1. Purpose and scope of Interpretative document No. 2


(2) Article 3 of the Directive stipulates that the purpose of the Interpretative Documents is to give concrete form to the essential requirements for the creation of the necessary links between the essential requirements set out in Annex I to the Directive and the mandates for the preparation of harmonized standards and guidelines for European technical approvals or the recognition of other technical specifications within the meaning of Articles 4 and 5 of the Directive.

Where considered necessary, the provisions of this Interpretative Document will be further specified in each particular mandate. In drafting the mandates, account will be taken, if necessary, of the other essential requirements of the Directive, as well as of other relevant Directives concerning construction products.

(3) This Interpretative Document deals with the aspects of the works where "Safety in case of fire" may be concerned. It identifies products or product families and characteristics relating to their satisfactory performance.

For each intended use of the product, the mandates will indicate in further detail which of those characteristics shall be dealt with in the harmonised specifications, using a step by step procedure with CEN/ CENELEC/ EOTA, which will allow the product characteristics to be modified or complemented, if necessary.

Annex I to the Directive gives the following definition of the essential requirement which is applicable when and where the works are subject to regulations containing such a requirement:

"The construction works must be designed and built in such a way that in the event of an outbreak of fire:

- the load-bearing capacity of the construction can be assumed for a specific period of time,
- the generation and spread of fire and smoke within the works are limited,
- the spread of fire to neighbouring construction works is limited,
- occupants can leave the works or be rescued by other means,
- the safety of rescue teams is taken into consideration."

(4) In accordance with the Council Resolution of 7 May 1985 (New Approach) and the preamble to the Directive, this interpretation of the essential requirement is intended not to reduce the existing and justified levels of protection for works in the Member States.
2. Levels or classes for essential requirements and for related product performances

1 Where differences specified in Article 3(2) of the Directive are identified and justified in conformity with Community law, classes for essential requirements and for related product performances may be necessary. The purpose of such classes is to achieve the free circulation and free use of construction products.

In this case such classes shall be determined either in the interpretative document or according to the procedure provided for in Article 20(2)(a) of the Directive. Where through this procedure a classification of product performance is identified as the means of expressing the range of requirement levels of the works, the Commission will within the mandate request CEN, CENELEC or EOTA to make the appropriate proposal.

The range of requirement levels covered by the classes depends on the existing and justified levels encountered in Member States.

In cases where a Member State determines in conformity to Article 6(3) of the Directive among the classes only one or some classes to be observed in its territory (or part of it), it shall do so only on the basis of the differences specified in Article 3(2) of the Directive.

2 Where justified differences specified in Article 3(2) of the Directive are not identified, classes (or levels) of product performances may also be used by the standardizers as a means of convenience for specifiers, manufacturers and purchasers. For certain products, classes (or levels) make it easier to use the standard to relate product performance to its intended use.

Such performance classes (or levels) for products may with reference to Article 4(1) of the Directive therefore be established by the standardizers who will keep the Commission and the Standing Committee informed of the ongoing work on this matter in the framework of the execution of mandates.

3 Each time classes are defined for works or for products, it is necessary to set up a class called "no performance determined" when and where at least one Member State has no legal requirement at all in that field.

3. Meaning of the general terms used in the Interpretative documents

3.1 Construction works

Construction works means everything that is constructed or results from construction operations and is fixed to the ground. This term covers both buildings and civil engineering works. In the Interpretative Documents "construction works" are also referred to as the "works". Construction works include for example: dwellings; industrial, commercial, office, health, educational, recreational and agricultural buildings; bridges; roads and highways; railways; pipe networks; stadiums; swimming pools; wharfs; platforms; docks; locks; channels; dams; towers; tanks; tunnels; etc.

3.2 Construction products
(1) This term refers to products which are produced for incorporation in a permanent manner in the works and placed as such on the market. The terms "construction products" or "products", where used in the Interpretative Documents, include materials, elements and components (single or in a kit) of prefabricated systems or installations which enable the works to meet the essential requirements.

(2) Incorporation of a product in a permanent manner in the works means:

- that its removal reduces the performance capabilities of the works; and
- that the dismantling or the replacement of the product are operations which involve construction activities.

3.3 Normal maintenance

(1) Maintenance is a set of preventive and other measures which are applied to the works in order to enable the works to fulfil all its functions during its working life. These measures include cleaning, servicing, repainting, repairing, replacing parts of the works where needed, etc.

(2) Normal maintenance generally includes inspections and occurs at a time when the costs of the intervention which has to be made are not disproportionate to the value of the part of the works concerned, consequential costs being taken into account.

3.4 Intended use

The intended use of a product refers to the role(s) that the product is intended to play in the fulfilment of the essential requirements.

3.5 Economically reasonable working life

(1) The working life is the period of time during which the performance of the works will be maintained at a level compatible with the fulfilment of the essential requirements.

(2) An economically reasonable working life presumes that all relevant aspects are taken into account, such as:

- costs of design, construction and use;
- costs arising from hindrance of use;
- risks and consequences of failure of the works during its working life and costs of insurance covering these risks;
- planned partial renewal;
- costs of inspections, maintenance, care and repair;
- costs of operation and administration;
- disposal;
- environmental aspects.

3.6 Actions

Actions which may affect the compliance of the works with the essential requirements are brought about by agents acting on the works or parts of the works. Such agents include mechanical, chemical, biological, thermal and electro-magnetic agents.
3.7 Performance

Performance is a quantitative expression (value, grade, class or level) of the behaviour of a works, part of the works or product, for an action to which it is subject or which it generates under the intended service conditions (for the works or parts of works) or intended use conditions (for products).

4. Explanation of the essential requirement "Safety in case of fire".

4.1 Introduction to Fire Requirements

Fire safety requirements constitute a vital part of the regulations for works in the EEC countries. Fire safety in construction works includes requirements on the layout of buildings and on the performance of structures, building products, services and installations, and fire safety installations under fire conditions.

Such requirements are normally formulated for a number of occupancies, such as dwellings, hotels, assembly rooms, offices, industrial premises etc., taking into account the specific occupant risk and the specific fire risk.

4.2 Fire Safety Strategy

Fire safety objectives deal with the items given in the definition of the essential requirement - see "purpose and scope".

An important part of the strategy is to minimize the occurrence of fires (fire prevention) but the scope of this document cannot cover all the relevant factors, such as, for example, fire safety management.

The development and growth of fire depends upon a number of factors including the nature and distribution of the contents (fire load), the air supply, the thermal properties of the enclosure of the construction works, the fire and smoke control systems, and the fire protection system efficacy. Building contents, however, are not a matter for this Directive. The reaction-to-fire performance of the internal lining of a room (its wall and ceiling surfaces, and its floor coverings) can influence the rate at which fire and smoke develop and therefore is often controlled.

In addition fire safety of the occupants can be improved by early detection of a fire, which may be provided by an automatic fire detection and alarm system and/or by suppression of fire by an appropriate fire protection system.

A fire compartment is surrounded by a boundary which constitutes a barrier to fire (compartmentation) and smoke (a smoke barrier). In order to prevent fire growing to an unacceptable size leading to a dangerous spread of smoke within the construction works, the boundaries of such room(s) would normally be constructed to resist fire for a given period of time. While the construction surrounding the compartment concerned has to be fire-resisting, consideration also needs to be given to means of communication between adjoining compartments. Thus the use of doors, stairs and escalators etc., should not breach the integrity of compartments (and the barriers to fire and smoke).
A prerequisite for the integrity of the compartmentation is the overall stability of the main structure.

The restriction or prevention of the spread of fire between neighbouring (separate) buildings is the next important step in the fire safety strategy.

The intervention of the fire brigade/rescue teams plays an important role in providing fire safety in construction works. The above described provisions for, and the means of, fire protection are seen in close relationship with the intervention, fire-fighting and rescue operation by the fire brigade.

Even if the effect of the fire brigade action may not be expressed directly, the necessary provisions for fire safety of the construction works are influenced and may be taken into account in different ways in the Member States.

The above strategy is consistent with the objective of the essential requirement "Safety in case of fire" and the five headings, see "purpose and scope". The five headings are not independent. In this document the construction products concerned are identified and listed under the appropriate heading and their characteristics are given in Chapter "provisions concerning products and...".

4.3 Engineering approach in the field of Fire Safety

Fire safety engineering is the approach by the application of engineering principles to evaluating the required level of fire safety and to designing and calculating the necessary safety measures.

Regarding fire safety of construction works, the tools of fire safety engineering can be used in several ways:

(a) for determining basic information on how fire and fire effluents are developing and spreading in works, e.g.

- the calculation of fire development in rooms
- the calculation of fire spread inside or outside buildings beyond the room of fire origin
- the assessment of movement of fire effluents in buildings and similar works

(b) for the assessment of actions, e.g.

- the exposure to heat and fire effluents of persons and works
- the mechanical action on building structures and/or works

(c) for evaluating the performance of construction products when exposed to fire, e.g.

- in developing fires, characteristics like ignitability, flame spread, rate of heat release, production of smoke and toxic gases
- resistance of structures affected by fire in terms of load-bearing capacity and separating function

(d) for the evaluation of detection, activation, suppression, e.g.

- the activation times of control systems, suppression systems, fire brigade, occupants
- the effect of fire and smoke control systems (including extinguishing agents)
- the assessment of detection times depending on the nature and location of fire/smoke detectors
- the interaction of suppression and other safety devices
(e) for the evaluation and design of evacuation and rescue provisions

At present only some aspects of fire engineering have been developed and a significant research effort is needed in order to develop a global, coherent approach.

An engineering approach requires that relevant characteristics of products are provided, and calculation and design procedures are validated on an agreed and harmonized basis.

5. Basis for verification of the satisfaction of the essential requirement "Safety in case of fire"

5.1 General

(1) This chapter identifies basic principles prevailing in Member States for the verification of the satisfaction of the essential requirement "Safety in case of fire". These principles are currently complied with, when and where the works are subject to regulations containing this essential requirement.

(2) The essential requirement, as far as applicable, is satisfied with acceptable probability during an economically reasonable working life of the works.

(3) The satisfaction of the essential requirement is assured by a number of interrelated measures concerned in particular with:
- the planning and design of the works, the execution of the works and necessary maintenance;
- the properties, performances and use of the construction products.

(4) It is up to the Member States, when and where they feel it necessary, to take measures concerning the supervision of planning, design and execution of the works, and concerning the qualifications of parties and persons involved. Where this supervision and this control of qualifications are directly connected with the characteristics of products, the relevant provisions shall be laid down in the context of the mandate for the preparation of the standards and guidelines for European technical approval related to the products concerned.

5.2 Actions

(1) The performance of products is related to the specified action.

In this INTERPRETATIVE DOCUMENT, the term ACTION is considered to be a mechanical action (e.g. loads, forces resulting from constrained thermal expansion, and impacts), a thermal action, an action caused by environmental conditions (e.g. weathering, humidity) or a combination of these.
A thermal action consists of radiation, convection and conduction. The level of thermal action versus time is defined by the stage of development of fire, which could be simulated by calculation or test in the evaluation of product performance in end use conditions.

For thermal actions the following levels of exposure are identified:

- small ignition source (e.g. match type)
- single burning items (e.g. burning furniture, stored materials in industrial premises)
- fully developed fire (e.g. natural fire exposure, standard temperature/time curve).

(2) For evaluating the reaction-to-fire performance of products, radiation, convection and a combination of these exposures are used.

Thermal actions depend upon the kind, intensity and duration of exposure and may be characterized by:

- size of flame,
- level of radiation,
- level of convective heat transfer (combustion gas temperature and velocity),

with or without local flame impingement.

(3) For evaluation of the response of fire detection installations, smoke control and fire extinguishing installations, fires simulating a single item or a localized group of items burning, are used.

The actions depend upon the kind, intensity and duration of exposure and may be characterized by:

- rate of heat release,
- flame height and amount of smoke generated,
- fire area (surface burning area),
- level of temperature.

(4) For the evaluation of fire resistance of structures the following possibilities are prevailing in Member States:

(a) consideration of natural fire scenarios

(defined by parameters listed below)

A calculation of the thermal action caused by fire in a construction works (e.g. room, group of rooms, part of a construction works) should consider:

- the fire load (type, amount and burning rate)
air supply to the fire

- geometry and size of enclosure (defined by the fire compartment)

- thermal properties of the enclosure

and depending on the particular fire safety strategy or engineering approach, consideration can also include:

- influence of fire suppression installation (e.g. sprinkler installation)

- fire brigade/rescue team action (which may be initiated by a fire detection installation).

(b) consideration of conventional fire scenarios

The Essential Requirement requires that fire spread is limited and that the load-bearing capacity of the construction is adequate for a specific period of time. These requirements can be satisfied by proving fire resistance of load-bearing and/or separating elements. Internationally it is agreed to use the "standard temperature/time curve" (see ISO 834 Part 1) as a model for a fully developed fire. It follows the relationship:

\[ T = 345 \log_{10}(8t + 1) + 20 \]

where \( T \) is the furnace gas temperature, °C

t is the duration of the thermal exposure during the fire test, minutes.

The "standard temperature/time curve" is a conventional model used for evaluating the performance of products exposed to a fully developed fire. The adoption of this temperature/time curve is a simplification to represent thermal action.

For specific fire situations determined in "provisions concerning products and works", products shall be exposed to the standard temperature/time curve up to 300 °C, 600 °C, 820 °C, staying at these levels for the remainder test time.

The severity of thermal attack associated with a natural fire can be higher or lower than that associated with the "standard temperature/time curve". For a more severe attack (especially a higher rate of temperature rise) a harmonized hydrocarbon curve is used for proving fire resistance, which follows the relationship

\[ T = 1080 [1 - 0.325 \exp(-0.167t) - 0.675 \exp(-2.5t)] + 20 \]

(\( t \) = time in minutes)

A test having a rate of temperature increase slower than that of the "standard temperature/time curve" (that is a smouldering curve) should be required in circumstances mentioned e.g. in "Fire protective coatings, cladding and screens" but only if it is expected that the performance of the product exposed to a slowly growing natural fire would be substantially less than the performance achieved when that product is exposed to the heating conditions of the "standard temperature/time curve". The smouldering curve follows the relationship
\[ T = 154 \ (t)^{0.25} + 20 \]

\( t = \) time in minutes

The condition of heat transfer to the test specimen is included in the test specification.

For special extreme fire scenario (e.g. traffic tunnels, nuclear plants, etc.), more severe conventional curves may be specified.

(c) Basis for calculations of fire resistance

When making a calculation of fire resistance it is necessary to consider load-bearing capacity, integrity and insulation. This presupposes a calculation of, or experimental data on, the thermal response of the element which, in the case of a calculation, requires information on heat transfer from the fire to the element.

When a conventional temperature/time curve is used (i.e. the ISO 834 temperature/time relation given above) appropriate convective and radiative heat transfer coefficients should be used which correspond to the conditions occurring in the harmonized test. For other design fire exposures (e.g. hydro-carbon and smouldering fires) an appropriate heat transfer coefficient should be used.

Assessment of integrity is sometimes difficult as it requires information, for example on the likelihood of cracks and holes developing in the element which often can only be determined by undertaking a fire resistance test.

Note: Fire load density may be determined from design values depending on the building type (in accordance with the general philosophy for determining actions on structures) or by measurement of the actual fire load.

5.3 Verification of the satisfaction of the Essential Requirement

There might be various methods for verifying that the Essential Requirement or specified level of the Essential Requirement is satisfied on the basis of the harmonized characteristics of the construction products. None of them shall create barriers to the use of a product which would comply with the relevant technical specifications.

The requirement's expression in the national regulations can be made in accordance with three different approaches, or a combination of these:

- Statement of a minimum performance requirement, in numerical or general terms, of the works. Where this is done in general terms then a link is required between the requirement for works and the product characteristics.

- Statement of minimum fire performance of the products e.g. fire resistance, reaction-to-fire, performance of fire safety installations. In this case, the statement shall be made by reference to the technical specifications.

- Statement of the critical fire environment levels people in or near the works may be exposed to. The harmonized terminology shall be used.


(2) A general distinction is made between:

- Category A: These are standards, which concern the design and execution of buildings and civil engineering works and their parts, or particular aspects thereof, with a view to the fulfilment of the essential requirements as set out in Council Directive 89/106/EEC.

Category A standards should be taken into consideration within the scope of the Directive as far as the differences in laws, regulations and administrative provisions of Member States prevent the development of harmonised product standards.

- Category B: These are technical specifications and guidelines for European technical approval which exclusively concern construction products subject to an attestation of conformity and marking according to Articles 13, 14 and 15 of Council Directive 89/106/EEC. They concern requirements with regard to performance and/or other properties, including durability, of those characteristics that may influence the fulfilment of the essential requirements, testing and compliance criteria of a product. Category B standards that concern a family of products, or several families of products, are of a different character and are called horizontal (category Bh) standards.

(3) This distinction between Categories A and B is not intended to lay down different priorities for the work on the respective documents but to reflect the difference in the responsibilities of the authorities of Member States and in those of the bodies for European Standardisation and Technical Approval in implementing the Directive 89/106/EEC.

(4) In order to ensure the quality of these documents with a view to the fulfilment of the essential requirement, the provisions of this Interpretative Document will result in specific conditions which will be included in the mandates for the preparation of the respective European standards and guidelines for the European technical approval.

(5) The assumptions made in Category A standards on the one hand and those made in Category B specifications on the other shall be compatible with each other.

(6) Category B technical specifications and guidelines for European technical approval shall indicate the intended use(s) of the respective products

7. Provisions concerning products and works in Interpretative document No. 2

7.1 General

Verification of performances of construction works concerning the Essential Requirement "Safety in Case of Fire" may include:
- Methods for assessing, for example, fire development (including generation of smoke and hazardous fire effluents) in a room, spread of fire and smoke in the construction works, and spread of fire and smoke to neighbouring construction works and to the environment.

- Methods for assessment of performance and design of parts of works (e.g. structures and installations) e.g. structural fire performance, smoke venting installations, pressurization installations, sprinkler installations, fire detection and alarm installations.

- Methods for evaluating the interaction between fire, occupants, fire protection measures and fire-fighting and rescue activities.

The levels of the essential requirement may be a function of:

- the type, use and location of the construction works
- its layout
- the availability of the emergency facilities

7.2 Load-bearing capacity of the construction

Statement of principles

The stability of the main structure of a construction works in case of fire is necessary:

- to provide for the safety of the occupants during the time they are assumed to remain in the building,
- to increase the safety of rescue teams and fire-fighters,
- to guard against collapse of a building, causing injury to people,
- to allow the construction products involved in fire safety to carry out their functions for the necessary time.

The required period of stability, usually expressed in terms of conventional fire resistance times, depends on the goals of regulators.

The following are examples of the goals of some regulators:

- No specified fire resistance requirements for buildings with limited fire load density or where the consequences of collapse of structures are acceptable.

- Fire resistance for a specified but limited period of time, where the time requirements can be specified to allow for safe evacuation of occupants and intervention of rescue teams.

- Fire resistance of the main structure to ensure it can survive a full burn out of all combustible materials in the building, or a specified part of it, without taking into account the intervention of the fire brigade/rescue teams.
The stability of buildings has to be ensured through sufficient fire resistance of the main structure. The fire resistance of the main structure is currently assumed to be satisfied if the fire resistance of the individual elements is demonstrated to be at least the same and the connections do not reduce the fire resistance of the main structure.

Attention is drawn to indirect actions caused by the consequences of thermal dilatation, deflection and/or failure of structural elements.

**Parts of works concerned**

7.3 Limitation of generation and spread of fire and smoke within the construction works

**Statement of principle**

The objectives are:

- to retard the speed of fire development and spread of fire and smoke in the works so as to enable occupants near and/or remote from the origin of fire to have sufficient time to escape

- to enable the fire brigade/rescue teams to control the fire before it has grown too large.

These may be achieved by:

- prevention of initial ignition

- limitation of the generation and spread of fire and smoke within the room of origin

- limitation of spread of fire and smoke beyond the room of origin.

7.4 Prevention of initial ignition

**General**

Prevention of initial ignition depends on a set of conditions ranging from user instruction to requirements regarding the detailing of appliances and equipment as well as installation of the latter in the construction works.

**Works or parts of them concerned**

Provisions prevailing in Member States

7.5 Limitation of the generation and spread of fire and smoke within the room of origin

**General**

Provisions prevailing in Member States aim at limiting the rapid participation of construction products in the early stage of a fire and limiting the contribution of construction products to the full development of a fire in the room of origin. Thus the relevant products must have certain reaction-to-fire performances in their end use conditions. These performances are evaluated over a range of thermal exposures from exposure to a small flame (match type exposure), the heating condition
simulating a fire in the contents (single burning item, e.g. furniture), to the thermal action similar to that of a further developed fire.

Note: In the early stage of a fire, critical conditions for the occupants might not be reached in the room of origin, and survival is still possible within the premises concerned. Unfavourable contribution of heat and smoke (opacity - toxicity) from the exposed surfaces can reduce the time until critical conditions for the occupants are reached.

Increased thermal action is usually associated with a further development of fire. In a large room, however, severe thermal action from a localized fire in the contents may expose nearby construction products to heating conditions normally associated with a further developed fire.

Fire detection and alarm systems can be installed in order to ensure early detection of a fire and to activate alarms, warning and fire suppression/extinguishing systems.

**Parts of works concerned:**

(a) Walls/ceilings

(b) Floors

(c) Pipes and ducts - including externally applied insulation - (relevant products: see "Products subject to reaction to fire requirements")

(d) Installations

Provisions concerned with works or parts of them.

7.6 Limitation of spread of fire and smoke beyond the room of origin

**General**

Limitation of fire and smoke spread can be achieved by one or a combination of the following:

- installation of fire-separating elements (walls, floors, etc.) adapted to the use of the construction (i.e. adapted to the expected thermal action in the construction works),

- closure of openings in fire-separating elements,

- an appropriate design of the façades, hindering spread to adjacent parts of the same works,

- fire suppression/fire extinguishing installation,

- removal of hot gases by natural or mechanical means,

- installation of smoke barriers (e.g. smoke control doors),

- the provision of fire-resisting ventilation ducting and/or the installation of fire dampers and actuating devices,
- creating differences of air pressure between zones within the construction works to control the passage of smoke between them.

Note: Critical life-threatening conditions for the occupants should not be reached in the escape routes. The propagation of heat and smoke (opacity - toxicity) beyond the room of origin can reduce the time until critical conditions are reached.

For practical reasons the smoke compartmentation boundaries, often, but not always, coincide with the fire compartmentation and both functions are then able to be fulfilled by the same separating elements.

Usually, fire-resisting separating elements without openings or gaps are implicitly expected to constitute sufficient barriers to smoke spread without the necessity of formulating detailed requirements. For other separating elements, e.g. doors, penetration seals for pipes and electrical cables, etc. this may not be so and the explicit formulation of smoke barrier requirements may be necessary if a smoke-stop function is expected to be fulfilled.

Special consideration needs to be given to the risk of smoke propagation represented by the presence of ventilation ducts and service ducts and shafts including their maintenance openings.

**Parts of works concerned:**

(a) Exposed surfaces

Exposed surfaces used as façades

(b) Parts (with fire-separating function)

- Walls (internal/external)
  - Floors
  - Roofs
  - Partitions and non-load-bearing external walls

As far as external walls are concerned, fire spread from one fire compartment to another can occur due to:

- failure of fire separation elements between fire compartments
- failure of joints between walls/floors and the façades
- fire spread in cavities inside the façades
- fire spread along the outside surface of the façade

Performance criteria:

- Reaction-to-fire performance
- Fire resistance against: fire from the inside
  fire from the outside
- Ceiling membranes
- Closures for conveyors and trackbound transportation systems
- Raised floors
- Construction joints
- Service ducts and shafts

(c) Parts which contribute to fire resistance

Suspended ceilings

A suspended ceiling is one which is considered only to contribute to the fire resistance of the element (e.g. floor or roof) above, unlike a ceiling membrane which in itself possesses fire resistance independent of any element above.

The effect of lighting, ventilation and maintenance openings, service installations and combustible materials in the floor or roof void, suspension devices etc. on the fire resistance has to be considered.

(d) Installations

Ventilation systems (ducts and dampers)
Automatic fire detection and alarm installations
Smoke and heat exhaust ventilation installations
Pressurization installations

The purpose of a pressurization installation for smoke control is to protect certain escape routes and other areas against the ingress of smoke by maintaining the air within them at pressures higher than those in adjacent parts of the works. These smoke free zones enable:

- occupants of the work to evacuate to a safe place, and/or
- fire-fighters and rescue teams to move around the building from a safe place.

Exposure/action: Ambient indoor and outdoor climate.

Performance criteria: Ability to activate and establish a design overpressure in a specified enclosure or a design velocity of flow through openings in the walls of the specified enclosure. The installation shall be able to maintain its function in case of failure of the primary power supply.
7.7 Limitation of spread of fire to neighbouring construction works

**Statement of principle**

The limitation of spread of fire to neighbouring construction works is necessary:

- to ensure safety of occupants in other construction works nearby and remote from the burning construction works

- to avoid conflagration and the consequences thereof, e.g. loss of vital services such as hospitals, communication installations, loss of resources and widespread destruction of homes and housing facilities

- to enable the fire brigade to control the fire (radiation from large fires may prevent approach of fire brigade/rescue teams).

The following two situations are currently covered:

- Fire spread between construction works which are entirely separate, as in buildings facing each other across a street for example.

- Fire spread between different construction works joined together, but with a fire-separating wall between them.

Limitation of fire spread to neighbouring construction works may be achieved by

- Limitation of radiation by controlling:
  
  * distance between construction works

  * size of unprotected areas such as windows

  * reaction-to-fire performance of products for façades

  * fire resistance of the unglazed or glazed parts of the façades

  * active protection measures such as water spray installations.

- Controlling the ignition and fire spread over the external roof surface, including roof lights,

- Controlling the penetration of the fire to the inside of the building,

- Controlling the ignition of the surface of the roof covering from a fire below,

- Ensuring the fire-separating function of a roof or part of a roof exposed to a fully developed fire from below,

- The use of fire-separating walls with or without performance requirements such as impact resistance in addition to fire resistance.
Parts of works concerned:

(a) Fire-separating parts
- Fire-separating walls
- External walls and façades
- Roof coverings including roof lights

(b) Automatic waterspray installations

7.8 Evacuation of occupants

Statement of principle

Provision of means of escape for occupants in a construction works and provision of access for rescue teams is necessary:

- to allow occupants anywhere within the construction works to be able to evacuate to a place of safety,

- to allow rescue teams to have access to, search, and get out of the construction works.

In case of fire the safety of occupants during evacuation may be ensured by four types of measures:

- design and layout of escape routes in order to ensure safe evacuation of occupants to a place of safety

- separation of escape routes from the surroundings by means of fire and smoke-separating elements

- smoke control measures

- limitation of fire and smoke generation from wall and ceiling linings and floor coverings in escape routes.

In addition to the measures given in sections "load bearing capacity of the construction" and "provisions concerning works" the following measures can be considered, having regard to the construction works, its occupancy and use:

- fire detection and alarm installations including fire warning installations

- design, layout and number of escape routes and exits appropriate to the number of occupants and their mobility.

- provisions in escape routes which may include:

  * emergency lighting installations

  * emergency exit sign installations
* emergency power supply installations serving fire safety installations

* safety devices on doors (panic bars etc.)

* emergency guidance systems.

- provision of pressurisation installations and other smoke control measures.

- provision of safe rescue places inside and/or outside the construction works.

- provision for access of rescue teams

* access to the construction works

* accessibility for emergency and fire brigade vehicles

* fire-fighting lift installations.

- emergency communication systems within the construction works

* emergency alarm installations/fire warning installation

* emergency communication installations (also for the fire brigade).

- Emergency facilities used either by the occupants, or by the fire brigade (for intervention and fire-fighting at the start of the fire)

* first aid hose installations.

**Parts of works concerned:**

(a) Exposed surfaces

Walls/ceilings

Floors

Fire protective systems for electrical cables (including cables with intrinsic fire resistance)

(b) Parts of works (with fire-separating functions)

Walls and partitions

Ceilings (including suspended ceilings)

Floors

(c) Installations

1) Manual fire alarm installation
2) Automatic fire detection and alarm installations

3) Smoke and heat exhaust ventilation installations

4) Pressurization installations

5) Flammable gas detection installations

6) Fire warning installations

A fire warning system is installed in a works in order to make possible the activation of an audible and/or a visual signal to warn the occupants or the staff that an emergency situation exists and evacuation may need to be initiated.

Exposure/action: Ambient climate.

Performance criteria: Ability to activate manually or automatically visible or audible warnings to the occupants. The installations should be able to maintain its function for a minimum design time (hours) in case of failure of the primary power supply

7) Fire call installations.

The purpose of the installation is to provide facilities within the works for the automatic transmission of a fire alarm from the works to the fire-fighters/rescue teams or to a control (fire command) station.

8) Emergency lighting installations

The purpose of the installation is to ensure that lighting is provided promptly, automatically and for a suitable time in a specified area when the normal power supply to the normal lighting fails. The purpose of the installation is to ensure:

- that the means of escape can be safely and effectively used;
- that activities in particularly hazardous workplaces can be safely terminated;
- emergency actions can be effectively carried out at appropriate locations in the work.

Exposure/action: Ambient climate.

Performance criteria: Ability to provide sufficient light in case of failure of the primary power supply in order to allow safe evacuation of the occupants or for other purposes.

9) Emergency exit signs installations

Emergency exit signs are installed in a works in order to show the occupants the location of exits to be used for evacuation in case of an emergency (fire) and the planned way of egress from each point in the works to the exits (e.g. by direction marking) (including "not to be used in case of fire").

Exposure/action: Ambient climate, resistance against impact
Performance criteria: Ability to provide clear, easy to identify and visible instructions concerning escape routes and exits for occupants.

10) First aid hose installations

11) Emergency power supply of installations serving fire safety installations

The purpose of this installation is to provide, promptly, automatically and for a suitable time - power supply to the fire safety installations when the normal supply fails or in the event of damage or accident to elements of the system intended to supply, distribute or control power for this installation. Fire safety installations sometimes include their own emergency power supply.

12) Water supply installations serving fire safety installations

The purpose of the installation is to provide a suitable and reliable water supply (sometimes including a suitable water source) for the fire brigade and for the effective operation of fixed fire-fighting installations.

Exposure/action: Ambient climate appropriate to intended use.

Performance criteria:

- Required flow of water (m³/h)
- Pressure (bar)
- Continuity of supply (h)

7.9 Safety of rescue teams

**Statement of principles**

In addition to load-bearing capacity, limitation of spread of fire and smoke, and evacuation of occupants, provisions aim at:

- ensuring possibility for rescue operations to be carried out
- allowing fire-fighting to be carried out effectively inside and around the works
- enabling rescue teams and fire-fighters to operate with a reasonable level of safety and leave the works with safety.

Such provisions may include:

- access/space for fire-fighting appliances outside/inside the building
- water supply installations serving fire safety installations
- fire hydrant installations
- rising and/or falling fire mains in the building with branch outlets, and where appropriate foam inlets, dedicated to fire suppression

- floor plan layouts

- fire-fighting shafts

- fire-fighting or safety staircases

- fire-fighting lift installations

- fire-fighting lobbies

- smoke and heat exhaust ventilation installations

- pressurization installations

- emergency power supply installations serving fire safety installations

- emergency lighting installations

- control of utilities (gas, electricity, water, etc.) and active fire safety systems

- switches/valves for shutting down utilities

- emergency communications installations

- fire protective systems for electrical cables (including cables with intrinsic fire resistance)

- marking of dangerous substances

- signs to assist fire-fighters.

Parts of works concerned:

(a) fire protective systems for electrical cables

(b) emergency power supply of installation serving fire safety installations

(c) Water supply installations serving fire safety installations

(d) Smoke and heat exhaust ventilation installations

(e) Pressurisation installations

(f) Fire call installations

(g) Emergency lighting installations

(h) Fire hydrant installations
The purpose of the installation is to provide a connection (i.e. hydrant) to the water main to which the fire brigade can connect fire-fighting equipment (e.g. hose) in order to fill reservoirs and/or supply hoses and monitors.

(i) fire-fighting lift installations

A fire-fighting lift (often called a fire lift) is installed in a works to enable fire-fighters and their equipment to travel rapidly and with a reasonable measure of safety to upper and lower floors so that they have sufficient energy left for the difficult and lengthy task of fire-fighting/rescue.

The lift can also be used by the occupants of the works in normal conditions, but in a fire emergency the control of the lift is transferred to the fire-fighters using a fire-fighting lift switch usually positioned near the lift at fire service access level. The lift may be positioned in a protected lobby to minimize the possibility of smoke and fire entering the lift car and/or lift well. The speed of the lift should enable any floor to be reached within a very short time (1 minute for instance).

Another objective of a fire-fighting lift may be to evacuate disabled persons when a fire emergency arises.

A fire lift should preferably be sited next to a protected stairway so that if failure of the lift occurs fire-fighters can use the stairs without having to pass through a life-threatening zone. To achieve this it is considered good practice to have the lift and stairs within a protected shaft with a lobby separating the lift/stairs from the accommodation (fire/smoke area) at each storey level.

Exposure/action: Increased temperature.

Specified load.

Water damage to electrical components (from fire suppression/fire-fighting).

Performance criteria: Provision of a safe and reliable means of transportation of fire-fighters and rescue teams by lift in a works in case of fire.

Ability to maintain its function in case of failure of the primary power supply.

(j) Emergency communication installations

An emergency communication system may be installed in a construction works in order to provide facilities within the works for transmission of information within the works, to the fire brigade, to the building staff or to trained tenants, performing duties in the event of a fire emergency.

8. Working life and durability.

8.1 Treatment of working life of construction works in relation to the essential requirement

(1) It is up to the Member States, when and where they feel it necessary, to take measures concerning the working life which can be considered reasonable for each type of works, or for some of them, or for parts of the works, in relation to the satisfaction of the essential requirements.
Where provisions concerning the durability of works in relation to the essential requirement are connected with the characteristics of products, the mandates for the preparation of the European standards and guidelines for European technical approvals, related to these products, will also cover durability aspects.

8.2 Treatment of working life of construction products in relation to the essential requirement

(1) Category B specifications and guidelines for European technical approval should include indications concerning the working life of the products in relation to the intended uses and the methods for its assessment.

(2) The indications given on the working life of a product cannot be interpreted as a guarantee given by the producer, but are regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

Interpretative document 2: SAFETY IN CASE OF FIRE further stipulates:

(3) Sometimes products are qualified for normal use but this does not include automatically the durability of fire safety performance.

Examples are:

- products sensitive to environmental influences (weathering, chemical effects, etc.) e.g. fire retardant treated products, intumescent materials

- movable closures (if they do not close under normal use there may be no risk for life safety but there might be one in case of fire) e.g. self-closing doors, shutters and dampers.

Methods for assessing working life are e.g.:

- tests involving washing and cleaning procedures
- long-term and short-term weathering tests
- mechanical tests (closing tests, vibration, impact tests)
- corrosion tests.