# Guidance signs, Emergency lighting and General lighting

**CFPA-E Guideline No 5:2016 F**

CFPA EUROPE


**FOREWORD**

The European fire protection associations have decided to produce common guidelines in order to achieve similar interpretation in the European countries and to give examples of acceptable solutions, concepts and models. The Confederation of Fire Protection Associations Europe (CFPA-E) has the aim to facilitate and support the fire protection work in the European countries.

The guideline is primarily intended for those responsible for safety in companies and organisations. It is also addressed to the installation firms, rescue service, consultants, safety companies, architects etc. so that, in the course of their work, they may find it useful to have access to different functional solutions with guidance signs, emergency lighting and general lighting devices according to the EU Directive.

The proposal of this guideline have been produced by The Swedish Fire Protection Association

This guideline has been compiled by Guidelines Commission and adopted by all fire protection associations in the Confederation of Fire Protection Associations Europe.

These guidelines reflect best practice developed by the countries of CFPA Europe. Where the guidelines and national requirements conflict, national requirements must take precedence.

Copenhagen, October 2016
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CFPAEUROPE

European Guideline

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Keywords: Evacuation, escape, lighting, signalling, guidance, photoluminescent

European Guideline

## 1 Introduction

The object of this Guideline is to recommend an appropriate level regarding the planning and design of guidance signs, emergency lighting and general lighting to facilitate an evacuation in the event of power breakdown or fire.

This guideline contains different requirements due to European legislation and standardization. In addition the guideline presents planning advices and examples of design solutions.

The reason that escape routes should be provided vid guidance signs can be summarised by the following three factors.

- Firstly, that people shall be able to locate the escape route before evacuation is to take place.
- Secondly, that in the event of a fire people shall be able to find their way to the escape route.
- Thirdly, which is a factor that is often disregarded, that the sign shows that the door opens into an escape route and that it shall be easily opened and not obstructed.

The primary purpose of emergency lighting is to enable satisfactory escape to take place in the event of external power breakdown. There is no direct link to the event of fire except the requirement of a fire-protected cable in certain cases.

General lighting is required in all escape routes and in places of assembly in such an extent that satisfactory escape can be carried out.

## 2 Definitions

**Additional sign**
Sign that is used together with a safety sign and provides additional information.

**Central emergency power supply**
Emergency power supply by a centrally sited battery, group of batteries or standby power plant.

**Dark premises**
Premises that have no daylight through windows.

**Daylight premises**
Premises with daylight through windows.

**Edge-illuminated sign**

Sign that is illuminated from the edges by a LED light can be considered as a translucent sign.

**Emergency exit**
See "Escape route".

**Emergency lighting**
Lighting provided for use when the supply to the normal lighting fails.

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

**Escape route**
Route from a fire compartment to the open which shall, along its entire length, be separated from other adjoining premises by construction complying with fire resistance regulations.

**Fire compartment**
Part of a building, separated from the rest of the building by construction complying with fire resistance regulations, inside which a fire can develop during a prescribed least period without spreading to other parts of the building.

**General lighting**
Lighting in escape routes and places of assembly that shall provide satisfactory illumination in the event of escape.

**Guidance sign**
Sign with a green front face and clear white symbols in accordance with the EU Directive that shows the way to the escape route. There is no difference between signs for exits and emergency exits. If it is necessary to make a distinction between these signs, they should be supplemented by other signs.

**Guide lighting**
Emergency lighting provided only over certain specific travel routes.

**Health care premises**
Premises for health and social care and the care of persons with functional impairment.

**Height of sign**
The height of a sign.

**Height of symbol**
Height of symbols in a pictogram.

**Illuminated sign**
Sign that is integral with a luminaire and is illuminated from the front or the side by a light source. In the standard EN 1838 this sign is called "externally illuminated safety sign".

**Local emergency power supply**
Luminaire with integral battery.

**Luminance**
Luminous intensity per unit area. Indicates the readability of a sign.

**Pictogram**
Front face of a sign that describes a situation or prescribes a certain action. According to the EU Directive, a sign that refers to an escape route shall be green with clear white symbols.

**Phosphorescent sign**
See Photoluminescent sign.

**Photoluminescent sign**
Sign that absorbs radiant energy when illuminated and subsequently releases this energy in the form of visible light.

**Place of assembly**
Premises or group of premises in a fire compartment where more than 150 persons who are not familiar with the layout of the premises may be present. Examples of places of assembly are auditoria, restaurants, sports halls, churches, educational establishments, theatres and department stores.

**Safety sign**
A sign that gives special information in a safety context and is made visible by sufficient illumination.

**Translucent sign**
Sign where light shines through the front of the sign. In the standard EN 1838 this sign is called "internally illuminated safety sign".

**Travel route**
Floor surface inside an escape route or the way to an escape route up to 0.3 m from a wall.

**Walkway to escape route**
Walkway inside a fire compartment that leads to an escape route.

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# 3 Guidance signs

## 3.1 General

The EU Directive 92/58/EEC on the minimum requirements for the provision of safety and/or health signs at work, specifies that the guidance sign shall have the symbol of a running man, a door and an arrow and also that the colour shall be green and white. The European standard EN-ISO 7010:2012 Safety colours and safety signs, defines further the design and in the European standard EN 1838:2013 Lighting applications – Emergency lighting, the size and luminosity of the signs are defined.

There are three kinds of guidance signs:
- Translucent signs
- Illuminated signs
- Photoluminescent signs

Our definition is that a translucent sign is fitted with a light that shines through the front of the sign. The contrast provided is therefore very high. An illuminated sign is one that has an integral light that illuminates the sign. A photoluminescent sign absorbs radiant energy when illuminated and subsequently releases this energy in the form of visible light.

Translucent signs have the best legibility and provide the clearest contrast followed by illuminated signs. Photoluminescent signs are less satisfactory, the lack of contrast is compensated by their larger size.

The placing of signs, whether they shall be displayed high or low is often discussed. The argument in favour of low placing is that the layer of fire gases obscures signs that are placed high. According to CFPA-E, however, this is not the whole truth. People acquire most of their knowledge of the layout of the premises before evacuation begins.

High placing is favourable in view of the fact that the signs can be seen from a long way off and that they are not at risk of damage. However, there is nothing to prevent the person in charge of the premises displaying signs in a lower position in addition to signs that are placed high. In this Guideline, we define signs placed high as those at the height of the top of a door, i.e. in the direct sight line of a standing person. A placing higher than this should be avoided.

Horizontal signalling can be a good complement of the vertical signs in that cases when the smoke can easily and quickly invade the top of the room. Horizontal signalling consists normally of a photoluminiscent tape that is stuck to the floor along the evacuation path. It remains visible even when the occupants must crawl to evacuate the premises.

The number of signs required to ensure that satisfactory escape is possible varies according to the knowledge that persons in the premises have of the layout of the building. The basic rule is that signs shall be provided unless they are unnecessary. Consequently, more signs are required in premises where the people present are not familiar with the layout of the building.

The function of signs at places of work is to inform employees and visitors that an escape route is located in a specific position. The number of signs can therefore often be limited to one sign above the door to the escape route. If this door is difficult to find, additional signs may be required. In public premises the persons present are not familiar with the layout of the premises, and more signs are therefore required in such premises.

The guidance signs shall all the time be illuminated when persons are present in the premises. In premises lit by daylight through windows, this is normally solved by the illumination being switched on all the time. In other cases, when there is no daylight, the illumination for the guidance signs can be switched on at the same time as the general lighting for the premises.

## 3.2 Planning and design

### *3.2.1 Planning*

The premises shall be provided with signs so that satisfactory escape can take place in the event of fire. The need for guidance signs shall be judged on the basis of:

- the risk of fire;
- the number of persons to be evacuated;
- the risk of lighting failure;
- whether or not the premises have daylighting;
- ease of finding one's way around in the premises;
- type of activity.

In public premises or elsewhere where the persons present do not have good knowledge of the layout of the premises, illuminated or translucent signs shall be used. Photoluminescent signs can have a good function in workplaces and similar premises where the persons present are familiar with the layout of the premises.

Illuminated or translucent guidance signs shall be provided with emergency power. The sign shall function for at least one hour in case of power loss. The emergency power could be provided via a central or local battery or a standby power plant. The cables from a central

emergency power supply shall be protected from fire for at least 30 minutes outside the fire compartment served. Protection can be provided either by protecting the cable route or by using a cable that has a fire resistance rating. In large fire compartments a protected cable may be required inside the compartment also. The need for this should be determined by expert investigation.

The only requirement for photoluminescent signs is that they should have necessary illumination to cause energy to be stored. This illumination can be provided by the general lighting system.

Guidance signs shall be placed in such a way that there is no ambiguity in the event of evacuation. Signs shall as far as possible be placed at an appropriate height which in most cases is directly above the door with regard to the normal sight line. Obstacles on or near the door may cause the sign to be raised, lowered or supplemented by further signs. It should be possible to see at least one sign at all times from all points in the corridors.

### *3.2.2 Design*

A guidance sign shall be rectangular or square in shape. The sign shall have green and white colours and the symbols shall be designed according to EN-ISO 7010 (Ref.no. E001 or E002).

The size of the sign depends on whether it is translucent, illuminated or photoluminescent. It is essential that the sign should be easy to read. In order to achieve this, signs should have the following sizes.

- The height of symbols in a translucent sign should be equal to at least 0.5% of the reading distance.
- The height of symbols in an illuminated sign should be equal to at least 1.0% of the reading distance.
- The size of a photoluminescent sign should be at least where A is the area of the sign and L the reading distance, i.e. ca 1.5% of the reading distance.

$$A \geq \frac{L^2}{2\,000}$$

| Reading distance (m) | Translucent sign Symbol height (mm) | Illuminated sign Symbol height (mm) | Photoluminescent sign Size of sign height · width (mm) |
|---|---|---|---|
| 5 | (25) 60* | (50) 60* | 80 · 150 |
| 10 | (50) 60* | 100 | 160 · 310 |
| 20 | 100 | 200 | 320 · 620 |
| 30 | 150 | 300 | 480 · 940 |
| 40 | 200 | 400 | 640 · 1250 |

* In no case should the least symbol height be less than 60 mm.

The table sets out the symbol height/sign size for the different types of sign for a number of reading distances. Note that for photoluminescent signs the size of sign is given, and for the others the symbol height.

The symbol height should not be less than 60 mm for any of the signs.

Lighting for translucent or illuminated signs shall always be switched on when activity is being carried on in the premises.

## 3.3 Examples

The examples of placing given below shall be regarded as the minimum requirement based on the EU Directive and standards. Addition of further signs may be required to satisfy the performance requirement.

A stairway or escape route is indicated by 

Guidance signs are indicated by 

Illuminated or translucent signs are indicated by 

### *3.3.1 Places of work*

Places of work are buildings such as offices, factories, warehouses, workshops etc. where the people present are familiar with the layout of the premises. Persons who are not familiar with the layout of the premises, e.g. repairmen, customers etc. may however also be present.

Emergency lighting for guidance signs is not normally required in dark office corridors, provided that the office rooms have daylighting.

Normally, signs are required for all escape routes from places of work. It is rare for signs not to be required. One example of this is when there is only one escape route from the workplace and there is an unimpeded view of the layout of the workplace, such as in small shops at street level with escape directly into the open, and workplaces with access to only one stairway and with the alternative escape route via the ladder equipment of the rescue service.

In cases where emergency escape is via openable windows and only one window can be opened, this window shall be signed. The sign shall be placed so that it is not obscured by curtains etc.

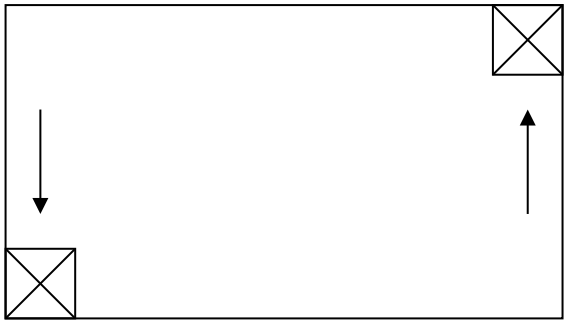

*Fig. 1. Workplace with access to two stairways.*

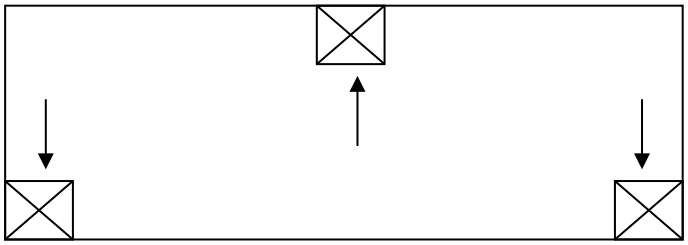

*Fig. 2. Workplace with access to three or more escape routes.*

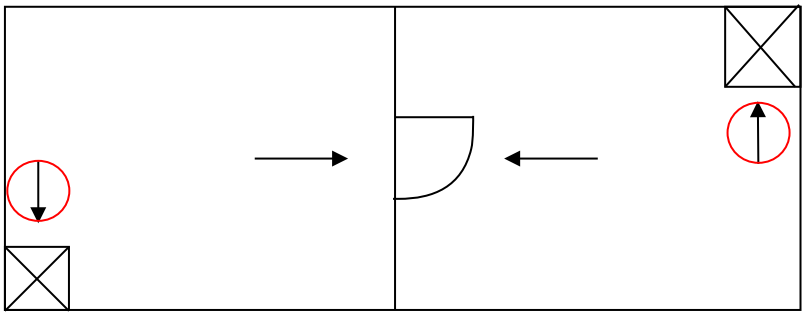

*Fig. 3. Workplaces where escape takes place across another activity/tenant.*

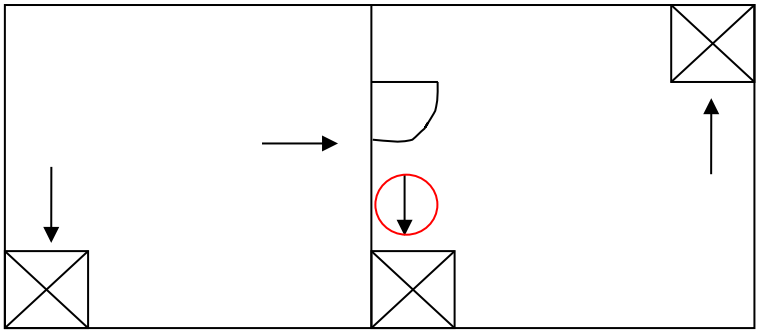

*Fig. 4. Workplaces where escape takes place across another activity/tenant.*

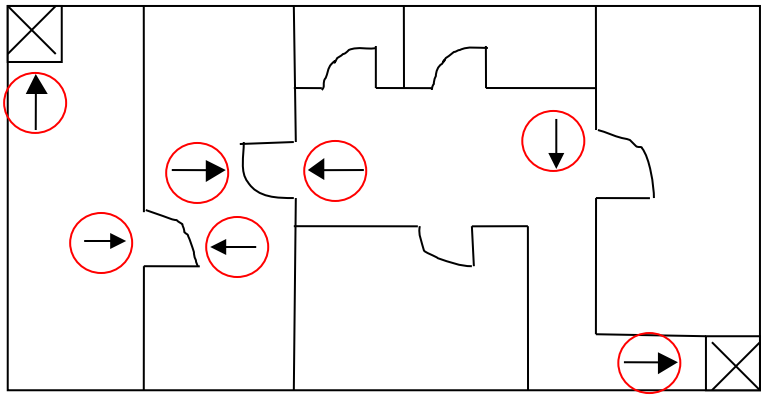

*Fig. 5. Workplaces below ground and/or without daylighting. In these premises a larger number of signs required, either provided with electric emergency lighting or photoluminescent.*

If all stairways are needed to ensure safety of escape, guidance signs shall be provided for all of these. Further signs may be required in the corridors to ensure that there is clear understanding of the positions of these stairways.

When escape takes place across another tenant, those escaping normally have little knowledge of the layout of the premises across which escape is taking place.

For the case when the persons are familiar with the layout of the premises, i.e. when both premises are occupied by the same tenant, see Fig. 2-3.

All escape routes shall be provided with guidance signs. The door leading to the adjoining activity can be provided with a photoluminescent sign, the other doors shall be provided with permanently translucent or illuminated signs. The reason that signs to the stairway, in the premises across which escape takes place, cannot be in the form of

photoluminescent signs is that escape may have to take place during the dark part of the day. In such a case there is no guarantee that the lighting is switched on or has recently been switched on, to ensure that photoluminescent signs are activated. One alternative to providing the premises with illuminated or translucent signs is to site the switch in such a way that lighting in the premises across which escape is to take place can be switched on from the premises being evacuated.

### *3.3.2 Public premises for a maximum of 150 persons*

Public premises for a maximum of 150 persons, i.e. premises that are not places of assembly and in which persons have little knowledge of the layout of the premises.

A sign that is only photoluminescent is not acceptable.

The symbol size should not be less than 100 mm in any of the signs. Lighting for the translucent or illuminated signs shall always be switched on when activity is being carried on in the premises.

Guidance signs are not required in this case in view of the fact that only one escape route is required and that there is unimpeded view of the premises which have an area of less than 120 $m^2$.

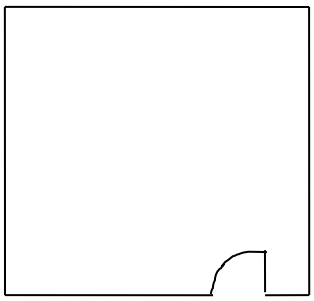

*Fig. 6. Small shop, only one door leading directly into the street.*

Both escape routes shall be provided with guidance signs. Further signs in corridors, if any, may be required to ensure that people can find their way out of the premises.

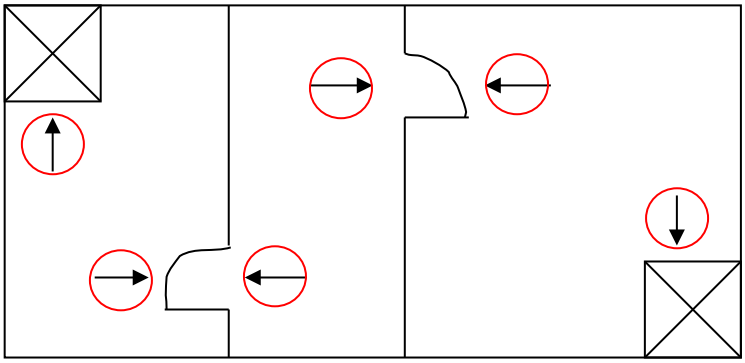

*Fig. 7. Premises that require two escape routes.*

### *3.3.3 Places of assembly*

Places of assembly, i.e. premises for more than 150 persons where these persons have little knowledge of the layout of the premises.

In places of assembly, cinemas, auditoria, churches, restaurants, dance halls and similar premises the symbol height for any of the signs shall not be less than 100 mm. In department stores and retail trade establishments, the symbol height should not be less than 150 mm.

Lighting for translucent or illuminated signs shall be switched on at all times when activity is being carried on in the premises. Photoluminescent is not acceptable.

Guidance signs shall be sited in such a way that there is no ambiguity in the event of evacuation. Signs shall as far as possible be placed at an appropriate height which in most cases is directly above the door with regard to the normal sight line. Obstacles on or near the door may cause the sign to be raised, lowered or supplemented by further signs. It should be possible to see at least one sign at all times from all points in the premises.

In shops and department stores it is essential for the signs to be sited so that they are below product description signs and advertising signs. The major routes through the premises shall be provided with additional signs. Minor routes from which no sign is visible can be accepted provided that the distance from a point from where at least one sign can be seen is no greater than 5 m.

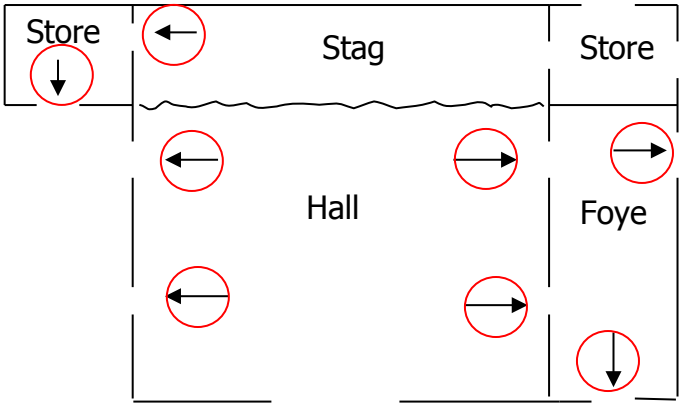


*Fig. 8. Place of assembly. Guidance signs shall be provided at all doors and at all changes in direction.*

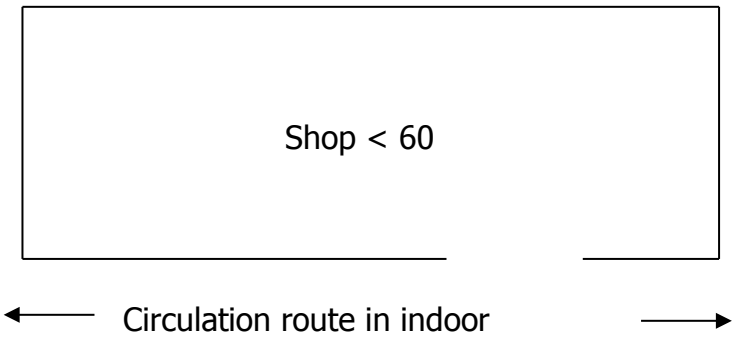


*Fig. 9. Small shop < 30 persons (ca 60 m² net customer area or smaller) in indoor shopping centre for more than 150 persons. The shop premises normally don´t need to be provided with guidance signs.*

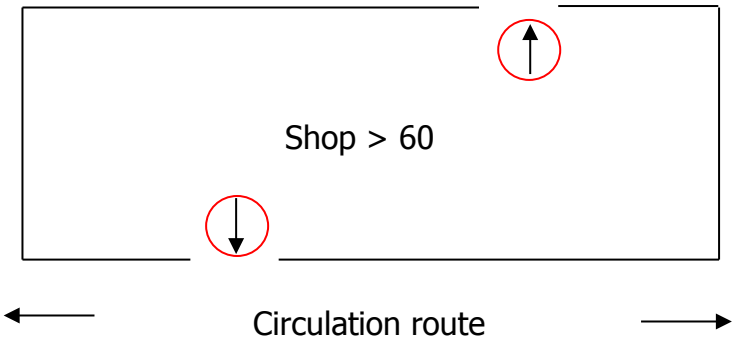

*Fig. 10. Large shop > 30 persons (ca 60 m² net customer area or larger) with requirement for escape facilities at the rear in indoor shopping centre for more than 150 persons.*

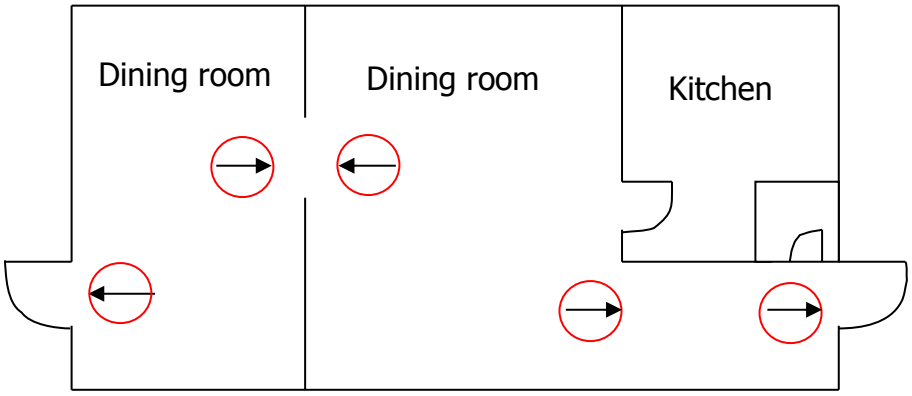


*Fig. 11. Restaurant. The main entrance normally don´t need to be provided with guidance signs. It is acceptable for only the alternative escape route to be signed. It must however be signposted along its entire length.*

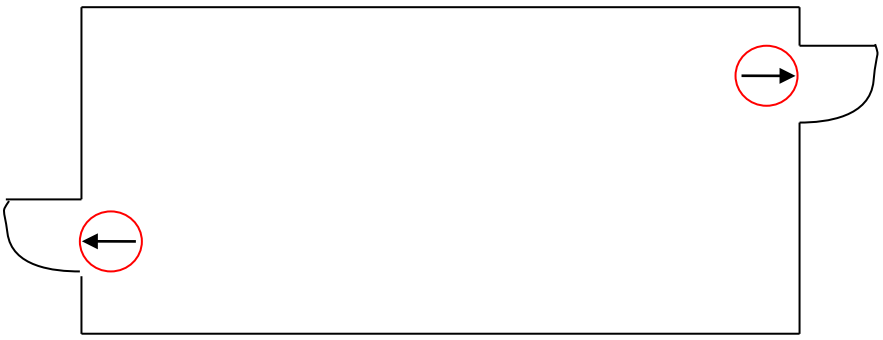

*Fig. 12. Auditorium > 150 persons. For public events such as concerts, theatre performances or similar, the main entrance must also be signed. Further signs may be required.*

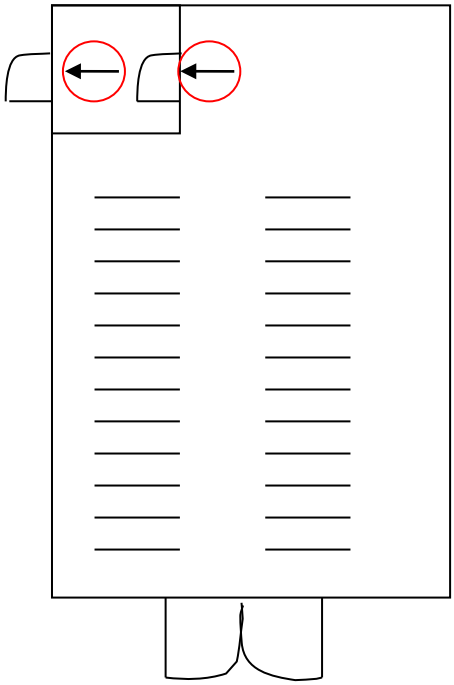

*Fig. 13. Church or other building of architectural or historical interest, with simple escape conditions.*

### *3.3.4 Schools and educational premises*

In educational premises that are rented out or have evening activities, the premises are to be provided with translucent or illuminated signs. Photoluminescent signs are not acceptable.

If the persons present are familiar with the layout of the premises, i.e. the premises are not rented out or have evening activities. The premises can be be signposted in the same way as workplaces, in accordance with Fig. 1-5

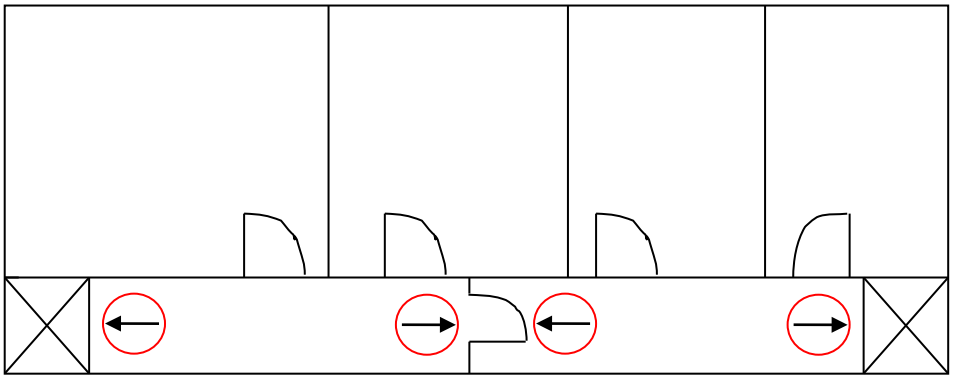

*Fig. 14. Educational premises with escape through the corridor.*

Educational premises which are rented out and have evening activities. If both escape routes pass through the corridor, it is sufficient for the doors to the staircases and any doors in the corridor to be provided with translucent or illuminated guidance signs.

If an alternative escape route passes across an adjoining lecture hall, all doors in the direction of escape are to be provided with translucent or illuminated guidance signs.

See also the section on public premises, no familiarity with the layout of the premises.

### *3.3.5 Hotels*

Hotels, boarding houses or similar premises for temporary overnight accommodation where people have little knowledge of the layout of the premises.

The premises shall be provided with translucent or illuminated signs. Photoluminescent signs are not acceptable.

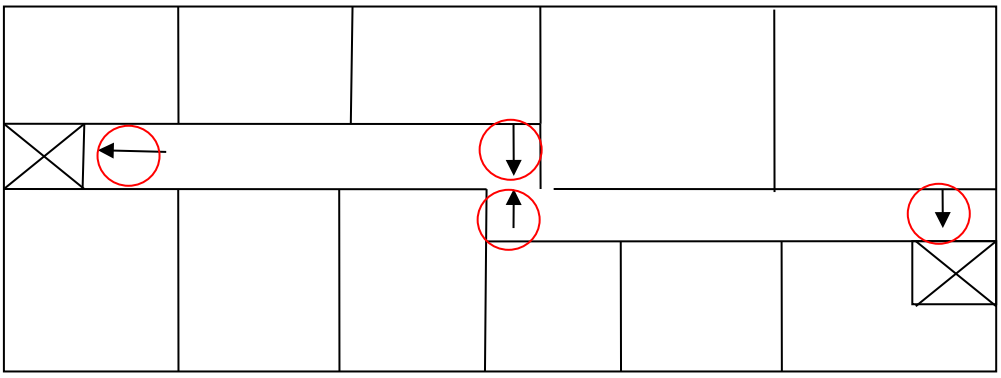

*Fig. 16. Hotel corridor*

Hotel corridors shall be provided with guidance signs at changes in direction and stairways.

### *3.3.6 Health care premises*

Health care premises or similar premises for health or social care and for the care of people with disabilities, where the people are not familiar with the layout of the premises.

The premises are to be provided with translucent or illuminated signs. Photoluminescent signs are not acceptable.

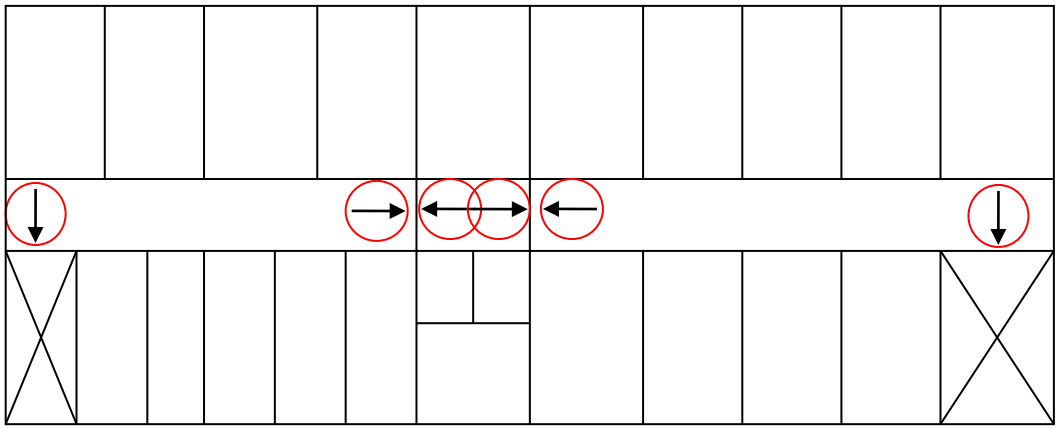

*Fig. 17. Two wards with a lobby between the wards. All doors in the corridor leading to the escape route and to adjoining wards are to be provided with guidance signs.*

### *3.3.7 Garages*

Garages or similar premises for the parking of vehicles.

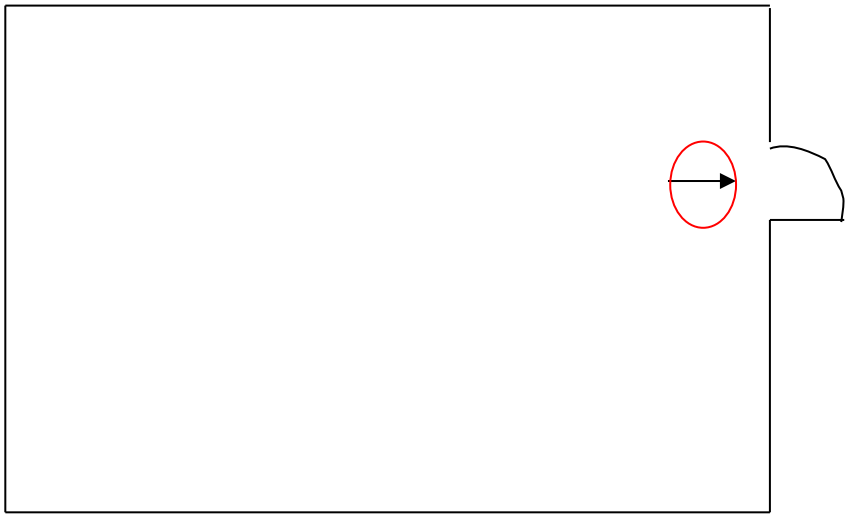

*Fig. 18. Small garage with only one escape route, i.e. a travel route no longer than 30 m to doors leading to the open.*

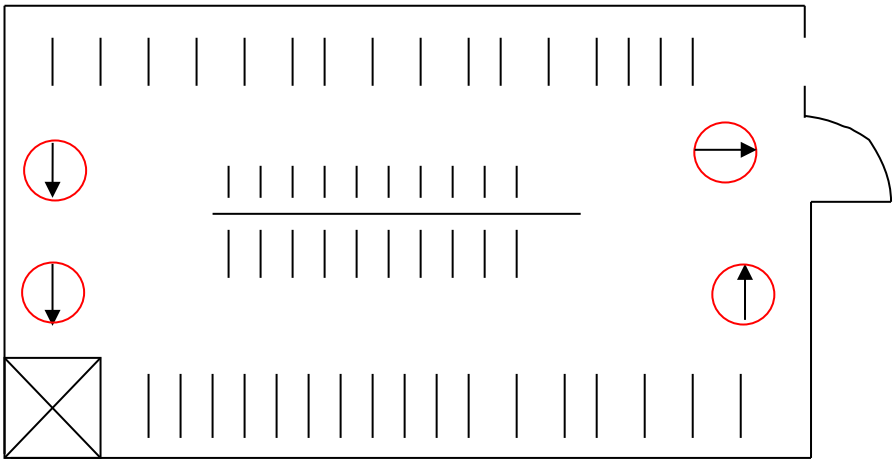

*Fig. 19. Large garage with two or more escape routes. The doors should be provided with guidance signs. Additional signs are normally required to ensure that satisfactory evacuation can take place.*

### *3.3.8 Stairways*

For all hotels, health care premises, places of assembly and garages larger than 600 $m^2$ and for stairways in buildings taller than 8 storeys and deeper than one basement storey, lighting for translucent or illuminated signs is to be provided with emergency power via a central or local battery.

Where the persons are not familiar with the layout of the stairway, for instance, in a stairway that is used only for escape from a workplace or public premises, the stairway shall be provided with guidance signs when:
- the entrance on the ground floor is not glazed, unless this is evidently unnecessary.
- the change in direction is not evident or when the stairs narrow down in a complicated manner.
- dark premises are evacuated via light or dark stairways.
- the normal entrance/exit should not be used but a special exit shall be used.
- the direction of escape leads upwards.
- the stairway has no daylight on each storey.

Where the persons are familiar with the layout of the premises and the stairway, for instance in a stairway that is used daily at a place of work, the stairway shall be provided with guidance signs when:
- the entrance on the ground floor is not glazed, unless this is evidently unnecessary.
- the change in direction is not evident or when the stairs narrow down in a complicated manner.
- the normal entrance/exit should not be used but a special exit shall be used.

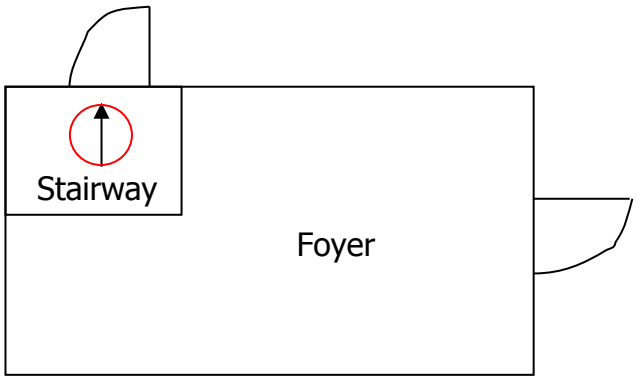


*Fig. 20. Stairway where the normal exit is across a corridor/reception and a door to the open. The emergency exit is via a door directly to the open.*

# 4 Emergency Lighting

## 4.1 General

According to the EU directive 89/654/EEC, concerning the minimum safety and health requirements for the workplace, when planning new premises, emergency lighting is required in escape routes that require illumination in the event of escape. In existing premises, emergency routes and exits requiring illumination must be provided with emergency lighting of adequate intensity in case the lighting fails. Workplaces in which workers are especially exposed to risks in the event of failure of artificial lighting must be provided with emergency lighting of adequate intensity.

Since the requirement is formulated in performance terms, this means that consideration shall be given to the probability of power breakdown and other factors which affect the safety of escape in the event of power breakdown. An example of such factors is whether or not the stairway has windows that admit daylight.

## 4.2 Planning and design

According to the EU directive 89/654/EEC, concerning the minimum safety and health requirements for the workplace, when planning new premises, emergency lighting is required in escape routes that require illumination in the event of escape. In existing premises, emergency routes and exits requiring illumination must be provided with emergency lighting of adequate intensity in case the lighting fails. Workplaces in which workers are especially exposed to risks in the event of failure of artificial lighting must be provided with emergency lighting of adequate intensity.

Since the requirement is formulated in performance terms, this means that consideration shall be given to the probability of power breakdown and other factors which affect the safety of escape in the event of power breakdown. An example of such factors is whether or not the stairway has windows that admit daylight.

### *4.2.1 Planning*

Emergency escape lighting should be installed in:
- escape routes in hotels, health care premises, places of assembly
- escape routes in buildings that are taller than eight storeys
- places of assembly, inside the premises and directly outside the exits.
- dark escape corridors in places of work, i.e. corridors that have no daylighting. Note that dark office corridors are not normally considered to be escape corridors.
- in main stairways and similar that have no daylight and are used daily in workplaces in buildings that are taller than three storeys and/or deeper than one basement storey.

Emergency lighting should also be installed in lift cages.

Stairways at places of work which have windows that admit daylight could be excluded from the requirement concerning emergency escape lighting unless it´s required in national legislation.

The reason that emergency escape lighting is required only in the main stairways and other stairways that are used daily is that there is no need for all escape routes to be used in this type of escape situation when there is no threat other than power breakdown.

In other dark working premises situated in basement storeys and similar, it is acceptable for only the guidance signs to be provided with emergency lighting. Luminous intensity on floor surfaces need not be as much as 1 lux in such cases.

Emergency power supply can be arranged through standby power, in the form of either a standby power plant or local or central batteries that automatically come into operation when the mains power fails.

In most cases, a protected cable is required only outside the fire compartment served. The reason is that the fire compartment shall have been evacuated before the fire has assumed such an extent that cables and similar equipment are put out of action.

Central and local batteries have both advantages and disadvantages.

The advantages of local batteries are:
- Lower installation cost when the number of lights is less than about 15.

- The installation is more reliable. When there is a defect in a light/battery, the other lights are not affected.
- The power is supplied over the circuit feeding the general lighting, which means that in the event of a local power failure the emergency lighting is switched on.

The disadvantages of local batteries are:
- More time is needed for maintenance and maintenance costs are therefore higher. This time can be reduced by central monitoring of the luminaires.

The advantages of central batteries are:
- Less time is needed to maintain and check batteries, although it is still necessary to go round and check at certain intervals that the luminaires function. This time also can be reduced by modern technology.

The disadvantages of central batteries are:
- The installation is vulnerable. In the event of a battery defect or short circuit, the whole installation or in the best case the section concerned is put out of action.
- The installation is expensive owing to cabling of fire resistance classification.
- It is not normally switched on in the event of a local power failure, since it is powered centrally.

Electric cables for a central power supply for emergency lighting shall be laid along a route protected in fire resistance class EI 30 outside the fire compartment concerned, or constructed with the corresponding fire resistance. In large fire compartments it may also be necessary for cables inside the compartment to be protected.

The requirements for emergency lighting in buildings generally are regulated in the national building codes or other legislation.

### *4.2.2 Design*

The emergency lighting should be designed according to EN 1838 (Lighting applications – Emergency lighting) and installed, tested and maintained according to EN 50172 (Emergency escape lighting systems), EN 60598-2-22 (Particular requirements – Luminaries for emergency lighting) and EN 62034 (Automatic test systems for battery powered emergency escape lighting).

- Emergency lighting shall normally have a luminous intensity of not less than 1 lux on floor surfaces for a period of at least 60 minutes in case of an external power breakdown.

- Emergency supply shall be arranged via a central or local battery or standby power plant that is automatically switched on in the event of power failure.

Escape routes shall be provided with emergency escape lighting to such an extent that satisfactory escape can take place in the event of power failure.

In designing emergency lighting systems, all factors that reduce the illumination shall be taken into consideration such as voltage drops and the ageing or soiling of light sources performances.

## 4.3 Examples

### *4.3.1 Hotels*

In hotels, escape routes, i.e. stairways and hotel room corridors, shall be provided with emergency escape lighting.

Emergency luminaires in corridors should be placed low in order to better perform their function in the event of fire. It is best to inset the luminaires into walls, columns and other fixed installations at a height of ca 0.5 m above floor level.

Emergency luminaires in stairways should be mounted on the walls. From the standpoint of escape it makes no difference whether the luminaires are placed high or low.

### *4.3.2 Health care installations*

In health care installations the escape routes, i.e. stairways, shall be provided with emergency escape lighting.

Emergency luminaires in stairways should be inset into, or mounted on, the walls. From the standpoint of escape it makes no difference whether the luminaires are placed high or low.

### *4.3.3 Places of assembly*

In places of assembly, escape routes, i.e. stairways, any corridors inside the fire compartment concerned, stairs in assembly rooms, the place of assembly concerned and the space where the escape route emerges into the open, shall be provided with emergency escape lighting.

In corridors and places of assembly emergency luminaires should be sited low so that they can better perform their function in the event of fire. It is best to inset the luminaires into walls, columns and other fixed installations at a height of ca 0.5 m above floor level. In large open rooms it may be necessary to provide additional luminaires in the ceiling.

Lighting in stairways that is placed on each step is traditionally provided by a luminaire with a filament bulb fed from a central emergency power supply. All experience shows that these bulbs have a short service life. They are either destroyed by foot impact or the filaments are broken by the vibrations caused by people walking on the stairs.

A better solution that lasts longer and consequently needs less maintenance is to provide equally spaced fluorescent tubes inset into the walls. They need not be located above each step, it is not their location that is most important but that the luminous intensity on each step should be at least 1 lux.

If the stairs are situated between two banks of seats, it is best to site the luminaires along the edges of the rows of seats or to integrate them into the lighting for the rows of seats.

### *4.3.4 Stairways in buildings of more than 8 storeys*

In all buildings of more than 8 storeys, stairways shall be provided with emergency escape lighting.

Stairways shall be provided with emergency escape lighting to such an extent that satisfactory escape can take place in the event of power failure.
Emergency luminaires in stairways should be inset into, or mounted on, the walls. From the standpoint of escape it makes no difference whether the luminaires are sited high or low.

### *4.3.5 Main stairway in workplaces in buildings of less than 9 storeys*

Escape routes that require lighting to enable safe escape to take place shall be provided with emergency escape lighting that illuminates them sufficiently in the event of power failure. The purpose of this is to ensure safety of escape in the event of power failure. CFPA-E considers that it is sufficient to provide the main stairway with emergency escape lighting in order to satisfy this requirement.

Depending on whether the stairway is dark or provided with windows to the open, the conditions for safety of escape differ. CFPA-E therefore considers that dark main stairways and similar stairways that are used daily in buildings of more than four storeys containing workplaces should be provided with emergency escape lighting. Stairways with daylight need to be provided with emergency escape lighting in buildings that are taller than eight storeys.

Stairways shall be provided with emergency escape lighting to such an extent that satisfactory escape can take place in the event of power failure.

Dark main stairways and similar stairways that are used daily in buildings of more than four storeys shall be provided with electric emergency escape lighting. The luminous intensity provided by emergency escape lighting shall be at least 1 lux on the floor surface with the worst illumination for a period of at least 60 minutes.

Emergency luminaires in stairways should be inset into, or mounted on, the walls. From the standpoint of escape it makes no difference whether the luminaires are sited high or low.

### *4.3.6 Emergency lighting for dangerous workplaces*

The duty of this type of emergency lighting is to maintain the safety of persons who are engaged on dangerous processes or are involved in other dangerous situations, and to enable them to carry out the working operations required to close down activities, which must be done to secure the safety of others. Examples of such premises/activities are premises housing switchgear, metal-finishing installations, premises where there is a risk of falls from great heights, and similar activities.

The workplaces shall be provided with emergency escape lighting to such an extent that satisfactory escape can take place in the event of power failure. Lighting shall also be designed in such a way that the working operations required to close down activities, which are necessary to secure the safety of others, can be carried out.

Emergency luminaires in corridors should be sited low in order to better perform their function in the event of fire. It is best to inset the luminaires into walls, columns and other fixed installations at a height of ca 0.5 m above floor level. In large open premises it may be necessary to provide additional luminaires in the ceiling.

## 5 General lighting

### 5.1 General

Since general lighting is in most cases in operation during the evacuation stage, its design is of the utmost importance for the way safe escape can take place.

In most cases, general lighting in escape routes is provided in such a way that every other light is connected to a different circuit. It is essential for interaction between general lighting and emergency lighting to be provided in such a way that emergency lighting comes into operation in cases when general lighting is put out of action. Emergency lighting is in most cases wired in such a way that it comes into operation only in the event of external power

breakdown. This implies that in the event of a local fire that puts general lighting out of action, the emergency lighting is not activated since only one circuit has been put out of operation.

In premises where only persons familiar with the layout of the premises are present, e.g. in places of work, general lighting can be designed so that it is switched on, either manually or automatically, when the escape route is entered. It is essential that the switch that is to be used in such a case is fitted with internal illumination of the glow light type or similar, so that it can be easily located.

As far as public premises are concerned, where the persons present are not familiar with the layout of the premises, the general lighting in the premises and in escape routes shall be switched on all the time when persons are present in the premises. This can be done either by general lighting being switched on all the time, controlled by a time switch, or switched on automatically when somebody is present in the escape route.

## 5.2 Examples

The construction and function of general lighting in escape routes, walkways to escape routes and places of assembly are of the utmost importance for escape in the event of fire. In view of the fact that in most cases there is no time for emergency lighting to come into operation in the event of a fire, it is the lighting that functions in the normal case that is used in the event of emergency escape.

It is therefore of the utmost importance for a satisfactory escape situation that the general lighting should be switched on.

This is seldom a problem in the actual main stairway, but in stairways that are used only for emergency escape, lighting is in most cases not switched on when activity is carried on in adjoining premises.

In conjunction with escape from workplaces and similar premises where it may be expected that no congestion will occur in the door to the stairway, it is acceptable for lighting to be switched on by those escaping. This presupposes that the switch is fitted with a light emitting diode and that it is located in the immediate vicinity of the door.

In conjunction with escape from places of assembly, public premises and similar premises where it may be expected that congestion will occur during escape, lighting in all the affected stairways shall be switched on when activity is in progress. Alternatively, lighting shall be automatically activated when the door to the stairway is opened, either by a switch in the door or by a motion detector inside the stairway.

## 6 Maintenance

In order that the guidance signs, emergency lighting and general lighting should have satisfactory function in the event of fire, they shall be maintained. Unfortunately, it is far too common for maintenance to be neglected. Faulty lamps, batteries that have no capacity and short circuits are common defects found during inspections.

In the market today there are many types of self-checking emergency lights and guidance signs available. These signs carry out a check of their own condition and transmit an alarm to the person responsible for the property. CFPA-E recommends that these types of self-checking systems should be used in new installations.

Existing systems that do not perform these functions should be subjected to regular inspections of emergency lighting, guidance signs and general lighting.

In public premises an appropriate inspection frequency is about once a month.

In buildings where only persons who are familiar with the layout of the premises are present, an appropriate inspection frequency is once every three months.

## 7 Guidelines

*Fire*

Guideline No. 1:2015 F - Fire protection management system
Guideline No. 2:2013 F - Panic & emergency exit devices
Guideline No. 3:2011 F - Certification of thermographers
Guideline No. 4:2010 F - Introduction to qualitative fire risk assessment
Guideline No. 5:2016 F - Guidance signs, emergency lighting and general lighting
Guideline No. 6:2011 F - Fire safety in care homes for the elderly
Guideline No. 7:2011 F - Safety distance between waste containers and buildings
Guideline No. 8:2004 F - Preventing arson – information to young people
Guideline No. 9:2012 F - Fire safety in restaurants
Guideline No.10:2008 F - Smoke alarms in the home
Guideline No.11:2015 F - Recommended numbers of fire protection trained staff
Guideline No.12:2012 F - Fire safety basics for hot work operatives
Guideline No.13:2015 F - Fire protection documentation
Guideline No.14:2007 F - Fire protection in information technology facilities
Guideline No.15:2012 F - Fire safety in guest harbours and marinas
Guideline No.16:2016 F - Fire protection in offices
Guideline No.17:2015 F - Fire safety in farm buildings

Guideline No.18:2013 F - Fire protection on chemical manufacturing sites
Guideline No.19:2009 F - Fire safety engineering concerning evacuation from buildings
Guideline No.20:2012 F - Fire safety in camping sites
Guideline No.21:2012 F - Fire prevention on construction sites
Guideline No.22:2012 F - Wind turbines – Fire protection guideline
Guideline No.23:2010 F - Securing the operational readiness of fire control system
Guideline No.24:2016 F - Fire safe homes
Guideline No.25:2010 F - Emergency plan
Guideline No.26:2010 F - Fire protection of temporary buildings on construction sites
Guideline No.27:2011 F - Fire safety in apartment buildings
Guideline No.28:2012 F - Fire safety in laboratories
Guideline No.29:2013 F - Protection of paintings: Transport, exhibition and storage
Guideline No.30:2013 F - Managing fire safety in historical buildings
Guideline No.31:2013 F - Protection against self-ignition and explosions in handling and storage of silage and fodder in farms
Guideline No.32:2014 F - Treatment and storage of waste and combustible secondary raw materials
Guideline No.33:2015 F - Evacuation of people with disabilities
Guideline No.34:2015 F - Fire safety measures with emergency power supplies
Guideline No.35:2016 F - Fire safety in warehouses
Guideline No.36:2016 F - Fire prevention in large tents

*Natural hazards*
Guideline No.1:2012 N - Protection against flood
Guideline No.2:2013 N - Business Resilience – An introduction to protecting your business
Guideline No.3:2013 N - Protection of buildings against wind damage
Guideline No.4:2013 N - Lightning protection
Guideline No.5:2014 N - Managing heavy snow loads on roofs
Guideline No.6:2015 N - Forest fires

*Security*
Guideline No. 1:2010 S - Arson document
Guideline No. 2:2010 S - Protection of empty buildings
Guideline No. 3:2010 S - Security system for empty buildings
Guideline No. 4:2010 S - Guidance on key holder selections and duties
Guideline No. 5:2012 S - Security guidelines for museums and showrooms
Guideline No. 6:2014 S - Emergency exit doors in non-residential premises