

0 GENERAL.

0.1 Objective.

These basic regulations define the minimum requirements that the conception, construction and design of low-rise buildings (LG) must meet in order to:

- a) prevent the occurrence, development and propagation of fire;
- b) ensure the safety of those present;
- c) preventively facilitate the fire department's intervention.

0.2 Scope.

0.2.1 This annex applies to the following buildings to be erected and the following extensions to existing buildings, for which the application for construction is submitted after December 31, 1997 and before December 1, 2012:

- 1. the low buildings;
- 2. the extensions of buildings that are low buildings after realization;
- 3. the premises or parts of low-rise buildings in which an industrial activity takes place and whose total area is less than or equal to 500 m², under the following conditions:
 - mainly non-industrial activities take place in the building and the total area of premises with industrial activity is less than the remaining area of the building;
 - the industrial activities in these premises support the non-industrial activities in the same compartment;
 - there are no night-occupied premises in the compartment in which industrial activities take place.

0.2.2 However, excluded from the scope of this annex are:

- 1. the industrial buildings;
- 2. The buildings consisting of up to two storeys and with a total area less than or equal to 100 m²;
- 3. the single-family homes.

0.3 Terminology - see Appendix 1.

0.4 Response to fire of the materials - see Appendix 5.

1 IMPLANTATION AND ACCESS ROADS.

Access roads are determined in agreement with the fire department according to the following guideline:

1.1 *[Fire department accessibility and emplacement]*

For single-story buildings, fire department vehicles must be able to approach at least to within 60 m of a building façade.

For buildings with more than one storey, fire department vehicles must be able to reach a facade at least at one point that provides access to each storey at recognizable points.

To this end, vehicles must have an access point and a staging area:

- either on the drivable roadway of the public highway;
- either on a special access road from the travelable roadway of the public highway and having the following characteristics:
 - minimum clear width: 4 m;
 - minimum turning radius: 11 m on the inside and 15 m on the outside;
 - minimum clear height: 4 m;
 - maximum slope: 6%;
 - load bearing capacity: such that vehicles, without galvanization, with a maximum axle load of 13t can drive and stop there, even if they deform the terrain. For structures located on access roads, refer to NBN B 03-101.

1.2 [Outbuildings, etc.]

Outbuildings, projecting roofs, canopies, cantilevers or other such additions are permitted only if they do not compromise either evacuation, occupant safety or fire department action.

1.3 [Horizontal distance between buildings]

The horizontal distance, free from any combustible element and located between an LG and an opposing building, must be at least 6 m, unless the walls meet the conditions defined for adjacent buildings.

The walls separating adjacent buildings have $R_f \geq 1 h$.

In these walls a connection between these buildings may exist through a door $R_f \geq \frac{1}{2} h$, self-closing or self-closing in case of fire.

The condition of distance between an LG and an opposing building does not apply to buildings separated by existing streets, roads..., belonging to the public domain.

2 COMPARTMENTALIZATION AND EVACUATION.

2.1 [Size of compartments]

The building is divided into compartments whose area is less than 2,500 m², with the exception of the parking buildings (see 5.2).

Single-story buildings that can be carried out in a single compartment, the area of that compartment may reach 3500 m². The length of this compartment shall not exceed 90 m.

As for the buildings referred to in the above paragraphs, the area of a compartment, as the case may be, may exceed either 2,500 square meters or 3,500 square meters, if it is equipped with an automatic fire extinguishing system and a smoke and heat extraction system, which comply with the standards or with the rules of good craftsmanship in this matter recognized by the Minister of the Interior, according to the procedure and conditions he determines.

The height of a compartment corresponds to the height of one storey. However,

the following exceptions are allowed:

- the parking building with building levels (see 5.2);
- a compartment may extend over two superimposed floors with an interior connecting staircase (duplex), if the cumulative area of those floors does not exceed 2,500 m²;
- the height of a compartment may extend over several superimposed building levels, if this compartment contains only technical rooms (see 5.1.1).
- the height of a compartment may extend over several floors (atrium) provided that this compartment is equipped with an automatic fire extinguishing system and a smoke and heat extraction system, which comply with the standards or with the rules of good craftsmanship on the subject recognized by the Minister of the Interior, according to the procedure and conditions he determines.

2.2 Evacuation of compartments.

2.2.1 Number of outputs.

Each compartment has minimum :

- an exit if occupancy is less than 100 persons;
- two exits if occupancy is 100 or more than 100 and less than 500 persons;
- 2 + n exits where n is the integer immediately greater than the division by 1000 of the maximum occupancy of the compartment, if the occupancy is 500 or more than 500 persons.

The minimum number of exits can be increased by the fire department in function of the occupancy and configuration of the premises.

The number of exits from building floors and classrooms is determined as for compartments.

2.2.2 Outputs.

The exits are located in opposite zones of the compartment.

Evacuation routes lead outside or to stairwells, or stairs, located inside or outside the building, (for horizontal distances see 4.4).

With regard to underground building levels, one exit to the outside via an evacuation path with walls and doors $R_f \frac{1}{2} h$ may replace the required access to one of the stairwells.

For the parking building: see 5.2.

At an evacuation level, each stairway leads to the outside either directly or over an evacuation path that meets the requirements of 4.4.

3 REGULATIONS FOR SOME BUILDING ELEMENTS.

3.1 Penetrations through walls.

Penetrations through walls of pipes for fluids or for electricity and the expansion joints shall not adversely affect the required fire resistance of the building elements.

3.2 Structural elements.

The structural elements have:

- a) $R_f \frac{1}{2} h$ for single-story buildings. However, this requirement does not apply to the roof if it is protected on the inside by a building element with $R_f \frac{1}{2} h$;
- b) for buildings with more than one storey : $R_f 1 h$ above E_i level. The structure of the roof has a fire stability of $\frac{1}{2} h$. This requirement is not applicable if the roof is protected on the inside by a building element with $R_f \frac{1}{2} h$;
- c) the structural elements in the basement floors, including the level E_i floor have $R_f 1 h$.

No fire resistance requirements are imposed on the structural elements of open parking buildings whose horizontal walls possess $R_f 1 h$.

3.3 Vertical interior walls and interior doors.

For walls and doors, which demarcate compartments, 4.1 applies; if they demarcate evacuation routes, 4.4 applies.

The interior vertical walls demarcating classrooms or the entirety of classrooms with night occupancy have at least the fire resistance of the structural elements.

The doors in these walls have $R_f \frac{1}{2} h$.

3.4 Ceilings and false ceilings.

3.4.1 In evacuation routes, premises open to the public and collective kitchens, false ceilings have a fire stability of $\frac{1}{2} h$.

3.4.2 The space between the ceiling and the false ceiling is interrupted by the extension of all vertical walls possessing at least $R_f \frac{1}{2} h$.

If the space between the ceiling and the false ceiling is not equipped with an automatic extinguishing system, the space should be interrupted by vertical separations with $R_f \frac{1}{2} h$ such that there are spaces whose horizontal projection can be inscribed in a square of maximum 25 m side.

3.5 Facades.

The studs of the curtain wall skeleton (light facade) are fixed to the building skeleton at the level of each storey.

The parapet and the lintel are fastened to the floor slab in such a way that the whole assembly will be in place during $\frac{1}{2} h$ meets the "flame tightness" criterion of NBN 713-020; the same requirement is also met by the pennants.

The connection of the façade element to the floor meets the requirements imposed for the floor or for the walls separating the compartments.

4 PRECAUTIONS ON CONSTRUCTION OF COMPARTMENTS AND EVACUATION ROOMS.

4.1 Compartments.

The walls between compartments have at least the fire resistance of the structural elements.

The connection between two compartments is permitted only if it is through a self-closing or, in the event of fire, self-closing door Rf ½ h.

4.2 Interior stairwells.

4.2.1 General.

The stairs connecting several compartments are enclosed. The basic principles of 2 "Compartmentalization and Evacuation" apply to them.

4.2.2 Opinion.

4.2.2.1 The interior walls of the stairwells have at least the required Rf of the structural elements.

Their outer walls may be glazed if these openings are sealed over at least 1 m laterally with an element that has a flame density of ½ h.

4.2.2.2 Stairwells must provide access to an evacuation level.

4.2.2.3 On each floor, the connection between the compartment and the stairwell is ensured by a door with Rf ½ h.

A direct connection of both floors of a duplex compartment to the stairwell is not required, provided that:

- the total area of the compartment is less than or equal to 300 m²;
- the area of the floor of the duplex that evacuates directly through the stairwell is greater than the area of the other floor of the duplex compartment.

4.2.2.4 If several compartments lie in the same horizontal plane, they may have a common stairwell provided that it is accessible from each compartment through a self-closing or, in the event of fire, self-closing door with Rf ½ h.

4.2.2.5 Stairwells serving underground levels should not be a direct extension of those serving levels above an evacuation level.

This does not preclude one over the other, subject to the following conditions:

1. the walls separating them have the same resistance to fire as those of the interior walls of stairwells.
2. access to each stairwell is through a self-closing or, in the event of fire, self-closing door with Rf ½ h.

4.2.2.6 At the top of each interior stairwell is an air vent with a diameter of at least 1 m² and which opens into the open air. This opening is normally closed; to open it, one uses a hand control placed in a highly visible position at the evacuation level.

This requirement does not apply to stairwells between evacuation levels and underground building levels.

4.2.3 Stairs.

4.2.3.1 Construction provisions.

The stairs have the following features:

1. Like the spillways, they have a fire stability of $\frac{1}{2} h$ or the same conception of construction as a concrete slab with $R_f \frac{1}{2} h$;
2. they are equipped with handrails on both sides.
For stairs with a useful width, less than 1.20 m, one handrail is sufficient, provided there is no danger of falling;
3. the step tread is at least 0.20 m at each point;
4. the rise of the steps should not exceed 18 cm;
5. their slope should not exceed 75% (maximum slope angle 37°);
6. they are of the "straight" type.
However, "spiral staircases" are permitted if they have displaced treads and if, in addition to the above requirements, with the exception of the aforementioned point 3, their treads have at least 24 cm of tread on the walkway.

4.2.3.2 Useful width of stair arms, spillways and sashes.

The useful width is at least equal to 0.80 m and reaches at least the required useful width b_r calculated according to Annex 1 "Terminology".

The staircase arms and staircase landings of the same compartment shall not differ in their useful width by more than one passage unit.

If a compartment contains special purpose rooms, the theoretical useful stair width (according to Appendix 1 "Terminology") based on their number of users is calculated only over the height between this compartment and the evacuation level.

4.3 Exterior stairwells.

Exterior stairs should provide access to an evacuation level.

The requirements of 4.2.3 apply to it with however the following deviation: no fire stability is required, but the material belongs to class A0.

The connection between the compartment and an external staircase is done

- either through a door;
- either through escape terrace(s).

For the connection between the evacuation level and the immediately higher level, a staircase or section of staircase may be used that is retractable or articulated.

4.4 Evacuation routes and escape terraces.

In a compartment, the connection between and to stairs is via evacuation routes or over escape terraces.

The length of dead-end evacuation roads should not exceed 15 m.

The road to be traveled in open air plays no role in calculating these distances.

The useful width of evacuation paths, escape terraces and of their access, exit or

passage doors is greater than or equal to the required useful width (see Appendix 1 "Terminology"). It is at least 0.80 m for evacuation routes and doors, and at least 0.60 m for escape terraces.

Doors on these paths shall not possess any locking device that could impede evacuation. No point of a compartment shall be beyond:

- a) For classrooms with daytime occupancy only:
 - 30 m from the evacuation road connecting the stairs or exits;
 - 45 m from access to the nearest staircase or exit;
 - 80 m from access to a second staircase or exit.
- b) For classrooms or entirety of classrooms with night occupancy:
 - 20 m from the evacuation route connecting stairs or exits;
 - 30 m from access to the nearest staircase or exit;
 - 60 m from access to a second staircase or exit.

The exits lead outside or to another compartment.

Any vertical interior walls of evacuation roads and access doors to these roads have $R_f \frac{1}{2} h$.

This requirement does not apply to compartments with only daytime occupancy whose area does not reach 1250 m².

The evacuation of classrooms or a set of classrooms with night occupancy is done through evacuation routes whose vertical walls and doors have an $R_f \frac{1}{2} h$.

This requirement does not apply to the evacuation of these premises if they belong to the operation of a building with a commercial function.

At an evacuation level, no exit windows of building sections with a commercial function, which do not have $R_f \frac{1}{2} h$, shall open onto the evacuation road connecting the exits of other building sections to the public road, except for the last 3 m of this evacuation road.

These provisions do not apply to parking buildings (see 5.2).

4.5 Signalization.

For all building levels, the sequence number shall be clearly posted on landings and in the escape areas at stairwells and elevators.

The designation of exits and emergency exits shall comply with the provisions on occupational safety and health signage.

5 CONSTRUCTION REQUIREMENTS FOR SOME CLASSROOMS AND TECHNICAL ROOMS.

5.1 Technical classrooms and spaces.

5.1.1 General.

A technical room or a set of technical rooms constitutes a compartment. Its height may extend over several successive floors.

5.1.1.1 For the technical rooms, the compartment requirements apply subject to the following modifications:

1. access to two exits leading:

- either to an adjacent compartment through a door Rf ½ h;
- either to a stairwell through a door Rf ½ h;
- either to the outside, such that an evacuation level is attainable;

2. deviating from 4.4, no point of the compartment shall be beyond:

- 45 m from the road connecting the two exits in the technical compartment;
- 60 m from the nearest exit;
- 100 m from the second exit;

if however the surface of the technical compartment does not exceed 1000 m², one exit to a stairwell, to the outside or to another compartment is sufficient. In this case, the distance to this exit may not exceed 60 m;

3. if the height of the technical compartment extends over several successive floors (see 2.1) and if it includes more than one service floor connected by stairs or ladders:

- then, provided that the compartment area is less than 1000 m², one access to a stairwell, to the outside or to another compartment may suffice every two service floors, and starting with the lowest;
- if the compartment area exceeds 1000 m², then each service floor must provide access to at least one of two exits; these alternate from floor to floor;

4. the useful width of evacuation routes, stairways, spillways and shafts shall be at least 0.80 m.

5.1.2 Heating departments and ancillaries.

Their design and implementation comply with the requirements of standard NBN B 61-001 +A1 : 1996. If the total useful heat capacity of the generators installed in the boiler room is less than 70 kW but greater than 30 kW, this room is considered a technical room.

The boiler rooms and their connections to the other parts of the building may be provided by a self-closing door Rf 1 h provided that it does not open onto a stairwell or onto an elevator landing or into a room at particular risk. The door rotates in the sense of escape.

The facilities for storage and relaxation of liquefied petroleum gas used to heat the building are located outside the building.

5.1.3 Transformer Rooms.

5.1.3.1 General.

They comply with the requirements of the General Regulations on Electrical Installations (A.R.E.I.).

Furthermore:

- the walls have Rf 1 h, except for the exterior walls;
 - the interior doors have Rf ½ h;
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- If water (from any source, including fire water) can reach the floor, for example by infiltration or through cable ducts, then all measures must be taken so that the water level remains constantly and automatically below the vital parts of the electrical installation as long as it is in use.

If the oil content of the whole apparatus reaches 50 l or more, the regulations of NBN C 18-200 "Guidelines for the fire protection of the premises of electricity transformation" must be applied.

5.1.3.2 On-site assembled posts or prefabricated posts.

An on-site assembled post or prefabricated post shall be erected in a designated room, with walls Rf 1 h.

Access, if not from the outside, is through a door Rf ½ h.

5.1.4 Household waste disposal.

5.1.4.1 Dumpster.

It is preferably installed on the outside of the building.

Its walls are made of non-combustible materials and have a smooth inner surface.

The ventilation tube of the chute must extend at least 1 m above the roof level. The chute doors shall be self-closing.

Regarding resistance to fire:

1. if the tube is set up inside the building, the walls have Rf 1 h and the doors have Rf ½ h;
2. if the tube is set up outside the building with the doors on the inside, they have Rf ½ h; each joint between the door and the tube has Rf 1 h.

5.1.4.2 Local for storage of garbage.

The walls have Rf 1 h.

If this room does not give out into the open air, it is accessible through a self-closing door Rf ½ h.

5.1.5 Pipe sleeves.

5.1.5.1 Vertical tubes.

Their walls have Rf 1 h.

The trapdoors and doors have Rf ½ h.

The free ventilation cross section of the duct is at least equal to 10% of the total horizontal cross section of the duct, with a minimum of 4 dm².

These tubes may be built in the stairwells.

However, their walls may have Rf ½ h if the ducts are compartmentalized at the level of each storey by horizontal screens with the following characteristics:

- they are of non-combustible material;
- they cover the entire space between the pipes;

-they have $R_f \frac{1}{2} h$.

In this case, the tube should not be ventilated.

5.1.5.2 Horizontal tubes.

Ducts penetrating vertical walls for which an R_f is prescribed have:

- either walls and doors with the same R_f as these vertical walls;
- either a building element at the height of each wall with the same R_f as these vertical walls.

5.2 Parking buildings.

In deviation from the basic principle stated in 2.1, a parking building may form a compartment whose area is not limited even when there are several communicating building levels.

The walls between the parking buildings and the rest of the building have at least the required R_f of the structural elements.

However, the parking compartment may include some premises not intended for residence, such as : premises for electrical transformation, archive rooms, technical rooms ...

The walls of these rooms exhibit $R_f 1 h$ and access is by a self-closing door $R_f \frac{1}{2} h$.

At each building level, evacuation is arranged as follows :

- at least two stairwells or exterior stairways meet the requirements contained in 4.2 or 4.3 and shall be accessible from any point on the building level; the distance to be covered to the nearest staircase shall not exceed 45 m; the minimum useful width of such staircases shall be 0.80 m ;
- as stated in 2.2.2 al. 3, on the building level under consideration, the required access to one of the two stairwells may be replaced by a direct exit to the outside;
- on the building level closest to the exit level, the sloped roadway may replace one of the stairwells if the slope measured at its centerline does not exceed 10%;
- the 10% limitation does not apply to compartments smaller than 500 m², if evacuation via the ramp remains possible.
- In addition to the signs defined in 4.5, the evacuation routes on each level are also indicated on the floor or above.

In enclosed parking buildings with a total area greater than 2,500 m², the measures necessary to prevent the spread of smoke must be taken.

5.3 Halls.

5.3.1 [General]]

If it can accommodate more than 500 people, these halls may be arranged underground only if the difference between the lowest floor level of these halls and the closest evacuation level does not exceed 3 m.

If the aforementioned halls are intended for a maximum of 500 persons, they may be installed underground, provided that the lowest floor level accessible to the public is not more than 4 m below the average level of the various evacuation levels of the establishment.

The number of exits is determined as for compartments.

5.3.2 Construction.

The walls forming these rooms or set of rooms not only meet the regulatory requirements applicable to these rooms, but also have the R_f value of the walls of a compartment.

Each passageway in the vertical walls is closed by a self-closing door or in case of fire self-closing door $R_f \frac{1}{2} h$.

These doors swing open in the sense of escape.

No object should interfere with evacuation to the exits.

5.4 Shopping or commercial complex.

The furnishing of storefronts opening onto interior galleries is permitted at an evacuation level and on adjacent building floors provided:

1. the complex with its galleries is separated from other building parts by walls with $R_f 1 h$;
2. the other building sections have their own exits independent of the exits of the retail or commercial complex;

The partition walls between commercial premises have $R_f \frac{1}{2} h$ and extend into any false ceiling. This requirement is waived if the store or commercial complex is equipped with an automatic hydraulic extinguishing system (NBN S 21-028).

5.5 Collective kitchens.

The collective kitchens, possibly including the restaurant, are separated from the other building parts by walls with $R_f 1 h$.

When the kitchen is not compartmentalized with respect to the restaurant, each fixed deep-frying appliance is equipped with a fixed automatic fire extinguisher that is coupled with a device that interrupts the supply of energy to the deep-frying appliance.

Each passageway is closed by a self-closing door $R_f \frac{1}{2} h$ or in case of fire self-closing door.

These doors turn away from the kitchen in the direction of escape.

Horizontal and vertical transport systems for dishes may be installed between kitchens and restaurants; if this transport passes through other premises, it must be enclosed in ducts with walls $R_f \frac{1}{2} h$.

6 EQUIPMENT OF THE BUILDINGS

6.1 Elevators and freight elevators

6.1.1 General.

- 6.1.1.1 The machine and associated parts of an elevator and/or freight elevator are not accessible except for maintenance, inspection and emergencies. The drive unit is located :
- or in a machine room

- either in the shaft, with the exception of oleohydraulic elevators, for which the drive unit, including the oil reservoir, must be located exclusively in a machine room.

The control bodies will be able to be accessed from the overflow if they:

- Are placed in an area that meets the requirements listed in 5.1.5.1;
- be part of the platform wall.

- 6.1.1.2 All elevators are equipped at their evacuation level with a mechanism that allows them to be recalled to that level, after which the elevator is rendered inoperative.

This mechanism will be indicated.

The elevator will only be able to be reactivated by an authorized person.

- 6.1.1.3 The assembly consisting of one or more shafts, and of their access landings to form a shaft for the underground building levels, is enclosed by walls with $R_f 1\text{ h}$.

Access doors between the compartment and the shafts are self-closing or self-closing in case of fire and have $R_f \frac{1}{2}\text{ h}$.

- 6.1.1.4 The assembly of the shaft doors shall have a stability to fire and a flame tightness of $\frac{1}{2}\text{ h}$ in accordance with NBN 713-020. This is assessed by exposing the door wall on the side of the platform to the fire.

The platform wall will be tested with any operating and control devices that are part of it.

- 6.1.1.5 When the elevator calls on only one compartment, the walls of the shaft, referred to in 6.1.1.3, and the shaft doors, referred to in 6.1.1.4, shall not meet the respective requirements for fire resistance, stability in the event of fire, and flame tightness.

Yet the walls of an elevator shaft in a stairwell are solid, continuous and non-combustible.

- 6.1.1.6 No extinguishing device containing water shall be installed in the shaft(s).

- 6.1.1.7 In case of abnormal increase in the temperature of the machine and/or of the control organs, the elevators must be designed and constructed to stop at the first access platform that is technically possible, but refuse new operating orders.

In this case, an audible alarm signal should alert those in the cabin to exit the elevator when it stops; the doors open and remain open just long enough for passengers to exit, that is, at least 15 seconds.

The mechanisms enabling the opening of the doors remain active. This operation

must take precedence over any other command.

- 6.1.1.8 If the building is equipped with a fire detection - system, the elevators should be recalled to the evacuation level if a fire is detected outside the elevators and their associated components.

The shaft doors open, and remain open just long enough for passengers to exit, that is, at least 15 seconds, after which the elevator becomes inoperative.

The mechanisms that allow the doors to open remain active.

The elevator will only be able to be reactivated by an authorized person.

6.1.2 Elevators and freight elevators whose machinery is located in a machine room.

6.1.2.1 The walls enclosing the assembly formed by the shaft and engine room have R_f 1 h.

If the engine room door or trap door gives out into the building, they have R_f $\frac{1}{2}$ h. One must provide in the vicinity a glass, locked cabinet containing the key.

The whole shaft and engine room, or shaft are naturally ventilated through outside air nozzles.

If the shaft and engine room are ventilated separately, the ventilation openings each have a minimum cross-sectional area of 1% of the respective horizontal surfaces.

If the whole shaft and machine room are ventilated at the top of the shaft, the ventilation opening has a minimum cross-sectional area of 4% of the horizontal area of the shaft.

6.1.3 Elevators and freight elevators whose machinery is located in the shaft.

6.1.3.1 A smoke detection system will be placed at the top of the shaft. In case of detection of smoke in the shaft, the cabin will stop in accordance with 6.1.1.7. The detection system in the shaft shall be provided so that its maintenance and control can be done from outside the shaft.

The elevator will only be able to be reactivated by an authorized person.

6.1.3.2 The shaft should be naturally ventilated through outside air nozzles.

The ventilation opening, located at the top of the shaft, has a minimum cross-sectional area of 4% of the horizontal area of the shaft.

6.1.4 Oleohydraulic elevators

The machine room is separated from the elevator shaft. The walls of the machine room have R_f 1 h.

Access to the engine room is through a self-closing door R_f $\frac{1}{2}$ h.

The machine rooms and elevator shafts should be naturally ventilated through outside air nozzles.

The ventilation openings have a minimum cross-sectional area of 4% of the horizontal cross-sectional area of the room.

The level of the engine room door thresholds is raised so that the tub thus formed has a capacity at least equal to 1.2 times the oil content of the machinery.

Electrical equipment as well as electrical and hydraulic lines running from the engine room to the elevator shaft are installed higher than the highest level that the drained oil in the engine room can reach. The space around the penetrations for these pipes, should be sealed with materials with at least the same R_f as the wall.

A thermal interrupter is provided in the oil bath and in the windings of the pump drive motor.

Oil characteristics:

Flash point in open vessel: $\geq 190\text{ }^{\circ}\text{C}$ Combustion
point: $\geq 200\text{ }^{\circ}\text{C}$ Auto-ignition point: $\geq 350\text{ }^{\circ}\text{C}$

A fixed rapid extinguisher, whose content is determined in proportion to the amount of oil used or to the volume of the engine room, protects machinery. It is operated by a thermal detector.

In case of detection of machine fire, the cab will stop in accordance with 6.1.1.7.

6.2 Paternoster elevator, container transport and freight elevator with loading and unloading automation.

6.2.1 These aircraft have their own engine rooms, shafts and landings.

The engine rooms are located at the top of the shaft. The interior walls of machine rooms and of the shafts have Rf 1 h.

The interior entrance doors have Rf $\frac{1}{2}$ h.

The platform walls of the shaft and their supervisory hatches have Rf $\frac{1}{2}$ h.

The shaft doors or access hatches of these devices operate automatically and are normally closed.

If the container transport system follows a horizontal and/or vertical path, passing through floors and compartments, doors are provided at each of these passages.

Their shutters or doors meet the criterion of flame tightness for $\frac{1}{2}$ hour. They are tested with the platform side facing the furnace. They operate automatically and are normally closed.

In the event of a fire, the facilities are taken out of service.

6.2.2 Installation of paternoster elevators for passenger transportation is prohibited.

6.3 Escalators.

6.3.1 The stairwell of escalators has walls with Rf 1 h; if the escalator serves only a duplex, no casing is required.

6.3.2 Access to the stairwell shall be on each level, through a self-closing or, in the event of fire, self-closing door Rf $\frac{1}{2}$ h.

6.3.3 The escalator automatically shuts down as soon as fire is detected in a compartment to which it leads.

6.4 *[Elevators for persons with limited mobility].*

Where an elevator intended for the evacuation of persons with reduced mobility is mandatorily required, it shall comply with the following requirements in addition to those listed in 6.1.

- 6.4.1 At all levels, the access platform forms a shaft; the doors for access from the compartment to the elevator platforms have Rf ½ h and are self-closing or self-closing in case of fire.
- 6.4.2 The minimum dimensions of the elevator car are 1.1 m (width) x 1.4 m (depth).
- 6.4.3 The shaft doors open and close automatically, and have a useful width of at least 0.80 m.

6.5 Low voltage electrical installations for motive power, lighting and signaling.

- 6.5.1 They comply with the requirements of the legal and regulatory texts in force, as well as with the General Regulations on Electrical Installations (A.R.E.I.).
- 6.5.2 Electrical lines supplying plant or equipment that absolutely must remain in service in the event of a fire shall be located so as to spread the risks of general decommissioning.

On their route to the compartment where the installation is located, the electrical lines have an Rf 1 h in accordance with addendum 3 of standard NBN 713-020.

These requirements do not apply if the operation of the installations or devices remains assured even in the event of a power supply failure.

The installations or devices referred to are :

- a) safety lighting and emergency lighting if necessary;
- b) the systems for notification, alert and alarm;
- c) smoke extraction systems;
- d) the water pumps for firefighting and possibly the emptying pumps;
- e) elevators intended for the evacuation of persons with reduced mobility referred to in Section 6.4.

6.5.3 Autonomous power sources.

The circuits referred to in 6.5.2 shall be capable of being supplied by one or more self-contained power sources; the power of those sources shall be sufficient to simultaneously supply all installations connected to those circuits.

Once the normal power fails, the autonomous sources automatically and within 1 minute, ensure the operation for one hour of the above installations.

6.5.4 Safety lighting

Safety lighting meets the requirements of NBN L 13-005 (photometric and colorimetric requirements) and C 71-100 (installation rules and instructions for inspection and maintenance) and C 71-598-222 (self-contained emergency lighting devices).

The evacuation routes, escape terraces, landings, elevator cages, halls or rooms accessible to the public, the rooms in which the autonomous power sources or the pumps for the fire extinguishing systems are installed, the boiler rooms and the main signs, are provided with safety lighting with a horizontal illuminance of at least 1 lux at the level of the ground or of steps, in the axis of the escape route; in places of the escape route where a dangerous condition exists, the minimum horizontal illuminance is 5 lux. These dangerous places may be, for example : a change of direction, a crossing, a transition to stairs, unforeseen height differences in the tread.

This safety lighting may be powered by the normal power source, but if it fails, it must be powered by one or more autonomous power source(s).

Autonomous lighting devices connected to the circuit that feeds the normal lighting in question may also be used as long as they provide every guarantee of proper operation.

6.6 Installations for combustible gas distributed by pipes.

These installations comply with regulatory requirements and rules of good workmanship.

Plants for flammable gas lighter than air also comply with:

- NBN D 51-001 - Central heating, ventilation and air conditioning - Rooms for natural gas pressure reducing devices
- NBN D 51-003 - Installations for flammable gas lighter than air, distributed by pipes.
- NBN D 51-004 - Installations for combustible gas lighter than air, distributed by pipes - Special installations.

6.7 Aerial installations

If an aëraulic system is present, it must meet the following conditions.

6.7.1 Conception of installations

6.7.1.1 Integration of classrooms or enclosed spaces into classrooms

No room or enclosed space, even in an attic or basement, may be integrated into the network of air ducts unless these spaces meet the regulations imposed on the ducts.

6.7.1.2 Use of stairwells for air transport

No stairwell may be used to supply or exhaust air from other premises.

6.7.1.3 Limiting the reuse of air

The air extracted from premises with a particular fire hazard, storage area for flammable products, boiler room, kitchen, garage, parking building, transformer room, room for garbage storage, should not be re-routed; it should be exhausted to the outside.

The air exhausted from other premises may :

- or re-routed to the same premises, provided that a smoke damper in accordance with section 6.7.5 is installed in the recycling duct;
- or blown into yet other premises to serve there as compensating air for mechanical extraction systems with direct exhaust to the outside, provided that additionally a smoke damper and a duct system for direct exhaust to the outside of this recycling air is provided.

In both cases, the recycling air is automatically exhausted to the outside when smoke is present in it.

However, the above provisions (smoke damper on the recycling air and smoke detection in the extraction duct) are not required for air handling units with flow rates less than or equal to 5000 m³/h, serving only a single room.

6.7.2 Construction of air ducts.

6.7.2.1 Air ducts in evacuation routes.

In the evacuation routes, as well as in the technical ducts and in the places that are not accessible after finishing the building, the ducts and their interior or exterior insulation are made of materials A0; the lining of the insulation is at least of materials A1.

The flexible pipes are at least of materials A1 and their length is maximum 1 m.

The ducts and their suspension systems also have a fire stability of ½ h in evacuation paths.

6.7.2.2 Exhaust ducts of collective kitchens

The ducts for exhausting polluted air from collective kitchens are made of class A0 materials. In the kitchen, these exhaust ducts and their suspension systems also have a fire stability of ½ h.

The horizontal exhaust ducts, outside the kitchen and in compartments other than this in which the kitchen is located, meet the following requirements:

- either they are placed in tubes with walls Rf 1 h;
- either they are Ro 1 h.

The horizontal exhaust ducts, outside the kitchen and in compartments other than this in which the kitchen is located, meet the following requirements:

- either they are outside the building;
- either they are placed in tubes with walls Rf 1 h;
- either they are Ro 1 h.

6.7.3 Passages of air ducts through walls.

6.7.3.1 General.

Wall penetrations of air ducts shall generally comply with 3.1.

This requirement does not apply to the passage of air ducts through walls with an Rf ½ h, under the following conditions :

- the air ducts are made of Class A0 materials over a distance of at least 1 m on each side of the pierced wall;
- air ducts connecting to these passages and passing through horizontal evacuation paths shall not be connected to air nozzles located in these evacuation paths;
- This is a compartment with only day-use classrooms.

6.7.3.2 Passages with fire resistant dampers

No air duct may pass through a wall requiring an Rf greater than or equal to 1 h, and no air duct may pass through a partition wall between two compartments requiring an Rf greater than or equal to ½ h or pass through a duct wall requiring an Rf greater than or equal to ½ h, unless it meets one of the following conditions:

- a) a fire-resisting damper with the same fire resistance as the penetrated wall and complying with 6.7.4. is placed at the level of the wall penetration;
 - b) the duct has a Ro equal to the fire resistance of the penetrated wall or is placed in a duct with the same Rf along the entire length of the passage through the compartment or through the protected space. This duct shall have no opening unless provided with a damper described in paragraph (a) above;
-

- c) the channel simultaneously meets the following conditions:
- the cross-sectional area of the passage does not exceed 130 cm²;
 - in the passage of the wall is equipped with a device, which in case of fire closes the passage and then has a fire resistance equal to that of the wall pierced.

The air ducts located in ducts reserved exclusively for them and at their upper end terminating in a technical room containing only the air handling groups they connect, may pass through the walls of the technical room without additional provisions. In this case, the ventilation of the ducts as required in 5.1.5.1 shall be accomplished through the technical room.

6.7.4 Fire resistant dampers

6.7.4.1 Operation

One distinguishes two operation types :

Type A : for closing the valve is provided:

- or a thermal detector.
The valve closes automatically when the temperature of the flowing air exceeds the limit. The closing occurs by the melting of one or more fuses at a temperature located between 80 and 100 °C if the detection is inside the duct. In the case of detection outside the duct, the response time of the detector is Grade 1 according to NBN S 21-105;
- or a smoke detector.
The damper closes automatically when smoke is detected in the duct.
- either both of the aforementioned detectors.

Type B : the valve can be closed by remote control using a positive safety system. It is also equipped with a thermal detection that additionally closes the valve automatically under the conditions mentioned for the valve A.

Closing is done by a system that requires no external energy.

The fire dampers at the boundaries of compartments equipped with a fire detection system are of operation type B.

In case of detection, the valves of the stricken compartment are automatically closed. By

"compartment boundaries" is meant :

- the partitions to other compartments;
- the walls of pipe ducts passing through the compartment;
- the walls between the compartment and the stairwells.

6.7.4.2 Performance of the valve

The fire damper placed in the passages of walls Rf 1 h (respectively Rf ½ h) has following performance:

- a) after 250 consecutive cycles of opening and closing, a valve of the same manufacture shall not be deformed or damaged anywhere;
- b) in the closed position and at a pressure differential of 200 Pa, air leakage in the airflow direction does not exceed 10 m³/h per meter of inner circumference;

- c) the valve resists the corrosive atmosphere in which it is placed;
- d) no periodic lubrication is required for proper valve operation;
- e) the valve as a whole has a stability in case of fire and a flame tightness of 1 h, (respectively $\frac{1}{2}$ h) according to NBN 713-020. In addition, it meets the thermal insulation criterion for $\frac{1}{2}$ h (respectively $\frac{1}{4}$ h);
- f) the damper box contains at the top a damper position indicator and an indelible arrow indicating the direction of air flow. A rating plate shows the inside dimensions of the valve, the name of the manufacturer, the manufacturing number and year of manufacture; it also bears a highly visible and indelible mark indicating a fire protection device;
- g) after operation of the valve, it should be able to be turned off again.

6.7.4.3 Valve placement

The valve is fixed and secured in the wall in such a way that the stability of the valve is guaranteed independently of the two connection channels, even if one of the two channels disappears.

For inspection and maintenance of the valve, an easily accessible inspection door is placed on the valve box or on the duct in the immediate vicinity of the valve. This door has the same fire resistance as the duct.

In order to facilitate the location of the fire damper, a highly visible and indelible mark designating a fire protection device shall be affixed along with the words "fire damper." This mark shall be placed on the inspection door or in the room perpendicular to the damper.

6.7.5 Smoke Valves

A smoke valve meets the following conditions:

- in closed position and at a static pressure difference of 500 Pa, the air loss must not exceed 2 % of the flow rate corresponding to an air velocity of 3 m/sec in open position;
- the gasket used to obtain this tightness must be able to withstand temperatures ranging from - 30°C to 100°C for 2 h, after which the valve still passes the tightness test mentioned above.

6.7.6 Operation in case of fire of the aerial systems

In areas of the building equipped with a fire detection system, the air handling units serving only the infested compartment are shut down upon detection of fire.

The placement of a central fire control sign to control certain elements of the aerial installations may be imposed by the competent fire department in special cases. In this case, this sign shall be placed at a point easily accessible to the fire department and located at the usual level of access.

6.8 Establishments for notification, warning, alarm and firefighting equipment.

These establishments are determined on the advice of the competent fire department.

6.8.1 Notification and firefighting devices are required in buildings.

6.8.2 Number and location of fire alarm, warning, alarm and fire suppression devices.

6.8.2.1 The number of devices is determined by the size, condition and risk in the classrooms.

The devices shall be judiciously spaced in sufficient number to serve every point of the space in question.

6.8.2.2 Devices requiring human intervention shall be installed in visible or clearly marked locations that are freely accessible under all circumstances. They are located near exits, on landings, in corridors, among others, and are installed in such a way that they do not obstruct circulation and cannot be damaged or struck.

The devices placed outside are sheltered from all weather conditions if necessary.

6.8.2.3 The signage complies with applicable regulations.

6.8.3 Fire alarm.

6.8.3.1 The notification of discovery or detection of fire must be able to be immediately transmitted to the fire departments by one notification device per compartment; in the buildings whose area per floor is less than 500 m², one notification device, for the building is sufficient.

6.8.3.2 The necessary connections shall be permanently and promptly assured by telephone or electric lines, or by any other system providing the same guarantees of operation and the same facilities for use.

6.8.3.3 Each device that can establish the connection subject to human intervention carries a message about its destination and instructions for use.

In the case of a telephone set, this message will state the call number to be formed, unless the connection is direct or automatic.

6.8.4 Warning and alarm.

The warning and alarm signals or messages can be picked up by all persons involved and must not be able to be confused among themselves or with other signals. Their electrical circuits differ from each other.

6.8.5 Firefighting equipment.

6.8.5.1 General.

Firefighting equipment consists of devices or installations that may or may not be automatic.

The quick extinguishers and wall reels are for first intervention, that is, they are intended for use by occupants.

6.8.5.2 Portable or mobile rapid extinguishers.

These devices are determined by the nature and extent of the hazard.

6.8.5.3 Wall reels with axial feed, wall hydrants.

6.8.5.3.1 The number and location of these devices is determined by the nature and extent of the fire hazard.

Their number meets the following conditions:

(a) each compartment larger than 500 m² has at least one reel;

(b) any point of the compartment must be able to be reached by the water jet from the nozzle.

The compression fitting of the wall hydrants complies with the regulations of the Royal Decree of January 30, 1975 establishing the type of couplings used for fire prevention and suppression (B.S. of April 9, 1975).

6.8.5.3.2 The riser that feeds any appliances with pressurized water has the following characteristics:

the inside diameter and feed pressure must be such that the pressure at the least endowed reel meets the requirements of NBN EN 671-1, taking into account that 3 reels with axial feed must be able to operate simultaneously for $\frac{1}{2}$ h.

6.8.5.3.3 Any devices are fed with pressurized water without prior operation. This pressure shall be at least 2.5 bar at the worst point.

6.8.5.4 Underground and above-ground hydrants.

6.8.5.4.1 They are fed by the public water supply system through a pipe with minimum inner diameter of 80 mm.

If the public grid cannot meet these conditions, other sources of supply with a minimum capacity of 50 m³ are used.

6.8.5.4.2 The location of above-ground and underground hydrants and immediately their number are determined on the basis of the ministerial circular of October 14, 1975 concerning water supplies for extinguishing fires.

"In industrial and commercial zones and in places of high population density, water connections shall be spaced at a maximum distance of 100 m apart. Elsewhere, because of the location of buildings or establishments to be protected from fire, they are distributed so that the distance between the entrance to each building or establishment and the nearest hydrant does not exceed 200 m."

6.8.5.4.3 Underground or above-ground hydrants shall be installed at least 0.60 m (measured horizontally) from the side of streets, roads or thoroughfares on which vehicles may drive and park.

0 GENERAL.

0.1 Objective.

These basic regulations define the minimum requirements that the conception, construction and design of low-rise buildings (LG) must meet in order to:

- prevent the occurrence, development and propagation of fire;
- ensure the safety of those present;
- preventively facilitate the fire department's intervention.

0.2 Scope.

0.2.1 This annex applies to the following buildings to be erected and the following extensions to existing buildings, for which the application for construction is submitted as of December 1, 2012:

1. the low buildings;
2. the extensions of buildings that are low buildings after realization;
3. the premises or parts of low-rise buildings in which an industrial activity takes place and whose total area is less than or equal to 500 m², under the following conditions:
 - mainly non-industrial activities take place in the building and the total area of premises with industrial activity is less than the remaining area of the building;
 - the industrial activities in these premises support the non-industrial activities in the same compartment;
 - there are no night-occupied premises in the compartment in which industrial activities take place.

0.2.2 However, excluded from the scope of this annex are:

1. the industrial buildings;
2. The buildings consisting of up to two storeys and with a total area less than or equal to 100 m²;
3. the single-family homes.

0.3 Plates *[The plates are included with the corresponding text]*

Plate 2.1 - Facades between buildings

Plate 2.2 - Facades between compartments.

1 IMPLANTATION AND ACCESS ROADS.

The access routes referred to in Section 1.1 shall be determined in agreement with the Fire Department, according to the following guidance.

1.1 Fire department accessibility and emplacement

For single-story buildings, fire department vehicles must be able to approach at least to within 60 m of a building façade.

For buildings with more than one story, fire department vehicles must be able to reach a facade at least at one point that provides access at recognizable points to

each building layer.

To this end, vehicles must have an access point and a staging area:

- a) either on the drivable roadway of the public highway;
 - b) either on a special access road from the travelable roadway of the public highway and having the following characteristics:
 - minimum clear width: 4 m;
 - minimum turning circle with turning radius 11 m (on the inside) and 15 m (on the outside);
 - minimum clear height: 4 m;
 - maximum slope: 6%;
 - load capacity: such that vehicles, without galvanizing, with a maximum axle load of 13t can drive on it and stand still, even when deforming the terrain.
- For structures located on access roads, refer to NBN B 03-101.

1.2 Outbuildings

Outbuildings, projecting roofs, canopies, cantilevers or other such additions are permitted only if they do not compromise either evacuation, occupant safety or fire department action.

1.3 Horizontal distance between buildings

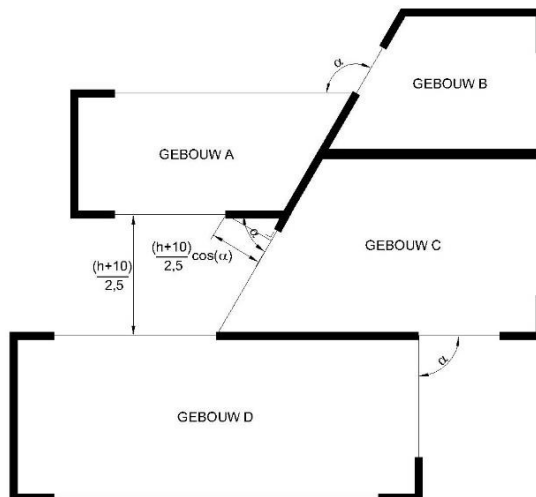
To prevent a fire from spreading between two buildings:

- (a) either, if facades face each other or form a recessed dihedral angle, then the distance (in m) between facade sections that do not have at least EI 60 or REI 60 shall be at least:

$$\frac{h+10}{2,5} \cos \alpha \text{ for } 0^\circ \leq \alpha \leq 90^\circ$$

$$0 \text{ for } 90^\circ < \alpha \leq 180^\circ$$

where α is the enclosed angle and h is the height of the building in m (see Plate 2.1).



For buildings for which the application for construction was submitted before July 1, 2022, the

a horizontal distance between buildings of 6 m is sufficient.

- (b) either the radiation of a fire from a building onto an opposite building, and vice versa, shall not exceed 15 kW/m².

Walls separating adjacent buildings have EI 60, or REI 60 when load-bearing.

In these walls a connection between these buildings may exist through a door EI1 30, self-closing or self-closing in case of fire.

The condition of distance between a low building and an opposing building does not apply to buildings separated by existing streets, roads,... belonging to the public domain.

2 COMPARTMENTALIZATION AND EVACUATION.

2.1 Size of compartments

The building is divided into compartments whose area is less than 2,500 m², with the exception of the parking lots (see 5.2).

The maximum area of a single-story building consisting of one compartment shall be 3500 m². The length of this compartment shall not exceed 90 m.

The maximum area of a compartment may exceed either 2500 m² or 3500 m², respectively, if the compartment is equipped with an automatic extinguishing system and a smoke and heat extraction system.

The Minister of the Interior determines the conditions under which exceptions are possible to the size of the compartment respectively either 2500 m² or 3500 m² without having to provide an automatic extinguishing system and/or a smoke and heat extraction system.

The height of a compartment corresponds to the height of one storey. However,

the following exceptions are allowed:

- a) the parking lot with building layers (see 5.2);
- b) a compartment may extend over two superimposed floors with an interior connecting staircase (duplex), if the cumulative area of those floors does not exceed 2,500 m²;
- c) the height of a compartment may extend over three superimposed building levels with an interior connecting staircase (triplex), provided that the sum of their cumulative area does not exceed 300 m², and that this compartment is equipped with an automatic fire detection system of the total surveillance type that automatically provides a fire alarm indication and whose detectors are adapted to the risks present;
- d) the height of a compartment may extend over several superimposed building levels, if this compartment contains only technical rooms (see 5.1.1).
- e) the height of a compartment may extend over several floors (atrium) provided:
 - That this compartment is equipped with an automatic fire extinguishing system and a smoke and heat extraction system. The Minister of the Interior shall determine the conditions under which exceptions to the mandatory installation of an automatic extinguishing system and a smoke and heat extraction system;

The Minister of the Interior determines the conditions to be met by the automatic fire extinguishing system and smoke and heat extraction system.

2.2 Evacuation of compartments.

2.2.1 Number of outputs.

Each compartment has minimum:

- one exit if the maximum occupancy is less than 100 people;
- two exits if occupancy is 100 or more than 100 and less than 500 persons;
- $2 + n$ exits where n is the integer immediately greater than the quotient of the division by 1000 of the maximum occupancy of the compartment, if the occupancy is 500 or more than 500 persons.

The minimum number of exits may be increased by the fire department depending on the occupancy and configuration of the premises.

The number of exits from building floors and classrooms is determined as for compartments.

2.2.2 Outputs.

The exits are located in opposite zones of the compartment.

Evacuation routes lead either:

- outside;
- to stairwells;
- to stairs, located inside or outside the building (for horizontal distances see 4.4).

As for the underground building levels, one exit to the outside via an evacuation route with walls EI 30 and doors EI 30 may replace the required access to one of the stairwells.

For parking: see 5.2.

At an evacuation level, each stairway leads to the outside either directly or over an evacuation path that meets the requirements of 4.4.

3 REGULATIONS FOR SOME BUILDING ELEMENTS.

3.1 Penetrations through walls.

Penetrations through walls of pipes for fluids or for electricity and the expansion joints of walls shall not adversely affect the required fire resistance of the building elements.

The provisions of Annex 7 "Common Provisions," Chapter 1, shall apply.

3.2 Structural elements.

The structural elements, according to their situation, possess fire resistance as shown in Table 2.1, where EI represents the lowest evacuation level.

	Structural elements of the roof	Other structural elements
Above the floor of E_{gg} Single storey	R 30 (*)	R 30
Multiple building layers	R 30 (*)	R 60
Under E_{gg} , including the floor of E_i	Not applicable	R 60

Table 2.1 - Fire resistance of structural elements.

(*) No requirements for the structural elements of the roof if protected on the inside by a building element EI 30.

3.3 Vertical interior walls and interior doors.

For walls and doors, which demarcate compartments, 4.1 applies; if they demarcate evacuation routes, 4.4 applies.

The interior vertical walls that demarcate classrooms or the entirety of classrooms with night occupancy have a fire resistance, shown in Table 2.2.

	Walls
Above the floor of E_{gg} Single storey	EI 30
Multiple building layers	EI 60
Under E_{gg} , including the floor of E_i	EI 60

Table 2.2 - Fire resistance of vertical interior walls

The doors in these walls have EI 30.

3.4 Ceilings and suspended ceilings.

3.4.1 In evacuation routes, premises accessible to the public and collective kitchens, suspended ceilings have EI 30 (☒→☒), EI 30 (☒→☒) or EI 30 (a ↔ b) according to NBN EN 13501- 2 and NBN EN 1364-2 or have a fire stability of ½ h according to NBN 713-020.

This requirement does not apply to the exceptions listed in Section 4.4.1.2 and to compartments equipped with an automatic fire extinguishing system of the sprinkler type adapted to the risks present.

3.4.2 The walls for which fire resistance is required extend into the space between the ceiling and the suspended ceiling.

If the space between the ceiling and the suspended ceiling is not equipped with an automatic extinguishing system, this space must be divided into volumes whose horizontal projection can be inscribed in a square of maximum 25 m side.

These volumes are separated by vertical screens with the following characteristics:

- they consist of a material of class A1 and/or A2-s1,d0;
- they cover the entire space between the pipes;
- they have EI 30.

3.5 Facades

3.5.1 Single-walled facades

3.5.1.1 Separation between compartments

The studs of the curtain wall skeleton shall be attached to the building frame at the level of each floor. With the exception of buildings equipped with an automatic extinguishing system, these attachments shall be R 60 with respect to a fire in an underlying and adjacent compartment.

The linear joint at the façade is sealed so that no cold smoke can penetrate between the façade and the compartment walls.

Moreover, with the exception of a limited linear joint with a width not exceeding 20 mm at the façade, the connection of the compartment walls to the façade has at least EI 60 or EI 60 (i→o).

3.5.1.2 Opposite facades and facades forming a dihedral angle

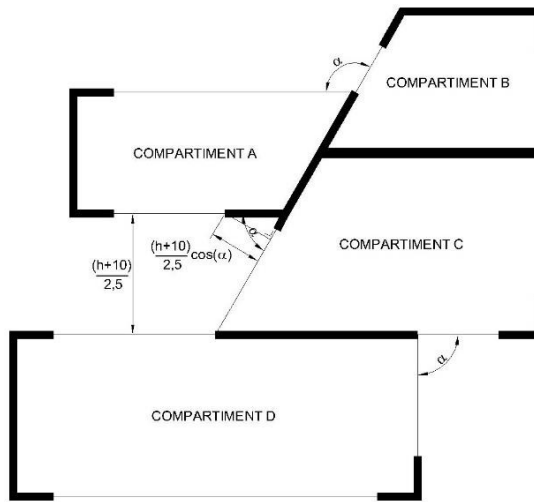
To prevent a fire from spreading between two compartments:

- (a) either, if facades face each other or form an indented dihedral angle, then the distance (in m) between the facade sections that do not have at least E 30 or E 30 (o→i) shall be at least:

$$\frac{h+10}{2,5} \cos \alpha \text{ for } 0^\circ \leq \alpha \leq 90^\circ$$

$$0 \text{ for } 90^\circ < \alpha \leq 180^\circ$$

where α is the enclosed angle and h is the height of the building in m (see Plate 2.2).



For buildings for which the application for construction was submitted before July 1, 2022, the following formula may also be used:

$$\frac{h+5}{2} \cos \alpha$$

(b) or the radiation of a fire between facades belonging to different compartments shall not exceed 15 kW/m².

3.5.2 Double-walled facades.

3.5.2.1 Double-walled façade interrupted by compartmentalization.

The cavity of the double-skin facade is interrupted in the extension of each compartment wall by an element that has at least E 60. This element covers the entire space understood between the two walls and has a minimum length of 60 cm to be counted from the inner wall of the facade.

This element may contain openings, provided that the continuity of compartmentation through the cavity is ensured by a fire self-closing closure device with a fire resistance E 60. This device is tested in its supporting structure, according to the direction of the compartment wall; its closure is ordered:

- either by a thermal detection at the level of this device that responds at a temperature of up to 100°C.
- either by smoke detection in the cavity or in all compartments along the façade, meeting the conditions in Section 3.5.2.3.

Where there are ventilation openings between the cavity of the double-walled façade and the interior environment of the building, smoke detection is permitted only in the cavity or in all compartments along the façade. It meets the conditions of section 3.5.2.3.

3.5.2.2 Double-walled facade without compartmentalization.

The double-walled facades without compartmentalization must conform to one of the two options listed below.

3.5.2.2.1 Double-walled facade whose inner wall is fireproof.

The outer wall of the double-walled facade consists of at least 50% between floors

from building elements without specific fire resistance.

The inner wall has:

- or, over the entire height, at least a fire resistance E 30 (i↔o);
- or alternately every two building levels at least a fire resistance EI 30 (i↔o).

3.5.2.2.2 Double-walled facade open to the outside.

The regulations for single-wall facades may be applied to the interior wall when the exterior wall contains fixed or mobile ventilation openings that open automatically in case of fire.

The fixed vents are placed at 30 ± 10 degrees to the outside and upward relative to the horizontal, evenly distributed over at least 50% of their area.

Mobile vents meet, in the event of fire, the same conditions as fixed vents.
The safety position of the mobile slats is triggered by a general fire detection system in the compartments along facades. Automatic operation shall comply with the conditions provided in Section 3.5.2.3.

3.5.2.3 Automatic closing/opening systems.

3.5.2.3.1 Operation

Closure/opening is commanded by an automatic fire detection system.

The facility will be equipped with manual opening and closing systems. Their operation is reserved for the fire department. Their location must be determined in agreement with the fire department.

3.5.2.3.2 Business security.

When the normal energy source (electrical energy, compressed air network) fails, the detection system or the control system puts the closing/opening system into the safety position.

Any lack of power source, power supply or electrical or pneumatic control must be automatically reported to the detection center.

3.5.2.3.3 Operation in case of fire in an adjacent compartment.

If the closing/opening systems do not have positive safety, then the electrical lines connecting the closing/opening system shall comply with Section 6.5.2.

4 PRECAUTIONS ON CONSTRUCTION OF COMPARTMENTS AND EVACUATION ROOMS.

4.1 Compartments.

Walls between compartments shall have at least the fire resistance indicated in Table 2.3.

	Walls
Above the floor of _{Egg} Single storey Multiple	30
 yEI 60	store

Under _{Egg},
including the floor of 60 _{EI}

Table 2.3 - Fire resistance of walls between compartments.

Connection between two compartments is permitted only if it is through a self-closing or, in the event of fire, self-closing door _{EI1} 30.

4.2 Interior stairwells.

4.2.1 General.

The stairs connecting several compartments are enclosed. The basic principles of 2 "Compartmentalization and Evacuation" apply to them.

4.2.2 Opinion.

4.2.2.1 The interior walls of the stairwells have at least EI 60.

Their outer walls may be glazed if these openings are set off laterally over at least 1 m with an element E 30.

4.2.2.2 Stairwells must provide access to an evacuation level.

A direct connection of each floor of a duplex to the stairwell is not required, provided that:

- the total area of the duplex compartment or duplex apartment is less than or equal to 300 m²;
- the area of the building floor of the duplex that does not evacuate directly through the stairwell is less than or equal to 150 m².

The direct connection of each floor of a triplex to the stairwell is not required, provided that:

- the area of each storey of the triplex that does not evacuate directly through the stairwell is less than or equal to 100 m²;
- the connection with the plywood at least happens:
 - for a day-occupancy-only triplex extending over the evacuation level (E), the immediately upper level (E+1) and the immediately lower level (E-1), from the level located at the evacuation level;
 - in other cases, from the lowest building floor and one of the other two building floors.

4.2.2.4 If several compartments lie in the same horizontal plane, they may have one or

have multiple common stairwells provided they are accessible from each compartment through a self-closing or, in the event of fire, self-closing door EI 30.

- 4.2.2.5 Stairwells serving underground levels should not be a direct extension of those serving levels above an evacuation level.

This does not preclude one over the other, subject to the following conditions:

1. The walls separating them have EI 60.
2. access to each stairwell is through a self-closing or, in the event of fire, self-closing door EI 30.

- 4.2.2.6 At the top of each interior stairwell, there is a ventilation opening with a diameter of at least 1 m² and which opens into the open air. This opening is normally closed; to open it, a hand control is used which is placed in a highly visible position at the evacuation level.

This requirement does not apply to stairwells between evacuation levels and underground building levels.

If stairwells connect up to two upper floors, with an area less than or equal to 300 m², to the evacuation level, the area of the ventilation opening may be limited to 0.5 m².

If the stairwell does not serve all building levels due to the presence of a duplex at the top of the building, the ventilation opening shall be connected to the stairwell by means of a duct whose cross section is at least equal to the area required for the ventilation opening.

4.2.3 Stairs.

4.2.3.1 Construction provisions.

The stairs have the following features:

1. Like the spillways, they have R 30 or are designed in the same way as a concrete slab with R 30.
However, fire stability is not required for stairs and landings composed exclusively of Class A1 materials with a melting temperature greater than 727°C (e.g., steel meets this condition, aluminum and glass do not);
2. they are equipped with handrails on both sides.
For stairs with a useful width, less than 1.20 m, one handrail is sufficient, provided there is no danger of falling;
3. the step tread is at least 20 cm in each point;
4. the rise of the steps should not exceed 18 cm;
5. their slope should not exceed 75% (maximum slope angle 37°);
6. they are of the "straight type."
However, "spiral staircases" are allowed if they have displaced steps and if their steps, in addition to the aforementioned requirements, (with the exception of the aforementioned point 3), have at least 24 cm of tread on the walkway.

4.2.3.2 Useful width of stair arms, spillways and sashes.

This useful width is at least equal to 0.80 m and reaches at least the required useful width b_r calculated according to Annex 1 "Terminology".

The staircase arms and staircase landings of the same compartment shall not differ in their useful width by more than one passage unit.

If a compartment contains special purpose rooms, the theoretical useful stair width (according to Appendix 1 "Terminology") based on their number of users is calculated only over the height between this compartment and the evacuation level.

4.3 Exterior stairwells.

Exterior stairs should provide access to an evacuation level.

The requirements of 4.2.3 apply to it with however the following deviation: no fire stability is required, but the material belongs to class A1.

The connection between the compartment and an external staircase happens:

- either through a door;
- either through escape terrace(s).

However, a staircase or section of stairs that is retractable or articulated may be used for connection between the evacuation level and the immediately higher level.

4.4 Evacuation routes and escape terraces.

4.4.1 General regulations

4.4.1.1 No point of a compartment shall be beyond:

- a) For premises with daytime occupancy only:
 - 30 m from the evacuation road connecting the exits;
 - 45 m from access to the nearest exit;
 - 80 m from access to a second exit.
- b) For classrooms or entirety of classrooms with night occupancy:
 - 20 m from the evacuation road connecting the exits;
 - 30 m from access to the nearest exit;
 - 60 m from access to a second exit.

The length of dead-end evacuation roads should not exceed 15 m.

The useful width of evacuation routes, escape terraces and of their access, exit or passage doors is greater than or equal to the required useful width (see Annex 1 "Terminology"). It shall be at least 0.80 m for evacuation routes and doors, and at least 0.60 m for escape terraces.

In a compartment, the connection between and to stairs is via evacuation routes or over escape terraces.

The provisions of this section do not apply to parking lots (see 5.2).

4.4.1.2 Considered an exit from a compartment:

- An interior stairwell in accordance with the section 4.2;
- An exterior stairwell in accordance with the section 4.3;
- direct access to open air at an evacuation level;
- an evacuation route at an evacuation level whose interior vertical walls have EI 60 and the doors of the premises giving onto these routes are self-closing or self-closing in case of fire and have EI 30.

The road to be traveled in open air plays no role in calculating these distances.

The doors on these roads must not have a latch that could impede evacuation.

Any vertical interior walls of evacuation routes have EI 30 and the access doors to these routes have EI 30.

This requirement, as well as the requirement of sections 3.4.1 and 6.7.2.1, shall not apply to day-occupancy-only compartments whose area does not reach 1250 m².

This requirement, as well as the requirement of Sections 3.4.1 and 6.7.2.1, shall also not apply to day-occupancy-only compartments whose area is less than 2,500 m² on condition:

- that these compartments are equipped with an automatic extinguishing system of the sprinkler type adapted to the risks present;
- That the building is equipped with an automatic fire detection system of the total surveillance type that automatically indicates a fire alarm indication and its location and whose detectors are adapted to the risks present;
- and that the products used for cladding vertical walls, ceilings and floors of those compartments meet fire response requirements for evacuation routes.

The evacuation of classrooms or a set of classrooms with night occupancy is done through evacuation routes whose vertical walls have EI 30 and doors EI 30.

This requirement does not apply to the evacuation of these premises if they belong to the operation of a building with a commercial function.

4.4.2 At an evacuation level

At an evacuation level, no exit windows of building sections with a commercial function, which do not have EI 30, shall open onto the evacuation road connecting the exits of other building sections to the public road, except for the last 3 m of this evacuation road.

4.5 Signalization.

The serial number of each floor shall be clearly posted on landings and in the escape areas at stairwells and elevators.

The designation of exits and emergency exits shall comply with the provisions on occupational safety and health signage.

5 CONSTRUCTION REQUIREMENTS FOR SOME CLASSROOMS AND TECHNICAL ROOMS.

5.1 Technical classrooms and spaces.

5.1.1 General.

A technical room or a set of technical rooms constitutes a compartment. This compartment may extend over several successive building levels.

The technical rooms are subject to the compartment requirements with the following modifications:

1. access to two exits leading:

-either to an adjacent compartment through a door EI 30;

- either to a stairwell through a door EI1 30;
 - either to the open air, such that an evacuation level is attainable;
2. deviating from 4.4.1, no point of the compartment shall be beyond :
- 45 m from the road connecting the two exits in the technical compartment;
 - 60 m from the nearest exit;
 - 100 m from the second exit;
- However, if the area of the technical compartment does not exceed 1000 m², one exit to a stairwell, to the outside or to another compartment is sufficient. In this case, the distance to this exit may not exceed 60 m;
3. if the height of the technical compartment extends over several consecutive building levels (see 2.1) and if it includes several service floors connected by stairs or ladders:
- if the compartment area is less than 1000 m², every two service floors, starting with the lowest, one access to a stairwell, to the outside or to another compartment is sufficient;
 - if the compartment area exceeds 1000 m², then each service floor must provide access to at least one of two exits; these exits alternate from floor to floor;
4. the useful width of evacuation routes, stairways, spillways and shafts shall be at least 0.80 m.

5.1.2 Heating Departments.

5.1.2.1 Boiler rooms with combustion appliances with a cumulative combustion flow rate greater than or equal to 75 kW and fuel storage rooms.

The boiler rooms with combustion appliances with a cumulative combustion flow rate greater than or equal to 75 kW and the fuel storage rooms, are technical rooms.

The requirements of Section 5.1.1 shall apply subject to the following modifications:

- Each boiler room and fuel storage area should be a separate compartment;
- The interior walls of these boiler rooms and fuel storage rooms have EI 60;
- Access to these boiler rooms and fuel storage areas:
 - Either through a self-closing door EI1 60;
 - Either through a sas with the following characteristics:
 1. it contains self-closing doors EI1 30;
 2. the walls have EI 60;
 3. the surface area is a minimum of 2 m²;
 - Either through an open-air exit, in such a way that an evacuation level can be reached. The doors swing open in the sense of escape.
- No point of these boiler rooms and fuel storage rooms shall be further than 15 m from the nearest exit.

The capacity of a fuel storage room shall be limited so that the total fire load of the fuel storage room is less than or equal to 750 GJ.

5.1.2.2 Common Provisions.

The design, construction and furnishing of firing units shall comply with the provisions of paragraph 4 of Annex 7.

5.1.2.3 Derogations.

For buildings for which the application for construction was submitted before July 1, 2022, the following derogatory provisions apply:

- Section 5.1.2.1: Does not apply to boiler rooms with combustion appliances with a total useful heat output (also called total rated output) less than 70 kW;
- Section 5.1.2.1: Not applicable to combustion units with combustion appliances with a total useful heat output (also called total rated output) greater than or equal to 70 kW if the access to the combustion unit and the fire resistance of the walls, floors, ceilings and doors of the combustion unit comply with the requirements of standard NBN B 61-001 +A1 : 1996.

Notwithstanding this standard, the boiler rooms and their ancillary rooms may be connected to the other parts of the building by a self-closing door _{EI1} 60 provided that it does not open onto a stairwell or onto an elevator landing or into a room at particular risk. The door rotates in the escape direction.

5.1.3 Transformer Rooms.

5.1.3.1 General.

They comply with the requirements of the General Regulations on Electrical Installations (A.R.E.I.).

Furthermore:

- the walls have EI 60, except for the exterior walls;
- the interior doors have _{EI1} 30;
- if water (of any origin, including fire water) can reach the floor, for example by infiltration or through cable ducts, then all measures must be taken so that the water level remains constantly and automatically below the level of the vital parts of the electrical installation as long as it is in use.

If the oil content of the whole apparatus reaches 50 l or more, the regulations of NBN C 18-200 "Guidelines for the fire protection of the premises of electricity transformation" must be applied.

5.1.3.2 On-site assembled posts or prefabricated posts.

An on-site assembled post or prefabricated post shall be erected in a designated room, with walls EI 60.

Access, if not from the outside, is through a door _{EI1} 30.

5.1.4 Household waste disposal.

5.1.4.1 Dump tubes are prohibited.

5.1.4.2 Local for storage of garbage.

The walls have EI 60.

The room is accessed through a self-closing door _{EI1} 30.

5.1.5 Pipe sleeves.

5.1.5.1 Vertical tubes.

When vertical ducts penetrate horizontal walls requiring fire resistance, one of the following three measures applies:

1. the walls of the vertical ducts have a fire resistance EI 60; the trapdoors and doors have EI 30.

They have decent ventilation at their upper end.

The free ventilation cross section of the duct is at least equal to 10% of the total horizontal cross section of the duct, with a minimum of 4 dm².

The free ventilation cross section can be equipped with motorized ventilation valves whose opening is ordered as follows:

- automatically upon detection of a fire in the tube;
- automatically upon detection of a fire in the building, if equipped with a general fire detection system;
- automatically in the event of a power source, power supply or control failure (device with positive safety);
- manually via a control at an evacuation level at a location determined in agreement with the fire department.

If the free-vented cross-section of a duct is equipped with a motorized vent valve, any gas piping in this duct must meet the requirements of standard NBN D 51-003 or of standard NBN D 51-006 for piping and connections in a non-vented technical duct.

2. at the level of the penetration there is a building element with at least the required fire resistance of the horizontal wall;
3. the walls of the vertical ducts have EI 30; the trapdoors and doors EI 30; the vertical ducts are interrupted at the level of each compartment by horizontal screens with the following characteristics:
 - they consist of a material of class A1 and/or A2-s1,d0;
 - they cover the entire space between the pipes;
 - they have EI 30.

In cases 2 and 3, the tubes should not be ventilated.

5.1.5.2 Horizontal tubes.

When horizontal ducts penetrate vertical walls requiring fire resistance, one of the following three measures applies:

1. the walls of the horizontal tubes and trapdoors and doors have at least the required fire resistance of the vertical wall;
2. At the level of the penetration there is a building element with at least the required fire resistance of the vertical wall;
3. the walls of the horizontal ducts have EI 30; the trapdoors and doors EI 30; the ducts are interrupted at the level of each compartment by vertical screens with the following characteristics:
 - they consist of a material of class A1 and/or A2-s1,d0;
 - they cover the entire space between the pipes;
 - they have EI 30.

5.2 Parking.

Notwithstanding the basic principle set forth in Section 2.1, a parking lot may form a compartment whose area is not limited even when there are several communicating building levels.

5.2.1 Structural elements.

Notwithstanding section 3.2, the structural elements of the parking have R 120 and the floors of the parking building levels and ramps have R 120.

When the roof has no function other than to protect the parking lot from the weather:

- have the structural elements of the roof R 30;
- or are the structural elements of the roof separated from the rest of the parking lot by a building element EI 30.

For the open parking building layers, the structural elements are not subject to any fire resistance requirement, provided:

- That the floors of these open parking building layers and the slopes between these open parking building layers have at least REI 60;
- and that these structural elements do not carry another compartment.

5.2.2 Compartment.

The walls between the parking lot and the rest of the building have EI 60, and the connection between the parking lot and the rest of the building is ensured:

- either by a sas with walls EI 60 and self-closing or in case of fire self-closing doors EI 30;
- either by a self-closing or fire self-closing door EI 60.

5.2.3 Parking under several buildings.

Notwithstanding paragraph 1.3, the parking lots of adjacent buildings do not have to be separated by a wall. Consequently, those parking lots shall constitute only one and the same parking lot.

In that case, the structural elements of the entire parking lot have R 120, including the structural elements of the open parking building layers.

5.2.4 Common Provisions.

The design, construction and layout of the parking lot shall comply with the provisions of the Section 3 of the Appendix 7.

5.2.5 Derogations.

Sections 5.2.1 to 5.2.4 do not apply to the parking of a building for which the application for construction was submitted before July 1, 2022 if it meets the following conditions.

Notwithstanding paragraph 3.2, no fire resistance requirements are imposed on the structural elements of open parking lots whose horizontal walls possess REI 60.

The walls between the parking lot and the rest of the building have EI 60.

The parking compartment may include some non-residential premises, such as: transformer rooms, storage rooms, archive rooms, technical rooms ...

The walls of these rooms exhibit EI 60 and access is by a self-closing or, in the event of fire, self-closing door EI 30.

The specific regulations concerning boiler rooms, transformer rooms and garbage storage rooms continue to apply (cf. 5.1.2, 5.1.3 and 5.1.4, respectively).

At each building level, evacuation is arranged as follows:

- at least two stairwells or exterior stairways meet the requirements contained in 4.2 or 4.3 and are accessible from any point on the building level; the distance to be covered to the nearest staircase shall not exceed 45 m; the minimum useful width of such staircases shall be 0.80 m;
- as stated in 2.2.2, third paragraph, the required access to one of the two stairwells may be replaced on the considered level by a direct exit to the open air;
- on the building level closest to the exit level, the sloping roadway may replace one of the stairwells or outdoor staircases if the slope measured at its centerline does not exceed 10%;
- the limitation of the slope to 10% does not apply to compartments whose area is equal or less than 500 m², if evacuation via the slope remains possible;
- In addition to the signs defined in 4.5, the evacuation routes on each level are also indicated on the floor or above.

However, a single exit per building level (interior stairwell, exterior stairs, direct exit to the open air or sloped roadway on the building level closest to the exit level) is sufficient on condition:

- That the parking extends in height over a maximum of two building levels;
- That neither of these two building levels is located more than two building levels above or below the vehicle exit level;
- That no point of parking is located at a distance further than 15 m from the entrance to the evacuation road to the exit;
- and that no point of parking is located at a distance further than 30 m from the exit access.

In enclosed parking lots with a total area larger than 2500 m², the measures necessary to prevent the spread of smoke must be taken.

5.3 Halls.

5.3.1 General.

If it can accommodate more than 500 people, these halls may only be arranged underground if the difference between the lowest floor level of these halls and the nearest evacuation level does not exceed 3 m.

If the aforementioned halls are intended for a maximum of 500 persons, they may be installed underground, provided that the lowest floor level accessible to the public is not more than 4 m below the average level of the various evacuation levels of the establishment.

The number of exits is determined as for compartments.

5.3.2 Construction.

The walls forming these rooms or set of rooms not only comply with the regulatory requirements applicable to these rooms, but also have the same fire resistance as the walls of a compartment.

Each passage in the vertical walls is closed by a self-closing or in the event of fire

self-closing door EI1 30.

These doors swing open in the sense of escape.

No object should interfere with evacuation to the exits.

5.4 Shopping or commercial complex.

The furnishing of storefronts opening onto interior galleries is permitted at an evacuation level and on adjacent building floors provided:

1. the complex with its galleries is separated from other building parts by walls with EI 60;
2. the other building parts have their own exits independent of the exits of the shopping or commercial complex.

The partition walls between the commercial premises have EI 30 and extend into any suspended ceiling. This last requirement is waived if the store or commercial complex is equipped with an automatic fire extinguishing system of the sprinkler type adapted to the risks present.

5.5 Collective kitchens.

The collective kitchens, possibly including the restaurant, are separated from the other building parts by walls EI 60.

Each passageway is closed by a self-closing or fire self-closing door EI1 30. These doors turn in the direction of escape from the kitchen.

When the kitchen and restaurant are compartmentalized from each other, the horizontal and vertical transport systems between kitchen and restaurant should meet the following conditions:

- this transport is in tubes with walls EI 60 when passing through other premises;
- the conveyor system is sealed at the level of the compartment wall(s) with a device EI1 60.

When the kitchen is not compartmentalized with respect to the restaurant, each fixed deep-frying appliance is provided with a fixed automatic fire extinguisher that is coupled with a device that interrupts the supply of energy to the deep-frying appliance.

6 EQUIPMENT OF THE BUILDINGS.

6.1 Elevators and freight elevators.

6.1.1 General.

6.1.1.1 The machine and associated parts of an elevator or freight elevator are not accessible except for maintenance, inspection and emergencies. The drive unit is located:

- or in a machine room;
- either in the shaft.

Control devices may be accessible from the platform, provided that they do not adversely affect the required fire resistance of the platform wall or the wall of the shaft in which they are placed.

- 6.1.1.2 In case of abnormal rise in the temperature of the machine and/or of the other electrical equipment, the elevators must stop on a platform so that passengers can disembark.

An automatic return to normal operation is possible only after sufficient cooling.

- 6.1.1.3 No extinguishing device containing water shall be set up in the shaft(s).

6.1.2 Opinion.

- 6.1.2.1 The assembly consisting of one or more shafts and the possible machine room, as well as access landings to form a shaft for the underground building levels, is enclosed by walls with EI 60.

Their exterior walls may be glazed if they meet the requirements of Section 3.5.

The access doors between the compartment and the sas have EI1 30 and are self-closing or self-closing in case of fire.

If the area of the shaft is smaller than the area of the car of the elevator or freight elevator, the access door between the compartment and the shaft shall be a fire self-closing swing door EI1 30 operated by a fire detection system that includes at least the following:

- a smoke detection system in the shaft;
- and a smoke detection in the compartment near the access door to the sas.

The access platform may be part of the evacuation route.

- 6.1.2.2 The whole of the shaft doors of the elevator or freight elevator has E 30 fire resistance according to the standard NBN EN 81-58, with the platform wall exposed to the fire on the side of the platform. The platform wall will be tested with any operating and control devices forming part thereof.

The shaft doors tested by other methods are accepted in accordance with the Royal Decree of April 12, 2016 on the marketing of elevators and safety components for elevators, provided that they have at least the same degree of fire resistance.

These requirements do not apply when the elevator(s) are located in a stairwell serving building levels above an evacuation level, provided:

- That on all floors served by this stairwell with elevator(s), in each compartment, the connection to this stairwell with elevator(s) is through evacuation routes;
- and that on all floors served by this stairwell with elevator(s), the connection between this evacuation route and this stairwell with elevator(s) is ensured by a self-closing or, in the event of fire, self-closing door with EI1 30 giving access to a landing in this stairwell with elevator(s).

- 6.1.2.3 The requirements of sections 6.1.2.1 and 6.1.2.2 are not required in the following cases:

- a) on all floors served by the elevator or freight elevator, if such elevator or freight elevator serves the floors of only one compartment consisting of multiple floors;
- b) on the building level(s) of only one of the compartments served by the elevator or freight elevator, provided that this compartment is not a parking compartment or an apartment, and that the view of this elevator or freight elevator on the other building levels does comply with the requirements of Sections 6.1.2.1 and 6.1.2.2 or with Section (c) below;
- c) on the building level(s) where the elevator or freight elevator issues directly into the open air, provided that the view of this elevator or freight elevator on the other building levels is

to the requirements of paragraphs 6.1.2.1 and 6.1.2.2 or paragraph (b) above.

6.1.2.4 Elevators and freight elevators whose drives are located in a machine room.

The interior walls of the engine room that do not give out onto the shaft have EI 60. The doors or trapdoors in these walls have EI 30.

The fire department is assured access to the engine room.

6.1.2.5 Oleohydraulic elevators and freight elevators.

The space in which the drive unit of an oleohydraulic elevator or freight elevator is installed is provided with a containment that has a capacity at least equal to 1.2 times the oil content of the machinery and reservoirs.

If the drive of an oleohydraulic elevator or freight elevator is installed in a machine room, the electrical equipment as well as the electrical and hydraulic lines running from the machine room to the elevator shaft are installed higher than the highest level that the leaked oil in the machine room can reach.

6.1.2.6 Elevators and escalators.

The landing of the elevator(s) may be the landing of one or more escalators. The assembly consisting of one or more shafts and the machine room, if any, as well as access landings of the elevator(s) and escalator(s), shall then form only one unit.

6.1.3 Ventilation.

6.1.3.1 The shaft, engine room or the whole shaft and engine room are naturally ventilated through outside air nozzles in the upper part.

However, the shaft or the whole shaft and machine room may be ventilated via indoor air nozzles provided that the view of the elevator or freight elevator complies with:

- either the case described in (a) of section 6.1.2.3;
- or the case described in (b) of paragraph 6.1.2.3 in that the building bay(s) where the requirements of paragraphs 6.1.2.1 and 6.1.2.2 are not required are located above the other building levels.

6.1.3.2 The ventilation openings have a minimum cross-sectional area of 1% of the horizontal area of the room from which the air is discharged.

6.1.3.3 The vents may be equipped with motorized vents whose opening is ordered as follows:

- automatically ordered to ensure adequate ventilation for elevator users, even during extended downtime;
- automatically commanded in the event of an abnormal rise in temperature of the machine and/or control organs;
- automatically commanded upon detection of a fire in the shaft and/or engine room;
- automatically commanded upon detection of a fire in the building, if equipped with a general fire detection system;
- automatically commanded in the event of a power source, power supply or control failure (device with positive safety);
- manually via an evacuation level control.

6.1.4 Operation in case of fire.

The operation of elevators in the event of a fire complies with the following regulations or any other rule of good practice that provides an equivalent level of safety, in accordance with the Royal Decree of April 12, 2016 on the marketing of elevators and safety components for elevators.

The principle of operation of elevators in the event of a fire is that when a signal indicating a fire is received from the fire detection system or a manual call device, the elevator car is brought to the designated elevator platform to allow passengers to disembark there and then remove the elevator from normal service.

- 6.1.4.1 The operation of the elevators in the event of fire meets the requirements of standard NBN EN 81-73.
- 6.1.4.2 The elevator landing at the evacuation level is recorded as designated elevator landing.
- 6.1.4.3 Each elevator battery is equipped with at least one manual call facility at an evacuation level.

Moreover, if the building is equipped with a general fire detection system or with a fire detection system in the shafts and/or in the machine rooms, this system must transmit a signal to the elevators in case of fire.

- 6.1.4.4 When general or partial detection is required in the building and the machinery of the elevators and freight elevators is located in the shaft, smoke detection should be placed in the shaft.
- 6.1.4.5 If a fire is detected by a fire detection system on the platform corresponding to the designated main platform, the elevator shall receive one or more additional electrical signals so that the elevator car is diverted to the designated replacement platform.
- 6.1.4.6 If the elevators are on the designated landing in the event of a fire, there must be the possibility that the fire department can easily verify that the elevator cars are there and that no one is trapped in the elevator.

Elevators that, upon their arrival at the designated platform, are stationary with open doors and out of normal operation meet this requirement.

- 6.1.4.7 The elevator can only be returned to normal operation by an authorized person.
- 6.1.4.8 For buildings for which the application for construction was submitted before April 1, 2017, the following derogation provisions apply:

-Section 6.1.4.1: Applicable only to elevators designed or modernized after March 31, 2017.

6.2 Paternoster elevator, container transport and freight elevator with loading and unloading automation.

The engine rooms are located at the top of the shaft. The interior walls of the engine rooms and of the shafts have EI 60.

The interior entrance doors have EI 30.

The shaft walls on the platform side and the supervisory hatches in these walls have EI 30.

The shaft doors or access hatches of these devices operate automatically and are normally closed.

If the container transport system follows a horizontal and/or vertical path, passing through building layers floors or compartments, doors are provided at each of these passages.

Their shutters and doors have E 30. They operate automatically and are normally closed. In case of fire, the facilities are put out of service.

6.2.2 Installation of paternoster elevators for passenger transportation is prohibited.

6.3 Escalators.

6.3.1 The stairwell of escalators has walls with EI 60.

6.3.2 Access to the stairwell shall be on each level, through a self-closing or in the event of fire self-closing door EI 30.

6.3.3 The escalator automatically shuts down as soon as fire is detected in a compartment to which it leads.

6.3.4 The requirements of Sections 6.3.1 and 6.3.2 are not required in the following cases:

- a) on all floors served by the escalator, if the escalator serves the floors of only one compartment consisting of several floors;
- b) on the building floor(s) of only one of the compartments served by the escalator, provided that this compartment is not a parking compartment, and that the view of this escalator on the other building floors does comply with the requirements of paragraphs 6.3.1 and 6.3.2 or to paragraph (c) below;
- c) on the building level(s) where the escalator issues directly into the outside air, provided that the view of such escalator on the other building levels does meet the requirements of paragraphs 6.3.1 and 6.3.2 or paragraph (b) above.

6.4 Special elevators.

The special elevators and their operation in case of fire comply with the following regulations or any other rule of good craftsmanship providing an equivalent level of safety, in accordance with the Royal Decree of April 12, 2016 on the marketing of elevators and safety components for elevators.

6.4.1 Elevators intended for evacuating persons with reduced mobility.

When an elevator intended to evacuate persons with reduced mobility becomes mandatory, it shall comply with the following requirements in addition to those listed in Section 6.1.

6.4.1.1 This elevator shall be designed and constructed so as not to impede or prevent access and use by persons with reduced mobility.

6.4.1.2 At all levels of construction, elevator landings shall form a shaft that meets the requirements of Section 6.1.2.1 where the area is equal to or greater than the elevator car area.

6.4.1.3 Elevator cages are accessible to at least one person in a wheelchair and an accompanying person.

The minimum dimensions of the elevator cages are 1.1 m (width) x 1.4 m (depth).

- 6.4.1.4 The shaft doors open and close automatically and have a useful width of at least 0.90 m.
- 6.4.1.5 Evacuation is carried out under the supervision of a competent person. For this purpose, the elevator is equipped with an "evacuation key" switch that allows an authorized person to take over the operation of the elevator.
- 6.4.1.6 Elevators intended for the evacuation of persons with reduced mobility shall be marked with clear and recognizable signage.
- 6.4.1.7 The elevator shall include an intercom system that permits verbal two-way communication when the elevator is in evacuation mode. This system shall allow for communication between the elevator car, evacuation level and the machine room or emergency operations panel.

Communication equipment in the elevator car and at the evacuation level must include a built-in microphone and speaker; a telephone with a receiver is not allowed.

The wiring of the communication system shall be installed in the elevator shaft and/or in the machine room where appropriate.

- 6.4.1.8 With the exception of elevators serving only two building levels, each elevator landing shall include an intercom system that permits verbal two-way communication when the elevator is in evacuation mode. This system must allow communication between each elevator landing, the evacuation level and the machine room or emergency operations panel, so that the floors on which persons with reduced mobility who need to be evacuated are located can be recognized and this information can be relayed to the person in charge of evacuation.

Communication equipment on each elevator platform and at the evacuation level must include a built-in microphone and speaker; a telephone with a receiver is not permitted.

The communication system is designed so that its operation remains assured in case of failure of the elevator car communication system referred to in Section 6.4.1.7.

6.4.2 Elevators intended for the fire department.

If the building is equipped with one or more elevators intended for the fire department, it must meet the following requirements in addition to those listed in Section 6.1.

- 6.4.2.1 Elevators intended for the fire department and their operation in case of fire meet the requirements of standard NBN EN 81-72.
- 6.4.2.2 At all levels of construction, elevator landings shall form a shaft that meets the requirements of Section 6.1.2.1 where the area is equal to or greater than the elevator car area.
- 6.4.2.3 If no wall EI 60 is provided in an elevator battery to separate the elevator intended for firefighting from the other elevators in a same shaft, then all elevators and their electrical equipment must have the same fire protection as the elevator intended for firefighting.
- 6.4.2.4 The minimum dimensions of the elevator cages are 1.1 m (width) x 2.1 m (depth).
- 6.4.2.5 The shaft doors open and close automatically and have a useful width of at least 0.80 m.
- 6.4.2.6 A "fireman's key" switch is provided on the platform of the firemen's access level that allows the firemen to take over the operation of the elevator.

- 6.4.2.7 The elevator must be able to reach the floor farthest from the fire department access level in less than 60 seconds after closing the doors.

6.4.3 Derogations.

For buildings for which the application for construction was submitted before April 1, 2017, the following derogatory provisions apply:

- Section 6.4.1.4: The shaft doors of elevators designed before April 1, 2017, open and close automatically and have a useful width of at least 0.80 m.
- Items 6.4.1.6, 6.4.1.7 and 6.4.1.8: Applicable only to elevators designed or modernized after March 31, 2017.
- Items 6.4.2: Not applicable.

6.5 Low voltage electrical installations for motive power, lighting and signaling.

- 6.5.1 They comply with the requirements of the legal and regulatory texts in force, as well as with the General Regulations on Electrical Installations (A.R.E.I.).

- 6.5.2 Electrical lines supplying plant or equipment that absolutely must remain in service in the event of a fire shall be located so as to spread the risks of general decommissioning.

On their route to the compartment where the installation is located, the electrical lines have the following fire resistance:

- a) or an intrinsic fire resistance of at least
 - PH 60 amounts to NBN EN 50200 for pipes whose outer diameter is less than or equal to 20 mm and whose conductor cross-section is less than or equal to 2.5 mm²;
 - Rf 1 h is according to add. 3 of NBN 713-020 for pipes whose outer diameter is greater than 20 mm or whose conductor cross-section is greater than 2.5 mm²;
- b) or Rf 1 h, according to add. 3 of NBN 713-020, for pipes without intrinsic fire resistance placed in ducts.

These requirements do not apply if the operation of the installations or devices remains assured even in the event of a power failure.

The installations or devices referred to are:

- a) the safety lighting and possibly the replacement lighting;
- b) the systems for notification, alert and alarm;
- c) smoke extraction systems;
- d) the water pumps for firefighting and possibly the emptying pumps;
- e) the special elevators referred to in section 6.4.

6.5.3 Autonomous power sources.

The circuits referred to in 6.5.2 shall be capable of being supplied by one or more autonomous power sources; the power of those sources shall be sufficient to simultaneously supply all the installations connected to those circuits.

Once the normal power fails, the autonomous sources automatically and within one minute, ensure the operation for one hour of the above installations.

6.5.4 Safety lighting.

The safety lighting meets the requirements of standards NBN EN 1838, NBN EN 60598-2-22 and NBN EN 50172.

This safety lighting may be powered by the normal power source, but if it fails, it must be powered by one or more autonomous power source(s).

Autonomous lighting devices connected to the circuit that feeds the normal lighting in question may also be used as long as they provide every guarantee of proper operation.

6.6 Installations for combustible gas distributed by pipes.

Combustible gas installations comply with:

- NBN D 51-001 - Central heating, ventilation and air conditioning - Rooms for natural gas pressure reducing devices;
- NBN D 51-003 - Installations for flammable gas lighter than air, distributed by pipes;
- NBN D 51-004 - Installations for combustible gas lighter than air, distributed by pipes - Special installations;
- NBN D 51-006 - Gas installations for commercial butane or commercial propane in relaxed gas phase with a maximum working pressure (MOP) of 5 bar - Indoor piping, installation and commissioning of consumption appliances - General technical and safety requirements.

6.7 Aerial installations

If an aëraulic system is present, it must meet the following conditions.

6.7.1 Conception of installations

6.7.1.1 Integration of classrooms or enclosed spaces into classrooms

No room or enclosed space, even in an attic or basement, may be integrated into the network of air ducts unless these spaces meet the regulations imposed on the ducts.

6.7.1.2 Use of stairwells for air transport

No stairwell may be used to supply or exhaust air from other premises.

6.7.1.3 Limiting the reuse of air

Air exhausted from premises with a particular fire hazard, storage area for flammable products, boiler room, kitchen, garage, parking lot, transformer room, trash storage room, should not be re-routed and should be exhausted to the outside.

Air extracted from other classrooms may:

- or re-routed to the same premises, provided that a smoke damper in accordance with section 6.7.5 is installed in the recycling duct;
- or blown into yet other premises to serve as compensating air for mechanical extraction systems with direct exhaust to the outside, provided that additionally a smoke damper and a duct system for direct exhaust to the outside of this recycling air is provided.

In either case, smoke detection must be installed in the recycling air in front of the smoke valve. If smoke is detected in the recycling air, the

air handling groups shut down, the smoke dampers closed and, in the second case, the ductwork for the discharge to the outside of the recycling air is automatically opened and is ready to operate when the air handling groups are put into operation by the fire department.

However, the above provisions (smoke damper on the recycling air and smoke detection in the extraction duct) are not required for air handling groups serving only a single room with a total flow rate less than or equal to 5000 m³/h.

6.7.2 Construction of air ducts.

6.7.2.1 Air ducts in evacuation routes.

In the evacuation routes, as well as in the technical ducts and in the places that are not accessible after finishing the building, the ducts are made of materials of class A1; the insulation products including their linings are at least of class A2-s1,d0.

The flexible pipes are at least of class B-s1, d0 and their length is not more than 1 m.

The air ducts in the evacuation routes with their suspensions have a fire stability of at least ½ h.

This provision is satisfied if:

- either the ducts and their suspensions have EI 30 (ho ↔) or EI 30 (ve ↔) when placed horizontally or vertically, respectively;
- either the ducts are suspended so that the following requirements are met:
 - suspensions are made of steel
 - distance axis to axis between suspensions ≤ 1 meter
 - force per suspension point ≤ 500 N
 - tension in the suspensions ≤ 18N/mm²
 - distance between ducts and suspensions ≤ 5 cm
 - shear stress ≤ 10 N/mm²

The requirements of this section do not apply to the exceptions listed in section 4.4.1.2 and to compartments equipped with an automatic fire extinguishing system of the sprinkler type adapted to the risks present.

6.7.2.2 Exhaust ducts of collective kitchens

The exhaust ducts of collective kitchens are made of Class A1 materials.

The exhaust ducts located outside the collective kitchens are:

- either placed in ducts whose walls have EI 60;
- either have EI 60 (ho ↔) or EI 60 (ve ↔) when placed horizontally or vertically, respectively.

Exhaust ducts in collective kitchens with their suspensions have a fire stability of at least ½ h.

This provision is satisfied if:

- either the ducts and their suspensions have EI 30 (ho ↔) or EI 30 (ve ↔) when placed horizontally or vertically, respectively;
 - either the ducts are suspended so that the following requirements are met:
 - suspensions are made of steel
 - distance axis to axis between suspensions ≤ 1 m
 - force per suspension point ≤ 500 N
 - tension in the suspensions ≤ 18N/mm²
-

- distance between ducts and suspensions ≤ 5 cm
- shear stress ≤ 10 N/mm²

6.7.3 Passages of air ducts through walls.

6.7.3.1 General.

Wall penetrations of air ducts shall generally comply with 3.1.

This requirement does not apply to the passage of air ducts through walls with EI 30 under the following conditions:

- the air ducts are made of Class A1 materials over a distance of at least 1 m on each side of the pierced wall;
- air ducts connecting to these passages and passing through horizontal evacuation paths shall not be connected to air nozzles located in these evacuation paths;
- This is a compartment with only day-use classrooms.

6.7.3.2 Passages with fire resistant dampers

No air duct is allowed:

- pass through a wall for which a fire resistance greater than or equal to EI 60 is required;
- pass through a partition wall between two compartments requiring a fire resistance greater than or equal to EI 30 or pass through a pipe duct wall requiring a fire resistance greater than or equal to EI 30;

unless it meets one of the following conditions:

- a) a fire damper with the same fire resistance (EI-S) as required for the penetrated wall and complying with 6.7.4 is placed at the level of the wall penetration.
However, this damper may be placed off the axis of the wall and connected to this penetrated wall by a duct provided that the assembly of duct and damper possesses the same fire resistance (EI-S) as required for the penetrated wall;
- b) the duct has the same fire resistance EI $i \leftrightarrow o$ as required for the penetrated wall or is placed in a duct with the same fire resistance as required for the penetrated wall along the entire length of the passage through the compartment or through the protected space. This duct shall have no opening unless provided with a damper described in paragraph (a) above;
- c) the channel simultaneously meets the following conditions:
 - the cross-sectional area of the passage does not exceed 130 cm²;
 - in the passage of the wall, the duct is equipped with a device, which in case of fire closes the passage and then has the same fire resistance as required for the penetrated wall.

The air ducts located in ducts reserved exclusively for them and at their upper end terminating in a technical room containing only the air handling groups they connect, may pass through the walls of the technical room without additional provisions. In this case, the ventilation of the ducts as required in 5.1.5.1 shall be accomplished through the technical room.

6.7.4 Fire resistant dampers

6.7.4.1 Operation

One distinguishes two operation types:

Type A : the valve is automatically closed when the temperature of the flowing air in the duct exceeds a limit.

Type B : Type A valve that can additionally be closed by remote control through a positive safety system.

Closing is done by a system that requires no external energy.

If a general fire detection system is required, fire dampers at compartment boundaries shall be of operation type B.

In case of detection, the valves of the stricken compartment are automatically closed. By

"compartment boundaries" is meant:

- the partitions to other compartments;
- the walls of pipe ducts passing through the compartment;
- the walls between the compartment and the stairwells.

6.7.4.2 Performance of the valve

The fire damper placed in the passages of walls has following performance:

Fire resistance of the wall	Fire resistance of the valve
EI 60	EI 60 (ho i ↔ o) S EI 60 (ve i ↔ o) S
EI 30	EI 30 (ho i ↔ o) S EI 30 (ve i ↔ o) S

Table 2.4 - Fire resistant dampers.

In the absence of CE marking, the valve meets the following requirements:

- a) after 250 consecutive cycles of opening and closing, a valve of the same manufacture shall not be deformed or damaged anywhere;
- b) the valve resists the corrosive atmosphere in which it is placed;
- c) no periodic lubrication is required for proper valve operation;
- d) the damper box contains at the top a damper position indicator and an indelible arrow indicating the direction of air flow. A rating plate shows the inside dimensions of the valve, the name of the manufacturer, the manufacturing number and year of manufacture; it also bears a highly visible and indelible mark indicating a fire protection device;
- e) after operation of the valve, it should be able to be turned off again.

6.7.4.3 Valve placement

The valve is fixed and secured in the wall in such a way that the stability of the valve is guaranteed independently of the two connection channels, even if one of the two channels disappears.

For inspection and maintenance of the damper, an easily accessible inspection door is placed on the damper box or on the duct in the immediate vicinity of the damper. This door has the same fire resistance as required for the duct.

To facilitate the location of the fire damper, a highly visible and indelible mark indicating a fire protection device shall be affixed along with the

words "fire damper." This mark shall be placed on the inspection door or in the room perpendicular to the damper.

6.7.5 Smoke Valves

A smoke valve meets the following conditions:

1. the tightness of the valve must have one of the following qualities:
 - a) in the closed position and at a static pressure difference of 500 Pa, the air loss must not exceed 60 l/s.m²;
 - b) class 3 according to the NBN EN 1751 standard;
2. the gasket used to obtain this tightness must be able to withstand temperatures ranging from - 20°C to 100°C for 2 h, after which the valve still passes the tightness test mentioned above;
3. the locking system of the smoke valve has positive safety.

6.7.6 Operation in case of fire of the aerial systems

In areas of the building equipped with a fire detection system, the air handling units serving only the infested compartment are shut down upon detection of fire.

The placement of a central fire control sign to control certain elements of the aerial installations may be imposed by the competent fire department in special cases. In this case, this sign shall be placed at a point easily accessible to the fire department and located at the usual level of access.

6.8 Establishments for notification, warning, alarm and firefighting equipment.

The notification, warning, alarm and firefighting resources are determined in agreement with the fire department according to the following guideline.

6.8.1 Notification and firefighting devices are required in buildings.

6.8.2 Number and location of fire alarm, warning, alarm and fire suppression devices.

6.8.2.1 The number of devices is determined by the size, condition and risk in the classrooms.

The devices shall be judiciously spaced in sufficient number to serve every point of the space under consideration.

6.8.2.2 Devices requiring human intervention shall be installed in visible or clearly marked locations that are freely accessible in all circumstances. They are located near exits, on landings, in corridors, among others, and are installed in such a way that they do not obstruct circulation and cannot be damaged or struck.

The devices placed outside are sheltered from all weather conditions if necessary.

6.8.2.3 The signage complies with applicable regulations.

6.8.3 Fire alarm.

6.8.3.1 The notification of fire discovery or detection must be able to be transmitted immediately to the fire departments by one notification device per compartment; in buildings where the area per floor is less than 500 m², one notification device for the building is sufficient.

6.8.3.2 The necessary connections shall be permanently and promptly assured by telephone or electric lines, or by any other system providing the same guarantees of operation and the same facilities for use.

6.8.3.3 Each device that can establish the connection subject to human intervention carries a message about its destination and instructions for use.

In the case of a telephone set, this message will state the call number to be formed, unless the connection is direct or automatic.

6.8.4 Warning and alarm.

The warning and alarm signals or messages may be received by all persons concerned and shall not be capable of being confused among themselves or with other signals.

6.8.5 Firefighting equipment.

6.8.5.1 General.

Firefighting equipment consists of devices or installations that may or may not be automatic.

The quick extinguishers and wall reels are for first intervention, that is, they are intended for use by occupants.

6.8.5.2 Portable or mobile rapid extinguishers.

These devices are determined by the nature and extent of the hazard.

6.8.5.3 Wall reels with axial feed, wall hydrants.

6.8.5.3.1 The number and location of these devices are determined by the nature and extent of the fire hazard.

If the area of a building is less than 500 m², no wall reel is mandatory (except in the case of special risks). In all other cases, the number of wall reels is determined as follows:

1. the water jet reaches every point of a compartment;
2. compartments larger than 500 m² have at least 1 wall reel.

The compression fitting of any wall hydrants is adapted to the couplings used by the fire department.

6.8.5.3.2 The riser that feeds any appliances with pressurized water has the following characteristics:

the inside diameter and feed pressure must be such that the pressure at the least endowed reel meets the requirements of NBN EN 671-1, taking into account that 3 reels with axial feed must be able to operate simultaneously for ½ h.

6.8.5.3.3 Any devices are fed with pressurized water without prior operation. This pressure shall be at least 2.5 bar at the worst point.

6.8.5.4 Underground and above-ground hydrants.

6.8.5.4.1 This overhead and underground hydrants are fed by the public water supply system through a pipe with minimum inside diameter of 80 mm.

If the public network cannot meet these conditions, other sources of supply with minimum capacity of 50 m³ shall be used, unless the entire building is equipped with an automatic fire extinguishing system of the sprinkler type adapted to the risks present.

- 6.8.5.4.2 In industrial and commercial zones and in places of high population density, the water connections are located at a maximum distance of 100 m apart. Elsewhere, because of the location of buildings or establishments to be protected from fire, they are distributed so that the distance between the entrance to each building or establishment and the nearest hydrant does not exceed 200 m.
- 6.8.5.4.3 Underground or above-ground hydrants shall be installed at a horizontally measured distance of at least 0.60 m from the side of streets, roads or thoroughfares on which vehicles can drive and park.