

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Luminaires – **iTeh STANDARD PREVIEW**
Part 2-22: Particular requirements – Luminaires for emergency lighting
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Luminaires – **IEC 60598-2-22:2014**
Partie 2-22: Règles particulières – Luminaires pour éclairage de secours
<https://standards.iteh.ai/catalog/standards/sis/71195ccc6-c213-4a3ca1767-d0cfl1bd81f9/iec-60598-2-22-2014>



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IEC 60598-2-22

Edition 4.0 2014-06

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d0cff1bd81f9/iec-60598-2-22-2014

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX



ICS 29.140.40

ISBN 978-2-8322-1659-0

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LUMINAIRES –

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

FOREWORD

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International Standard IEC 60598-2-22 has been prepared by subcommittee 34D: Luminaires of IEC technical committee 34: Lamp and related equipment.

This fourth edition cancels and replaces the third edition published in 1997, AMD1:2002 and AMD2:2008. This edition constitutes a technical revision.

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

- a) Clause 22.3, addition of definitions for PELF and Self-contained portable emergency luminaire;
- b) Clause 22.5, updated with the introduction of requirements for non-replaceable lamp and batteries;

- c) Clause 22.6, improved requirements to confirm that the charge indication is correctly connected to the circuit together with other clarifications regarding the controlgear and the remote box with its connecting cable to the emergency luminaire;
- d) Clause 22.12, improved requirements to ensure that the luminaire shall not become unsafe;
- e) Clause 22.16, full revision of the photometric testing to align with ISO and CIE;
- f) Clause 22.17, now only references the requirements which are now covered in IEC 61347-2-7;
- g) Clause 22.19, now only references the requirements which are now covered in IEC 61347-2-7;
- h) Annex A, now includes nickel metal hydride batteries and reference to cell types in IEC 61951-1;
- i) Annex B, minor changes to the classifications;
- j) Annex C, Figure C.1 deleted in favour of a revised text;
- k) Annex E, the additional requirements covering self-contained portable emergency luminaires

The text of this standard is based on the following documents:

FDIS	Report on voting
34D/1119/FDIS	34D/1131/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

This standard is to be read in conjunction with IEC 60598-1 *Luminaires – Part 1: General requirements and tests*.

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

In this standard, the following print types are used:

- requirements: in roman type
- *test specifications: in italic type*
- notes: in small roman type.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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

The contents of the corrigenda of March 2015 and April 2016 have been included in this copy.

LUMINAIRES –

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

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

This part gives general requirements for emergency lighting equipment.

This part continues to use the term “lamp” which also includes “light source(s)” where appropriate.

22.2 Normative references

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

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

IEC 60155, *Glow-starters for fluorescent lamps*

IEC 60364-5-56, *Electrical installations of buildings – Part 5: Selection and erection of electrical equipment – Chapter 56: Safety services*

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

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, *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, *Lamp controlgear – Part 2-7; Particular requirements for battery supplied electronic controlgear for emergency lighting (self-contained)*

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 – Part 1: nickel-cadmium*

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

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

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*

22.3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60598-1 as well as the following apply:

22.3.1

emergency lighting

lighting for use when the supply to the normal lighting fails; it 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 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

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 units comprising a supply changeover system, a battery charging device and, where appropriate, a means for testing

Note 1 to entry: This unit may also contain the lamp control gear.

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 rated duration of operation

22.3.15**rated duration of emergency operation**

time, as claimed by the manufacturer, that 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 that may be applied to a fully charged battery

22.3.20**remote inhibiting facility**

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

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 case of a normal supply failure 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 specific safety message obtained by a combination of colour and geometric shapes

<https://standards.iteh.ai/catalog/standards/sist/91153ec8-c213-4a3d-a767-3864-1>

Note 1 to entry: Details are given in ISO 3864-1 and ISO 3864-4:2014

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: $PELF = LDL \times EBLF$

where LDL is the rated lumen output of the light source and, for discharge light sources, 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 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, 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, control gear etc. that will not be fitted into the emergency luminaire.

22.4 General test requirements

The provisions of Section 0 of IEC 60598-1 shall apply. The tests described in each appropriate section of IEC 60598-1 shall be carried out in the order listed in this part of IEC 60598-2.

When testing combined emergency luminaires according to the requirements of this part, 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 according to the requirements of the relevant part of IEC 60598-2 (for example, if the luminaire is recessed, it shall be tested according to the requirements of the part dealing with recessed luminaires).

If some elements of an emergency luminaire are adjacent (within 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 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 IEC 60598-1 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 IEC 60598-1 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 according to 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.

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

22.6.8 In self-contained luminaires, 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 permit 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 during maintenance.

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 or of the whole luminaire (if having non-replaceable lamp(s) and/or battery) is needed when they no longer meet their rated duration of operation after the corresponding recharge period.

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.

22.6.17 The marking required by 22.6.1, 22.6.2, 22.6.7 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 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 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 unauthorised persons. In the instruction leaflet supplied with the adjustable emergency track mounted luminaire, the manufacturer shall provide the photometric data.

22.6.21

Compliance with the requirements of 22.6.1 to 22.6.20 is checked by inspection.

22.7 Construction

The provisions of Section 4 of IEC 60598-1 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. For specific items, refer to Annex K of IEC 61347-2-7.

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.

22.7.2 Lamp controlgear for operating the emergency lamp(s) and control units incorporated into emergency luminaires shall comply with IEC 61347-2-7, IEC 61347-2-3: Annex J, IEC 61347-2-2, IEC 61347-2-12 and IEC 61347-2-13 as appropriate.

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 over current consumption).

Compliance is checked by measurement and inspection.

22.7.4 For emergency luminaires, the mechanical strength tests given in Clause 4.13 of IEC 60598-1 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 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 charging circuit, a safety isolating transformer shall be used. If a separating transformer is used as insulation between the normal supply and the battery charging circuit, the insulation in the battery 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/reinforced insulation on the normal supply circuit fulfils this requirement. The connection of both circuits to a terminal block where the required creepage/clearances are obtained by leaving one terminal free, without the possibility of connection between the circuits, is also acceptable.

IEC 60598-2-22:2014

Compliance is checked by inspection.

<https://standards.iteh.ai/catalog/standards/sist/91153ec8-c213-4a3d-a767-d0c11bd81f9/iec-60598-2-22-2014>

22.7.7 Self-contained emergency luminaires shall have adjacent to them or incorporated in them a device for charging the battery 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 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.

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 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 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 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 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 mode.

Installation details are given 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 and shall not cause an overload that could impair the operation of the battery.

Compliance is checked by the test of Clause 22.6 of IEC 61347-2-7.

22.7.12 Self-contained emergency luminaires using a battery of one or more lead acid cells, or a battery of three or 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.

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. .

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

(The requirements in this clause were moved to Clause 25 of IEC 61347-2-7.)

22.7.15 Void. (The requirements in this clause were moved to Clause 25 of IEC 61347-2-7.)

22.7.16 Void. (The requirements in this clause were moved to Clause 25 of IEC 61347-2-7.)

22.7.17 Void. (The requirements in this clause were moved to Clause 25 of IEC 61347-2-7.)

22.7.18 Void. (The requirements in this clause were moved to Clause 25 of IEC 61347-2-7.)

22.7.19 In self-contained emergency luminaires providing emergency lighting by means of tungsten filament lamps, the lamp voltage, 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 lamp voltage during the first 10 cycles of the endurance tests given in 22.13.1.