

# European guideline



**CFPA**EUROPE

*Fire protection documentation*

## **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 in Europe (CFPA E) has the aim to facilitate and support fire protection work in the European countries.

The market imposes new demands for quality and safety. Today fire protection forms an integral part of a modern strategy for survival and competitiveness.

The guideline is primarily intended for those responsible for safety in companies and organisations. It is also addressed to the rescue services, consultants, safety companies etc so that, in the course of their work, they may be able to help companies and organisations to increase the levels of fire safety.

The proposal of this guideline has been produced by the Swedish Fire Protection Association and the author is Lars Rang from Sweden.

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

Zurich,

CFPA Europe, 15 November 2006

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## **1 Introduction**

The aim of this guideline is to give a simple and accessible description of what fire protection documentation should look like. Fire protection documentation should be drawn up by a fire consultant or some other fire engineering expert. The fire protection measures should be shown on special drawings, fire drawings. The fire protection documentation supplements and summarises the information set out on the drawings.

The intention is that the fire protection documentation should be continually updated and changed as design proceeds. Fire protection documentation is an important tool in coordinating the fire protection issues associated with a construction project among the groups of consultants involved. (These may include the architect, structural designer, building services consultant, electrical consultant, etc).

A fire protection document should be drawn up prior to the start of construction to describe the building to be constructed. When the building has been finished, the documentation must be reviewed to ensure that its contents correspond with the final result. The fire protection documentation should be continually updated, both when changes are made during construction and when changes occur after the building had been completed.

The fire protection documentation also forms a basis for the supervision and maintenance performed by the owner or user of the building. Using a well-designed fire protection document, the user can easily understand how the fire protection of the building is arranged and how it is to work. In the same way, it will provide help during official inspections.

The fire protection documentation will also be helpful in showing how fire protection is affected by changes to the work carried out in the building or by alterations in the building's layout.

Those who draw up the fire protection documentation usually assume responsibility for the overall fire protection strategy and general design, while technical consultants are responsible for detailed solutions. The fire protection documentation should be signed by the author who assumes responsibility that the solutions presented comply with the requirements set out in the applicable regulations.

Fire protection documentation should always be subjected to a quality audit by a third person of the appropriate qualifications.

In relation to alterations or modernisation measures, the fire protection documentation should cover all the affected parts of the building. Affected parts are the fire compartments and associated escape routes which are involved in the alterations. The fire protection documentation should clearly show the affected parts and set out what consequences the alterations will have.

When alterations are undertaken which have only a minor effect on the fire protection, it is not necessary to draw up a full fire protection document. In such cases, examination of the drawings and a brief fire engineering report by a fire protection professional will be satisfactory.

## **2 The contents of the fire protection documentation**

Fire protection documentation should set out the conditions governing fire protection measures and the design of the fire protection. Examples of the appropriate structure and contents of a fire protection document are given in the following sections.

Fire protection documentation should describe either the minimum acceptable level, or the actual construction, of fire protection measures; both these are acceptable.

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At the start of a project, the fire protection documentation can be seen as a guide for the other engineering consultants in choosing layout and systems. The further the project proceeds, the more detailed and descriptive the fire protection documentation can be made. When the project is completed, a final document should be drawn up which describes the fire protection as constructed in the building.

### 2.1. Headings

Typically, the contents/headings of the fire protection documentation should include:

- Introduction
- Description of the building
- Other design conditions
- Minor deviations and alternative designs
- Escape in the event of fire
- Protection against the spread of fire inside a fire compartment
- Protection against the spread of fire and fire gases between fire compartments
- Protection against the spread of fire between buildings
- Air handling installations
- Heat producing appliances
- Loadbearing capacity in the event of fire
- Fire fighting facilities
- Fire protection installations
- Other fire protection installations
- Inspection and maintenance schedule
- Drawings
- Appendix

### 2.2. Introduction

The aim of the introduction is to provide brief information as to which person and company has drawn up the fire protection documentation, what building it refers to, what type of construction measures must be taken, and the data which formed the basis for the documentation.

***A description should be given of the following***

- Author of the fire protection documentation
- Person or company who has commissioned the fire protection documentation
- Date of the fire protection documentation and dates of revisions
- Building regulations, recommendations etc which the building complies with
- Property registration number
- Person or company who has commissioned the building
- Does the project comprise a new building, an extension to a building, or alterations to an existing building?
- A list of drawings with drawing numbers, dates, and dates of revisions
- A list of other descriptions

Note: Remember to write the date or the date of revision and page number on every page in the fire protection documentation.

### 2.3. Description of the building

A brief description of the building – number of storeys, type of building, activity conducted, its location on the site and a description of the nearby area.

It is best to show the situation of the building on a site plan and to refer to this.

The activity conducted in the buildings should be described briefly so that the assessments made in the following sections should be easy to understand.

***Suggested information:***

- Location of building on the site
- Number of storeys, basement and attic
- Activity in the building
- Fire resistance class
- Short technical description of the building's construction

### 2.4. Other design conditions

Special conditions which have a significance for the design of fire protection measures should be set out here. The conditions to be described under this heading are the fundamental design conditions.

***A description should be given of the following other design conditions:***

- The number of people for which the building, assembly areas etc is intended
- The kind of activity for which the building is constructed
- Ability and resources (attendance time) of the fire and rescue service
- Average fire load intensity  $f_1$  (MJ/m<sup>2</sup>)
- Highest local fire load intensity  $f_2$  (MJ/m<sup>2</sup>)
- Special hazards such as flammables and explosives
- Technical or other measures to be taken to achieve a standard higher than demanded by regulations
- Special requirements, e.g. a risk analysis

### 2.5. Minor deviations and alternative design

*Minor deviations* are deviations that may be permitted if necessitated by special reasons, provided that the building is nevertheless satisfactory from a fire engineering standpoint and no appreciable inconvenience is caused in any other respect. The appropriate authority should be consulted.

The term *alternative design* refers to the case when the building is equipped with fire engineering installations over and above those required by the authorities; these demand special investigation and verification that the total fire protection of the building is not inferior to what it would have been if all the regulatory requirements had been complied with.

In the event of an alternative design, the reason, limitations and substitute functions should be described. Reference should be made to the special investigation, which should be appended to the fire protection documentation.

## **2.6. Escape in the event of fire**

The overall escape strategy should be described here. This should comprise a brief description of the escape routes, whether these go via stairs, corridors, windows or doors, another fire compartment, directly out into the open, via an access balcony, or to a place of safety. If escape requires the assistance of the rescue service, this is to be specified here.

In addition to this, information should be given concerning the number of escape routes, the unobstructed width of the escape routes, travel distances and the siting of the escape routes in the building. If the doors to escape routes are lockable/interlocked, the type of locking function or interlock should be described.

If a simplified design method is used in designing the escape routes, the assumptions must be set out.

Where analytical design is used, this must be stated here, but its description must be given under the heading, Appendices. The design model and the check on the design, if any, must be described.

The types of guidance signs and emergency lighting must be described here.

### ***A description should be given of the following:***

- Organisation
- Whether escape requires the assistance of the rescue service
- Escape strategy
- Access to escape routes
- Spaces in the building classified as escape routes
- Types of stairways
  - a stairway which is constructed so that it prevents the spread of fire and fire gases to the stairway for not less than 60 minutes
  - a stairway which is constructed so that it limits the spread of fire and fire gases to the stairway for not less than 60 minutes
  - other stairways
- Travel distance to an escape route
- Travel distance along an escape route
- Doors in escape routes
  - panic or emergency exit devices
  - door closers
  - whether doors are outward or inward opening
  - width and height
  - intruder protection locking
- Guidance signs for escape
- Emergency lighting
- General lighting
- Escape alarm

## **2.7. Protection against the spread of fire inside a fire compartment**

Describe surface finishes and their backing materials, pipe insulation classes and floor coverings in escape routes and other premises. A description must also be given here of the structures enclosing secondary fire compartments, e.g. the separating structures for private rooms, smoking rooms and day rooms in hospital wards.

***A description should be given of the following:***

- Surface finishes and claddings in escape routes
- Surface finishes and claddings in other premises
- Pipe insulation class in escape routes
- Pipe insulation class in other premises
- Floor coverings in escape routes
- Floor coverings in other premises

## **2.8. Protection against the spread of fire and fire gases between fire compartments**

The fire protection documentation shall describe the principles governing the division of the building into fire compartments. Measures to prevent or delay the spread of fire through weak points such as windows and facades, and to prevent the spread of fire or fire gases via lift shafts, shall be described.

Measures to limit or prevent the spread of fire or fire gases via the air handling installation shall be described in the "Ventilation" section.

Compartmentation and the fire resistance classes of e.g. walls, floors and doors shall be clearly described on drawings. If details of E Class are used, this shall be stated here and if necessary verified under the heading "Verification".

If there is an element of structure whose fire resistance characteristics are not generally known, the construction of the element should be shown on a drawing and/or described.

***A description should be given of the following:***

- Division into fire compartments
- Fire resistance class of structural and non-structural elements separating fire compartments (walls, doors, windows, floors and shafts)
- Fire resistance class of roof lantern
- External walls and roof covering if a roof situated at a lower level
- Spread of fire or fire gases to other fire compartments from or via the lift shaft or other shaft
- Fire protection construction of windows in external walls which face one another
- Fire protection construction of glazed balconies or access balconies, and glazed patios
- Fire protection construction of external walls
- Division into fire compartments of attics and ceiling voids

## **2.9. Protection against the spread of fire between buildings**

The measures taken to prevent or delay the spread of fire to other buildings are to be described here. If calculations have been made for radiation levels, this should be stated here and a reference made to "Verification".

A reference should also be made to fire drawings and the site plan.

***A description should be given of the following:***

- Distance between buildings
- Compartmentation of large buildings
- Fire walls
- Roof covering
- External walls covering

## 2.10. Air handling installations

The ventilation installed in the building should be briefly described.

The function of the installation in the event of fire should also be described and, as appropriate, the fire engineering solutions or installations such as dampers, detectors, alarms, special fire gas ventilation shafts, fans running during a fire, etc.

***A description should be given of the following:***

- Type of system
- Strategy: to prevent, considerably impede or limit the spread of fire gases between fire compartments
- Method of protection against the spread of fire
- Fire resistance class of ventilation ducts
- Method of protection against the spread of fire gases
- Emergency stop button for the ventilation system
- Fire protection construction of plant rooms and shafts
- Method of suspension of ventilation ducts
- Operating system of the air handling installation
- The principle of fire detection
- Fire protection construction of kitchen flues

## 2.11. Heat producing appliances

If the heat producing appliances have a significant influence on fire protection, they are to be described here together with the fire protection measures taken. In other cases, only the type of heating, e.g. district heating, is to be stated.

If the appliances require fuel, such as wood, oil or similar, the fuel store and its fire resistance shall be described and its details shown on a drawing.

***A description should be given of the following:***

- What heat-producing appliances are installed
- Fire resistance class of boiler rooms and fuel rooms
- Fire protection construction of heat producing appliances
- Fire protection construction of flues for solid, liquid and gaseous fuel

## 2.12. Loadbearing capacity in the event of fire

A simple technical description should be given of the loadbearing structure of the building, including the structures for mezzanine floors, balconies, access balconies, eaves and stairs.

If there are elements of structure whose fire engineering characteristics are not generally known, the construction of these elements should be shown on a drawing and/or described. Type approval, test certificate or analytical design shall be described in the section "Appendices".

***A description should be given of the following:***

The fire resistance classes of

- The vertical loadbearing structure and the horizontal structure which provides stability for the structural frame
- Horizontal structure which does not provide stability
- Roof construction
- Balconies
- Access balconies
- Mezzanine floors
- Stairs

## **2.13. Fire fighting facilities**

A description should be given here of the capabilities and resources (attendance time) of the rescue service, internal and external access routes, their nature and siting in the building and its surroundings. Access routes to basements, attics and roofs, and the facilities for fire fighting in these, should also be described here, as well as hard-standings for the vehicles of the rescue service and rescue roads, if any.

Water supply in the form of fire ponds, fire hydrants on the ground or in the facade, and all other appliances which facilitate water supply in the event of fire should be described here. A brief description should also be given of arrangements for manual fire fighting, such as internal fire hydrants and portable fire extinguishers. An outline description should be given of any fire gas ventilation. A more detailed description should be given in the "Fire protection installations" section.

***A description should be given of the following:***

- In-house fire brigade
- Capability and resources (attendance time) of the fire and rescue service
- Access routes for the rescue service
  - attics and roofs
  - basements
  - doors
- Fire gas ventilation
  - basements
  - attics
  - stairways
- Firefighters' lift (A lift which, in the event of fire, can be used only by the rescue service personnel for fire fighting and escape)
- Equipment for manual fire fighting
  - internal fire hydrants
  - rising mains for water supply
  - fire ponds
  - fire hydrants
  - fire extinguishers
- Access for the rescue service
  - rescue roads
  - signs
  - sizes of hardstandings

For some types of objects, the facilities for action by the rescue service are very restricted unless special measures are taken. These measures should be described on drawings and, if appropriate, be appended to this section.

***Examples of such objects:***

- Buildings with more than one basement
- Buildings of more than eight storeys
- Buildings inside courtyards
- Tunnels
- Buildings over courtyards or streets
- Objects with long attendance times
- High-rack storage buildings
- Buildings housing activities that present a fire hazard

## **2.14. Fire protection installations**

Fire protection installations may be manual or automatic. Examples of such installations are fire gas ventilation, extinguishing systems, fire alarms, escape alarms, fire detectors and positive pressure ventilation.

Fire protection installations can be set out on drawings which show e.g. the siting of fire gas vents, control devices, alarm buttons, the fire alarm control panel and sprinkler control centre. The overriding requirement for each type of installation shall be described in the fire protection documentation.

If the installation supersedes or augments other fire protection measures, this should be stated in the "Minor deviations and alternative design" section. The purpose of the installation should also be stated, i.e. whether the installation provides protection for the building or persons, or whether the installation is essential for the attendance of the rescue service.

***A description should be given of the following:***

- Automatic water sprinkler installation (or other fixed fire extinguishing system)
  - purpose and extent
  - rules governing installation
  - any deviations from these rules
  - risk classification
  - maximum permissible storage height
  - type of sprinkler
  - RTI value of sprinkler head
  - position of sprinkler control centre
  - type of water supply
  - results of capacity test
  - design flow and pressure
  - control signals from activated sprinklers
  - communication link to rescue service
  
- Fire gas ventilation
  - purpose and extent
  - design method
  - thermal/mechanical
  - free area of fire gas vent
  - free area of air inlet
  - design of openable panels
  - opening function and control device
  - siting of inlet openings and fire gas vents
  - discharge coefficient,  $C_v$
  - power supply
  - flame and smoke screens

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- fire protected cables and motors
- protection against negative wind effects
- volume flow rate of fans
- temperature requirements
  
- Automatic fire alarm installation
  - purpose and extent
  - rules governing installation
  - any deviations from these rules
  - type of detectors
  - siting of detectors
  - site of the fire alarm control centre
  - siting of fire protection control panels
  - connection to rescue service
  - monitoring of alarm
  - transmission of alarm
  - transmission delay unit
  - alarm organisation at the object
  - control functions from the fire alarm
  
- Escape alarm installation
  - purpose and extent
  - rules governing installations, any deviations from these rules
  - area of coverage
  - method of activation (manual or automatic/manual)
  - type and extent of detection system
  - siting of alarm buttons
  - selection function for escape alarm
  - control functions from the escape alarm
  - signal character
  - required audibility and, if applicable, intelligibility
  - standby power
  - fire protected cable, types of fire protection for cables to alarm device
  - alarm organisation
  
- Positive pressure ventilation of stairways
  - purpose and extent
  - design method
  - positive pressure
  - vents
  - control
  - ease of opening of doors
  - verification of pressure
  - power supply
  
- Smoke alarm
  - purpose and extent
  - type/number
  - area monitored
  - series connection

Maintenance of performance and emergency power supply of the above mentioned fire protection systems (duration, kind of additional power supply, etc.)

## 2.15. Other fire protection installations

Details can be given here of e.g. fire protection requirements for lift installations, inter alia measures to ensure that critical conditions do not arise in lift cars in the event of fire in the lift machinery.

## 2.16. Inspection and maintenance schedule

The fire protection documentation should describe the plans for inspection and maintenance during operation. Operating and maintenance instructions may be appended to the user documentation after completion of the building and the fire protection installations.

### *Example of operating and maintenance instructions*

- Ventilation ducts
- Emergency lighting
- Guidance signs for escape
- Fire alarm installation
- Escape alarm installation
- Fire protection system
- Equipment for manual fire fighting
- Fire gas ventilation
- Doors and door furniture
- Fire compartments

## 2.17. Drawings

Drawings should be appended to the fire protection documentation, but for certain objects it may be sufficient to refer to a special set of drawings. Always quote the drawing number and the date of latest revision.

In order to facilitate reading and use of the fire protection documentation, drawings should be A4 or A3 in size and to an appropriate scale.

### *Examples of drawings:*

- layout plan
- floor plans
- cross sections
- fire protection plans
- classification of hazardous areas

## 2.18. Appendices

### *Examples of other documents which should be included in the fire protection documentation:*

- calculations
- minutes
- inspection reports
- investigations
- operating and maintenance instructions
- certificates

### **3 European guidelines**

- Guideline No 1:2002 - Internal fire protection control
- Guideline No 2:2007 - Panic & emergency exit devices
- Guideline No 3:2003 - Certification of thermographers
- Guideline No 4:2003 - Introduction to qualitative fire risk assessment
- Guideline No 5:2003 - Guidance signs, emergency lighting and general lighting
- Guideline No 6:2004 - Fire safety in residential homes for the elderly
- Guideline No 7:2005 - Safety distance between waste containers and buildings
- Guideline No 8:2004 - Preventing arson – information to young people
- Guideline No 9:2005 - Fire safety in restaurants
- Guideline No 10:2007 - Smoke alarms in the home
- Guideline No 11:2005 - Number of fire protection trained staff
- Guideline No 12:2006 - Fire safety basics for hot work operatives
- Guideline No 13:2006 - Fire protection documentation
- Guideline No 14:2007 - Fire protection in information technology facilities
- Guideline No 15:2007 - Fire safety in guest harbours and marinas