VISUAL GUIDE: EMERGENCY LIGHTING

LIGHTINGEUROPE
THE VOICE OF THE LIGHTING INDUSTRY

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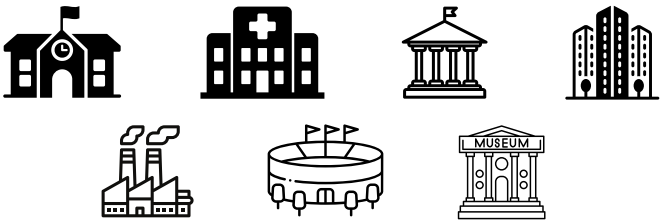
Introduction



Emergency lighting is installed in all types of buildings.

Its main functions are:

Show directions to evacuation routes from a building in the event an evacuation is required. This is generally independent of the state of the normal mains supply: exit signs should always be visible.

Provide illumination to aid in a safe evacuation of a building when the normal main supply has failed.

Provide illumination to allow occupants to stay within a building when the main supply has failed, but an evacuation is not necessary or desirable.

Allow hazardous processes to be made safe when the normal main supply has failed, as a part of a building evacuation procedure.

Allow critical procedures to continue in the event of a failure of the normal main supply.

In short: "Emergency lighting: always there to save lives!"

There are a number of legal requirements concerning emergency lighting. Within Europe these include:

The Workplace Directive (89/654/EEC)

The Directive lays down minimum requirements for safety and health at the workplace. General obligations for the employer:

- traffic routes to emergency exits, and the exits themselves, are kept clear at all times
- technical maintenance of the workplace and of the equipment and devices is carried out as quickly as possible
- the workplace and the equipment and devices are regularly cleaned to an adequate level of hygiene
- safety equipment and devices are regularly maintained and checked.

The Signs Directive (92/58/EEC)

This Directive lays down minimum requirements for the provision of safety and health signs at work. Employers must ensure that safety and health signs are in places where hazards cannot be avoided or reduced.

Directive 92/58/EEC

The EU Safety/Health Signs Directive (92/58/EEC) set out simple 'Pictogram' sign formats to be used within the European Union.

OK

EN 1838

EN 1838 prescribes to follow the requirements of ISO 3864-1 (colours), ISO 3864-4 (photometric) and EN ISO 7010 (design).

Recommended

As additional pictograms, the wheelchair user exit may be used.

Not allowed!

Text and words (like "EXIT", "SORTIE", "USCITA DI EMERGENZA", "SALIDA") are not recommended.

Not OK

Emergency lighting luminaires and central safety power supply systems must comply with their respective specifications/standards.

Member states and countries may also have local requirements. These requirements support the European directives, but implement these in country specific ways.

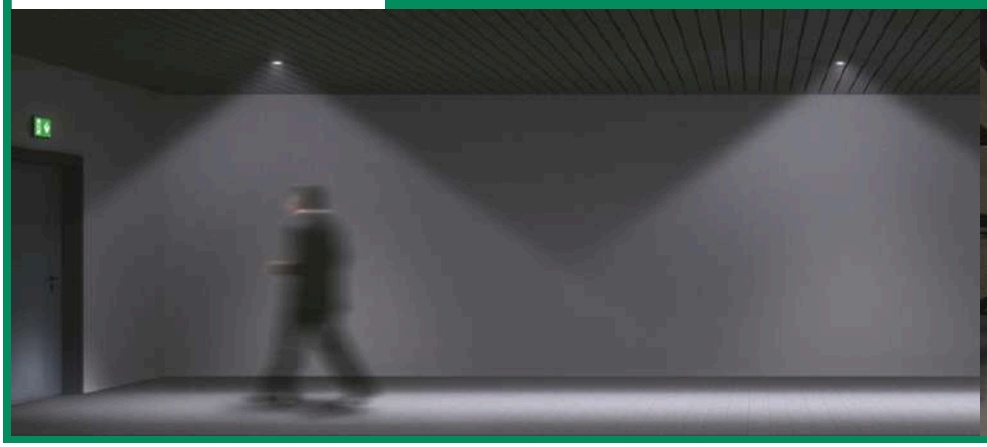
It is therefore important that when emergency lighting is being considered, that national requirements are taken into account.

Refer to national emergency lighting associations for further detail on national requirements.

The specifications of EL as defined by EN 1838:2024

Escape route lighting

Assist the safe exit of occupants by illuminating the escape routes.



Open area (anti-panic) lighting

Avoid panic, and enable safe movement of occupants towards escape routes.

Local area lighting

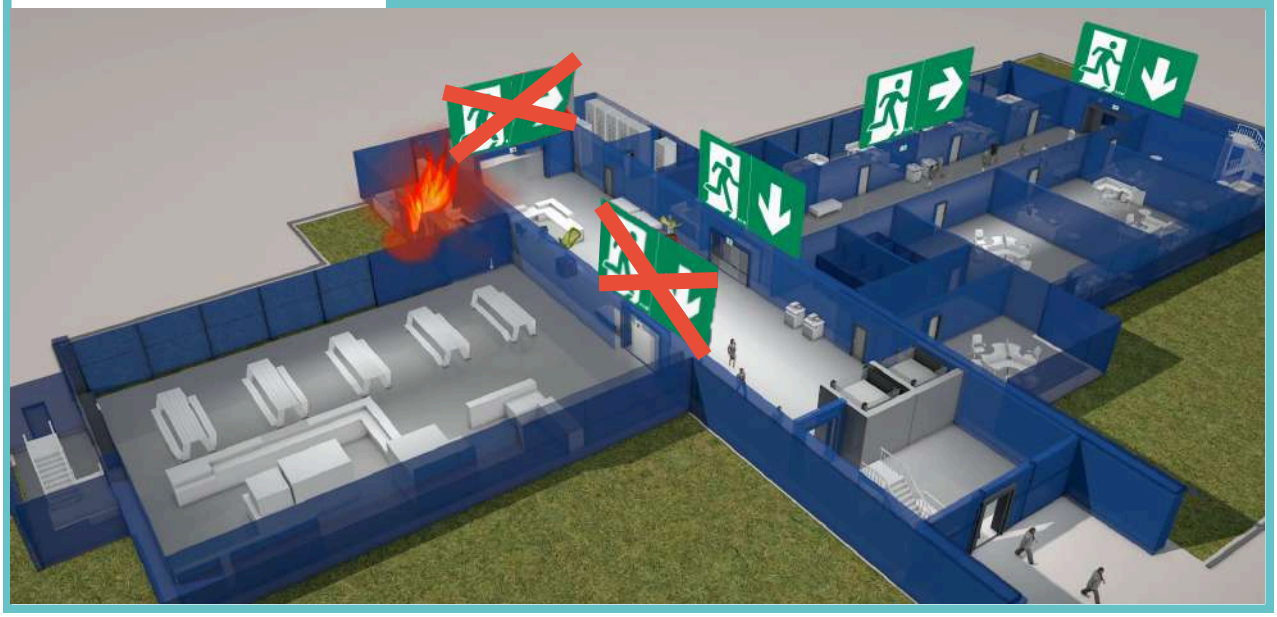
Protect occupants who are allowed to remain in a premise in the event of a supply failure.

High risk task area lighting

Assist people involved in a potentially dangerous process or situation, and allow them to properly and safely shut down the machinery

Adaptive emergency escape lighting (AEELS)

Assist the safe exit from a building adapting the direction to the real time changing building conditions (evolution because of fire,...)



EN1838 also mentions a category - standby lighting, which is not intended for emergency escape lighting but to allow the continuation of regular operations in a building in the event of a normal mains failure.

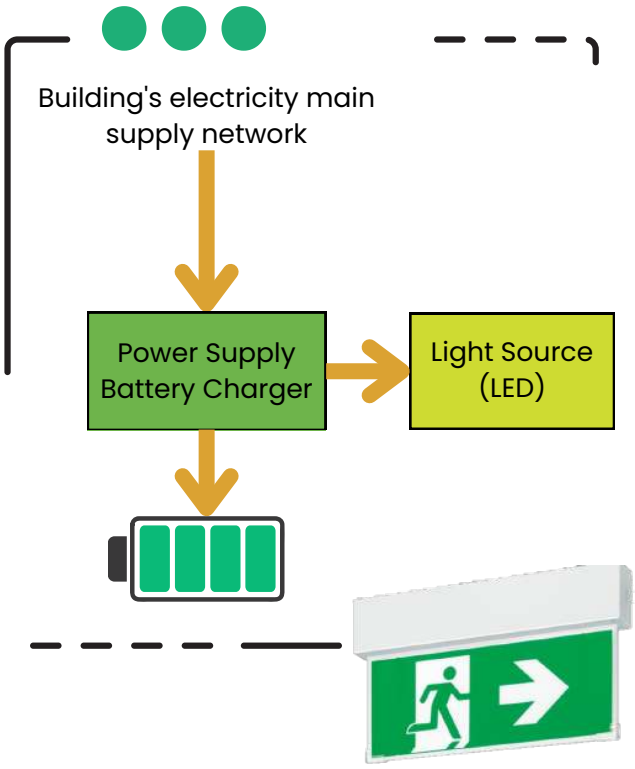
The specifications of EL

Self-contained or Centrally Powered Emergency Lighting?

Self-contained emergency lighting

Each emergency lighting luminaire is autonomous.

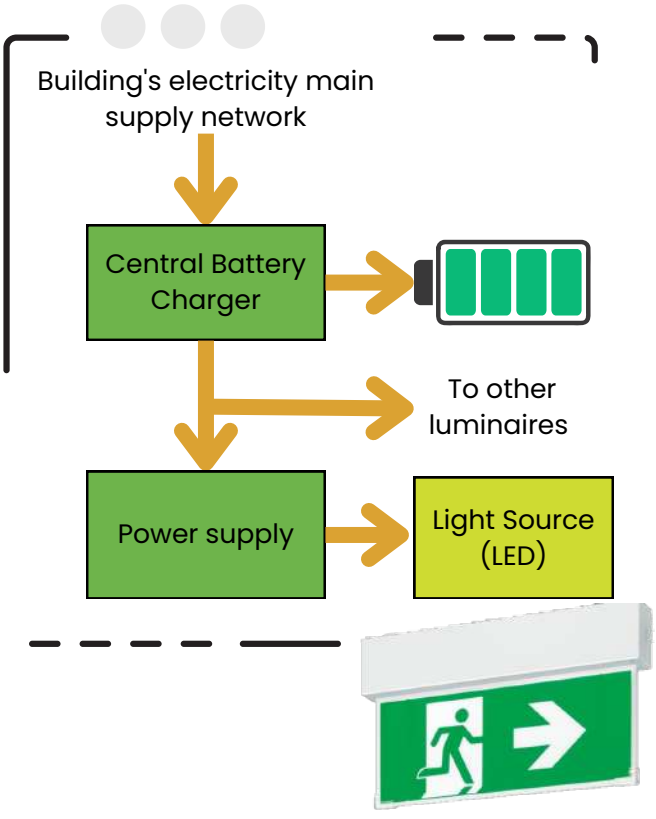
It contains a battery which provides power in case of building's mains failure



Centrally Powered Systems (CPS)

The emergency lighting luminaires do not contain batteries.

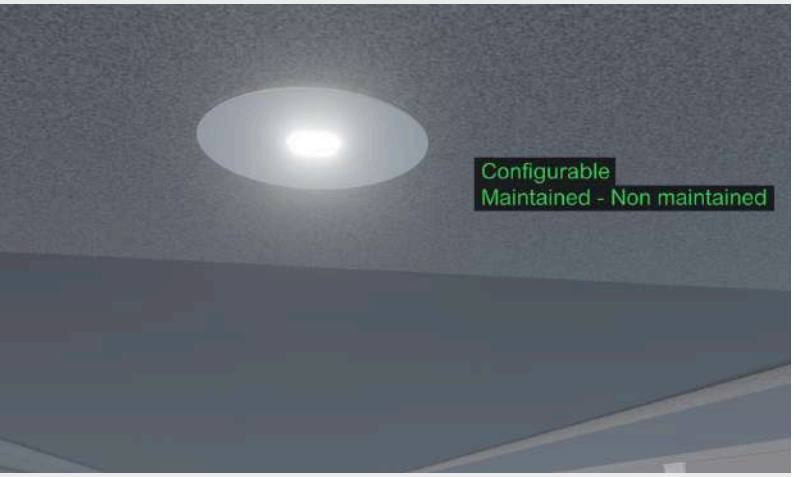
The central battery is located in a separate location (e.g., in a technical room), and will power the connected emergency lighting luminaires in case of mains failure.



The specifications of EL

Maintained or Non-maintained Emergency Lighting ?

Maintained
The luminaire is always ON whether the building's main power supply is present or not



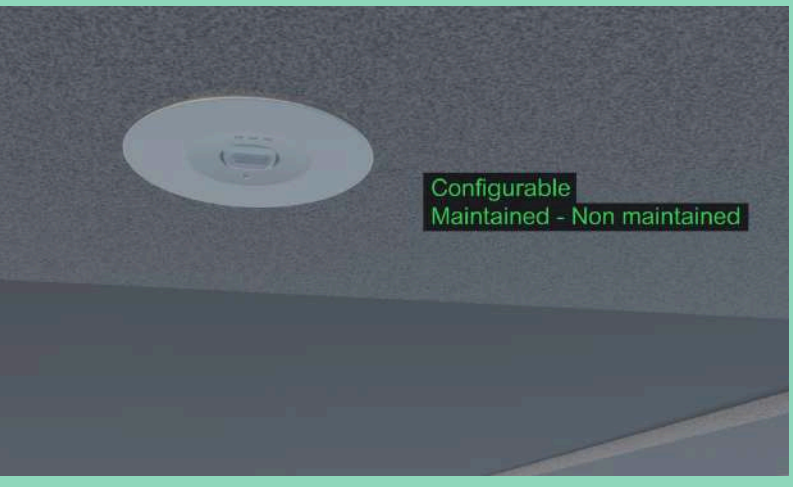
Normal Light on

Black out

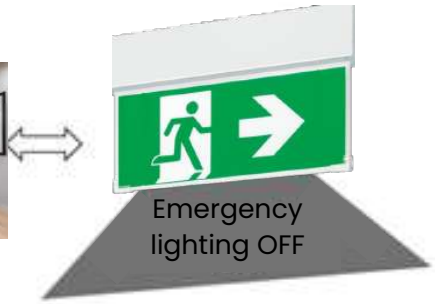
Emergency lighting always ON

e.g. Exit signs are usually maintained, because an evacuation may be required even though the mains supply is still present.

Non maintained
The luminaire is OFF when the building's main power supply is present, and will turn ON in case of a mains failure



Normal Light on



Black out

e.g. Luminaires that illuminate rooms in case of mains failure.

Emergency Lighting's robustness

It's important that emergency lighting is suitable for the environment it is installed within.

IP Rating:
classifies luminaires protection against solids (objects, particles and dust) and liquids (water).

Examples of IP grades for Emergency Lighting:

- IP42 for indoor applications
- IP65 for outdoor applications

IK Rating:
classifies mechanical strength of luminaires against impact.

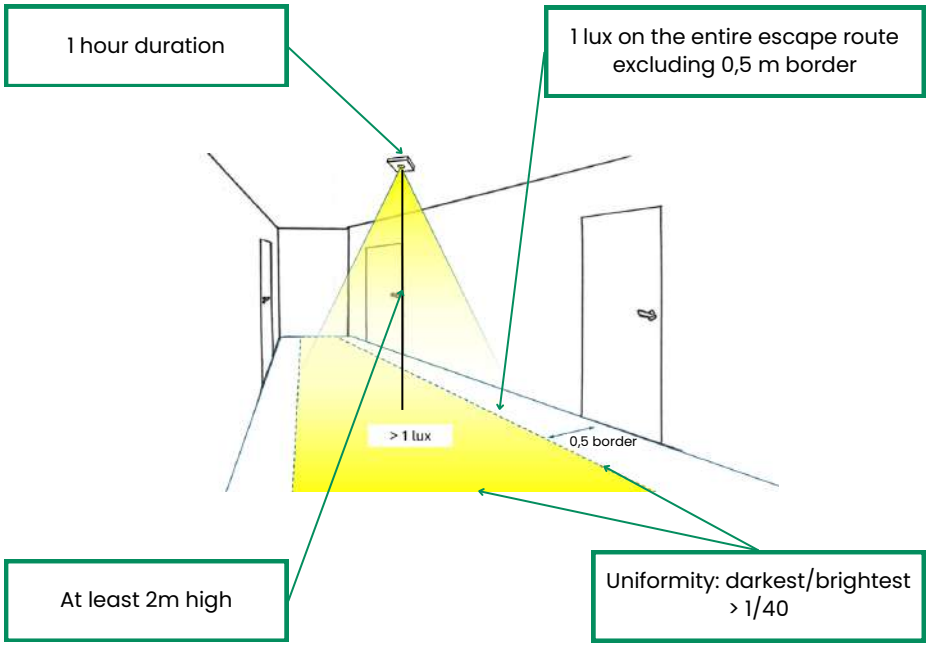
Examples of IK rating for Emergency Lighting:

- IK04 for offices
- IK10 for harsh environments

Where to install emergency lighting according to EN 1838 and EN 50172 ?

Don't forget to refer to your national laws and emergency lighting organisation for your country's specific requirements.

In EN 1838:2024, four categories are given:



ESCAPE ROUTE LIGHTING

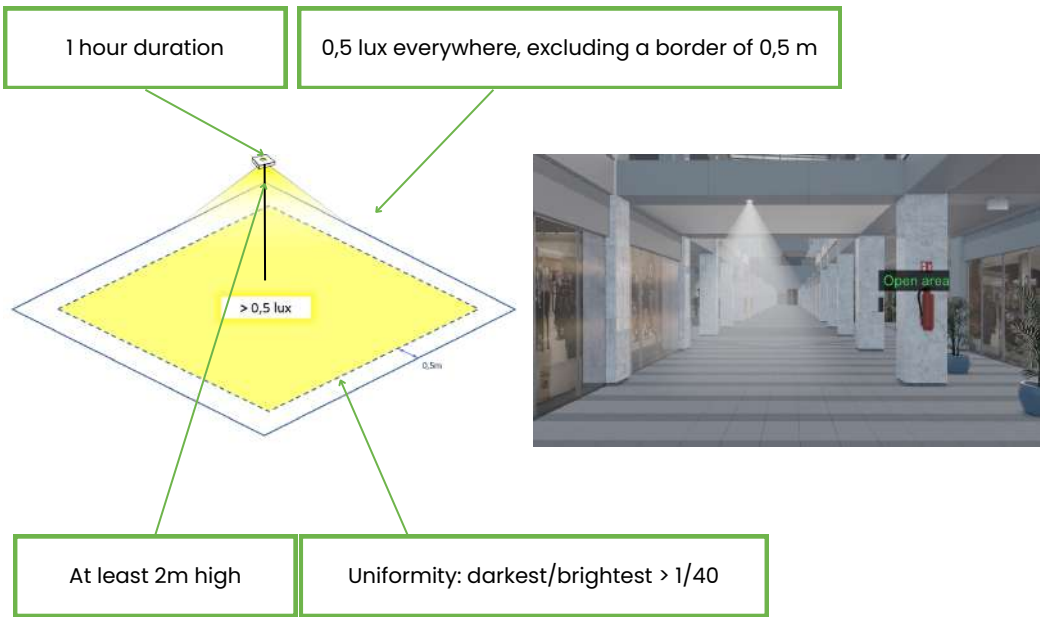
Why? Allows to leave the building in safety

Where? Everywhere along the escape route

OPEN AREA (ANTI-PANIC) LIGHTING

Why? Allows to reach the escape route in safety

Where? Large > 60 m2 and complex rooms, toilets for the disabled



HIGH RISK TASK AREA LIGHTING

Why? Allows to make a potentially dangerous situation safe, prior to evacuating

Where? Wherever a potentially dangerous situation may exist

EXAMPLES

Laboratoria, control rooms

High voltage cabinets

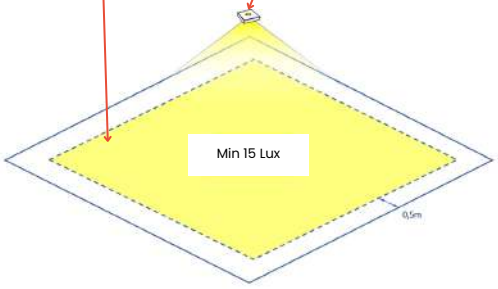
Chemicals

Hot surfaces

Rotating machines, robots

Uniformity: darkest/brightest > 1/10

Duration: as long as needed to make the situation safe



At least 10 lux of normal lighting illumination intensity on the visual task; in any case not less than 15 lux

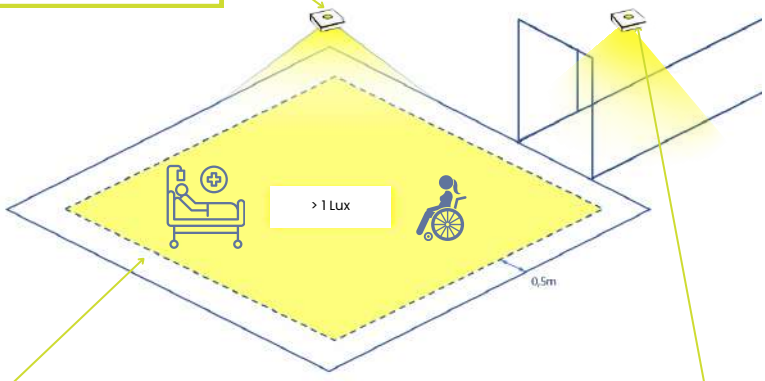
LOCAL AREA LIGHTING

Why? Allows people to stay in an area of safety.

Where? Places where it is safer to remain, as an evacuation may be impractical or dangerous.

For example: in homes for the elderly.

Duration: longer than the associated emergency lighting.



At least 1 lux, based on risk assessment

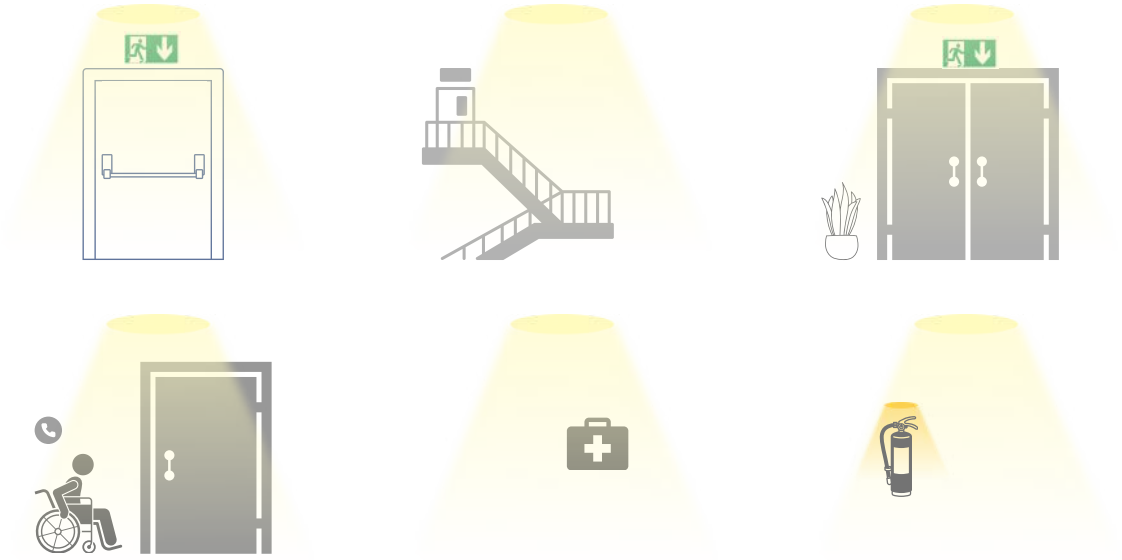
Associated emergency lighting: If main supply is not restored in due time, evacuation will be ordered anyway. Duration must be enough!

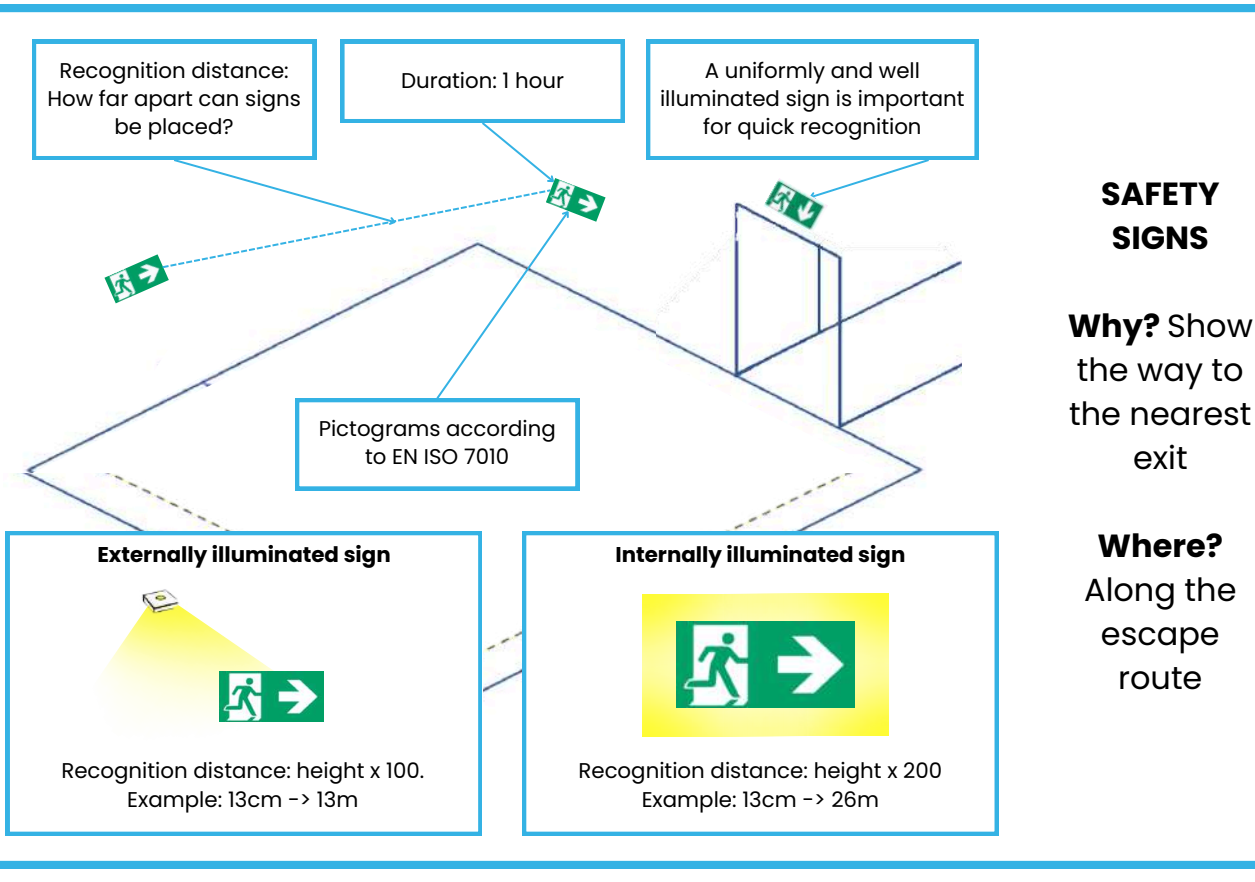
The standard also defines points of emphasis, where emergency lighting is needed

Examples of POINTS OF EMPHASIS

Why? Important points which need emergency lighting

Where? Nearby (≈2m) these points an emergency luminaire must be installed.





SAFETY SIGNS

Why? Show the way to the nearest exit

Where? Along the escape route

The importance of the continuous risk assessment of the installation and maintenance of Emergency Lighting

Importance of maintenance

- Aging of emergency lighting luminaires, like any other devices, is normal and inevitable.
- It is a legal requirement that your emergency lighting works correctly.
- Building owners or tenants are legally obliged to test their emergency lighting regularly. They will be liable in the event emergency lighting systems fail to operate.
- The EN50172:2024 standard defines the periodic checks and tests for an emergency lighting installation. Strict adherence to them keeps the system efficient and functional.

When was the last time your emergency luminaires were tested?

Requirements can even be stricter in some European countries depending on local regulations.

The required periodic checks of emergency lighting systems according to EN 50172:2024

DAILY VERIFICATION

Central power supply systems: check the status indicator, to verify for possible failures.

Self-contained EL systems: daily verification is recommended - it is realistically applicable only if an automatic monitoring function is present (ATS according to EN62034).

MONTHLY VERIFICATION

Functional Test: Check the emergency mode of each emergency luminaire, by simulating a failure of the supply to the normal lighting.

All emergency luminaires and safety signs shall be checked to ensure that they are present and functioning correctly. After the functional test (a few minutes disconnecting the mains power), the supply to the normal lighting shall be restored and any indicator lamp or device shall be checked to verify that it is showing that the normal supply has been restored – in case an automatic test system is used, these requirements are deemed to be fulfilled.

Correct operation of system monitors shall be checked. The date of the test and its results shall be recorded in the logbook.

ANNUAL VERIFICATION

Duration Test: check the emergency mode of each emergency luminaire , for the full duration of the rated autonomy (e.g. 1 hour or 3 hours).

Visual check of the luminaires, to verify:

- the absence of obstacles that compromise the visibility of safety signs;
- the integrity and legibility of the internally illuminated safety signs;
- the absence of obstacles between externally illuminated safety signs and their corresponding emergency luminaire.
- their intended function is not impaired due to the presence of dirt or dust or visible material degradation.

Check the correct operation of system monitors of central safety power supply systems

Verify the operation of inhibition mode and rest mode of emergency luminaires.

EVERY FIVE YEARS

Illuminance measurements according to EN 1838, to check that the emergency lighting system still reaches its designed illumination levels.

How can I prove that I have performed the tests?

A logbook shall be kept to document the periodic checks, tests, faults and any subsequent changes made to the emergency escape lighting system.

The logbook shall be maintained by the party having legal responsibility for the building and shall be made available for examination by a duly authorized person.

The logbook may be in a hardcopy or electronic format.

The logbook may include results from automatic test systems, as far as applicable. Electronic formats shall be readily accessible and shall remain recognizable.

Log-book items		Note
a) date of commissioning of the system	✓	• Any repairs or remedial work identified by this report or work performed as planned maintenance must be actioned within a reasonable time frame and all changes to the installation shall be recorded • Corrective actions can include the replacement of a luminaire or components, such as light sources, fuses, batteries or other electrical sources for safety services • The logbook can also include pages relating to other safety records, e.g. fire alarms.
b) date and brief details of each service, checks or test carried out	✓	
c) date and brief details of any defects and corrective actions taken	✓	
d) date and brief details of any subsequent changes to the emergency escape lighting system	✓	

identification of the duly authorized person(s) for performing any of the items a) to d)

Which are the types of technologies on the market and how is the verification and management of the logbook carried out

The latest digital technologies allow to automate verification processes, reducing operating costs and guaranteeing precise and systematic system verification while avoiding human errors. Testing and monitoring functions must comply with EN62034 which prescribes the characteristics of an ATS (Automatic Test System).

There are three main categories of tests.

Type 1 – Manual test luminaires (self contained or centrally powered)

Functional and duration tests without ATS (Automatic Test System) – Manual test luminaires

Check operation by manually interrupting electricity supply

It must be simulated a failure of the supply by cutting off AC power to the luminaires/system and evaluate the result:

- Functional: Verify luminaire's correct operation for at least 1 minute
- Duration: Verify luminaire's correct operation for the entire period prescribed for that appliance (1 hour, 2 hours,...)

Each luminaires' indicator shall also be checked to show main power restore and battery charging

Type 2 - Self-contained luminaires with stand alone test function

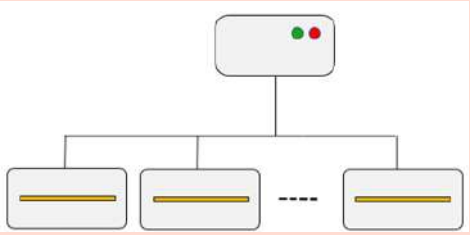
Functional and duration tests with ATS (Automatic Test System – EN62034) incorporated into each individual lamp - Self-contained luminaires with stand alone test function

Each luminaire independently carries out functional tests

Each luminaire independently carries out functional tests (typically once a month) and duration tests (typically once a year) indicating the results on local light indicators of the lamp itself; simply check the status of the indicator red/green light of each individual luminaire

Type 3 - Central monitoring systems (self contained or centrally powered)

Functional and autonomy tests with centralized control ATS (Automatic Test System – EN62034) - Central monitoring systems



Check monitoring system
Check the system control unit

- The system control unit coordinates the testing functions of the entire system by commanding periodic tests and collecting diagnostic information from the luminaires/battery system;
- The system control unit summarizes the status of the system indicating regular operation or the presence of anomalies.
- The centrally controlled ATS is able to generate printable test reports to automatically compile the system logbook.
- A remote control system connected via a computer network can be included for the complete remote management of the system.

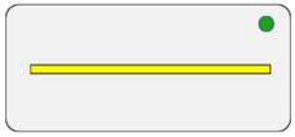
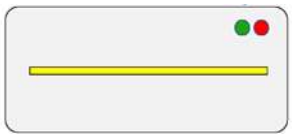
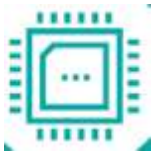
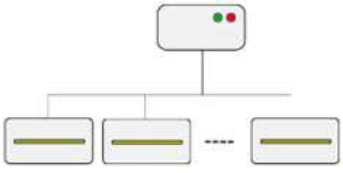
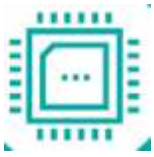
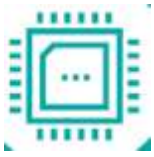
Each category implies a specific verification process that is simplified as the level of technology adopted increases.

A regularly verified emergency lighting system increases people safety through improved reliability and responsiveness thanks to the latest digital and connected technologies.

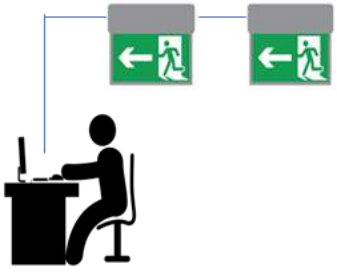
Regular servicing is essential

A regularly verified emergency lighting system increases people's safety thanks to greater reliability and responsiveness thanks to the latest digital and connected technologies.

Recommended | Neutral | less appropriate

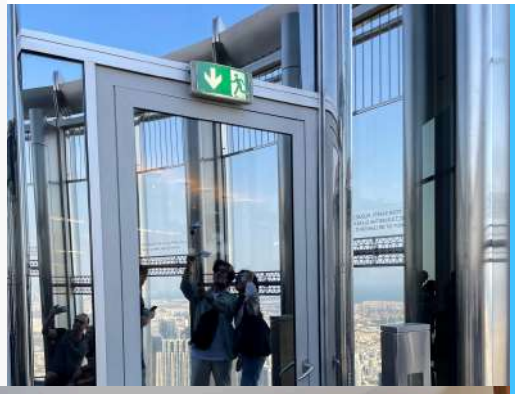
Type	Functional and duration tests	System inspection
Manual test luminaires (self contained or centrally powered) 	Performed manually on each luminaire	Visual inspection of every luminaire + CBS status indicators 
Self-contained luminaires with stand alone test function 	Automatically carried out by each luminaire 	Visual inspection of status indicators
Central monitoring systems 	Automatically carried out by the central panel 	System status is reported via indicators, APP, PC software, webserver, BMS & Cloud 



Logbook	OPEX	
Manually maintained by operator		
Manually maintained by operator		
Digital logbook is maintained and stored in the system memory or in the Cloud		

Importance of continuous risk assessment

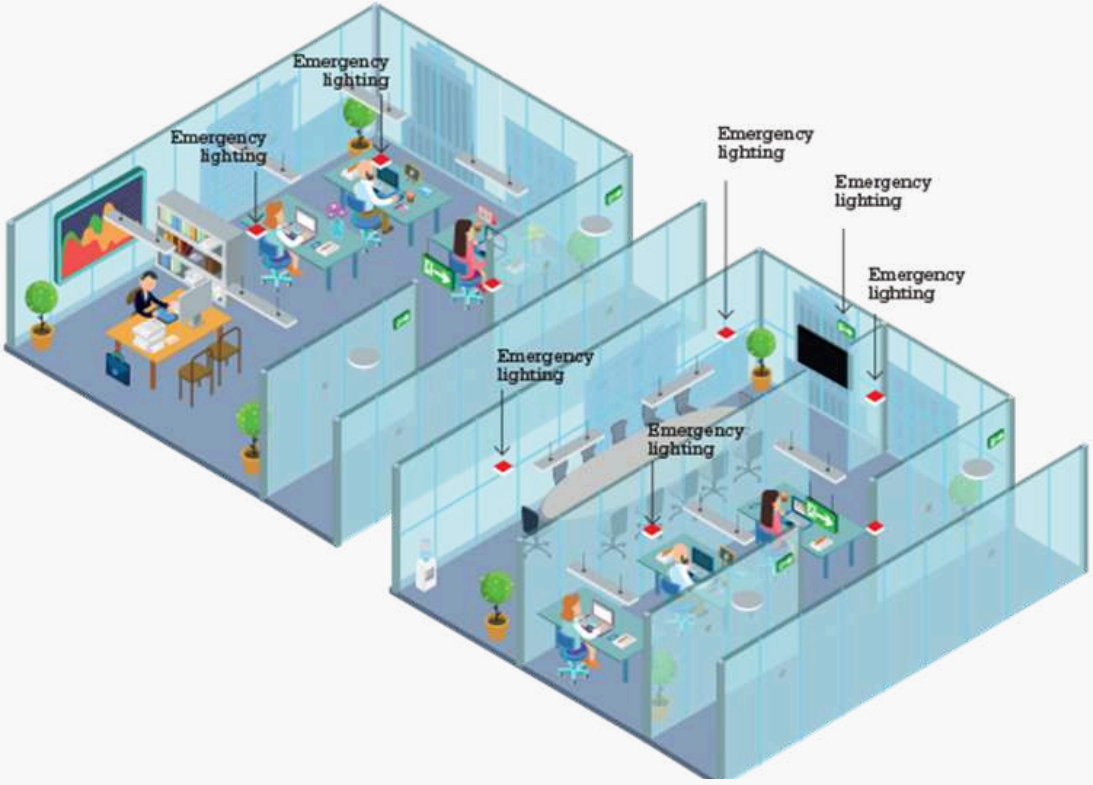
Is Your emergency lighting installation following the building evolution?



Risk assessment is a process by which the responsible person for premises (normally the Business owners and/or tenants) conducts an evaluation of the risks to occupants and uses fire precautions to eliminate or limit these risks to tolerable levels.

Changes to building layout or use may mean that the emergency lighting is no longer correct or adequate and needs reconfiguration or reconsideration.

Therefore the emergency lighting should be regularly assessed to ensure it is correct and provides a safe environment in the event of an emergency. Failure to do this is one of the top five compliance issues with emergency lighting.

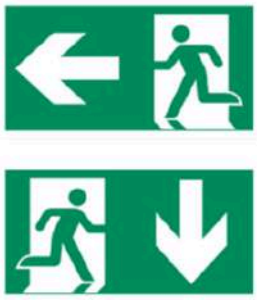

Emergency lighting
Emergency lighting
Emergency lighting
Emergency lighting
Emergency lighting
Emergency lighting
Emergency lighting

Annex 1 Explanation of the Signs Directive

Annex I of the text of the Workplace Directive (89/654/EEC) specifically states:

- 4.5. Specific emergency routes and exits must be indicated by signs in accordance with the national regulations transposing Directive 77/576/EEC (2) into law. Such signs must be placed at appropriate points and be made to last.

In December 2020 the EU Commission issued non- binding guidelines clarifying the relationship between directive 92/58/EEC and the ISO standard on safety and health signs (EN ISO 7010)

Directive 92/58/ EEC of 24 June 1992	Emergency exit signs of EN ISO 7010:2020-03 'Graphical symbols – Safety colours and safety signs – Registered safety signs' in combination with supplementary arrow signs (ISO 3864-3 'Graphical symbols – Safety colours and safety signs') – examples
 Emergency exit / escape route (White pictogram on green background)	

No.	Directive 92/58/ EEC	EN ISO 7010:2020-03 Graphical symbols – Safety colours and safety signs – Registered safety signs
37.	 Emergency exit / escape route	 E001 Emergency exit (left hand)
38.	 Emergency exit / escape route	 E002 Emergency exit (right hand)
39.	 This way (supplementary information sign)	 Supplementary arrow sign (type D of ISO 3864-3) in white on green. To be used to give directional information (direction examples, the arrows may be rotated in increments of 45°).

Annex II – Normative references

- EN 12665, Light and lighting - Basic terms and criteria for specifying lighting requirements
- EN 1838: 2024, Lighting applications - Emergency lighting
- CEN/TS 17951: 2024, Lighting Applications - Adaptive Emergency Escape Lighting Systems
- EN 50172:2024, Emergency escape lighting systems
- EN IEC 60598-1, Luminaires - Part 1: General requirements and tests (IEC 60598-1)
- EN 60598-2-22, Luminaires - Part 2-22: Particular requirements - Luminaires for emergency lighting
- EN 62034, Automatic test systems for battery powered emergency escape lighting
- EN 50171, Central safety power supply systems
- EN ISO 7010, Graphical symbols - Safety colours and safety signs - Registered safety signs (ISO 7010)
- ISO 3864-1, Graphical symbols — Safety colours and safety signs — Part 1: Design principles for safety signs and safety markings
- ISO 3864-3, Graphical symbols — Safety colours and safety signs — Part 3: Design principles for graphical symbols for use in safety signs
- ISO 3864-4, Graphical symbols — Safety colours and safety signs — Part 4: Colorimetric and photometric properties of safety sign materials

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