of Section 13 of Part 1 shall apply together with the following requirements.

For emergency luminaires containing ~~a battery~~ an electrical source for safety services (ESSS), any part or component of the luminaire that it is possible to move and can come into possible contact with the ~~battery~~ ESSS, or the leads from the charger to the ~~battery~~ ESSS or charger circuit, shall be compliant with the glow wire test as stated in 13.3.2 of Part 1 but at a test

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temperature of 850 °C. Other parts of the luminaire which do not perform this protective function do not need to be subjected to this test at 850 °C.

~~Where a removable gear box within 1 m does not include a battery or charging leads then no special cable is required.~~

~~In the case of a remote gear box with a connecting cable of less than 1 m, which does include a battery or charging leads, the cable should be in a sleeve meeting the 850 °C glow wire requirement, or should be of fire resistant cable.~~

Where the external cable length from a remote box is within 1 m and does not include an ESSS or charging leads then no special protection to the cable is required.

In the case where the connecting cable from the remote box is within 1 m and includes an ESSS or charging leads, the cable shall be in a sleeve meeting the 850 °C glow wire requirement or the cable shall provide an equivalent fire resistance. This requirement is not applicable if the leads from the charger to the ESSS or charger circuit are protected to limit any fault current higher than 6 A within 1 s of applying a fault.

Compliance is checked by applying the fault conditions as described in the controlgear standard and any short circuit between conductors of the external cable. After 1 s the current shall not be higher than 6 A.

NOTE Where a remote box is more than 1 m from the emergency luminaire, which is no longer a self-contained luminaire, then refer to national installation rules.

Compliance is checked by the test in 13.3.2 of Part 1.

22.17 Photometric data

22.17.1 The manufacturer shall make available the intensity distribution data necessary for the calculation of the emergency lighting installation in accordance with ISO 30061. The intensity data in emergency mode may be provided in candelas or in relative cd/1 000 lm. If the values are declared in candelas, the manufacturer shall provide the emergency luminaire rated luminous flux derived from the intensity distribution table.

Compliance is checked by direct measurements in emergency operating condition taking into account the test operating condition described in 22.17.3 or by measurements in normal operating condition and calculation as described in 22.17.2.

22.17.2 If values are declared in cd/1 000 lm, the manufacturer shall also provide the reference flux in emergency mode.

In the case of luminaires with tubular fluorescent lamps or other discharge lamps, the reference flux is the practical emergency light source flux PELF calculated as the rated flux of the lamp multiplied by the EBLF of the associated emergency ballast.

In the case of luminaires with LED light source, the reference flux is:

– the practical emergency light source flux PELSF

  The value may be calculated as the light source luminous flux of the LED module (LDL) in reference condition corresponding to the luminaire (at the same t_p) and at rated current ($I_{\text{normal mode}}$) multiplied by the EOF_I or ($I_{\text{emergency}}/I_{\text{normal mode}}$) of the associated constant current emergency controlgear.

NOTE 1 In this case the LOR of the luminaire has influence on the calculation of the emergency rated luminaire flux.

– the emergency luminaire rated luminous flux

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This value shows the rated luminous flux of the luminaire in normal mode ($I_{\text{normal mode}}$) multiplied by the EOF_I or ($I_{\text{emergency}}/I_{\text{normal mode}}$) of the associated constant current emergency controlgear.

NOTE 2 In this case the LOR of the luminaire is considered as 1.

The factor EOF_I can only be used under the following conditions:

– The forward current of the LED is controlled by the controlgear only.
– All LEDs mounted in the luminaire are supplied both in normal operating conditions and in emergency mode.
– The luminaire luminous flux and/or the LED light source luminous flux is measured at $I_{\text{normal mode}}$ corresponding to the $I_{\text{normal mode}}$ of the controlgear (e.g. in the case of a luminaire to be used with independent controlgear).
– The current in emergency mode is equal to or lower than $I_{\text{normal mode}}$ (EOF_I equal to or lower than 1).

NOTE 3 The use of emergency output factors different from EOF_I (e.g. EOF_U or EOF_P) are not part of the scope of 22.17.2. They can only be used for design purposes and not for testing.

22.17.3 Emergency luminaires shall provide at least 50 % of the level declared photometric data claimed by the manufacturer during operation in emergency mode 5 s after failure of the normal supply, and full rated photometric performance after 60 s and continuously to the end of the rated duration of the emergency operation. Emergency luminaires used for high-risk task-area lighting shall provide 100 % of the level declared photometric data within 0,5 s after failure of the normal supply, and continuously to the end of the rated duration of the emergency operation.

Compliance is checked by measurement, including the necessary calculation where required, and the following test conditions:

a) for self-contained luminaires in emergency mode during operation from the internal ~~batteries~~ ESSS after a 24 h charge time, or the charging time declared by the manufacturer as in 22.6.21 at 0,9 times the minimum rated voltage;

b) for centrally supplied luminaires, the measurements for 5 s and 60 s shall be made at maximum supply voltage and all other measurements at 0,9 times the minimum rated supply voltage when stable photometric conditions have been reached.

Measurements for both self-contained emergency luminaires and centrally supplied emergency luminaires shall be made using a new lamp which has been aged according to the appropriate lamp standard for initial luminous flux measurements.

Photometric measurements shall be made in accordance with the requirements of CIE 121 SP1 taking into account the specific type of light source of the luminaire. For LED luminaires, measurements shall be made in accordance with the requirements of CIE S025. For emergency safety signs, the photometric distribution requirements of 22.17.1 do not apply. However, they do apply for the emergency lighting component if the sign also has an emergency lighting function.

All values shall be at least the minimum declared data.

NOTE 1 For verification purposes, if photometric data are declared in cd/1 000 lm, they can be recalculated in candelas taking into account the practical emergency lamp flux. In case of non-compliance, the luminous flux of the lamp used can be checked in reference conditions and the measured photometric data can be corrected to the rated value of the lamp.

NOTE 2 The verification of intensity distribution in relative values of the emergency luminaire and EBLF (or PELF) of the circuit can be made independently of each other.

22.17.4 In order to identify safety colours, the minimum value for the colour-rendering index of the light source in an emergency escape luminaire shall be $R_a > 40$.

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Compliance is checked by inspection.

22.17.5 Internally illuminated emergency safety signs shall meet the requirements of ISO 30061.

The luminance of permanently illuminated safety signs in non-emergency mode shall meet the requirements of ~~ISO 3864-1 and ISO 3864-4~~ ISO 30061.

Compliance in emergency mode operation is checked by measurement in similar testing conditions as described in 22.17.1.

Luminance measurements shall be made in accordance with Annex C only.

22.18 Changeover operation

Devices for changeover from normal to emergency mode shall comply with the requirements of Clause 21 of IEC 61347-2-7:2011, Clause 21 of IEC 61347-2-7:2011/AMD1:2017 and Clause 21 of IEC 61347-2-7:2011/AMD2:2021, and for guidance see Annex ~~J~~ L of IEC 61347-2-7:2011.

22.19 High temperature operation

Emergency luminaires shall be capable of operating ~~satisfactorily~~ in the emergency mode at an ambient temperature of 70 °C for at least ~~half of the rated duration~~ 30 min after the start of the emergency operation.

Compliance is checked by satisfying the following test.

The relative light outputs of the luminaire operating in the emergency mode at t_a and at an ambient temperature of 70 °C shall be compared.

The battery shall be charged for 24 h at rated supply voltage. The emergency luminaire shall then be placed in a test chamber incorporating a remote light meter with fixed geometry in relation to the luminaire. With the ambient inside the chamber at t_a, the luminaire shall be disconnected from the supply and the relative light output measured 60 s after interruption of the supply.

The luminaire shall be removed from the chamber and the battery, after being fully discharged, is charged for 24 h at rated supply voltage. The test chamber shall be pre-heated to give an internal ambient temperature of 70 °C± 5 °C. The emergency luminaire shall be returned to the same position as for the previous test. After 1 h, the luminaire shall be operated from the emergency supply. The light output reading shall not fall below 50 % of the initial 60 s result at any time from 60 s ~~to half the rated duration~~ until 30 min after the start of the emergency operation.

For central battery systems, the voltage is considered constant and the battery may be substituted with a power supply. The test voltage is the rated voltage of the emergency luminaire. The light output reading shall not fall below 50 % of the initial 60 s result at any time from 60 s until 30 min after the start of the emergency operation.

NOTE The light meter can have the photometer head outside of the enclosure so that it is not affected by the ambient temperature. This can be achieved by the use of a clear glass window, fibre optic light guides, etc.

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22.20 Battery chargers for self-contained emergency luminaires

Devices for recharging batteries in self-contained emergency luminaires shall comply with the requirements of Clause 22 of IEC 61347-2-7:2011, Clause 22 of IEC 61347-2-7:2011/AMD1:2017 and Clause 22 of IEC 61347-2-7:2011/AMD2:2021.

22.21 Test devices for emergency operation

22.21.1 Self-contained emergency luminaires shall be provided with:

– an automatic test facility complying with IEC 62034, or

– a manual integral test facility, or

– the means of connection to a remote test facility, for simulating failure of the normal supply.

Manually operated test switches shall be self-resetting or key operated.

~~*The device shall be tested for compliance according to the manufacturer's operating instructions.*~~

Compliance is checked by inspection with reference to the manufacturer's operating instructions.

NOTE The third dashed item can be satisfied by a device which is provided in the associated fixed wiring installation.

22.21.2 Any remote test device used in conjunction with emergency lighting luminaires shall not influence the proper function of the safety illumination.

22.21.3 Indicators shall conform to the colour requirements given in IEC 60073.

Compliance is checked by inspection and by operating the test device in accordance with the instructions given by the manufacturer in the instruction leaflet.

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Annex A
(normative)

~~Batteries~~ ESSSs for self-contained emergency luminaires

A.1 General

~~Batteries~~ ESSSs incorporated in emergency luminaires shall be one of the following types:

a) sealed nickel cadmium;

b) valve regulated lead acid;

c) nickel metal hydride;

d) lithium iron phosphate ($LiFePO_4$), lithium nickel manganese cobalt oxide ($Li(NiCoMn)O_2$), lithium titanate oxide (LTO);

e) EDLC.

Other battery or EDLC types may be allowed provided they conform to their relevant safety and performance standard and the relevant requirements of this document.

A.2 Safety and lifetime

To comply with the requirements of 22.7.8, two aspects shall be met. Firstly the ~~battery~~ ESSS shall conform to its relevant standard and secondly the luminaire shall operate within specific tolerances to ensure that the required performance can be maintained by the ~~battery~~ ESSS throughout its four year normal operating life.

A.3 Charge capacity

~~A battery~~ An ESSS's capacity shall be chosen so that the luminaire will achieve its rated duration for at least four years of normal operation.

Compliance is checked by the following tests in Clause A.4~~, A.5 and A.6~~ to Clause A.10.

A.4 Sealed nickel cadmium batteries

A.4.1 The battery shall conform to IEC 61951-1 for cells intended for permanent charge at elevated temperatures.

A.4.2 The battery in the luminaire shall operate within the following limits.

a) The maximum continuous surface temperature of the battery shall be:

   1) 40 °C for designated T type cells;

   2) 50 °C for designated U type cells.

It is important to determine the position of the maximum surface temperature of the battery, particularly with respect to multi-cell battery packs as the life of the battery is highly dependent on cell temperature.

b) The maximum continuous overcharge rate shall be 0,08 C_5A (at 1,06 rated mains voltage).

c) The minimum continuous ambient temperature of the cells within the luminaire shall be 5 °C (occasional outage to 0 °C).

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d) The maximum discharge rates shall be for 1 h: 0,6 C_5A and for 3 h: 0,25 C_5A (excluding the initial starting period). The maximum discharge rates for other time periods may be interpolated from these values.

Other recharge and discharge modes are allowed provided they are in accordance with the battery manufacturer's data sheet.

A.5 Sealed nickel metal-hydride batteries

A.5.1 The battery shall conform to IEC 61951-2 for cells intended for permanent charge at elevated temperatures.

A.5.2 The battery in the luminaire shall operate within the following limits.

a) The maximum continuous case temperature of the cell shall be:
   1) 40 °C for designated T type cells, and
   2) 50 °C for designated U type cells.
b) The maximum continuous overcharge rate shall be 0,08 C_5A (at 1,06 rated mains voltage).
c) The minimum continuous ambient temperature of the cells within the luminaire shall be 5 °C.
d) The maximum discharge rates shall be for 1 h: 0,6 C_5A and for 3 h: 0,25 C_5A (excluding the initial starting period). The maximum discharge rates for other time periods may be interpolated from these values.

Other recharge and discharge modes are allowed provided they are in accordance with the battery manufacturer's data sheet.

A.6 Valve regulated lead acid batteries

A.6.1 The battery in the luminaire shall conform to the relevant requirements of IEC 60896-21 or IEC 61056-1.

A.6.2 The battery in the luminaire shall operate within the following limits.

a) The maximum continuous surface temperature of the battery shall be:
   1) 30 °C with temperature compensation of float charge voltage normally between –3 mV/cell/°C and –4 mV/cell/°C or as recommended by the cell manufacturer, or
   2) 25 °C without temperature compensation, the float charge voltage at 25 °C shall be between 2,22 V/cell and 2,4 V/cell or as recommended by the cell manufacturer.
b) The maximum recharge current shall be 0,4 C_{20}.
c) The maximum discharge rates shall be for 1 h: 0,4 C_{20} and for 3 h: 0,17 C_{20} (excluding the initial starting period). The maximum discharge rates for other time periods may be interpolated from these values.
d) The maximum RMS ripple current shall be not more than 0,1 C_{20}.
e) The minimum continuous ambient temperature close to but not touching the cells within the luminaire shall be 5 °C (occasional outages to 0 °C).

Other recharge and discharge modes are allowed provided they are in accordance with the battery manufacturer's data sheet.

~~**A.7** The maximum surface temperature of the battery within the luminaire shall be measured after 48 h from start of recharge.~~

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~~**A.8** If operating outside the limits given in Clauses A.4, A.5 and A.9, alternative operating parameters and evidence of the four-year design life for the cells shall be supplied by the battery manufacturer or the luminaire manufacturer.~~

~~**A.9** The battery of a self-contained emergency luminaire is not a user serviceable item and shall only be replaced by a competent person.~~

A.7 Lithium iron phosphate ($LiFePO_4$), lithium nickel manganese cobalt oxide ($Li(NiCoMn)O_2$), lithium titanate oxide (LTO) batteries

A.7.1 The cells shall conform to IEC 62620 and IEC 62133-2.

A.7.2 A battery shall conform to the following subclauses of IEC 62133-2:2017:

– 7.2.2 – Case stress at high ambient temperature (battery);
– 7.3.2 – External short-circuit (battery);
– 7.3.6 – Over-charging of battery;
– 9.2 – Battery marking;
– 9.4 – Other information.

A.7.3 A battery shall conform to the following subclauses of IEC 62620:2014:

– 5.3 – Battery designation;
– 6.3.1 – Discharge performance at +25 °C;
– 6.3.2 – Discharge performance at low temperature;
– 6.3.3 – High rate permissible current;
– 6.5 – Cell and battery internal resistance;
– 6.6.2 – Endurance in storage at constant voltage (permanent charge life).

NOTE For lithium batteries conformity with UN38.3, covering United Nations recommendations for the transport of dangerous goods, is often a mandatory requirement. There exists significant commonality between the requirements of UN38.3 and the requirements of the IEC lithium battery standards detailed in Clause A.7. Where equivalent or more onerous assessments have been conducted to demonstrate UN38.3 conformity, these same results can also be used as a basis to demonstrate conformity with the mentioned IEC standards. The establishment of common UN/IEC assessment protocols by a manufacturer can be used to limit the need for repeated testing against IEC standards.

A.7.4 Test and assessment data established to confirm the conformity of a lithium battery to the requirements of this document may be used to demonstrate the conformity of similar batteries (i.e. other family members of the same battery design, as compared to the tested battery, which is here referred to as the reference battery), provided the following criteria are met:

a) The cells used to construct the battery are of identical make and type to those used in the reference battery.
b) The battery being assessed has the same cell quantity and electrical configuration (series/parallel arrangement).
c) If the battery being assessed is connected by a set of cables and plug:
   – the plug type shall provide equivalent electrical connection characteristics;
   – the resistance of the battery cables shall be no higher than those of the reference battery.
d) If a battery protection device is used on the battery pack:
   – the DC resistance of the battery system including the protection module/circuit and its connection shall be equal to or less than the value of the reference sample;

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– evidence of the equivalent design, components and operation (including maximum temperature of components) of the protection circuit, compared to the reference battery, needs to be provided.

e) The addition or removal of a mounting bracket is permitted, provided it does not mechanically or electrically interfere with the battery cell's operation.

A.7.5 The battery shall integrate a built-in protection device against over-discharge, discharge overcurrent, and overcharge if the luminaire is designed for battery replacement. In addition, unless otherwise declared by the battery and/or cell manufacturer, if two or more cells are connected in series, each cell voltage shall be monitored separately with appropriate control to ensure that the specified voltage limits are not exceeded. This control may be contained within the battery, as part of the battery protection, or as part of the controlgear.

If a single cell can be removed as a separate component, then controlgear with a protection device shall be used unless the cell includes a battery protection.

If the battery is not replaceable, the protection device shall either be incorporated in the lamp controlgear or in the battery, and the following provisions shall apply:

a) The battery shall not be accessible during normal operation or installation. To assess compliance the following criteria shall be met:

   i) The battery pack or cell shall be located in a position where it cannot be touched by a test finger in accordance with test probe B of IEC 61032:1997.

   ii) The battery pack or cell shall be labelled, in addition to the requirements of 22.6.7, with the text "DO NOT REMOVE".

b) The battery shall be secured and prevented from being dislodged during installation, operation and transportation. The product, contained within its packaging, shall be subjected to a 1,2 m drop test, onto a concrete floor in any orientation. Following the test, the battery or cell and connections shall not be damaged and shall remain secure in its mounting. *Compliance is checked by inspection following the drop test.*

c) If the protection device is not contained within the battery, then the protection device shall be contained within and assessed as part of the controlgear.

A.7.6 For lithium battery types, a fully discharged battery shall be charged for 48 h during which time the maximum surface temperature of the battery shall not exceed that stated on the battery manufacturer's declaration of design or Table 3 of IEC 61347-2-7:2011/AMD2:2021.

A.8 EDLC

A.8.1 The EDLC in the luminaire shall conform to the relevant requirements of IEC 62391-1 and IEC 62391-2.

A.8.2 The EDLC in the luminaire shall operate within the following limits:

a) The maximum continuous surface temperature of the EDLC shall be in accordance with the EDLC manufacturer's declaration.

b) The maximum charge voltage shall be in accordance with the EDLC manufacturer's declaration.

For items a) and b) the combination of voltage and temperature shall be chosen in accordance with the EDLC manufacturer's declaration to ensure the four-year life design.

NOTE The Class 2 is the most appropriate for this application, however, other classes can be used, if the required performance of the luminaire is delivered.

A.8.3 For a self-contained luminaire with an EDLC, the designed duration (when new) with the light source operating in emergency mode shall be increased to a factor that takes into

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consideration the capacitance degradation ($C_{deg\%}$) as declared by the EDLC manufacturer under the voltage and temperature conditions in A.7.2 for the four year lifetime.

During the test according to this document (22.17), the emergency duration (checked on the new luminaire) shall not be less than the rated duration multiplied by a factor calculated as follows:

$$\text{Test duration} = \text{Rated duration} \times K_d$$

where K_d is a factor that takes into consideration the capacitance degradation as follows:

$$K_d = 100/(100 - C_{deg\%})$$

EXAMPLE In the case where the capacitance degradation ($C_{deg\%}$) is 30 % as declared by the EDLC manufacturer, the rated duration will be increased by the factor:

$$K_d = 100/(100 - 30) = 1{,}42$$

A.9 Maximum surface temperature

The maximum surface temperature of the ESSS within the luminaire shall be measured after 48 h from start of recharge. For self-contained luminaires where the manufacturer declares a lower charging time in accordance with 22.6.1, the temperature shall be measured after twice the rated charge time with a minimum of 12 h.

A.10 Alternative operating parameters

If operating outside the limits given in Clauses A.4, A.5, A.6 and A.7, alternative operating parameters and evidence of the four-year design life for the ESSS shall be supplied by the ESSS manufacturer or the luminaire manufacturer.

A.11 ESSS replacement

The ESSS of a self-contained emergency luminaire is not a user serviceable item and shall only be replaced by a competent person.

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Annex B
(normative)

Luminaire classification

Emergency luminaires shall be classified and marked as per their construction as follows.

A unique designation denoting the type, mode of operation, the facilities included and the rated duration of the luminaire shall be clearly affixed to the luminaire.

The designation consists of a rectangle, divided in three or four segments, each containing one or more positions. Relevant to the construction, a position will consist of a letter or a figure, or a point if no indication has to be given.

The shape of the emergency luminaire designation is as follows:

*	*	******	***

The segments and positions ~~have to~~ shall be completed by letters and figures indicating the intended constructions as identified in the following list.

a) First segment containing one character: Type

   X self-contained

   Z central supply

b) Second segment containing one digit: 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) Third segment containing a possible seven characters: Facilities. To be completed where appropriate at the time of installation

   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~~ ESSS

   F automatic test gear complying with IEC 61347-2-7 denoted EL-T

   G internally illuminated safety sign

d) Fourth segment containing up to three digits: For self-contained luminaires to indicate the minimum duration of the emergency mode expressed in minutes, for example:

   10 to indicate 10 min duration

   60 to indicate 1 h duration

   120 to indicate 2 h duration

   180 to indicate 3 h duration

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The following two examples of marking are given to explain the method of using the coding:

X	1	BD	60

Meaning: self-contained, maintained luminaire including a remote rest mode and which is suitable for a high-risk task-area and having an emergency mode duration of 60 min.

Z	1	F	

Meaning: centrally supplied, maintained luminaire with automatic test function having an emergency mode duration that will be defined by the emergency power supply used in the installation.

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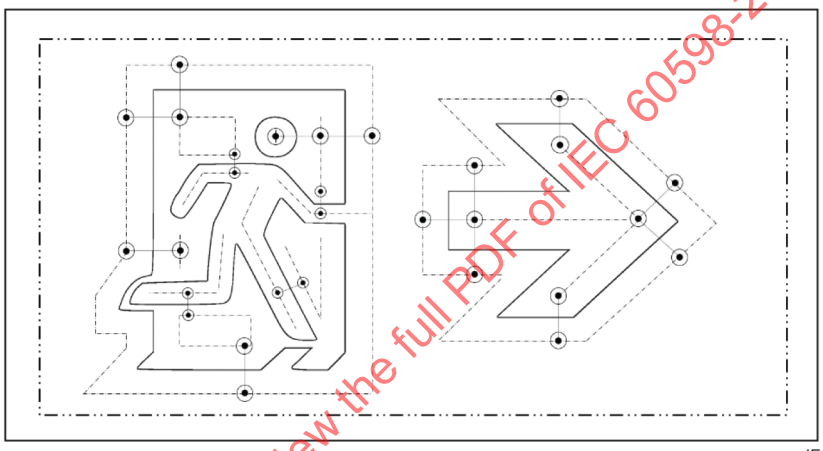
Annex C
(normative)

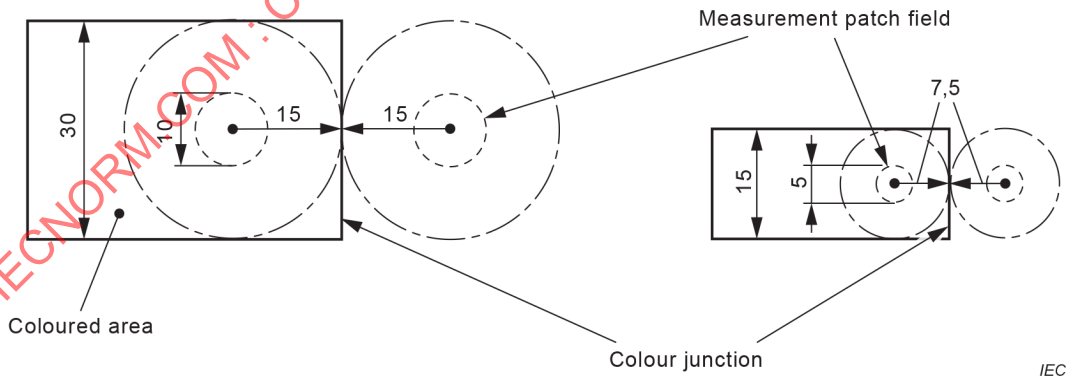
Luminance measurements

C.1 Contrast: Luminances are measured normal to the surface over a 10 mm diameter field for each coloured surface of the sign. The minimum and maximum luminance is measured over the areas for each colour and for the coloured background a 10 mm wide outer border of the whole pictogram is excluded from the measurements. In order to ~~measure~~ determine the luminance ratio between two adjacent colours, the luminance measurements shall be taken at a distance of 15 mm on either side of the junction of two colours. If the diameter of the coloured area ~~of colour~~ is less than 30 mm, the patch diameter and the 15 mm distance shall be reduced proportionally (see Figure C.1). ~~The size of the patch shall be chosen to fit into the selected area and the measurement to be one patch size/width from the boundary of the area to the edge of the patch.~~ The measurements shall not be made outside of the square area as defined for the safety pictogram required by ISO 30061.



a) Typical example of measurement position

Dimensions in millimetres



b) Patch diameter

Figure C.1 – Typical example of measurement positions

C.2 On-site photometric tests: All illuminance measurements and all luminous measurements shall be made with a photopic, Vλ, corrected meter.

Measurement shall be carried out in accordance with Annex C of ISO 3864-4:2011.

At all times, the measured values shall be not less than those specified in this document.

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Annex D
(informative)

Rest mode and ~~inhibition~~ remote inhibiting mode facilities

~~Emergency luminaires need an unswitched supply so that when the power is switched off to the normal luminaires, the emergency luminaires do not change over and the batteries remain connected to the supply and continue to be charged. In order to avoid unwanted discharges, rest mode or inhibiting mode facilities can be provided (see Clause 22.7) to protect the integrity of batteries when the normal supply fails but emergency lighting is not needed at that time (or when the batteries are included with the luminaire and stored before installation). For both facilities, remote control devices shall be installed via proper wiring.~~

~~The main characteristics of rest mode are:~~

~~a) it can only be operated when the normal supply has failed, enabling battery capacity to be conserved if not needed;~~

~~b) the remote control wiring is fail-safe against short circuit, contact to earth or interruption;~~

~~c) at the restoration of the normal supply, the luminaire reverts to normal mode.~~

~~NOTE At the moment, remote control devices for rest mode operation are not standardized.~~

~~The main characteristics of inhibition mode are as follows.~~

~~a) It can be set independently from the condition of the normal power and therefore when the building is unoccupied, a supply failure or disconnection will not cause an unwanted discharge.~~

~~b) The protection against the interruption of the wiring to the remote control should be provided by a proper installation according to the relevant wiring rules of IEC 60364-5-56 concerning safety services as follows:~~

~~1) Circuits of safety services should be independent of other circuits.~~

~~NOTE This means that an electrical fault or any intervention or modification in one system will not affect the correct functioning of any other circuits. This can necessitate separation by fire-resistant partitions, different routes or enclosures.~~

~~2) Circuits of safety services should not pass through locations exposed to fire risk unless they are fire-resistant. The circuits should not in any case pass through zones exposed to explosion risk.~~

~~3) The protection against overload may be omitted.~~

~~4) Overcurrent protective devices should be used so as to avoid an overcurrent in one circuit impairing the correct operation of other circuits of safety services.~~

~~5) Switchgear and controlgear should be clearly identified and grouped in locations accessible only to competent persons.~~

~~6) Alarm devices should be clearly identified.~~

~~NOTE If service facilities are provided to inhibit output, they can comply with these requirements.~~

Self-contained emergency luminaires need an unswitched supply so that when the power to the normal luminaires is switched off, the emergency luminaires do not change over and continue to charge their batteries. In order to avoid unwanted discharges, rest mode or remote inhibiting mode facilities can be provided (see 22.5) to protect the integrity of batteries when the emergency lighting is not needed and the normal supply fails at that time (or when the batteries are included with the luminaire and stored before installation).

The main characteristics of rest mode are:

a) Its function is relevant only when the normal supply is voluntarily shut down, enabling stored energy needed in case of mains failure, to be conserved.

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b) A failure of the remote control wiring (short circuit, open circuit or connection to earth) does not affect the emergency operation of the luminaire.

c) At the restoration of the normal supply, the luminaire reverts to normal mode.

NOTE Remote control devices for rest mode are not standardized.

The main characteristics of remote inhibiting mode are:

a) It can be set independently from the condition of the normal power and therefore when the building is unoccupied, a supply failure or disconnection will not cause an unwanted discharge.

b) The protection against the interruption of the wiring to the remote control should be provided by a proper installation according to the relevant national wiring rules.

Table D.1 – Time scale rest mode and inhibiting mode versus status of normal mains supply

	t_0	t_1	t_2	t_3	
	Mains ON	**Mains OFF**	**Mains OFF**	**Mains ON**	**Mains OFF**
Rest mode	Luminaire in normal mode	Luminaire in emergency mode	Luminaire in rest mode (see NOTE 1)	Luminaire in normal mode (see NOTE 2)	Luminaire in emergency mode
Inhibiting mode active	Luminaire in inhibiting mode (see NOTE 3)	Luminaire in inhibiting mode (see NOTE 3)	Luminaire in inhibiting mode (see NOTE 3)	Luminaire in inhibiting mode (see NOTE 3)	Luminaire in inhibiting mode (see NOTE 3)
Inhibiting mode not active (see NOTE 4)	Luminaire in normal mode	Luminaire in emergency mode	Luminaire in emergency mode	Luminaire in normal mode	Luminaire in emergency mode

NOTE 1 The luminaire is switched to rest mode manually; the mains and the rest mode are activated in sequence by manual action.

NOTE 2 The luminaire is switched to normal mode from rest mode automatically.

NOTE 3 The luminaire is switched to remote inhibiting mode manually or by means of an interlock with the local mains switch; when mains is ON and the luminaire is in remote inhibiting mode, batteries are in charge.

NOTE 4 The luminaire acts as a normal emergency lighting product when the remote inhibiting mode has been switched to inactive.

Both in rest mode and remote inhibiting mode, a drain current from the battery and/or self-discharge will occur, thus reducing the stored energy available for emergency operation immediately following the rest or inhibiting mode period. The manufacturer should consequently give an indication of the rest or inhibiting mode time allowed after a full charging period, in order for the luminaire to provide at least 50 % of its rated duration in emergency operation.

Following any rest or inhibiting mode period, a complete recharge of the battery should be provided. The rest or inhibiting mode function allows for this recharge to be conducted with the building occupied as a limited functioning of the emergency operation of the luminaire (50 % of rated duration) will still be available.

The characteristics of rest or inhibiting mode have been summarized in Table D.1.

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Annex E
(normative)

Requirements for self-contained portable emergency luminaires

E.1 General

The purpose of this annex is to specify the requirements and tests for self-contained portable emergency luminaires which can provide additional emergency lighting to support the permanent emergency lighting installation.

Self-contained portable emergency luminaires may be for purposes of inspection and escape, for use in temporary sites, rooms that are not continuously occupied and/or where a safety procedure may be required, and, also even in the event of a distribution network failure of a central battery system.

E.2 Scope of requirements provided in Annex E

This annex modifies the requirements of this document when self-contained emergency luminaires are for portable use.

Self-contained portable emergency luminaires are not suitable to ensure a fixed safety illumination as required in ISO 30061.

This annex also includes relevant requirements and tests that shall be conducted and complied with for controlgear, as specified in IEC 61347-2-7, that incorporate additional facilities such as remote control devices, indicators, changeover devices.

E.3 Terms and definitions

For the purpose of this annex, the definitions of Section 1 of Part 1 and Clause 22.3 of this document, with the exception of those modified below, and the following apply.

E.3.1
base unit
fixed unit into which the self-contained portable emergency luminaire is located during normal mode and charging of its ~~battery~~ ESSS(s)

Note 1 to entry: The base unit can contain the part of the control unit for charging the ~~battery~~ ESSS in the self-contained portable emergency luminaire.

E.3.2
normal mode
state of a self-contained portable emergency luminaire that is ready to operate in emergency mode while it is connected to the normal supply and the normal supply is on

E.3.3
emergency mode
state of a self-contained portable emergency luminaire that provides lighting when energized by its internal power source

E.3.4
switching mode
~~in the case of a normal supply failure, the self-contained portable emergency luminaire automatically changes over to having an emergency capability and the lamp may be either illuminated or its function inhibited until manually switched on~~

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state of a self-contained portable emergency luminaire which, in the case of a normal supply failure, automatically changes over to having an emergency capability and whereby the lamp can be either illuminated or its function inhibited until manually switched on

E.3.5
control unit
unit or set of units comprising a supply changeover system, ~~a battery~~ an ESSS charging device and, where appropriate, a means for testing

Note 1 to entry: The control unit can be divided between the luminaire and the base unit.

Note 2 to entry: For tubular fluorescent lamps, this unit can also contain the lamp controlgear.

E.4 General test requirements

The provisions of Part 1 and of this document shall apply unless otherwise specified in this annex.

E.5 Classification of luminaires

The requirements of Clause 22.5 of this document shall apply except that the protection against electric shock for the base unit and portable emergency luminaires with mains-voltage supplied integrated charger shall be Class I or Class II only and for the self-contained portable emergency luminaire without integrated mains-voltage supplied charger, the insulation shall correspond to the requirements of Class III.

E.5.1 Self-contained portable emergency luminaires are classified according to construction as follows:

a) where the control unit is completely contained in the self-contained portable emergency luminaire;

b) where part of the control unit remains in the base unit.

E.5.2 In addition, self-contained portable emergency luminaires are classified according to their operation as follows:

a) automatic initiation with manual control,

b) automatic initiation with automatic control,

c) manual control of operation.

E.5.3 In addition, self-contained portable emergency luminaires are classified according to their photometric performance and distribution and shall be measured in accordance with IEC TR 61341 as follows:

a) narrow beam angles no greater than 15°;

b) medium beam angles between 15° and 25°;

c) wide beam angles greater than 25°;

d) variable beam angles – state the range of angles.

The average beam intensity shall be given in candelas. For variable beam angles the average beam intensity shall be given for the narrowest and widest beam angles.

The beam angle is measured to 50 % of the beam peak intensity.

Luminaires with a concentrated intensity distribution may require more angles at which the luminous intensity data are presented (e.g. every 1° in the area where 90 % of the luminous flux is emitted).

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E.6 Marking

The provisions of Section 3 of Part 1 and Clause 22.6 of this document shall apply together with the requirements of E.6.1 to E.6.4.

E.6.1 For self-contained portable emergency luminaires, any relevant markings shall remain visible after installation. In the case of a separate charging device, the markings shall be attached to both parts and the Class II symbol shall only appear on the charger.

E.6.2 Self-contained portable emergency luminaires shall be accompanied with clear instructions for the electrical and mechanical installation and use in accordance with its classification as given in Clause E.5.

E.6.3 The base unit and self-contained portable emergency luminaires shall each have a warning notice to instruct the return of the self-contained portable emergency luminaires to the base unit for recharging after use.

E.6.4 In the instruction leaflet supplied with the self-contained portable emergency luminaire, the manufacturer shall give photometric data in accordance with E.5.3.

E.7 Construction

The provisions of Section 4 of Part 1 and Clause 22.7 of this document shall apply together with the requirements of E.7.1 to E.7.16 to both the self-contained portable emergency luminaire and the base unit where applicable.

Compliance of E.7.1 to E.7.16 is checked by inspection, measurement or testing.

E.7.1 Self-contained portable emergency luminaires shall have one of the following constructions:

a) where the control unit is completely contained in the self-contained portable emergency luminaire;

b) where part of the control unit remains in the base unit.

E.7.2 For self-contained portable emergency luminaires, the mechanical strength tests given in 4.13 of Part 1 shall be applied with the portable section treated as a rough service luminaire as given in 4.13.4 of Part 1.

E.7.3 The base unit shall be permanently connected to an unswitched supply.

E.7.4 The integral manual switch shall be used to switch the unit from the inhibiting mode to the emergency mode. This switch shall also allow the emergency mode to be switched to inhibiting mode. When the normal power supply is restored and the self-contained portable emergency luminaire is connected to its power supply unit, it shall automatically go into the recharging state before the normal supply voltage reaches 0,85 times the nominal value.

E.7.5 An integral overcurrent protection device shall be connected immediately after the terminals connecting the self-contained portable emergency luminaire to the normal supply.

E.7.6 Power supply connection between the self-contained portable emergency luminaire and its base unit shall be made without the use of a tool. The corresponding connection devices shall comply with the requirements of their relevant standard.

E.7.7 No access to live parts shall be possible during or after connection or disconnection.

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E.7.8 The supply cable, if applicable, shall be disconnected from the portable part before use.

E.7.9 For self-contained portable emergency luminaires with a separate charging device, the connection between the portable part and the charger shall be mechanically interlocked to prevent an incorrect polarized connection.

E.7.10 Self-contained portable emergency luminaires with incandescent lamps shall have at least two independent lamps and they shall be replaceable.

It shall be ensured that in case of a failure of the main lamp, the second lamp is automatically active and emits enough light for proper working conditions.

The main lamp shall have an average life of at least 100 h.

The lamps shall be of the same type, their nominal voltage shall match the ~~battery~~ ESSS voltage and they shall have an average life of at least 100 h.

E.7.11 The colour rendering index of any emergency lamps shall be R_a 40 or better.

E.7.12 On re-instatement of the normal supply, the base unit shall have an audible and/or visible warning to indicate that the self-contained portable emergency luminaire has been removed and the warning shall not be cancelled until the self-contained portable emergency luminaire is reconnected to the base unit.

E.7.13 On failure of the mains supply, the self-contained portable emergency luminaire shall either operate in the emergency mode with the lamps illuminated or display an indicator to identify the location of the self-contained portable emergency luminaire.

When an indicator is used, it shall have a load of ≤ ~~0,01C5/h~~ 0,01 C_5/h of the capacity of the ~~battery~~ ESSS.

E.7.14 Self-contained portable emergency luminaires may be fitted with an indicator to give warning of low ~~battery~~ ESSS capacity remaining.

E.7.15 Self-contained portable emergency luminaires, together with the base unit, shall have adequate stability.

Compliance is checked by placing the portable part of the self-contained portable emergency luminaire in the most unfavourable position of normal use on a plane inclined at an angle of 15° to the horizontal.

The self-contained portable emergency luminaire shall be retained in the base unit.

Any instructions supplied by the manufacturer with the luminaire shall receive due consideration in respect of the stability test. The luminaire shall not overturn and the safety self-contained portable emergency luminaire shall remain in its base unit.

Base units which are permanently fixed to a structure and assemblies which are fastened by clips or similar devices are not subjected to this test.

E.7.16 Self-contained portable emergency luminaires shall have adequate stability to illuminate the task area when it is used and placed on a non-horizontal surface.

Compliance is checked by placing the portable part of the self-contained portable emergency luminaire in the most unfavourable position of normal use on a plane inclined at an angle of 15° to the horizontal.

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The self-contained portable emergency luminaire shall not slide nor overturn and the targeted task area shall remain illuminated.

E.8 Changeover operation

The provisions of Clause 22.18 of this document shall apply in addition to the following:

For self-contained portable emergency luminaires provided with an integral manual switch, the requirements of 22.7.10 shall be excluded. Design should also be made to avoid the possibility of switching off the charger whilst holding the luminaire.

E.9 High temperature operation

The provisions of Clause 22.19 of this document shall apply with an ambient temperature of 40 °C.

E.10 Thermal test

The thermal tests representing normal operation and abnormal operation, of Clauses 12.4 and 12.5 of Part 1, are made with the portable part of the self-contained portable emergency luminaire and independent controlgear, if any, either placed on a dull black painted wooden floor or suspended so that they rest against a dull black painted wooded wall, whichever is the more unfavourable.

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Bibliography

IEC 60050-482, *International Electrotechnical Vocabulary (IEV) – Part 482: Primary and secondary cells and batteries* (available at http://www.electropedia.org)

IEC 60364-5-56, *Low-voltage electrical installations – Part 5-56: Selection and erection of electrical equipment – Safety services*

ISO 3864-1:2011, *Graphical symbols – Safety colours and safety signs – Part 1: Design principles for safety signs and safety markings*

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Luminaires –
Part 2-22: Particular requirements – Luminaires for emergency lighting

Luminaires –
Partie 2-22: Exigences particulières – Luminaires pour éclairage de secours

IEC 60598-2-22:2021-12(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LUMINAIRES –

Part 2-22: Particular requirements – Luminaires for emergency lighting

FOREWORD

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IEC 60598-2-22 has been prepared by subcommittee 34D: Luminaires of IEC technical committee 34: Lighting. It is an International Standard.

This fifth edition cancels and replaces the fourth edition published in 2014 and Amendment 1:2017. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) update of requirements for rest mode and inhibiting mode;
b) clarification of high temperature operation tests;
c) introduction of new requirements for lithium batteries;
d) introduction of new requirements for electric double layer capacitors (EDLCs);

e) clarification of resistance to heat, fire and tracking;

f) clarification of test facilities for self-contained luminaires;

g) clarification of the test method for contrast measurements of exit signs.

The text of this International Standard is based on the following documents:

Draft	Report on voting
34D/1635/FDIS	34D/1642/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

This Part 2-22 is to be used in conjunction with the latest edition of IEC 60598-1 and its amendment(s). It was established on the basis of the ninth edition (2020) of that standard.

NOTE 1 When "Part 1" is mentioned in this document, it refers to IEC 60598-1.

NOTE 2 In this document, the following print type is used:

– compliance statements: *in italic type.*

A list of all parts in the IEC 60598 series, published under the general title *Luminaires*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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LUMINAIRES –

Part 2-22: Particular requirements – Luminaires for emergency lighting

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22.1 Scope

This part of IEC 60598 specifies requirements for emergency luminaires for use with electrical lamps on emergency power supplies not exceeding 1 000 V.

This document does not cover the effects of non-emergency voltage reductions on luminaires incorporating high pressure discharge lamps.

This document gives general requirements for emergency lighting equipment.

In this document, the term "lamp" which also includes "light source(s)" where appropriate, is used.

22.2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60073, *Basic and safety principles for man-machine interface, marking and identification – Coding principles for indicators and actuators*

IEC 60155, *Glow-starters for fluorescent lamps*

IEC 60598-1, *Luminaires – Part 1: General requirements and tests*

IEC 60896-21, *Stationary lead-acid batteries – Part 21: Valve regulated types – Methods of test*

IEC 61032:1997, *Protection of persons and equipment by enclosures – Probes for verification*

IEC 61056-1, *General purpose lead-acid batteries (valve-regulated types) – Part 1: General requirements, functional characteristics – Methods of test*

IEC TR 61341, *Method of measurement of centre beam intensity and beam angle(s) of reflector lamps*

IEC 61347-2-2, *Lamp controlgear – Part 2-2: Particular requirements for d.c. or a.c. supplied electronic step-down convertors for filament lamps*

IEC 61347-2-3:2011, *Lamp control gear – Part 2-3: Particular requirements for a.c. and/or d.c. supplied electronic control gear for fluorescent lamps*

IEC 61347-2-7:2011, *Lamp controlgear – Part 2-7: Particular requirements for battery supplied electronic controlgear for emergency lighting (self-contained)*
IEC 61347-2-7:2011/AMD1:2017
IEC 61347-2-7:2011/AMD2:2021

IEC 61347-2-12, *Lamp controlgear – Part 2-12: Particular requirements for d.c. or a.c. supplied electronic ballasts for discharge lamps (excluding fluorescent lamps)*

IEC 61347-2-13, *Lamp controlgear – Part 2-13: Particular requirements for d.c. or a.c. supplied electronic controlgear for LED modules*

IEC 61951-1, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Secondary sealed cells and batteries for portable applications – Part 1: Nickel-Cadmium*

IEC 61951-2, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Secondary sealed cells and batteries for portable applications – Part 2: Nickel-metal hydride*

IEC 62034, *Automatic test systems for battery powered emergency escape lighting*

IEC 62133-2:2017, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary lithium cells, and for batteries made from them, for use in portable applications – Part 2: Lithium systems*

IEC 62391-1:2015, *Fixed electric double-layer capacitors for use in electric and electronic equipment – Part 1: Generic specification*

IEC 62391-2:2006, *Fixed electric double-layer capacitors for use in electronic equipment – Part 2: Sectional specification – Electric double-layer capacitors for power application*

IEC 62620:2014, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Secondary lithium cells and batteries for use in industrial applications*

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

ISO 30061:2007, *Emergency lighting*

CIE 121 SP1, *The Photometry and Goniophotometry of Luminaires – Supplement 1: Luminaires for Emergency Lighting*

CIE S025, *Test Method for LED Lamps, LED Luminaires and LED Modules*

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22.3 Terms and definitions

For the purposes of this document, the terms and definitions given in Part 1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

22.3.1
emergency lighting
lighting for use when the supply to the normal lighting fails

Note 1 to entry: Emergency lighting includes emergency escape lighting, high-risk task-area lighting and standby lighting.

22.3.2
emergency escape lighting
that part of emergency lighting that provides illumination for the safety of people leaving an area or attempting to terminate a dangerous process before vacating an area

22.3.3
standby lighting
that part of emergency lighting that enables normal activities to continue substantially unchanged

22.3.4
high-risk task-area lighting
part of emergency lighting provided to ensure 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 occupants of the premises

22.3.5
maintained emergency luminaire
luminaire in which the emergency lighting lamps are energized at all times when normal or emergency lighting is required

22.3.6
non-maintained emergency luminaire
luminaire in which the emergency lighting lamps are in operation only when the supply to the normal lighting fails

22.3.7
combined emergency luminaire
luminaire containing two or more lamps, at least one of which is energized from the emergency lighting supply and the others from the normal lighting supply

Note 1 to entry: A combined emergency luminaire is either maintained or non-maintained.

22.3.8
self-contained emergency luminaire
luminaire providing maintained or non-maintained emergency lighting in which all the elements such as the electric source for safety services (ESSS), the lamp, the control unit and the test and monitoring facilities, where provided, are contained within the luminaire or adjacent to it (that is, within 1 m cable length)

22.3.9
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

22.3.10
compound self-contained emergency luminaire
self-contained luminaire providing maintained or non-maintained emergency lighting and also providing emergency supply for operating a satellite luminaire

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22.3.11
satellite emergency luminaire
luminaire for maintained or non-maintained operation which derives emergency operation supply from an associated compound self-contained emergency luminaire

22.3.12
control unit
unit or set of units comprising a supply changeover system, an electric source for safety services (ESSS) charging device and, where appropriate, a means for testing

Note 1 to entry: This unit can also contain the lamp controlgear.

22.3.13
normal supply failure
condition in which the normal lighting can no longer provide a minimum illuminance for emergency escape purposes and when the emergency lighting should become operative

22.3.14
emergency luminaire rated luminous flux
lumen output as claimed by the luminaire manufacturer, 60 s (0,5 s for high-risk task-area luminaires) after failure of the normal supply, and continuously maintained to the end of the rated duration of operation

22.3.15
rated duration of emergency operation
time, as claimed by the manufacturer, during which the rated emergency lumen output is provided

22.3.16
normal mode
state of a self-contained emergency luminaire that is ready to operate in emergency mode while the normal supply is on

Note 1 to entry: In the case of a normal supply failure, the self-contained luminaire automatically changes over to the emergency mode.

22.3.17
emergency mode
state of a self-contained emergency luminaire that provides lighting when energized by its internal power source, the normal supply having failed

22.3.18
rest mode
state of a self-contained emergency luminaire that has been intentionally extinguished while the normal supply is off and that, in the event of restoration of the normal supply, automatically reverts to normal mode

22.3.19
maximum overcharge rate
maximum continuous charge rate (e.g. current or voltage) that can be applied to a fully charged electric source for safety services (ESSS)

22.3.20
remote inhibiting facility
means for inhibiting remotely a luminaire associated with an emergency lighting system

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22.3.21
remote inhibiting mode
state of a self-contained emergency luminaire which is inhibited from operating by a remote device while the normal supply is on and in the case of a normal supply failure when the luminaire does not change over to emergency mode

22.3.22
internally illuminated safety sign
self-contained or centrally supplied emergency luminaire intended to provide a specific safety message obtained by a combination of colour and geometric shapes

Note 1 to entry: Details are given in ISO 3864-1 and ISO 3864-4.

22.3.23
practical emergency lamp flux
PELF
minimum luminous flux of the lamp observed during the rated duration of the emergency mode

Note 1 to entry: PELF = LDL × EBLF
where LDL is the rated luminous flux of fluorescent or discharge lamp; this is taken as the initial lighting design lumens at 100 h.

22.3.24
self-contained portable emergency luminaire
portable luminaire providing emergency lighting where all of the elements, such as the electric source for safety services (ESSS), the lamp(s), the control unit, a manual switch for switching on or off one or more lamp and the test and monitoring facilities, where provided, are contained within the luminaire which can be detached from its base unit for use in the emergency mode

22.3.25
emergency ballast lumen factor
EBLF
ratio of the emergency luminous flux of the lamp supplied by the emergency controlgear to the luminous flux of the same lamp operated with the appropriate reference ballast at its rated voltage and frequency

Note 1 to entry: The emergency ballast lumen factor is the minimum of the values measured at the appropriate time after failure of the normal supply and continuously to the end of the rated time duration.

[SOURCE: IEC 61347-2-7:2011, 3.13]

22.3.26
emergency luminaire mounted on lighting track system
emergency luminaire specifically designed to be used on luminaire track systems

22.3.27
remote box
box complying with the same requirements as the emergency luminaire

Note 1 to entry: Its purpose is to contain any of the components e.g. battery, controlgear that will not be fitted into the emergency luminaire.

22.3.28
practical emergency light source flux
PELSF
minimum luminous flux of the light source observed during the rated duration of the emergency mode

Note 1 to entry: For LED light sources:

a) if EOF_l is given: PELSF = LDL × EOF_l

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b) if $I_{emergency}$ from constant current controlgear is defined: PELSF = LDL × ($I_{emergency}$ / $I_{normal\ mode}$)
where LDL is the lumen output of the LED module under the condition corresponding to the operation in the luminaire (identical t_p) operated at the same current ($I_{normal\ mode}$).

22.3.29
battery manufacturer's declaration of design
document issued by the battery manufacturer that provides technical information necessary to evaluate the safe use of the battery and its operating regime in accordance with the requirements of this document

Note 1 to entry: Examples of the battery manufacturer's declaration of design for a lithium battery is given in IEC 61347-2-7.

22.3.30
rated capacity
capacity value of a battery determined under specified conditions and declared by the manufacturer

[SOURCE: IEC 60050-482:2004, 482-03-15]

22.3.31
electric source for safety services
ESSS
energy source for self-contained emergency luminaire, intended to supply the emergency lighting luminaire in emergency mode

Note 1 to entry: The ESSS can also supply the luminaire in rest mode and inhibiting mode.

22.3.32
electric double-layer capacitor
EDLC
device that stores electrical energy using a double-layer in an electrochemical cell

22.4 General test requirements

The provisions of Section 0 of Part 1 shall apply. The tests described in each appropriate section of Part 1 shall be carried out in the order listed in this document.

When testing combined emergency luminaires in accordance with the requirements of this document, the tests shall cover those parts of the luminaire which are involved with providing emergency lighting taking into account the influence of all other luminaire parts and components. The components and parts of the luminaires designed to provide only normal lighting shall be subjected to the tests in accordance with the requirements of the relevant part of IEC 60598-2 (for example, if the luminaire is recessed, it shall be tested in accordance with the requirements of the part dealing with recessed luminaires).

If some elements of an emergency luminaire are adjacent (within a 1 m cable length) to the main part of the luminaire, all the elements of the luminaire, including the means of inter-connection, shall satisfy the relevant requirements of this document.

The additional requirements covering self-contained portable emergency luminaires are given in Annex E.

The photometric tests of Clause 22.17 shall be made on a separate sample luminaire.

Derating factors should be applied during the emergency lighting installation scheme design which is relevant to the application. These factors are normally defined by the relevant application standard.

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22.5 Classification of luminaires

Emergency luminaires shall be classified in accordance with the provisions of Section 2 of Part 1 except that all emergency luminaires shall be classified as suitable for direct mounting on normally flammable surfaces.

Emergency luminaires shall also be classified as specified in Annex B.

22.6 Marking

The provisions of Section 3 of Part 1 shall apply together with the requirements of 22.6.1 to 22.6.20 below.

22.6.1 Luminaires shall be clearly marked with the rated supply voltage or voltage range(s).

22.6.2 Luminaires shall be clearly marked with details of their classification in accordance with Clause 22.5 (see Annex B).

22.6.3 Luminaires with replaceable lamps shall be clearly marked with details of the correct replacement lamp in a position visible during lamp replacement. This ensures that the emergency luminaire's rated luminous flux can be achieved.

NOTE The information relating to correct lamp replacement can include the number, type, rated voltage and rated wattage, etc.

22.6.4 Where appropriate, in addition to t_a marking, the range of ambient temperature shall be marked or given in the instruction leaflet supplied with the luminaire.

22.6.5 Emergency luminaires employing replaceable fuses and/or replaceable indicator lamps shall be marked with the details of fuse ratings and/or details of the indicator lamps.

22.6.6 For manual testing only, test facilities to simulate normal supply failure, where provided, shall be clearly marked so that the marking is visible during routine testing.

22.6.7 Self-contained luminaires shall be clearly marked with details about the nature of the ESSS it contains as follows.

22.6.7.1 Self-contained emergency luminaires with replaceable batteries shall be clearly marked with the details of the correct battery replacement. If the manufacturer indicates that the battery is only replaceable with a specific type, the battery technology (e.g. NiMH) and the type reference or the code of the replaceable battery shall be indicated. If the battery is replaceable with another type, the details shall include the battery technology (e.g. NiMH), rated voltage, capacity, temperature rating, and temperature classification.

Luminaires containing a non-replaceable battery(s) shall be marked to indicate that the battery is non-replaceable.

22.6.7.2 In self-contained luminaires with batteries, the batteries shall be marked with the year and month or year and week of manufacture.

In self-contained luminaires with replaceable batteries, space shall be provided on the battery label to allow the marking, by the installer or commissioning engineer, of the date of commissioning of the battery.

For luminaires with non-replaceable batteries, the space for marking the date of commissioning shall be provided on the battery or on a label visible during maintenance.

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22.6.7.3 Self-contained emergency luminaires with an EDLC shall be clearly marked with the details for correct EDLC replacement. If the manufacturer indicates that the EDLC is only replaceable with a specific type, it shall indicate the type reference or the code of the replaceable EDLC. If the EDLC is replaceable with another type, the details shall include the type of EDLC (according to the applicable IEC standard), (e.g. rated voltage, capacity, temperature rating, temperature classification, dimensions).

Luminaires containing a non-replaceable EDLC shall be marked to indicate that the EDLC is non-replaceable.

22.6.8 Void.

22.6.9 Combined emergency luminaires shall be marked with details relating to correct lamp replacement for all lamps. If the lamps used in the emergency circuit and the normal supply circuit differ, the respective types shall be clearly identified.

Lampholders for emergency lighting lamps in combined luminaires shall be identified by a green dot, at least 5 mm in diameter, which shall be visible when replacing the lamp.

22.6.10 In the instruction leaflet supplied with the self-contained emergency luminaire, the manufacturer shall state that the replacement of the ESSS or of the whole luminaire (if equipped with a non-replaceable ESSS) is needed when they no longer meet their rated duration of operation after the corresponding recharge period.

All details for correct replacement of the ESSS shall be included in the instruction leaflet supplied with the self-contained emergency luminaire. If the manufacturer indicates that the ESSS is only replaceable with a specific type, the type reference or the code of the replaceable ESSS shall be indicated. If the ESSS is replaceable with another type, the instructions shall include: ESSS technology or type (battery, e.g. NiMH), applicable IEC standard (EDLC), rated voltage, capacity, temperature rating, temperature classification.

In addition, the instruction leaflet supplied with the self-contained emergency luminaire shall contain the substance of the following information: "The electric source for safety service is not a user serviceable item and shall only be replaced by the manufacturer service agent or a similar qualified person".

22.6.11 In the instruction leaflet supplied with the luminaire, the manufacturer shall give details of test facilities incorporated in the luminaire or appropriate instructions if these test facilities are supplied separately. The instructions shall include details of test procedures.

22.6.12 In the instruction leaflet supplied with the luminaire, the manufacturer shall give details of the connection leads to be used between a compound self-contained luminaire and an associated satellite luminaire. The maximum length of cables that limits the voltage drop to 3 % shall be specified.

22.6.13 Void.

22.6.14 In the instruction leaflet supplied with self-contained emergency luminaires, the manufacturer shall give details of any device which changes the mode of operation.

22.6.15 The manufacturer shall make available the photometric data in accordance with Clause 22.17.

22.6.16 Any normal preparation procedure for use of the luminaire shall be stated in the manufacturer's installation instructions. This preparation shall be carried out before type tests are made.

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22.6.17 The marking required by 22.6.1, 22.6.2, 22.6.7.1 2nd paragraph, 22.6.7.3 2nd paragraph and 22.6.20 shall be in a position such that the information can be seen when the luminaire has been installed.

The marking in 22.6.5, 22.6.7.1 1st paragraph, 22.6.7.3 1st paragraph and 22.6.9 shall be visible during the maintenance of the relevant component.

NOTE For recessed luminaires, this information can be marked on the interior of the luminaire so that it is visible when the light controlling cover is removed.

22.6.18 The mounting instructions for luminaires intended for external plug and socket connections, without provisions to prevent accidental disconnection, shall be provided with the warning: "This luminaire is intended only for mounting in locations where the plug and socket are protected from unauthorized disconnection".

22.6.19 In the instruction leaflet supplied with the luminaire, the manufacturer shall specify if the lamp(s) and/or the ESSS is/are non-replaceable.

22.6.20 For emergency luminaires mounted on lighting track systems, they shall be marked to indicate that they are an emergency luminaire and shall not be adjusted by unauthorized persons. In the instruction leaflet supplied with the adjustable emergency track mounted luminaire, the manufacturer shall provide the photometric data.

22.6.21 In self-contained luminaires, the rated charge time, if lower than 24 h, can be declared in the instruction leaflet.

22.6.22 Where applicable, for self-contained luminaires, the manufacturer shall make available information for the allowed time for the luminaire to stay in rest mode or remote inhibiting mode after a full charging period, in order for the luminaire to provide at least 50 % of its rated duration of emergency operation.

The time shall be declared in the instruction leaflet supplied with the luminaire in days and calculated according to the procedure in IEC 61347-2-7:2011/AMD2:2021, 25.6.2.

NOTE 1 Examples of declared periods are 7, 30 or 90 days.

NOTE 2 The characteristics of rest mode and inhibiting mode are explained in Annex D.

22.6.23 *Compliance with the requirements of 22.6.1 to 22.6.22 is checked by inspection.*

22.7 Construction

The provisions of Section 4 of Part 1 shall apply together with the requirements of 22.7.1 to 22.7.23 below. In addition, emergency luminaires with automatic testing systems shall comply with the additional requirements of IEC 62034 as identified in Annex K of IEC 61347-2-7:2011 and Annex K of IEC 61347-2-7:2011/AMD1:2017.

22.7.1 In emergency luminaires, fluorescent lamps used to provide emergency lighting shall start in the emergency mode without the aid of glow starters as specified in IEC 60155. Such starters shall not be in circuit during the emergency mode. The emergency lighting shall not be provided by means of fluorescent lamps with built-in glow starters.

Compliance is checked by inspection.

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22.7.2 Lamp controlgear for operating the emergency lamp(s) and control units incorporated into emergency luminaires shall comply with IEC 61347-2-2, IEC 61347-2-3, IEC 61347-2-7, IEC 61347-2-12 and IEC 61347-2-13 as appropriate and with the additional safety requirements for electronic controlgear for emergency lighting in the appropriate annex of the standards (e.g. Annex J of IEC 61347-2-3:2011).

Compliance is checked by the relevant tests specified in these standards.

22.7.3 Emergency luminaires shall be equipped with a protection device which disconnects the luminaire from the supply in case of any failure within that luminaire affecting the circuit (short circuit or overcurrent consumption).

Compliance is checked by measurement and inspection.

22.7.4 For emergency luminaires, the mechanical strength tests given in Part 1 shall be applied with a minimum impact energy of 0,35 Nm to all external parts.

22.7.5 Whilst connected to a live supply, self-contained emergency luminaires shall have adequate separation between the normal supply and live parts in the circuit for ESSS charging. When there are exposed live parts, double insulation, reinforced insulation, earth screen or other equivalent techniques can be used.

Additionally, in the event of bare contacts in the ESSS charging circuit, a safety isolating transformer shall be used. If a separating transformer is used as insulation between the normal supply and the ESSS charging circuit, the insulation in the ESSS charging circuit shall consist of at least basic insulation.

Compliance is checked by inspection and by the tests of Clauses 22.8 and 22.15.

22.7.6 In centrally supplied combined emergency luminaires, electrical separation between normal and emergency supplies shall be ensured by double insulation, reinforced insulation, earthed screen or other equivalent means.

EXAMPLE The use of basic insulation only, for both circuits, or double or reinforced insulation on the normal supply circuit fulfils this requirement. The connection of both circuits to a terminal block where the required creepage and clearances are obtained by leaving one terminal free, without the possibility of connection between the circuits, is also acceptable.

Compliance is checked by inspection.

22.7.7 Self-contained emergency luminaires shall have adjacent to them or incorporated in them a device for charging the ESSS from the normal supply and an indicator visible in normal use, for example a lamp, which shows the following conditions:

a) the luminaire is connected and the charge of the ESSS is being maintained;

b) circuit continuity exists through the tungsten filament of emergency lighting lamps where appropriate.

Where an electrical light source indicator is used, it shall comply with the colour requirements of IEC 60073 and be green.

For emergency luminaires with tungsten filament lamp(s) both a) and b) apply at the same time, and for other emergency luminaires without tungsten filaments, such as fluorescent and LED lamps, only a) applies.

For emergency luminaires with tungsten filament lamps, compliance that circuit continuity exists through the tungsten filament is checked in the following manner: disconnection of one of the lamps, or all the lamps when connected in parallel, causes the indicator to extinguish or change colour in accordance with IEC 60073.

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For all emergency luminaires, compliance that the charge indicator is correctly connected to the circuit is checked in the following manner: disconnection of the ESSS during the charging phase, causes the indicator to extinguish or change colour in accordance with IEC 60073.

22.7.8 Self-contained emergency luminaires shall incorporate an ESSS that meets the requirements of Annex A and is designed to provide the rated duration for at least four years of normal operation. This ESSS shall be used only for emergency related functions within the luminaire or its satellite.

Compliance is checked by inspection and the tests of Annex A.

22.7.9 Void

22.7.10 In self-contained emergency luminaires, there shall be no manual or non-self-resetting circuits between the ESSS and emergency lighting lamps other than the changeover device.

Self-contained emergency luminaires and centrally supplied emergency luminaires shall not contain any manual or non-self-resetting switch isolating the emergency circuit(s) from the mains supply other than facilities enabling rest mode or inhibiting mode.

NOTE Installation details can be found in IEC 60364-5-56.

Compliance is checked by inspection.

22.7.11 Lamp failure. Any lamp failure (emergency or normal operating lighting lamps) shall not interrupt the charging current to the ESSS and shall not cause an overload that could impair the operation of the ESSS.

Compliance is checked by the test of Clause 22.6 of IEC 61347-2-7:2011 and Clause 22.6 of IEC 61347-2-7:2011/AMD2:2021.

22.7.12 Self-contained emergency luminaires using a rechargeable battery as the emergency safety source shall comply with the requirements of Clause 23 of IEC 61347-2-7:2011 and Clause 23 of IEC 61347-2-7:2011/AMD2:2021.

22.7.13 The operation of a self-contained emergency luminaire in the emergency mode shall not be influenced by a short-circuit, a contact to earth or an interruption, in the wiring of the normal supply.

Compliance is checked by the test of Clause 28.2 of IEC 61347-2-7:2011.

22.7.14 Self-contained emergency luminaires with a remote inhibiting and/or rest mode function shall meet the requirements of Clause 25 of IEC61347-2-7:2011 and Clause 25 of IEC61347-2-7:2011/AMD2:2021.

22.7.15 Void. (The requirements in this clause were moved to IEC 61347-2-7:2011.)

22.7.16 Void. (The requirements in this clause were moved to IEC 61347-2-7:2011.)

22.7.17 Void. (The requirements in this clause were moved to IEC 61347-2-7:2011.)

22.7.18 Void. (The requirements in this clause were moved to IEC 61347-2-7:2011.)

22.7.19 In self-contained emergency luminaires providing emergency lighting by means of tungsten filament lamps, the lamp voltage, which, after 30 % of rated duration of operation, has elapsed in the emergency mode, shall not exceed 1,05 times the rated lamp voltage.

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Compliance is checked by measuring the lamp voltage during the first 10 cycles of the endurance tests given in 22.13.1.

22.7.20 Self-contained emergency luminaires shall use a rechargeable battery in accordance with the technical specification provided by the controlgear manufacturer (see Clause 7 of IEC 61347-2-7:2011, Clause 7 of IEC 61347-2-7:2011/AMD1:2017 and Clause 7 of IEC 61347-2-7:2011/AMD2:2021) and Annex A of this document.

22.7.21 In self-contained emergency luminaires, the ESSS and chargers shall be contained within the emergency luminaire or a remote box.

22.7.22 In self-contained emergency luminaires, remote boxes shall comply with the same requirements for mechanical, thermal and resistance to heat, fire and tracking as for the emergency luminaire.

22.7.23 Emergency luminaires and adjustable emergency luminaires, mounted on lighting track systems which are intended to be used for display lighting applications, shall include a system for locking the luminaire in a fixed aiming direction and fixed position on the track. The locking system shall ensure that the luminaire can be locked in its final aiming position and location and that it cannot be adjusted or moved without the aid of a tool.

NOTE The tool does not include a ladder or other means required to gain access to the luminaire.

22.7.24 A luminaire incorporating an EDLC shall provide an adequate space around the capacitor free from other components, in order to allow the correct operation of the overpressure device.

After the operation of the overpressure device, creepage distances and clearances shall not be reduced below the required limits.

The capacitor manufacturer shall be consulted to define the increased dimensions of the capacitor after operation of the overpressure device.

Compliance shall be checked by inspection with reference to the dimensional information provided by the capacitor manufacturer.

22.8 Creepage distances and clearances

The provisions of Section 11 of Part 1 shall apply.

22.9 Provision of earthing

The provisions of Section 7 of Part 1 shall apply.

22.10 Terminals

The provisions of Sections 14 and 15 of Part 1 shall apply.

22.11 External and internal wiring

The provisions of Section 5 of Part 1 shall apply together with the requirements of 22.11.

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22.11.1 Electrical connections to the mains, between separate parts of the luminaire (e.g. remote controlgear box) and between luminaire components shall be protected against the risk of accidental disconnection. Electrical connections shall be permanent or have a provision to prevent accidental disconnection. Internal plug and socket connections not having a provision against accidental disconnection are accepted if direct access to them is prevented (e.g. protected by a cover that cannot be removed by a single action with one hand). External plug and socket connections not having a provision against accidental disconnection are accepted if the luminaire is provided with a warning as required by 22.6.18.

NOTE In France and Denmark a permanent connection is required by the safety lighting regulation.

Compliance is checked by inspection.

22.12 Protection against electric shock

The provisions of Section 8 of Part 1 shall apply.

22.13 Endurance test and thermal test

The provisions of Section 12 of Part 1 shall apply together with the requirements of 22.13.1 to 22.13.7.

22.13.1 For self-contained emergency luminaires, the endurance test shall be as specified in Part 1 except that the requirements of items c) and d) shall be replaced by the following.

The luminaire shall be tested in the enclosure for a total duration of 390 h, made up of 10 successive cycles of 36 h and a final normal operation for 30 h, at maximum rated supply voltage. The luminaire shall be operated normally from maximum supply voltage for 30 h and for 6 h in the emergency mode, in each of the 10 cycles. In the case of durations longer than 6 h, the emergency period shall be extended until the lamp extinguishes and the total duration shall be increased accordingly. For both combined and maintained emergency luminaires, the normal lamp shall be operated during the 30 h periods.

Luminaires with an IP classification greater than IP20 shall be subjected to the relevant tests given in Clauses 12.4, 12.5, 12.6 and 12.7 of Section 12 of Part 1 after the test(s) given in 9.2 of Part 1 but before the test(s) given in 9.3 of Part 1 specified in 22.14 of this document. The test in 22.13.7 shall be carried out after the endurance test in 22.13.1 but before the thermal tests in 22.13.2 to 22.13.6.

Compliance is checked by the requirements of 12.3.2 of Part 1.

Additionally the luminaire shall operate satisfactorily during 50 supply voltage switching operations after the endurance test. Each switching operation shall consist of connection to the normal rated supply for 60 s and disconnection from the supply for 20 s.

Compliance is checked by inspection.

For luminaires with short-rated durations or with an inbuilt delay, after restoration of the normal supply and before the emergency lamp extinguishes, the duration of the 50 switching operations test should be modified as follows, to ensure that the batteries are not fully discharged before the completion of the test:

– mains off = 20 s;
– mains on = *delay* + {(20 + *delay*) × I_{dmax}} ÷ (0,65 × I_c);
– delay = time of delay [s];
– I_{dmax} = maximum discharge current [A], in accordance with item d) of A.4.2;

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– I_c = charge current [A].

For luminaires with an inbuilt delay, the emergency lamp may be switched off after 20 s using the appropriate device, for example rest mode facility, switch, push-button.

NOTE The 11th 30 h charge at the end of the endurance test is such that the 50 switching operations test can be started with the batteries fully charged. The luminaire could not otherwise be expected to perform satisfactorily with discharged batteries.

22.13.2 The thermal tests given in Clauses 12.4 and 12.5 of Part 1 shall be carried out in both the normal operating mode and the emergency lighting mode. Luminaires designed to have pictograms applied to translucent parts shall be tested with those pictograms applied that give the most unfavourable thermal effect.

22.13.3 The conditions of test for luminaires in the emergency mode shall be as follows:

– for self-contained emergency luminaires: the temperature limits of Section 12 of Part 1 shall apply at any time between switch-on of the emergency mode and complete ESSS discharge;
– for combined emergency luminaires: the two circuits shall be tested together unless it is evident from the construction that the two circuits are not designed for operation together.

22.13.4 For the purposes of 22.13.3, voltage limits for discharge durations in Table 1 shall be used.

Table 1 – Voltage per cell to which the battery is discharged

Battery type	Discharge condition per cell V	
	Up to 1 h duration	Greater than 1 h duration
NiCd	1,0	1,0
Pb	1,75	1,8
NiMH	1,0	1,0
$Li(NiCoMn)O_2$	3,0	3,0
$LiFePO_4$	2,0	2,0
LTO	1,5	1,5
The values given apply at an ambient temperature of (20 ± 5) °C. The above-mentioned limits may be modified if supported by the battery manufacturer's declaration of design.		

For other battery types, these values are given by the battery manufacturer.

For EDLCs, the value is the lowest value measured at the end of the emergency operation, immediately before the light source extinguishes.

22.13.5 The temperature allowance of 5 °C specified in the first sentence of item a) of 12.4.2 of Part 1 shall be reduced to 2 °C for the limiting temperature of the ESSS.

22.13.6 Self-contained emergency luminaires shall be subjected to an additional thermal test in accordance with Clause 12.5 of Part 1 except that the abnormal service condition shall be the replacement of the internal ESSS with a short-circuit link across the ESSS charger output.

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The luminaire shall comply with 12.5.2 of Part 1 and shall not become unsafe. After removal of the short circuit link, reconnection of the ESSS and replacement of user serviceable fuse-links where necessary, the luminaire shall continue to function as intended. Internal component failures within the controlgear caused by the ESSS short circuit should not be repaired unless user servicing of these parts is intended. In these cases, the luminaire should continue to function as intended following replacement of the complete item of controlgear.

22.13.7 On completion of the endurance test, after a complete ESSS discharge in accordance with 22.13.4, a self-contained emergency luminaire shall be allowed to cool to its rated ambient temperature (t_a) or to 25 °C, whichever is the higher and shall be subjected to a 24 h charging cycle, or the charging time declared by the manufacturer as in 22.6.21, at 0,9 times the rated supply voltage after which the luminaire, with the lamp as tested, shall, at the end of the rated duration with the lamp operating, provide the V_{min} value established in Clause 20 of IEC 61347-2-7:2011, Clause 20 of IEC 61347-2-7:2011/AMD1:2017 and Clause 20 of IEC 61347-2-7:2011/AMD2:2021.

22.14 Resistance to dust and moisture

The provisions of Section 9 of Part 1 shall apply. For luminaires with IP classification greater than IP20, the order of tests specified in Section 9 of Part 1 shall be as specified in Clause 22.12 of this document.

22.15 Insulation resistance and electric strength

The provisions of Section 10 of Part 1 shall apply.

22.16 Resistance to heat, fire and tracking

The provisions of Section 13 of Part 1 shall apply together with the following requirements.

For emergency luminaires containing an electrical source for safety services (ESSS), any part or component of the luminaire that it is possible to move and can come into possible contact with the ESSS, or the leads from the charger to the ESSS or charger circuit, shall be compliant with the glow wire test as stated in 13.3.2 of Part 1 but at a test temperature of 850 °C. Other parts of the luminaire which do not perform this protective function do not need to be subjected to this test at 850 °C.

Where the external cable length from a remote box is within 1 m and does not include an ESSS or charging leads then no special protection to the cable is required.

In the case where the connecting cable from the remote box is within 1 m and includes an ESSS or charging leads, the cable shall be in a sleeve meeting the 850 °C glow wire requirement or the cable shall provide an equivalent fire resistance. This requirement is not applicable if the leads from the charger to the ESSS or charger circuit are protected to limit any fault current higher than 6 A within 1 s of applying a fault.

Compliance is checked by applying the fault conditions as described in the controlgear standard and any short circuit between conductors of the external cable. After 1 s the current shall not be higher than 6 A.

NOTE Where a remote box is more than 1 m from the emergency luminaire, which is no longer a self-contained luminaire, then refer to national installation rules.

Compliance is checked by the test in 13.3.2 of Part 1.

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22.17 Photometric data

22.17.1 The manufacturer shall make available the intensity distribution data necessary for the calculation of the emergency lighting installation in accordance with ISO 30061. The intensity data in emergency mode may be provided in candelas or in relative cd/1 000 lm. If the values are declared in candelas, the manufacturer shall provide the emergency luminaire rated luminous flux derived from the intensity distribution table.

Compliance is checked by direct measurements in emergency operating condition taking into account the test operating condition described in 22.17.3 or by measurements in normal operating condition and calculation as described in 22.17.2.

22.17.2 If values are declared in cd/1 000 lm, the manufacturer shall also provide the reference flux in emergency mode.

In the case of luminaires with tubular fluorescent lamps or other discharge lamps, the reference flux is the practical emergency light source flux PELF calculated as the rated flux of the lamp multiplied by the EBLF of the associated emergency ballast.

In the case of luminaires with LED light source, the reference flux is:

– the practical emergency light source flux PELSF

  The value may be calculated as the light source luminous flux of the LED module (LDL) in reference condition corresponding to the luminaire (at the same t_p) and at rated current ($I_{\text{normal mode}}$) multiplied by the EOF_I or ($I_{\text{emergency}}/I_{\text{normal mode}}$) of the associated constant current emergency controlgear.

NOTE 1 In this case the LOR of the luminaire has influence on the calculation of the emergency rated luminaire flux.

– the emergency luminaire rated luminous flux

  This value shows the rated luminous flux of the luminaire in normal mode ($I_{\text{normal mode}}$) multiplied by the EOF_I or ($I_{\text{emergency}}/I_{\text{normal mode}}$) of the associated constant current emergency controlgear.

NOTE 2 In this case the LOR of the luminaire is considered as 1.

The factor EOF_I can only be used under the following conditions:

– The forward current of the LED is controlled by the controlgear only.
– All LEDs mounted in the luminaire are supplied both in normal operating conditions and in emergency mode.
– The luminaire luminous flux and/or the LED light source luminous flux is measured at $I_{\text{normal mode}}$ corresponding to the $I_{\text{normal mode}}$ of the controlgear (e.g. in the case of a luminaire to be used with independent controlgear).
– The current in emergency mode is equal to or lower than $I_{\text{normal mode}}$ (EOF_I equal to or lower than 1).

NOTE 3 The use of emergency output factors different from EOF_I (e.g. EOF_U or EOF_P) are not part of the scope of 22.17.2. They can only be used for design purposes and not for testing.

22.17.3 Emergency luminaires shall provide at least 50 % of the level declared photometric data claimed by the manufacturer during operation in emergency mode 5 s after failure of the normal supply, and full rated photometric performance after 60 s and continuously to the end of the rated duration of the emergency operation. Emergency luminaires used for high-risk task-area lighting shall provide 100 % of the level declared photometric data within 0,5 s after failure of the normal supply, and continuously to the end of the rated duration of the emergency operation.

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Compliance is checked by measurement, including the necessary calculation where required, and the following test conditions:

a) for self-contained luminaires in emergency mode during operation from the internal ESSS after a 24 h charge time, or the charging time declared by the manufacturer as in 22.6.21 at 0,9 times the minimum rated voltage;

b) for centrally supplied luminaires, the measurements for 5 s and 60 s shall be made at maximum supply voltage and all other measurements at 0,9 times the minimum rated supply voltage when stable photometric conditions have been reached.

Measurements for both self-contained emergency luminaires and centrally supplied emergency luminaires shall be made using a new lamp which has been aged according to the appropriate lamp standard for initial luminous flux measurements.

Photometric measurements shall be made in accordance with the requirements of CIE 121 SP1 taking into account the specific type of light source of the luminaire. For LED luminaires, measurements shall be made in accordance with the requirements of CIE S025. For emergency safety signs, the photometric distribution requirements of 22.17.1 do not apply. However, they do apply for the emergency lighting component if the sign also has an emergency lighting function.

All values shall be at least the minimum declared data.

NOTE 1 For verification purposes, if photometric data are declared in cd/1 000 lm, they can be recalculated in candelas taking into account the practical emergency lamp flux. In case of non-compliance, the luminous flux of the lamp used can be checked in reference conditions and the measured photometric data can be corrected to the rated value of the lamp.

NOTE 2 The verification of intensity distribution in relative values of the emergency luminaire and EBLF (or PELF) of the circuit can be made independently of each other.

22.17.4 In order to identify safety colours, the minimum value for the colour-rendering index of the light source in an emergency escape luminaire shall be R_a > 40.

Compliance is checked by inspection.

22.17.5 Internally illuminated emergency safety signs shall meet the requirements of ISO 30061.

The luminance of permanently illuminated safety signs in non-emergency mode shall meet the requirements of ISO 30061.

Compliance in emergency mode operation is checked by measurement in similar testing conditions as described in 22.17.1.

Luminance measurements shall be made in accordance with Annex C only.

22.18 Changeover operation

Devices for changeover from normal to emergency mode shall comply with the requirements of Clause 21 of IEC 61347-2-7:2011, Clause 21 of IEC 61347-2-7:2011/AMD1:2017 and Clause 21 of IEC 61347-2-7:2011/AMD2:2021, and for guidance see Annex L of IEC 61347-2-7:2011.

22.19 High temperature operation

Emergency luminaires shall be capable of operating in the emergency mode at an ambient temperature of 70 °C for at least 30 min after the start of the emergency operation.

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Compliance is checked by satisfying the following test.

The relative light outputs of the luminaire operating in the emergency mode at t_a and at an ambient temperature of 70 °C shall be compared.

The battery shall be charged for 24 h at rated supply voltage. The emergency luminaire shall then be placed in a test chamber incorporating a remote light meter with fixed geometry in relation to the luminaire. With the ambient inside the chamber at t_a, the luminaire shall be disconnected from the supply and the relative light output measured 60 s after interruption of the supply.

The luminaire shall be removed from the chamber and the battery, after being fully discharged, is charged for 24 h at rated supply voltage. The test chamber shall be pre-heated to give an internal ambient temperature of 70 °C ± 5 °C. The emergency luminaire shall be returned to the same position as for the previous test. After 1 h, the luminaire shall be operated from the emergency supply. The light output reading shall not fall below 50 % of the initial 60 s result at any time from 60 s until 30 min after the start of the emergency operation.

For central battery systems, the voltage is considered constant and the battery may be substituted with a power supply. The test voltage is the rated voltage of the emergency luminaire. The light output reading shall not fall below 50 % of the initial 60 s result at any time from 60 s until 30 min after the start of the emergency operation.

NOTE The light meter can have the photometer head outside of the enclosure so that it is not affected by the ambient temperature. This can be achieved by the use of a clear glass window, fibre optic light guides, etc.

22.20 Battery chargers for self-contained emergency luminaires

Devices for recharging batteries in self-contained emergency luminaires shall comply with the requirements of Clause 22 of IEC 61347-2-7:2011, Clause 22 of IEC 61347-2-7:2011/AMD1:2017 and Clause 22 of IEC 61347-2-7:2011/AMD2:2021.

22.21 Test devices for emergency operation

22.21.1 Self-contained emergency luminaires shall be provided with:

– an automatic test facility complying with IEC 62034, or
– a manual integral test facility, or
– the means of connection to a remote test facility, for simulating failure of the normal supply.

Manually operated test switches shall be self-resetting or key operated.

Compliance is checked by inspection with reference to the manufacturer's operating instructions.

NOTE The third dashed item can be satisfied by a device which is provided in the associated fixed wiring installation.

22.21.2 Any remote test device used in conjunction with emergency lighting luminaires shall not influence the proper function of the safety illumination.

22.21.3 Indicators shall conform to the colour requirements given in IEC 60073.

Compliance is checked by inspection and by operating the test device in accordance with the instructions given by the manufacturer in the instruction leaflet.

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Annex A
(normative)

ESSSs for self-contained emergency luminaires

A.1 General

ESSSs incorporated in emergency luminaires shall be one of the following types:

a) sealed nickel cadmium;

b) valve regulated lead acid;

c) nickel metal hydride;

d) lithium iron phosphate ($LiFePO_4$), lithium nickel manganese cobalt oxide ($Li(NiCoMn)O_2$), lithium titanate oxide (LTO);

e) EDLC.

Other battery or EDLC types may be allowed provided they conform to their relevant safety and performance standard and the relevant requirements of this document.

A.2 Safety and lifetime

To comply with the requirements of 22.7.8, two aspects shall be met. Firstly the ESSS shall conform to its relevant standard and secondly the luminaire shall operate within specific tolerances to ensure that the required performance can be maintained by the ESSS throughout its four year normal operating life.

A.3 Charge capacity

An ESSS's capacity shall be chosen so that the luminaire will achieve its rated duration for at least four years of normal operation.

Compliance is checked by the following tests in Clause A.4 to Clause A.10.

A.4 Sealed nickel cadmium batteries

A.4.1 The battery shall conform to IEC 61951-1 for cells intended for permanent charge at elevated temperatures.

A.4.2 The battery in the luminaire shall operate within the following limits.

a) The maximum continuous surface temperature of the battery shall be:

   1) 40 °C for designated T type cells;

   2) 50 °C for designated U type cells.

It is important to determine the position of the maximum surface temperature of the battery, particularly with respect to multi-cell battery packs as the life of the battery is highly dependent on cell temperature.

b) The maximum continuous overcharge rate shall be 0,08 C_5A (at 1,06 rated mains voltage).

c) The minimum continuous ambient temperature of the cells within the luminaire shall be 5 °C (occasional outage to 0 °C).

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d) The maximum discharge rates shall be for 1 h: 0,6 C_5A and for 3 h: 0,25 C_5A (excluding the initial starting period). The maximum discharge rates for other time periods may be interpolated from these values.

Other recharge and discharge modes are allowed provided they are in accordance with the battery manufacturer's data sheet.

A.5 Sealed nickel metal-hydride batteries

A.5.1 The battery shall conform to IEC 61951-2 for cells intended for permanent charge at elevated temperatures.

A.5.2 The battery in the luminaire shall operate within the following limits.

a) The maximum continuous case temperature of the cell shall be:
   1) 40 °C for designated T type cells, and
   2) 50 °C for designated U type cells.
b) The maximum continuous overcharge rate shall be 0,08 C_5A (at 1,06 rated mains voltage).
c) The minimum continuous ambient temperature of the cells within the luminaire shall be 5 °C.
d) The maximum discharge rates shall be for 1 h: 0,6 C_5A and for 3 h: 0,25 C_5A (excluding the initial starting period). The maximum discharge rates for other time periods may be interpolated from these values.

Other recharge and discharge modes are allowed provided they are in accordance with the battery manufacturer's data sheet.

A.6 Valve regulated lead acid batteries

A.6.1 The battery in the luminaire shall conform to the relevant requirements of IEC 60896-21 or IEC 61056-1.

A.6.2 The battery in the luminaire shall operate within the following limits.

a) The maximum continuous surface temperature of the battery shall be:
   1) 30 °C with temperature compensation of float charge voltage normally between –3 mV/cell/°C and –4 mV/cell/°C or as recommended by the cell manufacturer, or
   2) 25 °C without temperature compensation, the float charge voltage at 25 °C shall be between 2,22 V/cell and 2,4 V/cell or as recommended by the cell manufacturer.
b) The maximum recharge current shall be 0,4 C_{20}.
c) The maximum discharge rates shall be for 1 h: 0,4 C_{20} and for 3 h: 0,17 C_{20} (excluding the initial starting period). The maximum discharge rates for other time periods may be interpolated from these values.
d) The maximum RMS ripple current shall be not more than 0,1 C_{20}.
e) The minimum continuous ambient temperature close to but not touching the cells within the luminaire shall be 5 °C (occasional outages to 0 °C).

Other recharge and discharge modes are allowed provided they are in accordance with the battery manufacturer's data sheet.

A.7 Lithium iron phosphate ($LiFePO_4$), lithium nickel manganese cobalt oxide ($Li(NiCoMn)O_2$), lithium titanate oxide (LTO) batteries

A.7.1 The cells shall conform to IEC 62620 and IEC 62133-2.

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A.7.2 A battery shall conform to the following subclauses of IEC 62133-2:2017:

– 7.2.2 – Case stress at high ambient temperature (battery);
– 7.3.2 – External short-circuit (battery);
– 7.3.6 – Over-charging of battery;
– 9.2 – Battery marking;
– 9.4 – Other information.

A.7.3 A battery shall conform to the following subclauses of IEC 62620:2014:

– 5.3 – Battery designation;
– 6.3.1 – Discharge performance at +25 °C;
– 6.3.2 – Discharge performance at low temperature;
– 6.3.3 – High rate permissible current;
– 6.5 – Cell and battery internal resistance;
– 6.6.2 – Endurance in storage at constant voltage (permanent charge life).

NOTE For lithium batteries conformity with UN38.3, covering United Nations recommendations for the transport of dangerous goods, is often a mandatory requirement. There exists significant commonality between the requirements of UN38.3 and the requirements of the IEC lithium battery standards detailed in Clause A.7. Where equivalent or more onerous assessments have been conducted to demonstrate UN38.3 conformity, these same results can also be used as a basis to demonstrate conformity with the mentioned IEC standards. The establishment of common UN/IEC assessment protocols by a manufacturer can be used to limit the need for repeated testing against IEC standards.

A.7.4 Test and assessment data established to confirm the conformity of a lithium battery to the requirements of this document may be used to demonstrate the conformity of similar batteries (i.e. other family members of the same battery design, as compared to the tested battery, which is here referred to as the reference battery), provided the following criteria are met:

a) The cells used to construct the battery are of identical make and type to those used in the reference battery.
b) The battery being assessed has the same cell quantity and electrical configuration (series/parallel arrangement).
c) If the battery being assessed is connected by a set of cables and plug:
   – the plug type shall provide equivalent electrical connection characteristics;
   – the resistance of the battery cables shall be no higher than those of the reference battery.
d) If a battery protection device is used on the battery pack:
   – the DC resistance of the battery system including the protection module/circuit and its connection shall be equal to or less than the value of the reference sample;
   – evidence of the equivalent design, components and operation (including maximum temperature of components) of the protection circuit, compared to the reference battery, needs to be provided.
e) The addition or removal of a mounting bracket is permitted, provided it does not mechanically or electrically interfere with the battery cell's operation.

A.7.5 The battery shall integrate a built-in protection device against over-discharge, discharge overcurrent, and overcharge if the luminaire is designed for battery replacement. In addition, unless otherwise declared by the battery and/or cell manufacturer, if two or more cells are connected in series, each cell voltage shall be monitored separately with appropriate control to ensure that the specified voltage limits are not exceeded. This control may be contained within the battery, as part of the battery protection, or as part of the controlgear.

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If a single cell can be removed as a separate component, then controlgear with a protection device shall be used unless the cell includes a battery protection.

If the battery is not replaceable, the protection device shall either be incorporated in the lamp controlgear or in the battery, and the following provisions shall apply:

a) The battery shall not be accessible during normal operation or installation. To assess compliance the following criteria shall be met:

   i) The battery pack or cell shall be located in a position where it cannot be touched by a test finger in accordance with test probe B of IEC 61032:1997.

   ii) The battery pack or cell shall be labelled, in addition to the requirements of 22.6.7, with the text "DO NOT REMOVE".

b) The battery shall be secured and prevented from being dislodged during installation, operation and transportation. The product, contained within its packaging, shall be subjected to a 1,2 m drop test, onto a concrete floor in any orientation. Following the test, the battery or cell and connections shall not be damaged and shall remain secure in its mounting. *Compliance is checked by inspection following the drop test.*

c) If the protection device is not contained within the battery, then the protection device shall be contained within and assessed as part of the controlgear.

A.7.6 For lithium battery types, a fully discharged battery shall be charged for 48 h during which time the maximum surface temperature of the battery shall not exceed that stated on the battery manufacturer's declaration of design or Table 3 of IEC 61347-2-7:2011/AMD2:2021.

A.8 EDLC

A.8.1 The EDLC in the luminaire shall conform to the relevant requirements of IEC 62391-1 and IEC 62391-2.

A.8.2 The EDLC in the luminaire shall operate within the following limits:

a) The maximum continuous surface temperature of the EDLC shall be in accordance with the EDLC manufacturer's declaration.

b) The maximum charge voltage shall be in accordance with the EDLC manufacturer's declaration.

For items a) and b) the combination of voltage and temperature shall be chosen in accordance with the EDLC manufacturer's declaration to ensure the four-year life design.

NOTE The Class 2 is the most appropriate for this application, however, other classes can be used, if the required performance of the luminaire is delivered.

A.8.3 For a self-contained luminaire with an EDLC, the designed duration (when new) with the light source operating in emergency mode shall be increased to a factor that takes into consideration the capacitance degradation ($C_{\text{deg}\%}$) as declared by the EDLC manufacturer under the voltage and temperature conditions in A.7.2 for the four year lifetime.

During the test according to this document (22.17), the emergency duration (checked on the new luminaire) shall not be less than the rated duration multiplied by a factor calculated as follows:

$$\text{Test duration} = \text{Rated duration} \times K_{\text{d}}$$

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where K_d is a factor that takes into consideration the capacitance degradation as follows:

$$K_d = 100/(100 - C_{deg\%})$$

EXAMPLE In the case where the capacitance degradation ($C_{deg\%}$) is 30 % as declared by the EDLC manufacturer, the rated duration will be increased by the factor:

$$K_d = 100/(100 - 30) = 1{,}42$$

A.9 Maximum surface temperature

The maximum surface temperature of the ESSS within the luminaire shall be measured after 48 h from start of recharge. For self-contained luminaires where the manufacturer declares a lower charging time in accordance with 22.6.1, the temperature shall be measured after twice the rated charge time with a minimum of 12 h.

A.10 Alternative operating parameters

If operating outside the limits given in Clauses A.4, A.5, A.6 and A.7, alternative operating parameters and evidence of the four-year design life for the ESSS shall be supplied by the ESSS manufacturer or the luminaire manufacturer.

A.11 ESSS replacement

The ESSS of a self-contained emergency luminaire is not a user serviceable item and shall only be replaced by a competent person.

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Annex B
(normative)

Luminaire classification

Emergency luminaires shall be classified and marked as per their construction as follows.

A unique designation denoting the type, mode of operation, the facilities included and the rated duration of the luminaire shall be clearly affixed to the luminaire.

The designation consists of a rectangle, divided in three or four segments, each containing one or more positions. Relevant to the construction, a position will consist of a letter or a figure, or a point if no indication has to be given.

The shape of the emergency luminaire designation is as follows:

*	*	******	***

The segments and positions shall be completed by letters and figures indicating the intended constructions as identified in the following list.

a) First segment containing one character: Type

X self-contained

Z central supply

b) Second segment containing one digit: 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) Third segment containing a possible seven characters: Facilities. To be completed where appropriate at the time of installation

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 ESSS

F automatic test gear complying with IEC 61347-2-7 denoted EL-T

G internally illuminated safety sign

d) Fourth segment containing up to three digits: For self-contained luminaires to indicate the minimum duration of the emergency mode expressed in minutes, for example:

10 to indicate 10 min duration

60 to indicate 1 h duration

120 to indicate 2 h duration

180 to indicate 3 h duration

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The following two examples of marking are given to explain the method of using the coding:

X	1	BD	60

Meaning: self-contained, maintained luminaire including a remote rest mode and which is suitable for a high-risk task-area and having an emergency mode duration of 60 min.

Z	1	F	

Meaning: centrally supplied, maintained luminaire with automatic test function having an emergency mode duration that will be defined by the emergency power supply used in the installation.

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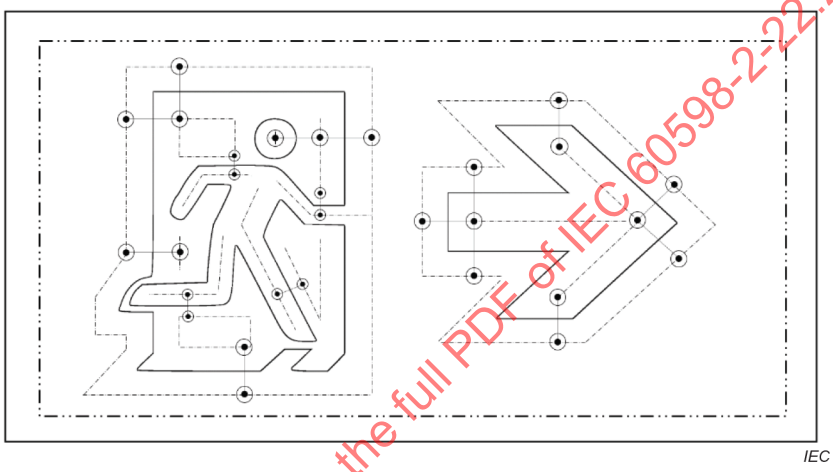
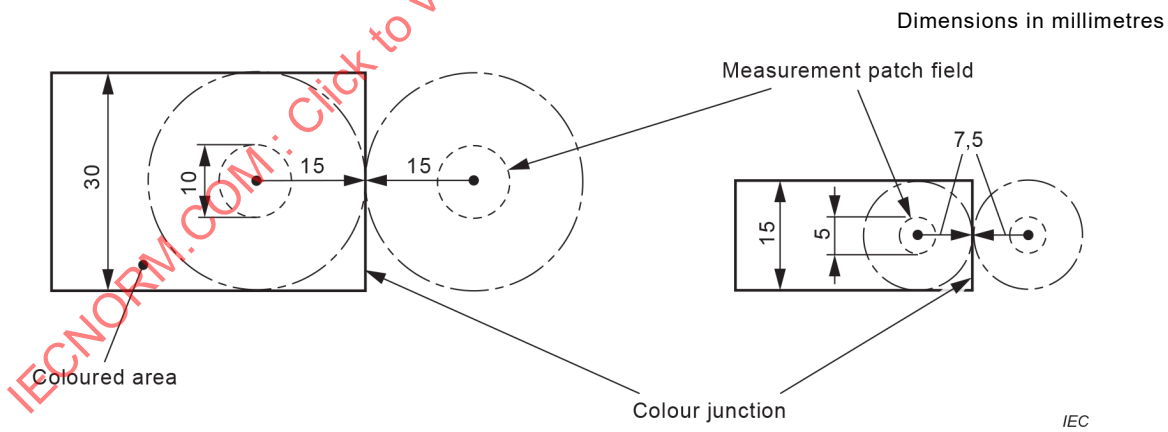
Annex C
(normative)

Luminance measurements

C.1 Contrast: Luminances are measured normal to the surface over a 10 mm diameter field for each coloured surface of the sign. The minimum and maximum luminance is measured over the areas for each colour and for the coloured background a 10 mm wide outer border of the whole pictogram is excluded from the measurements. In order to determine the luminance ratio between two adjacent colours, the luminance measurements shall be taken at a distance of 15 mm on either side of the junction of two colours. If the diameter of the coloured area is less than 30 mm, the patch diameter and the 15 mm distance shall be reduced proportionally (see Figure C.1). The measurements shall not be made outside of the square area as defined for the safety pictogram required by ISO 30061.



a) Typical example of measurement position



b) Patch diameter

Figure C.1 – Typical example of measurement positions

C.2 On-site photometric tests: All illuminance measurements and all luminous measurements shall be made with a photopic, Vλ, corrected meter.

Measurement shall be carried out in accordance with Annex C of ISO 3864-4:2011.

At all times, the measured values shall be not less than those specified in this document.

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Annex D
(informative)

Rest mode and remote inhibiting mode facilities

Self-contained emergency luminaires need an unswitched supply so that when the power to the normal luminaires is switched off, the emergency luminaires do not change over and continue to charge their batteries. In order to avoid unwanted discharges, rest mode or remote inhibiting mode facilities can be provided (see 22.5) to protect the integrity of batteries when the emergency lighting is not needed and the normal supply fails at that time (or when the batteries are included with the luminaire and stored before installation).

The main characteristics of rest mode are:

a) Its function is relevant only when the normal supply is voluntarily shut down, enabling stored energy needed in case of mains failure, to be conserved.

b) A failure of the remote control wiring (short circuit, open circuit or connection to earth) does not affect the emergency operation of the luminaire.

c) At the restoration of the normal supply, the luminaire reverts to normal mode.

NOTE Remote control devices for rest mode are not standardized.

The main characteristics of remote inhibiting mode are:

a) It can be set independently from the condition of the normal power and therefore when the building is unoccupied, a supply failure or disconnection will not cause an unwanted discharge.

b) The protection against the interruption of the wiring to the remote control should be provided by a proper installation according to the relevant national wiring rules.

Table D.1 – Time scale rest mode and inhibiting mode versus status of normal mains supply

t_0 t_1 t_2 t_3

	Mains ON	Mains OFF	Mains OFF	Mains ON	Mains OFF
Rest mode	Luminaire in normal mode	Luminaire in emergency mode	Luminaire in rest mode (see NOTE 1)	Luminaire in normal mode (see NOTE 2)	Luminaire in emergency mode
Inhibiting mode active	Luminaire in inhibiting mode (see NOTE 3)	Luminaire in inhibiting mode (see NOTE 3)	Luminaire in inhibiting mode (see NOTE 3)	Luminaire in inhibiting mode (see NOTE 3)	Luminaire in inhibiting mode (see NOTE 3)
Inhibiting mode not active (see NOTE 4)	Luminaire in normal mode	Luminaire in emergency mode	Luminaire in emergency mode	Luminaire in normal mode	Luminaire in emergency mode

NOTE 1 The luminaire is switched to rest mode manually; the mains and the rest mode are activated in sequence by manual action.

NOTE 2 The luminaire is switched to normal mode from rest mode automatically.

NOTE 3 The luminaire is switched to remote inhibiting mode manually or by means of an interlock with the local mains switch; when mains is ON and the luminaire is in remote inhibiting mode, batteries are in charge.

NOTE 4 The luminaire acts as a normal emergency lighting product when the remote inhibiting mode has been switched to inactive.

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Both in rest mode and remote inhibiting mode, a drain current from the battery and/or self-discharge will occur, thus reducing the stored energy available for emergency operation immediately following the rest or inhibiting mode period. The manufacturer should consequently give an indication of the rest or inhibiting mode time allowed after a full charging period, in order for the luminaire to provide at least 50 % of its rated duration in emergency operation.

Following any rest or inhibiting mode period, a complete recharge of the battery should be provided. The rest or inhibiting mode function allows for this recharge to be conducted with the building occupied as a limited functioning of the emergency operation of the luminaire (50 % of rated duration) will still be available.

The characteristics of rest or inhibiting mode have been summarized in Table D.1.

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Annex E
(normative)

Requirements for self-contained portable emergency luminaires

E.1 General

The purpose of this annex is to specify the requirements and tests for self-contained portable emergency luminaires which can provide additional emergency lighting to support the permanent emergency lighting installation.

Self-contained portable emergency luminaires may be for purposes of inspection and escape, for use in temporary sites, rooms that are not continuously occupied and/or where a safety procedure may be required, and, also even in the event of a distribution network failure of a central battery system.

E.2 Scope of requirements provided in Annex E

This annex modifies the requirements of this document when self-contained emergency luminaires are for portable use.

Self-contained portable emergency luminaires are not suitable to ensure a fixed safety illumination as required in ISO 30061.

This annex also includes relevant requirements and tests that shall be conducted and complied with for controlgear, as specified in IEC 61347-2-7, that incorporate additional facilities such as remote control devices, indicators, changeover devices.

E.3 Terms and definitions

For the purpose of this annex, the definitions of Section 1 of Part 1 and Clause 22.3 of this document, with the exception of those modified below, and the following apply.

E.3.1
base unit
fixed unit into which the self-contained portable emergency luminaire is located during normal mode and charging of its ESSS(s)

Note 1 to entry: The base unit can contain the part of the control unit for charging the ESSS in the self-contained portable emergency luminaire.

E.3.2
normal mode
state of a self-contained portable emergency luminaire that is ready to operate in emergency mode while it is connected to the normal supply and the normal supply is on

E.3.3
emergency mode
state of a self-contained portable emergency luminaire that provides lighting when energized by its internal power source

E.3.4
switching mode
state of a self-contained portable emergency luminaire which, in the case of a normal supply failure, automatically changes over to having an emergency capability and whereby the lamp can be either illuminated or its function inhibited until manually switched on

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E.3.5
control unit
unit or set of units comprising a supply changeover system, an ESSS charging device and, where appropriate, a means for testing

Note 1 to entry: The control unit can be divided between the luminaire and the base unit.

Note 2 to entry: For tubular fluorescent lamps, this unit can also contain the lamp controlgear.

E.4 General test requirements

The provisions of Part 1 and of this document shall apply unless otherwise specified in this annex.

E.5 Classification of luminaires

The requirements of Clause 22.5 of this document shall apply except that the protection against electric shock for the base unit and portable emergency luminaires with mains-voltage supplied integrated charger shall be Class I or Class II only and for the self-contained portable emergency luminaire without integrated mains-voltage supplied charger, the insulation shall correspond to the requirements of Class III.

E.5.1 Self-contained portable emergency luminaires are classified according to construction as follows:

a) where the control unit is completely contained in the self-contained portable emergency luminaire;

b) where part of the control unit remains in the base unit.

E.5.2 In addition, self-contained portable emergency luminaires are classified according to their operation as follows:

a) automatic initiation with manual control,

b) automatic initiation with automatic control,

c) manual control of operation.

E.5.3 In addition, self-contained portable emergency luminaires are classified according to their photometric performance and distribution and shall be measured in accordance with IEC TR 61341 as follows:

a) narrow beam angles no greater than 15°;

b) medium beam angles between 15° and 25°;

c) wide beam angles greater than 25°;

d) variable beam angles – state the range of angles.

The average beam intensity shall be given in candelas. For variable beam angles the average beam intensity shall be given for the narrowest and widest beam angles.

The beam angle is measured to 50 % of the beam peak intensity.

Luminaires with a concentrated intensity distribution may require more angles at which the luminous intensity data are presented (e.g. every 1° in the area where 90 % of the luminous flux is emitted).

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E.6 Marking

The provisions of Section 3 of Part 1 and Clause 22.6 of this document shall apply together with the requirements of E.6.1 to E.6.4.

E.6.1 For self-contained portable emergency luminaires, any relevant markings shall remain visible after installation. In the case of a separate charging device, the markings shall be attached to both parts and the Class II symbol shall only appear on the charger.

E.6.2 Self-contained portable emergency luminaires shall be accompanied with clear instructions for the electrical and mechanical installation and use in accordance with its classification as given in Clause E.5.

E.6.3 The base unit and self-contained portable emergency luminaires shall each have a warning notice to instruct the return of the self-contained portable emergency luminaires to the base unit for recharging after use.

E.6.4 In the instruction leaflet supplied with the self-contained portable emergency luminaire, the manufacturer shall give photometric data in accordance with E.5.3.

E.7 Construction

The provisions of Section 4 of Part 1 and Clause 22.7 of this document shall apply together with the requirements of E.7.1 to E.7.16 to both the self-contained portable emergency luminaire and the base unit where applicable.

Compliance of E.7.1 to E.7.16 is checked by inspection, measurement or testing.

E.7.1 Self-contained portable emergency luminaires shall have one of the following constructions:

a) where the control unit is completely contained in the self-contained portable emergency luminaire;

b) where part of the control unit remains in the base unit.

E.7.2 For self-contained portable emergency luminaires, the mechanical strength tests given in 4.13 of Part 1 shall be applied with the portable section treated as a rough service luminaire as given in 4.13.4 of Part 1.

E.7.3 The base unit shall be permanently connected to an unswitched supply.

E.7.4 The integral manual switch shall be used to switch the unit from the inhibiting mode to the emergency mode. This switch shall also allow the emergency mode to be switched to inhibiting mode. When the normal power supply is restored and the self-contained portable emergency luminaire is connected to its power supply unit, it shall automatically go into the recharging state before the normal supply voltage reaches 0,85 times the nominal value.

E.7.5 An integral overcurrent protection device shall be connected immediately after the terminals connecting the self-contained portable emergency luminaire to the normal supply.

E.7.6 Power supply connection between the self-contained portable emergency luminaire and its base unit shall be made without the use of a tool. The corresponding connection devices shall comply with the requirements of their relevant standard.

E.7.7 No access to live parts shall be possible during or after connection or disconnection.

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E.7.8 The supply cable, if applicable, shall be disconnected from the portable part before use.

E.7.9 For self-contained portable emergency luminaires with a separate charging device, the connection between the portable part and the charger shall be mechanically interlocked to prevent an incorrect polarized connection.

E.7.10 Self-contained portable emergency luminaires with incandescent lamps shall have at least two independent lamps and they shall be replaceable.

It shall be ensured that in case of a failure of the main lamp, the second lamp is automatically active and emits enough light for proper working conditions.

The main lamp shall have an average life of at least 100 h.

The lamps shall be of the same type, their nominal voltage shall match the ESSS voltage and they shall have an average life of at least 100 h.

E.7.11 The colour rendering index of any emergency lamps shall be R_a 40 or better.

E.7.12 On re-instatement of the normal supply, the base unit shall have an audible and/or visible warning to indicate that the self-contained portable emergency luminaire has been removed and the warning shall not be cancelled until the self-contained portable emergency luminaire is reconnected to the base unit.

E.7.13 On failure of the mains supply, the self-contained portable emergency luminaire shall either operate in the emergency mode with the lamps illuminated or display an indicator to identify the location of the self-contained portable emergency luminaire.

When an indicator is used, it shall have a load of ≤ 0,01 C_5/h of the capacity of the ESSS.

E.7.14 Self-contained portable emergency luminaires may be fitted with an indicator to give warning of low ESSS capacity remaining.

E.7.15 Self-contained portable emergency luminaires, together with the base unit, shall have adequate stability.

Compliance is checked by placing the portable part of the self-contained portable emergency luminaire in the most unfavourable position of normal use on a plane inclined at an angle of 15° to the horizontal.

The self-contained portable emergency luminaire shall be retained in the base unit.

Any instructions supplied by the manufacturer with the luminaire shall receive due consideration in respect of the stability test. The luminaire shall not overturn and the safety self-contained portable emergency luminaire shall remain in its base unit.

Base units which are permanently fixed to a structure and assemblies which are fastened by clips or similar devices are not subjected to this test.

E.7.16 Self-contained portable emergency luminaires shall have adequate stability to illuminate the task area when it is used and placed on a non-horizontal surface.

Compliance is checked by placing the portable part of the self-contained portable emergency luminaire in the most unfavourable position of normal use on a plane inclined at an angle of 15° to the horizontal.

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The self-contained portable emergency luminaire shall not slide nor overturn and the targeted task area shall remain illuminated.

E.8 Changeover operation

The provisions of Clause 22.18 of this document shall apply in addition to the following:

For self-contained portable emergency luminaires provided with an integral manual switch, the requirements of 22.7.10 shall be excluded. Design should also be made to avoid the possibility of switching off the charger whilst holding the luminaire.

E.9 High temperature operation

The provisions of Clause 22.19 of this document shall apply with an ambient temperature of 40 °C.

E.10 Thermal test

The thermal tests representing normal operation and abnormal operation, of Clauses 12.4 and 12.5 of Part 1, are made with the portable part of the self-contained portable emergency luminaire and independent controlgear, if any, either placed on a dull black painted wooden floor or suspended so that they rest against a dull black painted wooded wall, whichever is the more unfavourable.

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

LUMINAIRES –

Partie 2-22: Exigences particulières – Luminaires pour éclairage de secours

AVANT-PROPOS

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Cette cinquième édition annule et remplace la quatrième édition parue en 2014 et l'Amendement 1:2017. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

a) mise à jour des exigences relatives à l'état de repos et l'état de neutralisation;

b) clarification des essais de fonctionnement à température élevée;

c) introduction de nouvelles exigences pour les batteries au lithium;

d) introduction de nouvelles exigences pour les condensateurs électriques à double couche (EDLC);

e) clarification de la résistance à la chaleur, au feu et aux courants de cheminement;

f) clarification des dispositifs d'essai pour les blocs autonomes;

g) clarification de la méthode d'essai pour les mesures du contraste des signaux de sortie.

Le texte de cette Norme internationale est issu des documents suivants:

Projet	Rapport de vote
34D/1635/FDIS	34D/1642/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

La langue employée pour l'élaboration de cette Norme internationale est l'anglais.

Le présent document a été rédigé selon les Directives ISO/IEC, Partie 2, il a été développé selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles sous www.iec.ch/members_experts/refdocs. Les principaux types de documents développés par l'IEC sont décrits plus en détail sous www.iec.ch/standardsdev/publications.

La présente Partie 2-22 doit être utilisée conjointement avec la dernière édition de l'IEC 60598-1 et son ou ses amendements. Elle a été établie sur la base de la neuvième édition (2020) de cette norme.

NOTE 1 L'expression "la Partie 1" utilisée dans le présent norme fait référence à l'IEC 60598-1.

NOTE 2 Dans le présent document, les caractères d'imprimerie suivants sont utilisés:

– déclarations de conformité: *caractères italiques*.

Une liste de toutes les parties de la série IEC 60598, publiées sous le titre général *Luminaires*, se trouve sur le site web de l'IEC.

Le comité a décidé que le contenu du présent document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous webstore.iec.ch dans les données relatives au document recherché. A cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
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LUMINAIRES –

Partie 2-22: Exigences particulières – Luminaires pour éclairage de secours

22.1 Domaine d'application

La présente partie de l'IEC 60598 spécifie les exigences applicables aux luminaires d'éclairage de secours à utiliser avec des lampes électriques sur des alimentations de secours qui ne dépassent pas 1 000 V.

Le présent document ne traite pas des effets d'une chute de tension de l'alimentation normale sur les luminaires qui incorporent des lampes à décharge haute pression.

Le présent spécifie les exigences générales applicables aux équipements d'éclairage de secours.

Dans le présent document, le terme "lampe", qui inclut également les "sources lumineuses" le cas échéant, est utilisé.

22.2 Références normatives

Les documents suivants sont cités dans le texte de sorte qu'ils constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60073, *Principes fondamentaux et de sécurité pour l'interface homme-machine, le marquage et l'identification – Principes de codage pour les indicateurs et les organes de commande*

IEC 60155, *Interrupteurs d'amorçage à lueur pour lampes à fluorescence (starters)*

IEC 60598-1, *Luminaires – Partie 1: Exigences générales et essais*

IEC 60896-21, *Batteries stationnaires au plomb – Partie 21: Types étanches à soupapes – Méthodes d'essai*

IEC 61032:1997, *Protection des personnes et des matériels par les enveloppes – Calibres d'essai pour la vérification*

IEC 61056-1, *Batteries d'accumulateurs au plomb-acide pour usage général (types à soupapes) – Partie 1: Exigences générales et caractéristiques fonctionnelles – Méthodes d'essai*

IEC TR 61341, *Méthode de mesure de l'intensité dans l'axe du faisceau et de l'angle (ou des angles) d'ouverture des lampes à réflecteur*

IEC 61347-2-2, *Appareillages de lampes – Partie 2-2: Exigences particulières pour les convertisseurs abaisseurs électroniques alimentés en courant continu ou alternatif pour lampes à incandescence*

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IEC 61347-2-3:2011, *Appareillages de lampes – Partie 2-3: Exigences particulières pour les appareillages électroniques alimentés en courant alternatif et/ou en courant continu pour lampes fluorescentes*

IEC 61347-2-7:2011, *Appareillages de lampes – Partie 2-7: Règles particulières relatives aux appareillages électroniques alimentés par batterie pour l'éclairage de secours (autonome)*
IEC 61347-2-7:2011/AMD1:2017
IEC 61347-2-7:2011/AMD2:2021

IEC 61347-2-12, *Appareillages de lampes – Partie 2-12: Exigences particulières pour les ballasts électroniques alimentés en courant continu ou alternatif pour lampes à décharge (à l'exclusion des lampes fluorescentes)*

IEC 61347-2-13, *Appareillages de lampes – Partie 2-13: Exigences particulières pour les appareillages électroniques alimentés en courant continu ou alternatif pour les modules de LED*

IEC 61951-1, *Accumulateurs alcalins et autres accumulateurs à électrolyte non acide – Accumulateurs étanches pour applications portables – Partie 1: Nickel-cadmium*

IEC 61951-2, *Accumulateurs alcalins et autres accumulateurs à électrolyte non acide – Accumulateurs étanches pour applications portables – Partie 2: Nickel-métal hydrure*

IEC 62034, *Systèmes automatiques d'essai pour éclairage de sécurité sur batteries*

IEC 62133-2:2017, *Accumulateurs alcalins et autres accumulateurs à électrolyte non acide – Exigences de sécurité pour les accumulateurs portables étanches, et pour les batteries qui en sont constituées, destinés à l'utilisation dans des applications portables – Partie 2: Systèmes au lithium*

IEC 62391-1:2015, *Condensateurs électriques fixes à double couche utilisés dans les équipements électriques et électroniques – Partie 1: Spécification générique*

IEC 62391-2:2006, *Condensateurs électriques fixes à double couche utilisés dans les équipements électroniques – Partie 2: Spécification intermédiaire – Condensateurs électriques à double couche pour application de puissance*

IEC 62620:2014, *Accumulateurs alcalins et autres accumulateurs à électrolyte non acide – Eléments et batteries d'accumulateurs au lithium pour utilisation dans les applications industrielles*

ISO 3864-4:2011, *Symboles graphiques – Couleurs de sécurité et signaux de sécurité – Partie 4: Propriétés colorimétriques et photométriques des matériaux des signaux de sécurité*

ISO 30061:2007, *Eclairage de secours*

CIE 121 SP1, *The Photometry and Goniophotometry of Luminaires – Supplement 1: Luminaires for Emergency Lighting* (disponible en anglais seulement)

CIE S025, *Test Method for LED Lamps, LED Luminaires and LED Modules* (disponible en anglais seulement)

22.3 Termes et définitions

Pour les besoins du présent document, les termes et définitions de la Partie 1 ainsi que les suivants s'appliquent.

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L'ISO et l'IEC tiennent à jour des bases de données terminologiques destinées à être utilisées en normalisation, consultables aux adresses suivantes:

- IEC Electropedia: disponible à l'adresse http://www.electropedia.org/
- ISO Online browsing platform: disponible à l'adresse http://www.iso.org/obp

22.3.1
éclairage de secours
éclairage utilisé lorsque l'alimentation de l'éclairage normal est défaillante

Note 1 à l'article: L'éclairage de secours inclut l'éclairage de sécurité, l'éclairage des emplacements de travaux dangereux et l'éclairage de remplacement.

22.3.2
éclairage de sécurité
partie de l'éclairage de secours qui fournit un éclairage pour la sécurité des personnes qui quittent une zone ou essayent de terminer une opération dangereuse avant d'évacuer une zone

22.3.3
éclairage de remplacement
partie de l'éclairage de secours qui permet aux activités normales de se poursuivre de manière pratiquement inchangée

22.3.4
éclairage des emplacements de travaux dangereux
partie de l'éclairage de secours qui est fourni afin d'assurer la sécurité des personnes impliquées dans une situation ou un procédé potentiellement dangereux et de permettre d'arrêter une procédure de manière appropriée à la sécurité de l'opérateur et des occupants des locaux

22.3.5
luminaire pour éclairage de secours du type permanent
luminaire dans lequel les lampes d'éclairage de secours sont alimentées en tout temps, lorsque l'éclairage normal ou l'éclairage de secours est exigé

22.3.6
luminaire pour éclairage de secours du type non permanent
luminaire dans lequel les lampes d'éclairage de secours sont en fonctionnement uniquement lorsque l'alimentation de l'éclairage normal est défaillante

22.3.7
luminaire mixte pour éclairage de secours
luminaire qui contient deux ou plusieurs lampes, l'une au moins étant alimentée par le circuit d'éclairage de secours et les autres à partir du circuit d'éclairage normal

Note 1 à l'article: Un luminaire mixte pour éclairage de secours est permanent ou non permanent.

22.3.8
bloc autonome d'éclairage de secours
luminaire qui fournit un éclairage de secours de type permanent ou non permanent, dans lequel tous les éléments, tels que la source électrique de sécurité (ESSS), la lampe, l'ensemble de commande et les dispositifs d'essais et de contrôle, s'ils existent, sont contenus dans le luminaire ou à proximité de celui-ci (c'est-à-dire moins de 1 m de câble)

22.3.9
luminaire d'éclairage de secours alimenté par source centrale
luminaire pour fonctionnement permanent ou non permanent qui est alimenté à partir d'une source centrale de secours qui n'est pas incorporée dans le luminaire

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22.3.10
bloc autonome composé pour l'éclairage de secours
bloc autonome d'éclairage qui fournit l'éclairage de secours permanent ou non permanent ainsi que l'alimentation de secours pour le fonctionnement d'un bloc satellite

22.3.11
luminaire satellite d'éclairage de secours
luminaire qui assure un fonctionnement permanent ou non permanent, alimenté par un bloc autonome composé pour l'éclairage de secours, qui lui est associé

22.3.12
ensemble de commande
un ou plusieurs ensembles qui comprennent un système de commutation d'alimentation, un dispositif de charge de source électrique de sécurité (ESSS) et, le cas échéant, des moyens d'essais

Note 1 à l'article: Cet ensemble peut également comporter l'appareillage de lampe.

22.3.13
défaillance d'alimentation normale
condition dans laquelle l'éclairage normal ne peut plus assurer un niveau minimal d'éclairement aux fins d'évacuation d'urgence et lorsqu'il convient que l'éclairage de secours entre en fonctionnement

22.3.14
flux lumineux assigné d'un luminaire d'éclairage de secours
flux lumineux déclaré par le fabricant du luminaire, 60 s après la défaillance de l'alimentation normale (0,5 s pour les luminaires d'éclairage des emplacements de travaux dangereux) et maintenu en continu jusqu'à la fin de la durée assignée de fonctionnement

22.3.15
durée assignée de fonctionnement de secours
intervalle de temps, déclaré par le fabricant, pendant lequel le flux lumineux assigné de secours est émis

22.3.16
état de veille
état dans lequel un bloc autonome d'éclairage de secours est prêt à fonctionner en état de fonctionnement de secours, pendant que le réseau normal est alimenté

Note 1 à l'article: Dans le cas d'une défaillance de l'alimentation normale, le bloc autonome passe alors automatiquement à l'état de fonctionnement de secours.

22.3.17
état de fonctionnement de secours
état dans lequel un bloc autonome d'éclairage de secours assure l'éclairage en étant alimenté par sa source interne d'énergie électrique, lorsque l'alimentation normale est défaillante

22.3.18
état de repos
état d'un bloc autonome d'éclairage de secours qui a été éteint intentionnellement lorsque l'alimentation normale est interrompue et qui, dans le cas du retour de celle-ci, revient automatiquement à l'état de veille

22.3.19
taux de surcharge maximale
taux de charge maximale en continu (par exemple courant ou tension) qui peut être appliqué à une source électrique de sécurité (ESSS) complètement chargée

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22.3.20
moyen neutralisateur à distance
moyens pour neutraliser à distance un luminaire associé à un système d'éclairage de secours

22.3.21
état de neutralisation à distance
état d'un bloc autonome d'éclairage de secours dont le fonctionnement est neutralisé à l'aide d'une commande à distance en présence de l'alimentation normale et qui, dans le cas d'une défaillance de l'alimentation normale, ne passe pas en état de fonctionnement de secours

22.3.22
panneau de sécurité éclairé de l'intérieur
bloc d'éclairage de secours autonome ou alimenté par une source centrale destiné à fournir un message de sécurité spécifique obtenu au moyen d'une combinaison de couleurs et de formes géométriques

Note 1 à l'article: Les détails sont donnés dans l'ISO 3864-1 et l'ISO 3864-4.

22.3.23
flux lumineux de secours pratique
PELF
flux lumineux minimal de la lampe observé pendant la durée assignée de l'état de fonctionnement de secours

Note 1 à l'article: PELF = LDL × EBLF
où LDL est le flux lumineux assigné de la lampe à fluorescence ou à décharge; il est considéré comme le flux lumineux déterminé à 100 h de fonctionnement.

Note 2 à l'article: L'abréviation "PELF" est dérivée du terme anglais développé correspondant "practical emergency lamp flux".

22.3.24
bloc autonome d'éclairage de secours portatif
luminaire portatif qui fournit un éclairage de secours dans lequel tous les éléments, tels que la source électrique de sécurité (ESSS), la lampe, l'ensemble de commande, un commutateur manuel pour la mise sous et hors tension d'une ou plusieurs lampes, et les dispositifs d'essais et de contrôle, s'ils existent, sont contenus dans le luminaire qui peut être détaché de son embase pour une utilisation en état de fonctionnement de secours

22.3.25
facteur de flux lumineux du ballast en mode secours
EBLF
rapport entre le flux lumineux de la lampe alimentée par l'appareillage en mode secours et le flux lumineux de la même lampe lorsque celle-ci fonctionne avec le ballast de référence approprié, alimenté à sa propre tension assignée et à sa fréquence assignée

Note 1 à l'article: Le facteur de flux lumineux du ballast en mode secours est le minimum des valeurs mesurées au moment approprié après la coupure de l'alimentation normale et ensuite de manière continue jusqu'à la fin de la durée assignée de fonctionnement en mode secours.

Note 2 à l'article: L'abréviation "EBLF" est dérivée du terme anglais développé correspondant "emergency ballast lumen factor".

[SOURCE: IEC 61347-2-7:2011, 3.13]

22.3.26
luminaire de secours monté sur un système de rampe d'éclairage
luminaire de secours spécialement conçu pour être utilisé sur les systèmes de rampe d'éclairage

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22.3.27
boîtier déporté
boîte qui satisfait aux mêmes exigences que le luminaire de secours

Note 1 à l'article: Cette boîte a pour objet de contenir un ou plusieurs composants, par exemple batterie, appareillage, qui ne sont pas installés dans le luminaire de secours.

22.3.28
flux de source lumineuse de secours pratique
PELSF
flux lumineux minimal de la source lumineuse observé pendant la durée assignée de l'état de fonctionnement de secours

Note 1 à l'article: Pour les sources lumineuses à LED:

a) si EOF_l est donné: PELSF = LDL × EOF_l

b) si $I_{secours}$ en provenance d'un appareillage à courant constant est défini: PELSF = LDL × ($I_{secours}$ / $I_{état\ de\ veille}$)

où LDL est le flux lumineux du module de LED dans la condition qui correspond au fonctionnement dans le luminaire (t_p identique) qui fonctionne au même courant ($I_{état\ de\ veille}$).

Note 2 à l'article: L'abréviation "PELSF" est dérivée du terme anglais développé correspondant "practical emergency light source flux".

22.3.29
déclaration de conception du fabricant de batteries
document publié par le fabricant de batteries qui fournit les informations techniques nécessaires pour évaluer l'utilisation sûre de la batterie et son régime de fonctionnement conformément aux exigences du présent document

Note 1 à l'article: Des exemples de déclarations de conception du fabricant de batteries pour une batterie au lithium sont donnés dans l'IEC 61347-2-7.

22.3.30
capacité assignée
valeur de la capacité d'une batterie déterminée dans des conditions spécifiées et déclarée par le fabricant

[SOURCE: IEC 60050-482:2004, 482-03-15]

22.3.31
source électrique de sécurité
ESSS
source d'énergie du bloc autonome d'éclairage de secours, prévue pour alimenter le luminaire d'éclairage de secours en état de fonctionnement de secours

Note 1 à l'article: L'ESSS peut également alimenter le luminaire à l'état de repos et à l'état de neutralisation.

Note 2 à l'article: L'abréviation "ESSS" est dérivée du terme anglais développé correspondant "electric source for safety services".

22.3.32
condensateur électrique à double couche
EDLC
dispositif qui stocke l'énergie électrique au moyen d'une double couche dans un élément électrochimique

Note 1 à l'article: L'abréviation "EDLC" est dérivée du terme anglais développé correspondant "electric double-layer capacitor".

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22.4 Exigences générales d'essai

Les dispositions de la Section 0 de la Partie 1 doivent s'appliquer. Les essais décrits dans chaque section applicable de la Partie 1 doivent être effectués selon l'ordre indiqué dans le présent document.

Lors des essais menés sur des luminaires mixtes pour éclairage de secours conformément aux exigences du présent document, les essais doivent couvrir les éléments du luminaire qui participent à la fourniture de l'éclairage de secours en tenant compte de l'influence de tous les autres éléments et composants du luminaire. Les composants et éléments des luminaires qui sont exclusivement conçus pour assurer l'éclairage normal doivent être soumis aux essais selon les exigences de la partie correspondante de l'IEC 60598-2 (par exemple, si le luminaire est encastré, il doit être soumis aux essais suivant les exigences de la partie qui traite des luminaires encastrés).

Si certains éléments d'un luminaire d'éclairage de secours sont à proximité (moins de 1 m de câble) de la partie principale du luminaire, tous les éléments de celui-ci, y compris les moyens d'interconnexion, doivent satisfaire aux exigences correspondantes du présent document.

Les exigences supplémentaires qui couvrent les blocs autonomes d'éclairage de secours portatifs sont données à l'Annexe E.

Les essais photométriques du 22.17 doivent être effectués sur un échantillon de luminaire distinct.

Il convient d'appliquer les facteurs de réduction pendant la conception de l'installation d'éclairage de secours qui est pertinente pour l'application. Ces facteurs sont normalement définis par la norme de l'application correspondante.

22.5 Classification des luminaires

Les luminaires d'éclairage de secours doivent être classés en conformité avec les dispositions de la Section 2 de la Partie 1, excepté que tous les luminaires d'éclairage de secours doivent être classés de façon appropriée à un montage direct sur des surfaces normalement inflammables.

Les luminaires d'éclairage de secours doivent également être classés comme cela est spécifié à l'Annexe B.

22.6 Marquage

Les dispositions de la Section 3 de la Partie 1 doivent s'appliquer conjointement avec les exigences énoncées du 22.6.1 au 22.6.20 ci-après.

22.6.1 Les luminaires doivent porter un marquage clair de la tension d'alimentation assignée ou de la ou des plages de tensions.

22.6.2 Les luminaires doivent porter un marquage clair des caractéristiques de leur classification selon 22.5 (voir Annexe B).

22.6.3 Les détails de la lampe de remplacement adaptée doivent être clairement marqués sur les luminaires avec des lampes remplaçables, dans un endroit qui est visible lors du remplacement de la lampe. Ceci assure que le flux lumineux assigné du luminaire d'éclairage de secours peut être atteint.

NOTE Les informations relatives au remplacement correct de la lampe peuvent inclure le nombre, le type, la tension assignée et la puissance assignée, etc.

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22.6.4 En plus du marquage *t*a, lorsque cela s'applique, la plage des températures ambiantes doit être marquée ou spécifiée dans la notice d'instructions fournie avec le luminaire.

22.6.5 Les luminaires d'éclairage de secours équipés de fusibles remplaçables et/ou de lampes témoins remplaçables doivent comporter des indications concernant les caractéristiques des fusibles et/ou des lampes témoins.

22.6.6 Pour les essais manuels uniquement, les dispositifs de vérification destinés à simuler une défaillance de l'alimentation normale, s'ils existent, doivent être clairement marqués, de sorte que le marquage soit visible lors des essais périodiques.

22.6.7 Les blocs autonomes d'éclairage doivent porter un marquage clair des informations relatives à la nature de l'ESSS qu'ils contiennent, comme cela est indiqué ci-après.

22.6.7.1 Les blocs autonomes d'éclairage de secours équipés de batteries remplaçables doivent porter un marquage clair des informations relatives au remplacement correct de la batterie. Si le fabricant indique que la batterie n'est remplaçable que par un type spécifique, la technologie de la batterie (par exemple Ni-MH) et la référence du type ou le code de la batterie remplaçable doivent être indiqués. Si la batterie est remplaçable par un autre type, les informations doivent inclure la technologie de la batterie (par exemple Ni-MH), la tension assignée, la capacité, la température assignée et la classification des températures.

Les luminaires qui contiennent une ou plusieurs batteries non remplaçables doivent être marqués pour indiquer que la batterie n'est pas remplaçable.

22.6.7.2 Les batteries des blocs autonomes avec batteries doivent porter le marquage de l'année et du mois ou de l'année et de la semaine de fabrication.

Dans les blocs autonomes avec batteries remplaçables, l'étiquette de la batterie doit comporter un emplacement afin de permettre le marquage de la date de mise en service par l'installateur ou l'ingénieur qualifié.

Pour les luminaires avec des batteries non remplaçables, l'emplacement pour le marquage de la date de mise en service doit être prévu sur la batterie ou sur une étiquette visible au moment de la maintenance.

22.6.7.3 Les blocs autonomes d'éclairage de secours équipés d'un EDLS doivent porter un marquage clair des informations relatives au remplacement correct de l'EDLC. Si le fabricant indique que l'EDLC n'est remplaçable que par un type spécifique, il doit préciser la référence du type ou le code de l'EDLC remplaçable. Si l'EDLC est remplaçable par un autre type, les informations doivent inclure le type d'EDLC (selon la norme IEC applicable), par exemple la tension assignée, la capacité, la température assignée, la classification des températures, les dimensions.

Les luminaires qui contiennent des EDLC non remplaçables doivent être marqués pour indiquer que l'EDLC n'est pas remplaçable.

22.6.8 Vide.

22.6.9 Les luminaires mixtes pour éclairage de secours doivent porter le marquage des indications relatives au remplacement correct de toutes les lampes. Si des lampes différentes sont utilisées dans le circuit d'alimentation normal et dans le circuit de secours, les types de lampes respectifs doivent être clairement identifiés.

Les douilles pour lampes d'éclairage de secours dans les luminaires mixtes doivent être identifiées par un point vert d'au moins 5 mm de diamètre, qui doit être visible lors du remplacement des lampes.

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22.6.10 Dans la notice d'instructions fournie avec le bloc autonome d'éclairage de secours, le fabricant doit indiquer que le remplacement de l'ESSS ou du luminaire complet (s'il est équipé d'une ESSS non remplaçable) est nécessaire lorsqu'ils ne satisfont plus à leur durée de fonctionnement assignée après la période de recharge correspondante.

Toutes les informations relatives au remplacement correct de l'ESSS doivent figurer dans la notice d'instructions fournie avec le bloc autonome d'éclairage de secours. Si le fabricant indique que l'ESSS est remplaçable uniquement par un type spécifique, la référence du type ou le code de l'ESSS remplaçable doit être indiqué. Si l'ESSS est remplaçable par un autre type, les instructions doivent comporter: la technologie ou le type de l'ESSS (batterie, par exemple Ni-MH), la norme IEC applicable (EDLC), la tension assignée, la capacité, la température assignée, la classification des températures.

En outre, la notice d'instructions fournie avec le bloc autonome d'éclairage de secours doit contenir, en substance, l'information suivante: "La source électrique de sécurité n'est pas un composant accessible à l'utilisateur et doit être remplacée uniquement par un prestataire de services du fabricant ou par une personne de qualification équivalente".

22.6.11 Dans la notice d'instructions fournie avec le luminaire, le fabricant doit donner des indications sur les dispositifs d'essai incorporés au luminaire ou des instructions appropriées si ces dispositifs d'essai sont fournis séparément. Ces instructions doivent inclure des indications sur les procédures d'essai.

22.6.12 Dans la notice d'instructions fournie avec le luminaire, le fabricant doit donner des indications concernant les câbles de liaison à utiliser entre un bloc autonome composé et un bloc satellite associé. La longueur maximale des câbles qui limite la chute de tension à 3 % doit être spécifiée.

22.6.13 Vide.

22.6.14 Dans la notice d'instructions fournie avec les blocs autonomes d'éclairage de secours, le fabricant doit donner des indications sur tout dispositif qui en modifie le mode de fonctionnement.

22.6.15 Les données photométriques doivent être disponibles auprès du fabricant conformément au 22.17.

22.6.16 Toute procédure de préparation normale pour l'utilisation du luminaire doit être précisée dans les instructions d'installation du fabricant. Cette préparation doit être réalisée avant d'effectuer les essais de type.

22.6.17 Les marquages exigés en 22.6.1, 22.6.2, au 2e alinéa du 22.6.7.1, au 2e alinéa du 22.6.7.3 et en 22.6.20 doivent se situer dans une position telle que l'information puisse être visible après l'installation du luminaire.

Le marquage indiqué en 22.6.5, au 1er alinéa du 22.6.7.1, au 1er alinéa du 22.6.7.3 et en 22.6.9 doit être visible pendant la maintenance du composant correspondant.

NOTE Pour les luminaires encastrés, cette information peut être marquée à l'intérieur du luminaire afin qu'elle soit visible lorsque la vasque est enlevée.

22.6.18 Les instructions d'installation des luminaires équipés de connexions externes du type fiche/socle, et qui ne sont pas prévues pour prévenir une accidentelle déconnexion, doivent comporter l'avertissement suivant: "Ce luminaire est uniquement destiné à une installation dans des lieux où les fiches et les socles sont protégés de toute déconnexion non autorisée".

22.6.19 Dans la notice d'instructions fournie avec le luminaire, le fabricant doit spécifier si la ou les lampes et/ou l'ESSS sont non remplaçables.

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22.6.20 Les luminaires d'éclairage de secours montés sur des systèmes de rampe d'éclairage doivent être marqués pour indiquer qu'il s'agit de luminaires d'éclairage de secours et ne doivent pas être ajustés par des personnes non autorisées. Dans la notice d'instructions fournie avec le luminaire monté sur rampe de secours ajustable, le fabricant doit fournir les données photométriques.

22.6.21 Pour les blocs autonomes, la durée de charge assignée peut être déclarée dans la notice d'instructions si elle est inférieure à 24 h.

22.6.22 Le cas échéant, pour les blocs autonomes, le fabricant doit fournir des informations sur la durée admissible pendant laquelle le luminaire reste à l'état de repos ou à l'état de neutralisation à distance après une période de charge complète, afin que le luminaire assure au moins 50 % de sa durée assignée de fonctionnement de secours.

Cette durée doit être déclarée en jours dans la notice d'instructions fournie avec le luminaire et calculée selon la procédure décrite en 25.6.2 de l'IEC 61347-2-7:2011/AMD2:2021.

NOTE 1 Les périodes déclarées sont, par exemple, de 7, 30 ou 90 jours.

NOTE 2 Les caractéristiques de l'état de repos et de l'état de neutralisation sont expliquées à l'Annexe D.

22.6.23 *La conformité aux exigences énoncées du 22.6.1 au 22.6.22 est vérifiée par examen.*

22.7 Construction

Les dispositions de la Section 4 de la Partie 1 doivent s'appliquer conjointement avec les exigences énoncées du 22.7.1 au 22.7.23 ci-après. Les luminaires d'éclairage de secours équipés de systèmes automatiques d'essai doivent en outre satisfaire aux exigences supplémentaires de l'IEC 62034, comme cela est indiqué à l'Annexe K de l'IEC 61347-2-7:2011 et à l'Annexe K de l'IEC 61347-2-7:2011/AMD1:2017.

22.7.1 Dans les luminaires d'éclairage de secours, les lampes à fluorescence destinées à cet éclairage doivent s'amorcer, dans l'état de fonctionnement de secours, sans l'aide de starters à lueur, comme cela est spécifié dans l'IEC 60155. De tels starters ne doivent pas être dans le circuit pendant l'état de fonctionnement de secours. L'éclairage de secours ne doit pas être assuré au moyen de lampes à fluorescence avec starters à lueur intégrés.

La conformité est vérifiée par examen.

22.7.2 Les appareillages pour le fonctionnement des lampes d'éclairage de secours et les ensembles de commande intégrés dans les luminaires d'éclairage de secours doivent satisfaire à l'IEC 61347-2-2, l'IEC 61347-2-3, l'IEC 61347-2-7, l'IEC 61347-2-12 et l'IEC 61347-2-13, selon le cas, ainsi qu'aux exigences de sécurité supplémentaires relatives aux appareillages électroniques pour l'éclairage de secours dans l'annexe appropriée des normes (par exemple, Annexe J de l'IEC 61347-2-3:2011).

La conformité est vérifiée par les essais pertinents spécifiés dans ces normes.

22.7.3 Les luminaires d'éclairage de secours doivent être équipés d'un dispositif de protection qui déconnecte le luminaire de l'alimentation en cas de défaillance dans ce luminaire qui affecte le circuit (court-circuit ou surconsommation de courant).

La conformité est vérifiée par mesurage et par examen.

22.7.4 Pour les luminaires d'éclairage de secours, les essais de résistance mécanique décrits dans la Partie 1 doivent être effectués sur toutes les parties externes avec une énergie de choc minimale de 0,35 Nm.

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22.7.5 Lorsqu'ils sont connectés au réseau, les blocs autonomes d'éclairage de secours doivent avoir une séparation adéquate entre l'alimentation normale et les parties actives du circuit de charge de l'ESSS. Lorsqu'il y a des parties actives accessibles, une double isolation, une isolation renforcée, un écran mis à la terre ou toute autre technique équivalente peuvent être utilisés.

De plus, dans le cas de contacts nus, un transformateur de sécurité d'isolation doit être utilisé dans le circuit de charge de l'ESSS. Si un transformateur de séparation est utilisé comme isolation entre l'alimentation normale et le circuit de charge de l'ESSS, l'isolation de ce dernier doit être constituée au moins d'une isolation principale.

La conformité est vérifiée par examen et par les essais des 22.8 et 22.15.

22.7.6 Dans les luminaires mixtes pour éclairage de secours alimentés par une source centrale, une séparation électrique entre les alimentations normales et de secours doit être assurée par une double isolation, une isolation renforcée, par un écran mis à la terre ou par d'autres moyens équivalents.

EXEMPLE L'utilisation d'une isolation principale seulement pour les deux circuits ou d'une isolation double ou renforcée sur le circuit d'alimentation normal satisfait à cette exigence. La connexion des deux circuits à un bloc de jonction dans lequel les lignes de fuite et distances d'isolement exigées sont obtenues en laissant une borne libre, sans possibilité de connexion entre les circuits, est également acceptable.

La conformité est vérifiée par examen.

22.7.7 Les blocs autonomes d'éclairage de secours doivent comporter à proximité, ou incorporer, un dispositif de charge de l'ESSS à partir de l'alimentation normale et un dispositif de signalisation visible en utilisation normale, par exemple une lampe, qui signale les situations suivantes:

a) le luminaire est connecté et la charge de l'ESSS est maintenue;

b) la continuité du circuit est assurée par le filament de tungstène des lampes d'éclairage de secours, lorsque cela est approprié.

Si un voyant lumineux est utilisé, il doit satisfaire aux exigences colorimétriques de l'IEC 60073 et doit être vert.

Pour les luminaires d'éclairage de secours équipés d'une ou de plusieurs lampes à filament de tungstène, a) et b) s'appliquent simultanément, et pour les autres luminaires d'éclairage de secours sans filament de tungstène, comme les lampes à fluorescence et LED, seul a) s'applique.

Pour les luminaires d'éclairage de secours équipés de lampes à filament de tungstène, la conformité de l'existence d'une continuité du circuit dans le filament de tungstène est vérifiée de la manière suivante: la déconnexion d'une des lampes, ou de toutes les lampes lorsqu'elles sont connectées en parallèle, entraîne l'extinction du voyant ou son changement de couleur conformément à l'IEC 60073.

Pour tous les luminaires d'éclairage de secours, la conformité de la connexion correcte du voyant de charge au circuit est vérifiée de la manière suivante: la déconnexion de l'ESSS pendant la phase de charge entraîne l'extinction du voyant ou son changement de couleur conformément à l'IEC 60073.

22.7.8 Les blocs autonomes d'éclairage de secours doivent être équipés d'une ESSS qui satisfait aux exigences de l'Annexe A et est conçue pour une durée assignée de fonctionnement normal d'au moins quatre ans. Cette ESSS doit être utilisée uniquement pour des fonctions en relation avec le secours, dans le luminaire ou son satellite.

La conformité est vérifiée par examen et par les essais de l'Annexe A.

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22.7.9 Vide

22.7.10 Dans les blocs autonomes d'éclairage de secours, il ne doit y avoir aucun circuit manuel ou non autoréarmable autre que le dispositif de commutation entre l'ESSS et les lampes d'éclairage de secours.

Les blocs autonomes d'éclairage de secours et les luminaires d'éclairage de secours alimentés par source centrale ne doivent comporter aucun interrupteur manuel ou non autoréarmable qui isole le ou les circuits de secours du réseau d'alimentation, autre que les dispositifs de mise à l'état de repos ou à l'état de neutralisation.

NOTE Les détails d'installation peuvent être consultés dans l'IEC 60364-5-56.

La conformité est vérifiée par examen.

22.7.11 Défaillance de la lampe. La défaillance d'une lampe (lampes d'éclairage de secours ou de fonctionnement normal) ne doit pas interrompre le courant de charge vers l'ESSS ni provoquer une surcharge susceptible de compromettre le fonctionnement de celle-ci.

La conformité est vérifiée par l'essai du 22.6 de l'IEC 61347-2-7:2011 et du 22.6 de l'IEC 61347-2-7:2011/AMD2:2021.

22.7.12 Les blocs autonomes d'éclairage de secours qui utilisent une batterie rechargeable comme source de sécurité de secours doivent satisfaire aux exigences de l'Article 23 de l'IEC 61347-2-7:2011 et de l'Article 23 de l'IEC 61347-2-7:2011/AMD2:2021.

22.7.13 Le fonctionnement d'un bloc autonome d'éclairage de secours en état de fonctionnement de secours ne doit pas être influencé par un court-circuit, une mise à la terre ou une interruption dans le circuit d'alimentation normale.

La conformité est vérifiée par l'essai du 28.2 de l'IEC 61347-2-7:2011.

22.7.14 Le bloc autonome d'éclairage de secours avec une fonction de neutralisation à distance et/ou de mise à l'état de repos doit satisfaire aux exigences de l'Article 25 de l'IEC61347-2-7:2011 et de l'Article 25 de l'IEC61347-2-7:2011/AMD2:2021.

22.7.15 Vide. (Les exigences du présent paragraphe ont été transférées vers l'IEC 61347-2-7:2011.)

22.7.16 Vide. (Les exigences du présent paragraphe ont été transférées vers l'IEC 61347-2-7:2011.)

22.7.17 Vide. (Les exigences du présent paragraphe ont été transférées vers l'IEC 61347-2-7:2011.)

22.7.18 Vide. (Les exigences du présent paragraphe ont été transférées vers l'IEC 61347-2-7:2011.)

22.7.19 Dans les blocs autonomes d'éclairage de secours qui assurent l'éclairage de secours au moyen de lampes à filament de tungstène, la tension de la lampe, après avoir dépassé 30 % de la durée de fonctionnement assignée en état de fonctionnement de secours, ne doit pas excéder 1,05 fois la tension assignée de la lampe.

La conformité est vérifiée par mesurage de la tension de la lampe pendant les 10 premiers cycles des essais d'endurance décrits en 22.13.1.

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22.7.20 Les blocs autonomes d'éclairage de secours doivent utiliser une batterie rechargeable selon la spécification technique fournie par le fabricant de l'appareillage (voir Article 7 de l'IEC 61347-2-7:2011, Article 7 de l'IEC 61347-2-7:2011/AMD1:2017 et Article 7 de l'IEC 61347-2-7:2011/AMD2:2021) et l'Annexe A du présent document.

22.7.21 Dans les blocs autonomes d'éclairage de secours, les ESS et chargeurs doivent être contenus dans le luminaire d'éclairage de secours ou un boîtier déporté.

22.7.22 Dans les blocs autonomes d'éclairage de secours, les boîtiers déportés doivent satisfaire aux mêmes exigences concernant la résistance mécanique, l'échauffement et la résistance à la chaleur, au feu et aux courants de cheminement que le luminaire d'éclairage de secours.

22.7.23 Les luminaires d'éclairage de secours et les luminaires d'éclairage de secours ajustables, montés sur des systèmes de rampe d'éclairage, qui sont destinés à être utilisés pour les applications d'éclairage d'affichage, doivent inclure un système pour verrouiller le luminaire dans une direction de visée fixe et une position fixe sur la rampe. Le système de verrouillage doit assurer que le luminaire peut être verrouillé dans sa position de visée finale et à son emplacement final, et qu'il ne peut pas être ajusté ou déplacé sans l'aide d'un outil.

NOTE L'outil n'inclut pas d'échelle ou autre moyen exigé pour accéder au luminaire.

22.7.24 Dans un luminaire qui incorpore un EDLC, un espace suffisant doit être prévu autour du condensateur, exempt d'autres composants, afin de permettre le fonctionnement correct du dispositif de protection contre les surpressions.

Après le fonctionnement du dispositif de protection contre les surpressions, les lignes de fuite et les distances d'isolement ne doivent pas être réduites au-dessous des limites exigées.

Le fabricant du condensateur doit être consulté afin de définir l'augmentation des dimensions du condensateur après le fonctionnement du dispositif de protection contre les surpressions.

La conformité doit être vérifiée par examen par rapport aux informations dimensionnelles fournies par le fabricant du condensateur.

22.8 Lignes de fuite et distances d'isolement

Les dispositions de la Section 11 de la Partie 1 doivent s'appliquer.

22.9 Dispositions en vue de la mise à la terre

Les dispositions de la Section 7 de la Partie 1 doivent s'appliquer.

22.10 Bornes

Les dispositions des Sections 14 et 15 de la Partie 1 doivent s'appliquer.

22.11 Câblage externe et interne

Les dispositions de la Section 5 de la Partie 1 doivent s'appliquer conjointement avec les exigences du 22.11.

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