

European guideline



Guidance signs
Emergency lighting
General lighting

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.

Zurich, 18 December 2003
CFPA Europe

Dr. Hubert Rüegg
Chairman

Stockholm, 18 December 2003
Guidelines Commission

Tommy Arvidsson
Chairman

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1 Introduction

This Guideline contains different requirements concerning guidance signs, emergency lighting and general lighting.

The object of this Guideline is to lay down an appropriate level of regarding the design and siting of signs and lighting for escape in the event of fire or power breakdown.

1.1 Guidance signs

The EU Directive specifies that the sign shall have the symbol of a running man, a door and an arrow.

The requirements concerning the sizes of signs vary. The basic requirement is that the sign shall provide a clear contrast to the background and that it shall be legible. Translucent signs have the best legibility and provide the clearest contrast. Illuminated and photoluminescent signs are less satisfactory. We therefore recommend that three different design rules should be applied for the three different types of sign. Translucent signs should have symbols of a height that corresponds to 0.5% of the reading distance. In illuminated signs, the height of symbols, in millimetres, should correspond to 1% of the reading distance. Photoluminescent signs should be designed according to the equation

$A \geq \frac{L}{2000}$ which corresponds to about 1.5% of the reading distance. This means that the signs will need to be a little larger.

Photoluminescent signs can have a good function in workplaces and similar premises where the persons present are familiar with the layout of the premises. The lack of contrast in comparison with illuminated or translucent signs is compensated for by their larger size. However, in public premises or elsewhere where the persons present do not have good knowledge of the layout of the premises, illuminated or translucent should be used.

The siting of signs, i.e. 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.

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 reason that escape routes are signposted 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 not be blocked or fitted with a locking system that does not confer ease of opening.

The meaning of an illuminated or translucent sign is discussed in a number of contexts. 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. The only requirement for photoluminescent signs is that they should have the necessary illumination to cause energy to be stored.. This illumination can be provided by the general lighting system without a special circuit.

Power supply for the illumination is also important. As mentioned above, for photoluminescent signs the necessary energy may be provided by a normal circuit. When the sign is illuminated or translucent, the lowest safety level is that it is supplied through a separate circuit distinct from the main lighting circuit. This cable does not require special routing or fire resistance. In certain specific cases a protected cable is required which enables the lighting to function for at least 30 minutes in spite of the cable being exposed to fire.

In most cases, however, this requirement applies only outside the fire compartment served and in the case of centrally supplied emergency power. Examples of exceptions are when the fire compartment is very large, as in large public premises of the shopping centre type.

The reason that lighting supplied via a separate circuit can be approved is as follows. In most fires evacuation has been completed before the fire has spread from the object in which the fire had started. That is to say, the extent of fire is limited during the evacuation stage. There is very little likelihood of the whole power supply being put out of action during this period. In places of assembly, hotels and healthcare premises, and in tall buildings, it is however considered of great importance for the cable to be protected for 30 minutes.

Emergency lighting of guidance signs, i.e. lighting that comes into operation in the event of external power breakdown, is required to ensure safety of escape in the event of external power breakdown. Emergency lighting is not required primarily to ensure safety of escape in the event of fire, which is a common misconception. In choosing between a local battery and a central battery, however, the local battery also provides additional safety of escape in the event of fire.

The guidance signs shall at all times 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.

1.2 Emergency lighting

It is important to state that the primary object of emergency lighting is to enable satisfactory escape to take place in the event of external power breakdown. There is no direct coupling to escape in the event of fire. In cases where a protected cable is required, lighting has direct coupling to fire. 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.

According to the EU Directive, emergency lighting shall be installed in escape routes in hotels, health care premises, places of assembly and in escape routes in buildings that are taller than eight storeys, as well as in places of assembly irrespective of building height, in order to secure satisfactory escape in the event of external power breakdown.

According to the EU Directive, emergency lighting is also required for all escape routes that require illumination in the event of escape. 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.

The CFP-A-E recommendation is that stairways at places of work which have windows that admit daylight should be exempted from the requirement concerning emergency lighting, unless requirements concerning emergency lighting are laid down in national legislation.

However, at places of work electric emergency lighting is required in the main stairways and other stairways that are used daily, have no means of daylight and are accommodated in buildings taller than three storeys, and/or deeper than one basement storey.

The reason that emergency 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.

Emergency lighting is also required in dark escape corridors, i.e. corridors that have no daylighting. Note that dark office corridors are not normally considered to be escape corridors.

Lighting is to be provided as electric emergency lighting, and shall normally have a luminous intensity of not less than 1 lux on floor surfaces.

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

1.3 General lighting

The general lighting discussed in this Guideline is lighting that is required in all escape routes and in places of assembly. The object of general lighting is that there shall be such effective illumination in the rooms that satisfactory escape is possible.

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.

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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.

2 Explanations

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.

Daylit premises

Premises with daylight through windows.

Edge-illuminated sign

Sign that is integral with a luminaire and is illuminated from the edges by a light source = illuminated sign.

Emergency exit

See "Escape route".

Emergency lighting

Emergency lighting that is switched on to ensure safety of escape when general lighting fails owing to power breakdown. The object of this lighting is to enable satisfactory escape to take place in spite of the failure of the external power supply. The requirement for emergency lighting has no direct coupling to the fire situation. However, certain design options for emergency lighting can enhance reliability also in a fire situation.

Escape route

Route from a fire compartment to the external air 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.

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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.

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 that is integral with a luminaire and where light shines through the front of the 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.

3 Examples of guidance signs

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.

Performance requirements

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
- the type of activity.

Construction

A guidance sign shall be rectangular or square in shape. The sign shall have a green background with white symbols.

In dark premises, e.g. premises situated in a basement storey or premises without daylighting, the guidance sign shall be provided with emergency lighting. The emergency lighting shall function for one hour.

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

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.

$$A \geq \frac{L^2}{2000}$$

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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.

Photoluminescent signs are to be illuminated by general lighting.

In other cases, lighting should be on a separate circuit or provided with an emergency power supply via a central or local battery. CFPA-E recommends, as the lowest level, electric emergency lighting or photoluminescent signs.

Siting

Guidance signs shall be sited in such a way that there is no ambiguity in the event of evacuation. Consideration should however be given to the fact that the persons in the premises are familiar with the layout of the premises. 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. Any obstacles, for instance fixed installations or furnishings, may cause the sign to be raised, lowered or supplemented by further signs.

General examples

The examples of signing given below shall be regarded as the minimum requirement based on the EU Directive. 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



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 external air, and workplaces with access to only one stairway and with the alternative escape route via the ladder equipment of the rescue service.

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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.

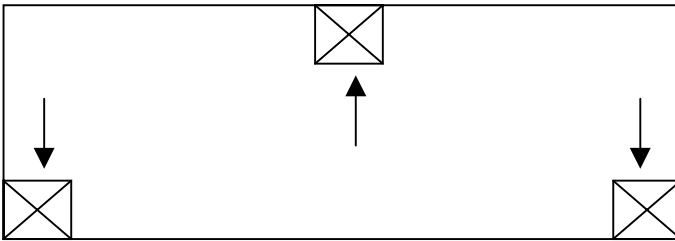


Fig. 2. Workplace with access to three or more escape routes.

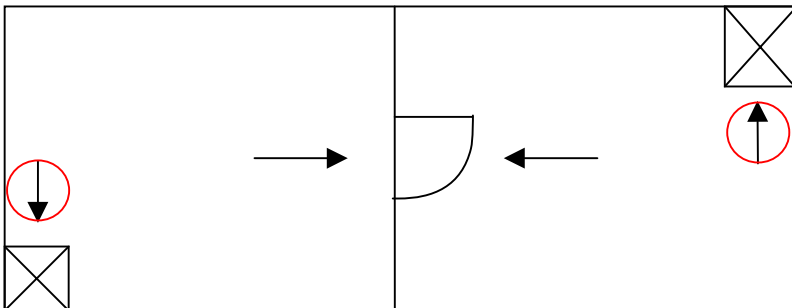


Fig. 3. Workplaces where escape takes place across another activity/tenant.

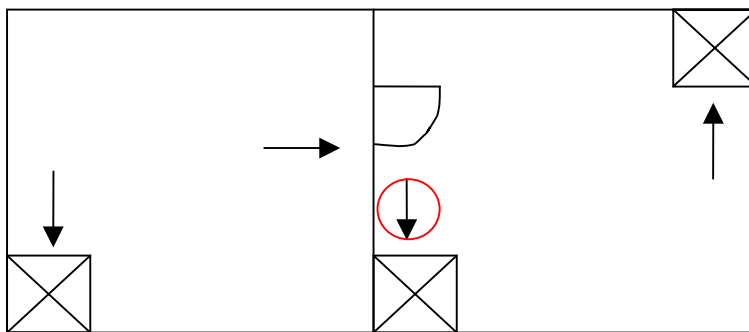


Fig. 4. Workplaces where escape takes place across another activity/tenant.

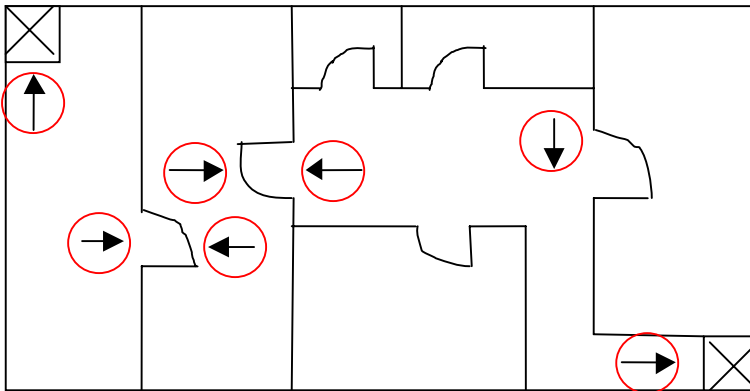


Fig. 5. Workplaces below ground and/or without daylighting. In these premises a larger number of signs required, either provided with electric emergency lighting or photoluminescent.

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.

3.2 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.

Performance requirements

The premises shall be provided with signs in such a way that satisfactory evacuation can take place in the event of fire. The need for guidance signs shall be assessed in view of

- 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
- the type of activity.

Construction

A guidance sign shall be rectangular or square in shape. The sign shall have a green background with white symbols. A sign that is only photoluminescent is not acceptable.

The size of the sign depends on whether it is translucent or illuminated. 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 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.

Lighting for the signs can be provided in the form of a separate circuit only when the premises are intended for a small number of persons, 50 persons, and where escape conditions are very simple, e.g. doors leading directly into the external air. In other cases, i.e. when the premises are intended for more than 50 persons, and where escape conditions are more complicated, the CFPA Europe recommends that signs be provided with emergency lighting with 1 hour's period of operation, via a central or local battery.

Siting

Guidance signs shall be sited in such a way that there is no ambiguity in the event of evacuation. Consideration should however be given to the fact that the persons in the premises are not familiar with the layout of the premises. 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.

Examples

The examples of signing given below shall be regarded as the minimum requirement based on legislation. Addition of further signs may be required to satisfy the performance requirement.

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 m².

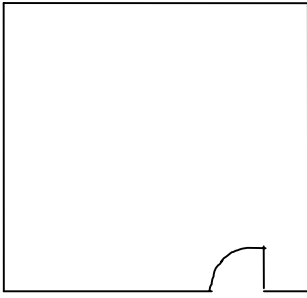


Fig. 6. Small shop, only one door leading directly into the street.

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.

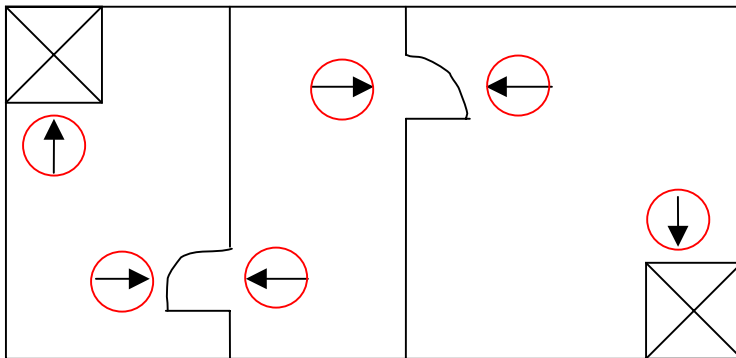


Fig. 7. Premises that require two escape routes.

3.3 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.

Performance requirements

The premises shall be provided with signs in such a way that satisfactory evacuation can take place in the event of fire. The need for guidance signs shall be assessed in view of

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

Construction

A guidance sign shall be rectangular or square in shape. The sign shall have a green background with white symbols. A sign that is only photoluminescent is not acceptable.

The size of the sign depends on whether it is translucent or illuminated. 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.

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. In addition, the signs shall be provided with emergency power via a central or local battery or a standby power plant.

The power supply shall be protected from fire for 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.

Siting

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.

Examples

The examples of signing given below shall be regarded as the minimum requirement based on legislation. Addition of further signs may be required to satisfy the performance requirement.

Guidance signs shall be provided at all doors and at all changes in direction.

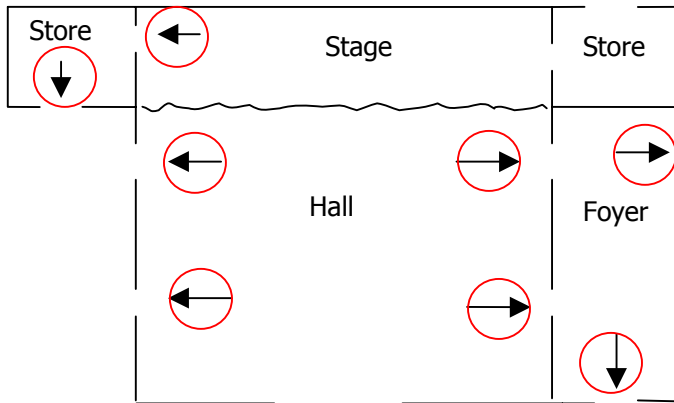
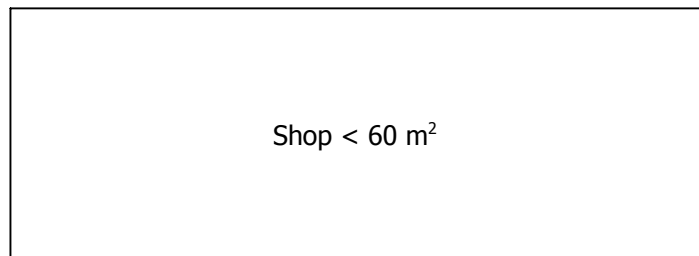


Fig. 8. Place of assembly.



← Circulation route in indoor shopping →

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 need not normally be provided with guidance signs.

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The circulation route shall be provided with guidance signs. A sign may be a substitute for the requirement for emergency lighting in the shop.

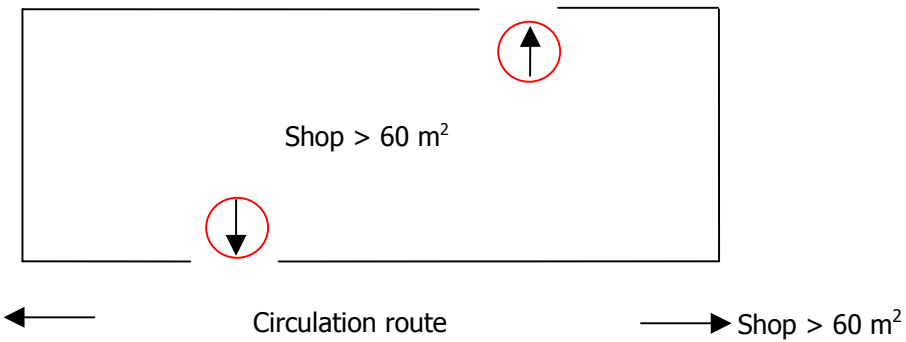


Fig. 10. Large shop > 30 persons (ca 60 m² net customer area or larger) with requirement for escape facilities at the rear in indoor shopping centre for more than 150 persons.

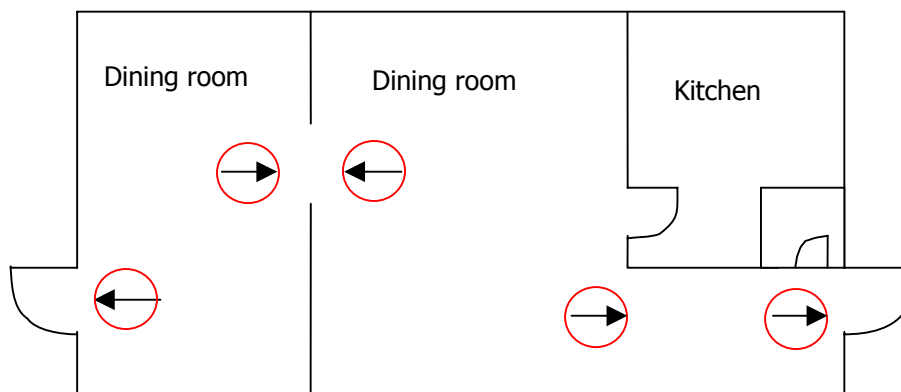


Fig. 11. Restaurant.

The main entrance need not normally 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.

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For public events such as concerts, theatre performances or similar, the main entrance must also be signed. Further signs may be required.

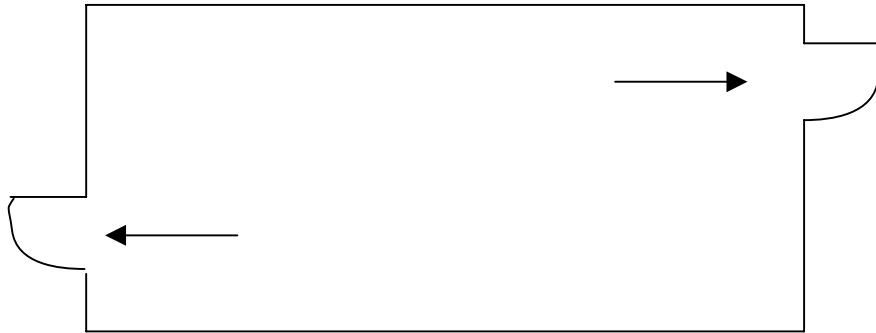


Fig. 12. Auditorium > 150 persons.

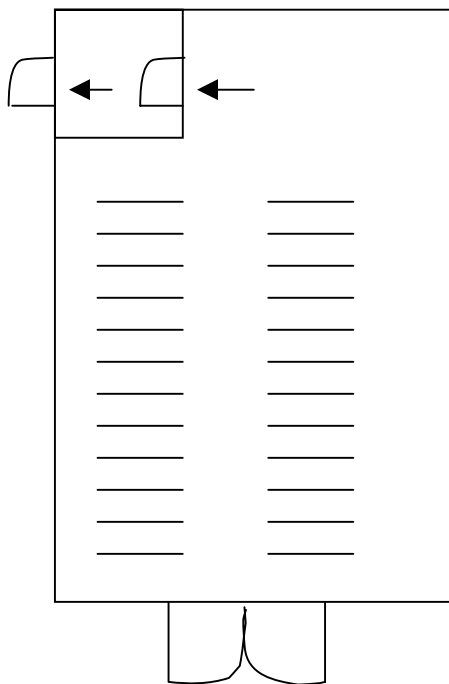


Fig. 13. Church or other building of architectural or historical interest, with simple escape conditions.

3.4 Schools and educational premises

Schools, educational premises and similar premises.

Performance requirements

The premises shall be provided with signs in such a way that satisfactory evacuation can take place in the event of fire. The need for guidance signs shall be assessed in view of

- the risk of fire
- the number of persons to be evacuated
- the risk of lighting failure
- whether or not the premises have daylight
- the type of activity.

Construction

A guidance sign shall be rectangular or square in shape. The sign shall have a green background with white symbols.

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.

$$A \geq \frac{L^2}{2000}$$

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.

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Lighting for translucent or illuminated signs should be supplied by a separate circuit or it should be provided with an emergency power supply via a central or local battery.

Photoluminescent signs are to be illuminated by general lighting.

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.

Siting

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.

Examples

The examples of signing given below shall be regarded as the minimum requirement based on legislation. Addition of further signs may be required to satisfy the performance requirement.

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 are to be signposted in the same way as workplaces, in accordance with Fig. 1-5

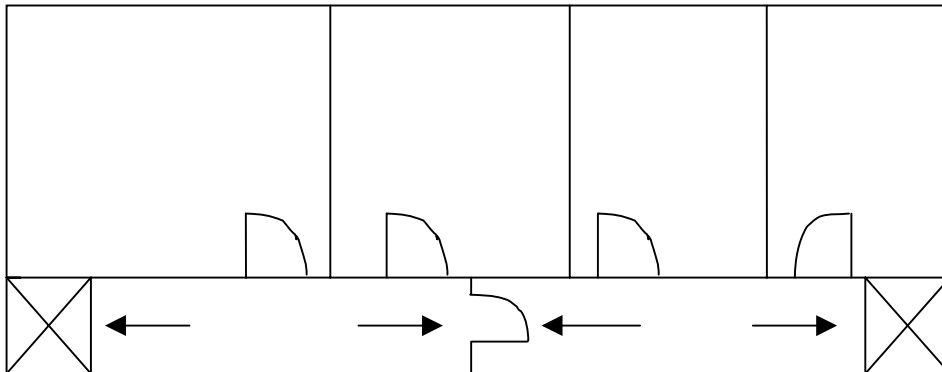


Fig. 14. Educational premises with escape through the corridor.

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.

3.5 Hotels

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

Performance requirements

The premises shall be provided with signs in such a way that satisfactory evacuation can take place in the event of fire. The need for guidance signs shall be assessed in view of

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

Construction

A guidance sign shall be rectangular or square in shape. The sign shall have a green background with white symbols.

The size of the sign depends on whether it is translucent or illuminated. It is essential that the sign should be easy to read. In order to achieve this, signs should have the following sizes. Photoluminescent signs on their own are not acceptable.

- 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 symbols on any of the signs should not be less than 60 mm.

The lighting for translucent or illuminated signs shall be provided with emergency power via a central or local battery or standby power plant.

The power supply shall be protected from fire for 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.

Siting

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 corridors.

Examples

The examples of signing given below shall be regarded as the minimum requirement based on legislation. Addition of further signs may be required, depending on the size of sign and reading distance, in order to satisfy the performance requirement.

Guideline No 5:2003

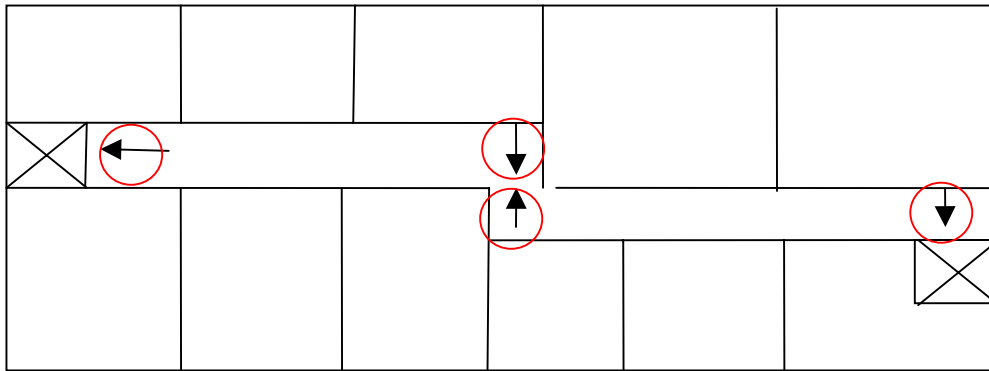


Fig. 16. Hotel corridor

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

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.

Performance requirements

The premises shall be provided with signs in such a way that satisfactory evacuation can take place in the event of fire. The need for guidance signs shall be assessed in view of

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

Construction

A guidance sign shall be rectangular or square in shape. The sign shall have a green background with white symbols.

The size of the sign depends on whether it is translucent or illuminated. 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.
- Photoluminescent signs on their own are not acceptable.

The size of symbols on any of the signs should not be less than 60 mm.

The lighting for translucent or illuminated signs shall be provided with emergency power via a central or local battery or standby power plant.

The power supply shall be protected from fire for 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.

Siting

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 corridors.

Examples

The examples of signing given below shall be regarded as the minimum requirement based on legislation. Addition of further signs may be required, depending on the size of sign and reading distance, in order to satisfy the performance requirement.

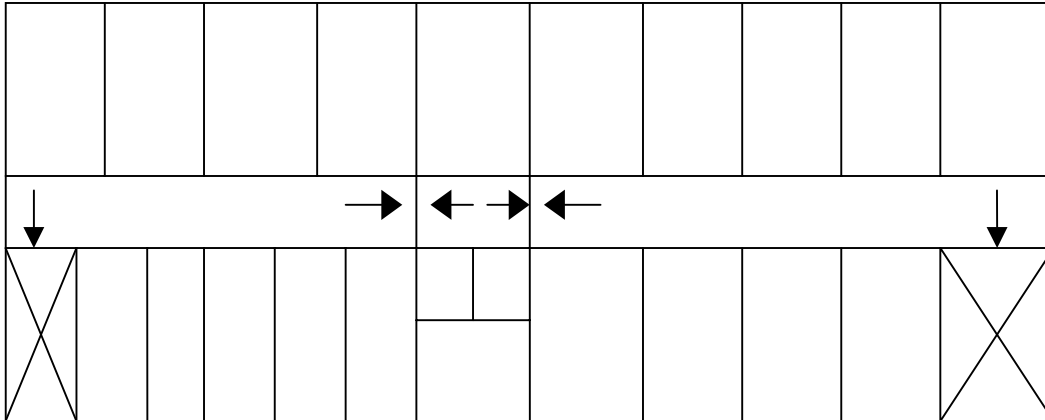


Fig. 17. Two wards with a lobby between the wards.

All doors in the corridor leading to the escape route and to adjoining wards are to be provided with guidance signs.

3.7 Garages

Garages or similar premises for the parking of vehicles.

Performance requirements

The premises shall be provided with signs in such a way that satisfactory evacuation can take place in the event of fire. The need for guidance signs shall be assessed in view of

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

Construction

A guidance sign shall be rectangular or square in shape. The sign shall have a green background with white symbols. Photoluminescent signs on their own are not acceptable.

- The size of the sign depends on whether it is translucent or illuminated. 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 symbols on any of the signs should not be less than 60 mm.

The lighting for translucent or illuminated signs shall be provided with emergency power via a central or local battery or standby power plant. In a garage smaller than 600 m², the signs can be supplied by a separate circuit as an alternative to an emergency power supply.

Siting

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. Irrespective of where in the garage a person is situated, it should be possible to see at least one sign within a radius of 5 m.

Examples

The examples of signing given below shall be regarded as the minimum requirement based on legislation. Addition of further signs may be required, depending on the size of sign and reading distance, in order to satisfy the performance requirement.

Guideline No 5:2003

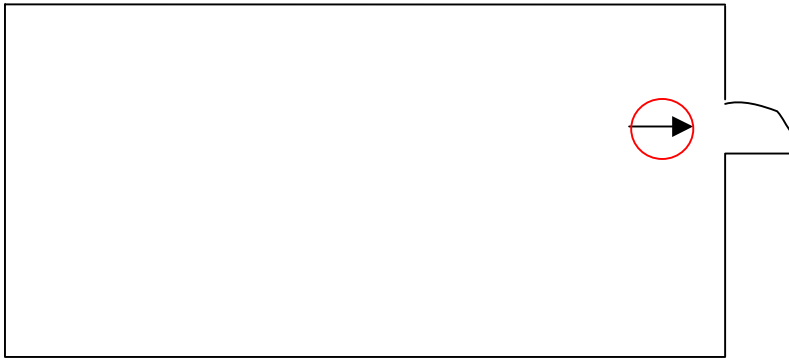


Fig. 18. Small garage with only one escape route, i.e. a travel route no longer than 30 m to doors leading to the external air.

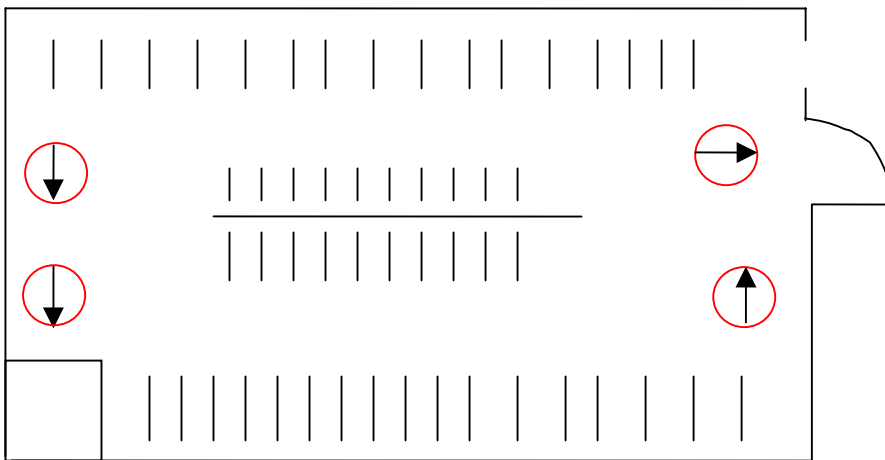


Fig. 19. Large garage with two or more escape routes.

The doors are to be provided with guidance signs. Additional signs are normally required to ensure that satisfactory evacuation can take place.

3.8 Stairways

Performance requirements

The premises shall be provided with signs in such a way that satisfactory evacuation can take place in the event of fire. The need for guidance signs shall be assessed in view of

- the familiarity with the layout of the premises of the escaping persons
- the number of persons to be evacuated
- the risk of lighting failure
- whether or not the premises have daylight
- the type of activity.

Construction

A guidance sign shall be rectangular or square in shape. The sign shall have a green background with white symbols.

- The size of the sign depends on whether it is translucent or illuminated. It is essential that the sign should be easy to read.

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

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

For all hotels, health care premises, places of assembly and garages larger than 600 m² 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.

For public premises for ≤ 150 persons, educational premises, schools and garages smaller than 600 m², lighting shall be supplied by a separate circuit or provided with an emergency power supply via a central or local battery.

Photoluminescent signs are to be illuminated by general lighting.

Siting

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 to the external air, or similar height 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.

Examples where the persons are not familiar with the layout of the premises of the escaping persons

This is the case, for instance, in a stairway that is used only for escape from a workplace or public premises.

The examples of signing given below shall be regarded as the minimum requirement.. Addition of further signs may be required to satisfy the performance requirement.

Where the persons are not familiar with the layout of the stairway, the stairway shall be provided with guidance signs.

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- When the entrance on the ground floor is not glazed, unless this is evidently unnecessary.
- When the change in direction is not evident or when the stairs narrow down in a complicated manner.
- When dark premises are evacuated via light or dark stairways.
- When the normal entrance/exit should not be used but a special exit shall be used.
- When the direction of escape leads upwards.
- When the stairway has no daylight on each storey.

Examples where the persons are familiar with the layout of the premises of the escaping persons

This is the case, for instance, in a stairway that is used daily at a place of work. Where the persons are familiar with the layout of the stairway, the stairway shall be provided with guidance signs.

- When the entrance on the ground floor is not glazed, unless this is evidently unnecessary.
- When the change in direction is not evident or when the stairs narrow down in a complicated manner.
- When the normal entrance/exit should not be used but a special exit shall be used.

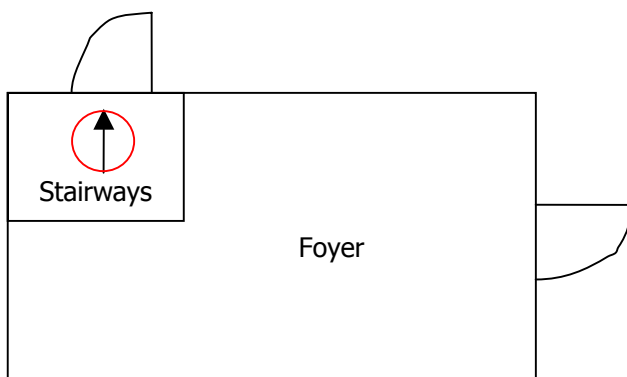


Fig. 20. Stairway where the normal exit is across a corridor/reception and a door to the external air. The emergency exit is via a door directly to the external air.

4 Emergency lighting

The purpose of emergency lighting is to enable satisfactory escape to take place in spite of the failure of the power supply. The requirement for emergency lighting has no direct coupling to escape in the event of fire. However, certain emergency lighting designs can enhance the reliability of lighting even in conjunction with escape in the event of fire. One example of this is the use of luminaires provided with local batteries.

Emergency lighting is normally required in escape routes from hotels, places of assembly and health care premises. In places of assembly emergency lighting is also required inside the premises and directly outside the exits to the external air.

In workplaces also, electric emergency lighting is required in main stairways and similar stairways that are used daily, have no daylighting and are situated in buildings that are taller than three storeys and/or deeper than one basement storey.

Emergency lighting is further required in stairways in all buildings that are taller than eight storeys.

The requirement for emergency lighting in buildings can generally be regulated by national rules. Special national rules for emergency lighting in workplaces may also affect the requirement for emergency lighting.

Design of emergency lighting

In designing emergency lighting systems, all factors that reduce the illumination during the service life of the installation shall be taken into consideration. Examples of these are voltage drops, the ageing and soiling of light sources.

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.

Central and local batteries have both advantages and drawbacks.

The advantages of a local battery 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 drawback of a local battery is:

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

The advantage of a central battery is:

- 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.

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The drawbacks 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 to 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.

Filament lamps should not be used in emergency lighting owing to their low reliability.

Emergency power luminaires shall not have glow starters. They shall be ignited via permanently installed electrical starters.

4.1 Hotels

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

Performance requirements

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

Construction

The luminous intensity provided by emergency lighting shall be at least 1 lux on the floor surface with the worst illumination for a period of at least 60 minutes.

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.

Emergency lighting in the form of photoluminescent lines/signs is not acceptable.

Siting

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.

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.

4.2 Health care installations

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

Performance requirements

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

Construction

The luminous intensity provided by emergency lighting shall be at least 1 lux on the floor surface with the worst illumination for a period of at least 60 minutes.

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

Emergency lighting in the form of photoluminescent lines/signs is not acceptable.

Siting

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 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 external air, shall be provided with emergency lighting.

Performance requirements

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

Construction

The luminous intensity provided by emergency lighting shall be at least 1 lux on the floor surface with the worst illumination for a period of at least 60 minutes.

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.

Emergency lighting in the form of photoluminescent lines/signs is not acceptable.

Siting

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.

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

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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.

4.4 Stairways in buildings of more than 8 storeys

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

Performance requirements

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

Construction

The luminous intensity provided by emergency lighting shall be at least 1 lux on the floor surface with the worst illumination for a period of at least 60 minutes.

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.

Emergency lighting in the form of photoluminescent lines/signs is not acceptable.

Siting

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.

4.5 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 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 lighting in order to satisfy this requirement.

Depending on whether the stairway is dark or provided with windows to the external air, 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 lighting. Stairways with daylight need to be provided with emergency lighting in buildings that are taller than eight storeys.

Performance requirements

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

Construction

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

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. Emergency lighting in the form of photoluminescent lines is not acceptable.

Siting

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.

4.6 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.

Performance requirements

The workplaces shall be provided with emergency 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.

Construction

The luminous intensity provided by emergency lighting shall be at least 1 lux on the floor surface with the worst illumination for a period of at least 60 minutes.

Emergency supply shall be arranged via a central or local battery.

Emergency lighting in the form of photoluminescent lines/signs is not acceptable.

Siting

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

Examples of general lighting

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 European guideline

Guideline No 1:2002 - Internal Fire Protection Control

Guideline No 2:2002 - Panic & emergency exit devices

Guideline No 3:2003 - Certification of thermographers

Guideline No 4:2003 - Introduction to Qualitative Fire Risk Assessment