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PROPOSED AMENDMENTS TO THE CONSTRUCTION AND HOUSING CODE AND TO THE SAFETY REGULATION ON HIGH-RISE BUILDINGS:

Construction and Housing Code
Part 2 - Regulation

Book I – General provisions
TITLE II – Fire safety and protection
CHAPTER II – Safety provisions on high-rise buildings

Article R. 122-1.

This chapter lays down the provisions for guaranteeing the safety of persons against the risks of fire and panic in high-rise buildings.
It shall apply to all high-rise buildings that are to be built, to alterations and adjustments to be made in existing buildings and to changes to the purpose of rooms in these buildings.

Section I - Definitions and classifications

Article R. 122-2.

For the purposes of this chapter, a high-rise building shall consist of any main building of which the floor of the highest storey, in relation to the highest ground storey accessible to the vehicles of the public fire and rescue services:
- is situated at a height of **more** than 50 metres for residential buildings, such as those laid down by Article R. 111-1;
- is situated at a height of more than 28 metres for all other buildings.

All the load-bearing elements and basements of the building shall form an integral part of the high-rise building.
Adjacent buildings, regardless of their height, shall also form an integral part of the high-rise building where they are not isolated from it under the conditions specified by the safety regulation laid down in Article R. 122-4.
By way of derogation from the previous indent, car parks situated beneath a high-rise building shall not be considered to be part of the building where they are separated from the building's other premises by fire walls with a four-hour fire-break or REI 240 rating and where they include a maximum of just one direct or indirect communication route with the said premises under the conditions set by the safety regulation laid down by Article R. 122.4. Spaces situated in the bottom part of the high-rise building that comply with the conditions of independence and with the safety measures established by the orders laid down in Articles R. 111-13 and R. 122.4 shall not be considered to be part of the building.

Buildings that are designed primarily for residential use shall not constitute high-rise buildings where the floor of the highest storey is between 28 metres and 50 metres in height,

and where the non-residential premises meet conditions of independence with regard to the residential premises, established by the orders laid down in Articles R. 111-13 and R. 122-4.

Article R. 122-3.

High-rise buildings whose normal use involves fewer than one person per 100 m2 net floor area being present on each storey shall not be subject to the provisions of this chapter.

Article R. 122-4.

A joint Order issued by the ministers responsible for the implementation of the provisions of this chapter, after receiving the opinion of the Central Safety Committee established by Article R. 123-29 and laying down safety regulations, shall lay down, for the various classes of high-rise building, the measures for implementing the principles laid down by this chapter that are common to all or some of these various classes and the provisions that are specific to each of them. It shall also lay down the measures that must be taken by the builder during the works to limit the risk of fire and to facilitate the operations of the fire and rescue services.

The orders laying down or amending the safety regulation shall determine those provisions that, in view of their nature or importance, apply solely to buildings due to be built, or to buildings whose plans have been submitted with a view to receiving a building permit or planning permission, or to buildings being built, or to buildings that have already been built, respectively. For each of these categories of building, the orders shall determine the conditions and deadlines for implementing the decreed provisions.

Article R. 122-5.

§1. High-rise buildings shall be divided into the following classes:
H.R.A.: residential buildings;
H.R.O.: hotel buildings;
H.R.R.: teaching buildings;
H.R.S.: archive buildings;
H.R.C.T. : control tower buildings;
H.R.U.: medical buildings;
H.R.W. 1: office buildings, meeting the conditions set by the regulation laid down in Article R. 122-4 and of which the floor height as defined in Article R. 122-2 is greater than 28 metres and less than or equal to 50 metres;
H.R.W. 2: office buildings of which the floor height is greater than 50 metres;
H.R.Z.: buildings that are designed primarily for residential use of which the floor height is greater than 28 metres and less than or equal to 50 metres and consisting of non-residential premises that do not meet the conditions of independence set by the orders laid down in Articles R. 111-13 and R. 122.4.
S.: skyscrapers: any building of which the floor of the highest storey is situated more than 200 metres above the highest ground storey accessible to the vehicles of the public fire and rescue services shall constitute a skyscraper.

§2. A building may accommodate several different classes of activity. The provisions applicable in this case are defined by the safety regulation laid down in Article R 122-4.

Section 2 - Location. Conditions of use. Safety principles

Article R. 122-6.

The construction of a high-rise building shall be permitted only on sites that are situated no more than 3 kilometres from a main public fire and rescue station.

However, the Prefect, having heard the opinion of the departmental safety and accessibility advisory committee, may authorise the construction of a high-rise building at a greater distance, by a reasoned order, with account taken, in particular, of the class of the building, the occupation density, the ease of access and movement, the type of emergency centre, the safety service exclusive to the building and the water resources of the area.

Article R. 122-7.

High-rise buildings may not contain, except where exceptions are laid down by the safety regulation, establishments classified in the list laid down pursuant to Law No 76-663 of 19 July 1976 on installations classified for the protection of the environment, where the classification results from the dangers of fire and explosion that such establishments represent.

It shall be prohibited to store or to handle inside these establishments substances or preparations classed as explosive, combustive or extremely flammable, as well as the materials laid down in Article R. 232-12-14 of the Employment Code, except where exceptions are laid down by the safety regulation.

Article R. 122-8.

Only modes of occupancy and use that involve a number of persons corresponding to an average occupancy of no more than one person per 10 m2 net floor area in each compartment as laid down in Article R. 122-10 shall be permitted in these buildings.

However, the safety regulation may authorise installations or premises with a greater occupation density, except where any appropriate measures are provided for.

Article R. 122-9.

In order to ensure the safety of occupants and adjoining buildings, the construction of high-rise buildings must enable the following safety principles to be complied with:

1° In order to extinguish fire before it spreads to a dangerous extent:

- the building shall be divided into compartments laid down in Article R. 122-10, the walls of which must not enable the fire to spread from one compartment to another in less than two hours;
- the combustible materials in each compartment shall be limited under the conditions set by the regulation laid down in Article R. 122-4;
- materials that are liable to spread fire shall be prohibited;

2 The evacuation of occupants shall be guaranteed by at least two stairways per compartment. However, for class H.R.W. 1 buildings, the safety regulation specifies the conditions under which this rule may be disregarded.

Lift access shall be prohibited in compartments affected or threatened by fire; emergency lift access shall remain possible under the conditions set by the safety regulation laid down in Article R 122-4;

3 The building must include:

a) One or more independent power supplies, to remedy the faults, where necessary, of that used during normal service;
b) An effective alarm system and means of firefighting at the disposal of the public fire and rescue services and, where appropriate, at the disposal of occupants;
4 In the event of a fire breaking out in a part of the building, the lifts and service lift must continue to operate in order to serve floors and compartments not affected or threatened by fire;
5 Appropriate provisions must prevent smoke from spreading from the damaged compartment to the other parts of the building;
6 Communications from one compartment to another or via the stairways must be guaranteed by smoke-proof devices in the closed position that enable smoke that has entered to be eliminated quickly;
7 In order to prevent an external fire from spreading to a high-rise building, the building must be insulated by a protected area meeting the conditions laid down by the safety regulation.

Article R. 122-10.

The compartments laid down in Article R. 122-9 shall be one floor high, no more than 75 metres long and have a net floor area no greater than 2 500 m2.
The compartments may contain two floors if the total surface area does not exceed 2 500 m2; they may contain three floors for a total surface area of 2 500 m2 when one of them is situated on the floor providing access to the vehicles of the public fire and rescue services.
Where it is not possible to define the net floor area of a part of a high-rise building, a gross floor area of 3 000 m2 shall be deemed equivalent to the 2 500 m2 net floor area specified above.
The walls of these compartments, including devices such as insulation locks or doors providing access to stairways, lifts and service lifts and between compartments, must have 2-hour or EI 120 fire break capacity, REI 120 fire break capacity in the case of load-bearing functionality.

Article R. 122-11.

Builders and fitters shall be obliged, each for their own part, to ensure that installations and equipment are established in compliance with the regulatory provisions, and in particular that the fire behaviour of building materials and components meets the conditions laid down by the safety regulation.
Checks carried out by the administration or by the departmental safety and accessibility advisory committee shall not relieve builders and fitters of the responsibilities incumbent on them personally.

Section 2 a – Authorisation of works on a high-rise building laid down in Article L.122-1

Article R. 122-11-1

Authorisation of works on high-rise buildings, as laid down in Article L.122-1, shall be given by the Prefect of the department.

It may only be given if the planned works comply with the accessibility and safety standards laid down in section III of Chapter I, Title I of Book I and in sections 1 and 2 of this chapter.

Due to the specific characteristics of some buildings, the authorisation may be accompanied by special or exceptional requirements that strengthen or lessen these provisions.

In accordance with Article R. 425-14 of the Town Planning Code, a building permit shall take the place of the authorisation laid down in Article L. 122-1, if the Prefect's decision is favourable. This consent shall be examined and issued under the conditions laid down by this section.

Article R. 122-11-2

Authorisation applications shall be presented:

a) By the owner(s) of the land, their representative or by one or more persons attesting to having been authorised by them to carry out the works;

b) Or, in the case of joint ownership, by one or more co-owners or their representative;

c) Or by a person with the authority to benefit from expropriation for public utility purposes.

Applications shall be submitted by recorded delivery letter, with a request for acknowledgement of receipt, to the prefecture of the department in which the works are planned.

The Prefect shall acknowledge receipt without delay.

Where the planned works are also subject to a building permit, the acknowledgement of receipt shall be attached to the building permit application.

Article R. 122-11-3

The authorisation application file produced in triplicate shall include:

1 Technical instructions indicating in detail the provisions taken to comply with the measures specified by the safety regulation laid down in Article R. 122-4;

2 Plans accompanied by descriptive schedules specifying the fire resistance capacity of the building components, the width of the vertical and horizontal communal and private passageways, the production and distribution of high-, medium- and low-voltage electricity, the hydraulic equipment, the air conditioning, ventilation and heating systems, the technical room fittings, and the emergency facilities;

3° Where appropriate, a request for exemption, aimed at reducing the safety restrictions, accompanied by written proof of the request and a list of compensation measures that are such as to guarantee an equivalent level of safety.

An order of the Minister for Safety shall define, where necessary, the content of the plans and instructions.

Article R. 122-11-4

Where the building houses one or more establishments open to the public, the applicant shall attach three copies of the file referred to in Article R. 111-19-17(II)(a).

Authorisation of works laid down in this sub-section shall be understood to mean authorisation in accordance with Article L. 111-8. The Prefect shall obtain the consent or opinions laid down in Articles R. 111-19-23 and R. 111-19-24.

Article R. 122-11-5

I. – The deadline for examination of the authorisation application shall be five months from the date on which the file is submitted.

Where an express decision is not notified within the five-month deadline referred to in the first indent, the authorisation of works shall be deemed to have been granted.

II. - If the file does not include the documents required in implementation of this sub-section, the competent authority, within one month of receipt or submission of the file to the town hall, shall send a recorded delivery letter with a request for acknowledgement of receipt to the applicant or to the author of the declaration or, in the case laid down by Article R. 423-48 of the Town Planning Code, shall send an e-mail, providing an exhaustive list of the missing documents. The five-month deadline for examination shall therefore begin from the date on which these documents were received.

Where the project is the subject of a building permit application, the provisions of Articles R. 423-39 to R.423-41 of the Town Planning Code shall apply. The deadline for examination of the building permit shall therefore begin at the latest from the dates of receipt of the documents referred to in the previous paragraph or of the documents missing from the building permit application file, where the competent authority has notified a list of these documents to the applicant, under the conditions laid down by Article R. 423-38 of the Town Planning Code.

The Prefect shall send a copy of the letter referred to in the previous paragraph to the competent authority, so that they may issue the permit.

III. - If the decision is to reject the application or if it is accompanied by requirements or a derogation, it must be reasoned.

IV. Where the project is the subject of a building permit application, the Prefect shall notify his decision to the competent authority, so that they may issue the permit.

Article R. 122-11-6

The Prefect shall send a copy of the file to the departmental safety and accessibility advisory committee, or, in Paris, Hauts-de-Seine, Seine-Saint-Denis and Val-de-Marne, to the departmental safety committee, for their opinion. If this opinion is not given within two months, it shall be deemed favourable.

If the building is greater than 100 metres in height, calculated in accordance with the methods laid down in Article R. 122-2, and must be subject to special or exceptional requirements, the Prefect shall send a copy of the file to the central safety committee laid down in Article R.123-29, for its opinion. If this opinion is not given within three months, it shall be deemed favourable.

Section 3 – Work carried out by the Central Safety Committee

Article R. 122-12.

The Central Safety Committee established by Article R. 123-29 shall give its opinion in the cases laid down by this chapter, as well as on all issues concerning safety in high-rise buildings that are submitted to it for examination by the ministers concerned.
The permanent members of the Central Safety Committee, duly appointed by the Minister for the Interior, shall have access at any time to the communal areas of high-rise buildings and to establishments open to the public that are installed in these buildings.

Article R. 122-13.

The term owner used in this chapter and in the safety regulation laid down in Article R. 122-4 shall apply to owners, co-owners and associations of co-owners.

Section 4 - Obligations relating to the occupation of premises

Article R. 122-14.

In order to ensure the fulfilment of the obligations incumbent on him under the provisions of this chapter, the owner may appoint a representative and a deputy to act on his behalf and to correspond with the administrative authority. He shall be obliged to appoint a representative and a deputy where he himself does not reside in the town in which the said buildings are located.
Where the building belongs to a company, to several co-owners or tenants in common, they shall appoint a representative and his deputy to represent them.

Article R. 122-15.

The representative, or, in his absence, his deputy, appointed under the provisions of the previous article, shall be deemed to be the sole correspondent of the administrative authority.
Their role is defined in the safety regulation laid down in Article R 122-4.

Article R. 122-16.

The owner shall be obliged to maintain and service installations in accordance with the provisions of this Regulation. He shall undertake, by means of a body approved by the Minister for the Interior, to perform the checks laid down by the safety regulation before and during occupation of their premises.

With regard to the aforementioned bodies, failure to respond for more than four months to the request for approval or for renewal submitted in implementation of the previous paragraph shall constitute refusal.

Article R. 122-17.

The owner shall be obliged to provide for one fire safety and assistance service for the occupants of all the premises of the high-rise building and to make these persons undertake, in the cases laid down in the safety regulation, periodic evacuation exercises.
The regulation shall determine the classes of building in which occupants must participate in the safety service and in evacuation exercises.

Article R. 122-18.

The owner, tenants and occupants of high-rise buildings may not make any alterations to the premises that are in breach of the provisions of this chapter and of the safety regulation.
Furthermore, they must ensure that the fire load of the items of furniture installed in the building does not exceed the limits laid down by the said regulation.

Section 5 – Inspection measures

Article R. 122-19.

Subject to the implementation of the provisions of Article L. 1142-1 of the Defence Code, the mayor and the departmental State representative shall ensure, each for their own part, that the provisions of this chapter are implemented.
The competent safety committee shall, in all cases, be the departmental safety and accessibility advisory committee established by Decree No 95-260 of 8 March 1995 (amended). The members of this committee may be given a remit to undertake inspection visits carried out in implementation of the provisions of this chapter and of chapter III of this title; they shall be appointed for this purpose by the Prefect, after receiving the opinion of the committee.

Article R. 122-20

The mayor, after receiving the opinion of the departmental safety and accessibility advisory committee, may ask the builders to commission one of the laboratories approved by the Minister for the Interior to check the flammability of the materials or, where necessary, the fire resistance of the building components used and to send him the report on these checks.

Article R. 122-21

During the construction of high-rise buildings, on-site visits may be carried out by the committee, either on its own initiative, or at the request of the mayor or Prefect.

Article R. 122-22

The total or partial occupation of a building shall be subject to compliance with the safety requirements being observed. The owner shall submit an application for this purpose to the mayor, who shall make a decision after receiving the opinion of the committee.

Article R. 122-23

The committee shall visit the building at the request of the mayor; it shall request to see the safety register and the inspection reports compiled by the approved bodies; it shall proceed with the checks that it deems necessary. The owner or representative laid down in Article R. 122-14 shall be present for this visit.

Article R. 122-24

The compartments of a building under construction may be occupied if the safety personnel and corresponding emergency equipment have been put in place and are able to fulfil their duties. The mayor, after receiving the opinion of the committee, shall lay down, where necessary, the special conditions to be observed both in terms of carrying out the works and of insulating the site from the rest of the building.

Article R. 122-25

The mayor's decision shall be notified directly to the owner or representative; a certified copy of the decision shall be sent to the Prefect.

Article R. 122-26

After completion of the works or in the case of partial occupancy, the Prefect shall have the emergency centre concerned register the building on the list of buildings for which the public fire and rescue services must draw up an intervention plan.

Article R. 122-27

A departmental file of high-rise building inspections shall be created and updated by the Prefect.

Article R. 122-28

During occupation of a building, the committee may make periodic or unexpected visits to the communal parts of all high-rise buildings, under the conditions set by the safety regulation laid down in Article R. 122-4.
The owner or representative shall be present for visits of which they have been notified.
Following each visit by the committee, a report shall be drafted recording, in particular, the proper fulfilment of the requirements laid down during a previous visit and shall mention, where necessary, the proposed measures.
The mayor shall notify this report to the owner or representative, who shall have 15 days in which to submit his comments. Once this period has expired, the mayor shall notify him of the decisions taken.

Article R. 122-29

A safety register shall be kept by the owner or representative containing crucial safety inspection information, in particular:
The various instructions laid down in case of fire;
The list of names and hierarchical positions of persons belonging to the building's safety service;
The list and location plans of the equipment at the disposal of this service;
The dates of safety exercises;
The dates of the various checks and inspections, together with the comments or reports to which they have given rise.
The safety register shall be subject each year to certification by the mayor. It shall be presented during administrative inspections.

- Above Article R 152.3 should read: "Section 2: High-rise buildings"

Article R. 152-3

Without prejudice to the application, where necessary, of the harsher penalties laid down, in particular, in Articles L. 480-2 to L. 480-9 of the Town Planning Code and L. 152-1 to L. 152-9 of this Code, any infringement of the provisions of Articles R. 122-7, R. 122-8, R. 122-14 to R. 122-18 and R. 122-20 shall be punished by the fine laid down for class 5 offences. Any infringement of the provisions of Article R. 122-22 shall be punished by the same penalties. In this case, the fine shall be applied for as many days as the building was occupied without authorisation.

Article R. 152-4

Any infringement of those provisions of Articles R. 122-23 and R. 122-28 that relate to the obligation for the owner or representative to be present at inspection visits shall be punished by the fine laid down in Article 131-13(5) of the Penal Code. In the event of the offence being repeated, the fine shall be that laid down for the repetition of class 5 offences. Any infringement of the provisions of Article R. 122-29 shall be punished by the same penalties.

Article R. 152-5

Without prejudice to the application, where necessary, of the harsher penalties laid down in Articles 209 to 233 of the Penal Code and of Article L. 152-10, infringements that hinder the performance of duties incumbent, in implementation of the provisions of this chapter, on members of the departmental safety and accessibility advisory committee and on those of the Central Safety Committee, shall be punished by the penalties laid down in Article R. 152-2.

SAFETY REGULATION ON HIGH-RISE BUILDINGS:

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TITLE I.

H.R.
GENERAL MEASURES COMMON TO ALL CLASSES OF HIGH-RISE BUILDING

CHAPTER I
General provisions

Article H.R. 1
General

1. With the exception of administrative provisions, provisions relating to technical checks and inspections, and to maintenance, this Regulation shall not apply to existing high-rise buildings (HRBs).

Where replacement installation, fitting or extension works are undertaken in these buildings, the provisions of this regulation shall apply only to parts of the building or installations that have been altered.

However, if these alterations result in an increased risk to the high-rise building as a whole, additional safety measures may be imposed in accordance with the opinion of the safety committee.

2. In accordance with the requirements of Article R. 122-4 of the Construction and Housing Code, the provisions of this title shall include the general requirements common to the various classes of building.

Title II lays down the additional provisions on the classification of high-rise buildings in which several activities are based and to the independence laid down in Article R. 122-2 of the aforesaid Code.

They are supplemented by the specific provisions applicable to each class of high-rise building included in Title III below.

In implementation of Articles R 232-12 and R 235-4 of the Employment Code, the provisions of the sections concerned of this Code shall not apply within the framework of this Regulation.

3. For the purposes of this Regulation, technical premises or groups of premises that cover an area of less than 50% of the current floor and that are accessible only from the terrace shall not be regarded as floors, within the meaning of Article R.122-2 of the Construction and Housing Code.

4. A single mezzanine shall be permitted per compartment; its surface area shall be included in the calculation of the surface area of the compartment.

By way of relaxation of Article H.R. 9, any mezzanines located within compartments and complying with the provisions of Article CO 11(4) of the amended Order of 25 June 1980 shall not be subject to the building's fire resistance requirement, provided that it can be ascertained that there is no risk of multiple collapse.

5. Where the present Regulation requires compliance with a French standard or with a non-harmonised European standard, this requirement shall not apply to products manufactured in accordance with standards, technical specifications or manufacturing procedures of a Member State of the European Community, or of another Signatory State to the Agreement on the

European Economic Area, or of Turkey, which enable an equivalent level of protection against fire to be provided.

However, a product may not be allowed to be placed on the market or may be withdrawn from the market if this level of protection cannot be offered in relation to the product. Such decisions are preceded by a procedure in which due hearing is given to the parties concerned.

6. Where this Regulation requires the certification of a product, such as the granting of the NF mark, this requirement shall not apply to products for which the equivalence of the level of protection against fire has been certified in a Member State of the European Community, another Signatory State to the Agreement on the European Economic Area, or Turkey. This equivalence shall be assessed in particular in terms of suitability for use in the fire protection systems mentioned in this Regulation. The certifying body must be accredited in accordance with standard NF EN 45011 by a body that is party to the Multilateral European Agreement laid down within the framework of European Cooperation for Accreditation. It shall issue certificates of conformity in accordance with the requirements of ISO/IEC Guide 65.

7. Where products are subject to CE marking, any item of proof of conformity other than that which allows the CE marking, referred to in this Regulation, shall cease to be required from the date of entry into force of this marking obligation. During the 'co-existence' period when manufacturers can use either French technical specifications or European technical specifications, it shall be permitted to provide proof of conformity of these products by referring to the French technical specifications.

8. Where they are carried out on the basis of a common reference, tests performed by the laboratories of other Member States of the European Community, of Signatory States to the Agreement on the Economic Area or of Turkey, accredited in accordance with standard NF EN ISO/IEC 17025 by a body that is party to the Multilateral European Agreement laid down within the framework of European cooperation for accreditation, shall be accepted as equivalent to tests performed in accredited French laboratories.

Article H.R. 2

Authorised activities

The following installations shall be authorised in implementation of Article R. 122-7 of the Construction and Housing Code and of the provisions of the Environment Code:

- electricity generators,
- heating and cooling installations,
- inverters,
- transformers.

Article H.R. 3

Terminology

1 – The fire resistance and reaction information that shall be laid down in this Regulation refers to Articles R. 121-1 to R. 121-13 of the Construction and Housing Code and to the texts in force. (1) Owners must be able to justify, in particular during visits by the safety committees and during technical inspections performed by approved bodies, that the building materials and components used have a fire resistance and reaction rating that is at least equal to the ratings laid down hereinafter in this Regulation.

Where a fire resistance requirement expressed in accordance with European ratings is introduced, the REI requirement may be reduced to EI if the component in question does not have a load-bearing function.

(1) Order of 10 September 1970 on frontages, amended Order of 21 November 2002 on the fire behaviour of construction products and fittings and amended Order of 22 March 2004 on the fire resistance of products, building and structural components.

2 – For the purposes of this Regulation, the following definitions shall be understood:

- general compartment alarm: signals transmitted with the aim of telling the occupants of the compartment to evacuate the premises. There must be at least one audible signal.

- alert: the act of requesting assistance from an emergency and firefighting service. A distinction may be made between the following:
  - internal alert: from a point in the building to the building's safety service;
  - external alert: from the building to the public fire and rescue services.

- normal power supply: supply coming from the normal source.

- alternative power supply: supply coming from the alternative source.

- safety electrical supply (S.E.S.): system that supplies the electric power necessary to operate the safety installations referred to below, in order to enable them to operate as effectively during normal operation, when the electric power comes from the normal-alternative supply, as during safety operation, when the electricity comes from the safety supply.

The safety electricity supply shall be deemed to be specific if it supplies only one of the safety installations and non-specific if it supplies several of them.

- lift: apparatus that serves specific floors, with the aid of a cage that moves either along rigid guides or along a fixed course in the absence of such guides. It shall be intended for the transport of persons, persons and goods, and goods only if the cage is accessible, i.e., if it is one in which a person can enter without difficulty and which is fitted with control devices inside the cage or within the reach of the person inside it.

- fire-retardant cable or C1, flame-retardant cable or C2, fire-resistant cable or CR1: The fire behaviour ratings of electrical cables and conductors (C1, C2, C3, CR1, CR2) during fires started by a source other than the cables, to which this Regulation refers, are laid down by the amended Order of 21 July 1994 on the classification and certification of the fire behaviour of electrical cables and conductors, and on the approval of testing laboratories.

- electrical wiring: unit consisting of one or more electrical conductors and of fasteners therefor and, where necessary, of mechanical protection therefor.

- fire load: Sum of the fire loads (expressed in MJ) that may be released by the complete combustion of all of the materials used in the building or located in a room (coverings, fixtures and fittings).

A fire load per unit of ground surface area or density of fire load (MJ/m2) may be determined.

- protected pipe course: pipe gallery, shaft, duct or air space, the volume of which is protected from external fire such that the wiring or equipment that use it may continue to function for a given period of time.

- communal horizontal walk area (C.H.W.A.): horizontal walk area that connects all of the access points to the stairways, lift landings and intercommunication facilities between compartments where they exist. Halls shall be classed as CHWAs.

- private horizontal walk area: walk area that has one of the following characteristics:
- pathway delimited by a partition that may have no fire-resistant characteristics;
-walk area or pathway not delimited by a partition but of which the design and signage must enable persons who use them to reach the exit without hesitating over which direction to follow.
A private horizontal walk area shall be compulsory in open-plan areas exceeding 300 m2;

- safety committee: shall apply to the EOP/HRB (establishments open to the public/high-rise buildings) subcommittee of the departmental safety and accessibility advisory committee;

- passageways: passageways shall consist of stairways and access points therefor, and horizontal walkways.

- primary load-bearing building component: building component, the collapse of which results in the collapse of the structure as a whole.

- safe waiting area: space created to allow wheelchair access and parking for persons with reduced mobility without this hindering the evacuation of the other occupants. It must be marked by a suitable sign and include appropriate instructions on what to do in case of incident. It shall have safety lighting and a voice link enabling the disabled person to signal his presence to the building's fire safety and evacuation assistance service.

The safe waiting area may be located:
- either in an intercommunication facility between a communal horizontal walk area and a stairway;
- or immediately adjacent to the aforementioned intercommunication facility under equivalent conditions that have received a favourable opinion from the safety committee.

- evacuation: action intended to enable occupants to leave a compartment that is the location of a fire or of any other event that may threaten their safety.

- stage one evacuation: in the event of the fire alarm sounding, the occupants of the compartment concerned shall move to a compartment in which they will be sheltered from the effects of a fire or of any other event that may threaten their safety.

- stage two evacuation: the occupants, having performed stage one of the evacuation, may move to the evacuation floor outside the building using the lifts and stairs.

- general evacuation: evacuation of all occupants to the exterior of the building, except the fire safety and evacuation assistance service.

- safety installations: installations that must be put into service or kept in service in case of

fire or in the event of failure of the normal-alternative power supply, to ensure people's safety. They shall comprise:

- minimum lighting: part of the lighting kept in service in the event of failure of the normal-alternative power supply;
- the fire safety system (F.S.S.) installations referred to in Article H.R.49, including smoke extraction fans;
- lifts, and the non-stopping of these devices in the damaged compartment;
- emergency water supplies (fire suppressors, water replenishment pumps, air compressors of automatic water extinguishing systems, etc.);
- drainage pumps;
- the mechanical ventilation, where present, of heat-affected rooms and of rooms containing accumulator batteries;
- the building's telecommunications referred to in Article H.R.50;
- the air conditioning of electricity service rooms;
- the ventilation of the electricity generator room;
- the mechanical ventilation or air conditioning system of the lift machinery rooms;
- …

- service lift: a lifting appliance serving specific levels, consisting of a cage whose interior is deemed inaccessible to persons due to its size and make-up.

- non occupation: a high-rise building shall be deemed to be unoccupied where the number of persons present in all the compartments is less than one person per 100 m^2 net floor area. In general, a class W high-rise building may be deemed to be unoccupied outside working hours and the hours in which cleaners are present. However, for the specific case in which normal activities in one or more compartments are performed outside normal working hours (subsidiaries working at the same time as parent companies with a time difference, for example), the assessment of the concept of non-occupation shall be subject to the opinion of the safety committee.

- hot work permit: document authorising the performance of hot work. The aim of the permit is to take all measures to prevent the risks of fire or explosion during works and to lay down the means and measures necessary to prevent and fight any initial fire that may break out on this occasion.

The hot work permit shall be signed by the developer or his qualified representative, by a representative from the central fire safety service (SSIAP 2 minimum) and by the operator. A copy shall be sent to each signatory. The validity period of the hot work permit must be specified; it shall be limited to one day or one operation. In the latter case, the maximum period of validity shall be five days, after which the hot work permit must be renewed.

- owner: term applicable to the owner, co-owner and association of co-owners;

- covering: product or group of products added to a building or structural component, designated as a support.

- normal power supply: supply consisting of a connection to the high-voltage or low-voltage public electricity distribution network or an independent internal generator.

- alternative power supply: supply distributing electrical power making it possible to operate all or part of the high-rise building in the event of failure of the normal supply.

Hereinafter in this Regulation, the unit consisting of the normal power supply and the alternative power supply shall be referred to as the 'normal-alternative power supply'.

- Electrical switchboard: group of electrical power control, protection and distribution devices grouped together in one medium. It may be contained within a casing such as: a cabinet, box, etc.

The term 'safety' shall be used where the aforesaid devices relate exclusively to safety installations.

The term 'normal' shall be used in other cases.

The term 'normal-alternative' shall be used where the supply may come from the normal or alternative source.

Control devices, even where grouped together, shall not constitute a switchboard.

- safety power supply:supply provided to keep in working order materials designed to counter the risks of fire and panic in the event of failure of the 'normal-alternative power supply'.

- fire safety system (F.S.S.): group of materials used to collect any information or orders relating exclusively to fire safety, to process them and to carry out the tasks necessary to protect a building from fire. In its most complex version, a F.S.S. consists of two main subsystems: a fire detection system (F.D.S.) and a fire protection system (F.P.S.). All F.S.S.s must comply with the provisions of Chapter XI, Section V of the amended Order of 25 June 1980.

- switching time: period of time between the moment when a fault in the normal power supply occurs and the moment when the voltage is available at the out-ports of the safety power supply.

- transfer switch: self-regulating sealing device consisting of an A.S.D. (Activated Safety Device), located in a transfer opening between an insulation lock and a communal horizontal walk area.

- protected technical area: room or cupboard, the area of which is protected from an external fire such that the materials that it contains may continue to function for a given period of time. This space must be reserved solely for this purpose and must not be used for storage.

The other technical terms referred to hereinafter in this Regulation are defined in the safety regulation on establishments open to the public and its technical instructions, as well as in the standards.

Article H.R. 4

Technical documents, checks and inspections

1. During the design stage, the safety notice accompanying the file provided at the time of construction work or land-use change and subject to the opinion of the safety committee, must be drafted in the order of the articles of this Regulation and make explicit reference to these articles and to all the additional technical documents. The technical instructions shall describe the frontages and the principles of the following technical and safety installations: high-, low- and medium-voltage electricity generation and distribution, water supply, air conditioning,

ventilation, smoke extraction, heating, technical room fittings, and emergency facilities. The drawings, together with the plans, sections and elevations of frontages necessary to gain a clear understanding of the project shall be attached to the safety notice.

Before the works begin on the frontages and technical installations, the developer must supplement the technical instructions by specifying detailed information in the form laid down by the safety regulation on establishments open to the public and by attaching the list of documents laid down in the chapters corresponding to the aforesaid regulation. These instructions and this list shall be sent to the safety committee.

2. The detailed information on the technical installations, provided when construction work or land-use change takes place and subject to the opinion of the safety committee, must be supplemented and supplied by the builder or owner before the work on these installations begins. It shall be presented, for each installation, in the form laid down by the safety regulation on establishments open to the public. It shall be accompanied by the list of documents laid down by the chapters of the aforesaid safety regulation and sent to the safety committee.

3. In implementation of Articles R. 122-23 and R. 122-28 of the Construction and Housing Code, the safety committee shall visit the building at the intervals specified below:

H.R.A. : 3 years;
H.R.O. : 3 years;
H.R.R. : 5 years;
H.R.S. : 5 years;
H.R.C.T.: 5 years;
H.R.U. : 2 years;
H.R.W. : 5 years;
H.R.Z. : 3 years;
S.: 3 years.

For buildings accommodating several classes of activity, the applicable interval shall be that which corresponds to the class of activity for which this interval is the most frequent.

The frequency of these checks may be changed, where necessary, by order of the mayor or Prefect, after receiving the opinion of the safety committee.

4. A certified copy of the decisions taken by the mayor following the inspection visits laid down by Article R. 122-28 of the Construction and Housing Code must be sent to the Prefect.

5. In order to obtain certification by the major, as laid down in Article R. 122-29 of the Construction and Housing Code, the safety register shall be accompanied by the last two technical inspection reports compiled, for each category of installation, according to the interval laid down in Article H.R.5.

Article H.R. 5

Technical inspections by approved bodies

Owners shall be obliged to have technical inspections performed, under the conditions specified below, by bodies referred to in Article R. 122-16 of the Construction and Housing Code.

Technical inspections concerning a single type of installation, except fire load inspections, must be performed throughout the building under the responsibility of one approved body.

1. Obligations of the developer or owner:

The developer or owner must send the inspectors a paper copy of the safety notice, the plans and detailed information on the technical installations, the requirements imposed by the building permit or works authorisation, as well as the history of the main alterations made and the requirements notified following inspection visits by the safety committees.

These inspections shall be performed in accordance with the provisions below:

2 Inspections during construction work:

Inspections in new or altered high-rise buildings shall be performed at the end of the visits made during the construction phase by the technical inspectors within the high-rise building. During these visits, the technical inspectors shall perform spot checks and ensure that the builders and fitters have performed the other exhaustive checks and tests that are incumbent on them.

The outcome of these visits shall make it possible to provide developers or owners, within the framework of a previously defined reference text, with a conformity assessment of the inspected object on completion of the work, in accordance with the regulatory provisions. This assessment shall be performed in accordance with the following methods:

- examination of design and execution documents;
- examination of the documentation provided (reports on the fire behaviour ratings of building materials and components, declarations of conformity, certificates of conformity, plans and diagrams, calculation notes, etc).

These inspections shall be the subject of a post-work regulatory inspection report (PWRIR).

3. Inspections in existing high-rise buildings:

3.1 They shall be performed according to the intervals below and shall consist in checking:

3.1.1 - every 6 months:

- the functioning of lifts fitted with priority call devices. This inspection shall be performed in the presence of the company responsible for maintaining these lifts.

- 3.1.2 – every year:
- the electrical installations and lighting of communal areas (under employee protection and this Order);
- the functioning of lifts not fitted with priority call devices. This inspection shall be performed in the presence of the company responsible for maintaining these lifts.
- the scenarios of the Fire Safety System;
- all of the activated safety devices;
- the operating conditions of the F.S.S.;
- the smoke extraction outlets of the stairways and twenty per cent of the emergency smoke extraction vents;
- the speed, flow rate and pressure of the mechanical smoke extraction installations of twenty per cent of the compartments;

Where it is stipulated above that twenty per cent of the vents or compartments shall be inspected each year, all of these vents or compartments must be inspected within five years.

- the extinguishing agents specified in Articles H.R. 51 to H.R. 55;
- the intercoms, the voice link apparatus specified in Article H.R. 63 and the safety telecommunications devices,
- the unlocking of the exits,
- the opening of the building's automatic sliding doors,
- other equipment performing a fire safety function that is not mentioned elsewhere;
- the installation of cooking or reheating apparatus intended for catering under the conditions laid down in Article GC 22 of the E.O.P. safety regulation;
- heating and cooking installations such as those laid down in paragraph 2 of Articles CH 58 and GZ 30 of the EOP safety regulation. ;

3.1.3. – every two years, the lightning conductors;

3.1.4 – every five years:
- the fire load assessments referred to in Article H.R. 61.

3.2 These inspections shall be performed in order to inform the owner, by means of clearly defined comments, of the state of the installations in relation to fire risk, so that he may take all measures necessary to remedy the observed defects.

The aim of these inspections, the content of which is laid down in the specific articles of this safety Regulation, shall be to ensure, as appropriate:
- the existence of the means necessary to service and maintain installations and equipment (designated technicians, maintenance contracts, instructions, maintenance logs, etc.);
- the maintenance condition of installations;
- the proper functioning of safety installations;
- the existence, proper functioning, regulating and operating of safety devices, provided that the inspections do not require destructive tests to be carried out;
- the compatibility of the installation with the high rise building's operating conditions;
- conformity with the regulatory provisions in relation to fire load.

To this end, the owner must send the approved inspection body the requirements notified following inspection visits by the safety committees, together with the safety register and the necessary technical documents.

Inspections in an existing high-rise building may be performed as appropriate:
- by means of an examination of the service and maintenance documents;
- by means of a visual examination of the parts that are accessible or made accessible at the request of the inspector;
- by means of functional tests.

They shall not replace the regulatory inspections performed during new builds, adjustments or alterations.

These inspections shall be the subject of a work regulatory inspection report (WRIR).

4. Inspections in existing high-rise buildings after formal notice has been given:

Inspections performed after formal notice has been given by the administrative authority in accordance with the opinion of the safety committee, shall consist:
- in performing inspections of the good condition and proper functioning of all or part of the designated equipment or installations;

- in verifying conformity or the capacity of technical installations to comply with the applicable regulatory requirements or with specific requirements;
- in verifying conformity or the capacity of building provisions to comply with the regulatory requirements or with specific requirements.

The safety committee shall specify the purpose, nature and reference of the requested inspections.

These inspections shall be the subject of a formal notice regulatory inspection report (FNRIR).

5. Regulatory technical inspection reports for high-rise buildings shall be compiled in accordance with the provisions appearing in the appendix to this chapter.

6. As soon as it has been brought to his attention, the owner must remedy the unavailability of the safety equipment. Within one month following their inspection, the owner must, where necessary, take all the measures necessary to repair the various installations.

APPENDIX

on technical inspection reports

The various inspection reports:

1 :
The post-work regulatory inspection report (PWRIR)

Le PWRIR shall include at least two parts:
- general and administrative information on the high-rise building;
- the opinions issued by the technical inspector(s) in implementation of the reference text referred to in Article H.R. 5(2).

1.1 General and administrative information that must appear at the beginning of the report:
- Identification of the approved body;
- Reference to the accreditation body (logo, acronym, etc.) of the approved bodies;
- Identification of the developer and/or owner;
- Identification of the inspector(s);
- Inspection completion date;
- Report issue date;
- Name and address of the high-rise building;
- Characteristics of the high-rise building:
- class: according to the purpose for which the high-rise building is used, with clarification, where necessary, of the type(s) and category(ies) of establishments open to the public that are contained therein;
- brief description of the technical installations (in particular, for electrical installations, it should be specified whether these are normal, alternative or safety power supplies);
- Applicable legislation;
- Nature and scope of the task assigned to the approved body;
- Nature and scope of the inspections performed;
- Identification of the measuring or testing materials used;
- References of the report;

- List of documents examined.

1.2 Opinions in relation to conformity

1.2.1 Form of opinions

Opinions shall be issued in one of the following forms:

- in compliance (C)
- not in compliance (NC)
- not applicable (NA)
- outside scope (OS)
- for future reference (PM)

NC: NC opinions shall be issued where discrepancies are observed between the regulatory requirements and the works carried out. They shall also correspond to non-performed services, the assessment of which cannot in fact be performed or to the absence of one or more supporting documents intended for the developer.

NA: NA opinions shall be issued where the high-rise building does not include certain provisions or technical installations mentioned in the safety regulation; the inspector may group together several articles, or even sections or chapters, on a single line where the provisions that are referred to therein do not apply.

OS: The indication OS shall apply to articles of the regulation whose inspection has not been assigned to the approved body.

PM: The indication PM shall apply to articles of the regulation that do not require an assessment of conformity as part of the task.

1.2.2 Issuing of opinions

Opinions in relation to compliance shall be issued in the order of the general provisions of the safety regulation followed by the specific provisions, or with specific provisions included in the corresponding general provisions.

With regard to adjustments or alterations to an existing high-rise building, the only articles mentioned shall be those of the part of the reference text that relates to the works.

Opinions in relation to non-compliance shall be the subject of an explanatory note. A full list of these opinions on non-compliance, together with their explanatory notes, numbered in a single series, with the parts of the installations concerned identified, shall be drawn up at the beginning or end of the report.

The content of the report shall be supplemented, where necessary:

- by documents provided by the developer or owner:
- certificate by means of which the developer or owner attests that they have performed all of the technical checks relating to solidity and to the safety of persons in accordance with the texts in force;
- certificate of the inspection body specifying that the solidity inspection has indeed been performed. This certificate shall be supplemented by summaries of the conclusions of the inspection reports, attesting to the solidity of the structure;
- by a reminder of the requirements annexed to the building permit or works authorisation, in so far as they reduce or increase the provisions of the safety regulation.

The other forms of issuing opinions may be the subject of an additional note or comment, where necessary.

2 :
The work regulatory inspection report (WRIR)

The report shall include at least two parts:
- general and administrative information on the high-rise building;
- the observations made by the technical inspector(s).

2.1 General and administrative information:
- Identification of the owner;
- References of the report;
- Name and address of the high-rise building;
- Class: according to the purpose for which the high-rise building is used, with clarification, where necessary, of the type(s) and category(ies) of establishments open to the public that are contained therein;
- Identification of the approved body;
- Reference to the accreditation body (logo, acronym, etc.) of the approved bodies;
- Identification of the inspector(s);
- Brief description of the high-rise building and of the inspected installation(s) including the history of the main alterations declared by the owner;
- Nature and scope of the inspection performed;
- Inspection date;
- Report issue date;
- Identification of the measuring or testing materials used;
- Existence of an updated or non-updated security register.

2.2 Outcome of inspections.

2.2.1 Form of opinions

Each installation or part of an installation inspected shall be subject to one of the following opinions:
- satisfactory (S)
- unsatisfactory (U)
- not inspected (NI)

S: An opinion S expresses the finding that a high-rise building or an installation has maintained its state of conformity, acquired at the time of commissioning or after a major alteration. It confirms that the functioning, servicing and maintenance of installations and equipment complies with the establishment's operating conditions.

Where the inspector does not have access to items enabling him to establish with certainty the regulatory reference that applies to all or part of the subject of his inspection, the maintaining of conformity shall be assessed on the basis of the regulatory provisions in force. In this case, if a discrepancy is observed, it may only result in a satisfactory opinion if it does not reflect a situation that is liable to compromise the safety of occupants.

NI: The non-inspection of an installation, or of parts of inspections, for operating or inaccessibility reasons, shall be pointed out and justified in the report.

U: Case that is not the subject of a satisfactory or not inspected opinion.

2.2.2 Issuing of opinions:

Defects observed during inspections shall give rise to clearly worded comments.

Where the inspector does not have access to a precise regulatory reference, such as that laid down in paragraph 2.2. above, the issued opinion must be the subject of a sufficiently explanatory note.

All of these detailed comments shall form the subject of a summary list drawn up at the beginning or end of the report, numbered in a single series, with the parts of the installations concerned identified.

Where the comments concern the same type of installation or safety device (flap gates, shutters, etc.), they shall be grouped together.

3.

Formal notice regulatory inspection reports: (FNRIR)

The report shall include at least three parts:

- the general and administrative information laid down in paragraph 1.1. above including the references to the report of the safety committee that forms the basis of the requirement or of the formal notice;
- the opinions in relation to compliance laid down in paragraph 1.2. above, adapted to the legislation applicable at the time of submission of the building permit or works authorisation application. In the absence of documentation relating to the fire behaviour ratings of building materials and components, the inspector shall undertake, as far as possible, to estimate the fire behaviour of these building materials and components, and the opinions shall thus be those laid down in paragraph 2.2 above. In the event of it being impossible to assess conformity, in particular where this assessment would require destructive tests not authorised by the owner, the inspector shall highlight the reasons for the impossibility in his report;
- the content of the work regulatory inspections under the conditions laid down in paragraph 2.2 above.

CHAPTER II
Construction

Section I
Siting and environment

Article H.R. 6
Access routes for fire engines

1. The exits of buildings on floors accessible to the vehicles of the public fire and rescue services may not be located more than 30 metres from a route open to traffic at its two ends and permitting the movement and parking of these engines.

2. On these routes, a pathway with the following minimum characteristics must be permanently reserved for firefighters:

- Clearance height: 3.50 metres;
- Width of the road, excluding lay-bys: 3.50 metres;

- Load-bearing capacity of 160 kilonewtons calculated for a vehicle with a maximum of 90 kilonewtons per axle, the axles being at least 3.60 metres apart;
- Shear resistance: 80 Newton/cm^2 over a minimum surface of 0.20 m^2;
- Minimum inner radius R: 11 metres;
- Extra width $E = \frac{15}{R}$ in bends with an inner radius of less than 50 metres;

(E and R: extra width and inner radius, expressed in metres)
- Slope less than 15 p. 100.

3. A public or private parking bay for fire engines must be in proximity to the building. Its characteristics shall be determined with the public fire and rescue services.

Article H.R. 7

Insulation from adjoining buildings, protected area

1. In implementation of Articles R. 122-2 and R. 122-9 of the Construction and Housing Code, a high-rise building must be insulated from adjoining buildings by a wall or a vertical frontage with a full-height 2-hour or REI 120 fire break capacity, or by a protected area.

2. The lateral boundary of the protected area shall consist of a vertical surface located at least 8 metres from any point of the building's frontages that do not have 2-hour or REI 120 fire break capacity.

The lower boundary of the protected area shall consist either of the ground, or of adjoining buildings or parts of adjoining buildings with 2-hour or REI 120 fire break capacity.

3. A high-rise building may not be built if the lateral boundary of its protected area encroaches on adjoining property. However, this rule may be disregarded in the following cases:

- the owner of the property has obtained the consent of the owners of the adjoining property to create, by means of an authenticated document, an agreed easement subjecting the aforesaid encroachment to the provisions of Article H.R. 8(3);
- the adjoining property complies with the provisions relating to the independence of spaces situated within a high-rise building laid down in Title II, Chapter II of this Regulation.

Article H.R. 8

Easement of the protected area

1. With the exception of the buildings referred to in paragraphs 2 and 3 below, the protected area must be clear of any combustible materials, vegetation excluded.

2. Buildings located completely or partly within the boundary delimited on the horizontal plane by the projection of the most prominent elements of the high-rise building, must comply with the provisions applicable to this building.

This provision shall not preclude the creation of establishments open to the public on the building's lower floors under the conditions laid down in Title II of Chapter II of this Regulation.

3. Other buildings, located completely or partly within the protected area, must comply with the following provisions:

- the floor of the highest storey shall be situated at least eight metres from the external storey accessible to the public on foot;
- the exits on this storey must be able to be reached at any time from the fire engine access routes by a safe walk area of less than 60 metres. Any positive or negative slope on this route shall be included in the calculation of the length of the walk area over a distance of five times the difference in storey;
- structures must be independent of the high-rise building and have 2-hour or R 120 fire resistance capacity;
- external walls, roofing and frontages located in the protected area must have 2-hour or RE 120 flame resistance capacity. This provision shall not apply to frontages constructed at right angles to the high-rise building that comply with the provisions of Article H.R. 13;
- premises may not house installations classed as prohibited by Article R. 122-7 of the Construction and Housing Code.

Section II
Structures

Article H.R. 9
Fire resistance

The fire resistance capacity of the structural components of the building (columns, beams, floors, etc.) must be 2-hours or R 120.

Article H.R. 10
Walls adjacent to other structures – Connecting bridges

1. Crossing devices in walls of buildings adjacent to other structures, of which there shall be no more than two per compartment, must be located in the communal horizontal walkways for high-rise buildings and open onto the communal parts for other, non-high-rise, buildings. They must comply with the provisions of Article H.R. 25.

2. Walls separating a high-rise building from a car park that is not contained therein must have 4-hour or REI 240 fire break capacity within the boundary of the high-rise building's protected area. Only one communication with an independent car park may be permitted.

The communication must open solely and directly onto the main access hall for pedestrians and may not be regarded as an evacuation area.

This communication must be achieved by means of an intercommunication facility with 4-hour or EI 240 fire break capacity, fitted with two doorsets with 2-hour or E 120 flame resistance capacity and 1-hour fire break capacity, equipped with a door closer or EI 60 – C.

The intercommunication facility must be under excess pressure in case of fire. If the doors are kept open for operating reasons, they must comply with the provisions of Article CO 47(1) to (3) of the amended Order of 25 June 1980.

The fire detection system of the high-rise building must include a detector located within the car park, immediately adjacent to the intercommunication facility.

This detector must control the closing of the intercommunication facility's doors and its placing under excess pressure.

This intercommunication facility shall be placed under the responsibility of the owner of the high-rise building or of his representative.

3. In the event of premises adjacent to the building presenting a risk of explosion, the insulation measures and the structural components of the high-rise building that are adjacent to these premises must be determined accordingly. Any communication, whether direct or indirect, with the high-rise building shall be prohibited.

4. The installation of connecting bridges between a high-rise building and an opposite building shall be authorised subject to compliance with the following provisions:
- the number of bridges shall be limited to 2 per compartment;
- they must end in a communal horizontal walk area;
- they must have ½-hour or R 30 fire resistance capacity;
- access to the bridge from the high-rise building shall be obtained by means of an intercommunication facility in compliance with the provisions of Article H.R. 25 with the exception of the automatic sprinkler-type extinguishing system; where the bridge connects a high-rise building to a non-high-rise building, access to the bridge from this other building shall be obtained by means of an intercommunication facility with half-hour fire break capacity fitted with a door closer or EI 30 – C;
- no rooms shall open onto the bridge;
- only the provisions laid down in Article H.R. 13 shall apply with regard to the bridge walls;
- each bridge shall have at least one smoke extraction outlet as laid down in Article H.R. 29(3). This provision shall not apply where the bridge connects two high-rise buildings.

In addition, the high-rise building's automatic fire detection system must include a detector situated immediately adjacent to the intercommunication facility, on the bridge side.

The sensitisation of this detector must control the closing of the intercommunication facility's doors.

This intercommunication facility shall be placed under the responsibility of the owner of the high-rise building or of his representative.

A bridge may not be regarded as an evacuation area.

It shall not contain any premises, fittings, stores or materials that constitute an appreciable fire load.

The maintenance of the bridge shall be placed under the responsibility of the owner of the high-rise building or of his representative.

Article H.R. 11

Integrated car parks and hazardous rooms located within the building

1. A car park that forms an integral part of the high-rise building as laid down in Article R.122-2 of the Construction and Housing Code must comply:
- with the general provisions laid down in Articles R.122-9 and R.122-10 of the Construction and Housing Code;
- with the provisions of this safety Regulation referred to hereinafter in this paragraph;
- with the technical, non-binding and non-attenuating provisions laid down in Chapter VI of Book IV of the safety regulation to counter the risks of fire and panic in E.O.P.s. (type PS), with the exception of paragraphs 2 and 3 of Article PS 9;
- with the following provisions, notwithstanding the measures laid down in the aforesaid safety regulations:
  - compliance with the fire safety measures in a covered car park shall be guaranteed by the owner of the high-rise building or by his representative;

- technical premises not linked to the operation of the car park may not communicate with the inside of the car park;
- the automatic fire detection system shall cover the entire car park. The sensitisation of a detector in the car park shall result in the operation of the provisions laid down in Article PS 27(2)(b) alone, without delay;
- by way of derogation from the provisions of Article PS 18(4)(4), manual smoke extraction controls shall be grouped together within the central fire safety post;
- the floors and vertical walls separating the car park from the rest of the high-rise building shall have 2-hour or REI 120 fire break capacity;
- an automatic sprinkler-type extinguishing system, conforming to the standards, must be installed;
- each compartment of the car park shall have a communal horizontal walk area;
- the walls separating the communal horizontal walk area from the area reserved for parking and traffic shall have 2-hour or REI 120 fire break capacity. Access to a communal horizontal walk area from the car park shall be obtained by means of an intercommunication facility with 2-hour or REI 120 fire break capacity fitted with doorsets with 1-hour flame resistance capacity equipped with door closers that either have an automatic fire detection controlled closing mechanism or are E 60 - C;
- charged fire hoses and the orifices of dry or wet standpipes shall be positioned in these walkways, in proximity to the car park access facilities, and shall not represent an obstacle for people;
- if stairways additional to those serving the other floors of the building are installed in order to comply with the provisions of Article PS 13 and if they are not served by a communal horizontal walk area, they shall be protected by a wall with 2-hour or REI 120 fire break capacity and placed under excess pressure under the conditions laid down in the technical instruction on smoke extraction in high-rise buildings;
- if these stairways open onto the building's protected area, the exit door shall have 1-hour or EI 60 fire break capacity.

By way of derogation, the fire resistance requirements laid down in Chapter VI of the aforesaid Book IV may be applied to parts of the car park that are located outside the protected area.

2. In premises of the building that present specific fire risks, the safety committee may request higher fire resistance capacities, in proportion to the risks, for load-bearing elements and walls.

Section III
Frontages and roofing

Article H.R. 12
General information relating to frontages

Frontages shall be designed and built such as to limit the spread of fire from one compartment to another:
- via the points at which the frontages meet structures and walls at the boundaries of the compartments;
- via the outside.

Frontages or parts of frontages with a load-bearing function shall have 2-hour or R 120 fire resistance capacity.

The compliance of frontages with the regulatory provisions of Articles H.R. 12 and H.R. 13 shall be confirmed by a certificate of the Scientific and Technical Building Centre, of EFECTIS France, or of any other laboratory recognised as competent by the central safety committee.

Article H.R. 13

Fire behaviour of frontages

Parts of frontages that are subject to a fire resistance requirement must not contain comfort openings that are liable to be open in case of fire.

In order to apply the following provisions, tangential planes shall be considered for curved frontages. The provisions applicable to frontages shall apply to roofs that form an angle of less than 30° to the vertical.

A REQUIREMENTS FOR ALL FRONTAGES

1. The mobilisable combustible mass (M) of a frontage must be less than or equal to 130 MJ/m², with account taken of all of the materials used in its construction.

If the mobilisable combustible mass (M) of the frontage is greater than 130 MJ/m^2, a file shall be submitted for the opinion of the central security committee under the conditions laid down in Article R.122-11-6 of the Construction and Housing Code.

The same obligation shall apply if the frontage is the subject of a significant technical innovation.

Frontage components and equipment shall be class M0 or A2-s3, d0, with the exception:

- of timber carpentry frames;
- of class M2 or C-s3, d0 carpentry frames;
- of class C-s3, d0 carpentry frames with their mineral glass inserts (and any spacers);
- of class C-s3, d0 mineral glass components assembled with their spacers;
- of class M2 or C-s3, d0 paints and waterproofing systems;
- of class M1 or B-s3, d0 awnings or integrated blinds;
- of joints and joint packings.

B REQUIREMENTS FOR GLASS FRONTAGES

For glass frontages, it shall be necessary:

- either to implement the building provisions laid down in technical instruction No 249, with the C+D rule applied in accordance with:
  - C+D ≥ 1.2 m where M ≤ 80 MJ/m²
  - C+D ≥ 1.5 m where M ≤ 130 MJ/m²

- or to prove the fire resistance capacity of 1-hour, external to internal fire or $E_{o \rightarrow i}$ 60 flame resistant frontages with use of the standardised thermal programme.

Where two consecutive frontage planes, of the same high-rise building or of a high-rise building and an adjacent structure, form a vertical concave dihedral at an angle of less than 100°, the parts of the frontages located within the dihedral shall have 1-hour or $E_{i \rightarrow o}$ 60 fire-break flame resistance capacity over a width of at least 4 metres, from the edge of the

dihedral, in order to limit the spread of fire caused by thermal draught. This provision shall not apply to contractions or projections of less than 1 metre.

Between two compartments located on the same storey of a high-rise building or between a high-rise building and an adjacent structure, the consecutive frontage planes of which form a concave angled dihedral, the following provisions shall be complied with:

- where the dihedral angle is less than 135°, the parts of frontages located on both sides of the dihedral edge shall have 1-hour or $EW_{i \rightarrow o}$ 60 fire break capacity over a width of at least 2 metres, in order to limit heat transfers by radiation;
- where the dihedral angle is greater than or equal to 135°, but less than 180°, the parts of frontages located on both sides of the dihedral edge shall have 1-hour or $EW_{i \rightarrow o}$ 60 flame resistance capacity over a width of at least 1 metre, in order to limit the spread of fire by convection under the effect of a cross wind.

C REQUIREMENT FOR NON-GLASS FRONTAGES

The requirement stipulated for non-glass frontages shall be 1-hour, external to internal fire, or $E_{o \rightarrow i}$ 60 flame resistance capacity with use of the standardised thermal programme.

Article H.R. 14

Roofing

Roofs shall be classified as B_{ROOF} (t3) within the meaning of the Order of 14 February 2003, and the use of materials liable to tear in flames in case of fire shall be prohibited.

Section IV
General building components and interior fittings

Article H.R. 15

Reaction to fire of building materials
(Repealed)

Article H.R. 16

Limitation of the fire load of building components except horizontal and side wall coverings.

1. The surface fire load of materials used in the construction of buildings must be less, on average and per compartment, than 255 MJ/m2 net floor area.

The combustible mass of a frontage shall not be taken into account under this article.

In the calculation of this surface fire load, category M0 or class A1 or A2 materials used in the construction of buildings shall be excluded.

2. The developer must provide the owner with evidence of the fire load laid down in paragraph 1 and list the various elements taken into account for this calculation.

Article H.R. 17

General provisions relating to cages, shafts and ducts

1. Lift, service lift and goods lift shafts must have walls made from class A1 materials with 2-hour or REI 120 fire break capacity, subject to the requirements of Articles H.R. 18 and H.R. 19 below on hatches and inspection doors.

By way of relaxation of the above provisions, lift cages may have walls made from class A2 – s1, d0 materials with a two-hour or EI 120 fire resistance capacity under the conditions of implementation that have received a favourable opinion from the C.E.C.M.I. (committee for the study and classification of materials in relation to fire risk), guaranteeing that the aforementioned performances are achieved.

2. Where a duct crosses a wall, it must possess the fire resistance characteristic of the crossed wall. This resistance may be obtained:

- either by the duct on its own if it possesses a sufficient fire resistance capacity;
- or, otherwise, by placing the duct in a sheath with the required fire resistance capacity, or by installing an automatic sealing device providing an equivalent fire resistance capacity (flap gate, shutter or any other device classified in accordance with the standard NF EN 1366-3) in the crossed wall.

3. In general, service shafts or ducts may not be located or opened in lift cages and their access points, or on lift landings where these are protected in implementation of Article H.R. 31 below.

These provisions and those of paragraph 2 above shall not apply to dry or wet standpipes, or to automatic sprinkler-type extinguishing systems or systems suitable for the existing risks.

Article H.R. 18

Specific provisions applicable to non-intersected vertical shafts

1. Lift cages, lift and service lift shafts and vertical service shafts, the intersection of which at floor level is prevented by the purpose for which they are intended, must contain only communication points, hatches or inspection doors with 2-hour or EI 120 fire break capacity that are kept locked, except for the cases referred to in the following paragraph.

Communication points between stairways and compartments, and between lifts and compartments, must comply, depending on the case, with the requirements of Articles H.R. 25 or H.R. 31.

2. The 2-hour or EI 120 fire break capacity stipulated above may be obtained for service shafts by the addition of the fire break capacities of the hatch or inspection door and of the doorset of the room providing access to these points. This room must not contain any combustible material, with the exception of the doorsets, and its walls must have a fire break capacity that is at least equal to that of its access door.

These shafts, with the exception of the lift and service lift shafts, must have automatic smoke extraction devices and be protected on every fifth floor by a fixed automatic sprinkler-type extinguishing installation conforming to current standards or suitable for the existing risks on the advice of the safety committee.

3. In addition to paragraphs 1 and 2 above, the shafts of mail lifts or of mechanised devices for transporting documents or other objects must be fitted, in their vertical part, with fire detectors on at least every third floor. Before being installed, mobile devices for sealing

access to these shafts must be the subject of a test report compiled by an approved laboratory and confirming their suitability as sealants.

Each shaft must be regarded as a specific safety area, and the closing of mobile sealing devices must be performed under the conditions laid down in Article H.R. 49(7), with the sensitisation of one of the detectors installed in the shaft controlling all of its sealing devices.

4. The installing of waste pipes shall be prohibited in high-rise buildings.

Article H.R. 19

Specific provisions applicable to intersected vertical shafts

1. All vertical service shafts must have 2-hour or EI 120 fire break capacity and be intersected on each floor by partitions with 2-hour or EI 120 fire break capacity, with no gaps left between the ducts.

2. The hatches and inspection doors of these shafts must have half-hour or EI 30 fire break capacity and be kept locked.

Their surface per shaft and per floor must be limited to 0.8 m^2 for shafts containing heating or ventilation air ducts and to 1.40 m^2 for shafts containing discharge or water supply ducts, cables, wiring or electrical switchboards.

In addition to these surfaces, hatches and inspection doors must have 1-hour or EI 60 fire break capacity.

Article H.R. 20

Specific provisions applicable to horizontal shafts

1. The hatches and inspection doors of horizontal shafts must have a fire break capacity that is equal to half that of the shaft.

Article H.R. 21

Ceilings, suspended ceilings

1. Ceiling coverings must be category M1 or class B – s3, d0. In addition to this provision, they must be category M0 or class A2 – s2, d0 in communal passageways, halls and communal kitchens.

The supporting wall of the covering must be category M0 or class A2 – s3, d0.

2. The components making up suspended ceilings must be class B - s3, d0. In addition to this provision, they must be class A2 – s2, d0 in communal passageways, halls and communal kitchens.

3. Suspended ceilings must have quarter-hour fire resistance capacity in communal passageways and halls.

4. Any plenum chambers between the ceiling and the suspended ceiling must be intersected every 25 metres by components made from category M 0 or class A2 - s2, d0 materials, and have half-hour or E 30 flame resistance capacity. Units composed in this way must have a

maximum surface area of 300 m^2. If it exceeds 0.20 metres in height, the plenum chamber must be able to be examined in all the units.

The plenum chamber may only contain category M 2 or class C – s3, d1 materials, with the exception of electrical wiring.

5. Suspended ceilings may not be taken into account for the calculation of the fire resistance of floors.

6. The hanger and fastening of suspended ceilings must be made from class A2 materials and made in accordance with the provisions of standard NF P 68-203.1.

7. Suspended ceilings installed in passageways must remain in place under the effect of pressure variations due to the operation of mechanical smoke extraction.

Article H.R. 22
Floor coverings and side wall coverings

1. All the support wall coverings referred to by this article must be made from category M0 or class A2 – s3, d0 materials.

2. Floor coverings must be category M3 or class C_{FL} - s1.

3. Side wall coverings must be category M 1 or class B – s3, d0.

In addition to these provisions, in communal passageways, halls and communal kitchens, side wall coverings must be category M 0 or class A2 –s2, d0.

Category M3 or class D materials shall, however, be authorised for doorsets and skirting, and category M1 or class $A2_{fl}$ materials for access floors (plenum side).

The fire behaviour rating of wallpaper pasted and paint applied to walls shall be justified under the conditions laid down in Annex III to the amended Order of 21 November 2002.

Section V
Passageways: stairways, horizontal walkways and doors

Article H.R. 23
General provisions

1. Passageways must be wide enough to accommodate at least two passage units, within the meaning of Article CO 36(2) of the safety regulation on establishments open to the public.

2. These passageways must also comply with the provisions of Articles CO 37, CO 38(1), CO 42, CO 44, CO 45, CO 46, CO 48, CO 50, CO 51, CO 53(4) et CO 55 of the aforesaid regulation.

3. Communal horizontal walkways must be enclosed by vertical and horizontal walls with 1-hour or REI 60 fire break capacity that do not comprise any storage areas opening onto the walkways. The doorsets of these walls must have half-hour flame resistance capacity and be fitted with door closers or E 30 – C. The inspection covers of the plenum chambers specified in Article H.R.21(4) must have 1-hour or EI 60 fire break capacity and be kept closed.

By way of relaxation, a 'reception' area per compartment, with a maximum surface area of 15 m^2, opening directly onto the communal horizontal walk area, shall be authorised under the following conditions:

- it is located outside the communal horizontal walk area;
- it is intended exclusively as a reception area;
- it is furnished with category M1 or class B – s3, d0 materials, limited to 750 MJ per m^2, without storage;
- at least one detection point, situated above the 'reception' area, is connected to the walk area detection unit.

4. Stairways serving the floors, on the one hand, and the bottom levels, on the other, must end at the highest level for pedestrian access. On this level, each stairway must have an exit providing direct access to the outside, except where these stairways open onto a hall that opens largely onto the outside. No communications shall exist between the areas of these stairways.

On this level, the stairway access points must be linked by a communal horizontal walk area.

However, exemptions may be granted by the safety committee in the case of renovations or adjustments in existing buildings.

5. Access points for use by firefighters must be indicated and marked.

6. In order to define the passageways of a building's premises, the number of persons permitted in these premises shall be determined, by type of activity, in accordance with the specific provisions of establishments open to the public. However, for premises in which activities are performed that are restricted to the staff of businesses installed in the building and to their occasional guests (private or professional), where the latter are accompanied, it shall be permissible for the staff to be made the subject of a declaration controlled by the manager of the establishment.

7. The locking of doors opening directly onto the outside, referred to as the building's main doors, in the direction of the entrance, shall be authorised subject to compliance with the following provisions:

- that it be possible to leave the building by turning the handle of each door fitted with the locking device except where these doors are locked under the conditions laid down in paragraph 2 above;
- that all the doors are unlocked from the central fire safety post;
- that all the doors are automatically unlocked in case of fire in a compartment;
- that the doors are manually unlocked by the fire safety and evacuation assistance service with the aid of keys.

Article H.R. 24

Stairways

1. On all levels, each stairway referred to in Article R. 122-9 of the Construction and Housing Code must be accessible from any occupied premises. These stairways must have straight flights. The maximum distance, measured along the axis of the communal horizontal walkways from the door of a dead-end room to the junction of two walkways, each leading to a stairway, shall not exceed 10 metres.

By way of derogation from Article H.R. 23(1), stairways may only contain one passage unit where they serve compartments accommodating fewer than one person per 100 m^2 net floor area.

2. Stairway access points must be more than 10 metres but less than 30 metres apart.

These distances shall be measured along the axis of the communal horizontal walkways between the stairway access points. Where there are several pathways, at least one must be less than 30 metres.

3. Outdoor areas shall not be included in the calculation of the distances separating the stairways referred to above.

4. In the case of stairways located outside the building, their walls, by way of derogation from the provisions of Article H.R. 17(1) above, may not have 2-hour fire break capacity but must protect them from flames, smoke, and inclement weather. If local atmospheric conditions do not preclude it, these stairways may be located outside. In this case, at least one side must be completely open on the outside, it must be at least two times the width of the stairway and located at least 2 metres from the building's bays.

Article H.R. 25

Intercommunication facilities

1. In accordance with the provisions of Article R. 122-10 of the Construction and Housing Code, communications from one compartment to another and with stairways must be guaranteed by facilities with 2-hour or EI 120 fire resistance capacity fitted with two doorsets with 1-hour or E 60 flame resistance capacity and half-hour or EI 30 fire break capacity, which can be reached by isolated persons without the air in the two compartments and in one compartment and a stairway coming into direct contact. An intercommunication facility between two compartments must connect two communal horizontal walkways.

2. In addition to the provisions of Article R. 122-9 of the Construction and Housing Code, during operation of the smoke extraction system, the intercommunication facilities between compartments must always be under excess pressure.

3. By way of derogation from the provisions of Article H.R. 23(1) and (2), the doors of the facilities referred to in paragraph 1 may contain only one passage unit. This exemption shall not apply to the stairway exit facilities located on the pedestrian access floor specified in Article H.R. 23(4).

4. Intercommunication facilities must a minimum surface area of 3 m^2 and a maximum surface area of 8 m^2. They must contain only two doorsets; the walk area between the two doorsets must be at least 1.40 metres long and must be obstacle-free.

Any shutter or hatch providing access to the shafts or ducts shall be prohibited, with the exception of the dry or wet standpipes, the shutters of the smoke extraction ducts and the electrical or telephone cables specific to the facilities.

5. Where the intercommunication facilities provide access to the stairways laid down by Article H.R. 24, their doors must:

- open outwards towards the stairway;
- be fitted with a door closer;
- bear an information plate with the words 'Fire door. Keep closed' only, in white letters on a red background. This plate shall be attached to each door, on the horizontal walk area side, on the one hand, and on the inside of the facility for the door providing access to the stairway, on the other.

Where the facilities connect two compartments on the same floor, their doors must be:

- either kept closed in the normal position and fitted with a door closer;
- or have an automatic closing mechanism and the NF mark; they must therefore operate under the conditions laid down in Articles H.R 49. In this case, the doors must have common A.S.D.s.

They shall open towards the inside of the facility and bear the information plate described in the paragraph above on the outside of each of the facility's doors.

6. By way of derogation from paragraph 1 above, and for operational requirements, intercommunication between two compartments located on the same floor may be achieved by means of a bay.

This exemption shall be subject to the opinion of the safety committee and to compliance with the following provisions:

- the bay shall be fitted with an automatic closing device with 2-hour or EI 120 fire break capacity. This device shall have the NF mark and shall operate under the conditions laid down in Article H.R. 49. It shall have a common A.D.S;
- if the device may not be manoeuvred by hand when closed, the bay shall be coupled, in its immediate vicinity, with a crossing device in accordance with paragraphs 1 to 5 above;
- the two linked compartments shall be fitted with an automatic sprinkler-type extinguishing system conforming to the standards or with a fixed automatic extinguishing installation suitable for the existing risks on the advice of the safety committee;
- an information plate bearing the words: 'Fire door. Do not obstruct closure', in white letters on a red background, must be affixed in a prominent position, near the bay, in each compartment.

This exemption shall be permissible only on the pedestrian access floor and on the two adjacent floors located above and below it; it shall, however, be permissible on all levels reserved for car parking.

Article H.R. 26

Permanent monitoring of the insulation of compartments

The following devices shall contribute to the permanent insulation of compartments:

- the doorsets of the insulation locks referred to in Article 25(5);

- the lift and service lift doors referred to in Article H.R. 31(1)(d) of which the landing door on its own shall guarantee the 2-hour or EI 120 fire break insulation;
- the doors for access to the non-intersected service shafts referred to in Article 18.

These devices shall constitute non-controllable safety devices, the normal operating position of which is the same as the safety position.

Prolonged defects in the position of these devices must be reported. The general display of information relating to each compartment must:
- be reported to the central safety post;
- be separate from that relating to the compartmentation function;indicate a fault in the standby position.
-

A maximum 60-second time delay may be specified to signal the opening of these doors in order to prevent faults from being signalled accidentally.

Article H.R. 27

Management of access control devices in case of fire

1. An access control system consists of devices that may affect:

a) on floor(s) providing pedestrian access to a building, access from the halls:
- to the lift landings,
- to the stairways;

b) on the other levels of the building, access to the communal horizontal walkways of the floors from:
- the lift landings,
- the stairways;

c) access to private areas from the floors' communal horizontal walkways.
The locking of floor access points, by means of access control devices, shall be permitted subject to compliance with the conditions laid down below.

2. General release control principle:

The release control of the access control devices shall permit:
- the evacuation of the occupants of the affected compartment, to unaffected compartments or to the outside of the building;
- the removal of any obstacles to the effectiveness of the smoke extraction system, whatever their height, in the affected compartment when the smoke extraction system is activated;
- the intervention of the emergency services from the unaffected compartments.

Regardless of where they are installed, the access control devices, with the exception of those referred to in paragraph 1(c) above, must be released automatically across all the floors of the building that are fitted with such devices (release control obstacles and systems) and this, as soon as the alarm process is activated in any one of the building's compartments.

A specific manual control device, intended for all the floors, located at the central fire safety post, must enable the automatic control to be backed up.

3. Specific provisions to be applied in addition to the above provisions:

- a) on floor(s) for pedestrian entrance to a building:

  - the exit of the lift cages must comply with the requirements of Article CO 45(2) of the amended Order of 25 June 1980,
  - the lift cage access doors must be able to be unlocked locally by the safety service, using keys or any other equivalent device authorised by the safety committee,
  - The access control devices, from the halls to the lift landings, must comply with the provisions of Article CO 46(2) of the amended Order of 25 June 1980.

- b) on the other floors of the building:

  - from the lift landings:
    - any motorised sliding doors must comply with the provisions of Article CO 48(3) of the aforesaid Order;
    - an intercom, enabling communication to be made with the central fire safety post, must be placed on each lift landing;
    - a manual control device installed on the controlled area side (break-glass box, for example), with a breaker inserted into the remote control line shall be located near each door concerned and must act simultaneously on all of the doors isolating the landing;
    - an opening device (a key contactor operating on the building's safety passageway) shall be placed on the landing side.

- c) access to private areas from the floors' communal horizontal walkways:

  Access to private areas may be controlled by any means permitting:
  - the evacuation of persons, in accordance with the requirements of the aforesaid Article CO45(2);
  - access to these private areas by officers from the building's fire safety and evacuation assistance service and the public fire and rescue service; the remote control of this equipment, from the central safety post, shall not be required.

Article H.R. 28

Smoke extraction

1. General:

a) – The purpose of smoke extraction is to extract, at the start of a fire, a proportion of the smoke and combustion gases in order to maintain in a useable state the passageways intended for the evacuation of occupations. This smoke extraction may also help to:

- limit the spread of the fire;
- facilitate the intervention of the emergency services.

b) – The documents to be provided in implementation of Article H.R. 4 include:

- a plan comprising:
  - areas for the evacuation of smoke and air ducts;
  - the layout of ventilation networks;

- the location of smoke extraction fans;
- the location of emergency smoke extraction vent control devices;
- an explanatory note specifying the technical characteristics of the various equipment.

2. Extraction of smoke from communal horizontal walkways:

a) –Smoke must be extracted from communal horizontal walkways in accordance with the technical instruction relating to smoke extraction in high-rise buildings. These provisions shall not apply to landings complying with the provisions of Article H.R. 31(1)(a).

b) – Materials used in the manufacture of the smoke extraction installation must comply with the provisions:
- of the standards relating thereto;
- of the technical instruction relating to smoke extraction in high-rise buildings;
- of Article H.R. 49.

3. Extraction of smoke from areas:

The communal areas referred to in Article H.R. 71 with a surface area greater than 300 m2 must have smoke extracted under the conditions laid down in Technical Instruction No 246.

Article H.R. 29

Emergency smoke extraction

1. In order to enable smoke and hot gases to be extracted from the damaged compartment where the mechanical smoke extraction system no longer works or has become insufficient, vents in the frontage must be provided on each floor in buildings that do not have mobile frames that are liable to fulfil the same function.

2. Emergency smoke extraction shall have the following characteristics:
- vents, of which there shall be at least one per 300 m^2 section of compartment surface area, must have a minimum unitary surface area of 1 m^2;
- each compartment or floor must contain at least four carefully distributed vents, which cannot therefore all be located on the same frontage;
- the vent opening control must be easily accessible to the public fire and rescue services;
- the vents may be opened using one of the following means:
    - one or two handle(s);
    - a manual control device (M.C.D.) conforming to the standard NF S 61-938;
    - a square socket at least 6 mm long and 10 mm deep, enabling the special key of the officers of the public fire and rescue services to be used, located at the bottom of the vent, set back no more than 10 mm;
- in the event of fire, the vents shall be opened by the public fire and rescue services or on their order.

3. Each stairwell laid down in Article R. 122-9 of the Construction and Housing Code must contain in its upper part one outlet with a free surface area of 1 m^2 permitting the extraction of smoke and opening outwards.
The outlet must be opened by remote control only, by means of a manual action from the central fire safety post. The control must be restricted solely to firefighters. An outlet positioning control shall be installed in the fire safety post.

Section VI
Lifts and service lift

Article H.R. 30
Lift and service lift shafts and cages

1. Lifts and service lifts, and, in general, all lifting apparatus linking two or more floors, must be installed in accordance with European directives.

2. For lifts, in addition to these provisions, the temperature inside the shafts must be compatible with the safe operation of the lifts, in particular by preventing the distorting of the guides. This operation must be guaranteed for two hours where there is a fire outside the shaft, which shall be assumed to develop in accordance with the standardised temperature/time curve laid down by standard NF EN 13501-2. To this end, the lift shaft walls must be such that, subject to the aforesaid thermal programme, the surface temperature of their interior wall does not exceed 70°C after two hours.

3. With the exception of lifts containing the priority call device laid down in Article H.R. 34, lift cages must be fitted with an accompanied control device for use, once activated, in disabling the lift with regard to landing calls that have already been made and in enabling it to be used only from the cage control panel.

Use of this control, of a unique model, shall be restricted to authorised and informed persons. Four of these control devices shall be kept at the central fire safety post, at the disposal of the chief of emergency operations.

4. Lifts must open, in all cases, onto communal horizontal walkways, and access thereto must be protected in case of fire in accordance with the provisions of Article H.R. 31 below.

However, lifts reserved for a specific purpose and for authorised persons (kitchen, restaurant, deliveries, management, etc.) may open onto private areas provided that they are directly accessible to the emergency services from the communal areas.

5. Lift machinery may be placed in a shaft where the total power installed in the shaft is less than or equal to 100 kVA. In this case, each electrical switchboard located in the shaft must be contained within a cabinet or box meeting one of the following conditions:
- its casing is made from metal;
- its casing passes the incandescent wire test laid down in the standards, the temperature of the incandescent wire being 750° C, where each piece of equipment meets the same condition.

6. Lift shafts must have smoke extracted by extraction under the conditions laid down by the technical instruction relating to smoke extraction in establishments open to the public (IT 246), where:
- either the total electric power installed in the shaft is greater than 40 kVA;
- or the lift shaft houses a machine containing oil, an oil tank or jacks.

The lift shaft smoke extraction device must be controlled automatically by means of fire detectors located in the lower and upper parts of the shaft. This automatic command shall be backed up by a manual command.

The extraction of smoke from a lift shaft shall not be required if the shaft is ventilated by mechanically forced convection that ensures a minimum extraction rate of 20 volumes/hour, where the temperature of the machines or their controls exceeds that specified by the manufacturer in the technical manual of the lift. The volume to be taken into account shall be equal to the cross-section of the shaft over a height of 2 metres, and the ambient temperature to be taken into account shall be 40°C, if the manufacturer has not provided this information.

The installation of an air duct in the lower part of the shaft shall not be compulsory for the purposes of extracting smoke from a partitioned lift shaft.

7. The supporting walls of the cage must be made from category M0 or A1 materials.
The coverings of the cage must be made from materials of categories:
- M3 or C_{fl} - s1 on the floor;
- M1 or C – s2, d0 for the vertical walls, the ceiling and the lighting fixtures.

8. The owner shall be obliged to ensure that the shaft pits are clean and, if necessary, to have them cleaned.

Article H.R. 31

Protection of access points to lifts and service lifts

1. The 2-hour fire break period, stipulated by Article H.R. 17, for communication facilities between lift and service lift shafts, on the one hand, and communal horizontal walkways, on the other, shall require the non-stopping of lifts and service lifts in the compartment concerned and may be achieved in four different ways:

a)- with the aid of fire doors separating the landing from the rest of the floor. This landing must therefore be fitted with an additional phonic device as described in Article H.R. 50;
b)- with the aid of fire doors not contained in the lift or service lift, located outside the shaft and in front of the landing doors of the apparatus;
c)- with the aid of fire doors contained in the lift or service lift, located inside the shaft and in front of the landing doors of the apparatus (device referred to as a thermal shield);
d)- with the aid of lift or service lift landing doors that are fire resistant on their own.

If the protection is achieved in accordance with provisions a) or b), the fire doors must have an automatic closing mechanism and the NF mark. The functioning of all the doors of one compartment must meet the conditions laid down in Article H.R. 49.

Furthermore, where the fire doors separate the lift landings, it must be possible to open them manually from both sides. Persons who are isolated on this landing must be informed that the lift will not stop and invited to use the stairs in accordance with the instructions displayed on these doors. The standardised emergency exit sign must be visible on these doors when they are in the safety position.

2. If the protection is achieved by means of landing doors that are fire resistant on their own, the following conditions must be met:
a) the lift landing doors must be forcibly closed after a maximum of 30 seconds;
b) the central fire safety post must be informed of the non-closure of the doors when this continues for more than 60 seconds, in accordance with Article H.R 26;
c) the central fire safety post must be informed of the position of the cages;

d) it shall be prohibited to keep the landing doors open during repair and maintenance operations.
e) the accompanied control manoeuvre shall be cancelled in the event of a fire being detected or of a priority call.

Article H.R. 32

Additional provisions relating to lift service landings

1. A clearly visible information plate must point out the need for the passageway that is necessary for the self-closing fire doors to operate to be kept obstacle-free. The inscription must be in white letters on a red background.

2. The service landing closing devices, where they exist, and the lift and service lift doors, must not intersect the compartment's communal horizontal walkways or make them smaller.

3. The necessary measures must be taken to ensure that the destruction of devices connected to the lift on the damaged floor (controls, signage, switchboards or panels for emergency tests and operations) may not disrupt the service on the other floors. This requirement may be disregarded if the devices are protected by a fire door with 2-hour or EI 120 fire break capacity, or are located on landings of which the doors and floors have the same fire break capacity.

Article H.R. 33

Lift cage assistance

1. Except in exceptional circumstances, it must be possible for cages, in the event of breakdown or during a deliberate shutdown, to be brought to an access floor.

2. If there is no landing door or access hatch with 2-hour fire break capacity on all floors, there must be at least two lifts in the same shaft such that passengers may be evacuated from a faulty cage to another cage that has stopped on the same floor, the cages being fitted with emergency side doors.

Where several lifts are installed in the same shaft, and where there is no landing door or access hatch on at least every third floor and at a vertical distance not exceeding 11 metres, each of the appliances must be fitted, in addition to the hatch and to the emergency ladders provided for below, with an emergency side door making it possible to move into the cage or onto the roof of an adjacent lift. Each cage must be equipped with an aperture or peephole to assist passengers in reaching a floor. Lifts must be fitted with an in-cage control for the exclusive use of the emergency services enabling them to guide the lift to a floor on which there is emergency equipment. The cage must have external lighting in order to facilitate the approach and evacuation. The opening of one of the intercommunication doors must prevent the functioning of the two appliances.

In the case of a wire mesh partition in the shaft, it must be divisible, and an appropriate tool must be made available for emergency purposes at the central fire safety post.

3. Where the distance to be covered between two emergency side doors is greater than 0.5 metres, a portable bridge must be able to be used to go from one cage to the other. The dimensions of this bridge shall depend, on the one hand, on the horizontal distance separating

the two cages and, on the other, on the width of the emergency side doors. This bridge must be permanently stored in the building's central fire safety post.

4. Any single lift in a shaft must be fitted with an emergency hatch and a metal ladder enabling passengers to reach the roof of the cage in the event of the lift accidentally stopping. This ladder may be placed within the cage itself, on its roof, or along these.

A second ladder stored in the machine room or the central fire safety post must make it possible to reach the roof of the cage from the next highest floor.

5. During maintenance of a cage, all measures must be taken to keep the other cages located in the same shaft in working order.

Article H.R. 34

Lifts for priority use by firefighters – Priority for operations

1. Firefighters must be able directly to access each floor of each undamaged compartment by means of at least two lifts fitted with a fire service priority call device.

2. The passageway used by the firefighters to gain access to the lifts from the routes laid down in Article H.R. 6 must:

- be at least two passage units wide,
- be no more than 50 metres long.

3. The order of priority that must be respected between the various lift and service lift operations is laid down as follows:

- taking out of service;
- cage inspection operation or cage emergency operation laid down in Article H.R. 33;
- non-stopping on damaged floors laid down in Article H.R. 31;
- fire service priority call operation laid down in paragraph 1 above (in case of fire on the emergency access floor, the priority call device shall take precedence over the non-stopping of cages operation);
- accompanied control operation laid down in Article H.R. 30;
- operation by means of an access control device (magnetic card, digicode, key, etc);
- normal operation of the apparatus.

Section VII

HEATING, VENTILATION, AIR CONDITIONING AND

Article HR 35.

General provisions

1. The aim of the provisions in this section is to avoid the risk of the outbreak, development and spread of fire and the risk of explosions caused by the installations referred to in paragraph 2.

2. These provisions concern installations for:

- heating (production of heat, distribution and emission);
- comfort ventilation, climate-control and air conditioning (production of heat or cold, distribution and emission);

- controlled mechanical ventilation;
- hot water for sanitary purposes (production and distribution);
- cooking and reheating (apparatus intended for catering).

Installations intended for other uses are not covered by the provisions of this section.

Article HR 36

Ban on fuels

It shall be prohibited to store or use any liquid, solid or gaseous fuels, including liquefied hydrocarbons, inside high-rise buildings and their protected area unless otherwise stated in this Regulation.

Boilers using gas shall be permitted under the conditions laid down in the following articles of this section.

Article HR 37

Heating and cooling installations

1. The rules detailed in Article CH 2 of the safety regulation on establishments open to the public shall apply to heating and cooling installations and appliances.

2. Inside the building, the following items only shall be permitted:
- substations compliant with Article CH 11;
- electric generators compliant with Article CH 12;
- electric cooling appliances compliant with Article CH 35;
- emission-production appliances with a surface temperature below 100 C compliant with Articles CH 44 and CH 45.

§3. Boiler rooms shall be permitted, provided that they are installed in accordance with one of the following provisions:
- on the terrace roof of the building, under the following conditions:
  - constructed in such a way that the effects of any explosion will be mitigated as much as possible;
  - the sole access to such boiler rooms shall be from outdoors, on the roof;
  - gas only is permitted;
  - the gas is supplied through a pipe installed inside a shaft on the outside of the building or in the open air;
- outside the building:
  - on the ground floor completely or partly within the protected area;
  - buried or in a basement, not within or linked to the basements of the high-rise building.

Whatever their power, for boiler rooms in basements or on the ground floor adjacent to a high-rise building, the adjoining walls and floors must have a four-hour fire-break or REI 240 rating, resist a pressure of 1 tonne/m^2 and have no intercommunication with the high-rise building, except for heating ducts and shafts, which must comply with Articles H.R 17 to HR 20. Where access to boiler rooms is situated within the protected area, this access may only be via a two-hour or REI 120 fire-break insulation lock fitted with two one-hour fire doorsets with a door closer or E 60-C.

4. Combustion-based production appliances or groups of appliances, forming complete prefabricated assemblies or sub-assemblies, designed to function outside, may be installed on the terrace roof of the building and outside of the boiler room under the conditions laid down in Article CH 5(2).

5. Boiler equipment must meet the provisions of Article CH 23. Pipes for heat transfer fluids must be metallic and the material used to insulate the pipes and containers holding heat transfer fluids must be of category M1 or classified as A2-s2,d0.

Article HR 38

Comfort ventilation installations and CMVs

1. Air discharge and return-air intake systems for providing comfort ventilation must meet the provisions of Articles CH 29 to CH 34, CH 36, CH 38 and CH 39 of the safety regulation on establishments open to the public. Electric heating batteries shall only be permitted in power stations and air-treatment modules. In these two cases, the batteries must meet the requirements laid down in Article CH 37.

Electric fan convector units are independent production-emission appliances and shall not be considered as ventilation network terminals. They must meet the requirements of Article HR 37.

Whatever the cross-section of the ducts, valves shall be used to ensure that compartments, sub-compartments laid down in Article HR U6, communal horizontal walkways and premises at significant risk or subject to fire load as defined in Article HR 61 are isolated. These sealing devices shall be positioned to the right of the fire wall, and have an equivalent fire resistance capacity to the crossed wall. These devices shall be kept in good working order in accordance with the conditions laid down in Article HR 49(6).

2. Controlled mechanical ventilation systems must comply with the provisions of Articles CH 41 and CH 42.

In addition to these provisions, the fire and smoke retarding requirement shall only be deemed to be met under the following conditions:
- the vertical collective duct shall be located in a shaft with a two-hour or EI 120 firebreak capacity;
- horizontal ducts must be fitted with sealing devices with a two-hour or EI 120 firebreak capacity to the right of the walls of the shaft, compartments, sub-compartments, or with a one-hour or EI 60 firebreak capacity for wall of communal horizontal walkways.

Article HR 39

Installation of cooking and reheating apparatus intended for catering

Cooking and reheating apparatus intended for catering must be installed in accordance with the provisions laid down in the GC articles of the safety regulation on establishments open to the public. In addition to these provisions, the contaminated air extraction devices in all large kitchens must be mechanical.

Section VIII
Electrical and lighting installations

Article HR 40

Aims and general information

1. The aim of the provisions of this section is to:
- prevent electrical installations from representing risks of the outbreak, development and spread of fire;
- to allow safety installations to operate in the event of a fire;
- to enable certain activities to continue in compartments not affected or threatened by fire.

2. Electrical installations must comply with Decree No 88-1056 of 14 November 1988 of the Minister responsible for employment and its implementing orders, as well as to the standards to which they refer.

3. The building must not be crossed by electric cables that do not belong to the building.

4. With the exception of installations located within electricity service rooms as referred to in Article HR 41, the highest voltage existing under normal operation between two conductors or between a conductor and earth must not exceed the low voltage range.

However, this provision does not preclude:
- the use of higher voltages for specified applications such as the use of discharge lamps, audiovisual appliances and electrical medical appliances;
- the passage of high-voltage general power cables if they are placed in a protected pipe course with two-hour or EI 120 firebreak walls and if they have no connections along their course.

5. The building must have lightning protection in accordance with the standards in force.

Article HR 41

Electricity service rooms

1. Electricity service rooms are rooms housing electrical equipment with access restricted to qualified persons responsible for maintaining and monitoring the equipment.

They must:
- be easy for the emergency services to access;
- be ventilated to the outside either directly or via a duct, or be air-conditioned;
- be equipped with extinguishing apparatus that is appropriate for the electrical risk;
- have either minimum lighting as referred to in Article HR 48, or emergency lighting consisting of fixed independent units and independent portable intervention units.

2. Electricity generators, supply stations, transformer substations, high-voltage cells and electrical appliances containing liquid dielectrics emitting inflammable or toxic vapours, safety switchboards, the general 'normal-alternative' switchboard, must be installed in an electricity service room with a ceiling and walls with a two-hour or REI 120 firebreak capacity and crossing devices with a one-hour or EI 60 firebreak capacity. Furthermore, this room must only be directly linked to technical premises or passageways not referred to in Article HR 23.

3. Accumulator batteries and associated equipment (chargers, inverters) must be installed

in an electricity service room.

They may however be placed in any room if the CU product of the batteries is less than or equal to 1000 and if the batteries are placed in a casing that may only be opened by staff responsible for their maintenance and monitoring. Uninterruptible power supplies (UPS) with a power less than or equal to 3.5 kVA may be installed under the same conditions.

Accumulator batteries installed in fire safety system equipment must comply with the installation rules for such equipment.

4. Rooms containing accumulator batteries and any casing housing such batteries must be ventilated in accordance with the conditions laid down in Article 554.2 of standard NF C 15-100. If mechanical ventilation is used, this must be powered by a safety electrical supply (S.E.S.).

5. Starter batteries for electricity generators and their charging devices may be installed in the same room as the generator.

6. Rooms housing electrical appliances containing liquid dielectrics emitting inflammable or toxic vapours must be ventilated directly to the outside.

Article HR 42

Power transformers

Power transformers may be dry or contain a liquid dielectric. If the transformers contain a liquid dielectric, the room must have a watertight retention casing of an appropriate size for the total volume of the dielectric. If the dielectric is an inflammable liquid, the quantity must not exceed 25 litres per tank, vat, cistern or per group of such communicating containers.

Dry transformers must be of class F1 as listed in standard NF EN 60726.

In rooms housing transformers powering safety installations, if mechanical ventilation or air conditioning is provided, the ventilation or air conditioning system must be powered by a safety electrical supply (S.E.S.).

Article HR 43

Safety and alternative power supplies

1. General:

a) – The safety power supply must be exclusive to the building.

b) – An alternative power supply shall be obligatory.

The developer shall identify the installations to be backed-up by the alternative power supply in the event of failure of the normal power supply. This alternative power supply must provide at least the lighting in all passageways and rooms with a capacity of over 50 people.

c) – The energy required to power safety installations must be obtained from at least two electricity generators compliant with standard NF S 61-940, each with a nominal power at least equal to the power required to start and operate all the building's safety equipment. These generators shall constitute the building's safety power supply. The maximum switching

time shall be 10 seconds.

All possible design and construction measures must be taken to ensure that an incident occurring on one of the generators does not affect the functioning of the other generators (e.g. non-combustible screen).
Their fuel store must provide for 36 hours of operation.

d) – The safety power supply may be used as an alternative power supply provided that installations other than safety installations are cut off automatically when only one safety generator remains.
e) The following measures must be taken in order to prevent accidents during switching actions:
- installations shall be designed to prevent the paralleling of the normal power supply with the alternative and safety power supplies;
- all automatic controls for switching devices shall have back-up manual local controls;
- the two breaking devices making up each switching device shall be fitted in such a way as to prevent short-circuiting by ionisation of the air.

2. Electricity generators

a) – Rooms in which electricity generators are installed must not be located on a higher floor than that accessible to fire engines, unless these rooms are located on the roof and the generators are powered by gas. Furthermore, the installation of gas-powered generators, which may only be used as an alternative power supply, must be examined by the Central Safety Committee.

b) – Rooms housing electricity generators must be well-ventilated to the outside, directly or via a duct. If mechanical ventilation or air conditioning is provided, the ventilators must be powered by a safety electrical supply (S.E.S.).

c) – Where a liquid fuel is used, the room and the fuel supply must be arranged in accordance with the following provisions:
- the floor of the room must be impermeable and form a leak-proof basin, the threshold of any openings being raised to at least 0.10 m and all steps being taken to ensure that any accidental fuel spillage cannot spread into orifices in the floor;
– if the room is in the basement, it must be served by a duct of M0 or A1 material with walls with a crossing firebreak capacity equivalent to that of the walls crossed and which opens to the outside at ground level, which allows the fire service to operate its ventilation equipment and which is closed off using a device which can be removed without needing any tools; the fuel pipes must be fixed, leak-proof and rigid;
- if a feeder tank supplies the motors, this must be fitted with:
    - an overflow pipe with a cross-section at least double that of the supply pipe, without any high point,
    - one or more vents,
    - level gauges resistant to impacts and temperature variations.
- the main tank must be lower than the feeder tank or, where there is no feeder tank, lower than the motor. If this provision cannot be observed, the motor must be supplied through a pipe from the top part of the tank, fitted with an anti-siphon device coupled with a second manual-control device;
- a device to quickly shut off the fuel supply must be installed outside the room;
- a remote gauge device;

- a stockpile of at least 100 litres of sand, a shovel and portable fire-extinguishers of at least Class B must be kept in the immediate vicinity of the access door.

d) – Within the framework of the exemptions laid down in Article R 122.7 of the Construction and Housing Code and in Article HR 37, the storage and use of second category liquid fuels shall be permitted for supplying alternative power supplies and safety power supplies.

This storage must be in a fixed tank installed in accordance with the technical regulations on installations classified for the protection of the environment, even if the tank's capacity is below the classification threshold.

e) - Combustion gases must be evacuated directly to the outside through leak-proof ducts made from A1 materials, placed in a shaft with a two-hour or EI 120 firebreak capacity.

f) – The electricity generators must receive regular maintenance, undergoing tests in accordance with the manufacturer's recommendations and at the following minimum intervals:

- every 15 days, check on oil, water and fuel levels, the motor reheating device and the state of the power supply used for starting (battery or compressed air);
- every month, in addition to the above checks, automatic starting test with a minimum load of 50 % of the generator's power including the running of the safety installations and operating with this load for 30 minutes.

The above interventions and their results must be noted in a maintenance log which must be made available to the safety committee.

Once a year, a representative from the approved body responsible for checking electrical installations shall witness the monthly tests set out above and shall check that the electricity generator's maintenance log is kept up-to-date.

3. Safety electrical supply (S.E.S.)

a) It must be possible to power the safety installations using a safety electricity supply (S.E.S), from two safety switchboards as defined in Article HR 3, separate and independent from one another. It must be possible to power each switchboard using the normal-alternative power supply and the safety power supply, via devices switching automatically between supplies should one fail.

Each safety switchboard must be installed in an electricity service room as defined in Article HR 41. One of the two switchboards must be installed in a room reserved for this use only; the other switchboard may be installed in the same room as that containing the general 'normal-alternative' switchboard, provided that the switchboards are sufficiently separated to prevent the propagation of an electric arc.

b) The safety power supply may back-up the high-voltage circuits for the building's installations, provided that the provisions of paragraph 1 of this Article and the conditions set out below are met:

- it must be possible for the safety switchboards to be powered by at least two transformers installed in two separate rooms, each of the rooms being supplied by two high-voltage cables (either in double parallel or looped). It must be possible to power each transformer using the

normal-replacement power supply and the safety power supply. Should one of the transformers fail, all the safety installations must be able to be backed-up automatically by the transformer(s) still in service;
- all high-voltage cables powering a transformer sub-station serving safety installations must be placed in a protected pipe course reserved for this use with walls with two-hour or EI 120 firebreak capacity.

Article HR 44

Energy supply circuits for safety installations

1. Each safety installation referred to in Article HR 3, except minimum lighting and those with a specific safety electricity supply such as the fire detection system, alarm equipment and fire safety control board, must be powered by two cables, originating from each of the safety switchboards defined in Article HR 3.

These cables must be selectively protected, follow separate paths and end at the switchboard situated in the immediate vicinity of each safety installation on a device that switches automatically to the cable with power in the event of zero voltage in the other cable.

2. The installations must have fixed cables only, installed according to the provisions of part 5-52 of standard NF C 15-100. All cables powering safety installations must be of category 2, installed exclusively in protected pipe courses with two-hour or EI 120 firebreak walls.

It shall not be necessary to place these cables inside a pipe course or protected technical area if the cables are situated inside the same compartment as the equipment that they supply. Cables powering non-autonomous disseminators in fire alarm equipment must be of category CR 1.

3. Each circuit must be protected such that any electrical incident affecting it, due to overcurrents, power cuts or earth faults, does not interrupt the supply of other safety circuits supplied by the same source.

4. The electric cables supplying the smoke extraction fans do not have to be protected against overcurrents, but only against short circuits. Consequently, they must be dimensioned in line with the strongest overcurrents, estimated at 1.5 times the normal current that the motors can cope with.

5. The electricity supply for safety installations provided from the safety switchboards referred to in Article HR 3 must be achieved:
- either in accordance with the IT diagram,
- or in accordance with the TN diagram. If the safety equipment in question only operates in the event of fire (e.g. smoke extraction fans), its insulation in relation to the earth must be continuously monitored during periods of non-use by a permanent insulation controller connected to a signalling device.
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Article HR 45

Wiring of normal-alternative installations

1. The installations must have fixed wiring only, installed according to the provisions of part 5-52 of standard NF C 15-100.

2. Circuits must be created in one of the following ways:
- either using prefabricated cables;
- or using category C2 conductors or wires if they are situated within a protected pipe course with two-hour or EI 120 firebreak walls, or within the same compartment as the equipment that they supply.

3. The conduits and profiled conduits used for cable runs, chutes, cable covers etc. must be flame retardant, as defined by the relevant standard in force.

Article HR 46

Electrical switchboards

1. The safety switchboards and the general 'normal-alternative' switchboard must be installed in accordance with the requirements of Article HR 41(2).

2. Switchboards not referred to in paragraph 1 must be installed in one of the following ways:
- in an electricity service room;
- in a service shaft;
- in any room or passageway except communal horizontal walkways, provided that they are enclosed in a metal cabinet or box.

Article HR 47

Signals

In addition to and independently of the signals provided on the Signalling Unit of the Fire Safety System (F.S.S.), the following signals must be transferred to the central fire safety post:
- insulating faults on installations created in accordance with Article HR 44(5);
- insufficiency of the electricity generator fuel store; this signal being ordered by the remote gauge device referred to in Article 43(2)(c);
- summary of the open position of protection devices placed in safety switchboards with the exception of lighting and telecommunication terminal circuits.

Article HR 48

Lighting

1. General:

a) For the purposes of this article and hereinafter, the following definitions shall be understood:
- ‘lighting’ shall mean that which is required for operation;
- ‘minimum lighting’ shall mean the part of the lighting kept in service in the event of failure of the normal-alternative power supply.

b) Passageway lighting appliances must be fixed or suspended and connected to stable building elements.

c) The outer parts of luminaires must pass the incandescent wire test, the temperature of the

incandescent wire being:
- 850°C for luminaires in stairways and communal horizontal walkways;
- 650°C for luminaires in rooms.

d) Additional portable lamps shall be permitted in rooms and halls, by way of derogation from the provisions of paragraph b) above. These lamps must be powered by category C 2 cables of the shortest possible length, and must not obstruct the movement of persons.

2. Minimum lighting

a) Minimum lighting shall be obligatory in communal horizontal walkways, landings, stairways and access points therefor. It must enable easy movement, visibility of the signs pointing towards stairways and proper completion of safety manoeuvres. It shall be provided by using the safety power supply to back-up all or part of the lighting circuits.

b) The minimum lighting for each communal horizontal passageway and each stairway must be provided by at least two terminal circuits each originating from a separate main circuit.
Each main circuit must be selectively protected and must follow a separate course from each safety switchboard defined in Article HR 3.

Each terminal circuit must have a surge protection device upstream of its entry into the compartment, but must not have any other protection device inside the compartment.
The terminal circuits must be designed in such a way that there is sufficient lighting should one of them fail.
The minimum lighting must operate continuously while the building is occupied, and its control devices must be accessible to safety personnel only.
c) The minimum lighting must be provided by lamps with a switch-on time not exceeding 15 seconds.

d) In addition to the minimum lighting, independent evacuation units compliant with standard NFC 71-800 must be installed in insulation locks and staircases. To compensate for the failure of the replacement lighting required by Article HR 43, these independent evacuation units shall be installed in private walkways, and ambiance units shall be installed in rooms with a capacity for over 50 people or with an occupation density greater than one person/10 m^2.

Section IX
EMERGENCY FACILITIES

Article HR 49
Fire safety system, alarm system

1. High-rise buildings must be equipped with a category A (HRB option) fire safety system (FSS) consisting exclusively of automatic detection zones.

2. The devices and equipment comprising the FSS must comply with the provisions of Articles MS 56, MS 57(2) and MS 58 of the amended Order of 25 June 1980, as well as any relevant standards. The manual control devices must have the NF mark.

3. The walls of pipe courses and protected technical areas (as defined in Article HR 3) containing cables and equipment belonging to the fire safety system must have a two-hour or EI 120 firebreak capacity.

However, the walls of protected pipe courses may have a one-hour or EI 60 firebreak capacity if located within a protected technical area.

Any pipe course access hatches or doorsets of protected technical areas must have a one-hour firebreak capacity equipped with a door closer, or EI 60 - C.

In addition, cables and equipment belonging to the fire safety system must be commissioned in accordance with the conditions laid down in the relevant standard(s).

4. Fire detectors shall be installed:
- in communal horizontal walkways;
- in private horizontal walkways;
- in the rooms referred to in Article HR 71;
- in the rooms or areas cited in Articles HR 10, HR 18(2) and (3), HR 30 and HR 61(3);
- in all specific risk rooms laid down in Book II of the safety regulation on establishments open to the public.

5. The area in which the alarm sounds shall be limited to one compartment.

6. The triggering of a detector shall set in motion the safety scenario for the individual compartment in question automatically and without delay. This scenario shall be adapted in accordance with the following cases:

6.1. Detection in a communal horizontal walk area:
- triggering of the limited alarm at the central fire safety post,
- shutdown of the air-conditioning or ventilation system if it is specific to the compartment, and any other shutdown of technical installations deemed necessary.

a) evacuation function:
- general sound alarm that must be audible in the affected compartment and at any point of this compartment;
- unlocking of emergency exit doors located on the floor from which occupants are evacuated to the outside;
- unlocking of doors designed for access for the public fire and rescue services;
- unlocking of the access control devices referred to in Article HR 27.

b) compartmentation function:
- closure of all activated security devices (fire shutters, doors, automatic-closing hatches for shafts of mail lifts or of mechanised devices for transporting documents or other objects, etc.),
- non-stopping of lift cages and service lift cages in the compartment in question,
- immediate departure of any lift or service lift standing in the compartment in question.

c) smoke extraction function:
- overpressurising enclosed stairwells,
- extraction of smoke from or overpressurising of the intercommunication facilities referred to in Article HR 25;
- extraction of smoke from the communal horizontal walkways affected.

Where a compartment includes two or more levels, the extraction function shall only be activated at the level where the fire detector was triggered.

6.2. Detection in a private horizontal walk area:
The safety scenario shall be identical to that set out in paragraph 6.1 above, with the exception of the extraction function.

6.3. Detection in any of the rooms referred to in Article HR 71:
- triggering of the evacuation function and of servo-controls specific to these rooms or areas.

6.4 Detection in a room or area defined in the final two indents of paragraph 4 above:
- triggering of the limited alarm at the central fire safety post and of servo-controls specific to this room or area.

7. The triggering of a detector in a compartment other than that in which the safety process is activated shall set in motion, within the aforementioned compartment:
- if it has a separate smoke extraction system, the automatic systems defined in paragraphs 6.1, 6.2, 6.3 or 6.4 as appropriate;
- if it shares the same smoke extraction system, the automatic systems defined in paragraphs 6.1 (except for smoke extraction), 6.2, 6.3 or 6.4 depending on the location of the fire detector triggered.

Article HR 50

Alert

1. Internal alert:

Phonic devices (no-dial telephones, intercoms, etc.) with which the central fire safety post may be alerted must be installed on all floors of the buildings, in communal horizontal walkways, in the immediate vicinity of each staircase, in intercommunication facilities and on the ground floor near to the exits. They must be placed at a height of approximately 1.30 m from the floor and not be obstructed by a door leaf when the door is open. Neither must they project from the wall by more than 0.10 m. They shall be red, have a means of protection from accidental activation, and their use shall be clearly indicated.

2. External alert:

It must be possible to alert the public fire and rescue services immediately. Visible, permanent and inalterable instructions for this must be displayed next to telephone apparatus.

The necessary connections must be provided according to the class of building:
- either by landline telephone;
- or by telephone line directly connected to the centre handling calls for the nearest of the aforementioned services;
- or by an equivalent device.

The said equivalent device must meet the following requirements:
- be approved by the safety committee;
- be fixed equipment;
- connect to an alert centre chosen in agreement with the Departmental Directorate of Fire and Rescue Services;
- make the connection with one simple action (by lifting the receiver, pushing a button, etc.);
- enable the establishment to be identified automatically;
- provide a voice link;

- enable periodic tests determined in agreement with the Departmental Directorate of Fire and Rescue Services.

Article HR 51

Firefighting equipment

1. Portable extinguishers suited to risks, compliant with the provisions of Articles MS 38 and MS 39 of the safety regulation on establishments open to the public must be installed near stairway access points and, where appropriate, intercommunication facilities between compartments.

They must also be placed on all floors of the buildings, near the entrances to rooms at specific risk of fire.

Six litre water spray extinguishers shall be carefully distributed, with at least one device per 200 m^2 and at least two devices per compartment and per floor.

§2. Each floor must have the same number of DN 25/8 charged fire hoses as staircases. Charged fire hoses, compliant with the provisions of Articles MS 14 to MS 17 of the safety regulation on establishments open to the public, must always be installed in communal horizontal walkways, near to and outside of stairway access points. They must never be located on lift landings that may be separated by fire doors when fire breaks out. They must be arranged so that the entire surface area of the premises can be effectively reached by a hose jet. These charged fire hoses may be supplied by wet standpipes. The pressure flow rate in the hose valve of the least favourable charged fire hose must be at least four bars.

§3. An automatic sprinkler-type extinguishing system conforming to current standards and the provisions of Article MS 25 of the safety regulation on establishments open to the public, or a fixed automatic extinguishing installation appropriate for the risks in question and approved by the safety committee must be installed in the compartments and rooms referred to in Articles HR 25(6) and HR 61(2). A similar system or other automatic extinguishing installation within the meaning of Article MS 30 of the aforesaid regulation may be required in rooms at specific risk of fire.

It shall be permitted to supply any of these systems using wet standpipes, provided that the flow rate and pressure laid down in Article HR 55 are maintained during their use. However, if the entire building is covered by a sprinkler type automatic extinguishing system, this must have an independent supply.

4. Other firefighting equipment used in conjunction with the equipment indicated above must comply with the provisions of the MS articles of the safety regulation on establishments open to the public.

Article HR 52

Emergency water supply

1. High-rise buildings must be supplied by drinking water from the public network, by means of two connections with a nominal diameter of 100 mm.

Pipelines from these connections must be fitted with valves and it must be possible to connect them together in order that a single pipeline may provide the flow required by firefighting equipment and the building’s normal service.

The pipelines may only be branched on a single pipeline of the public network if the latter is supplied at both ends and has an isolating valve between the two connections.

2. The building's hydraulic equipment must be configured in such a way any incident along a pipeline or at an appliance does not affect the supply of water to the emergency equipment.

Article HR 53

Fire hydrants and water drainage

1. Fire hydrants must be comply with the standards in force. The distance separating them from the supply connections of dry standpipes or from the emergency supply connections of wet standpipes must not exceed 60 m.

2. It must be possible to supply or re-supply dry or wet standpipes at a rate of 1000 litres per minute per standpipe.

The number of fire hydrants shall be determined by the fire and rescue services, with a minimum of two hydrants per high-rise building.

The simultaneous flow shall be set according to the number of fire hydrants required.

3. Steps shall be taken, without altering the firebreak properties of floors, to ensure that water discharged on one floor in the event of a fire does not enter the stairwells or lift/service lift shafts.

Article HR 54

Dry standpipes

1. Buildings less than or equal to 50 metres in height within the meaning of Article R. 122-2 of the Construction and Housing Code must be fitted with dry standpipes along their full height.

While the building is being constructed, one of the dry standpipes must be installed in such a way that it may be used on each floor from the start of the second phase of works.

2. There must be one 100 mm nominal diameter dry standpipe per stairwell; this dry standpipe shall include:

- two 65 mm supply connections located near accesses that can be used by the public fire and rescue services, with clearly indicated service areas;
- one 65 mm simple hydrant and two 40 mm simple hydrants located in the intercommunication facilities on each floor.

Article HR 55

Wet standpipes

1. Buildings with a height of over 50 metres within the meaning of Article R. 122-2 of the Construction and Housing Code must be fitted with wet standpipes along their full height.

While the building is being constructed, one of these standpipes must be installed in such a way that it may be used on each floor from the start of the second phase of works. It may be used temporarily as a dry standpipe up to 100 m.

2. The standpipes must never be exposed to risk of freezing, and shall be located in each stairwell. However, a wet standpipe may be shared between a stairwell serving infrastructure floors and a stairwell serving superstructure floors if these are superposed. They shall include one 65 mm simple hydrant and two 40 mm simple hydrants located in the intercommunication facilities on each floor.

3. Their supply device (gravity tanks, booster, pump, etc.) must ensure a flow of 1000 litres per minute at a pressure of 7 to 9 bars on any given floor and in each standpipe.

§4. The capacity of the tanks must provide at least 120 m^3 reserved exclusively for the fire service. They must be permanently supplied by the building's own equipment laid down in Article HR 52(1) with a minimum flow of 1000 litres per minute. .

This capacity may be reduced to 60 m^3 in buildings under 100 m high and with less than 750 m^2 surface area per compartment, provided that these tanks may be refilled by one of the following two methods:
- either automatically using the building's own equipment with a minimum flow of 1000 litres per minute;
- or by firefighters, from a 100 mm dry standpipe.

5. When tanks are located in the bottom part of a building, each wet standpipe must be supplied independently from the header or feeder tank located downstream of the boosters.

Each wet standpipe shall have two 65 mm emergency supply connections compliant with standards in force and located near accesses that can be used by the public fire and rescue services, with clearly indicated service areas.

Article HR 56

Equipment intended to assist the work of firefighters

1. All high-rise buildings must have a central fire safety post (FSP) for the exclusive use of staff responsible for fire safety.

The FSP must:
- be situated near to the access points for the public fire and rescue services, on the same floor;
- have a surface area of at least 50 m^2, excluding living areas;
- be made up of one-hour or REI 60 fire-break walls and half hour or E30 fire doorsets, or two-hour or REI 120 fire-break walls and one-hour or E 60 fire doorsets if it adjoins a room containing a specific fire risk;
- provide facilities to enable in particular the fire safety and evacuation assistance service to carry out their surveillance duties.

In the event that the entrances and exists to the high-rise building are all locked, an intercom must be provided to enable the public fire and rescue service to contact the FSP staff from the entrance normally reserved for them.

2. In addition to the fire hydrants required by Articles HR 54 and HR 55 above, the intercommunication facilities between stairwells and compartments required by Article HR 25 must bear:
a) The floor number, written on the stairwell side of the stairwell door giving access to each level.
b) A floor plan indicating in particular:

- the location of the access point where the plan is displayed;
- the general layout of the floor;
    - the location of smoke extraction vents and their opening controls and water drainage points;
- the location of emergency equipment, stop valves and emergency telephone.

3. In the event of fire, the fire safety and evacuation assistance service must be able to provide the public fire and rescue service with the following equipment and documents:
- at least four radio transmitter-receivers, for the whole of the building. These devices must be able to operate throughout the whole of the high-rise building;
- the lift controls referred to in Article HR 30(3);
- detailed plans of the building.

CHAPTER III

Provisions on the obligations of owners and occupants

Article HR 57
Representatives and deputies

Where a representative is appointed by the owner to carry out his obligations, pursuant to the provisions of Article R 122-14 of the Construction and Housing Code, the owner shall provide the names of the representative and his deputy for the mayor, who shall in turn inform the secretariat of the departmental safety and accessibility advisory committee.

The safety representative and his deputy must be able to:
- provide evidence of a thorough knowledge of the provisions of this safety regulation;
- be contacted easily by the administrative authority;
- arrive quickly at the address of the building in question.

Article HR 58
Role of representatives and their deputies

The role of the safety representative for a high-rise building falls within the framework of the implementation of the fire safety regulation defined in Article R 122-4 of the Construction and Housing Code. It consists of:
- being the sole contact for the administrative authorities for all matters concerning the implementation of the fire safety regulation, in accordance with Article R 122-15 of the Construction and Housing Code;
- being present at the periodic safety committee inspections;
- approving the works technical files referred to in Articles HR 4 and HR 65, proposed by the syndic and sent to the public services;
- informing the owner and the syndic immediately of the content of notifications issued by the public authorities, reports of tests conducted by bodies approved to carry out regulatory tests in high-rise buildings and quotes required for maintaining technical safety installations;
- checking that the owner implements fire safety provisions, in particular:
    - that contracts are signed by qualified companies and approved bodies to meet the requirement for technical inspections at the statutory intervals;
    - that the aforementioned regulatory technical inspection visits are carried out at the required intervals;

- that the fire safety and evacuation assistance service is in place and provided by qualified staff in accordance with legislation in force (amended Order of 2 May 2005);
- that the fire safety and evacuation assistance service implement the general and specific instructions on actions to be taken under normal circumstances, in the event of fire or incident on a safety installation;
- that maintenance contracts for safety installations exist and correspond to the needs of the technical installations;

- he shall without delay provide the owner or co-owners with a list of the comments requiring corrective action issued by the approved bodies (or qualified companies);
- he shall assess whether there is a valid case for any fire safety work suggested by maintenance companies or proposed by the syndic;
- if he does not work at the site on a permanent basis, he shall visit it several times a year and keep himself thoroughly informed on the development of cases for which he is responsible;
- he shall ensure that the building has an asbestos technical file (ATF) and that it is kept up-to-date.

The deputy representative shall support the safety representative's work.

Article HR 59

Maintenance of installations

The owner shall be obliged to have the building's technical and safety installations maintained, in accordance with Article R. 122-16 of the Construction and Housing Code.

The building's technical and safety installations must be operated by competent staff and maintained in good working order.

The building's technical and safety installations must always be covered by a maintenance contract.

Proof of the existence of maintenance contracts, procedure sheets, written instructions for use and test reports must be appended to the safety register.

Fire safety and evacuation assistance officers must know and apply the procedures for use of these installations in order to be able to use them as appropriate.

Article HR 60

Monitoring, drills, information for tenants

The owner shall be required:

1. To put in place, from the start of the secondary works, a permanent fire safety and evacuation assistance service, as well as emergency equipment suitable for the risks to be countered.

2. For the buildings referred to in Article R. 122-17 of the Construction and Housing Code, to organise an evacuation drill for each compartment, implementing the safety functions following the triggering of an automatic fire detector in a communal horizontal walk area.

3. To provide for the first and second phase evacuation of the building and carry out drills. A note defining how the building's evacuation is organised shall be drawn up by the owner and

made available to the safety committee. This note shall specify the assistance provided for the disabled. In the same way, a note must be drawn up defining the procedures for carrying out a general evacuation of the building.

4. To draw up and display fire instructions and evacuation plans in communal horizontal walkways near to the access points for stairwells and lifts.

5. To inform occupants of the conditions under which fire protection is assured and to remind them of the importance of abiding by the various safety requirements.

In particular, the owner must attach a notice concerning occupants' obligations to deeds of sale and rental contracts, in particular those resulting from the provisions of Articles R. 122-7 and R. 122-18 of the Construction and Housing Code and of Article HR 64.

Article HR 61

Limitation of the surface fire load

1. Pursuant to Article R. 122-18 of the Construction and Housing Code, the fire load of components not taken into account under Article HR 16 (coverings, fixtures and fittings, blinds etc.), must be on average less than 480 MJ/m^2 net floor area per compartment.

If the limit set in Article HR 16 is not reached, the developer or owner may add the available calorific difference per compartment to the limit values set out above.

2. However, if a compartment is completely protected by a fixed automatic sprinkler-type extinguishing installation or a fixed automatic extinguishing installation appropriate for the risks in question, the above values may be increased respectively from 480 MJ/m^2 to 680 MJ/m^2.

3. Pursuant to Article HR 11, rooms may be specially adapted for a greater surface fire load than the values defined in paragraph 1 above. In this case, the surface fire load of these rooms shall not be taken into account when calculating the average value for the compartment in question, and the following conditions must be met:

a) their net floor area shall be less than 100 m^2;

b) their protection shall be guaranteed by an automatic sprinkler-type extinguishing system or a fixed automatic extinguishing installation appropriate for the risks in question and approved by the safety committee.

c) their walls shall have a firebreak capacity of:

- three hours or REI 180 for a total surface fire load less than 880 MJ/m^2 net floor area;
- four hours or REI 240 for a total surface fire load of between 880 and 1280 MJ/m^2 net floor area;
- six hours or REI 360 for a total surface fire load greater than 1280 MJ/m^2 but less than 1680 MJ/m^2 net floor area.

However, in these three cases, the firebreak capacity may be limited to two hours, if the compartment is completely protected by an automatic sprinkler-type extinguishing system.

d) the fire stability rating of load-bearing structural components, adjoining or included in these rooms, shall be equal to the firebreak capacity of their walls;

e) their intercommunication facilities, which must be smoke-proof in closed position, shall have a two-hour or EI 120 firebreak capacity and must not be directly linked to passageways

or communal horizontal walkways. If the intercommunication facility consists of an insulation lock equipped with two doorsets, the latter must have at least a half-hour or EI 30 - C firebreak capacity.

4. Where the rooms referred to in paragraph 3 above are reserved exclusively for archiving documents, no limitation shall be made to the fire load if the conditions laid down in subparagraphs a, b and e of the said paragraph are met and if, in addition, the walls of these rooms have a four hour or REI 240 firebreak capacity and the load-bearing components referred to in subparagraph d above have a fire stability rating of six hours or R 360.

5. For rooms other than accommodation spaces, the occupants shall be obliged to have a fire load conformity assessment report drawn up by an approved body. This report shall be drawn up in the year following the installation in situ or any significant modification of the layout, then periodically every five years.

§6. By way of derogation from Article HR 64, in the entrance halls of the buildings, the surface fire load shall be limited to 50 MJ/m^2 net floor area or 100 MJ/m^2 net floor area if there is a fixed automatic extinguishing installation appropriate for the risks in the hall.

7. Tenants other than those occupying accommodation spaces must be able to prove to the owner or safety representative that the rooms they occupy do not exceed the authorised fire loads.

Article HR 62

Fire safety and evacuation assistance service

1. The composition and specific duties of the fire safety and evacuation assistance service, laid down by Article R. 122-17 of the Construction and Housing Code and Article HR 60 above, shall be defined in the specific provisions relating to each class of building. The fire safety and evacuation assistance service must be placed under the management of a head of fire safety; this person may be responsible for one central fire safety post only.

The qualification procedures for permanent staff of the fire safety and evacuation assistance service shall be defined by order of the Minister for the Interior.

2. The team leader and permanent officials of this service must never be diverted from their specific duties regarding fire safety, evacuation assistance and technical maintenance of fire safety installations. They shall have received specialised technical instruction concerning fire safety systems and fields relating to fire safety and evacuation assistance.

They must be in permanent contact with the central fire safety post, and be able to be gathered as quickly as possible.

3. This service shall fall under the building's general fire safety arrangements, and shall be charged with the following responsibilities:

a) to ensure that the central fire safety post is permanently staffed;

b) to target assistance while waiting for the public emergency and firefighting services to arrive; the team leader of the fire safety and evacuation assistance service or his deputy shall then be subject to the orders of the head of emergency operations;

c) to ensure that the instructions in case of fire are followed;

d) to organise patrols to prevent and detect fire risks, including in unoccupied areas,

e) To ensure that all fire protection equipment is in good working order and maintained, and to update the safety register laid down in Article R. 122-29 of the Construction and Housing Code.

f) To teach, train and direct staff in certain classes of HRB in implementing evacuation procedures and in using first aid in each compartment;

g) To monitor the work laid down in Article HR 65 and, where applicable, to issue fire permits;

h) To ensure that the members of the safety committee have access to all communal areas of the building when carrying out an inspection.

i) To be capable of receiving information regarding the functioning of the lifts and to implement the correct procedures when a lift is blocked.

4. A fire safety and evacuation assistance service may be common to more than HRB, subject to the following conditions:

- it is set up in a central fire safety post;
- the location, the surface area, the methods of liaison, the equipment whereby the tasks assigned to the fire safety and evacuation assistance service can be carried out, the composition of the service shall be defined on a case by case basis and, most importantly, the definition of information reports from the fire safety systems of the different HRBs;
- the service shall be placed under single management;
- it is capable of activating the central fire safety post of each HRB when the public emergency and firefighting services take action;
- the central fire safety post of each HRB shall be located at a distance of no more than 100m from the communal fire safety post via practical walkways.

These provisions shall be subject to the opinion of the safety committee.

Article HR 63

Occupants' safety

1. When a fire alarm is set off in a compartment, the occupants carry out a phase one evacuation by moving to an unaffected compartment. They may then carry out a phase two evacuation by moving to a previously arranged gathering point, pursuant to the provisions of Article HR 60. At the floor(s) at which pedestrians move outside, a phase one evacuation may take place directly outside the HRB.

2. The phase one evacuation of disabled persons, in particular those with reduced mobility, shall be effected by means of horizontal movement on the floor in which they are situated to another compartment or secure waiting area as defined in Article HR 3. This phase one evacuation shall take place without crossing the affected area.

Article HR 64

Miscellaneous prohibitions

It is prohibited for owners, occupiers and operators to:

- introduce, store and use solid, liquid or gas fuels and liquefied hydrocarbons not covered by the cases mentioned in Articles HR 11, HR 37, HR 43 and HR 65; this prohibition shall not apply to hospitals and healthcare facilities or to family care equipment, provided that the

amounts stored are limited to current consumption, or to household appliances not for cooking;
- place or install objects or materials that may lead to non-compliance with the provisions laid down in Articles HR 23 and HR 61 in communal walkways;
- to apply new wall coverings before the old coverings have been completely removed;
- to undertake any work or adaptation liable to reduce the fire-reaction or fire-resistance qualities laid down by this regulation for certain building components (partitions, ceilings, doors, etc.).

Article HR 65

Precautions to be taken during certain works

1. Certain adaptation, maintenance and cleaning procedures liable to obstruct the evacuation of people or to create obstructions to the outbreak and spread of fire shall be subject to prevention measures adapted by the building's fire safety and evacuation assistance service.

2. Authorisation must be applied for pursuant to Article R. 122.11.1 of the Construction and Housing Code and Article HR 4(1)
- - if the obstruction exceeds 48 hours;
- if the works require the use of appliances using liquid, solid or gaseous fuels in quantities exceeding 21 kg in the building, by way of derogation to Article HR 37;
- if the works, regardless of their duration, are liable to obstruct the action of the public emergency and firefighting services.

The application for authorisation must be submitted one month before the works begin, and must be accompanied by documents justifying their importance and by protection measures.

The authorisation shall specify any special conditions to be met after receiving the opinion of the safety committee; a copy shall be sent to the emergency centre where building is located. Without a response from the administration within the timeframe laid down in the previous subparagraph, the authorisation shall be deemed to have been granted.

3. Nevertheless, in an emergency, the works mentioned in paragraph 2 above may be done immediately provided that a statement detailing the nature of the work undertaken and the compensatory measures taken has been forwarded to the authority mentioned in Article R. 122.11-1 of the Construction and Housing Code.

4. Work referred to as 'hot work', for example, welding, oxygen cutting and grinding, must be the subject of a fire permit as defined in Article HR 3.

TITLE II

SUPPLEMENTARY PROVISIONS CONCERNING CLASSIFICATION AND INDEPENDENCE

CHAPTER I
General

Article HR 66

High-rise buildings accommodating several classes of activity

The classification of a building accommodating different classes of activity shall be done by referring to the building's main use. Other uses must be specified, in which case, both the general provisions and the specific provisions for each class of building shall apply in each of the parts concerned. The coordinated implementation of these provisions shall be subject to a document forwarded to the safety committee for it to deliver an opinion.

CHAPTER II
Independence of spaces located in the area occupied by high-rise buildings

Article HR 67
Siting

Pursuant to the provisions laid down in Article R. 122-2 of the Construction and Housing Code, areas located in the bottom part of the building meeting the criteria for independence and the safety measures laid down in this chapter shall not be deemed part of the building.

These areas may comprise establishments open to the public as defined in Article 123-2 of the Construction and Housing Code if they are arranged on three consecutive floors, of which one must be an access level for the public emergency and firefighting services.

Article HR 68
Insulation from high-rise buildings

1. Walls and floors separating the areas defined in Article HR 67 and an HRB must have three-hour or REI-180 firebreak capacity. The load-bearing components of the HRB crossing these areas must be three-hour or R 180 fire stable.

2. Any communication, whether direct or indirect, with the high-rise building shall be prohibited..

This connection must be achieved by means of an intercommunication facility with three-hour or EI 240 fire break capacity, fitted with two doorsets with one-hour flame resistance capacity and one-hour or EI 60 – C fire break capacity, equipped with a door closer.

The intercommunication facility must be boosted in the event of a fire. If the doors are kept open for operating reasons, they must comply with the provisions of Article CO 47(1) to (3) of the amended Order of 25 June 1980.

The fire detection system of the high-rise building must include a detector located within the area immediately adjacent to the intercommunication facility.

This detector must control the closing of the intercommunication facility's doors and its pressure boosting.

This intercommunication facility shall be placed under the responsibility of the owner of the high-rise building or of his representative.

3. In order to prevent the vertical spread of the fire between these areas and the HRB, the following measures must be put in place, as applicable:

- where these areas do not pass alongside the façade of the HRB, the C+D between these areas and the parts of the HRB that overlook them shall be over 1.5m.
- in other cases, the roofing of these areas shall be made from two-hour or RE 120 up to 8m measured horizontally from the façade of the HRB.

Article HR 69

Insulation between establishments open to the public located in areas defined in Article HR 67

The walls separating two or more adjoining establishments open to the public located in areas defined in Article HR 67 must be three-hour or REI 180 fire resistant.

No direct or indirect connection between them shall be permitted.

Article HR 70

Independence of technical installations and of emergency facilities

1. The technical equipment and emergency resources of establishments open to the public located in areas defined in Article HR 67 shall be completely independent of those of the HRB. They must be protected by an automatic sprinkler-type extinguishing system or a fixed automatic extinguishing installation appropriate for the risks in question and approved by the safety committee.

2. Each establishment shall be equipped with at least one alarm system. An information report may be set up in the central fire safety post of the HRB.

CHAPTER III

Measures aimed at non-independent premises and establishments that are open to the public or others, located in a high-rise building

Article HR 71

General

This chapter covers:

Areas hosting activities associated with the normal functioning of the HRB designed or reserved as a matter of priority for occupants and establishments open to the public.

2. The composition of the occupants shall be determined pursuant to the provisions of the safety regulation of establishments open to the public. Where the developer or the owner has the option of a personnel statement, this must specify the maximum capacity per compartment.

3. The provisions of the safety regulation for establishments open to the public that do not run counter to this regulation shall apply to areas and establishments defined in paragraph 1 above where the activities in these areas and establishments do not lead to a density of personnel per compartment above that laid down in Article R. 122-8 of the Construction and Housing Code.

Where the activities in these areas and establishments lead to a density of personnel per compartment above that laid down in Article R. 122-8 of the Construction and Housing Code, the following provisions in this chapter shall apply in addition to those laid down in the above subparagraph.

Article HR 72

Siting

Where areas and establishments defined in Article HR 71(1) lead to a density of personnel per compartment above that laid down in Article R. 122-8 of the Construction and Housing Code, their siting shall be:
- either on three successive levels of which one must be a pedestrian access level;
- or at another level from those defined above.

Article HR 73

Premises or establishments installed on one of three successive floors, one of which must be a pedestrian access floor

Areas or establishments defined in Article HR 72 may be arranged on three successive floors one of which must be a pedestrian access floor, under the following conditions:
- these areas or establishments must be accessible from two different points of the communal horizontal walkway, these passageways shall be taken into account in the number of passageways required;
- their passageways must be designed pursuant to Articles CO 34 to CO 56 of the safety regulation on establishments open to the public. The passage units and the necessary exits in addition to those mentioned in the point above must be independent and must give direct outside access;
- the surface fire load must comply with the values laid down in Article HR 61(1);
- an automatic sprinkler-type extinguishing system conforming to current standards and the provisions of Article MS 25 or a fixed automatic extinguishing installation appropriate for the risks in question and approved by the safety committee must be installed in all areas covered by this article;
- a charged fire hose cabinet complying with the standard in force must be installed.

Article HR 74

Premises or establishments installed on other floors

1. Areas or establishments defined in Article HR 72 may be arranged on higher floors than those laid down in Article HR 73 under the following minimum conditions:

a) where the staff of the compartment in which the areas or establishments are located is less than or equal to 250 persons:
- the net surface area must not exceed 500m2;
- the surface fire load must not exceed 480 MJ/m2 on average in the compartments concerned;
- If there are particular fire risks an automatic sprinkler-type extinguishing system or a fixed automatic extinguishing installation appropriate for the risks in question, approved by the safety committee, may be laid down. The emergency equipment must comply with the standards in force.

b) where the staff of the compartment in which the areas or establishments are located is above or equal to 250 persons:
- in addition to the provisions laid down in paragraph a) above, the number of occupants must not under any circumstances exceed 500 persons. A counter-timer system may be set up to ensure that the staff number is restricted following the opinion of the safety committee;
- the floors on which the areas or establishments are located shall be at least ten floors apart;

- an additional staircase of at least two passage units and meeting the provisions of this regulation must serve each of the levels on which these areas or establishments are located. This staircase may only serve the two floors immediately below the floor in question.

2. If these areas or establishments are arranged on the top two floors of the building, they may have a net surface area of 1000m2 per compartment. The maximum number of occupants remains 500 persons.

In these areas or establishments, the additional staircase laid down in paragraph 1 above shall not be required, where applicable, on the floor concerned, an uncovered terrace with a surface area at least equal to that of the establishment or the area in question. Accordingly, it shall be possible to evacuate the occupants via the building's two normal staircases.

TITLE III

SPECIFIC PROVISIONS APPLICABLE TO CLASSES OF BUILDINGS

Chapter I

HRA
Provisions applicable to residential buildings

Article HRA 1
Partitioning

1. Each apartment must be separated from neighbouring areas and communal horizontal walkways by one-hour or REI 60 firebreak elements.

2. In addition to Article HR 23(3), the doorsets of apartments giving onto communal horizontal walkways must be one-hour or E 60-C flame-retardant and equipped with a door closer.

Article HRA 2
Maximum evacuation distance

In addition to the provisions of Article HR 24(1) and (2), the distance between the front door of an apartment and the nearest staircase, measured along the axis of the walkways, must be no more than 20m.

Article HRA 3
Cellars and storerooms

When cellars and storerooms are located together on any floor of the building, the provisions of Article HR 61 shall not apply to these areas as a whole, but must be divided into surface areas below 500m2 meeting the following conditions:

a) The outer walls must have two-hour or REI 120 firebreak capacity and the indoor partitioning, except doorsets, must be made of category MO or A1 materials;

b) Inside each unit, the distance between all cellar or storeroom doors and the outlet of the unit must not exceed 20m;
c) Outlets must give onto a communal horizontal walkway and must be closed by one-hour or EI 60-C firebreak doorsets equipped with a door closer and open without a key towards the exit from the cellars. Doors must be no more than 20 metres from access to the nearest staircase;
d) The provisions of Article HR 28 shall not apply to communal horizontal walkways inside the units. Each unit must be equipped with automatic fire detection pursuant to the provisions of Article HR 49.

Article HRA 4

Electrical and controlled mechanical ventilation installations

1. By way of derogation to Article 43, the safety supply may:
- be made up of one single electricity generator room;
- in addition to safety installations, heating equipment and water distribution pumps, and boosters therefor.

2. The provisions of Article HR 46 shall not apply inside residences.

3. By way of derogation to the provisions of Article HR 48, except in collective areas of over 50m2, no safety lighting is required inside areas and apartments.

4. As regards controlled mechanical ventilation equipment, in addition to the provisions of Article HR 38(2), the requirement of not spreading fire and smoke is also deemed to have been fulfilled if the ventilator is working at all times, pursuant to the provisions of Article CH 43 and if the vertical collective duct in a two-hour or EI 120 firebreak shaft has been installed.
The ventilator must be supplied as a safety installation. Furthermore, it must be able to ensure that it functions for two hours at a temperature of 200°C. The ventilator's breakdown alarm shall be relayed to the central fire safety post.

Article HRA 5

Alarm and emergency facilities

1. Speakers must be installed in communal horizontal walkways, communal areas and in cellar and storeroom units defined in Article HRA 3. They must be subject to the checks under the conditions laid down in Article HR 5(3).

2. By way of derogation to Article HR 51(2), the installation of charged fire hoses shall not be mandatory.

Article HRA 6

Fire safety and evacuation assistance service

1. Pursuant to Article HR 62, the personnel of the fire safety and evacuation assistance service must ensure that the central fire safety post is staffed at all times by a safety agent with at least an SSIAP (French fire safety assistance qualification) 2.
By way of derogation to the provisions of Article HR 56, the surface of the fire safety post of an HRB may be reduced to 30 m2, excluding living areas, except in the case defined in paragraph 3 below.

2. Patrols must be carried out every day and in the following specific cases:
- during fitting or moving;
- after work in the communal areas has been completed.

During these patrols and the monitoring of works laid down in Article HR 65, the fire safety post must be staffed at all times by a person entirely familiar with the instructions and the application thereof. This person does not need to be SSIAP qualified.

3. The monitoring of works laid down by the provisions of Article HR 62 shall not apply to apartments.

CHAPTER II

HRO
Specific provisions applicable to hotel buildings

Section 1
Construction

Article HRO 1
Partitioning

All hotel rooms and service areas must be separated from neighbouring areas and communal horizontal walkways by one-hour or REI 60 firebreak elements. The doorsets of the rooms must be one-hour or E 60-C flame-retardant and equipped with a door closer.

Article HRO 2
Maximum evacuation distance

In addition to the provisions of Article HR 24(1) and (2), the distance between the front door of an apartment or room from access to the nearest staircase, measured along the axis of the communal horizontal walkways, must be no more than 20m.

When the rooms of an apartment can be rented separately, the distance shall be measured from the door of these rooms and the walkways of the apartment shall be treated as a communal horizontal walkway.

Article HRO 3
Lighting and sockets

1. A lighting terminal electrical circuit must not supply several rooms (or apartments).

2. Equipment ensuring the lighting of passageways and halls must be fixed or hung.

3. Movable lamps shall be authorised in rooms and halls, on desks and reading tables.

4. In rooms and apartments, power sockets must be no more than 16 amperes.

Article HRO 4
Access for firefighters

In order to gain access to priority lifts, the fire brigade must be able to use a signposted entry different from the access reserved for the public.

Article HRO 5
Fire detection/Alarm system

In addition to the provisions of Article HR 49, automatic fire detectors must also be installed in the rooms.

Alarm speakers must be installed at least in each room, in areas open to more than 19 people and in communal horizontal walkways.

When an automatic fire detector is set off in a room, it must lead to the activation of the alarm solely in the central fire safety post.

Section 2
Provisions on the obligations of owners and occupants

Article HRO 6
Cooking and reheating equipment

Cooking and reheating appliances installed in rooms must be exclusively electric and less than 3.5 kW.

Article HRO 7
Fire safety and evacuation assistance service

1. Pursuant to Article HR 62, the fire safety and evacuation assistance service of HRO class buildings must, under the responsibility of the building's fire safety service, include a central fire safety service, which shall comprise three fire safety officers, including a team leader.

The fire safety and evacuation assistance service must, depending on the building's capacity, comprise the following:

a. HRBOs of fewer than 250 rooms:

- an SSIAP2 qualified safety team leader exclusively concerned with safety tasks;
- at least two SSIAP1 qualified safety agents recruited either from the technical maintenance services or from the administration of reception staff.

b) HRBOs of 250 to 550 rooms:

- an SSIAP2 qualified safety team leader exclusively concerned with safety tasks;
- at least two SSIAP1 qualified safety agents who may only be recruited from the technical maintenance staff.

c. HRBOs of 551 to 850 rooms:

- an SSIAP2 qualified safety team leader and an SSIAP1 qualified safety team leader exclusively concerned with safety tasks;
- a qualified safety agent with at least SSIAP1 who may only be recruited from the technical maintenance staff.

d) HRBOs of over 850 rooms:

- an SSIAP2 qualified safety team leader and two SSIAP1 qualified safety agents exclusively concerned with safety tasks.

2. Patrols carried out by the fire safety and evacuation assistance service must take place at least three times a night.

3. The floor staff and the permanent night staff must receive supplementary training on:
- the procedure to follow in the event of evacuation taking into account the situation of disabled people, regardless of the nature of their disability;
- implementation of first aid procedures.

Article HRO 8
Plans and instructions

1. In areas occupied by the public and, in particular, in the rooms, a summary plan must indicate the procedure to follow in the event of evacuation of the compartment.
This plan must be accompanied by simple instructions in the event of fire or the alarm being set off.

2. The instructions laid down must be displayed in each room, must be written in French and must be augmented by a cartoon illustrating the instructions. The wording of the instructions in French may be supplemented by a translation into the languages spoken by regular occupants. They must indicate:

What to do in case of fire

In the event of fire in your room,

If you cannot control the fire:
- find the staircase, carefully close the door to your room and follow the signs;
- advise reception.

Should you hear the alarm signal,

If the corridor can be used:
- find the staircase, carefully close the door to your room and follow the signs.

If smoke makes it impossible to use the corridor or staircase:
- remain in your room;
- make your presence know, and await the arrival of the fire brigade.

Note. - A damp, wet door, rendered airtight by makeshift methods (damp linen) gives long-lasting fire protection.

CHAPTER III

HRR
Specific provisions applicable to teaching buildings

Section 1
General

Article HRR 1
Occupation density

In HRBs used exclusively for teaching, the average occupation of a compartment may, pursuant to Article R. 122-8 of the Construction and Housing Code, be more than one person per 10m2 net, without exceeding one person per 5m2.

Article HRR 2

Types of premises

HRBs used exclusively for teaching shall be reserved for disciplines not requiring the existence of laboratories posing particular risks of fire or explosion or whose activities require the use of products banned under Article R. 122-7 of the Construction and Housing Code and the Article HR 36 of this regulation.

Internship areas shall be banned in class R HRBs.

Section 2

Construction and installations

Article HRR 3

Shafts

In addition to Article HR 17, the shafts provided for in this paragraph may not be located or be opened in communal horizontal walkways except where communal horizontal walkways serve areas reserved for adult training.

Article HRR 4

Suspended ceilings

Furthermore, the provisions of Article HR 21(3) shall apply to suspended ceilings.

Article HRR 5

Partitioning

Apart from the partitioning of communal horizontal walkways laid down in Article 23(3), the volume of each compartment must be divided into cells of a maximum surface area of 500m2 by one-hour or REI 60 firebreak elements and half-hour or E 30-C flame-retardant doorsets equipped with a door closer.

Article HRR 6

Risk reduction

Adjoining areas posing particular fire risks (archives) must be as far as possible from access to staircases.

Article HRR 7

Maximum evacuation distance

In addition to the provisions of Article HR 24(1) and (2), the distance measured along the axis of the walkways of all work or rest areas at the entrance to the connection with the nearest staircase must be no more than 35m.

Article HRR 8

Installation of a third lift

1. In addition to the staircases laid down in Article HR 24, a third staircase following the same conditions must serve, from the pedestrian access level, all compartments whose personnel is no more than one person per 10m2 net surface area.

2. The provisions of Article HR 25(3) shall not apply to the doors of connection points with staircases which must always be at least 2 passage units wide.

Section 3
Emergency facilities

Article HRR 9
Fire safety and evacuation assistance service

1. Pursuant to the provisions of Article HR 62, the fire safety and evacuation assistance service of class HRR must, under the leadership of the building's head of fire safety service, comprise the following:
- a central service, permanently staffed by at least one SSIAP2 qualified safety team leader and two SSIAP1 qualified safety agents;

2. Patrols carried out by the fire safety and evacuation assistance service must take place.
- at least twice when the students are present;
- then one patrol immediately after the students have left, the next two hours later and at least one other during the night.

Periodical evacuation drills must be arranged under the conditions pursuant to Article HR 60, in which the occupants shall be required to participate.

3. When the building is unoccupied and under the representative's responsibility, the building's fire safety and evacuation assistance service may be made up of just two agents including one team leader.

CHAPTER IV
HRS
Specific provisions applicable to archive buildings

Single Article HRS

1. Pursuant to the provisions of Article R. 122-3 of the Construction and Housing Code, most buildings of this type shall not be subject to the safety regulation concerning HRBs.
Where applicable, measures concerning the protection and smoke extraction of staircases, and detection must be taken.

2. Supplementary provisions may be requested by the safety committee.

CHAPTER V

HRU

Specific provisions applicable to medical buildings

Section 1
General

Article HRU 1
Scope

The provisions of this chapter shall apply to the HRB whose activities are defined in Article U(1) of the safety regulation of establishments open to the public.

Article HRU 2
Psychiatric activity

An HRBU may not be set aside for the exclusive use of psychiatric hospitalisation. A psychiatric unit may be permitted in an HRBU.

Section 2
Construction

Article HRU 3
Communications between buildings

The different buildings of hospital establishments may only be connected under the conditions defined in Article HR 10.

The maximum surface area of connections defined in Article HR 25(4) may be exceeded where the smoke extraction conditions are thus laid down.

Article HRU 4
Nature of rooms permitted in high-rise buildings (HRB)

Only areas indispensable to the functioning of the establishment may be included in an HRBU, that is to say, areas relating to hospital services, medical, administrative and general services, except dangerous areas mentioned in Article HRB 5.

Hospital services may comprise one or more healthcare units including those involving individual constant monitoring of patients, for example intensive care and paediatrics.

Healthcare units may comprise wards, medical offices, care rooms and, where applicable, teaching rooms or service accommodation, food areas and technical areas.

Article HRU 5
Hazardous rooms excluded from HRBs

In addition to the provisions applicable to all types of HRB, the following must be stored outside the building:

- all areas or stocks of inflammable liquids above or equal to 10 litres;
- all areas or stocks of gas fuel and liquid hydrocarbons;
- central maintenance workshops, linen rooms and general shops of which the fire load exceeds the limits set by Article 61(1).

The walls of these areas and the connection points with the building must comply with the provisions laid down in Article HR 10(2).

Article HRU 6

Sub-compartments

1. All compartments defined in Article R. 122-10 of the Construction and Housing Code comprising wards must be divided into at least two sub-compartments of more or less equivalent capacity, by two two-hour or REI 120 fire-break walls. The connection points between sub-compartments, where they are not located at the junction between two compartments shall comprise one-hour or E 60 – C flame-retardant doorsets with automatic two-way closing doors. All sub-compartments must have a maximum capacity of 20 beds and must be capable of receiving the beds of patients from the biggest adjoining sub-compartment.

Subject to the implementation of the above provisions, the distance of 30m laid down in Article 24(2)(1) may be extended to 40m by way of derogation.

2. Staircases must be installed in a compartment in such a way that the occupants can, at each level, have access to a staircase without having to pass through an affected sub-compartment.

3. Where the compartment can house more than one healthcare unit, the division into sub-compartments must where possible correspond to the separation of healthcare units.

Section 3

General building components and interior fittings

Article HRU 7

Insulation

1. In addition to the general provisions above, the bays between the wards and the service areas must be sealed by one-hour or E 60 flame-retardant devices.

2. These rooms must be isolated from neighbouring rooms and from horizontal walkways by one-hour or REI 60 firebreak walls equipped with half-hour flame-retardant firebreak walls and equipped:

- either with an E 30-C automatically closing door closer;
- or with a door closer with a controlled stopper for an angle of at least 90°.

If monitoring bays are required, they shall be sealed by half-hour or E 30 flame-retardant firebreak elements.

A non-motorised sliding door not subject to fire-resistance requirements may be installed in areas of less than 10m2.

Article HRU 8

Specific insulation case

1. The provisions laid down in Article HRU 7 shall not apply to healthcare units involving constant visual monitoring of patients, provided they are insulated from other healthcare units and communal horizontal walkways by two-hour or REI 120 firebreak walls equipped with

one-hour of E 60-C flame-retardant doorstops equipped with a door closer or automatically closing for detecting fire in the walkway. These doors may have an automatic closing system that must be inhibited in the event of automatic fire detection.

These doors may have an automatic closing system that must be inhibited in the event of automatic fire detection.2. Operating theatres must have a surface area less than or equal to 1000m2 and be marked off by two-hour or REI 120 fire-break walls and one-hour E 60-C fire-retardant doorsets automatically closing for detecting fire in the walkway. These doors may have an automatic closing system that must be inhibited in the event of automatic fire detection.

Article HRU 9

Interior fittings

In addition to the provisions laid down in Article HR 22(3) and (4), any mechanical protection of partitions must be made of M2 or C-s2 d1 materials. They must not cover more than 20% of the surface of the walls. When there are door protection components, they must be category M1 or B-s2 d0 .

Handrails must be made of category Mr materials or made of M3 wood.

Mattresses except medical devices must comply with the tests laid down in Standard NF EN 597-1. Sheets and non-padded mattresses, except medical devices, must comply with the tests laid down in Standard NF EN ISO 12 592-1 and 2.

Article HRU. 10

Specific-risk areas

1. By way of derogation from Articles HR 61 and HR 64(1), the areas mentioned in the table below shall be authorised in HRBU and subject to the provisions of Article CO 28 except those relating to frontages.

2: The following shall be deemed areas of significant risk:

Archives with a volume of between 50m3 and 100m3 and storage spaces with a volume above 100m3 shall be permitted in HRBUs and deemed significant risk areas.

3. The following shall be deemed medium risk areas:

Area or risk	Average fire risk
Functional areas	
Kitchens	Where the power of cooking or reheating equipment is greater than 20 kW or in the case of the use of an open fryer, regardless of the power.
Technical workshops	If hot point or 5 m^3 < V < 100 m^3 or Q < 10 l per area
Areas inaccessible to ambulances	X
Imaging areas comprising transformers	X

Sterilisation	X
Storage of medical gases	50 l < CW < 200 l
Areas where inflammable liquids are used or stored	
All areas	3 l < Q < 10 l per areas
Areas where inflammable materials are stored	
Archives	V < 50 m^3
Linen rooms Refuse areas Other reserves Pharmacies	5 m^3 < V < 100 m^3
Key Q Quantity of inflammable liquids, expressed in litres, irrespective of category V: volume of areas, expressed in m^3 CW: water capacity	

4. In addition to the provisions of Article CO 28:

- doors of specific-risk areas may close automatically;
- specific-risk areas containing inflammable liquids must comply with the following measures:
  - they must be provided with permanent, carefully distributed, high and low ventilation, and the total section of each high and low ventilation must be at least 1/100 of the surface of the areas respectively, with a minimum of 10 dm^2 per outlet ;
  - they may be installed in basements only under exceptional circumstances and following the opinion of the safety committee.

5. Prohibitions:

Inflammable products with a flash point below 55°C shall be prohibited in walk areas.

Article HRU. 11

Shafts and ceilings

1. In addition to the provisions of Article HR 17, vertical shafts bringing the atmosphere of two compartments into contact may not be located in, or open directly onto, communal horizontal walk areas, except for lift shafts (including lifts for hospital patients) pursuant to Article HR 30.

2. In addition to the provisions of Article HR 21(1), the constituent parts of suspended ceilings and the materials for the ceiling covering of all walk areas shall belong exclusively to category M 0 or A2 - s2, d0.

Article HRU 12

Miscellaneous provisions

1. The provisions of Articles U28 and U29 of the safety regulation on establishments open to the public shall apply.

2. Areas subject to the specific isolation cases cited in Article HRU 8 may not undergo smoke extraction regardless of their surface.
In the case of compartments divided into sub-compartments, smoke extraction calculations shall be done on the basis of the sub-compartment.

3. By way of derogation from the general provisions of this Regulation, the ventilation equipment of specific areas such as operating theatres and intensive care areas shall function independently of the ventilation equipment of the rest of the high-rise building. This must not be interrupted by a break in functioning in any other areas or by the emergency cut-off switch provided for in Article CH 34(2). This provision may apply to other specific areas following the opinion of the safety committee.

4 – The provisions of Section XVI laid down in the EOP safety regulation (type U) on medical gas installation conditions shall apply.

All measures must be taken to prevent a fire that has broken out in a compartment from interrupting the supply of medical gases from other compartments. Each compartment and each area subject to the specific isolation cases cited in Article HR U8 must have cocks and valves for supplying the relevant medical gases.

Medical gas equipment must be inspected annually by an approved body.

Section 4
Passageways: stairways, horizontal walk areas, doors

Article HRU. 13
Communal horizontal walk areas

1. In addition to the provisions of Article HR 23(1), the communal horizontal walk areas of compartments closing off wards must be at least 3 passage units wide. This provision does not cover intercommunication between sub-compartments, which shall remain subject to the provisions of Article HRU6(1).

2. The provisions of Article HR 25(3) shall not apply. Intercommunication doors must accommodate at least two passage units.

Section 5
Technical installations

Article HRU 14
Electrical installations

1. The supply from the safety power supply for lifts may be limited to four appliances, two of which must be suitable for carrying bedridden patients, and all of which must be split between two different batteries.

There must also be a manual device for switching the supply onto other lifts. This device must be positioned close to where the lift machinery is located.

2. Equipment that is vital for hospital safety must be treated as safety installations defined in Article HR 3.

3. Electrical installations must also comply with the provisions of standard NF C 15-211 on low-voltage electrical installations in medical establishments. Pipes must not pass through operating theatres.

4. All measures must be taken to prevent a fire breaking out in a compartment from interrupting the functioning of electrical installations located in other compartments.

5. A qualified person must be physically present at all times to operate and maintain the building's electrical installations.

Section 6

Emergency facilities

Article HRU 15

Fire safety system and alarm system

1. In addition to Article HR 49(4), automatic fire detectors must be installed in all rooms except staircases and toilets.

2. The setting off of a fire detector in a horizontal communal walkway is set off entails the implementation of the provisions laid down in Article HR 49(6).

In addition to the provisions of Article HR 49(6)(1), the setting off of a fire detector in a common horizontal walkway activates the selective general alarm in the alarm area defined in Article HRU 15(3).

The provisions of Article HR 49(6)(2) shall not apply.

Where applicable, in addition to the provisions of Article HR 49(6)(3), the setting off of a fire detector in rooms covered in said article must also activate the selective general alarm, the unlocking of the emergency exits located at the level of evacuation of the occupants outside, the unlocking of the doors of the compartment in question, the unlocking doors designed for access for the emergency services and firefighting services and, where applicable, the smoke extraction of the room and the room's safety devices.

3. In addition to the provisions of Article HR 49(5) and (6), an alarm area shall be extended to one floor and to floors corresponding to the affected compartment; a partitioning area shall correspond to a compartment; and a smoke extraction area shall correspond to one sub-compartment.

4. The management unit for HRB-type alarms must enable the selective general alarm to be broadcast.

Each sub-compartment must, as a minimum, have an alarm repeater signal panel displaying fire alarm information from the fire detection system, so that surveillance staff are informed of the detection area affected by the fire. The use of independent alarm receivers shall be permitted as a complement to the general selective alarm and alarm repeater signal panels.

5. An operation assistance unit with standard signal panels of fire detection systems and with fire safety control boards must be installed in HRBUs. The unit must be supplied by a safe electricity supply as laid down in Article HR 3.

6. In the case of centralised surveillance of a site such as that laid down in Article HR U 19(3), only the fire safety systems of establishments configured in the same direction as the HRB may be monitored from the central fire safety post of the HRBU.

Article HRU 16
Warning

Pursuant to Article HR 50(2), the central fire safety post must be connected to the warning processing centre pursuant to the provisions of Article MS 71 of the EOP safety regulation.

Article HRU 17
Extinguishers

Portable water spray extinguishers with a capacity of at least 6 litres shall meet the following conditions:
- they shall be carefully distributed;
- there shall be at least one extinguisher per 200 m^2 so that no more than 15m needs to be covered to reach an extinguisher;
- an extinguisher shall be located close to crossing points between two sub-compartments.

Extinguishers suitable for particular risks complete this provision.

Section 7

Provisions on the obligations of owners, operators and occupants

Article HRU 18
Organisation of safety in case of fire

1. First phase evacuation procedures laid down in Article HR 63 shall be completed with the horizontal transfer of beds from one sub-compartment to another. Training obligations for the implementation of instructions by staff in the building and the action of fire safety services and evacuation assistance when the alarm is activated and when a fire has been confirmed are laid down in the note under Article HR 60(3). This document shall be drawn up by the head of the fire safety service or submitted for his opinion, and must be kept up to date.

2. In addition to the provisions of Article HR 60, all staff in the building must be informed of the dangers of fire in an HRBU and must be trained in the following:

- implementing specific instructions with a view to restricting the fire and ensuring horizontal transfer or evacuation;
- implementing extinguishing methods.

3. Fire evacuation drills shall be arranged periodically in order maintain staff training levels. Once a year, firefighters shall be invited to take part in such an exercise. These exercises shall be recorded in the HRBU's safety register.

Article HRU 19

Fire safety and evacuation assistance service

1. Pursuant to Article HR 62, the fire safety and evacuation assistance service must, under the responsibility of the building's fire safety service, include a central fire safety service, which shall comprise five fire safety officers, including a team leader, at all times.

2. Apart from the objectives laid down in Article HR 62, the mission of the central fire safety service be as follows:
- to be aware of the particular risks posed by certain services in the establishment;
- to ensure that patrols are carried out in all rooms not constantly monitored. The frequency of these patrols shall be based on the level of risk, with a minimum of four per 24-hour period;
- to be the first to take action in the event of a technical malfunction in the HRBU (power failure, water leak etc) that may affect the running of all or part of the building, using all information and communication devices;
- to carry out other specific safety tasks, on the opinion of the safety committee (fire protection of a heliport, participation at the management's request in organising an emergency contingency plan, a protocol for receiving radiation contaminated patients in emergency units…)

3. Where a hospital site comprises several buildings, high-rise or otherwise, the organisation of the fire safety and evacuation assistance service may be centralised, subject to the following conditions:
- the provisions of Article HR 62(3) must be met;
- the provisions of 2 above must be met;
- in this case, if the fire safety and evacuation assistance service ensures the permanent physical presence of a person qualified in electrical installations, the person in question must have the necessary skills and qualifications.

Chapter VI

H.R.W.
Specific provisions applicable to office buildings

Section 1

Class HRW 1 Buildings

Article HRW 1

Pursuant to the provisions of Article R. 122-9(2e) of the Construction and Housing Code, HRW1 buildings may have only one staircase when the following conditions have all been met:
- this refers to the situation on the date of publication of this Order;
- the net floor area of each compartment, as laid down in Article 10 of the Decree, does not exceed 750m^2;
- the exits of different rooms on the communal horizontal walkways shall not be more than 10m from a staircase access point. There may be no more than two staircase access points per level;
- archive rooms mentioned in Article HR 61(4) shall only be situated on the uppermost floors and shall not have offices.

Section 2

Provisions common to HRW classes 1 and 2

Article HRW 2
Partitioning

1. In addition to the partitioning of communal horizontal walkways provided for in Article HR 24(3), the volume accounted for by private rooms in each compartment, and at each level must be divided by one-hour or REI 60 fire break components and half-hour or E30-C fire doorsets fitted with a door closer in volumes at most equal to half the total volume of these rooms, at almost 5%.

2. By way of derogation from Article HR 23(3), the partitions of communal horizontal walkways may comprise one-hour or E60 firebreak glass elements, from a height of 1m above the floor or, without apron, EW 60 glass elements.

3. The doors provided for in Article HR 25(3) and those defined in paragraph 1 above may be automatic closing provided they meet the following conditions:
- the device must meet the requirements of Standard NF S 61-937;
- the closure of all doors per compartment must comply with the provisions of Article HR 49(6)(1), without the need for signalling.

Article HRW 3
Maximum evacuation distance

In addition to the provisions of Article HR 24(1) and (2), the distance measured in the axis of the walkways shall meet one of the following conditions:
- either 35m maximum between any work station and the nearest staircase access point;
- or 25m maximum between any work station and access to a communal horizontal walkway, ensuring that no work station is more than 40m from the nearest staircase access point.

Article HRW 4
Alarm

Sound devices laid down in Article HR49 must be installed in rooms housing at least 20 people and in communal and private horizontal walkways.

Article HRW 5

Fire safety and evacuation assistance service

1. Pursuant to the provisions of Article HR 62, the fire safety and evacuation assistance service of class HRW 1 or 2 must, under the leadership of the building's head of fire safety, comprise the following:

a) a central fire safety service composed as follows, on the basis of the class of the building:

- HRW 1 less than or equal to 750m2, with two permanent safety officers including a team leader;
- HRW 1 greater than 750m2:
    - when the building is occupied: three permanent safety officers including a team leader;
    - when unoccupied: two permanent safety officers including a team leader;
- HRW 2: three permanent safety officers including a team leader.

This may be changed, following the opinion of the safety committee, to two safety officers when the building is not occupied;

b) a local fire safety service per compartment, set up according to the provisions laid down in paragraph 2 above.

2. The occupants of each compartment shall be required to take part in the local safety service. This must comprise a compartment head and officers appointed from the permanent staff of each enterprise commensurate with the number of staff members. The number of occupants thus appointed shall be at least 1:25 of the occupants of the compartments, with a minimum of six.

3. The patrols carried out by the central fire safety and evacuation assistance service must take place as follows: the first immediately after the employees have left, the next two hours later and at least one more overnight.

The central fire safety and evacuation assistance service must arrange periodical evacuation drills under the conditions laid down in Article 60(2) and the occupants shall be required to take part.

4. In the event of a fire, the local safety service must:

- alert the central fire safety service;
- check the insulation of the compartment by the closure of fire doors;
- organise the evacuation of the compartment, taking account, where applicable, of the situation of any disabled people;
- implement first aid procedures;
- inform the central safety post of the situation.

Chapter VII

H.R.Z.

Provisions applicable to residential buildings above 28 metres and less than or equal to 50 metres in height including areas other than those for residential use

Single Article HRZ

1. Where the floor of the top floor of a residential building is located above 28m and no higher than 50m, with rooms used for one or more activities authorised under Article R. 122-5 of the Construction and Housing Code, the building shall be classified in the high-rise building category, and therefore class Z.

2. The building shall not, however, be considered as an HRB in the following cases that may confer the required independence pursuant to Article R. 122-2 of the Construction and Housing Code:

a. The areas are designed for a professional activity and form part of the same set of rooms as those in which families are living.

b. The areas are designed for a professional office activity or constitute an establishment open to the public, and are run one single natural or legal person and meet all of the following conditions:
- they form a single set of adjoining rooms, with a maximum surface area of 200m2, hosting fewer than 20 people on one level;
- they are insulated from the other parts of the building by one-hour or REI 60 fire-break walls and half hour or E30-C fire doorsets.

c. The areas are designed for professional office activities or constitute 5th category establishments open to the public meeting all of the following conditions:
- the floor of the uppermost level occupied by these areas is always located at 8m at the highest point above the ground outside accessible to pedestrians;
- each level occupied by these areas has at least one façade alongside a passageway meeting the characteristics laid down in the Order on protecting buildings against fire;
- these areas and the passageways thereof are insulated from the residential part of the building by with two-hour fire-break capacity or REI 120, without any intercommunication.

d. Similarly, where a type N establishment open to the public on the top two floors of a residential building less than 50m in height pursuant to Article R 122-2 of the Construction and Housing Code shall not be classified as HRZ if the establishment in question is not in direct contact with the rest of the building, is served by at least two protected staircases, pursuant to the Order on protection against fire in residential buildings and two passage units and may not host more than 500 people.

e. When an establishment open to the public from the first group is or becomes established inside a group 4 residential building as of the date on which this regulation enters into force, in order not to be classified as HRZ the whole building must meet the following conditions:
- the establishment open to the public complies with the provisions applicable to it pursuant to the safety regulation laid down in Article 123-12 of the Construction and Housing Code without prejudice to the provisions below;
- the establishment open to the public shall, for the part accessible to the public, comprise one single-volume unit;
- the establishment open to the public shall comprise one single-floor unit;
- the walls and floors separating the group 4 residential building from the group 1 establishment open to the public shall have a three-hour or REI 180 firebreak. The load-bearing elements of the group 4 residential building crossing these volumes must have three-hour or R 180 fire stability;

- the independence of the establishment open to the public shall be complete in relation to the rest of the building, in terms of access, passageways and technical installations;
- there shall be no intercommunication between the establishment open to the public and the residential building;
- any reserve areas of the establishment open to the public shall be restricted to 200m3 and 500m3, with no intercommunication between them, and shall be insulated by two-hour or REI 120 firebreak walls. The doorsets of these reserve areas opening onto the parts accessible to the public shall be one-hour or EI 60 C firebreak and equipped with a door closer.
- the conditions of serving and accessing the group 4 residential building, as laid down in the construction permit, shall be retained;
- there shall be at least one C+D of 1.5m located above and to the right of the establishment open to the public, provided it is perpendicular to the façade or an extended two-hour or E 120 firebreak covering, of between 1.5m and 8m in the other cases;

CHAPTER VIII

H.R.C.T.
Specific provisions applicable to control tower buildings

Single Article H.R.C.T.

The provisions annexed herewith constituting the specifications relating to fire prevention in aviation control towers shall apply to control towers meeting the conditions laid down in Article R 122-2 of the Construction and Housing Code.

CHAPTER IX

S.
Specific provisions applicable to skyscrapers

Article S1
General

The provisions of this chapter shall apply in addition to the provisions laid down in the other chapters of this safety regulation.

Article S2
Structures

Load-bearing primary construction components must be three-hour or R 180 fire stable.

Article S3
Stairways

Staircase shafts must be divided at approximately every 100m in height in order to form volumes in superposition. The passage between two successive volumes, as mentioned above, must be carried out on one floor using an intercommunication device shared by the two volumes. This device also allows access to the common horizontal walkway.

S4

Lifts for priority use by firefighters

1. Each floor of the skyscraper must have a compartment served by at least three 'firefighter' lifts as defined in Article HR34. They must also fulfil the following conditions:

- Two lifts capable of serving the uppermost floor of the building from the emergency access level in no more than 60 seconds;
- The third lift, capable of taking loads of 2500kg, must be able to serve the top floor in no more than 120 seconds.

2. When the building has several compartments per floor, connected in accordance with the provisions laid down in Article HR 25, each floor must be served in compliance with the following provisions:

- At least one compartment must meet the provisions of paragraph 1.
- The other compartments shall each have two 'firefighter' lifts as defined in Article GH34. The first lift serving from the emergency access floor in no more than 60 seconds. The second lift, capable of taking loads of 2500kg, serving this in no more than 120 seconds.

Article S5

Extinguishing agents

1. The entire building must be covered by a sprinkler-type automatic extinguishing system. This system must comply with the approved French standards and must be installed by specialised and duly qualified companies. Where specific risks are posed, fixed automatic extinguishing equipment appropriate for the risks in question may be put in place, subject to favourable opinion from the safety committee.

2. Skyscrapers must have one standpipe per stairwell as defined in Article 122-9 of the Construction and Housing Code.

These standpipes shall be supplied from two independent boost devices.

Each group of boosters must at all times ensure a flow of 2000 per minute at a pressure of 7 to 9 bars on each floor and in each standpipe.

The electricity supply of the boosters must be configured in such a way that the proper functioning of the other(s) is not affected by an incident on the equipment. The choice of supplying the standpipes from one booster group or the other must be possible with one single operation from a hand-held control from the fire safety central post.

The water supply network for the standpipes shall comprise a gridiron system per building. Devices for insulating the water supply from one standpipe in relation to another shall be put in place. These insulating devices shall have position checks reported to the fire safety central post.

Water tanks designed for standpipes must comply with the standards in force and must have a water capacity of at least 240m3 exclusively set aside for the fire service. They must be permanently supplied with the appropriate methods for the building laid down in Article HR 52(1) with a minimum flow of 2000 litres per minute. When tanks are located in the bottom part of the building the two booster groups must be installed in two different technical locations solely reserved for this purpose.

Article S6

Fire load in skyscrapers

The provisions laid down in Article S5(1) shall not run counter to the implementation of measures relating to the surface loads provided for in Article HR 61.

Article S7

Intervention management site – Advanced Fire Safety Site

1. An intervention management site, adjacent to the fire safety central post, must be set up in order to enable the public emergency and firefighting services to organise and manage the equipment they use in the event of a fire or, where they deem fit, any other event regarding the building in which they are involved.

This area must have a surface area of no less than 150m3 and must have a direct link to the central safety post and a fixed landline telephone connection.

An identical area to that defined above, referred to as the advanced fire security area, must be set up on a floor located clearly at two thirds of the height of the skyscraper. Regardless of use outside emergencies, it may be activated immediately and without restriction as soon as the firefighters' chief puts in the request. The walk area enabling those involved to return to this area via the stairs and lifts must be marked.

2. The provisions laid down in Article 62(4) shall not be authorised for skyscrapers.

Article S8

Composition of the fire safety and evacuation assistance service

The fire safety and evacuation assistance service of a skyscraper must be made up of at least one head of safety, two team leaders and three safety officers.

The composition of this service can be increased on the request of the safety committee depending on the activities taking place in the skyscraper.

APPENDIX

SPECIFICATION SHEET

CONCERNING FIRE PREVENTION

IN PATROLS DESIGNED FOR AIR TRAFFIC CONTROL TOWERS

Summary

SPECIFICATIONS RELATING TO FIRE PREVENTION IN AIR TRAFFIC CONTROL TOWERS

I – GENERAL PROVISIONS

1.1 DEFINITION

This chapter covers the specifications of air traffic control towers, only occupied in their shaft by spaces directly relating to the functioning of the control tower and of which the floor of the highest level – accessible to air traffic controllers – is located 28m from the emergency access level.

These installations shall be designed to host a staff of no more than 19 people.

* Please note that 'occupied' towers or those with activities within their shaft and of which the highest floor is above 28m shall be subject to the rules on HRBs.

1.2 APPLICATION OF SPECIFICATIONS SHEET IN EXISTING BUILDINGS

With the exception of the provisions on technical inspections and monitoring, this specifications sheet does not apply to existing establishments.
Where replacement installation, fitting or extension works are undertaken in existing towers, the provisions of this specifications sheet shall apply only to parts of the building or installations that have been altered.

II – CONDITIONS OF USE

CLASSIFIED INSTALLATIONS:

Apart form equipment strictly necessary to the functioning of air traffic, such as inverter loaders, control towers may not contain installations classified in the nomenclature relating to installations classified for environmental protection when the classification is the result of fire and explosion risk that the towers pose.

It is forbidden to store or handle especially inflammable liquids or category 1 inflammable liquids.

III - OBLIGATIONS RELATING TO THE OCCUPATION OF AREAS

RESPONSIBILITY OF OWNERS, CONSTRUCTORS AND OPERATORS:

Builders and fitters shall be obliged, each for their own part, to ensure that installations and equipment are established in compliance with the regulatory provisions, and in particular that

the fire behaviour of building materials and components meets the conditions laid down by this specifications sheet.

Checks carried out by the administration or by the safety and accessibility advisory committee of the department does not exempt builders and fitters from their own responsibilities.

Owners shall be required to maintain installation and ensure their conformity with the provisions of this specifications sheet, and to this end, they must:

- have installations checked by a body accredited by the Ministry of the Interior during the construction and planning stages;

- have equipment periodically checked by relevant experts or by an accredited body, pursuant to the provisions of chapter 18.1 of this specifications sheet when the establishment is up and running.

IV - CONSTRUCTION

4. 1 - DESIGN AND SERVICE

4.1.1 – SAFETY PRINCIPLES:

In order to ensure the safety of occupants and adjoining buildings, and in order to ensure the safety of air traffic, control towers must be constructed in such a way that the following safety principles are complied with:

In order to extinguish fire before it spreads to a dangerous extent:
- the control tower shall be divided into compartments defined in this specifications sheet, and their walls must not allow fire to pass between compartments;
- combustible materials in each compartment must be limited;
- materials that are liable to spread fire quickly shall be prohibited;

Occupants shall be evacuated via an enclosed or open air staircase.
- access to staircases shall be prohibited in the compartments affected or threatened by the fire.

Control towers must comprise:
- one or more independent sources of electricity, to remedy the shortfall, where necessary, of that used during normal service;
- an effective alarm system and means of firefighting at the disposal of the public emergency and firefighting services and, where appropriate, at the disposal of occupants.

Where a fire occurs in a part of the tower, at least one lift or service lift must continue to operate in order to serve floors and compartments not affected or threatened by fire.

Appropriate provisions must prevent smoke from spreading from the damaged compartment to the other parts of the tower.

In order to prevent an external fire from spreading to a control tower, the building must be isolated by a protection space meeting the conditions laid down by this specifications sheet.

4.2 ACCESS ROUTES FOR FIRE ENGINES

Access to control towers usable by the fire brigade must not be more than 30m from a passageway where fire engines can move and park.

This passageway must be at least 8m wide and shall include a road meeting the following characteristics:
- Width: 3m
- Width of the apron in front of the access to the tower: 6m of a length of at least 20m
- Load-bearing capacity calculated for a vehicle of 160kN with a maximum of 90kN per axle, these being at least 3.6m apart
- Shear resistance 80N/cm² on a minimum surface of 0.2m²
- Minimum inner radius R= 11m
- Extra width E = 15/R in bends with an inner radius of less than 50 metres (E and R expressed in m)
- Clearance height: 3.5m (passage under portico)
- Gradient less than 15%.

If the service requires the use of a cul-de-sac of a length above 30m, it must have a turning circle at the end and must meet the characteristics set out above.

4.3 - INSULATION

4.3.1 DEFINITION AND SERVICE OF THE PROTECTION AREA:

The protection area shall be a space free from any construction corresponding to the bare parts of the projection of the most protuberant parts of the facades. This area must be 8m away from all combustible elements.

The exits on this level must be reachable at all times from access routes.

The protection area may be crossed by a linking hall provided the following conditions are met:
- the tunnel shall not contain any stores or fittings that constitute a significant fire load;
- the tunnel shall be separated from each building connected by half-hour or E-30 doorsets;
- the tunnel shall only act as an evacuation route if it offers direct external access.

4.3.2 LATERAL ISOLATION BETWEEN A CONTROL TOWER AND ADJOINING AREAS

In order to stop an external fire from spreading to a control tower, the tower must be isolated from neighbouring buildings by a wall of a two-hour or REI 120 firebreak vertical façade in the entire height of the construction of the area. This shall increase to three hours or REI 180 if the building hosts operations posing particular fire risks.

Horizontally, one of the following provisions must be adopted:

- the façade shall have a two-hour (REI 120 or EI 120) firebreak capacity on 8m in height from the dividing line, with any bays two-hour or EI 120 flame resistant, and mounted on fixed chassis;

- the lowest roofing shall be made using half-hour or E 30 flame-resistant construction elements on 4m measured horizontally from the façade. If the area hosts an operation that is particularly fire-hazardous, this shall increase to one-hour or E 60 over an 8m distance.

Connection shall be possible either by an airlock with a half-hour or E 30 door or by means of a one-hour or EI 60-C firebreak door equipped with a doorset.

4.3.3. OPPOSITE INSULATION

If the facades of the control tower and an area are separated by a protection area of less than 8m, the façade of one of these must have one-hour RE 60 or E60 flame-resistance, and any bays blocked by half-hour or E30 flame-resistant components.

The horizontal part of the roofing located in the 8m protection area must have a half-hour or E30 screen for an internal fire.

V – FIRE RESISTANCE OF STRUCTURES

The main components of the structure and the dividing floors of the tower shall be:
- two-hour or R120 fire stable for structure;
- two-hour or REI 120 firebreak capacity for dividing floors (within the meaning of the tower's fire compartmentation).

Fire resistance is not required for monitoring superstructures.

VI – COVERING COMPONENTS

The elements making up the roof must be B roof (t 3).

VII – FACADES

The components of the façades separate from the load-bearing structure must be M1 (or B s3, d1), and must comply with the provisions laid down in technical instruction 249.

VII – INTERNAL DISTRIBUTION

8.1 – INTERNAL DISTRIBUTION

8.1.1 SHAFT

The shaft of the tower shall be divided horizontally by two-hour or EI 120 or REI 120 firebreak floors forming compartments of which the height between floors shall not exceed 11m. The compartments thus formed shall also comprise one-hour EI 60 or REI 60 firebreak intermediary floors at no more than every 6m.

The connections between the areas and the closed or open-air staircases shall be made by means of airlocks with a surface are of 3 to 6m2, equipped with half-hour or E30-C doors with doorsets.

No areas may give direct access to a closed or open-air stairwell.

8.1.2 MONITORED AREA

8.1.2.1 Definition

Monitored spaces shall consist of a compartment in which the staircase and the lifts from the access level of the tower converge and in which the vertical access links leading to the lookout area begin. This area may have 'living areas' for the monitoring staff, and may have a cooking and heating element with a combined power of no more than 3.5KVa.

8.1.2.2. Requirements

The 'living areas' in the monitored space must be isolated from the floor's distribution landing by one-hour or EI60 firebreak walls and half-hour or EI 30 flame-resistant doorsets fitted with a door closer.

The staircase leading to the lookout area must have a half-hour or E 30-C isolating door fitted with a door closer opening from the lookout area to the escape.

8.1.3 LOOKOUT AREA

The look-out area shall comprise a monitoring space and the associated technical area (strictly on the underside), and these areas shall not be isolated from one another. Together they shall form one compartment.

8.2 RISK AREAS

8.2.1 AREAS AT SIGNIFICANT RISK

The areas at significant risk are as follows:
- reserve areas specific to the needs of the tower;
- transformer sub-stations;
- HV electric areas.

These areas shall be isolated by two-hour or EI 120 or REI 120 firebreak walls and floors.
They shall be isolated from the passageways by airlocks.
The doorsets of these areas shall be one-hour or EI 60-C firebreak equipped with a door closer.

8.2.2 MEDIUM-RISK AREAS:

The areas at medium risk are as follows:
- the lift machinery rooms;
- technical air conditioning areas;

- electric areas;
- battery areas.

These areas shall be isolated by one-hour or EI 60 or REI 60 firebreak walls and floors.
The doorsets of these areas shall be half-hour or EI 30-C firebreak equipped with a door closer.
Areas referred to as protected technical volume areas housing fire safety system equipment must be treated as medium-risk areas.

IX – DUCTS AND SHAFTS

9.1 GENERAL PROVISIONS RELATING TO CAGES, SHAFTS AND DUCTS

Appropriate provisions must prevent smoke from spreading from the damaged compartment to the other parts of the building.

Stairwells, lift shafts and service lifts must consist of walls made of non-combustible materials (or A1) and two-hour or EI 120 and REI 120 firebreak.

All other vertical ducts must be located in shafts, except where they themselves have a firebreak capacity equal to the firebreak of the wall crossed.

9.2 PROVISIONS SPECIFIC TO NON-INTERSECTED VERTICAL SHAFTS

Vertical service shafts of which the intersecting to the right of the floors is made impossible by their destination must have two-hour or EI 120 (υe) (i→o) firebreak capacity. Devices such as hatches or inspection doors must have two-hour or EI 120 firebreak capacity, and must normally be kept locked, except in the following cases.

The connections between the lifts and the compartments must meet the provisions of Chapter XVI(16)(2) of this specifications sheet.

9.3 PROVISIONS SPECIFIC TO INTERSECTED VERTICAL SHAFTS

All vertical service shafts, except those mentioned in the previous Article must have 2-hour or EI 120 fire break capacity and be divided on each floor by partitions, thus forming compartments, with 2-hour or EI 120 fire break capacity, with no gaps left between the ducts. Any gaps around the electric cables shall also be plugged.

The hatches and inspection doors of these shafts must have half-hour or EI 30 fire break capacity and be kept locked.

Their surface per shaft and per floor must be limited to 0.8 m^2 for shafts containing heating or ventilation air ducts and to 1.40 m^2 for shafts containing discharge or water supply ducts, cables, wiring or electrical switchboards.

In addition to these surfaces, hatches and inspection doors must have one-hour or EI 60 fire break capacity.

9.4 PROVISIONS SPECIFIC TO HORIZONTAL SHAFTS

Horizontal shafts or conduits must, in the crossing of the firebreak walls of areas at risk of fire, have a firebreak capacity equal to the firebreak capacity of the wall crossed.

The materials making up the horizontal walls of the shafts must be category M0 (or A2 s 1do), and inspection hatches must have a fire break capacity that is equal to half that of the shaft.

X – PASSAGEWAYS

10.1 MAIN EVACUATION STAIRCASE

Control towers must have a 2 passage unit staircase serving at least the lower part of the last compartment. This staircase must be of a sufficient size for a stretcher to pass,

and must be either closed or open-air. In order to be deemed open air, the façade must give access to the outside for at least 50% per staircase.

The staircase serving the floors must be continuous until the level allowing for evacuation on the outside or on a walkway leading directly outside.

The stairwells serving the floors, and those serving the basement, must be halted at the evacuation level.

No area may lead directly to the main evacuation staircase. Connections must be made via an airlock with a half-hour or E 30-C flame resistant door and equipped with a door closer. For operational reasons, doors must have fire-detecting automatic closure capability.

The outlet of the staircase at evacuation level must be:
- directly to the outside or
- in the case of evacuation via a chamber, at least 20m from an exit outdoors.

10.2 INTERNAL PASSAGEWAYS

The lookout and the highest compartment areas must be served under the following conditions:
- by a passageway wider than one passage unit leading to the two-passage-unit main evacuation staircase;
- this passageway must lead to the control tower's main evacuation staircase by means of an air lock.

XI – INTERNAL FITTINGS

11.1 FIRE REACTION OF FLOOR MATERIALS

Floor coverings must be category M3 or B_{FL}-s1.

The wall support of the covering must always be category M0 or A1, except for (free access) raised floors, where these are category M1 or B (plenum side).

11.2 CEILINGS, SUSPENDED CEILINGS

The supporting wall of the covering must be category M0 or A1.

The component parts of suspended ceilings and the covering materials of ceilings must be category M1 or B-s2, d0. Furthermore, the surface fire load must not exceed 21 MJ per m2.

In communal passageways, the component parts of suspended ceilings and the covering materials of ceilings must be made of category M1 or A2-s2, d0 materials.

The plenum between the high floor and the suspended ceiling must be divided by components made of category M0 or A1 materials or by half-hour or EI 30 firebreak walls and must only contain category M0 materials (although category A2-s2, d0 materials are also acceptable).

Any electric cables must meet the provisions of Article 14.1.

These cells must have a maximum surface of 300m2, with the largest dimension not exceeding 30m.

If the height of the plenum exceeds 0.2m, it must be accessible throughout.

11.3 COVERINGS OF LATERAL WALLS

The supporting wall of the covering must be category M0 or A1.

The materials of the coverings of lateral walls (except doorsets) must be category M1 (or B – s2, d0). The surface fire load of the covering shall not exceed 21 MJ per m2.

In communal passageways, except lift cabins, the materials of coverings of lateral walls, except doorsets, must always be category M0, although category A2 – s2, d0 are also acceptable.

XII – SMOKE EXTRATION

12.1 SMOKE EXTRACTION IN THE MAIN EVACUATION STAIRCASE:

If the main evacuation staircase is closed it must be overpressured and must have at the top an opening of at least 1m2 of which the hand control shall be located in the vicinity of access to the staircase at the level of evacuation.

The overpressure must be between 20Pa and 80Pa. These values cover all closed doors. The rate must be such that it ensures an air passage speed above or equal to 0.5m/s through the access door of the affected area, with the other doors closed.

12.2 SMOKE EXTRACTION IN THE LOOKOUT

The lookout must have natural smoke extraction calculated on the basis of 1/100 with a minimum of 1m2. The controls must be manual and placed at the entrance to the compartment including the lookout.

XIII – HEATING, VENTILATION, AIR-CONDITIONING

Ventilation, heating and air conditioning equipment must comply with the provisions of Chapter V of Title I of Book II of the safety regulation against fire in establishments open to the public. The following provisions must also be implemented:

13.1 HEAT GENERATION

The generation of heat using fuel shall be prohibited in the tower or in the protected area.

13.2 VENTILATION NETWORK

When ventilation networks are not located in a shaft pursuant to the definition in Chapter IX of this specifications sheet, they must have a firebreak valve at the dividing floors of the compartments.

They must ensure a crossing firebreak capacity between the compartments.

In the lookout, the plenums of (free access) raised floors must not act as inflation plenums.

Ventilation areas located in the shaft must meet the specifications of medium-risk areas. Ventilation ducts must have firebreak valves at the crossing of the wall of the area, ensuring the firebreak capacity.

For air treatment plants with a rate above 10000m3/h, an autonomous release detector that is sensitive to smoke and combustion gas must be installed on the downstream side of the air treatment casing and at the root of distribution conduits.

This detector, in compliance with Standard NFS 61961 and awarded the NF mark, must automatically:

- stop the ventilator;
- close a metal register downstream of the filters;
- where applicable, cut the electricity supply of the heating batteries.

XIV – ELECTRICAL INSTALLATIONS

14.1 GENERAL INFORMATION

Electrical equipment must be installed in compliance with the relevant decrees, orders and standards and, more specifically, with the provisions laid down in Chapter VII of the safety regulation of establishments open to the public.

Electric cables must comply with Articles 4 and 5 of the amended Order of 21 July 1994, on the classification and certification of the fire behaviour of electrical cables and conductors, and on the approval of testing laboratories.

All piping and equipment must be installed in such a way that faults can easily my located at all times and worn materials and conductors can be replaced.

14.2 TRANSFORMERS.

Power transformers may be dry or contain a liquid dielectric. They must be cooled naturally, without forced ventilation. If the dielectric is an inflammable liquid, the quantity must not exceed 25 litres per tank, vat, cistern or per group of such communicating containers.

Transformers must be located where the walls have a two-hour or EI 120 or REI 180 firebreak capacity and one-hour or EU 60-C firebreak doorsets equipped with a door closer. The room must be directly ventilated on the outside. If mechanical ventilation is used, this must be powered by the electrical supply.

If, moreover, the transformers contain a liquid dielectric, the room must have a watertight retention casing of an appropriate size for the total volume of the dielectric.

Similar provisions shall apply to electric materials that may pose similar risk.

14.3 – DEFINITIONS OF INSTALLATIONS

Electrical installations shall include:

a) Normal equipment used during normal operation and using normal supply or supplies.

b) Replacement equipment made up of all or some of the normal equipment to be re-supplied by one or more different points of the normal source, if it is planned to pursue operations in the event of this source failing;

c) Safety equipment, which must be kept working in order to ensure people's safety and the safety of the tower in the event of a fire and in the event of failure of the normal sources; the functioning conditions and the sources of supply must fulfil the provisions of the articles below.

14.4 CHARACTERISTICS OF SAFETY EQUIPMENT

Safety equipment shall include:
- safety lighting;
- at least one lift that can be used by the emergency services in the event of a fire;
- smoke extraction;
- water boosters;
- mechanical ventilation of processing areas, where applicable;
- fire safety system (F.S.S.)

This fire safety equipment must be kept in service throughout the duration of the fire, for at least one hour.

Safety equipment must be supplied from the control tower's own safety switchboard.

Safety equipment must meet the provisions laid down in Section III of Chapter VII of the safety regulation for establishments open to the public.

14.5 CHARACTERISTICS OF SAFETY SUPPLIES

Safety supplies must lead to the supply of all safety equipment at the same time.

The safety supply may be made up of the air traffic control's replacement supply. Under these conditions, a specific departure point must be laid down, supplying the safety switchboard. If the control tower's electrical supply is cut, this must not under any circumstances affect the fire safety equipment.

Safety supply via an electricity-generating group must not be located above the level accessible to the fire brigade.

Furthermore, gas-powered generators must be checked by the central safety committee.

14.6 INDEPENDENCE OF PIPING

Piping supplying safety equipment must be laid in such a way that any disturbance affecting other electrical equipment should not deprive it of electricity.

XV – LIGHTING

Lighting equipment must meet the provisions laid down in Section III of Chapter VIII of the safety regulation for establishments open to the public.

Lighting equipment of walk areas and the common areas of each compartment must be designed so that any failure of a light source or the supply circuit does not have the effect of entirely depriving one of the walkways or communal areas of lighting.

The same rule shall apply to staircases.

XVI – LIFTS

16-1 LIFT SHAFTS AND CABINS

Lift shafts must comply with the conditions laid down in Chapter IX(9)(1) and (2) of this specifications sheet.

Lifts must be installed pursuant to the standards in force.

Lifts must, in all cases, open onto communal horizontal walkways, and access thereto must be protected in case of fire in accordance with the provisions laid down below.

16-2 PROTECTION OF ACCESS TO LIFTS

Access to staircases shall be prohibited in the compartments affected or threatened by the fire.

In the event of a fire breaking out in a part of the control tower, the lifts and service lift must continue to operate in order to serve floors and compartments not affected or threatened by fire.

The two-hour or EI 120 or REI 120 firebreak specifications laid down in Article 9.1 on lifts shafts shall be fulfilled by following one of the following solutions:

a) Access to the cabin must be by means of an airlock meeting the characteristics laid down in the second paragraph of Article 8.1.1;

b) Each cabin bay opening directly into a compartment shall have an automatically closing two-hour or EI 120-C firebreak door. This may be a swinging door provided the swing clearance does not exceed 100°.

The automatically closing firebreak doors of one compartment must function:
- simultaneously, by sensitising the fire detection devices and by remote control from the fire safety control board;
- separately, by means of a thermal device once the temperature reaches 70°C in the upper part thereof and, and by hand.

All of these methods of closure must coexist and must be independent of each other.

When firebreak doors isolate lift landings, they must be able to be opened manually, and people isolated on this landing must be warning that the lift will not stop and invited to take the stairs.

16.3 ADDITIONAL PROVISIONS RELATING TO LIFT LANDINGS

No technical shaft or duct may be located or opened in stairwells and the access devices thereof, nor on lift landings when they are made up of airlocks.

These provisions shall not apply to standpipes.

A clearly visible sign, pursuant to applicable standards, must indicate the need for the passageway necessary for the self-closing fire doors to operate to be kept obstacle-free.

The landing closing devices, where applicable, and the lift doors must not intersect or narrow the compartment's common general walk areas or make them smaller.

16.4 LIFT CAGE ASSISTANCE

In the event of breakdown or during a deliberate shutdown, it must be possible for all cages to be brought to an access floor.

Each lift must be located in a specific shaft.

16.5 PRIORITY LIFTS

Firefighters must have direct access to each level of each compartment not affected or threatened by the fire by means of at least one priority call lift pursuant to the standard in force.

Firefighters should not have to go more than 50m from the passageways defined in Chapter IV of this specifications sheet to reach the access points to priority call lifts.

XVII – FIREFIGHTING EQUIPMENT

17.1 FIREFIGHTING EQUIPMENT

Control towers must have the following extinguishing equipment:

17.1.1 CHARGED FIRE HOSES

Each floor must have a nominal diameter 25/8 charged fire hose.

The number of charged fire hoses and the choice of replacements must be such that the entire surface area can be effectively reached.

In all cases, the hose valve of the least favourable charged fire hose must have a minimum pressure rate of four bars.

17.1.2 DRY STANDPIPES

Control towers of which the floor of the top level is lower than or equal to 50m must have at least one dry standpipe, complying with standards, located in the main evacuation staircase.

Dry standpipes installed must have a nominal diameter of 100mm and must comprise for each level one simple 65mm intake or two simple 40mm intakes.

SUPPLY CONNECTIONS OF DRY STANDPIPES MUST BE LOCATED WHERE THE FIRE BRIGADE CAN LOCATE THEM EASILY AT LEAST 60 M FROM A HYDRANT, PURSUANT TO THE STANDARDS.

17.1.3. WET STANDPIPES

Towers, of which the floor of the top level is higher than 50 m, shall have at least one wet standpipe located in the main evacuation staircase.

Wet standpipes must be installed and positioned in such a way that they are not at risk of freezing.

They must comprise one 65 mm simple hydrant and two 40 mm simple hydrants located in the insulation locks on each floor.

The power supply device of each standpipe (booster, pump, etc.) must permanently ensure a flow of 1000 litres per minute at a static pressure of 7 to 9 bars on any given floor for a period of one hour.

The reserve shall consist of two 30m³ reservoirs. If this reserve is not liable to be refilled by the tower itself, it must be able to be refilled by a 100 mm dry standpipe.

The wet standpipe of a tower may be refilled through two 65 mm orifices with valves located at the access level for firefighters, and less than 60 m from a fire hydrant or pillar hydrant.

The refilling and discharge orifices must be indicated.

17.1.4. EXTINGUISHERS

Portable extinguishers suited to risks must be located in prominent positions that are easily accessible to personnel, with their supports firmly attached at a height that allows easy access. It is recommended that the handle not be placed higher than 1.20 m above the floor.

Extinguishers must be placed in such a way that the distance to be covered to reach an extinguisher is less than 15 metres at any point.

17.2. FIRE SAFETY SYSTEM

In order to enable the immediate discovery of a fire, a category A fire safety system compliant with the standards shall be installed in the tower, with a limited alarm signal sent, where necessary.

17.2.1. INSTALLATION

This system shall comply with the requirements laid down in Section V of Chapter XI, Title II, Book II of the Order of 25 June 1980.

The materials used in the fire safety system and the activated safety devices shall comply with the specifications of the standards.

Automatic fire detection systems shall be installed in all areas.

Access floors and plenums, of a height greater than 0.80 m, in which a fire and smoke load pass, shall be equipped with fire detection systems.

A fire safety systems coordinator shall be appointed during the installation or during any alterations.

17.2.2. OPERATING CONDITIONS

The activation of any of the tower's detectors shall result, without delay, in:

- information on the signal board and a fire alarm signal;
- the closure of the fire doors and valves of the affected compartment;
- smoke extraction, where necessary, of the affected room or compartment;
- the placing of enclosed stairwells under excess pressure;
- the lift not stopping on the affected floor.

In addition, the detector will trigger the general alarm procedure.

With regard to the lookout area, in order to be able to take the emergency measures necessary for air safety, this alarm shall be a limited alarm.

The person responsible for the lookout area must alert the aerodrome's firefighters immediately.

In the event that the aerodrome firefighters can intervene under optimal driving conditions in less than 5 minutes after the selective general alarm has been triggered, the firefighters present from the start of the intervention shall confirm the existence of an incident and give information on its location to the person responsible for the lookout so that all the necessary emergency provisions laid down for air traffic may be followed.

In all other cases, a signal board installed in a room used as the safety post located in the technical block at the foot of the tower, at a level closest to the access level for the emergency services, shall be continually monitored by qualified personnel, other than the personnel monitoring incidents to aircraft, responsible for:

- acting on the limited alarm;
- initiating the firefighting;
- organising the evacuation;
- warning and guiding the public emergency and firefighting services.

The designated monitoring staff must hold a fire safety and evacuation assistance officer's diploma (SSIAP1).

17.2.3. MAINTENANCE

The fire safety system must be kept in good working order. This must be overseen by a competent technician authorised by the operator.

The system shall be subject to a maintenance contract drawn up between the operator and the designated company. The contract shall state, among other things, the maintenance frequency and the emergency repair measures.

XVIII – Provisions on the obligations of owners, operators and occupants

18-1 TESTS

Owners, builders and fitters shall be obliged, each for their own part, to ensure that, at the time of construction and subsequent outfitting, equipment, when implemented, meets the conditions laid down by this specifications sheet, the standards and DTU.

Operators shall be obliged to keep the safety installations and equipment in good working order.

To this end, an approved body or competent technician must periodically test the following equipment:

Every 6 months	Lifts	By a competent technician or approved body

Every year	Electricity Lighting Extinguishing agents and fire safety systems Heating / Ventilation / smoke extraction (the operation of fire valves and shutters) Lightning conductors	 By a competent technician or approved body
Every 3 years	Category A fire safety system	By an approved body
Every 4 years	Lightning conductors	By an approved body

The bodies or technicians shall draw up an inspection report, which shall specify the conformance or non-conformance of the installations or equipment to the provisions that were applicable at the time of construction or outfitting.

They shall make a note of the date of their tests on the maintenance register.

18-2 DRILLS, OCCUPANTS' INFORMATION

The operator shall be obliged to:

- organise at least once every 6 months for all the personnel occupying the control tower:
  - an evacuation drill;
  - sessions intended to familiarise the occupants with the use of emergency equipment.

- draw up and display fire instructions in communal horizontal walk areas near to the access points for stairwells and lifts.

- inform occupants of the conditions under which fire protection is assured and to remind them of the importance of abiding by the various safety requirements.

18-3 WORKS

Certain alteration, maintenance and cleaning works that are liable to obstruct the evacuation of persons or to create the risk of fire breaking out or spreading shall be subject to authorisation in the following cases:
- if the obstruction exceeds 48 hours;
- if the works require the use of appliances using liquid, solid or gaseous fuels in quantities exceeding 21 kg;
- if the works, whatever their duration, are liable to hinder the work of the fire services.

An authorisation application shall be sent by the operator 1 month prior to the start of the works and shall stipulate, where appropriate, special conditions to be observed following the opinion of the safety committee; a copy shall be sent to the emergency centre where the building is located.

In the event of an emergency, the works shall be carried out immediately provided that a declaration stating the nature of the work carried out and the compensation measures taken is sent to the departmental safety and accessibility advisory committee. The emergency centre where the tower is located must be informed immediately.

Patrols shall be carried out after each site evacuation.

Hazardous works shall be covered by the provisions laid down in the Order of 19 March 1993 adopting Article R 237-8 of the Employment Code.

In the event of the works exceeding 24 hours' duration, the operator shall be obliged to submit an autorisation application to the State representative, indicating the precautions taken. It must be submitted 15 days before the works begin.

In order to perform hot work, namely oxyacetylene welding, a hot work permit shall be required.

Where hot work does not require the aforementioned authorisation application, the following measures must be taken:

- authorisation signed by the operator and referred to by his employees, stating the precautions to be taken;
- inspection of the locations after the work has been carried out.

18-4 MISCELLANEOUS PROHIBITIONS

It shall be prohibited for owners, occupiers and operators to:

- leave objects or materials in communal passageways;
- undertake any work or alterations liable to reduce the reaction to fire or fire-resistance qualities laid down by this specifications sheet (partitions, ceilings, doors, etc.).

TECHNICAL INSTRUCTION ON SMOKE EXTRACTION IN HIGH-RISE BUILDINGS

1. Purpose

Article R. 122.9 of the Construction and Housing Code and Article G.H. 25 of the Order of …… specify that adjoining compartments and stairways in high-rise buildings must be protected from the invasion of smoke by a facility for intercommunication with the affected compartment with a 2-hour or EI 120 fire break capacity. This facility must enable any smoke that has entered to be extracted quickly where the facility is used to allow persons to pass on a continuous and ongoing basis.

Furthermore, Article H.R. 28 of the aforesaid Order stipulates that communal horizontal walk areas and communal areas with a surface area greater than 300 m2 must have smoke extracted.

These provisions enable the following three objectives of this instruction to be laid down:

to enable the occupants of the affected compartment to evacuate it quickly and to be able to reach a protected area as quickly as possible, without being hindered by smoke and without the smoke escaping from this compartment;

to prevent smoke from entering stairways and adjoining compartments, regardless of the development of the fire and of subsequent incidents affecting the smoke extraction system.

to enable emergency teams quickly to locate the source of fire and to proceed to extinguish it without being hindered by dense smoke;

2. Principles

This Instruction indicates the conditions to be met and the results to be obtained by the two smoke extraction systems defined below in order to ensure that the objectives defined in paragraph 1 are achieved:

2.1 Solution A:
air discharge in the stairway;
air discharge and extraction in the intercommunication facilities;
air discharge and extraction in the communal horizontal walk area.

2.2 Solution B:
air discharge in the stairway;
air discharge in the intercommunication facilities;
air passage between the intercommunication facilities and the communal horizontal walk area through an insulation lock;
extraction and air discharge, where necessary, in the communal horizontal walk area.

These two systems may co-exist within the same compartment (solution A+B)

The provisions of this Instruction shall not exclude the possibility of implementing other smoke extraction systems, provided that they have been approved by the safety committee.

3. Provisions common to both systems

3.1 Characteristics of smoke extraction equipment:

High-rise buildings shall be equipped with a category A, HRB option, fire safety system.

The smoke extraction system must be controlled automatically by the fire detection system installed in the communal horizontal walk areas. This automatic control shall be backed up by the manual control of the centralised manual control unit (CMCU) of the fire safety control board (FSCB).

The automatic control of the smoke extraction devices of the other compartments in the building served by the same smoke extraction network shall be overridden for as long as the cause that initially activated the devices is still present (cf. H.R 49(7)).

However, the smoke extraction system of the other parts of the building must be able to be controlled manually from the CMCU.

The materials defined below must comply with the related standard and/or have the NF mark, where necessary: remote controlled valves, thermal tripping devices, insulation locks (solution B), smoke extraction shutters, stairwell outlets protected from smoke by mechanical overpressure, emergency smoke extraction vents, relay boxes for smoke extraction fans, etc.

3.2 Characteristics of the air intake vents, smoke extraction vents, smoke extraction shutters of communal horizontal walk areas:

The upper part of the air intake vents must be no more than 1 metre above the floor; the vents shall ideally be installed near the doors for access to the intercommunication facilities and must be fitted with 1-hour or E 60 flame resistant shutters, closed in the standby position.

The lower part of the smoke extraction vents must be at least 1.80 m above the floor, and the vents must be located in their entirety in the upper third of the walk area. The outlet of each vertical extraction duct in the compartment must be equipped with a 2-hour or EI 120 (i→o) fire break shutter, closed in the standby position.

The shutters must be installed in the fixed and fire resistant walls or elements of the building.

Manufacturers must indicate for each type of shutter the leakage rate corresponding to each low pressure value to which this apparatus may be subject.

In the communal horizontal walk areas, the maximum distance between two smoke extraction vents, or between a smoke extraction vent and an air intake vent, must not exceed 10 metres where the area is rectilinear, 7 metres where it is not.

Where horizontal ducts serve the various smoke extraction vents, they must (fig. 1):
- be made of category M0 or A2-s2, d0 materials and have ¼ hour or R15 fire resistance capacity;
- allow access to the vent of the vertical smoke extraction duct(s);
- not exceed 20 metres in length from the vertical duct;
- ensure an equal flow at each vent, to within 10%.

The maximum distances defined above shall apply in the case of unobstructed ceilings. They must be reduced in the case of obstructed ceilings.

In dead-end areas, the distance between a smoke extraction or air discharge vent and the door of a room must not exceed 5 metres.

3.3 Characteristics of air discharge and extraction vents:

Ducts must be made of category M0 or A2-s2, d0 materials and have ¼ hour fire resistance capacity. Air intake ducts shall be ventilation ducts and must have a 2-hour or EI 120 crossing fire break capacity.
On the other hand, smoke evacuation ducts shall be smoke extraction ducts and be tested with an internal fire. Their fire resistance capacity must provide a 2-hour or EI 120 fire break rating.

These requirements may be guaranteed by the sheath in which the ducts are placed, provided that they are on their own in this sheath and that the sheath has a 2-hour or EI 120 fire break capacity.

Furthermore, they must be satisfactorily air tight. To this end, their total leakage rate must be less than 20% of the flow rate required on the worst affected floor.

The smoke extraction network of the communal horizontal walk areas shall include at least two smoke extraction ducts.

3.4 Characteristics of fans:

Each of the ducts referred to in the previous paragraph shall be equipped with a fan of its own; the same shall apply to stairways.

The air discharge and extraction fans must be proportioned according to the characteristics of the network served and for a flow rate at least equal to the nominal flow rate increased by a tolerable leakage rate of approximately 20%.

The fans must be controlled by a relay box complying with the related standard.

The extraction fans must be class F_{400} 120, that is to say, they must be able to operate for two hours with smoke at 400° C.

The connection between the extraction fan and the duct must be made of category M0 or A2-s2, d0 material.

These latter two requirements shall not affect the air discharge fans.

The open or closed state of the fan disconnecting switch must be displayed at the central fire safety post on the signage unit of the fire safety control board. This requirement shall be met by the relay box.

The electric cables supplying the smoke extraction fans must comply with the provisions in Article H.R. 44.

The extraction fans must be installed either outside the building or in a technical area separated from the adjacent areas by walls with a 1-hour or REI 60 fire break capacity. The access door shall have ½ hour fire break capacity and be fitted with a door closer or EI 30 – C. The fan of the area shall be compatible with the functioning of the various items of equipment installed in this area.

Every measure must be taken to prevent smoke that has escaped to the outside from being taken back by the air discharge fans, regardless of the direction of the wind.

3.5 Starting up of the fans:

The fans must be started up with a maximum 30-second delay in order to allow the activated safety devices (shutters, doors, valves, automatic-closing hatches) to operate, guaranteeing the smoke extraction and compartmentation of the area in question.

3.6 Shutting down of the fans (activated safety process):

Each smoke extraction fan must be able to be shut down and restarted (firefighters' control) from the place at which its manual safety control is located. This function must be able to be carried out on access floor 2 only, within the meaning of the standard NF S 61-931, and must be indicated as a defect on the signage unit.

3.7 Resetting of the relay boxes:

The relay boxes of the smoke extraction fans must be able to be reset on access floor 2 either from the central fire safety post or from the technical area in which these relay boxes or the fans are installed.

4. Provisions specific to each system

4.1 Solution A

The upper edge of the intercommunication facilities' air intake vents must be no more than 1 metre above the floor.

The lower part of the intercommunication facilities' smoke extraction vents must be at least 1.80 m above the floor, and the vents must be located in their entirety in the upper third of the facility.

The intercommunication facilities' air intake and smoke extraction vents shall be fitted with 1-hour or E 60 flame resistant shutters, closed in the standby position.

The air intake and smoke extraction flow rates in the intercommunication facilities must be at least 0.20 m^3 per second per m^2 surface area of these facilities. As the intercommunication facilities must always be placed under excess pressure in comparison with the communal horizontal walk area, the air intake rate must be slightly greater than the smoke extraction rate.

The air intake rates in communal horizontal areas must be at least 1 m^3/s per vent with a speed not exceeding 5 m/s.

4.2 Solution B

The lower edge of the intercommunication facilities' air intake vents must be at least 1.80 metres above the floor. The vents shall be fitted with 1-hour or E 60 flame resistant shutters, closed in the standby position.

The insulation locks allowing air to pass between the intercommunication facility and the communal horizontal walk area must have their upper edge situated no more than 0.70 metres above the floor and a minimum surface area of 20 dm^2. They must be fitted with 1-hour or E 60 flame resistant insulation shutters, open in the standby and operating position.

Furthermore, thermal tripping devices must be installed in the upper part of the bays of the shutters that they control and must be located on the compartment side. Any faults in the standby position of this shutter must be indicated on the signage unit of the fire safety system in the smoke extraction function.

5. Calculations and measurements

5.1 Conditions to be met:

All calculations shall be obtained assuming that the air is under normal conditions:
temperature: 20°C.
density: 1.2 kg/m^3.

The smoke extraction calculations of the communal horizontal walk areas shall be obtained on a compartment-basis. In the event of this compartment consisting of several floors, calculations shall be obtained for all the floors, but the smoke extraction system shall be started up on a floor-by-floor basis, under the conditions specified in Article H.R. 49.
Calculations and measurements shall not be obtained in the doors of stairways located on the highest floor for pedestrian access.

5.2 Calculations

The calculation of the characteristics of the installation must make it possible to obtain a difference between the relative pressures of the stairways and the communal horizontal walk area in each compartment of between 20 pascals (minimum value in order to prevent smoke from escaping into the stairway) and 80 pascals (maximum value in order to be able to open the doors of the intercommunication facilities). These calculations shall be obtained assuming that the doors are closed and taking account of the permeability of the building and the ducts. In all cases, the differences between the relative pressures of the stairways and the intercommunication facilities, on the one hand, and the intercommunication facilities and the communal horizontal walk areas, on the other, shall not exceed 80 pascals.

The air intake rates in communal horizontal walk areas must be at least 1 m^3/s per vent with a speed not exceeding 5 m/s.
Furthermore, the extraction fans for each compartment must be proportioned so that the calculated sum of the potential extraction flow rates is at least 1.3 times the calculated sum of the potential air discharge flow rates of the air intake fans (flow from the stairways, intercommunication facilities and various vents). This flow rate shall be equally distributed, to within 10%, between the various extraction vents; it must not be less than 1 m3/s and per vent.

The air intake and extraction flow rates must enable the following minimum average air passage speeds to be obtained when the doors of the facilities for intercommunication with the stairways are open (these measurements being obtained within the frame of the doors of the floor concerned, all the other doors of the stairways having to be closed):

Solution	Stairway/insulation lock	Insulation lock/corridor
A	0.5 m/s	0.5 m/s
B	0.5 m/s	1 m/s

By way of derogation, where the doors of the intercommunication facilities are two passage units wide, the values 0.5 m/s and 1 m/s shall be reduced to 0.3 m/s and 0.6 m/s respectively.

5.3 Pressure and flow rate measurements:

The measurements of the pressure differences shall be obtained with all of the shutters in the normal operating position, the doors of the intercommunication facilities being closed.

The measurement of the flow rates must be obtained independently for each vent in the communal horizontal walk areas, the doors for communication between compartments and stairways being open. All the other doors of the stairways must be closed.

The ratio between the total extraction flow rate measured and the total air intake flow rate measured must always be greater than 1.

TECHNICAL INSTRUCTION ON SMOKE EXTRACTION IN HIGH-RISE BUILDINGS

1. Purpose

Article R. 122.9 of the Construction and Housing Code and Article G.H. 25 of the Order of …… specify that adjoining compartments and stairways in high-rise buildings must be protected from the invasion of smoke by a facility for intercommunication with the affected compartment with a 2-hour or EI 120 fire break capacity. This facility must enable any smoke that has entered to be extracted quickly where the facility is used to allow persons to pass on a continuous and ongoing basis.

Furthermore, Article H.R. 28 of the aforesaid Order stipulates that communal horizontal walkways and communal areas with a surface area greater than 300 m2 must have smoke extracted.

These provisions enable the following three objectives of this instruction to be laid down:

to enable the occupants of the affected compartment to evacuate it quickly and to be able to reach a protected area as quickly as possible, without being hindered by smoke and without the smoke escaping from this compartment;

to prevent smoke from entering stairways and adjoining compartments, regardless of the development of the fire and of subsequent incidents affecting the smoke extraction system.

to enable emergency teams quickly to locate the source of fire and to proceed to extinguish it without being hindered by dense smoke;

2. Principles

This Instruction indicates the conditions to be met and the results to be obtained by the two smoke extraction systems defined below in order to ensure that the objectives defined in paragraph 1 are achieved:

2.1 Solution A:
- air discharge in the stairway;
- air discharge and extraction in the intercommunication facilities;
- air discharge and extraction in the communal horizontal walk area.

2.2 Solution B:
- air discharge in the stairway;
- air discharge in the intercommunication facilities;
- air passage between the intercommunication facilities and the communal horizontal walk area through an insulation lock;

extraction and air discharge, where necessary, in the communal horizontal walk area.

These two systems may co-exist within the same compartment (solution A+B)

The provisions of this Instruction shall not exclude the possibility of implementing other smoke extraction systems, provided that they have been approved by the safety committee.

3. Provisions common to both systems

3.1 Characteristics of smoke extraction equipment:

High-rise buildings shall be equipped with a category A, HRB option, fire safety system.

The smoke extraction system must be controlled automatically by the fire detection system installed in the communal horizontal walkways. This automatic control shall be backed up by the manual control of the centralised manual control unit (CMCU) of the fire safety control board (FSCB).

The automatic control of the smoke extraction devices of the other compartments in the building served by the same smoke extraction network shall be overridden for as long as the cause that initially activated the devices is still present (cf. H.R 49(7)).

However, the smoke extraction system of the other parts of the building must be able to be controlled manually from the CMCU.

The materials defined below must comply with the related standard and/or have the NF mark, where necessary: remote controlled valves, thermal tripping devices, insulation locks (solution B), smoke extraction shutters, stairwell outlets protected from smoke by mechanical overpressure, emergency smoke extraction vents, relay boxes for smoke extraction fans, etc.

3.2 Characteristics of the air intake vents, smoke extraction vents, smoke extraction shutters of communal horizontal walkways:

The upper part of the air intake vents must be no more than 1 metre above the floor; the vents shall ideally be installed near the doors for access to the intercommunication facilities and must be fitted with 1-hour or E 60 flame resistant shutters, closed in the standby position.

The lower part of the smoke extraction vents must be at least 1.80 m above the floor, and the vents must be located in their entirety in the upper third of the walk area. The outlet of each vertical extraction duct in the compartment must be equipped with a 2-hour or EI 120 (i→o) fire break shutter, closed in the standby position.

The shutters must be installed in the fixed and fire resistant walls or elements of the building.

Manufacturers must indicate for each type of shutter the leakage rate corresponding to each low pressure value to which this apparatus may be subject.

In the communal horizontal walkways, the maximum distance between two smoke extraction vents, or between a smoke extraction vent and an air intake vent, must not exceed 10 metres where the area is rectilinear, 7 metres where it is not.

Where horizontal ducts serve the various smoke extraction vents, they must (fig. 1):
be made of category M0 or A2-s2, d0 materials and have ¼ hour or R15 fire resistance capacity;
allow access to the vent of the vertical smoke extraction duct(s);
not exceed 20 metres in length from the vertical duct;
ensure an equal flow at each vent, to within 10%.

The maximum distances defined above shall apply in the case of unobstructed ceilings. They must be reduced in the case of obstructed ceilings.

In dead-end areas, the distance between a smoke extraction or air discharge vent and the door of a room must not exceed 5 metres.

3.3 Characteristics of air discharge and extraction vents:

Ducts must be made of category M0 or A2-s2, d0 materials and have ¼ hour fire resistance capacity. Air intake ducts shall be ventilation ducts and must have a 2-hour or EI 120 crossing fire break capacity.
On the other hand, smoke evacuation ducts shall be smoke extraction ducts and be tested with an internal fire. Their fire resistance capacity must provide a 2-hour or EI 120 fire break rating.

These requirements may be guaranteed by the sheath in which the ducts are placed, provided that they are on their own in this sheath and that the sheath has a 2-hour or EI 120 fire break capacity.

Furthermore, they must be satisfactorily air tight. To this end, their total leakage rate must be less than 20% of the flow rate required on the worst affected floor.

The smoke extraction network of the communal horizontal walkways shall include at least two smoke extraction ducts.

3.4 Characteristics of fans:

Each of the ducts referred to in the previous paragraph shall be equipped with a fan of its own; the same shall apply to stairways.

The air discharge and extraction fans must be proportioned according to the characteristics of the network served and for a flow rate at least equal to the nominal flow rate increased by a tolerable leakage rate of approximately 20%.

The fans must be controlled by a relay box complying with the related standard.

The extraction fans must be class F_{400} 120, that is to say, they must be able to operate for two hours with smoke at 400° C.

The connection between the extraction fan and the duct must be made of category M0 or A2-s2, d0 material.

These latter two requirements shall not affect the air discharge fans.

The open or closed state of the fan disconnecting switch must be displayed at the central fire safety post on the signage unit of the fire safety control board. This requirement shall be met by the relay box.

The electric cables supplying the smoke extraction fans must comply with the provisions in Article H.R. 44.

The extraction fans must be installed either outside the building or in a technical area separated from the adjacent areas by walls with a 1-hour or REI 60 fire break capacity. The access door shall have ½ hour fire break capacity and be fitted with a door closer or EI 30 – C. The fan of the area shall be compatible with the functioning of the various items of equipment installed in this area.

Every measure must be taken to prevent smoke that has escaped to the outside from being taken back by the air discharge fans, regardless of the direction of the wind.

3.5 Starting up of the fans:

The fans must be started up with a maximum 30-second delay in order to allow the activated safety devices (shutters, doors, valves, automatic-closing hatches) to operate, guaranteeing the smoke extraction and compartmentation of the area in question.

3.6 Shutting down of the fans (activated safety process):

Each smoke extraction fan must be able to be shut down and restarted (firefighters' control) from the place at which its manual safety control is located. This function must be able to be carried out on access floor 2 only, within the meaning of the standard NF S 61-931, and must be indicated as a defect on the signage unit.

3.7 Resetting of the relay boxes:

The relay boxes of the smoke extraction fans must be able to be reset on access floor 2 either from the central fire safety post or from the technical area in which these relay boxes or the fans are installed.

4. Provisions specific to each system

4.1 Solution A

The upper edge of the intercommunication facilities' air intake vents must be no more than 1 metre above the floor.

The lower part of the intercommunication facilities' smoke extraction vents must be at least 1.80 m above the floor, and the vents must be located in their entirety in the upper third of the facility.

The intercommunication facilities' air intake and smoke extraction vents shall be fitted with 1-hour or E 60 flame resistant shutters, closed in the standby position.

The air intake and smoke extraction flow rates in the intercommunication facilities must be at least 0.20 m^3 per second per m^2 surface area of these facilities. As the intercommunication facilities must always be placed under excess pressure in comparison with the communal horizontal walk area, the air intake rate must be slightly greater than the smoke extraction rate.

The air intake rates in communal horizontal areas must be at least 1 m^3/s per vent with a speed not exceeding 5 m/s.

4.2 Solution B

The lower edge of the intercommunication facilities' air intake vents must be at least 1.80 metres above the floor. The vents shall be fitted with 1-hour or E 60 flame resistant shutters, closed in the standby position.

The insulation locks allowing air to pass between the intercommunication facility and the communal horizontal walk area must have their upper edge situated no more than 0.70 metres above the floor and a minimum surface area of 20 dm². They must be fitted with 1-hour or E 60 flame resistant insulation shutters, open in the standby and operating position.

Furthermore, thermal tripping devices must be installed in the upper part of the bays of the shutters that they control and must be located on the compartment side. Any faults in the standby position of this shutter must be indicated on the signage unit of the fire safety system in the smoke extraction function.

5. Calculations and measurements

5.1 Conditions to be met:

All calculations shall be obtained assuming that the air is under normal conditions:
temperature: 20°C.
density: 1.2 kg/m^3.

The smoke extraction calculations of the communal horizontal walkways shall be obtained on a compartment-basis. In the event of this compartment consisting of several floors, calculations shall be obtained for all the floors, but the smoke extraction system shall be started up on a floor-by-floor basis, under the conditions specified in Article H.R. 49.
Calculations and measurements shall not be obtained in the doors of stairways located on the highest floor for pedestrian access.

5.2 Calculations

The calculation of the characteristics of the installation must make it possible to obtain a difference between the relative pressures of the stairways and the communal horizontal walk area in each compartment of between 20 pascals (minimum value in order to prevent smoke from escaping into the stairway) and 80 pascals (maximum value in order to be able to open the doors of the intercommunication facilities). These calculations shall be obtained assuming that the doors are closed and taking account of the permeability of the building and the ducts. In all cases, the differences between the relative pressures of the stairways and the intercommunication facilities, on the one hand, and the intercommunication facilities and the communal horizontal walkways, on the other, shall not exceed 80 pascals.

The air intake rates in communal horizontal walkways must be at least 1 m^3/s per vent with a speed not exceeding 5 m/s.
Furthermore, the extraction fans for each compartment must be proportioned so that the calculated sum of the potential extraction flow rates is at least 1.3 times the calculated sum of the potential air discharge flow rates of the air intake fans (flow from the stairways, intercommunication facilities and various vents). This flow rate shall be equally distributed, to within 10%, between the various extraction vents; it must not be less than 1 m3/s and per vent.

The air intake and extraction flow rates must enable the following minimum average air passage speeds to be obtained when the doors of the facilities for intercommunication with the stairways are open (these measurements being obtained within the frame of the doors of the floor concerned, all the other doors of the stairways having to be closed):

Solution	Stairway/insulation lock	Insulation lock/corridor
A	0.5 m/s	0.5 m/s
B	0.5 m/s	1 m/s

By way of derogation, where the doors of the intercommunication facilities are two passage units wide, the values 0.5 m/s and 1 m/s shall be reduced to 0.3 m/s and 0.6 m/s respectively.

5.3 Pressure and flow rate measurements:

The measurements of the pressure differences shall be obtained with all of the shutters in the normal operating position, the doors of the intercommunication facilities being closed.

The measurement of the flow rates must be obtained independently for each vent in the communal horizontal walkways, the doors for communication between compartments and stairways being open. All the other doors of the stairways must be closed.

The ratio between the total extraction flow rate measured and the total air intake flow rate measured must always be greater than 1.

TECHNICAL INSTRUCTION ON THE ASSESSMENT OF THE FIRE LOAD IN HIGH-RISE BUILDINGS

The aim of this Instruction is to specify the rules for performing the fire load assessment laid down by Articles H.R. 5 and H.R. 61 of Order XXXXX laying down safety regulations on the construction of high-rise buildings (HRBs) and their protection against the risks of fire and panic, and to comment on certain articles thereof:

Article 1: Aim of the assessment

The aim of the assessment is to determine the fire load of the items of furniture and fittings of the private or communal parts of a HRB. This value shall subsequently be compared with the maximum values permitted by the regulations.

Article 2: Terminology

In addition to the definitions given in Article H.R. 3, the following terms shall be adopted:

Calorific potential of a combustible material: Heat emission in MJ of a kilogram of material during complete combustion thereof. This value shall be expressed in MJ/kg.

Fire load density: for practical application reasons, the fire load density shall be the fire load of a material, product or system, by unit of volume thereof. It shall be expressed in MJ/m^3.

Reference area of a room: the area shall be determined between the vertical walls and the bare interior of the frontages. It shall include areas occupied by fixed fittings (cupboards, decorative coverings, etc.).

Article 3: Elements affected by the assessment

The elements to be taken into account for the assessment of calorific potential are:
- items of furniture,
- combustible interior fittings not taken into account within the framework of Articles H.R. 16 and H.R. 13 (floor coverings, false floors, moveable partitions, side wall coverings, false ceilings, interior blinds, blinds, etc.).

The following shall be excluded:
- building components, whether they are implemented during construction or at the time of redevelopment, where they are taken into account within the framework of Article H.R. 16, such as shelving unit doors, concealment devices, false floors, false ceilings, moveable partitions and fixed technical installations or fittings.
- items of furniture or interior fittings of category M0 or fire resistance class A1 or A2.

Article 4: Documents to be provided

The following documents shall be provided by the applicant:
- Plans comprising the location of the compartment boundaries and the divisions thereof; indications of the fire resistance of the vertical walls and the reference areas;
- Justification of the fire load defined in Article H.R. 16, with a list of the various elements taken into account;
- Any other documents that may be of use for the assessment.

Article 5: Inventory method of assessing the elements taken into account

Except where specific information is given, the inventory shall take into account only those elements laid down in Article 3 and present during the assessment.

Article 6: Method of assessment

The assessment shall relate to the fire load of the container and the content, in the case of furniture and fittings.
It may be permitted to estimate the fire load of the content under maximum load, in particular where a visual examination is not possible.

Calculation of the fire load:

Stage 1: The assessment of the fire load of each item of furniture shall be established using one or more of the following methods:
- in accordance with the references already laid down in Annexes 1 and 2;

- on the basis of the documentation supplied by the manufacturer;
- by multiplying the products of the fire load by the weight or volume of each material:

Fire Load(MJ) = Calorific Potential(MJ/kg) x Weight(kg)
Fire Load(MJ) = Calorific Potential(MJ/m3) x volume (m3)

Stage 2: The assessment of the fire load in a room or an area of a compartment shall be defined by adding together the fire loads of each item of furniture therein.

Stage 3: Where there are rooms specifically fitted out in accordance with H.R. 61(3), their fire loads shall be related to the surface unit in question (MJ/m²), then compared with the permitted values.

Stage 4: The compartment's fire load shall be the sum of the fire loads of the areas and rooms of which it is formed, except for rooms specifically fitted out in accordance with H.R. 61(3), divided by the area in question (MJ/m²). The result of the value obtained shall subsequently be compared with the permitted values.

Annex 1: Reference grid by base material

DESCRIPTION OF MATERIALS	Megajoules
ABS (plastic) (1Kg)	36
Wood (1Kg)	17
Wood (1dm³)	12.7
Rubber (1Kg)	36
Polycarbonate (1Kg)	29
Leather (1Kg)	18
Plexiglas (1Kg)	24
PVC ground covering (1Kg)	20.5
PVC ground covering (1m² thickness 1.8mm)	61.5
Linear metre file	255 to 300
Electrical box (1m³)	500

Annex 2: Reference grid of furniture values

The values may only be used for furniture corresponding to the description.

DESCRIPTION OF FURNITURE	Megajoules
desk 120x60 simple veneer	33

desk 120x60 thickness 16mm	134
desk 120x60 thickness 22mm	167
desk 120x60 thickness 30mm	201
desk 120x60 all wood 1 set of drawers	586

desk 160x80 simple veneer	50
desk 160x80 thickness 16mm	234
desk 160x80 thickness 22mm	318
desk 160x80 thickness 30mm	368
desk 160x80 all wood 1 set of drawers	837
desk 160x80 all wood 2 sets of drawers	1004

desk 200x100 simple veneer	67
desk 200x100 thickness 16mm	352
desk 200x100 thickness 22mm	485
desk 200x100 thickness 30mm	670
desk 200x100 all wood 1 set of drawers	1507
desk 200x100 all wood 2 sets of drawers	1758

various desks (estimated by the inspector)

table 40x50 simple veneer	17
table 40x50 thickness 16mm	33
table 40x50 thickness 22mm	50
table 40x50 thickness 30mm	67

table 60x120 simple veneer	33
table 60x120 thickness 16mm	134
table 60x120 thickness 22mm	167
table 60x120 thickness 30mm	234

table 80x140 simple veneer	50
table 80x140 thickness 16mm	201
table 80x140 thickness 22mm	268
table 80x140 thickness 30mm	368

table 80x180 simple veneer	50
table 80x180 thickness 16mm	251
table 80x180 thickness 22mm	352
table 80x180 thickness 30mm	485

table 100x200 simple veneer	67
table 100x200 thickness 16mm	352
table 100x200 thickness 22mm	485
table 100x200 thickness 30mm	670

trapeze table (60x120)x80 thickness 16mm	117
trapeze table (60x120)x80 thickness 22mm	167

round table diameter 80 thickness 16mm	84
round table diameter 80 thickness 22mm	117
round table diameter 80 thickness 30mm	167

round table diameter 100 thickness 16mm	134
round table diameter 100 thickness 22mm	184
round table diameter 100 thickness 30mm	268

round table diameter 120 thickness 16mm	201
round table diameter 120 thickness 22mm	268
round table diameter 120 thickness 30mm	385

round table diameter 140 thickness 16mm	268
round table diameter 140 thickness 22mm	368
round table diameter 140 thickness 30mm	519

various tables (estimated by the inspector)

chest of drawers on wheels top of wood 70x43 thickness 22mm	84
chest of drawers on wheels all wood	419

metal chest of drawers (content estimated by the inspector)
various chests of drawers on wheels (estimated by the inspector)

simple chair	67
simple armchair	117
seat with an ABS shell	167
director’s chair	201
low armless chair	201
various seats (estimated by the inspector)	

metal shelving (content estimated by the inspector)
various shelving (estimated by the inspector)

wardrobe wood 1 module (60x180)	971
wardrobe wood 2 modules	1423
wardrobe wood 3 modules	2310
wardrobe wood 4 modules	3164
metal wardrobe (content estimated by the inspector)	
various wardrobes (estimated by the inspector)	

cupboard wood (L 80 x H 80 x W 50) thickness 22mm	703
cupboard wood (L 120 x H 80 x W 50) thickness 22mm	1055
cupboard wood (L 160 x H 80 x W 50) thickness 22mm	1423
metal cupboard (content estimated by the inspector)	
various cupboards (estimated by the inspector)	

1 linear metre of paper A4 format	670
Ream of A4 (80gr) 500 sheets	41
telephone	33
Minitel	50
keyboard display station	134

printer small model/fax	84
printer big model	301

photocopier small model/including paper	134
photocopier medium model/including paper	251
photocopier big model/including paper	419

refrigerator small model	100
refrigerator big model	201

cupboard underneath the sink 2 doors	904
cupboard underneath the sink 3 doors	1172

television 40cm	100
television 55cm	151
television 70cm	201
television 90cm	268

plastic letter box	17
plastic waste paper basket (small)	33
plastic waste paper basket (big)	84
VHS/IT cassette	15
IT tape small model	17
IT tape big model	84
false floorboards for computers	

various furniture (estimated by the inspector)

medical bed	419
made bed 90 (mattress, pillow, sheets, covers)	636
mattress 90x200	502
mattress 70x140	201
mattress 140x200	770

sheet	17
cover	67
bolster/pillow	17
pillow case (5 items)	17
under sheet (2 items)	17
bath mat (2 items)	17
bath sheet	84
towels (4 items)	17
facecloth (10 items)	17

boxes of tissues (10 items)	33
toilet paper (10 items)	33