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Having regard to the Law of July 30, 1979 on the prevention of fire and explosion and on compulsory civil liability insurance in such cases, in particular Article 2, amended by the Law of May 22, 1990;
Having regard to the opinion of the High Council for Fire and Explosion Protection;
Having regard to the opinion of the Commission of the European Communities,
Having regard to the opinion of the Council of State;
On the recommendation of our Minister of the Interior and having regard to the opinion of Our Ministers meeting in Council,

Have We decided and do We decide :

Art. 1 The technical specifications listed in the annexes to this decision apply to:

- the buildings to be erected;
- extensions to existing buildings but limited to the portion of the extension.

The basic standards do not apply to existing buildings. Considered
" existing buildings " are:

- the tall and medium buildings for which the building application was submitted before May 26, 1995;
- low-rise buildings for which the building application was submitted before Jan. 1, 1998.

Art. 2 These technical specifications apply to all buildings as defined in the Annexes to this Decree regardless of their purpose.

Regardless of whether a technical specification represents a relaxation or an aggravation of the fire safety requirement, a building is presumed to meet certain technical specifications as well if that building meets the corresponding technical specifications applicable to any building of the same category for which the application for construction was submitted later.

Art. 3 The testing and classification methods referred to in the Annexes to this Decision shall apply as long as they are not replaced by technical specifications concretized in implementation of the Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonized conditions for the marketing of construction products and repealing Council Directive 89/106/EEC.

Where, during the same period, a product is shown by appropriate documentation to satisfy the requirements of this Decision, in accordance with equivalent test and classification methods in another E.E.C. Member State, that product shall be presumed to comply with the technical specifications laid down in this Decision.

Art. 4 *[...]*

Art. 5 The Royal Decree of April 4, 1972 establishing the general requirements contained in standard NBN 713-010 on fire protection in high-rise buildings, as amended by the Royal Decree of November 10, 1974, is repealed.

Art. 6 *[...]*

Art. 6/1 The construction elements whose fire resistance is demonstrated according to the standard NBN 713-020 or the standard DIN 4102-6 for air ducts, respectively, and for which a CE marking is not yet mandatory, are allowed until December 1, 2016 or until the end of the coexistence period defined by the European Commission if at the latest on December 1, 2016

the European Commission has published the end of coexistence period for the standards concerned in the Official Journal of the European Union in accordance with Article 17, 5, c) of the Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonized conditions for the marketing of construction products and repealing Council Directive 89/106/EEC, without exceeding the date of 1 July 2022. For this purpose, the duration of fire resistance required by the annexes to this decree is converted into hours, preceded by "Rf" and "Ro" for air ducts, respectively. These building elements can be retained in the buildings after the mentioned transition period.

Art. 6/2 The provisions of paragraphs 9 and 10 of Annex 5/1 shall apply only to those construction products which are not required to bear CE marking and at the latest until four years after the entry into force of this Article, namely until December 1, 2016. These construction products may remain in the buildings after the mentioned transitional period.

Art. 6/3 The final coating materials of the roof coverings classified in A1 according to the classification system described in Annex 5, when they are not required to bear the CE marking, may be used in the uses provided for in point 8 of Annex 5/1 until four years after the entry into force of this article, namely until December 1, 2016. The construction products may remain in the buildings after the mentioned transitional period.

Art. 7 Our Minister of the Interior, Our Minister of Science Policy and Infrastructure and Our Minister of Employment and Labor, each for his or her part, are responsible for implementing this Decree.

Original text

Royal Decree of 07.07.1994 (B.S. 26.04.1995) + Erratum (B.S. 19.03.1996)

Changes

Royal Decree of 04.04.1996 (B.S. 20.04.1996).

Royal Decree of 18.12.1996 (B.S. 31.12.1996).

Royal Decree of 19.12.1997 (B.S. 30.12.1997).

Royal Decree of 04.04.2003 (B.S. 05.05.2003).

Royal Decree of 13.06.2007 (B.S. 18.07.2007) + Erratum (B.S. 17.08.2007)

Royal Decree of 18.09.2008 (B.S. 16.10.2008).

Royal Decree of 01.03.2009 (B.S. 15.07.2009) + Erratum (B.S. 04.02.2011)

Royal Decree of 12.07.2012 (B.S. 21.09.2012) + Erratum (B.S. 10.01.2014)

Royal Decree of 07.12.2016 (B.S. 18.01.2017).

Royal Decree of 20.05.2022 (B.S. 23.06.2022)

1 GENERAL DEFINITIONS.

1.1 Fire : set of phenomena belonging to uncontrolled damaging combustion.

1.2 Definitions regarding the whole of the building.

1.2.1 Height h of a building :

The height h of a building is conventionally the distance between the finished floor level of the highest building level and the lowest level of the roads usable by fire trucks around the building.

The highest building floor containing only technical classrooms is not included in this height measurement.

1.2.2 According to their height, one distinguishes :

1.2.2.1 The tall buildings (HG) : those whose height h is greater than 25 m

HG : $h > 25$ m

1.2.2.2 The medium height buildings (MG) : those whose height h is equal to or included between 10 m and 25 m

MG : $10 \text{ m} \leq h \leq 25$ m

1.2.2.3 The low buildings (LG) : those whose height h is less than 10m

LG : $h < 10$ m

1.3 Construction products : products as defined in point 1) of the Article 2 of the Regulation (EU) No 305/2011 establishing harmonized conditions for the marketing of construction products.

1.4 Building element: element formed from one or more building products with a function in the building:

1. carry without fire separating function (walls, floors, roofs, beams, columns, stairs);
2. bear with fire separating function (walls, floors, roofs ...);
3. protecting elements or parts of structures (suspended ceilings);
4. be non-load-bearing element or be part of a structure or a product for it (sheathing or walls, ceilings, facades, doors, shutters, elevator doors, pipe ducts and technical shafts);
5. are intended for technical installations (ducts, valves, cables, etc.).

1.5 Wall : building element, vertical or otherwise, that separates two volumes; an interior wall is located between two interior environments; an exterior wall is located between an interior and an exterior environment.

1.5.1 Compartment wall : a compartment wall is an interior wall located between two compartments.

1.6 Compartment : part of a building bounded by walls that prevent fire propagation to the adjacent compartment or compartments for a specified period of time should be prevented. A compartment may or may not be divided into rooms.

1.6.1 Area S of a compartment : horizontal gross area without any deduction measured between the inner surfaces of the compartment walls.

1.6.2 Number of users $_{np}$ of a compartment :

Suppose: S = the area of a compartment, expressed in m² (see 1.6.1);
S" = the area of a compartment section whose number of users can be accurately determined from the fixed furniture, expressed in m²;
S' = S - S", expressed in m²;
$_{np}$ = the number of users of a compartment;
$_{nr}$ = the number of users of a compartment that can be accurately determined from the fixed furniture.

For buildings referred to in Annexes 2, 2/1, 3, 3/1, 4 and 4/1, the value of $_{np}$ conventional is determined as follows :

- for premises not open to the public, the number of users np shall be at least equal to S/10.
- For premises open to the public, the number of users np shall be at least equal to S/3.

If the number of users nr of a compartment section can be accurately determined from the fixed furniture, then :

$_{np}$ = $_{nr}$ + S'/10, for premises not open to the public or $_{np}$ = $_{nr}$

+ S'/3, for premises open to the public.

1.7 Unfinished floor : horizontal rough wall, load-bearing and separating, and including : the load-bearing parts, the floor slabs, the intermediate beams and any fill, the whole forming the shell of the floor.

1.8 Ceiling : structural element covering the lower surface of the floor or roof and its supporting structure consisting of the suspensions, fixings and any insulation material. The ceiling can be fixed directly against the structural elements of the building or be a suspended ceiling.

1.9 Finished floor : horizontal wall that separates one level of a building from the immediately upper or immediately lower level of a building; this wall usually includes the following three parts :

a) the floor covering (possibly composed of : skirts, insulation layers, floating floors, ...);
b) the unfinished floor;
c) the ceiling.

Parts (a) and (c) may not exist.

1.9.1 Intermediate floor : an intermediate floor is a horizontal closed floor, in a compartment, which is not used exclusively for circulation, but on which goods and machinery may also be placed.

The number of intermediate floors of a compartment is the maximum number of intermediate floors traversed by any vertical line.

1.9.2 Open floor : an open floor is provided with evenly distributed openings covering at least 25% of the surface area; it is not considered an intermediate floor.

1.10 Suspended ceiling : suspended or self-supporting ceiling.

1.11 Storey : refers to the space between a floor and the ceiling above it. The building levels located below the level $_{Ei}$ are basement levels and do not qualify for determining the number of building levels of a building.

1.12 Building : any building structure forming a covered space accessible to people, enclosed in whole or in part by walls; industrial plants (such as chemical plants and tank farms) and engineering structures (bridges, tunnels, etc.) are not considered buildings.

1.13 Sub-compartment : part of a compartment bounded by walls that retard fire spread and limit the infested area.

1.14 Industrial building : a building or part of a building, which because of its construction and layout is intended for purposes of commercial processing or storage of materials or goods, commercial growing or storage of crops or commercial keeping of animals.

1.14.1 Warehouse : a warehouse is a covered entity, used primarily for the storage, transshipment and/or distribution of goods, regardless of its duration, consisting of one or more buildings with any attached canopies and/or associated structures.

1.15 Structural elements : the structural elements are the building elements that ensure the stability of the whole or part of the building, such as columns, load-bearing walls, main beams, finished floors and other essential parts that form the building's skeleton or frame, and that give rise to progressive collapse if they fail. Progressive collapse occurs if the failure of a structural component gives rise to the failure of parts of the building that are not in the immediate vicinity of the component under consideration and if the load-bearing capacity of the remaining structure is insufficient to support the occurring load.

The structural elements are classified as follows:

1° type I structural elements: elements that, in the event of failure, give rise to a progressive collapse that can extend beyond the compartment boundaries or give rise to damage to the compartment walls;

2° type II structural elements: elements that give rise to progressive collapse when collapsing, but not across compartment boundaries.

The requirements for structural elements whose type is not specified apply to all structural elements.

1.16 Premises with night occupancy: premises intended to accommodate sleeping occupants, as defined in the section 1.23.

1.17 Classrooms with day occupancy : different classrooms from those with night occupancy.

1.18 Duplex : the compartment formed by two superimposed building levels with an interior connecting staircase.

1.19 Running line : the running line is conventionally determined as follows :

- in the case of protruding stairs and diagonal stairs, regardless of their width, the walking line is in the center of the stairs;
- in the case of spiral staircases, spiral staircases and spindle staircases wider than 0.75 m, the walking line i s not less than 0.4 m and not more than 0.6 m from the inside of the handrail zone or from the spindle, and

at least 0.35 m from the outer edges of the steps;
-for spiral staircases, spiral staircases and spiral staircases narrower than 0.75 m, the walking line is in the center.

1.20 Self-reliant : having physical and/or psychological ability to bring oneself immediately to safety without physical assistance from others.

1.21 Not self-reliant : unable to bring oneself physically and/or psychologically to safety immediately without physical help from others.

1.22 Awake : able to notice an onset of fire or alarm immediately and respond accordingly.

1.23 Dormant : unable to immediately notice or respond accordingly to an onset of fire or alarm.

1.24 Green roof: roof covered with vegetation and the necessary layers for its growth (drainage, substrate, etc.).

1.25 Surrounding vegetation: any vegetation whose horizontal distance from a reference point does not exceed 3 m.

1.26 Boundary of the surrounding vegetation: the boundary of the surrounding vegetation relative to the reference axis is a notional line at an angle of 45° that should not cross the surrounding vegetation and is defined by the following equation:

$$hv_{,max} = {}_{dv} - 0.4\ m + {}_{he}$$

in which

$hv_{,max}$ indicates the maximum height of the surrounding vegetation at the considered point;
${}_{dv}$ indicates the horizontal distance between the considered point of the surrounding vegetation and the reference axis;
${}_{he}$ indicates the height of the element having a compartmentalization function and placed on the reference axis.

1.27 Sas: connecting space demarcated by fireproof walls and doors.

1.28 Triplex: the compartment formed by three superimposed building levels with an interior connecting staircase.

2 FIRE RESISTANCE.

Fire resistance refers to the ability of a building element to meet the criteria specified for the standard test of fire resistance for a given period of time with respect to load-bearing function, flame density and/or thermal insulation.

The classification system for the reaction-to-fire performance of construction products, construction works and parts thereof is set out in the Annex to Commission Decision 2000/367/EC of 3 May 2000 implementing Council Directive 89/106/EEC as regards the classification of the reaction-to-fire performance of construction products, construction works and parts thereof, as amended by Commission Decision 2003/629/EC of 27 August 2003.

2.1 General assessment of construction elements

The performance regarding the fire resistance of a building element is attested :

1° by the information accompanying the CE

marking; 2° in the absence of CE marking :

a) by a classification report for the application in question drawn up by a laboratory or certification body from a Member State of the European Union or from another country belonging to the European Economic Area, which demonstrates the guarantees of independence and competence laid down in the standards of the EN 45000 series or NBN EN ISO/IEC 17025;
That classification report is based on one of the following evaluation procedures :
1) one or more tests carried out in accordance with the relevant European standard;
2) [...]
3) one or more tests carried out according to a standard or technical specification of another member state of the European Union or of another country belonging to the European Economic Area, guaranteeing an equivalent degree o f protection;
4) An analysis of test results leading to a well-defined scope;

b) by a calculation note worked out according to a method approved by the Minister of the Interior, according to the procedure and conditions he establishes;

c) by the information accompanying a BENOR and/or ATG approval, or by an equivalent assessment accepted in another member state of the European Union or in another country belonging to the European Economic Area;

d) by the test report of a test conducted in accordance with standard NBN 713-020.

2.2 Specific assessment of fire doors

§ 1. The fire resistance of doors is tested according to standard NBN EN 1634-1 and is classified according to standard NBN EN 13501-2.
The fire resistance of a door is proven by the data belonging to the CE marking of the building product.

In the absence of CE marking for a fire-resistant door, the door must additionally meet the following requirements:

1° as regards tolerances of width, height, thickness and squareness, the minimum classes according to standard NBN EN 1529:
- After prior conditioning : class 1;
- after exposure to high humidity : class 1;
- after exposure to low humidity : class 1;

2° as regards tolerances of general and local flatness, the minimum classes according to standard NBN EN 1530:
- After prior conditioning : class 3;
- after exposure to high humidity : class 2;
- after exposure to low humidity : class 2;

3° regarding the requirements of mechanical resistance, the minimum classes according to standard NBN EN 1192:
- In non-industrial applications: class 1;

4° with regard to mechanical durability: the minimum class 4 according to the standard

NBN EN 12400.

For the requirements under 1° and 2°, the climatic conditions of temperature and humidity are defined in NBN EN 1294.

With regard to the fire resistance requirements and the minimum requirements defined in point 2°, the fire doors shall be subject to an assessment. The assessment and verification of the constancy of performance are carried out according to the system 1 described in point 1.2 of the Annex V of the Regulation (EU) No 305/2011 laying down harmonized conditions for the marketing of construction products.

§ Fire doors shall be installed in accordance with the installation conditions for which they have obtained their fire resistance classification.

3 REACTION IN CASE OF FIRE.

Behavior of a material that under specified test conditions, by its own decomposition, feeds a fire to which it is exposed.

3.1 *[Classification system of fire reaction characteristics of construction products]*

The classification system of fire reaction characteristics of construction products (NBN EN 13501-1) is described in Tables 1, 2 and 3 below.

The following symbols and definitions are used :

ΔT	Temperature rise
Δm	Mass loss
t_f	Duration of ignition
PCS	Gross calorific value
FIGRA	Fire propagation velocity
THR_{600s}	Total heat output
LFS	Lateral flame spread
SMOGRA	Smoke development rate
TSP_{600s}	Total smoke production
Fs	Flame expansion

Material : a single base substance or an evenly distributed (homogeneous) mixture of substances, e.g. metal, stone, wood, concrete, mineral wool with an evenly distributed binder, polymers.

Homogeneous product : a product consisting of a single material with equal density and composition of the whole product.

Non-homogeneous product : a product that does not meet the description of a homogeneous product

meets. It is a product composed of one or more substantial and/or non-substantial parts.

Substantial component : a material that constitutes a major part of a non-homogeneous product. A layer with a mass per unit area ≥ 1.0 kg/m² or a thickness ≥ 1.0 mm is considered a substantial part.

Non-substantial part : a material that is not a major part of a non-homogeneous product. A layer with a mass per unit area < 1.0 kg/m² and a thickness < 1.0 mm is considered a non-substantial part.

Two or more non-substantial layers adjacent to each other (i.e., without one or more substantial parts between the layers) are considered to be one non-substantial part and, therefore, must together meet the requirements for a layer that is a non-substantial part.

For non-substantial parts, the following distinction applies between internal non-substantial parts and external non-substantial parts :
- internal non-substantial component: a non-substantial component covered on both sides by at least one substantial component.
- external non-substantial component: a non-substantial component that is not covered on one side by a substantial component.

CLASSES OF MATERIAL REACTION TO FIRE OF CONSTRUCTION PRODUCTS OTHER THAN FLOORS, LINEAR THERMAL INSULATION PRODUCTS FOR PIPES AND ELECTRIC LINES			
CLASS	TEST METHOD(S)	CLASSIFICATION CRITERIA	COMPULSORY ADDITIONAL DECLARATION
A1	NBN AND ISO 1182(1) and	ΔT ≤ 30 °C; and Δm ≤ 50 %; and tf=0 (i.e. ignition not maintained)	
	NBN AND ISO 1716	PCS ≤ 2.0 MJ.kg-¹ (1); and PCS ≤ 2.0 MJ.kg-¹ (2)(2a); and PCS ≤ 1.4 MJ.m-² (3); and PCS ≤ 2.0 MJ.kg-¹ (4)	
A2	NBN AND ISO 1182(1) or	ΔT ≤ 50°C; and Δm ≤ 50 %; and $_{tf}$ ≤ 20 s	
	NBN AND ISO 1716 and	PCS ≤ 3.0 MJ.kg-¹ (1); and PCS ≤ 4.0 MJ.m-² (2) ; and PCS ≤ 4.0 MJ.m-² (3) ; and PCS ≤ 3.0 MJ.kg-¹ (4)	

	NBN EN 13823 (SBI)	FIGRA ≤ 120 W.s-¹; and LFS < edge of specimen; and THR_{600s} ≤ 7.5 MJ	Smoke production (5), and burning droplets/particles(6)
B	NBN AND 13823 (SBI); and	FIGRA ≤ 120 W.s-¹; and LFS < edge of specimen; and THR_{600s} ≤ 7.5 MJ	Smoke production (5), and burning droplets/particles(6)
	NBN EN ISO 11925-2 (8): Exposure= 30s	Fs ≤ 150 mm within 60 s	
C	NBN AND 13823 (SBI); et	FIGRA ≤ 250 W.s-¹; and LFS < edge of specimen; and THR_{600s} ≤ 15 MJ	Smoke production (5), and burning droplets/particles (6)
	NBN EN ISO 11925-2(8): *Exposure* = 30s	Fs ≤ 150 mm within 60 s	
D	NBN AND 13823 (SBI); and	FIGRA ≤ 750 W.s-¹	Smoke production (5), and burning droplets/particles (6)
	NBN EN ISO 11925-2(8): *Exposure* = 30s	Fs ≤ 150 mm within 60 s	
E	NBN EN ISO 11925-2(8): *Exposure* = 15s	Fs ≤ 150 mm within 20 s	Burning Droplets/Particles (7)
F	NBN EN ISO 11925-2(8): *Exposure* = 15s	Fs > 150 mm within 20 s	

Table 1

(1) For homogeneous products and essential parts of non-homogeneous products.

(2) For any external non-substantial component of non-homogeneous products.

(2a) Alternatively, all external non-substantial parts with a PCS ≤ 2.0 $MJ.^{m-2}$, provided the product meets the following criteria of NBN EN 13823 (SBI): FIGRA ≤ 20 $W.^{s-1}$; and LFS < edge of specimen and THR600s ≤ 4.0 MJ; and s1; and d0.

(3) For any internal non-substantial component of non-homogeneous products.

(4) For the entire product.

(5) s1 = SMOGRA ≤ $30m^2 .s^{-2}$ and TSP_{600s} ≤ 50m2; s2 = SMOGRA ≤ $180m^2 .s^{-2}$ and TSP_{600s} ≤ $200m^2$; s3 = not s1 or s2.

(6) d0 = no burning droplets/particles in NBN EN 13823 (SBI) within 600s; d1 = no burning droplets/particles longer than 10 s in NBN EN 13823 (SBI) within 600 s; d2 = not d0 or d1; ignition of the paper in NBN EN ISO 11925-2 leads to classification in d2.

(7) Meets = no ignition of the paper; does not meet = ignition of the paper (classification

d2).

(8) In the case of surface exposure to flame and, if relevant to the final application of the product, exposure of the edge to the flame.

CLASSES OF MATERIAL REACTION TO FIRE OF BUILDING PRODUCTS FOR FLOORS			
CLASS	TEST METHOD(S)	CLASSIFICATION CRITERIA	COMPULSORY ADDITIONAL DECLARATION
A1FL	NBN AND ISO 1182(1) et	ΔT ≤ 30 °C; and Δm ≤ 50 %; and tf=0 (ignition not maintained)	
	NBN AND ISO 1716	PCS ≤ 2.0 MJ.kg-¹ (1); and PCS ≤ 2.0 MJ.kg-¹ (2)(2a); and PCS ≤ 1.4 MJ.m-² (3); and PCS ≤ 2.0 MJ.kg-¹ (4)	
A2FL	NBN AND ISO 1182(1) or	ΔT ≤ 50°C; and Δm ≤ 50 %; and t_f ≤ 20 s	
	NBN AND ISO 1716 and	PCS ≤ 3.0 MJ.kg-¹ (1); and PCS ≤ 4.0 MJ.m-² (2); and PCS ≤ 4.0 MJ.m-² (3); and PCS ≤ 3.0 MJ.kg-¹ (4).	
	EN ISO 9239-1(5)	Critical flux (6) ≥ 8.0 kW.m-²	Smoke production (7)
BFL	EN ISO 9239-1(5) and	Critical flux (6) ≥ 8.0 kW.m-²	Smoke production (7)
	NBN EN ISO 11925-2 (8): *Exposure* = 15s	Fs ≤ 150 mm within 20 s	
CFL	EN ISO 9239-1(5) and	Critical flux (6) ≥ 4.5 kW.m-²	Smoke production (7)
	NBN EN ISO 11925-2 (8): *Exposure* = 15s	Fs ≤ 150 mm and 20 s	
DFL	EN ISO 9239-1(5)	Critical flux (6) ≥ 3.0 kW.m-²	Smoke production (7)

	and		
	NBN EN ISO 11925-2 ([8]): Exposure= 15s	Fs ≤ 150 mm within 20 s	
EFL	NBN EN ISO 11925-2 ([8]): Exposure= 15s	Fs ≤ 150 mm within 20 s	
FFL	NBN EN ISO 11925-2 ([8]): Exposure= 15s	Fs > 150 mm within 20 s	

Table 2

(1) For homogeneous products and essential parts of non-homogeneous products.

(2) For any external non-substantial component of non-homogeneous products.

(3) For any incorporation non-substantial part of non-homogeneous products.

(4) For the entire product.

(5) Test duration = 30 minutes.

(6) Critical flux is defined as the lower of the following two values: the radiation flux where the flame extinguishes or the radiation flux after a 30-minute test period (i.e., the flux corresponding to the largest flame expansion).

(7) s1 = smoke ≤ 750 %.min; s2 = not s1.

(8) In the case of surface exposure to flame and, if relevant to the final application of the product, exposure of the edge to the flame.

CLASSES OF MATERIAL FIRE BEHAVIOR OF LINEAR PIPE THERMAL INSULATION PRODUCTS			
CLASS	TEST METHOD(S)	CLASSIFICATION CRITERIA	COMPULSORY ADDITIONAL DECLARATION
A1L	NBN AND ISO 1182([1]) and	ΔT ≤ 30 °C; and Δm ≤ 50 %; and tf=0 (i.e. ignition not maintained)	
	NBN AND ISO 1716	PCS ≤ 2.0 MJ.kg-¹ ([1]); and PCS ≤ 2.0 MJ.kg-¹ ([2])([2a]); and PCS ≤ 1.4 MJ.m-² ([3]); and PCS ≤ 2.0 MJ.kg-¹ ([4])	
A2L	NBN AND ISO 1182([1])	ΔT ≤ 50 °C; and	

	or	Δm ≤ 50 %; and t_f ≤ 20 s	
	NBN AND ISO 1716 and	PCS ≤ 3.0 MJ.kg-¹ (1); and PCS ≤ 4.0 MJ.m-² (2); and PCS ≤ 4.0 MJ.m-² (3); and PCS ≤ 3.0 MJ.kg-¹ (4)	
	NBN EN 13823 (SBI)	FIGRA ≤ 270 W.s-; and LFS < edge of specimen; and THR_{600s} ≤ 7.5 MJ	Smoke production (5), and burning droplets/particles (6)
BL	NBN AND 13823 (SBI); and	FIGRA ≤ 120 W.s-¹; and LFS < edge of specimen; zn THR_{600s} ≤ 7.5 MJ	Smoke production (5), and burning droplets/particles (6)
	NBN EN ISO 11925-2(8): Exposure= 30s	Fs ≤ 150 mm within 60	
CL	NBN AND 13823 (SBI); et	FIGRA ≤ 460 W.s-¹; and LFS < edge of specimen; and THR_{600s} ≤ 15 MJ	Smoke production (5), and burning droplets/particles (6)
	NBN EN ISO 11925-2(8): *Exposure* = 30s	Fs ≤ 150 mm within 60 s	
DL	NBN AND 13823 (SBI); and	FIGRA ≤ 2100 W.s-¹ THR_{600s} ≤ 100 MJ	Smoke production (5), and burning droplets/particles (6)
	NBN EN ISO 11925-2(8): *Exposure* = 30s	Fs ≤ 150 mm within 60 s	
EL	NBN EN ISO 11925-2(8): *Exposure* = 15s	Fs ≤ 150 mm within 20 s	Burning Droplets/Particles (7)
FL	NBN EN ISO 11925-2(8): *Exposure* = 15s	Fs > 150 mm within 20 s	

Table 3

(1) For homogeneous products and essential parts of non-homogeneous products.

(2) For any external non-substantial component of non-homogeneous products.

(3) For any internal non-substantial component of non-homogeneous products.

(4) For the entire product.

(5) s1 = SMOGRA ≤ 105 $m^2 .s^{-2}$ and TSP_{600s} ≤ 250 m^2; s2 = SMOGRA ≤ 580 $m^2 .s^{-2}$ and TSP_{600s} ≤

1600 m^2; s3 = not s1 or s2.

(6) d0 = no burning droplets/particles in NBN EN 13823 (SBI) within 600s; d1 = no burning droplets/particles longer than 10 s in NBN EN 13823 (SBI) within 600 s; d2 = not d0 or d1; ignition of the paper in NBN EN ISO 11925-2 leads to classification in d2.

(7) Satisfies = no ignition of the paper; does not satisfy = ignition of the paper (classification d2).

(8) For surface exposure to the flame and, if relevant to the final application of the product, exposure of the edge to the flame.

3.2 ***[Fire reaction behavior of a construction product]***

The reaction-to-fire performance of a construction product is proven : 1° by

the data accompanying the CE marking;

2° in the absence of CE marking

a) by a classification report for the application in question drawn up by a laboratory or certification body from a Member State of the European Union or from another country belonging to the European Economic Area, which demonstrates the guarantees of independence and competence laid down in the standards of the EN 45000 or EN ISO/IEC 17000 series.
That classification report is based on one of the following evaluation procedures :
   1) The classification system described in Section 3.1;
   2) an analysis of test results leading to a defined field of application, when the tests are those described by the aforementioned classification system described in section 3.1.

b) by the information accompanying a BENOR and/or ATG approval, or by an equivalent assessment accepted in another Member State of the European Union or in another country belonging to the European Economic Area.

3.3 Certain products may be considered as belonging to classes A1 and A1FL without prior testing.

The Minister of the Interior determines their list.

3.4 Terms of use requirements.

The requirements of Annex 5/1 apply to the construction products in their final conditions of application, in other words, including the underlying layers and fixing method.

However, the influence of the underlying layers does not need to be assessed if they are protected by a building element with a fire protection capacity K or a fire resistance EI that meets the requirements of Table 4 below. The fire protection capacity and fire resistance are determined according to standard NBN EN 13501-2.

Application requiring at least the class s3, d2	Applicationrequiring at mostthe A2-class B-s1, d0
K_2 30 or EI $_{30}K_2$	10 or EI 15

Table 4

3bisPLAY FOR A FIRE FROM THE OUTSIDE OF THE ROOF COVERINGS.

3a.1 ***[Classification of the behaviour of roofs and roof coverings in the event of fire from the external side]***

The classification system of the behavior of roofs and roof coverings in the event of fire from the outside (NBN EN 13501-5) is described below:

SYMBOLS

The classifications according to the four test methods are:

- CEN/TS 1187:2013 test 1: $_{XROOF}$ (t1), where t1 = fly fire only;
- CEN/TS 1187:2013 test 2: $_{XROOF}$ (t2), where t2 = flying fire + wind;
- CEN/TS 1187:2013 test 3: $_{XROOF}$ (t3), where t3 = aircraft fire + wind + radiation,
- CEN/TS 1187:2013 test 4: $_{XROOF}$ (t4) where t4 = flying fire + wind + additional radiant heat

$_{TE}$: critical flame spread time outside side

$_{Tp}$: critical burn-through time

	Class	Classification criteria
CEN/TS 1187:2013 test 1	$_{BROOF}$ (t1)	Each of the following criteria must be met: - flame spread outside and inside side upwards < 0.700 m; - flame spread outside and inside side downward < 0.600 m; - maximum burned length outside and inside side < 0.800 m; - No burning material (droplets or particles) falls down from the exposed side; - burning/glowing particles do not penetrate the roof structure; - No fire holes with an area > 2.5 × $^{10-5\ m2}$; - the sum of the areas of burn holes < 4.5 × $^{10-3\ m2}$; - the lateral fire spread in the roof surface does not reach the edges of the measurement zone; - no internal smoldering fire; - maximum radius of fire spread on "horizontal roofs," on the inner and outer sides < 0.200 m.
	$_{FROOF}$ (t1)	No performance determined

	Class	Classification criteria
CEN/TS 1187:2013 test 2	$_{BROOF}$ (t2)	For both test series at wind speeds of 2 m/s and 4 m/s: - average damaged length of roofing and roof sheathing ≤ 0.550 m; - maximum damaged length of roofing and roof sheathing ≤ 0,800 m.
	$_{FROOF}$ (t2)	No performance determined

CEN/TS 187:2013 test 3	Class	Classification criteria
	BROOF (t3)	$t_E \geq 30$ min and $t_p \geq 30$ min
	CROOF (t3)	$t_E \geq 10$ min and $t_P \geq 15$ min
	DROOF (t3)	$t_P > 5$ min
	FROOF (t3)	No performance determined

CEN/TS 1187:2013 test 4	Class	Classification criteria
	BROOF (t4)	Each of the following criteria must be met: - No penetration of the roof system within 1 hour - During the preliminary test, after removing the test flame, the test specimens burn for < 5 min. - Flame spread during preliminary test < 0.38 m in the entire fire zone
	CROOF (t4)	Each of the following criteria must be met: - No penetration of the roof system within 30 min. - During the preliminary test, after removing the test flame, the test specimens burn for < 5 min. - Flame spread during preliminary test < 0.38 m in the entire fire zone
	DROOF (t4)	Each of the following criteria must be met: - Penetration of the roof system within 30 min, but not during the preliminary flame test - During the preliminary test, after removing the test flame, the test specimens burn for < 5 min. - Flame spread during preliminary test < 0.38 m in the entire fire zone
	EROOF (t4)	Each of the following criteria must be met: - Penetration of the roof system within 30 min, but not during the preliminary flame test - Flame expansion is uncontrolled
	FROOF (t4)	No performance determined

3a.2 ***[Proof of the behavior of a roof covering in the event of a fire from the outside]***

The behavior of a roof covering in the event of a fire from the outside shall be proved :

1° by the information accompanying the CE marking;

2° in the absence of CE marking or in the absence of information on the fire behavior of the entire roof structure at the time of CE marking:

a) by a classification report for the relevant application prepared by a laboratory or a certification body from a Member State of the European Union or from another country belonging to the European Economic Area, which provides the guarantees of independence and competence laid down in the standards of the EN 45000 or EN ISO/IEC 17000 series;
This classification report is based on one of the following evaluation procedures:
1) The classification system described in paragraph 3a1;
2) a analysis of test results which leads to a well-defined

scope, when the tests are those described in the aforementioned classification system described in item 3a1;

b) by the information accompanying a BENOR and/or ATG approval, or by an equivalent assessment accepted in another Member State of the European Union or in another country belonging to the European Economic Area, when the roof coverings were assessed according to the aforementioned classification system.

3a.3 Certain roofing materials are considered to meet requirements of the external fire performance criterion without testing.

The Minister of the Interior determines the list of these roof coverings.

4 TERMINOLOGY REGARDING THERMAL AND AERAULIC EQUIPMENT.

4.1 Firing department : whole consisting of the firing room and any fuel storage room(s) associated with it.

4.2 Boiler room : room in which one or more combustion appliances intended for central heating or hot water production are installed.

4.3 Fuel storage room : room intended to store a solid, liquid or gaseous fuel in which the total fire load of the stored fuel exceeds 15 GJ.

4.4 Duct : conduit through which air or combustion products flow.

4.5 Pipe : tubular pipe in which a fluid other than air or combustion products flows.

4.6 Pipes : general term denoting electrical conductors, channels and pipes.

4.7 Sleeve : enclosed space in which pipes are placed.

4.8 Resistance to fire propagation of an air duct (Ro) : time during which the duct can prevent fire from propagating from one compartment to another through the duct.

This resistance is determined in accordance with German standard DIN 4102 - Teil 6 - Lüftungsleitungen; Begriffe, Anforderungen und Prüfungen.

4.9 Fire damper : movable seal in a duct designed to p r e v e n t fire spread.

4.10 Infested building layer : is any building layer of a building where it is burning.

4.11 Combustion flow rate : amount of energy transferred per unit time to the combustion chamber of the combustion device by the fuel, expressed taking into account the lower calorific value $_{Hi}$. Also called "power at the burner" or "power input".

If a combustion appliance has more than one combustion flow rate, this s t a n d a r d takes into account the higher combustion flow rate.

5 ALLERLEI.

5.1 Door : building element placed in a wall opening, intended to allow and prevent passage; the door contains a fixed part (door frame with or without top panel and/or side panels), a movable part (door leaf), suspension, operating and closing elements and the connection to the wall.

5.1.1 Self-closing door : door equipped with a device that always forces it to close under normal conditions.

5.1.2 Fire self-closing door : door equipped with an automatic device that forces it to close in case of fire. The door and the associated device belong at least to class C1 according to NBN EN 16034.

5.2 Technical room or space : room or space in which fixed appliances or installations are located, connected to the building, and which (which) is accessible only to the persons in charge of operation, supervision, maintenance or repair.

5.3 Autonomous power source : electrical energy source whose flow rate is independent of the source(s) used in normal service; it is capable of powering, for a given period of time, installations or appliances whose continued service is indispensable.

This autonomous power source may consist of a connection to the public low-voltage grid when, in normal service, the power supply comes from a static transformer connected to the high-voltage grid and located in or near the building.

This solution is allowed if the public low-voltage grid remains in operation when the high-voltage grid is interrupted. This is attested by the electricity company.

5.4 Replacement lighting : artificial lighting that, in the event of the failure of ordinary artificial lighting, allows certain activities to continue in some areas of the building.

5.5 Safety lighting : lighting which, in the event of the failure of ordinary artificial lighting, ensures the recognition and use in all safety of escape routes at all times when the site is in use and which, to prevent panic, provides lighting to allow persons to recognize and reach evacuation routes."

5.6 Evacuation.

5.6.1 Evacuation path : maximum 10% sloped path, within the b u i l d i n g , giving access to stairwells, escape terraces or exits.

5.6.2 Escape terrace : maximum 10% sloping escape route, outside the b u i l d i n g , giving access to stairs.

5.6.3 Passage unit : minimum width considered necessary for the passage of one person. It shall be 0.60 m in application of this decree.

5.6.4 Useful width : the useful width of an escape space (stairs, landings, shafts, evacuation routes, escape terraces,...) is the clear width without any obstacle up to a height of at least 2 m.

However, one does not have to take into account the wall projection by skirting boards, stringers and footings insofar as it does not e x c e e d 0.10 m and insofar as it is not higher than 1 m above the steps or above the floor. The same applies to handrails.

5.6.5 Full theoretical useful width : the full theoretical useful width bt (m) of the

escape spaces of a compartment or set of compartments is determined by the ratio

$$_{bt} = (_{np})_{max} \times a$$

herein are

$_{np}$ the number of users of any compartment s e r v e d by the escape rooms;

$(_{np})_{max}$ is the maximum value of np considering all compartments, located on the same level, served by the escape spaces.

hereby amounts to a, depending on the nature of the escape spaces:

- 0.01 m in the case of evacuation routes, doors, escape terraces and sloping entrances;
- 0.0125 m for stairs descending to the exits;
- 0.02 m for stairs rising to the exits.

5.6.6 Actual useful width : the actual useful width $_{be}$ (m) is equal to 0.60 m multiplied by the whole number of passage units contained in the useful width.

5.6.7 Full required useful width and required useful width :

the full required useful width $_{btr}$ (m) is equal to 0.60 m multiplied by the integer number of passage units immediately greater than the full theoretical useful width $_{bt}$ or equal to the full theoretical useful width $_{bt}$ if bt is an integer multiple of 0.60 m.

the required useful width $_{br}$ (m) of an escape room is equal to an integer multiple of 0.60 m such that:

a) the sum of the actual useful widths of all escape spaces of the same compartment equals the full required useful width $_{btr}$

and

b) the required useful widths of the escape spaces of the same compartment do not differ from each other by more than one passage unit.

5.6.8 Evacuation level : building layer containing the exit(s) through which evacuation to the outside is possible. This level is referred to as level E.
These exits lead to the public road or to an area from which it is accessible.

In buildings with different evacuation levels : $_{Egg}$: the lowest evacuation level;
$_{Es}$: the highest evacuation level.

5.6.9 The full width of the public roads and/or escape area to which building evacuation routes connect shall be at least equal to the full required useful width of those evacuation routes.

5.6.10 Emergency exit: exit specifically for the evacuation of the building in the event of an emergency.

5.6.11 Emergency door: door placed in an emergency exit.

5.7 Discovery, detection, notification, alert, alarm.

A fire can be :
- discovered by one or more persons;
- detected by one or more automatic means.

Notification: informing the public emergency services of the discovery of a fire.

Alert: passed information about the discovery of a fire to those specifically designated to do so.

Alarm: command to users of one or more compartment(s) to evacuate.

5.8 Safe place: a place outside the building or, where appropriate, the part of the building located outside the compartment where there is a fire and from which it is possible to leave the building without having to pass through that compartment.

5.9 Firewater supply.

5.9.1 Primary fire water supply: fire water supplies that can be quickly deployed by the first vehicle to arrive on scene and serve for initial attack.

5.9.2 Secondary fire water supply : tapping point whose water can be brought to the industrial building with a simple arrangement consisting of pumps and which may be located several hundred meters away from the industrial building.

5.9.3 Tertiary firefighting water supply : water supply in a quasi - unlimited quantity that may be at a great distance.

5.10 Facades.

5.10.1 Single-skin facade : facade that does not contain an aerated cavity. A single-skin facade can be composed of either solid or lightweight facade elements, or can be a curtain wall, with or without a de-duplicated fire-resistant element.

5.10.2 Ventilated double-skin facade : facade consisting of two walls, usually glazed, separated by a cavity (also called air cavity or gap), which is naturally and/or mechanically ventilated and not used for evacuation.

5.10.3 Double-walled facade, ventilated from the outside : ventilated double-walled facade whose inner wall is air and watertight and whose outer wall is permeable.

5.10.4 Double-walled façade, ventilated along the inside : ventilated double-walled façade whose outer wall is air and watertight and the inner wall is permeable to air.

5.11 Positive safety : the installations are considered as operating with positive safety if the safety function of these installations or devices remains assured if the energy source, power supply and/or control fail.

5.12 Transits.

5.12.1 Penetration : opening in a wall, for the passage of a pipe for fluids, solids, electricity or electromagnetic waves, such as light (e.g. data and fiber optic cables).

5.12.2 Single penetration : penetration of a pipe or cable located at a sufficient distance from other penetrations so that there is no mutual influence; this minimum distance between any two pipes or cables is at least equal to the largest diameter of the two pipes (including any combustible insulation) or cables.

5.12.3 Seal : device used at the site of a penetration to limit fire spread through the wall.

5.12.4 Diameter or D : the nominal outside diameter of the pipe or cable or the circumference of the pipe or cable divided by π.

5.12.5 Mortar : mixture based on gypsum, lime and/or cement with inorganic filler with or without the addition of composite reinforcement and chemical additives.

5.12.6 Noncombustible pipes : pipes made of metal or other noncombustible materials with a melting point greater than 1000 K (727°C), excluding pipes in glass.

5.12.7 Combustible pipes : pipes that are not noncombustible pipes.

5.12.8 Gap between the pipe and the casing pipe: difference between the inside diameter of the casing pipe and the outside diameter of the pipe.

5.13 Protective equipment against fire: any equipment that allows to detect, signal, extinguish fire, reduce its harmful effects or facilitate the intervention of public emergency services.

6 TERMINOLOGY REGARDING INDUSTRIAL BUILDINGS.

6.1 Characteristic fire load $qf_{,k}$ [MJ/m²]

The characteristic fire load is a measure of the maximum energy released per unit area in case of fire.

The characteristic fire load $qf_{,k}$ per unit of floor area is determined by:

$$q_{f,k} = \frac{\sum_i M_i . H_{ui} . \Psi_i}{A}$$

in which:

M_i mass [kg] of material i.

H_{ui} net heat of combustion [MJ/kg] of material i (NBN EN ISO 1716:2002). $H_{ui} = H_{oi}$ (1 - 0.01 u) - 0.025 u (u is moisture [%] by weight).

Ψ_i non-mandatory coefficient [dimensionless] that allows taking into account protection of the material i against fire.

A total floor area of the compartment [m²] or partial area of 1000 m².

6.2 Mean fire load $qf_{,cl}$ [MJ/m²]

The normative fire load is equal to the characteristic fire load $qf_{,k}$ per m² of floor area, which takes into account full or partial combustion of the materials.

$$q_{f,cl} = q_{f,k} \cdot m$$

in which:

m coefficient less than or equal to 1 [dimensionless] (NBN EN 1991-1-2:2003).

If the fire load is not uniformly distributed over the entire floor area, the normative fire load is equal to the highest fire load per m² for any 1000 m² rectangular subarea.

7 TERMINOLOGY REGARDING PARKING LOTS.

7.1 Parking building layer : space of parking between a floor and a ceiling that includes the vehicle parking areas, circulation paths and possibly premises. The floor of this space may be horizontal or inclined.

7.2 Entrance to the parking lot : open-air access intended for fire department intervention.

7.3 Depth p of an underground parking lot : The depth p of an underground parking lot is conventionally the greatest vertical distance between the finished floor level of any parking lot at the deepest parking building level and the level of each entrance to the parking lot intended for the intervention of the fire department in this parking lot.

However, if the emplacement intended for fire department vehicles in front of this parking lot entrance is located higher than 1 m above this entrance, the distance between the level of this parking lot entrance and the floor level of this parking lot should be added to determine the depth p.

7.4 Open parking building layer : building layer of a parking lot that has two opposing facades that meet the following conditions:

1° these facades are not more than 60 m apart along their entire length;
2° each of these facades contains openings whose useful area covers at least 1/6 of the total area of the interior and exterior vertical walls of the perimeter of this level;
3° the openings are evenly distributed along the length of each of the two facades;
4° between these two facades, any obstacles are allowed, provided that the useful area for air flow is at least equal to the area of openings required in each of these facades;
5° the horizontal distance in open air between these facades and each external obstacle must be at least 5 m.

7.5 Open parking : a parking lot each level of which is an open parking building level, as defined in the section 7.4.

7.6 Car elevator : elevator used for moving the vehicles with their passengers between the different parking building levels.

7.7 Parking box : interior space of a parking lot, bounded by walls and intended for parking one or more vehicles.

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 Rf 1 h.

In these walls a connection between these buildings may exist through a door Rf ½ 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 Rf ½ 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) Rf ½ 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 Rf ½ h;

b) for buildings with more than one storey : Rf 1 h above Ei level. The structure of the roof has a fire stability of ½ h. This requirement is not applicable if the roof is protected on the inside by a building element with Rf ½ h;

c) the structural elements in the basement floors, including the level Ei floor have Rf 1 h.

No fire resistance requirements are imposed on the structural elements of open parking buildings whose horizontal walls possess Rf 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 Rf ½ 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 ½ 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 Rf ½ 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 Rf ½ 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
½ 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 ½ h or the same conception of construction as a concrete slab with Rf ½ 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 $_{br}$ 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 Rf ½ 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 Rf ½ 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 Rf ½ 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;

- 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 Rf ½ h.

In this case, the tube should not be ventilated.

5.1.5.2 Horizontal tubes.

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

- either walls and doors with the same Rf as these vertical walls;

- either a building element at the height of each wall with the same Rf 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 Rf 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 Rf 1 h and access is by a self-closing door Rf ½ 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 Rf 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 Rf ½ 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 Rf 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 Rf ½ 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 Rf 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 Rf ½ 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 Rf ½ 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 Rf 1 h.

Access doors between the compartment and the sas are self-closing or self-closing in case of fire and have Rf ½ h.

6.1.1.4 The assembly of the shaft doors shall have a stability to fire and a flame tightness of ½ 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 Rf 1 h.

If the engine room door or trap door gives out into the building, they have Rf ½ 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 Rf 1 h.

Access to the engine room is through a self-closing door Rf ½ 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 Rf 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: ≥ 190 °C Combustion point: ≥ 200 °C Auto-ignition point: ≥ 350 °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 ½ h.

The platform walls of the shaft and their supervisory hatches have Rf ½ 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 ½ 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 ½ 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 r e q u i r e d , 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 autono(o)m 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 m^3/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 a n 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 ½ h) according to NBN 713-020. In addition, it meets the thermal insulation criterion for ½ h (respectively ¼ 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 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 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

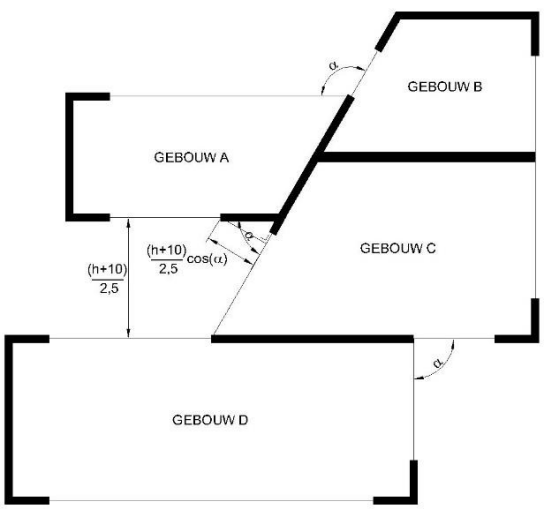
To prevent a fire from spreading between two buildings:

(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 α for $0° \leq \alpha \leq 90°$

0 for $90° < \alpha \leq 180°$

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 $_{EI1}$ 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 $_{EI1}$ 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

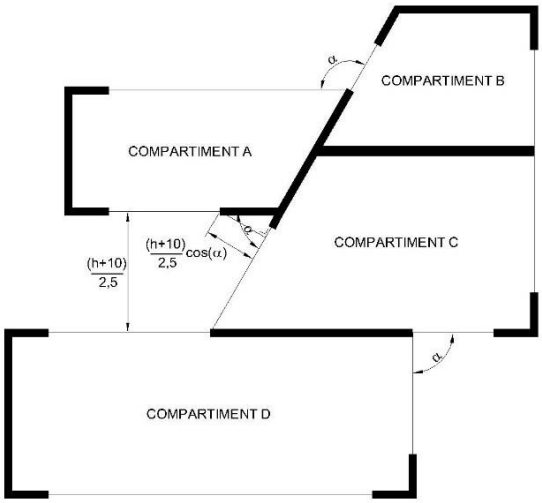
To prevent a fire from spreading between two compartments:

(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 α for $0° \leq \alpha \leq 90°$

0 for $90° < \alpha \leq 180°$

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 h a v e 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.

30.

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 $_{EI1}$ 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 EI1 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 $_{EI1}$ 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 $_{EI1}$ 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 $_{EI1}$ 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 $_{EI1}$ 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 $_{EI1}$ 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 EI1 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 $_{EI1}$ 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 $_{EI1}$ 30;
- either by a self-closing or fire self-closing door $_{EI1}$ 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 $_{EI1}$ 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 $_{EI1}$ 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 $_{EI1}$ 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 $_{EI1}$ 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 i ↔ o) or EI 60 (ve i ↔ o) 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↔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	wallFire 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.

0 GENERAL.

0.1 Objective.

These basic regulations define the minimum requirements that the conception, construction and design of medium-rise (MG) buildings 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 mid-rise buildings;

2. the extensions of buildings that when completed are mid-rise buildings;

3. The premises or parts of mid-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.

4. the tall buildings, and the extensions of buildings that when realized a r e tall buildings, whose upper two floors have one or more duplex apartments under the following conditions:
   - the underlying building floor of each duplex apartment is located at a height less than or equal to 25 m; this height is determined in the same manner as the height of a building as described in paragraph 1.2.1 of Annex 1;
   - the highest level of the building contains only the upper level of these duplex apartments and technical classrooms;
   - the total area of each duplex apartment is less than or equal to 300 m²;
   - each floor of a duplex apartment has a direct connection to a stairwell connecting such floors to evacuation level. This connection shall comply with Section 4.2.2.3; however, the last paragraph of Section 4.2.2.3 shall not apply to these duplex apartments;
   - the lower level of each duplex apartment has a facade opening that or a terrace accessible to the fire department as provided in the section 2.2.1.

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

1. the industrial buildings;
2. the single-family homes.

0.3 **Terminology** - see Appendix 1.

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

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

0.5.1 Plate I - Facades
0.5.2 Plate II - Facades
0.5.3 Plate III - Roofs of adjacent structures Plate IV -
0.5.4 Roofs

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]*

The building is continuously accessible to motor vehicles.

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; it shall be 8 m if the access road is dead-end;
  - 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.
  - ability to simultaneously carry 3 car vehicles of 15 t;
  - the distance from the edge of the road to the plane of the facade is between 4 m and 10 m.

Parked vehicles shall not impede the passage and arrangement of fire department vehicles on these access roads.
At least one of these access roads must allow fire department equipment and vehicles to drive, stop and work.

1.2 *[Fire department accessibility to facades]*

if the long facade does not contain a main entrance, the road must additionally run along a facade that does contain such an entrance.

The distance from the edge of this road to the plane of the facade should, preferably, be between 4 m and 10 m. If not, the facade openings may be considered inaccessible to fire department ladder vehicles (see 2.2.1).

If a pedestal supports one or more buildings, one of the following two provisions shall apply :

- the platform of the pedestal is accessible to the vehicles of the fire department, subject to the requirements of 1.1 but with the exception of the slope of the ramp which may be 12%;
- at least one of the facades of each building is accessible from a road for ordinary open-air traffic or in a tunnel that contains an open-air segment of at least 15 m x 7 m every 25 m.

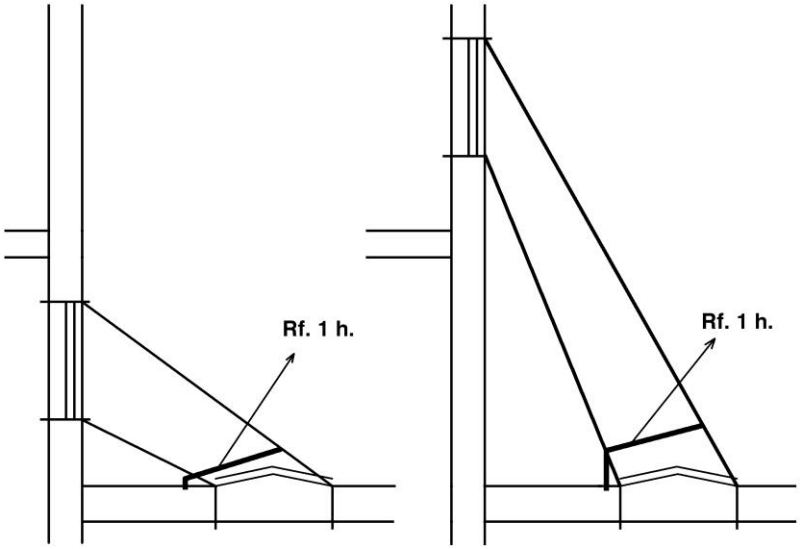
1.3 ***[Outbuildings, etc.]***

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.

If the glazed facades of the building project over building components that may or may not be part of this building, the roofs of these structures:

- have an Rf 1 h over a minimum horizontal distance of 5 m from these facades;

- and over this distance no skylights, air vents, smoke exhausts and openings occur unless



- those openings are separated from openings in the facades by a building element Rf 1h (Plate III);

- Whether the total area of the openings does not exceed 100 cm².

If these roofs do not possess these characteristics, then the façade of the MG projecting above them may not be glazed.

1.4 ***[Horizontal distance between buildings]***

The horizontal distance, free from any combustible element and located between an MG and an opposing building, must be at least 8 m, unless the walls meet the conditions defined for adjacent buildings.

The walls separating adjacent buildings have Rf 2 h.

In these walls, a connection between these buildings may exist via a sas, provided that it bears the following characteristics:

1. it should not end in a stairwell;
2. it includes two self-closing doors that feature Rf ½ h;
3. the walls have Rf 1 h;
4. the surface area is a minimum of 2 m².

The condition of distance between a MG 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).

As for the buildings referred to in the above paragraph, the area of a compartment may exceed 2,500 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;
  in case the duplex is located on the highest two floors of the building, the area of the compartment may be 2500 m² per floor;
- the first floor and the second floor (or mezzanine) may also form one compartment, provided that the total volume does not exceed 25000 m³;
- 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 meet the standards or the rules of good practice in the matter recognized by the Minister of the Interior, according to the procedure and conditions he determines.
  - and that the evacuation capabilities of the building shall comply with the provisions of this annex where evacuation through the atrium compartment may not be considered.

2.2 Evacuation of compartments.

2.2.1 Number of outputs.

Each compartment has at least :

- an output if :
  - without having to go through the stairwell, the users can reach a facade opening accessible to firefighters' ladders or if such opening does not exist, the users must be able to reach a terrace, accessible to firefighters, which measures at least 1 m², has a floor with Rf 1h and a handrail at least 1 m high, which meets the "flame density" criterion of NBN 713-020 for 1 h;

-and the maximum occupancy is less than 50 people;

- two exits if occupancy is 50 or more than 50 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.

If the occupancy is 50 or more than 50 persons, the number of exits from building floors and rooms shall be determined as for compartments.

For the two underground levels immediately below the evacuation level, one exit is sufficient if these levels contain only premises such as storerooms and if the distance from any point of the compartment to the exit is less than 15 m.

In the case of a compartment extending over several floors (atrium), the evacuation possibilities of the building must comply with the provisions of this annex, without taking into account the evacuation through the atrium compartment.

2.2.2 Outputs.

The exits are located in opposite zones of the compartment.

For compartments not located at an evacuation level, the exits are connected to the evacuation level by stairs located inside or outside the building, (for horizontal distances see 4.4).

For underground building levels, an exit that meets the requirements of an exit for the evacuation level may replace the required access to a stairwell.

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.

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:

Rf 1 h above Ei ;

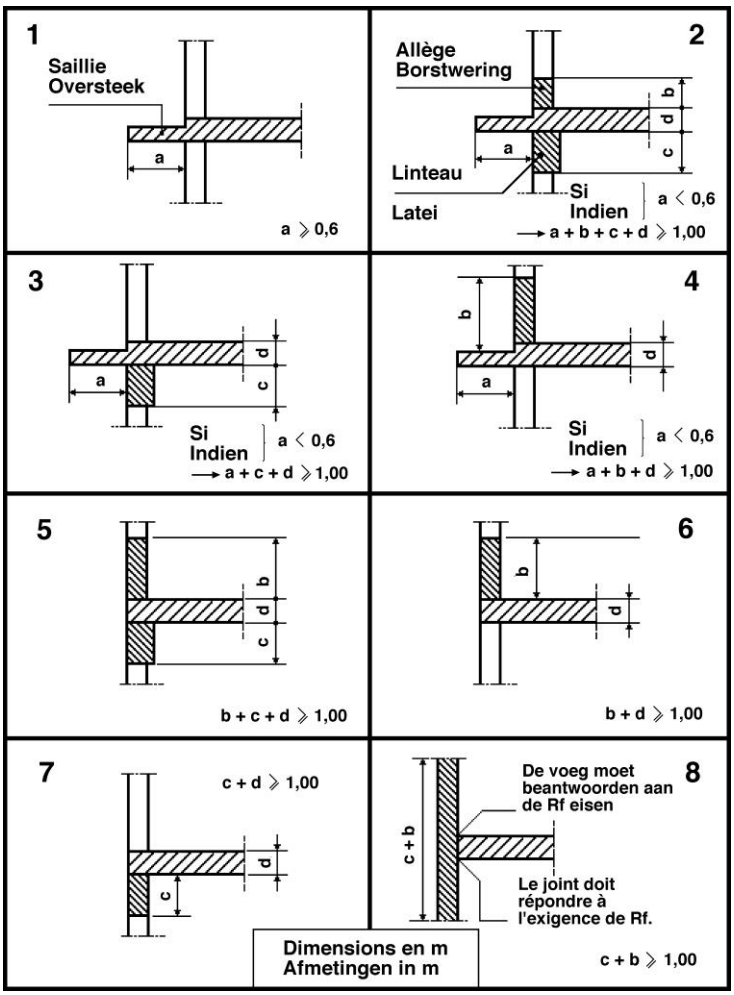
Rf 2 h under Ei including the floor of Ei .

3.3 Facades.

3.3.1 At the level of separations between compartments:

The façade includes at each building level a building element that meets the "flame density" criterion of NBN 713-020 for 1 h. This requirement is not imposed on the intermediate level of the duplex.

The figures of Plate I show the ways in which this building element is applied.



It includes :

a) A continuous horizontal overhang with width "a" equal to or greater than 0.60 m and connected to the floor;

b) an element composed:
   - from a continuous horizontal overhang with width "a" and connected to the floor;
   - in the upper storey, from a continuous parapet with height "b";
   - in the underlying building layer, from a continuous lintel with height "c".

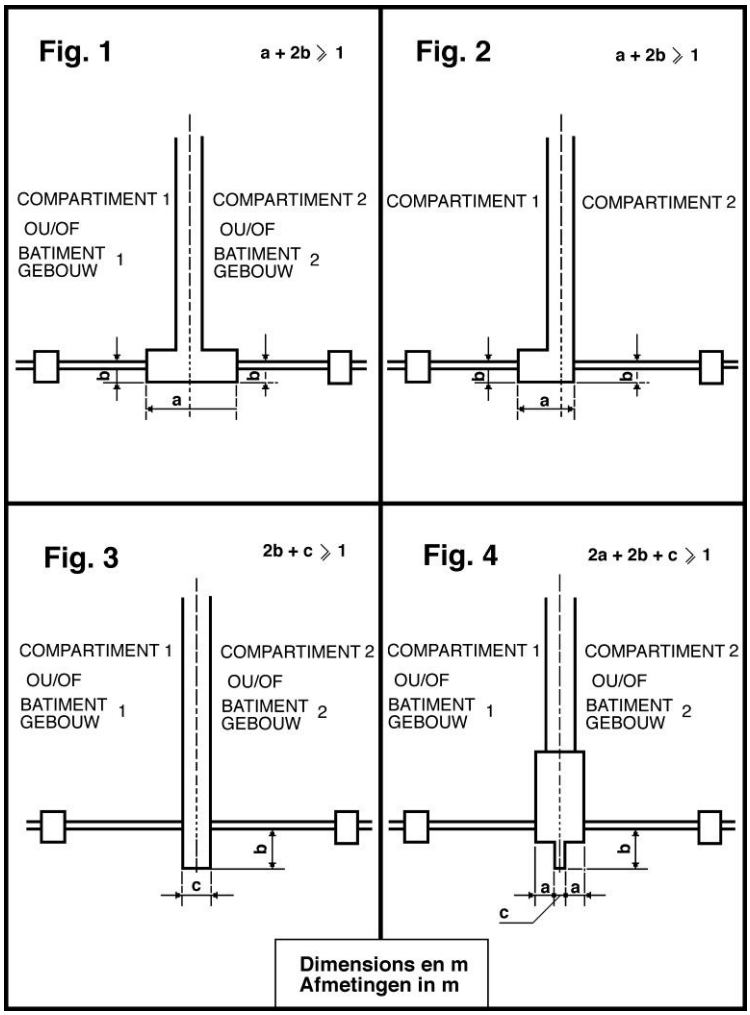
The sum of dimensions a, b, c and d (floor thickness) is equal to or greater than 1 m; each of dimensions a, b or c may be zero if necessary.

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 fixed to the floor slab in such a way that the whole complies with the "fire tightness" criterion of NBN 713-020 for 1 h; the piers also comply with the same requirement.

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

In order to prevent the fire from propagating along the façades between compartments located in the same plane or between different but adjacent buildings, a façade element that also meets the "integrity" criterion for 1 h shall also be provided; this façade element shall be installed between the glazed openings and shall be executed in the manner indicated in the figures of plate II :



a) either a continuous element located in the extension of the facade; the width of this element (2b + a) (Plate II, Figs. 1 and 2) is at least 1 m; the parts of this element located to the left and right of the center line of the common wall are at least 0.50 m wide, if two different buildings are involved;

b) either a continuous vertical overhang located in the centerline of the wall that the

separation between the two buildings or compartments; the length of this element (2b + c) (Plate II, Fig. 3) is at least 1 m;

(c) or a combination of the previous elements in such a way that the sum of the lengths is at least 1 m (Plate II, Fig. 4).

3.3.2 Facades that form a dihedral angle.

When two planes of the façade of a building, or when the façades of the building and of another adjacent structure form an indented dihedral angle greater than or equal to 90° (and less than 180°), the façade sections whose rib forms part of the indented dihedral angle at the level of the partitions between compartments have an Rf 1 h over a developed horizontal distance of at least 1 m.

For facades forming an indented dihedral angle less than 90°, the conditions for opposing facades are applied.

3.3.3 Facades facing each other.

These facades are either parallel or form an enclosed angle less than 90°.

For facade sections of opposite facades forming the separation between compartments, the shortest distance (in m) measured between the facade sections not possessing Rf 1 h is at least:

$$7 \times \cos(\alpha) + 1$$

where α is the enclosed angle.

3.4 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 Rf 1 h.

The doors in these walls have Rf ½ h.

The vertical interior walls of filing rooms have Rf 1 h; their doors are self-closing and have Rf ½ h.

3.5 Ceilings and false ceilings.

3.5.1 In evacuation routes, premises open to the public and collective kitchens, false ceilings have a fire stability of ½ h.

3.5.2 The space between the ceiling and the false ceiling is interrupted by the extension of all vertical walls possessing at least Rf ½ h.

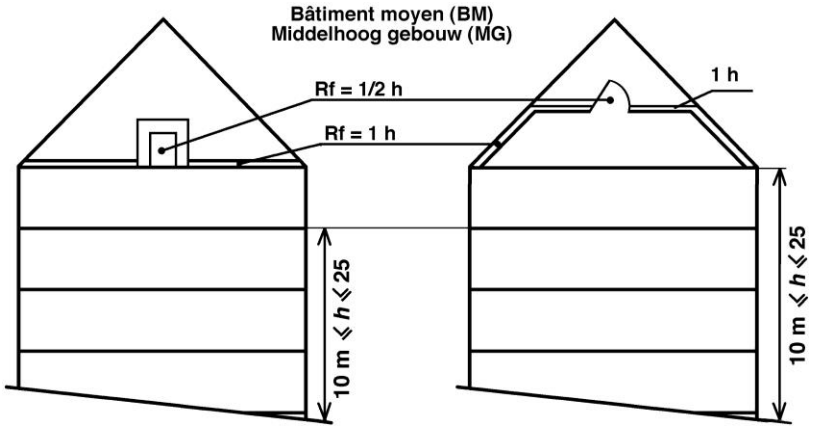
If the space between the ceiling and the false ceiling is not equipped with an automatic extinguishing system, the space should be interrupted by vertical separations with Rf ½ h such that there are spaces whose horizontal projection can be inscribed in a square of maximum 25 m side.

3.6 Roofs.

The buildings have flat roofs or pitched roofs.

Flat roofs or roofs with slight slope (slope angle not more than 10°) have a fire stability of 1 h.

For pitched roofs, the under-roof floor has Rf 1 h (Plate IV); any access to the space under the roof is by doors or trap doors with Rf ½ h.



Window openings may be provided in sloping roofs if Article 3.3 of the same annex is complied with for the portions of the sloping roofs at the level of the separation between compartments.

4 PRECAUTIONS ON CONSTRUCTION OF COMPARTMENTS AND EVACUATION ROOMS.

4.1 Compartments.

The walls between compartments have Rf 1 h. For the

facade or exterior walls, 3.3.

The connection between two compartments is permitted only if it is through a shaft that has the following characteristics:

1. it includes self-closing doors with Rf ½ h;
2. the walls have Rf 1 h;
3. the surface area is a minimum of 2 m².

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 laterally sealed over at least 1 m with an element having a flame density of 1 h.

4.2.2.2 Stairwells should provide access to an evacuation level and to all upper levels of buildings.

4.2.2.3 On each floor, the connection between the evacuation route and the stairwell is ensured by a self-closing door with Rf ½ h giving access to a landing in the stairwell.

This door opens in the sense of escape and must not be equipped with a locking system that would prevent its opening.

Its useful width is greater than or equal to the required useful width and is at least 0.80 m.

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 evacuating 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 it is accessible from each compartment through a connection that meets the requirements of 4.2.2.3.

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 Rf 1 h;
2. access from each stairwell to the evacuation level shall be in accordance with the requirements of 4.2.2.3.

4.2.2.6 Stairwells may not contain any objects unless detection devices , portable quick extinguishers, electrical lines, safety lighting, signaling, lighting and heating devices, smoke ducts or smoke extraction devices. Only access doors from evacuation routes to stairwells are permitted.

4.2.2.7 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.

4.2.3 Stairs.

4.2.3.1 Construction provisions :

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

The door swing shall not limit the useful width of the overflow to a value less than $_{br}$.

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 stairwells meet the conditions of 4.2.2.2.

Exterior stairwells are enclosed by walls; at least one side shall allow free entry of outside air on each level.

No point of the staircase shall be located less than 1 m from a façade section that does not have Rf 1 h.
The regulations of 4.2.3 apply to it with, however, the following deviation: the risers are not required; no fire stability is required, but the material belongs to class A0.

The connection between the compartment and an outdoor stairwell occurs:
- either through a door;
- either through escape terrace(s).

One stairwell may be replaced by two external staircases with straight stair arms; these staircases are connected by escape terraces on which any transverse dividers must not form difficult obstacles.

These outdoor staircases have the following features:

1. width minimum 0.60 m;
2. slope angle no greater than 45°;
3. tread of the steps at least 0.10 m;

4. rise of the steps maximum 0.20m;
5. at each staircase two handles.

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

4.4 Evacuation routes and escape terraces.

4.4.1 General regulations

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.

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 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.

The doors on these roads must not have a locking device that could impede evacuation. These

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

4.4.2 On a building level that is not an evacuation level.

In a compartment, connection between and to stairwells is via evacuation routes or over escape terraces. These paths may not pass through stairwells.

The travel distance between stairwell entrances is greater than 10 m and less than 60 m.

The interior vertical walls of evacuation roads and their access doors to these r o a d s have Rf ½ h.

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

4.4.3 On an evacuation level.

The interior walls of each evacuation route have Rf 1 h.

The doors of the premises giving onto this road shall be self-closing and have Rf ½ h. At

such level, access to the stairwell shall be in accordance with 4.2.2.3.

The evacuation route may include the entrance hall. This hall may include access to elevators and non-enclosed areas intended for reception and related services excluding beverage or dining areas.

At an evacuation level, no exit windows of building sections with a commercial function, which do not have Rf 1 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.

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 1 h;
   - either to a stairwell via a sas according to 4.1;
   - either to the outside, 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;

   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 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 2 h, except for the exterior walls;
- the interior doors have Rf 1 h;
- 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 2 h.

Access, if not from the outside, is through a door Rf 1 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 noncombustible 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 installed inside the building, it has the following characteristics: walls Rf 1h and self-closing doors 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 the storage of garbage.

The walls have Rf 1 h.

If this room does not give out into the open air, it is accessed through a sas with the following characteristics:

1. self-closing doors Rf ½ h;
2. walls Rf 1 h;
3. minimum area 2 m².

If the room is located under a chute, it is equipped with an automatic hydraulic extinguishing system that complies with the standards or rules of good craftsmanship on the subject.

5.1.5 Pipe sleeves.

5.1.5.1 Vertical tubes.

Their walls have Rf 1 h.
The trapdoors and doors have Rf 1 h.

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.

These tubes may be built in the stairwells.

However, their walls, trapdoors and doors may have Rf ½ h if the tubes are compartmentalized at the height 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 Rf ½ h.

In this case, the tube should not be ventilated.

5.1.5.2 Horizontal tubes.

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

- either walls and doors with the same Rf as these vertical walls;

- either a building element at the height of each wall with the same Rf 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 meet the requirements of 4.1.

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 Rf 2 h and access is by a sas with Rf 2 h and self-closing doors Rf ½ 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 sloping roadway may replace one of the stairwells if its walls have Rf 2 h and 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 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 classrooms or set of classrooms have Rf 1 h.

Each passageway in the vertical walls is closed by a self-closing door or in case of fire self-closing door Rf ½ 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 Rf 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 the trading rooms have Rf ½ 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 Rf 1 h.

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

Any passage between those classrooms and the rest of the building shall be closed by a self-closing or, in the event of fire, self-closing door Rf ½ h.

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 Rf 1 h.

6 EQUIPMENT OF 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 :
- either 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, is enclosed by walls with Rf 1 h.

Access doors between the compartment and the sas are self-closing or self-closing in case of fire and have Rf ½ h.

The elevator access platform(s) may be part of the evacuation route.

In a medium-rise building with no more than 6 apartments per floor served by the same stairwell, the common hall of those apartments may serve as the elevators' shaft.

The doors opening onto the common hall of those apartments may open in the opposite direction of evacuation and not be self-closing.

6.1.1.4 The assembly of the shaft doors shall have a stability to fire and a flame tightness of ½ 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 set up 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 in such a way that they can 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 Rf 1 h.

If the engine room door or trap door gives out into the building, they have Rf ½ 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.

As the shaft and the engine room separately ventilated be, have the vents 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 Rf 2 h.

Access to the engine room is through a sas with the following characteristics:

1. include two self-closing doors Rf ½ h;
2. walls have Rf 2 h;
3. Have a minimum area of 2 m²;
4. are separated from the landings and sashes of the stairwells and are not part of the evacuation route.

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 Rf 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: ≥ 190 °C Combustion point: ≥ 200 °C Auto-ignition point: ≥ 350 °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.

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.

Upon arrival at each served building level, a sas must exist with walls Rf 1 h.

The doors or access hatches shall be self-closing and meet the criterion of flame tightness for ½ hour. These doors or access hatches shall be tested with the platform side facing the furnace.

The area of this bog, which may serve exclusively for the handling of goods, is calculated for judicious arrangement of the loading and unloading facility and for easy accessibility of service personnel.

Between the lock and the shaft are doors or hatches.

The platform walls of the shafts and their supervisory hatches have Rf 1 h.

The shaft doors or access hatches of these units operate automatically and are normally closed. One element can open only when the other is closed.

Any passages from horizontal conveyors to the paternoster and freight elevators, as well as passages from one compartment to another, are through a sas sealed by two shutters or doors that meet the criterion of flame tightness for ½ hour. These hatches or doors are tested with the platform side facing the furnace.

These hatches operate automatically and are normally closed; when passing through a container, such a hatch or door can only open if the other is closed.

If the container transport system follows a horizontal and/or vertical route, passing through building layers or compartments, shafts are provided at each of these passages. The shaft walls have Rf 1 h.

Their two shutters or doors meet the criteria of flame tightness for ½ hour. They are tested with the platform side facing the furnace. They operate automatically and are normally closed. Such a hatch or door can open only if the other is 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 floor, through a self-closing or in the event of fire

self-closing door Rf ½ 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].*

When 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, the escape terraces, the landings, the elevator cages, the halls or classrooms that are

accessible to the public, the premises 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 a 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, an intersection, 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 autono(o)m power source(s).

Autonomous lighting devices connected to the circuit supplying the normal lighting in question may also be used provided that they provide all the guarantees for 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 o f 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 kitchens, 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 shall pass through any wall for which an Rf greater than or equal to 1 h

is required, and no air duct shall pass through a duct wall for which an Rf greater than or equal to ½ h is required 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 it 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 makes the valve close 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 2 h, (respectively Rf 1 h, 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 the event of fire and a flame tightness of 2 h, (respectively 1 h, ½ h) according to NBN 713-020. In addition, it meets the thermal insulation criterion for 1 h (½ h, ¼ h, respectively);
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 board to remove certain elements from the aeronautical

installations to operate, may be imposed by the competent fire department depending on the risk. 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 are 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 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 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

Are for use by residents.

6.8.5.2 Portable or mobile rapid extinguishers.

For special fire hazards, these devices are determined by the nature and extent of this 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 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 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, the water connections are located at a maximum distance of 100 m from each other. 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
driving and parking.

0 GENERAL.

0.1 Objective.

These basic regulations define the minimum requirements that the conception, construction and design of medium-rise (MG) buildings 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 mid-rise buildings;

2. the extensions of buildings that when completed are mid-rise buildings;

3. the premises or parts of mid-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.

4. the tall buildings, and the extensions of buildings that when realized are tall buildings, whose upper two floors have one or more duplex apartments under the following conditions:
   - the underlying building floor of each duplex apartment is located at a height less than or equal to 25 m; this height is determined in the same manner as the height of a building as described in paragraph 1.2.1 of Annex 1;
   - the highest level of the building contains only the upper level of these duplex apartments and technical classrooms;
   - the total area of each duplex apartment is less than or equal to 300 m²;
   - each floor of a duplex apartment shall have a direct connection to a stairwell connecting such floors to evacuation level. This connection shall comply with Section 4.2.2.3; however, the penultimate paragraph of Section 4.2.2.3 shall not apply to these duplex apartments;
   - the lower level of each duplex apartment has a facade opening that or a terrace accessible to the fire department as provided in the section 2.2.1.

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

1. the industrial buildings;
2. the single-family homes.

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

Plate 3.1 - Roofs of outbuildings Plate
3.2 - Facades between buildings

Plate 3.3 - Facades Plate 3.4 - Facades Plate 3.5 - Facades
Plate 3.6 - Facades between compartments Plate 3.7 - Roofs

1 IMPLANTATION AND ACCESS ROADS.

The access routes referred to in 1.1 and 1.4 shall be determined in agreement with the fire department, according to the following guidance.

1.1 Fire department accessibility and emplacement

The building is continuously accessible to motor vehicles.

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; it shall be 8 m if the access road is dead-end;
   - 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.
   - ability to simultaneously carry 3 car vehicles of 15 t.
   - the distance from the edge of the road to the plane of the facade is between 4 m and 10 m.

Parked vehicles shall not obstruct the passage and arrangement of fire department vehicles on these access roads.
At least one of these access roads must allow fire department equipment and vehicles to drive, stop and work.

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.

If the glazed facades of the building project over building components that may or may not be part of this building, then:

1. either the roofs of the building components shall meet the following conditions:

Horizontal distance from the facades, a	Requirement for fire resistance
a < 1	mEI 60
1 m < a < 5	mE 60

If in the roof over a distance of 5 meters skylights, air vents, smoke exhausts and

openings occur that do not have the required fire resistance, then they must meet the following conditions:

-or are shielded from openings in the facades by a building element that meets the following conditions (Plate 3.1):

Horizontal distance from facades, a	Requirement for fire resistance
a < 1 m	EI 60
1 m < a < 5 m	E 60

- or the total area of the openings in the roof does not exceed 100 cm²;

2. either the building facades meet the following conditions:

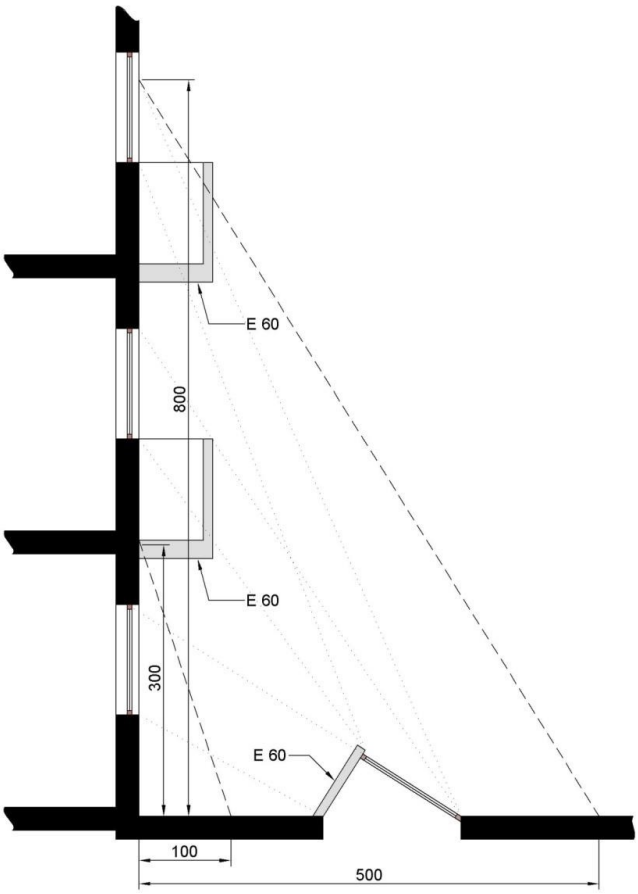
Height measured from the roof, b	Requirement for fire resistance
b < 3 m	EI 60 $_{(i \leftarrow o)}$
3 m < b < 8 m	E 60 $_{(i \leftarrow o)}$

If windows, air vents, smoke outlets and openings that do not have the required fire resistance are present in the façade over a height of 8 meters, they must meet the following conditions:

-or are shielded from the openings in the roof by a building element that meets the following conditions (Plate 3.1):

Horizontal distance from facades, a	Requirement for fire resistance
a < 1 m	EI 60
1 m < a < 5 m	E 60

- either the total area of the openings in the facade does not exceed 100 cm².



1.3 Horizontal distance between buildings

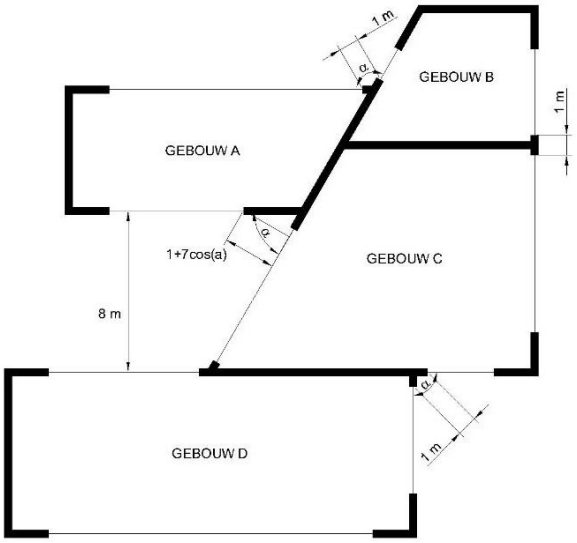
To prevent a fire from spreading between two buildings:

(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 120 or REI 120 shall be at least:

$1 + 7 \cos \alpha$ for $0° \leq \alpha \leq 90°$

1 for $90° < \alpha \leq 180°$

where α is the enclosed angle (Plate 3.2).



b) either, the radiation of a fire from a building onto an opposing building, and vice versa, must not exceed 15 kW/m².

Walls separating adjacent buildings have EI 120, or REI 120 when load-bearing.

In these walls, a connection between these buildings may exist via a sas, provided it bears the following characteristics :

1. it should not end in a stairwell;
2. it contains two self-closing doors $_{EI1}$ 30;
3. the walls have EI 60;
4. the surface area is a minimum of 2 m².

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

1.4 Accessible facades for the fire department

At least one of the long facades must run along a road accessible to fire department vehicles, and if the long facade does not contain a main entrance, the road must additionally run along a facade that does contain such an entrance.

The distance from the edge of this road to the plane of the facade should preferably be between 4 m and 10 m. Otherwise, the facade openings are considered inaccessible to fire department ladder vehicles (see 2.2.1).

If a pedestal supports one or more buildings, one of the following two provisions shall apply :
- the platform of the pedestal is accessible to the vehicles of the fire department, subject to the requirements of 1.1 but with the exception of the slope of the ramp which may be 12%;
- at least one of the facades of each building is accessible from a road for ordinary open-air traffic or in a tunnel that contains an open-air segment of at least 15 m x 7 m every 25 m.

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 area of a compartment may exceed 2500 m² if it is equipped with an automatic extinguishing system and a smoke and heat extraction system. The Minister of the Interior determines the conditions under which a compartment may be larger than 2500 m² without having to provide an automatic fire extinguishing system and 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;
   for the buildings for which the application for construction was submitted before April 1, 2017, in case the duplex is located on the highest two floors of the building, the compartment area may be 2,500 m² per floor;

b/1) the height of a compartment may extend over three superimposed building floors 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;

c) for buildings for which the application for construction was submitted before April 1, 2017, the first floor and the second floor (or mezzanine) may also form one compartment, provided that the total volume does not exceed 25000 m³;
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 are possible to the mandatory installation of an automatic fire extinguishing system and a smoke and heat extraction system;
   - and that the evacuation capabilities of the building shall comply with the provisions of this annex where evacuation through the atrium may not be considered.

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, without going through the stairwell, users can reach a facade opening, accessible to fire department ladder vehicles, or if no such opening exists, a terrace accessible to fire department ladders

be able to reach it. The terrace with a sufficiently large area to evacuate the users of the compartment, has a floor REI 60 and a façade element E 60 or a railing set back 1 m from the façade.

- two exits if occupancy is 50 or more than 50 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.

If the occupancy is 50 or more than 50 persons, the number of exits from building floors and rooms shall be determined as for compartments.

For the two underground levels immediately below the evacuation level, one exit is sufficient if these levels contain only premises such as storerooms and if the distance from any point of the compartment to the exit is less than 15 m.

In the event that a compartment extends over several floors (atrium), the evacuation possibilities of the building must comply with the provisions of this annex, whereby evacuation through the atrium may not be taken into account.

2.2.2 Outputs.

The exits are located in opposite zones of the compartment.

Compartments not located on an evacuation level are connected to the evacuation level by stairs located inside or outside the building (for horizontal distances see 4.4).

For underground building levels, an exit that meets the requirements of an exit for the evacuation level may replace the required access to a stairwell.

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 4.4.2.

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 possess fire resistance as shown in Table 3.1, where E represents the lowest evacuation level:

	Structural elements
Above the floor of EiR 60 Below including the floor of	Ei, 120 Ei

Table 3.1 - Fire resistance of structural elements.

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 vertical interior walls that demarcate classrooms or the entirety of classrooms with night occupancy have EI 60.

The doors in these walls have EI1 30.

The vertical interior walls of archive rooms have EI 60; their doors are self-closing or self-closing in case of fire and have EI1 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 4.4.3 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 are attached to the building skeleton at the level of each floor. With the exception of buildings equipped with an automatic

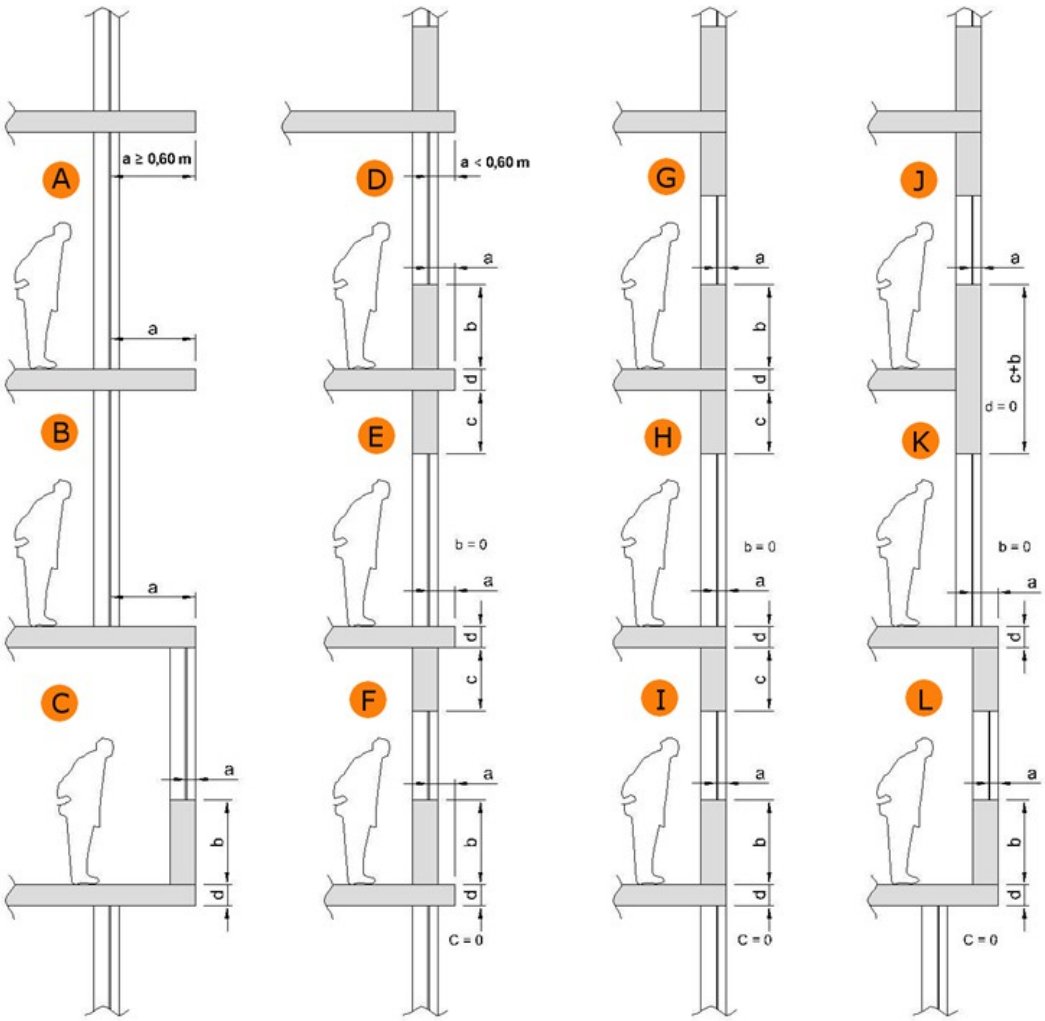
extinguishing system, these attachments must be R 60 relative to a fire in an underlying and adjacent compartment.

The connection of the compartment walls to the façade has at least EI 60 or EI 60 (i→o).

To reduce the risk of fire spread along the façade between compartments in a vertical or horizontal plane, one of the following requirements must be met:

(1) either the façade is provided with a fire-resistant construction element at the connection of the façade to the compartment wall (horizontally or vertically).

The figures of Plate 3.3 show how this building element is applied in relation to a horizontal compartment wall.



It includes:

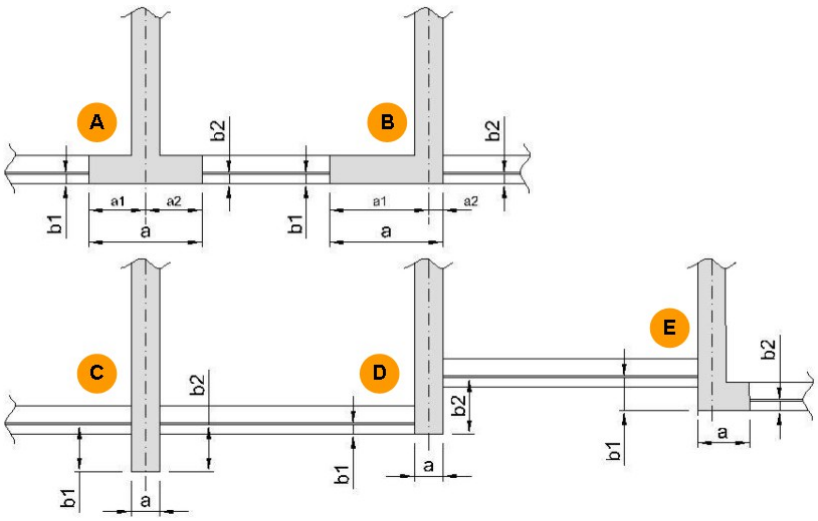
- either a horizontal overhang, having at least E 60, with width "a" equal to or greater than 0.60 m and connected to the floor (Plate 3.3, Figures A and B);

- or an element composed:
  - from a horizontal overhang, which has at least E 60, with width "a" and connected to the floor;

- in the upper storey, from a parapet, which has at least E 60 - ef (o→i), with height "b";
- in the underlying building layer, from a lintel, which has at least E 60 (i→o), with height "c".

The sum of dimensions a, b, c and d (floor thickness) is equal to or greater than 1 m; each of dimensions a, b or c may be zero if necessary (Plate 3.3, Figure C to L).

The figures of Plate 3.4 show how this building element is applied in relation to a vertical compartment wall.

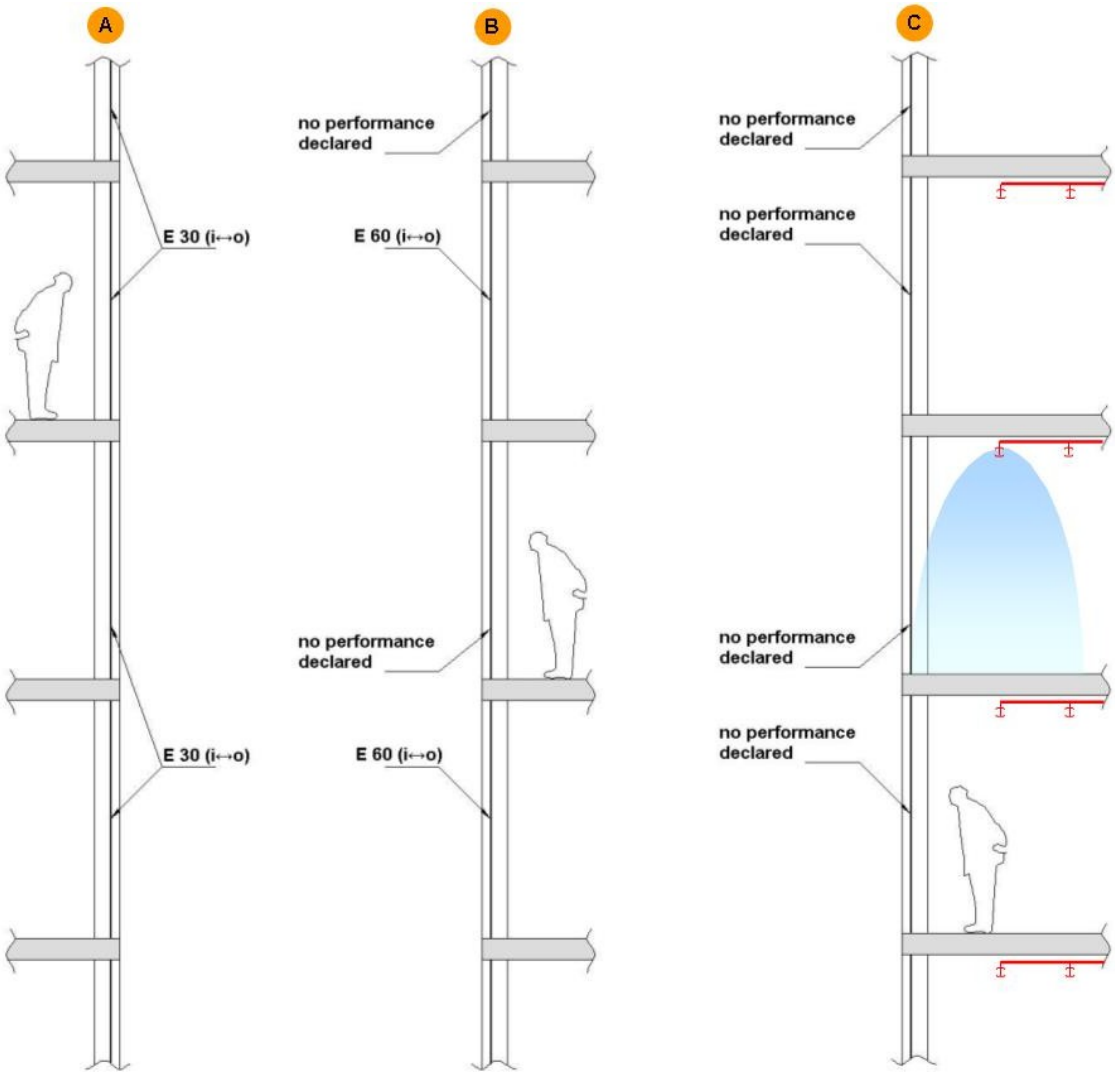


It includes:

- either an element located in the extension of the façade that has at least E 60 (i↔o); the width of this element (b1+b2+a) (Plate 3.4, Figures A and B) is at least 1 m; the parts of this element located to the left and right of the center line of the common wall are at least 0.50 m wide, if they are two different buildings (a1 ≥ 0.50 m and a2 ≥ 0.50 m);

- either a vertical overhang located in the center line of the wall separating the two buildings or compartments and having at least E 60 (o→i) (Plate 3.4, Figure C) or E 60 (i→o) (Plate 3.4, Figure D); the length of this element (b1+b2+a) is at least 1 m;

- or a combination of the previous elements in such a way that the sum of the lengths is at least 1 m (Plate 3.4, Figure E).



(2) either the facade has at least either E 30 (i↔o) over the full height of the building (Plate 3.5, Figure A) or E 60 (i↔o) every two building levels (Plate 3.5, Figure B).

(3) either the compartments located along the facades are equipped with an automatic extinguishing system of the sprinkler type adapted to the risks present (Plate 3.5, Figure C).

3.5.1.2 Opposite facades and facades forming a dihedral angle

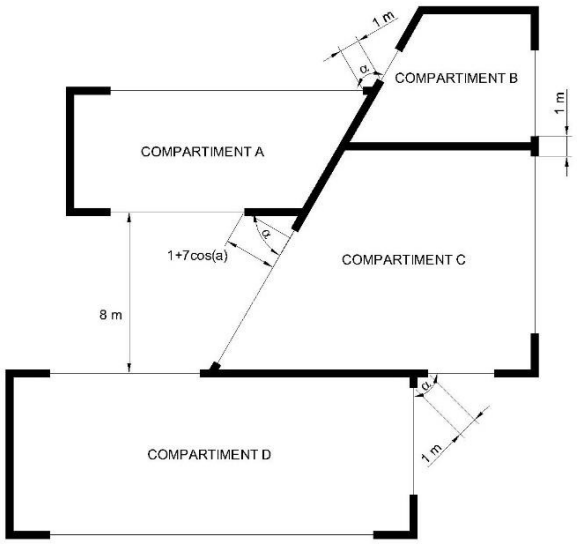
To prevent a fire from spreading between two compartments:

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

$1 + 7 \cos \alpha$ for $0° \leq \alpha \leq 90°$

1 for $90° < \alpha \leq 180°$

where α is the enclosed angle (Plate 3.6).



(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 facade 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 the compartmentation through the cavity is ensured by a fire self-closing closure device with a fire resistance E 60. This device shall be tested in its supporting structure, according to the direction of the compartment wall; its closure shall be 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 façade between floors consists of at least 50% 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 requirements 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 from 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 shall be actuated 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.

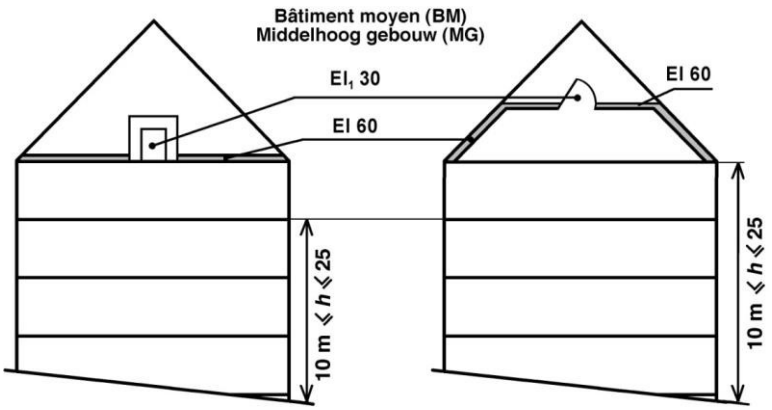
3.5.2.3.3 Operation in case of fire in an adjacent compartment.

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.

3.6 Roofs.

Flat roofs and those with a slight slope (slope angle not exceeding 10°) have R 60.

This requirement does not apply if the subroof floor has EI 60 (Plate 3.7) and if any access to the space under the roof, which must be empty, is through doors or hatches with $_{EI1}$ 30.



This requirement also does not apply to the roofs whose area is less than or equal to 100 m².

Window openings may be provided in pitched roofs, if point 3.5.1.1 of the same annex.

4 PRECAUTIONS ON CONSTRUCTION OF COMPARTMENTS AND EVACUATION ROOMS.

4.1 Compartments.

The walls between compartments have EI 60. Gable or

exterior walls have 3.5.

The connection between two compartments is permitted only if it is through a shaft that has the following characteristics:

1. it includes self-closing doors with $_{EI1}$ 30;
2. the walls have EI 60;
3. the surface area is a minimum of 2 m².

The doors may be self-closing in case of fire provided 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.

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

4.2.2.2 Stairwells shall provide access to an evacuation level and to all upper floors, except in the cases referred to in Section 4.2.2.3, third and fourth paragraphs.

4.2.2.3 On each floor, the connection between the evacuation route and the stairwell is ensured by a self-closing door with $_{EI1}$ 30 giving access to a landing in the stairwell. This door swings open in the sense of escape and shall not be equipped with a locking system that would prevent its opening. Its useful width is greater than or equal to the required useful width and is at least 0.80 m.

Doors may be self-closing in case of fire provided:
- That the building is equipped with an automatic fire detection system of the total surveillance type that automatically provides an indication of the fire alarm and its location and whose detectors are adapted to the risks present;
- and that all compartments served by this stairwell have daytime occupancy only.

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 more common stairwells provided they are accessible from each compartment by a connection that meets the requirements of 4.2.2.3.

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 from each stairwell to the evacuation level shall be in accordance with the requirements of 4.2.2.3.

4.2.2.6 At the top of each interior stairwell there is a ventilation opening with a cross-section of at least 1 m² and which opens into the open air. This opening is normally closed; to open it, a manual 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

4.2.2.7 Only the following items are allowed in the stairwells:
- detection means;
- fire extinguishers, with the exception of wall reels;
- signaling devices;
- lighting equipment;
- heaters;
- ventilation devices;
- DEPARTMENTS.

Electrical conduits, ventilation ducts and smoke ducts are allowed only if they serve only for the operation of the aforementioned objects installed in the stairwell.

Water pipes are allowed in the stairwells. Any other

piping is prohibited in the stairwells.

Elevators are permitted in a stairwell serving building levels above an evacuation level under the following conditions:
1. That compartments served by this stairwell with elevators are also served by other stairwells;
2. That these other stairwells do not have elevators;
3. and that the actual useful width of this stairwell with elevators is halved (according to Appendix 1 "Terminology").

4.2.2.8 In buildings with not more than 10 apartments served by the same interior stairwell, the connection between each apartment and this stairwell may, by way of derogation from point 4.2.2.3, be ensured by a door $_{EI1}$ 30 under the following conditions:
1. That this door is self-closing only in case of fire. In everyday use, this door is not self-closing (door closer with freewheeling function);
2. and that the building is equipped with an automatic fire detection system:
   a) which monitors at least the following:
      - the common interior stairwell;
      - and in each apartment the area near the door giving access to the stairwell;
   b) that provides an indication of the fire alarm;
   c) and whose detectors are adapted to the risks present.

Apartment doors opening onto the stairwell may open against the sense of escape.

And deviating from section 4.2.2.7, wall reels are allowed in stairwells, just like elevators without the conditions mentioned in the last paragraph of section 4.2.2.7.

4.2.3 Stairs.

4.2.3.1 Construction provisions.

The stairs have the following features:

1. Like the spillways, they have R 60 or are designed in the same way as a concrete slab with R 60;
2. they have solid risers;
3. they are equipped with a handrail on both sides, including along the landings;
   For stairs with a useful width, less than 1.20 m, one handrail is sufficient, provided there is no danger of falling;
4. the step tread is at least 20 cm in each point;

5. the rise of the steps should not exceed 18 cm;
6. their slope should not exceed 75% (maximum slope angle 37°);
7. 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 4), 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 door swing shall not limit the useful width of the overflows to a value less than b_r.

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 stairwells meet the conditions of 4.2.2.2.

Exterior stairwells are enclosed by walls; at least one side shall allow free entry of outside air on each level.

No point of the stairway shall be located less than 1 m from a façade section that does not have EI 60.

The requirements of 4.2.3 apply to it with, however, the following deviation: the risers are not required; no fire stability is required, but the material belongs to class A1.

The connection between the compartment and an outdoor stairwell occurs:
- either through a door;
- either through escape terrace(s).

One stairwell may be replaced by two external staircases with straight stair arms; these staircases are connected by escape terraces on which any transverse dividers must not form difficult obstacles.

These outdoor staircases have the following features:

1. width minimum 0.60 m;
2. slope angle no greater than 45°;
3. tread of the steps at least 0.10 m;
4. rise of the steps maximum 0.20m;
5. at each staircase two handles.

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 classrooms 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.

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 that meets the requirements of Section 4.4.2 applicable to evacuation routes connecting stairwells to the public highway.

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.

4.4.2 At an evacuation level

The vertical interior walls of the evacuation routes connecting stairwells to the public road have EI 60, and the doors of the classrooms giving onto these routes are self-closing and have $_{EI1}$ 30.

Doors may be self-closing in case of fire provided:
- That the building is equipped with an automatic fire detection system of the total surveillance type that automatically provides an indication of the fire alarm and its location and whose detectors are adapted to the risks present;
- and that all compartments served by these evacuation routes, as well as all compartments served by stairwells leading to these evacuation routes, have daytime occupancy only.

However, apartment doors opening onto the evacuation road may be self-closing in the event of a fire provided:
- That these doors are self-closing only in case of fire. In everyday use, these doors are not self-closing (door closer with freewheeling function);
- and that the building is equipped with an automatic fire detection system of the total surveillance type that automatically provides an indication of the fire alarm and its location and whose detectors are adapted to the risks present.

Evacuation routes that do not connect stairwells to the public road must meet the requirements of 4.4.3.

At such level, access to the stairwell shall be in accordance with 4.2.2.3.

The evacuation route may include the entrance hall. This hall may include the entrance to the elevators and non-enclosed areas intended for reception and related services excluding drinking establishments or dining areas.

At an evacuation level, no display windows of building parts with a commercial function, which do not have EI 60,shall open onto the evacuation road connecting the exits of other building parts to the public road, except for the last 3 m of this evacuation road.

4.4.3 On a building level that is not an evacuation level.

In a compartment, connection between and to stairwells is via evacuation routes or over escape terraces. These paths may not pass through stairwells.

The travel distance between stairwell entrances is less than 60 m.

The vertical interior walls of the evacuation routes have EI 30 and the access doors to these routes have $_{EI1}$ 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.

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.

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 $_{EI1}$ 60;
   - either to a stairwell via a sas according to 4.1;
   - or 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;
- Access doors to these boiler rooms and fuel storage rooms are self-closing and 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: Not applicable to combustion units 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.

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 120, except for the exterior walls;
- the interior doors have $_{EI1}$ 60;
- 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 120.

Access, if not from the outside, is through a door $_{EI1}$ 60.

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 accessible:

a) either through a sas with the following characteristics:
   1. self-closing doors $_{EI1}$ 30;
   2. walls EI 60;
   3. minimum area 2 m²;

b) either by a self-closing door EI1 30 provided that the garbage storage room is equipped with an automatic extinguishing system.
   This automatic extinguishing system is presumed to be compliant if it complies with

the requirements of the section 5.1.4.3.

5.1.4.3 Type solution for the premises for the storage of domestic waste - Automatic extinguishing system of the sprinkler type directly connected to the public water supply system.

This type solution is applicable only to a room for the storage of domestic waste whose area is less than or equal to 24 m².

This type solution describes an automatic extinguishing system with water connected to the public water supply system without mandatory installation of overpressure equipment (e.g. pump). This system is an installation where the pipes are always filled with water.

5.1.4.3.1 Environmental and operating conditions

The entire automatic fire suppression system, including the garbage storage room and the piping to it up to the building's water meter, must be protected from frost.

The pressure of the water in this system should not exceed 12 bar.

This automatic extinguishing system must be permanently capable of operation except during testing, checks or maintenance (all valves in the supply lines and the valves in the system itself in open position, components maintained in good working order, ...).

5.1.4.3.2 Features for design and installation of sprinklers

The sprinklers conform to standard NBN EN 12259-1 and have the following characteristics:
- they are of the conventional type, hanging or standing;
- their nominal operating temperature is 68°C or less;
- Their K-factor is between 75 and 85. The K-factor corresponds to the flow rate in l/min of a sprinkler subjected to a pressure of 1 bar.

The sprinklers are installed under the ceiling at a maximum distance of 30 cm from it or are built into the ceiling.

If the area of the room is less than or equal to 12 m², one sprinkler shall be installed in the center of the room.

If the area of the room is greater than 12 m² and less than or equal to 24 m², two sprinklers shall be installed centrally in the room, with a distance of not less than 2 m and not more than 4 m between them.

5.1.4.3.3 Characteristics of the pipes

The pipes of the system are in steel.

The pipes from the system and those from the system to the building's water meter have a nominal diameter (internal) of at least 25 mm.

The pipes are attached to the walls or built in, including in the room for garbage storage.

5.1.4.3.4 Water flow alarm

The water supply pipe is equipped with an alarm placed outside the room for the storage of domestic waste and complies with standard NBN EN 12259-2 or standard NBN EN 12259-5.

The piping of the system downstream of the alarm device shall only be used for automatic extinguishing of the household waste storage room.

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 $_{EI1}$ 60.

   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 commanded 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 EI1 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 $_{EI1}$ 30; the ducts are interrupted at the level of each compartment by vertical screens with the

following features:

- 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 60;
- or are the structural elements of the roof separated from the rest of the parking lot by a building element EI 60.

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

5.2.2 Compartment.

The walls and the connections between the parking lot and the rest of the building conform to the point 4.1, with the following modification : the doors of the connections can be self-closing in case of fire.

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.

The walls between the parking lot and the rest of the building meet the requirements of 4.1.

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

The walls of these classrooms exhibit EI 60 and:
- access is through a sas with walls EI 60 and self-closing or, in the event of fire, self-closing doors $_{EI1}$ 30;
- Whether access to each room is by a self-closing or fire self-closing door EI1 60.

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 level under consideration by a direct exit to the open air;
- on the building level closest to the exit level, the sloped roadway may replace one of the stairwells or outdoor staircases if its walls have EI 60 and 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 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 that make up these classrooms or entirety of classrooms have EI 60.

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.

Any passage between those classrooms and the rest of the building shall be closed by a self-closing or, in the event of fire, self-closing door $_{EI1}$ 30.

These doors turn in the escape direction 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 installed in the shaft(s).

6.1.2 Opinion.

6.1.2.1 The assembly consisting of one or more shafts and any engine room, as well as access landings to form a shaft, 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 in the vicinity of the access door to the shaft.

The elevator access platform(s) may be part of the evacuation route.

In the cases referred to in the last paragraph of Section 4.2.2.7 and in Section 4.2.2.8, the elevator landing and the stairwell may be common. The stairwell and the elevator shaft shall then form only one unit.

In a mid-rise building, the common hall of apartments served by one or more of the same interior stairwells may be considered as the elevators' shaft, if the number of apartments evacuating through this common hall is less than or equal to 6 apartments.

The doors opening onto the common hall of those apartments may open in the opposite direction of evacuation and not be self-closing.

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 to the cases referred to in the last paragraph of section 4.2.2.7 and in section 4.2.2.8.

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 outside air, provided that the view of such 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 (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 $_{EI1}$ 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 platform 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.

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 the engine rooms and of the shafts have EI 60.

A sas shall exist at the arrival at each served building level with walls EI 60. Doors or access hatches shall be self-closing E 30 and tested with the platform side facing the furnace.

The area of this bog, which may serve exclusively for the handling of goods, is calculated for judicious arrangement of the loading and unloading facility and for easy accessibility of service personnel.

Between the lock and the shaft are doors or hatches.

The shaft walls on the compartment side and entrances in these walls have EI 60.

The shaft doors or access hatches of these units operate automatically and are normally closed. One element can open only when the other is closed.

Any passages from horizontal conveyors to the paternoster and freight elevators, as well as passages from one compartment to another are through a sas, closed by two shutters or doors with E 30.

These hatches operate automatically and are normally closed; when passing through a container, such a hatch can only open if the other is closed.

If the container transport system follows a horizontal and/or vertical route, passing through building layers or compartments, shafts are provided at each of these passages. The shaft walls have EI 60.

Their two shutters or doors have E 30. They are tested with the platform side facing the furnace. They operate automatically and are normally closed. Such a hatch or door can only open if the other is 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 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 $_{EI1}$ 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 bay(s) where the escalator exits directly into the open air, provided that

That the view of this escalator on the other building levels does meet the requirements of Sections 6.3.1 and 6.3.2 or Section (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 at 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 derogation 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: Only applicable 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) either an intrinsic fire resistance that is 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) either 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 flammable 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 is allowed:
- 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 rooms 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 both cases, smoke detection must be installed in the recycling air before the smoke damper. If smoke is detected in the recycling air, the air handling units are shut down, the smoke dampers are closed and, in the second case, the ductwork for the exhaust of the recycling air to the outside is automatically opened and is ready to operate when the air handling units 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 maximum 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 4.4.3 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 i ↔ o) or EI 60 (ve i ↔ o) when placed horizontally or vertically, respectively.

The exhaust ducts in the collective kitchens with their suspensions continue to 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 60 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 which complies with 6.7.4 shall be placed at the level of the wall passage.
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↔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	wallFire resistance of the valve
EI 120	EI 120 (ho i ↔ o) S EI 120 (ve i ↔ o) S
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 3.2 - 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.

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:

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 board to remove certain elements from the aeronautical

installations to operate, may be imposed by the competent fire department depending on the risk. 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 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 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 with each other 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.

For special fire hazards, these devices are chosen according to the nature and extent of this 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 These above-ground 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 The location of the above-ground and underground hydrants and immediately their number are determined in consultation with the territorially competent fire department.

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 The 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 may drive and park.

0 GENERAL.

0.1 Objective.

These basic regulations define the minimum requirements that the conception, construction and design of high-rise (HG) buildings 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 tall buildings;

2. the extensions of buildings that when realized are tall buildings;

3. the premises or parts of tall 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 referred to in paragraph 4 of item 0.2.1 of Annex 3.

0.3 Terminology - see Appendix 1.

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

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

0.5.1 Plate I - Facades
0.5.2 Plate II - Facades
0.5.3 Plate III - Roofs of adjacent structures.
0.5.4 Plate IV - Roofs

1 IMPLANTATION AND ACCESS ROADS.

1.1 *[Fire department accessibility and emplacement]*

The building is continuously accessible to motor vehicles.

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; it shall be 8 m if the access road is dead-end;
  - 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.
  - ability to simultaneously carry 3 car vehicles of 15 t;
  - the distance from the edge of the road to the plane of the facade is between 4 m and 10 m.

Parked vehicles shall not obstruct the passage and arrangement of fire department vehicles on these access roads.
At least one of these access roads must allow fire department equipment and vehicles to drive, stop and work.

1.2 ***[Fire department accessibility to facades]***

At least one of the long facades must run along a road accessible to fire department vehicles, and if the long facade does not contain a main entrance, the road must additionally run along a facade that does contain such an entrance.

The distance from the edge of this road to the plane of the facade should be between 4 m and 10 m.

The distance to be covered from the roads defined above to elevators with a priority call device (see 6.1.5), shall not exceed 30 m.

If a pedestal supports one or more buildings, one of the following two provisions shall apply :

- the platform of the pedestal is accessible to the vehicles of the fire department, subject to the requirements of 1.1 but with the exception of the slope of the ramp which may be 12%;
- at least one of the facades of each building is accessible from a road for ordinary open-air traffic or in a tunnel that contains an open-air segment of at least 15 m x 7 m every 25 m.

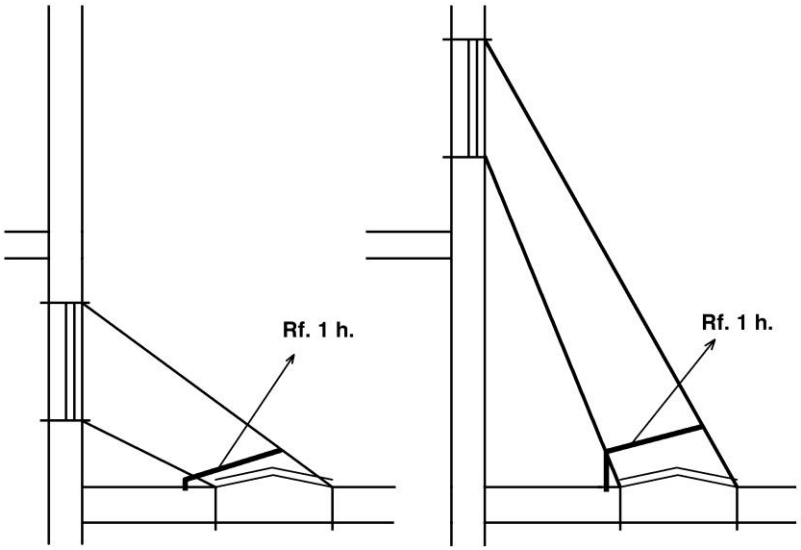
1.3 ***[Outbuildings, etc.]***

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.

If the glazed facades of the building project over building components that may or may not be part of this building, the roofs of these structures:

- have an Rf 2 h over a minimum horizontal distance of 5 m from these facades;

- and over this distance no skylights, air vents, smoke exhausts and openings occur unless



- those openings are separated from openings in the facades by a building element Rf 1h (Plate III);

- Whether the total area of the openings does not exceed 100 cm².

If these roofs do not possess these characteristics, then the façade of the HG projecting above them may not be glazed.

1.4 ***[Horizontal distance between buildings]***

The horizontal distance, free from any combustible element and located between a HG and an opposing building, must be at least 8 m, unless the walls meet the conditions of walls that are adjacent buildings.

The walls separating adjacent buildings have Rf 4 h.

In these walls, a connection between these buildings may exist via a sas, provided that it bears the following characteristics:

1. it should not end in a stairwell;
2. it includes two self-closing doors with Rf 1 h;
3. the walls have Rf 2 h;
4. the surface area is a minimum of 2 m².

1.5 ***[Distance from fire station]***

HG with a height of more than 50 m are planted within 10 km, along drivable roads, of a fire station.

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).

As for the buildings referred to in the above paragraph, the area of a compartment may exceed 2,500 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;
  in case the duplex is located on the highest two floors of the building, the area of the compartment may be 2500 m² per floor;
- the first floor and the second floor (or mezzanine) may also form one compartment, provided that the total volume does not exceed 25000 m³;
- 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 meet the standards or the rules of good practice in the matter recognized by the Minister of the Interior, according to the procedure and conditions he determines.
  - and that the evacuation capabilities of the building shall comply with the provisions of this annex where evacuation through the atrium compartment may not be considered.

2.2 Evacuation of compartments.

2.2.1 Number of outputs.

Each compartment has minimum :

- 2 outputs;

- 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.

If the occupancy is 50 or more than 50 persons, the number of exits from building floors and rooms shall be determined as for compartments.

For the two underground levels immediately below the evacuation level, one exit is sufficient if these levels contain only premises such as storerooms and if the distance from any point on each level to the stairwell or to the exit is less than 15m.

In the case of a compartment extending over several floors (atrium), the evacuation possibilities of the building must comply with the provisions of this annex, without taking into account the evacuation through the atrium compartment.

2.2.2 Outputs.

The exits are located in opposite zones of the compartment.

For compartments not located at an evacuation level, the exits are connected to the evacuation level by stairs located inside or outside the building, (for horizontal distances see 4.4).

For underground building levels, an exit that meets the requirements of an exit for the evacuation level may replace the required access to a stairwell.

For the parking building: see 5.2.

At an evacuation level, each stairway leads to the outside either directly or over a separate evacuation path that meets the requirements of 4.4.3.

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.

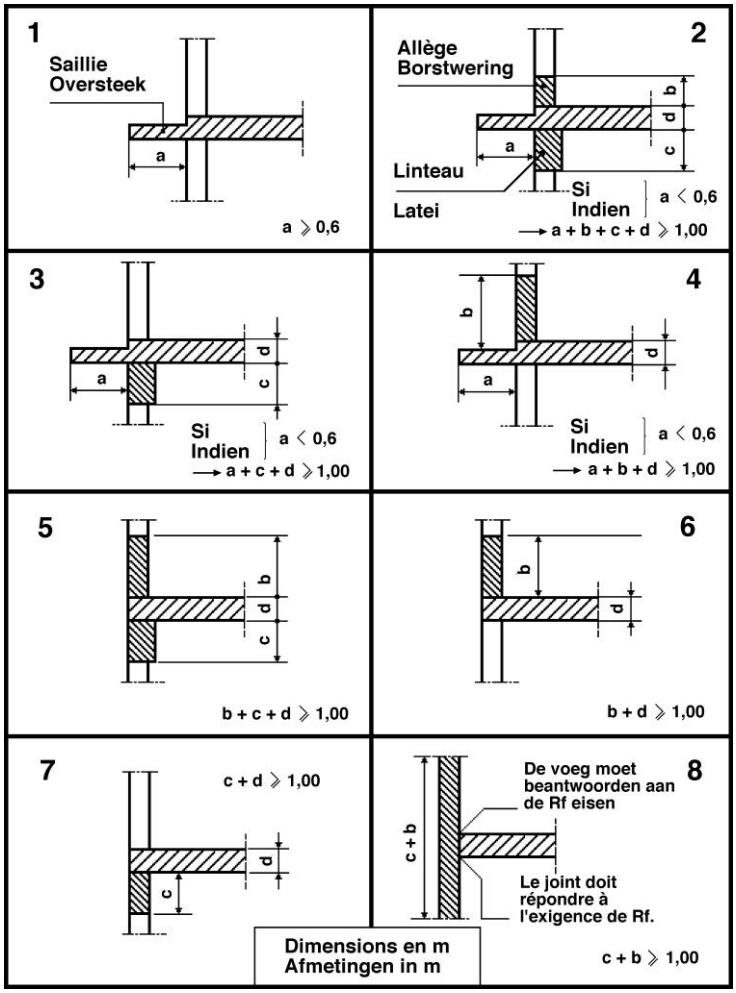
The structural elements have Rf 2 h.

3.3 Facades.

3.3.1 At the level of separations between compartments:

The façade includes at each building level a building element that meets the "flame density" criterion of NBN 713-020 for 1 h. This requirement is not imposed on the intermediate level of the duplex.

The figures of Plate I show the ways in which this building element is applied.



It includes :

a) A continuous horizontal overhang with width "a" equal to or greater than 0.60 m and connected to the floor;

b) an element composed :
   - from a continuous horizontal overhang with width "a" and connected to the floor;
   - in the upper storey, from a continuous parapet with height "b";
   - in the underlying building layer, from a continuous lintel with height "c".

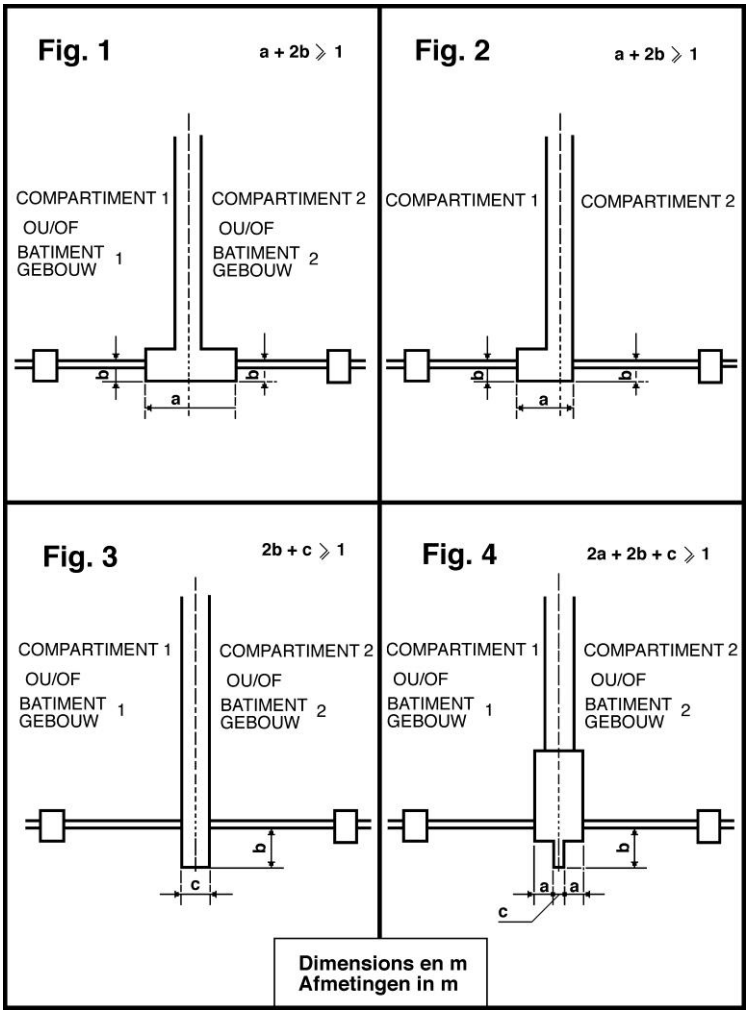
The sum of dimensions a, b, c and d (floor thickness) is equal to or greater than 1 m; each of dimensions a, b or c may be zero if necessary.

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 fixed to the floor slab in such a way that the whole complies with the "fire tightness" criterion of NBN 713-020 for 1 h; the piers also comply with the same requirement.

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

In order to prevent the fire from propagating along the façades between compartments located in the same plane or between different but adjacent buildings, a façade element that also meets the "integrity" criterion for 1 h shall also be provided; this façade element shall be installed between the glazed openings and shall be executed in the manner indicated in the figures of plate II :



a) either a continuous element located in the extension of the facade; the width of this element (2b + a) (Plate II, Figs. 1 and 2) is at least 1 m; the parts of this element located to the left and right of the center line of the common wall are at least 0.50 m wide, if two different buildings are involved;

b) either a continuous vertical overhang located in the center line of the wall separating the two buildings or compartments; the length of this element (2b + c) (Plate II, Fig. 3) is at least 1 m;

c) either a combination of the previous elements in such a way that the sum of the lengths is at least 1 m (Plate II, Fig. 4).

3.3.2 Facades that form a dihedral angle.

When two planes of the façade of a building, or when the façades of the building and of another adjoining structure form an indented dihedral angle greater than or equal to 90° (and less than 180°), the façade sections whose rib of the

indented two-plane corner part at the level of the partitions between compartments, an Rf 1 h over a developed horizontal distance of at least 1 m.

For facades forming an indented dihedral angle less than 90°, the conditions for opposing facades are applied.

3.3.3 Facades facing each other.

These facades are either parallel or form an enclosed angle less than 90°.

For facade sections of opposite facades forming the separation between compartments, the shortest distance (in m) measured between the facade sections not possessing Rf 1 h is at least:

$$7 \times \cos(\alpha) + 1$$

where α is the enclosed angle.

3.4 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 vertical interior walls that demarcate classrooms or the entirety of classrooms with night occupancy have Rf 1 h.

The doors in these walls have Rf ½ h.

The vertical interior walls of archive rooms have Rf 1 h; their doors are self-closing and have Rf ½ h.

3.5 Ceilings and false ceilings.

3.5.1 In evacuation routes, premises open to the public and collective kitchens, false ceilings have a fire stability of ½ h.

3.5.2 The space between the ceiling and the false ceiling is interrupted by the extension of all vertical walls possessing at least Rf ½ h.

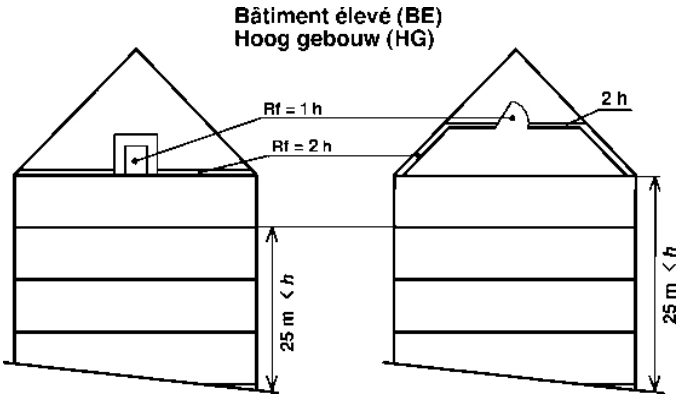
If the space between the ceiling and the false ceiling is not equipped with an automatic extinguishing system, the space should be interrupted by vertical separations with Rf ½ h such that there are spaces whose horizontal projection can be inscribed in a square of maximum 25 m side.

3.6 Roofs.

Preferably, only flat roofs or with slight slope (slope angle not exceeding 10°) are allowed.

The roofs have Rf 2 h.

For pitched roofs, the under-roof floor has Rf 2 h (Plate IV); any access to the space under the roof is by doors or trap doors with Rf 1 h.



4 PRECAUTIONS ON CONSTRUCTION OF COMPARTMENTS AND EVACUATION ROOMS.

4.1 Compartments.

The walls between compartments have Rf 2 h. For the

facade or exterior walls, 3.3.

The connection between two compartments is permitted only if it is through a shaft that has the following characteristics:

1. it includes self-closing doors with Rf ½ h;
2. the walls have Rf 2 h;
3. the surface area is at least 2 m²

The sas can serve as a sas for the stairwell but not as a sas for elevators.

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 laterally sealed over at least 1 m with an element having a flame density of 1 h.

4.2.2.2 Stairwells should provide access to an evacuation level and to all upper levels of buildings.

If the building is equipped with a flat roof or with a slight slope (see 3.6), each stairwell serving the floors above the evacuation level provides access to the roof, except for those located in the portions of the building that contain no more than 3 floors above the evacuation level.

If the access door to the roof is usually closed, it must carry a glazed box on both the inside and outside that contains the door key.

4.2.2.3 At each building level, the connection between the evacuation route and the stairwell is ensured by a shaft with the following characteristics:

1. it is ventilated;
2. it contains two self-closing doors with Rf ½ h that open in the sense of escape; they shall not be equipped with a locking system that would prevent its opening; their useful width is greater than or equal to the required useful width (calculated according to Annex 1 "Terminology") and is at least 0.80 m;
3. the walls have Rf 2 h;
4. the surface area is a minimum of 2 m².

At an evacuation level, this shaft can be replaced by a door with Rf 1 h and with the characteristics of the aforementioned shaft doors.

4.2.2.4 If several compartments lie in the same horizontal plane, they may have a common stairwell provided it is accessible from each compartment through a connection that meets the requirements of 4.2.2.3.

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 Rf 2 h;
2. access from each stairwell to the evacuation level shall be in accordance with the requirements of 4.2.2.3, except in the case referred to in 4.2.2.7 where access may be through a door with Rf ½ h.

4.2.2.6 In tall buildings (HG) with no more than 6 apartments per floor served by the same interior stairwell, the common hall of these apartments may be considered either as the elevator shaft or the stairwell shaft.

Deviating from 4.2.2.3, the doors on the common hallway may open against the sense of escape and not be self-closing.

4.2.2.7 In the tall buildings (HG) of maximum 36 m in height, and with no more than 4 apartments per floor served by the same stairwell, the common hall of these apartments may serve at the same time both as the axis of the stairwell and the axis of the elevators.

Deviating from 4.2.2.3, the doors on the common hallway may open against the sense of escape and not be self-closing.

4.2.2.8 Stairwells and access shafts may not contain any objects unless detection devices , portable quick extinguishers, electrical conduits, safety lighting, signaling, lighting and heating devices, smoke ducts or smoke extraction devices. Only access doors from evacuation routes to stairwells are permitted.

4.2.2.9 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

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 1 h or are conceived in the same way as a concrete slab with Rf 1 h;
2. they have solid risers;
3. they are equipped with a handrail on both sides, including along the landings.
   For stairs with a useful width, less than 1.20 m, one handrail is sufficient, provided there is no danger of falling;
4. the step tread is at least 0.20 m at each point;
5. the rise of the steps should not exceed 18 cm;
6. their slope should not exceed 75% (maximum slope angle 37°);
7. they are of the " straight " type.

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 $_{br}$ calculated according to Annex 1 "Terminology".

The door swing shall not limit the useful width of the overflow to a value less than $_{br}$.

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 stairwells meet the conditions of 4.2.2.2.

Exterior stairwells are enclosed by walls; at least one side shall allow free entry of outside air on each level.

No point of the staircase shall be located less than 1 m from a façade section that does not have Rf 1 h.

The regulations of 4.2.3 apply to it with, however, the following deviation: the risers are not required; no fire stability is required, but the material belongs to class A0.

The connection between the compartment and an outdoor stairwell occurs:
- either through a door Rf ½ h;
- either through escape terrace(s).

One stairwell may be replaced by two external staircases with straight stair arms; these staircases are connected by escape terraces on which any transverse dividers must not form difficult obstacles.

A single external staircase is sufficient at the HG referred to in

4.2.2.7. These external stairs have the following characteristics:

1. width minimum 0.60 m;
2. slope angle no greater than 45°;
3. tread of the steps at least 0.10 m;
4. rise of the steps maximum 0.20m;
5. at each staircase two handles.

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.

4.4.1 General regulations

No point of a compartment shall be beyond:

a) For premises with daytime occupancy only:
   - 30 m from the evacuation road connecting 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 road 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.

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 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.

Doors on these roads must not have a locking device that could impede evacuation. These

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

4.4.2 On a building level that is not an evacuation level.

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

These roads must not pass through stairwells nor through their sashes.

The travel distance between stairwell entrances is greater than 10 m and less than 60 m.

The interior vertical walls of evacuation roads and their access doors to these r o a d s have Rf ½ h.

4.4.3 On an evacuation level.

The interior walls of each evacuation route have Rf 2 h.

The doors of the premises giving onto this road shall be self-closing and shall have Rf

1 h. At such level, access to the stairwell shall be in accordance with 4.2.2.3.

The evacuation route may include the entrance hall. This hall may include access to elevators and non-enclosed areas intended for reception and related services excluding beverage or dining areas.

At an evacuation level, no exit windows of building sections with a commercial function, which do not have Rf 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.

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 via a sas according to 4.2.2.3;
   - either to a stairwell via a sas according to 4.2.2.3;
   - either to the outside, 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;

   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 heating departments and appurtenances lie:

- either in a neighboring building at a horizontal distance of at least 8 m within which there is no combustible element referred to in section 1.4;

- either in the building, but under the following conditions:
  - they must not be in, nor under, the high part;
  - however, heating sections with gas lighter than air may be on the roof;
  - their connections to the other portions of the building are through a shaft of the type described in section 1.4; their doors turn in the escape direction.

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 2 h, except for the exterior walls;
- the interior doors have Rf 1 h;
- 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 2 h.

Access, if not from the outside, is through a door Rf 1 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, it has the following characteristics: walls Rf 2 h and doors 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 2 h.

5.1.4.2 Local for storage of garbage.

The walls have Rf 2 h.

If this room does not give out into the open air, it is accessed through a sas with the following characteristics:

1. two self-closing doors Rf ½ h;
2. walls Rf 2 h;
3. minimum area 2 m².

If the room is located under a chute, it is equipped with an automatic hydraulic extinguishing system that complies with the standards or rules of good craftsmanship on the subject.

5.1.5 Pipe sleeves.

5.1.5.1 Vertical tubes.

Their walls have Rf 2 h.
The trapdoors and doors have Rf 1 h.

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.

These tubes may be built in the stairwells and in their sasses, but may not issue on them.

In the HG referred to in 4.2.2.7, the ducts may exit onto the common hall.

However, their walls may have Rf 1 h and their trapdoors and doors Rf ½ h, if the tubes 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 Rf 1 h.

In this case, the tube should not be ventilated.

5.1.5.2 Horizontal tubes.

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

- either walls and doors with the same Rf as these vertical walls;

- either a building element at the height of each wall with the same Rf 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 meet the requirements of 4.1.

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 Rf 2 h and access is by a sas with Rf 2 h and self-closing doors Rf ½ 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 sloping roadway may replace one of the stairwells if its walls have Rf 2 h and 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 a c c o m m o d a t e more than 500 people, then these halls may only be arranged underground provided the following conditions are met:
- the difference between the lowest floor level of these halls and the nearest evacuation level should not exceed 3 m;
- the number of exits is determined as for compartments;
- evacuation is made: either by stairs or by ramps that reach a maximum of 10% in the centerline. The total width of these roads exceeds the theoretical useful width.

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 classrooms or set of classrooms have Rf 2 h.

Each passage in the vertical walls is closed by a self-closing or, in case of fire, self-closing door Rf 1 h; or by a sas of minimum 2 m² bounded by walls Rf 2 h and by self-closing or, in case of fire, self-closing doors Rf ½ 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 Rf 2 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 Rf ½ 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 Rf 2 h.

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

Every passage to the rest of the building shall be closed either by a self-closing or fire self-closing door Rf 1 h, or by a sas of minimum 2 m² bounded by walls Rf 2 h and by self-closing or fire self-closing doors Rf ½ h.

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 Rf 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 :

- either 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, is enclosed by walls with Rf 2 h.

Access doors between the compartment and the sas are self-closing or self-closing in case of fire and have Rf ½ h.

The access platform shall be separated from the landings and shafts of the stairwells, and shall not be part of the evacuation route, except in the cases referred to in 4.2.2.6 and 4.2.2.7.

Notwithstanding 4.2.2.3, the doors opening onto the common hallway referred to in 4.2.2.6 and 4.2.2.7, open in the opposite direction of evacuation and are not self-closing.

6.1.1.4 The assembly of the shaft doors shall have a stability to fire and a flame tightness of ½ 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 in such a way that they can 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 must be recalled

to the evacuation level if a fire is detected outside the elevators and their associated components.

The shaft doors o p e n , and remain open just long enough for passengers t o 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 separating the assembly formed by the shaft and the engine room have Rf 2 h.

If the engine room door or trap door gives out into the building, they have Rf 1 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.

When machine rooms are located at different levels, the elevator shafts corresponding to each are separated by walls with Rf ½ h.

Each elevator battery must have its own machine room separated from that of the other elevator batteries.

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 Rf 2 h.

Access to the engine room is through a sas with the following features :

1. include two self-closing doors Rf ½ h;
2. walls have Rf 2 h;
3. Have a minimum area of 2 m²;
4. are separated from the landings and sashes of the stairwells and are not part of the evacuation route.

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 Rf 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: ≥ 190 °C Combustion point: ≥ 200 °C Auto-ignition point: ≥ 350 °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.

6.1.5 Elevators with priority call.

6.1.5.1 Each compartment and level equipped with an elevator, with the possible exception of the technical compartment of the higher level, is addressed by an elevator with priority call that connects it to an evacuation level easily accessible to the fire departments.

This condition is met :

- either by an elevator serving that evacuation level and all levels above;
- either by multiple elevators each serving this evacuation level and some of the levels above, if the set of elevators with priority call allows access to all compartments of the building.

The priority call elevator is not required in the buildings referred to in 4.2.2.7.

6.1.5.2 The lift height of an elevator with priority call is traveled in a maximum of 60 seconds.

Elevators with priority call can be used normally outside the conditions that require this call.

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

6.1.5.4 The shaft doors open and close automatically, and have a useful width of at least 0.80 m.

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

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 2 h.

Upon arrival at each served building level, a sas must exist with walls Rf 2 h.

The doors or access hatches shall be self-closing and meet the criterion of flame tightness for ½ hour. These doors or access hatches shall be tested with the platform side facing the furnace.

The area of this bog, which may serve exclusively for the handling of goods, is calculated for judicious arrangement of the loading and unloading facility and for easy accessibility of service personnel.

Between the lock and the shaft are doors or hatches.

The platform walls of the shafts and their supervisory hatches have Rf 1 h.

The shaft doors or access hatches of these units operate automatically and are normally closed. One element can open only when the other is closed.

Any passages from horizontal conveyors to the paternoster and freight elevators, as well as passages from one compartment to another, are through a sas sealed by two shutters or doors that meet the criterion of flame tightness for ½ hour. These hatches or doors are tested with the platform side facing the furnace.

These hatches operate automatically and are normally closed; when passing through a container, such a hatch or door can only open if the other is closed.

If the container transport system follows a horizontal and/or vertical route, passing through building layers or compartments, shafts are provided at each of these passages. The shaft walls have Rf 2 h.

Their two shutters or doors meet the criteria of flame tightness for ½ hour. They are tested with the platform side facing the furnace. They operate automatically and are normally closed. Such a hatch or door can open only if the other is 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 2 h; if the escalator serves only a duplex, no casing is required.

6.3.2 Access to the stairwell is on each floor, through a sas with the following characteristics:

1. it includes two self-closing or, in the event of fire, self-closing doors Rf ½ h;
2. the walls have Rf 2 h;
3. the surface area is a minimum of 2 m²;
4. it is distinct from the landings and sasses of stairwells and should not be part of the evacuation route.

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 meet 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) the machinery of elevators with priority call and elevators intended for the evacuation of persons with reduced mobility referred to in section 6.4;
d) smoke extraction systems;
e) the water pumps for firefighting and possibly the emptying pumps.

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.

The enactment of the autonomous power source causes the successive return

of the cages of elevators without priority call to the evacuation level where they are held in stasis with the doors closed, after sufficient passage of time.

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 autono(o)m 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.

6.5.5 Lightning protection.

The buildings will be equipped with a lightning protection system that meets the requirements of standard NBN C 18-100.

6.6 Installations for combustible gas distributed by pipes.

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 2 h;
- either they are Ro 2 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 2 h;
- either they are Ro 2 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 shall pass through a wall requiring an Rf greater than or equal to 1 h, and no air duct shall 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 three 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 system with

positive safety. It is also equipped with a thermal detection that additionally makes the valve close automatically under the conditions listed for valve A.

Type C : the valve is normally closed but can be opened and closed by remote control using a positive safety system.

This type is only applicable in desiccation plants (see 6.8).

Closing (or opening for Type C valves) 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 2 h, (respectively Rf 1 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 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 the event of fire and a flame density of 2 h, (respectively 1 h) according to NBN 713-020. In addition, it meets the criterion of thermal insulation for 1 h (respectively ½ 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 operation of certain elements of the aerial systems must be able to be monitored and operated from a point readily accessible to the fire department and located at the usual level of access.

The fire control sign must contain at least the following elements:
- signaling operation or shutdown of air handling groups and fans (by group or fan);
- control devices to command operation or shutdown of above mentioned groups and fans (per group or fan);
- synoptic diagram of the building with clear localization of the technical premises and air handling systems.

This fire control board is located in the same room and is combined with the central control board for the smoke extraction systems (see 6.8.4.9).

6.8 Aerodynamic installations for smoke extraction.

6.8.1 General.

Buildings should be equipped with aerial systems for smoke extraction from stairwells and, if necessary, from horizontal evacuation routes or common halls.

Where the following provisions refer to stairwells, they are meant those serving the high parts of the building (i.e., located above the lowest evacuation level).

6.8.1.1 Trial conditions.

One considers a single infested building layer per building located at the evacuation level or any building layer above it.

The air flow rates listed are these under the reference conditions, 20°C and 1013 mbar.

The overpressure and airflow control tests shall be performed with outdoor temperature higher than 10°C and wind speed lower than 4m/s.

6.8.1.2 Airtightness of the stairwells

This should be such that their leakage flow rate is less than the flow rate, calculated below for all doors leading to it. For a differential pressure of 60 Pa, the maximum leakage rate is

17 l/s per meter gap for single doors and 5 l/s per meter gap for 2-door sashes.

For the shafts, the calculation considers only the gap lengths of a single door of the shaft. With a differential pressure, Δ P, different from 60 Pa, is :

$$Q_{Lmax} = Q60 \times (\Delta P/60)^{0,66}$$

in which

Q_{Lmax} = maximum leakage flow rate at
Δ P Q60 = leakage flow rate at 60 Pa.

6.8.1.3 Characteristics of the blow-in fans.

The blow-in fan of a stairwell shall not cause an excess pressure of more than 80 Pa in it, at a flow rate equal to the leakage flow rate of this stairwell with all doors closed.

The fan must provide a flow rate of at least 2 m³/s and in the stairwell the air must be refreshed at least 10 times per hour, when the excess pressure there is zero (doors or sassen open).

6.8.1.4 Pressure loss caused by inlet vents and air ducts.

Fresh air inlet grilles and air ducts are sized to produce a small pressure drop; air ducts have as few bends as possible.

6.8.1.5 Pressure balance.

The blow-in and blow-out fans of the common halls or horizontal evacuation paths are interlocked so as not to cause uncontrolled pressures so that, in case of lack of flow at the blow-in fan, the other stops.

In the absence of flow at the exhaust fan, the excess pressure created in the common halls or horizontal evacuation paths must be lower than the excess pressure in the stairwell.

6.8.2 Buildings whose height exceeds 25 m and does not exceed 50 m.

6.8.2.1 Principle.

In case of fire, the interior stairwells are overpressurized relative to the evacuation route.

Putting into positive pressure is obtained by mechanical ventilation. Ventilation is accomplished by blowing outside air into the interior stairwell by means of a fan and an air duct with one or more blower nozzles.

6.8.2.2 Pressures and flow rates.

a) when doors and shafts of the stairwell are closed, the overpressure of the stairwell relative to the horizontal evacuation path of the infested floor must be understood to be between 40 and 80 Pa;
b) at all open stairwell doors or sassen, the flow rate of blown air in the stairwell must be at least 2 m³/s and the air in the stairwell must be refreshed at least 10 times per hour.

6.8.3 Buildings whose height exceeds 50 meters.

6.8.3.1 Principle.

In case of fire, the interior stairwells are placed in overpressure relative to their sases and relative to the horizontal evacuation paths. On the infested building level, the horizontal evacuation paths are additionally ventilated by blowing in fresh air and extracting smoke.

Overpressurization, blow-in and extraction are done mechanically and only with outside air.

Ventilation is established by:

- blowing outside air into the interior stairwell by means of a fan and an air duct with one or more blower nozzles;
- blowing outside air into the common halls and into the horizontal evacuation paths, by means of a fan and an air duct with blower nozzles equipped with a valve that opens only at the infested building level;
- extracting and exhausting smoke by means of a fan, an air duct with valves that open only at the infested building level, and possibly a network of air ducts equipped with extraction nozzles in the horizontal evacuation paths.

6.8.3.2 Pressures and flow rates.

a) when doors or shafts of the stairwell are closed, the excess pressure between the stairwell and the horizontal evacuation path of the infested building floor must be understood between 40 and 80 Pa;
b) with all stairwell doors or shafts open, the blow-in flow rate in the stairwell must be at least 2 m³/s and the air in the stairwell must be refreshed at least 10 times per hour.
c) the blow-in flow rate in the horizontal evacuation path of the infested building layer must be at least 1 m³/s and the air must be refreshed there at least 10 times per hour.

6.8.4 Technical Provisions.

6.8.4.1 Outside air intakes.

Outdoor air inlets for smoke exhaust ventilation are installed on the façade exposed to the prevailing wind in the lower half of the protected areas.

Each air inlet to the stairwell of the common halls or horizontal evacuation paths has separate grilles and ducts.

The fresh air supply ducts for smoke exhaust ventilation are equipped with a motorized smoke damper. This damper opens or closes when the associated fan kicks on or fails.

A smoke damper shall meet the requirements specified in 6.7.5:

6.8.4.2 Evacuation of smoke.

Evacuation to the outside of the extracted smoke is along the roof of the building, or possibly at the level of a lower roof.

6.8.4.3 Separate aëraulic circuits.

Each air supply in a stairwell has a fan and air ducts, separate from those of

the other stairwells.

For air supply in horizontal evacuation paths, vertical ducts serving the same common hall or horizontal evacuation path may have a common fan.

The same applies to extraction in the horizontal evacuation paths.

The horizontal evacuation paths served by separate groups of vertical ducts per compartment must have separate blow-in fans. The same applies to smoke extraction fans.

6.8.4.4 Fans of the smoke extraction system.

If the fans of the smoke extraction system are placed inside the building, they must be placed in a private room whose walls have Rf 2 h. The doors of the room have Rf 1 h.

The exhaust fans are capable of discharging 300°C smoke for at least 30 min.

6.8.4.5 Construction of air ducts.

The air ducts, including their inner or outer linings, are made of Class A0 materials.

The smoke extraction ducts must be able to discharge gases up to 300°C and resist the expansion forces induced by these temperatures.

The air ducts for smoke exhaust ventilation have Ro 2 h or are placed in proprietary ducts with walls Rf 2 h.

Notwithstanding the preceding paragraph, a fire stability of ½ h is sufficient for the horizontal air ducts of the smoke exhaust ventilation placed in a compartment and serving only this compartment.

6.8.4.6 Blower nozzle in stairwells.

The blower nozzle(s) of a stairwell is located in the lower half of that stairwell.

6.8.4.7 Blow nozzles and valves in the horizontal evacuation paths.

Where a blow-in duct enters the compartment, it is equipped with a fire damper that is closed in normal conditions and that opens automatically in case of fire in this compartment.

The valve is Type C and meets the requirements listed in 6.7.4.

The upper edge of the blowholes or nozzles shall be no more than 1.50 m above the floor.

6.8.4.8 Exhaust nozzles and valves in apartment common halls or horizontal evacuation paths.

6.8.4.8.1 Where an exhaust duct leaves the compartment, it is equipped with a fire damper, which is closed in normal conditions, and which opens automatically in case of fire in this compartment.

This valve is Type C and meets the requirements listed in 6.7.4.

6.8.4.8.2 The distance between 2 extraction nozzles or between an extraction nozzle and a blowing nozzle is no more than 10 m if the path followed is rectilinear and no more than 7 m in the other case. In the areas where there is no air circulation for smoke exhaust (dead-end corridor), the distance between an exhaust nozzle and the door of a room does not exceed 5 m.

Each mouth ensures an equal suction flow rate with a tolerance of ± 10%.

The extraction nozzles are installed as close to the ceiling as possible. Their lower edge is at least 1.80 m above the floor.

The horizontal ducts on which several suction nozzles are placed have a maximum length of 20 m, measured from the vertical duct to which they are connected.

6.8.4.9 Operation of smoke exhaust ventilation systems.

As stated in Section 6.7.6, a central control and command station for all aerial systems for the benefit of the fire department shall be located in the building.

This station should also include a control and operating panel for the smoke extraction systems.

The operation of the smoke exhaust ventilation system is done:
- automatically by combustion gas detectors judiciously distributed along the total length of the horizontal evacuation paths;
- manually by remote control from the central control station.

The central checkpoint provides:
- turn on or off any stairwell fan;
- turn on or off each blower and exhaust fan of a common hall or of horizontal evacuation paths, simultaneously;
- open the blower and exhaust valves for the smoke exhaust for each compartment.

Re-activation of the smoke exhaust ventilation system must be possible to put the automatics back on hold.

If necessary, the operation of the smoke evacuation system is signaled by sound and light signals.

Access to the controls of the central control station is by key.

6.8.4.10 Signalization.

6.8.4.10.1 A signage board in the central control station indicates the position of the smoke exhaust ventilation system.

6.8.4.10.2 Blower and suction valves.

For the blower and exhaust valves in the common hall of apartments or horizontal evacuation routes, the signage board for each compartment indicates the following positions:

- all valves are closed;
- all the valves are open;
- all valves are not in the same position.

6.8.4.10.3 Fire detection.

The signage board indicates for each compartment the functioning of the fire detection system, as well as the faults and failures occurring in the fire detection system.

6.8.4.10.4 Smoke exhaust fans.

The signaling board indicates the operation and shutdown of each fan. This signaling is done with airflow detectors.

6.8.4.11 Electrical power supply.

The fire detection, the light signals and the device for operating the blow-off and exhaust valves for smoke extraction are designed to remain in operation when the mains voltage is interrupted.

The blower and exhaust valves for smoke discharge open in the absence of voltage.

6.8.5 Maintenance - Testing - Control.

6.8.5.1 Maintenance.

The devices (detectors, valves, fans, etc.) are regularly maintained according to the manufacturer's guidelines. The constructor delivers for each device, an instruction which includes the periodicity, the nature of the maintenance to be carried out and any professional competence of the personnel welded with the maintenance. This instruction shall be attached to the safety register.

6.8.5.2 Periodic tests.

The appliances of each level of construction shall be periodically tested in accordance with their ordinary operation. The fans shall be tested quarterly and the other appliances at least once a year.

6.8.5.3 Control.

The check of the operation, including the measurement of flow and differential pressure, shall be carried out before occupying, even partially, the building and at any change that may affect the smoke exhaust.

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

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

6.9.1 Notification and firefighting devices are required in buildings.

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

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

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

6.9.2.2 Devices that require human intervention are placed on visible or clear designated areas that are freely accessible in all circumstances. They shall be located, inter alia, near exits, on landings, in corridors and shall be arranged so as not to impede circulation.

hinder and cannot be damaged or bumped into.

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

6.9.2.3 The signage complies with applicable regulations.

6.9.3 Fire alarm.

6.9.3.1 The notification of discovery or detection of fire shall be capable of being immediately communicated to the fire departments by a notification device on each floor and at least one in each compartment.

6.9.3.2 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.

6.9.3.3 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.

6.9.4 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.

6.9.5 Firefighting equipment.

6.9.5.1 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.

6.9.5.2 Portable or mobile rapid extinguishers.

For special fire hazards, these devices are d e t e r m i n e d by the nature and extent of this hazard.

6.9.5.3 Wall reels with axial feed, wall hydrants.

6.9.5.3.1 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 has at least one reel and one hydrant;
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).

6.9.5.3.2 The riser that feeds these devices with pressurized water has the following characteristics:

- the inner diameter is at least 70mm and the residual pressure at the least endowed hydrant is at least 2.5 bar when this hydrant flows 500 l per minute without hose nor nozzle.

- In addition, the installation must be able to provide a minimum water flow of 30 m³/h for at least 2 h.

6.9.5.3.3 The devices are fed with pressurized water without prior operation.

Branching from the public water system to the indoor pipe can be performed:

- either with direct passage without meter;

- either with a meter of the "Woltmann" type or similar, whose design and construction characteristics limit the pressure loss to a low value.

The following regulations are valid:

- the general shut-off valves and all intermediate valves are sealed in the open position;

- for a branch with direct passage, the operation of extinguishers is sealed in the closed position;

- the pipes exposed to frost are carefully protected without hindering or delaying their operation;

- the pipelines shall be equipped with the strictly necessary number of barrage valves and drain valves to prevent danger and nuisance in case of breakage;

- at the base of each vertical pipe, at its connection to the main pipe, a shut-off valve and a drain valve shall be provided;

- the handwheels of barrier valves and drain valves bear clear indications in connection with their opening direction;

- a pressure gauge with a three-way check valve is installed behind the general shut-off valve and a second one beyond the highest unit in relation to the floor. These pressure gauges allow a pressure reading of up to 10 bar with an accuracy rate of 0.2 bar (see NBN 363).

6.9.5.4 Underground and above-ground hydrants.

6.9.5.4.1 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 minimum capacity 100 m³ are used.

6.9.5.4.2 The location and number of hydrants above and below ground shall be determined so that at each entrance to the building the sum of the distances from that entrance to the two closest hydrants is less than 100 m.

6.9.5.4.3 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 can drive and park.

0 GENERAL.

0.1 Objective.

These basic regulations define the minimum requirements that the conception, construction and design of high-rise (HG) buildings 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 tall buildings;

2. the extensions of buildings that when realized are tall buildings;

3. the premises or parts of tall 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 referred to in point 4 of paragraph 0.2.1 of Annex 3/1.

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

Plate 4.1 - Outbuilding roofs Plate 4.2 -
Facades between buildings Plate 4.3 -
Facades
Plate 4.4 - Facades
Plate 4.5 - Facades
Plate 4.6 - Facades between compartments
Plate 4.7 - Roofs

1 IMPLANTATION AND ACCESS ROADS.

The access routes referred to in 1.1, 1.4 and 1.5 shall be determined in agreement with the fire department, according to the following guidance.

1.1 Fire department accessibility and emplacement

The building is continuously accessible to motor vehicles.

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; it shall be 8 m if the access road is dead-end;
   - 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.
   - ability to simultaneously carry 3 car vehicles of 15 t.
   - the distance from the edge of the road to the plane of the façade is between 4 m and 10 m.

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.

If the glazed facades of the building project over building components that may or may not be part of this building, then:

1. either the roofs of the building components meet the following conditions:

Horizontal distance from facades, a	Requirement for fire resistance
a < 1 m	EI 120
1 m < a < 5 m	E 120

If there are skylights, air vents, smoke outlets and openings in the roof over a distance of 5 meters that do not have the required fire resistance, they must meet the following conditions:

- or are shielded from openings in the facades by a building element that meets the following conditions (Plate 4.1):

Horizontal distance from facades, a	Requirement for fire resistance
a < 1 m	EI 120
1 m < a < 5 m	E 120

- or the total area of the openings in the roof does not exceed 100 cm²;

2. either the building facades meet the following conditions:

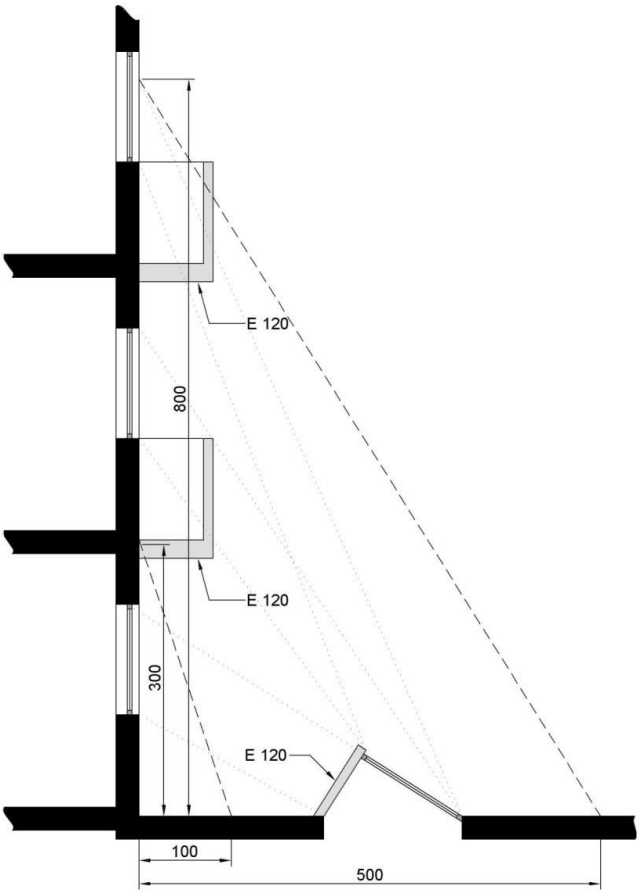
Height measured from the roof, b	Requirement for fire resistance
b < 3 m	EI 120 $_{(i \leftarrow o)}$
3 m < b < 8 m	E 120 $_{(i \leftarrow o)}$

If windows, air vents, smoke outlets and openings that do not have the required fire resistance are present in the façade over a height of 8 meters, they must meet the following conditions:

- either they are shielded from the openings in the roof by a building element that meets the following conditions (Plate 4.1):

Horizontal distance from facades, a	Requirement for fire resistance
a < 1 m	EI 120
1 m < a < 5 m	E 120

- either the total area of the openings in the facade does not exceed 100 cm².



1.3 Horizontal distance between buildings

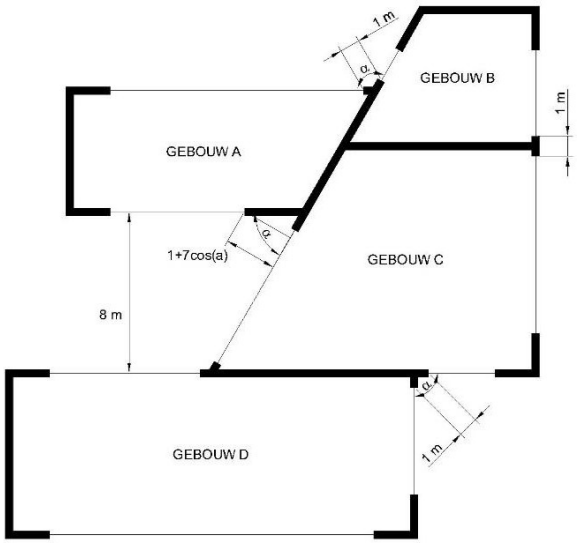
To prevent a fire from spreading between two buildings:

(a) either, if facades face each other or form a recessed dihedral angle, the distance (in m) between facade sections that do not have at least EI 240 or REI 240 shall be at least:

$1 + 7 \cos \alpha$ for $0° \leq \alpha \leq 90°$

1 for 90° <α ≤ 180°

where α is the contained angle (Plate 4.2).



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

Walls separating adjacent buildings have EI 240 or REI 240 when they are load-bearing.

In these walls, a connection between these buildings may exist via a sas, provided it bears the following characteristics :

1. it should not end in a stairwell;
2. it contains two self-closing doors $_{EI1}$ 60;
3. the walls have EI 120;
4. the surface area is a minimum of 2 m².

1.4 Accessible facades for the fire department

At least one of the long facades must run along a road accessible to fire department vehicles, and if the long facade does not contain a main entrance, the road must additionally run along a facade that does contain such an entrance.

The distance from the edge of this road to the plane of the facade should be between 4 m and 10 m.

The distance to be covered from the roads defined above to the elevators intended for the fire department (see 6.4.2), shall not exceed 30 m.

If a pedestal supports one or more buildings, one of the following two provisions shall apply :
- the platform of the pedestal is accessible to the vehicles of the fire department, subject to the requirements of 1.1 but with the exception of the slope of the ramp which may be 12%;
- at least one of the facades of each building is accessible by a road for ordinary open-air traffic or in a tunnel that contains an open-air segment every 25 m of at least

at least 15 m x 7 m.

1.5 Distance to fire station

HG with a height of more than 50 m are planted within 10 km, along drivable roads, of a fire station.

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 area of a compartment may exceed 2500 m² if it is equipped with an automatic extinguishing system and a smoke and heat extraction system. The Minister of the Interior determines the conditions under which a compartment may be larger than 2500 m² without having to provide an automatic fire extinguishing system and 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;
   for the buildings for which the application for construction was submitted before April 1, 2017, in case the duplex is located on the highest two floors of the building, the compartment area may be 2,500 m² per floor;
b/1) the height of a compartment may extend over three superimposed building floors 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;
c) for buildings for which the application for construction was submitted before April 1, 2017, the first floor and the second floor (or mezzanine) may also form one compartment, provided that the total volume does not exceed 25000 m³;
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 are possible to the mandatory installation of an automatic fire extinguishing system and a smoke and heat extraction system;
   - and that the evacuation capabilities of the building shall comply with the provisions of this annex where evacuation through the atrium may not be considered.

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:

- two outputs;

- 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.

If the occupancy is 50 or more than 50 persons, the number of exits from building floors and rooms shall be determined as for compartments.

For the two underground levels immediately below the evacuation level, one exit is sufficient if these levels contain only premises such as storerooms and if the distance from any point of the compartment to the exit is less than 15 m.

In the event that a compartment extends over several floors (atrium), the evacuation possibilities of the building must comply with the provisions of this annex, whereby evacuation through the atrium may not be taken into account.

2.2.2 Outputs.

The exits are located in opposite zones of the compartment.

Compartments not located on an evacuation level are connected to the evacuation level by stairs located inside or outside the building (for horizontal distances see 4.4).

For underground building levels, an exit that meets the requirements of an exit for the evacuation level may replace the required access to a stairwell.

For parking: see 5.2.

At an evacuation level, each stairway leads to the outside either directly or over a separate evacuation path that meets the requirements of 4.4.2.

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 have R 120.

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 vertical interior walls that demarcate classrooms or the entirety of classrooms with night occupancy have EI 60.

The doors in these walls have $_{EI1}$ 30.

The vertical interior walls of archive rooms have EI 60; their doors are self-closing or self-closing in case of fire and have $_{EI1}$ 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 4.4.3 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

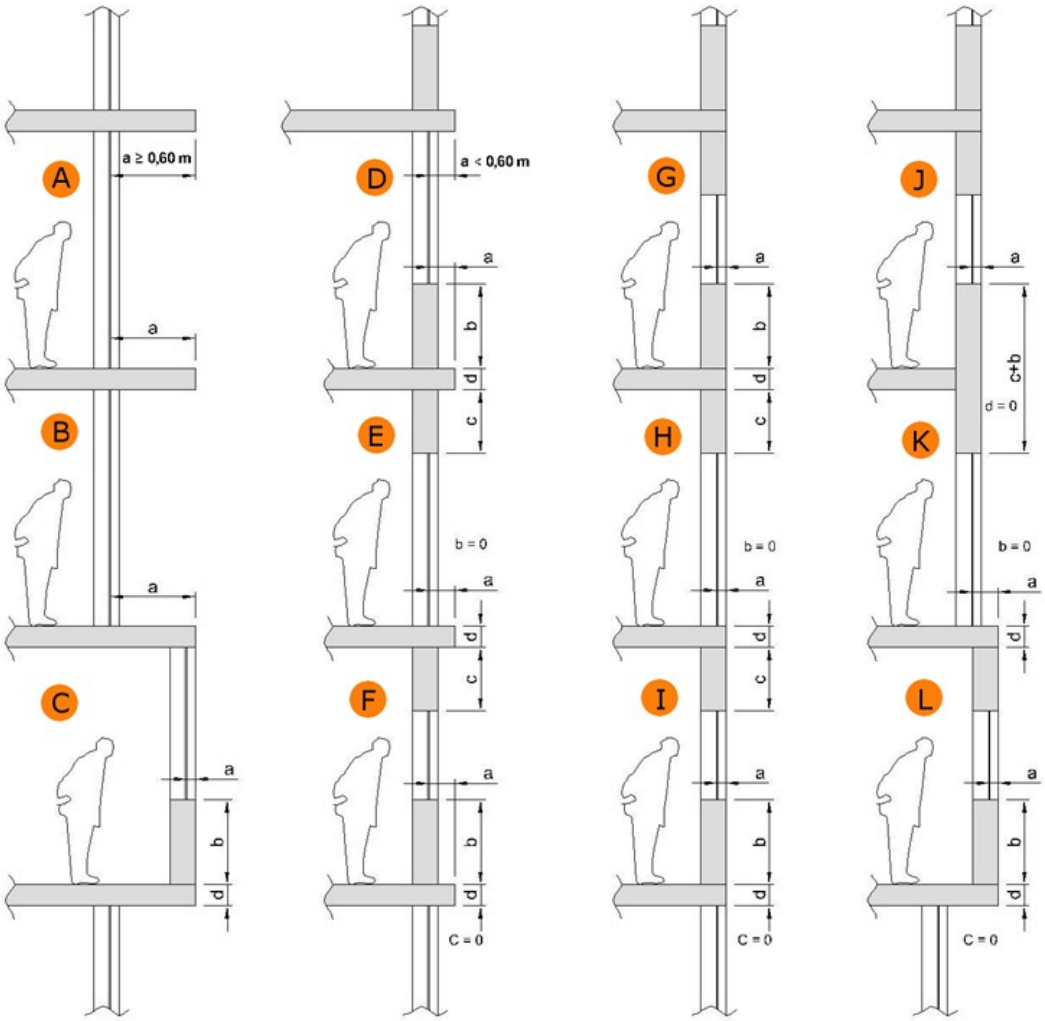
The studs of the curtain wall skeleton shall be attached to the building frame at the level of each floor. With the exception of buildings equipped with an automatic extinguishing system, these attachments shall be R 60 with respect to a fire in an underlying and adjacent compartment.

The connection of the compartment walls to the façade has at least EI 60 or EI 60 (i→o).

To reduce the risk of fire spread along the façade between compartments in a vertical or horizontal plane, one of the following requirements must be met:

(1) either the facade is provided with a fire-resistant building element at the level of the connection of the facade with the compartment wall (horizontal or vertical).

The figures of Plate 4.3 show how this building element is applied in relation to a horizontal compartment wall.



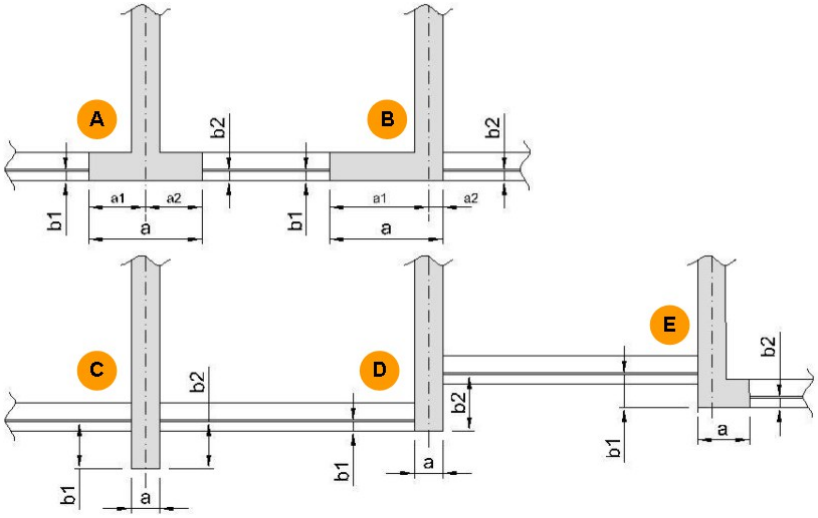
It includes:

- either a horizontal overhang, having at least E 60, with width "a" equal to or greater than 0.60 m and connected to the floor (Plate 4.3, Figures A and B);

- or an element composed:
  - from a horizontal overhang, which has at least E 60, with width "a" and connected to the floor;
  - in the upper storey, from a parapet, which has at least E 60 - ef (o→i), with height "b";
  - in the underlying building layer, from a lintel, which has at least E 60 (i→o), with height "c".

The sum of dimensions a, b, c and d (floor thickness) is equal to or greater than 1 m; each of dimensions a, b or c may be zero if necessary (Plate 4.3, Figure C to L).

The figures of Plate 4.4 show how this building element is applied in relation to a vertical compartment wall.

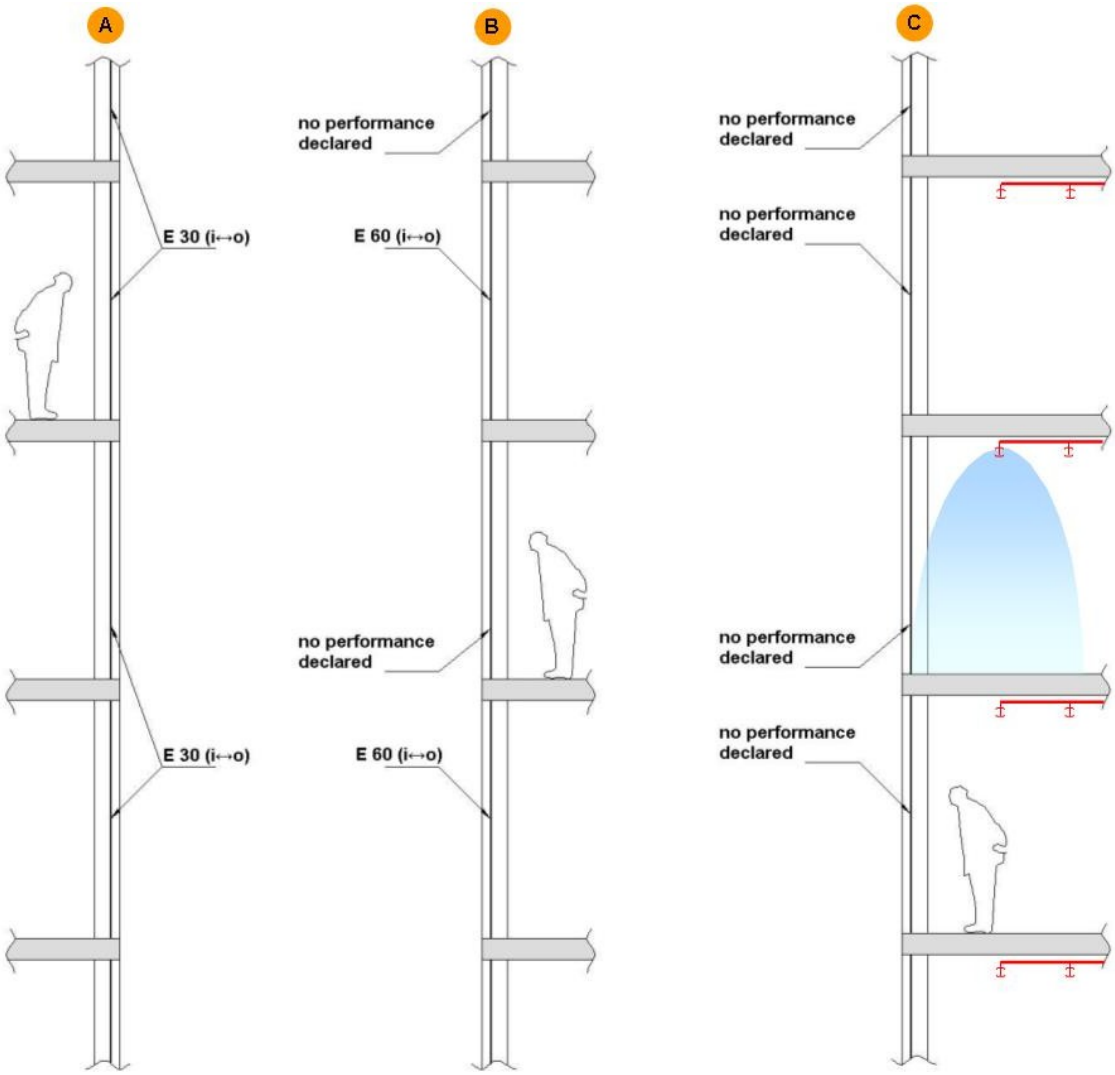


It includes:

- either an element located in the extension of the façade that has at least E 60 (i↔o); the width of this element (b1+b2+a) (Plate 4.4, Figures A and B) is at least 1 m; the parts of this element located to the left and right of the center line of the common wall are at least 0.50 m wide, if they are two different buildings (a1 ≥ 0.50 m and a2 ≥ 0.50 m);

- either a vertical overhang located in the center line of the wall separating the two buildings or compartments and having at least E 60 (o→i) (Plate 4.4, Figure C) or E 60 (i→o) (Plate 4.4, Figure D); the length of this element (b1+b2+a) is at least 1 m;

- or a combination of the previous elements in such a way that the sum of the lengths is at least 1 m (Plate 4.4, Figure E).



(2) either the facade has at least either E 30 (i↔o) over the full height of the building (Plate 4.5, Figure A) or E 60 (i↔o) every two building levels (Plate 4.5, Figure B).

(3) either the compartments located along the facades are equipped with an automatic extinguishing system of the sprinkler type adapted to the risks present (Plate 4.5, Figure C).

3.5.1.2 Opposite facades and facades forming a dihedral angle

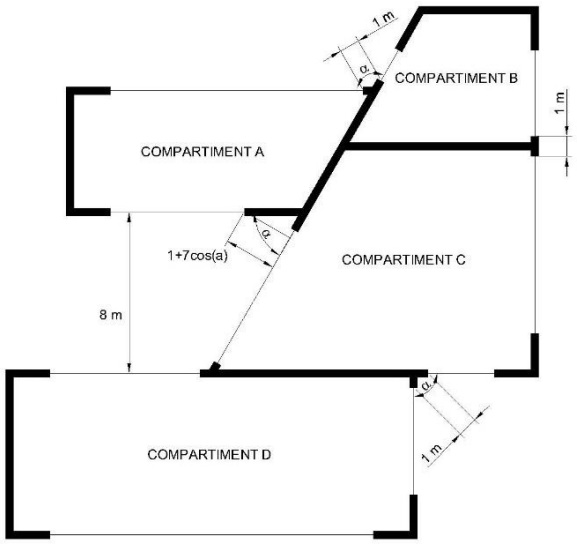
To prevent a fire from spreading between two compartments:

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

$1 + 7 \cos \alpha$ for $0° \leq \alpha \leq 90°$

1 for $90° < \alpha \leq 180°$

where α is the enclosed angle (Plate 4.6).



(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 facade 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 the 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 façade between floors consists of at least 50% 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 requirements 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 from 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 shall be actuated 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.

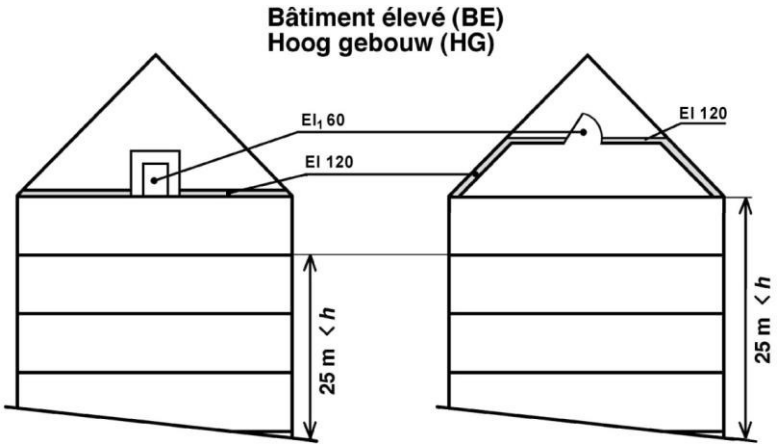
3.5.2.3.3 Operation in case of fire in an adjacent compartment.

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

3.6 Roofs.

Flat roofs and those with a slight slope (slope angle not exceeding 10°) have R 120.

This requirement does not apply if the subroof floor has EI 120 (Plate 4.7) and if access to the space under the roof, which must be empty, is through doors or shutters $_{EI1}$ 60.



This requirement also does not apply to the roofs whose area is less than or equal to 100 m².

4 PRECAUTIONS ON CONSTRUCTION OF COMPARTMENTS AND EVACUATION ROOMS.

4.1 Compartments.

The walls between compartments have EI 120. For the

facade or exterior walls, 3.5 applies.

The connection between two compartments is permitted only if it is through a shaft that has the following characteristics:

1. it includes self-closing doors with $_{EI1}$ 30;
2. the walls have EI 120;
3. the surface area is a minimum of 2 m².

The sas can serve as a sas for the stairwell but not as a sas for elevators.

The doors may be self-closing in case of fire provided 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.

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 120.

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

4.2.2.2 Stairwells should provide access to an evacuation level and to all upper levels of buildings.

If the building is equipped with a flat roof or a roof with a slight slope (see 3.6), each stairwell serving the floors above the evacuation level provides access to the roof, except for those located in the portions of the building that contain no more than 3 floors above the evacuation level.

If the access door to the roof is usually closed, it must carry a glazed box on both the inside and outside that contains the door key.

4.2.2.3 At each building level, the connection between the evacuation route and the stairwell is ensured by a shaft with the following characteristics :

1. it provides access to a single stairwell;
2. it contains self-closing doors EI1 30 that open in the sense of escape; they shall not be equipped with a locking system that would prevent its opening; their useful width is greater than or equal to the required useful width (calculated according to Annex 1 "Terminology") and is at least 0.80 m;
3. the walls have EI 120;
4. the surface area is a minimum of 2 m².

At an evacuation level, this shaft can be replaced by a self-closing door with EI1 60 and with the characteristics of the aforementioned shaft doors.

The doors may be self-closing in case of fire provided:
- That the building is equipped with an automatic fire detection system of the total surveillance type that automatically provides an indication of the fire alarm and its location and whose detectors are adapted to the risks present;
- and that all compartments served by this stairwell have daytime occupancy only.

A direct connection of each floor of a duplex or triplex to the stairwell is required.

4.2.2.4 If several compartments lie in the same horizontal plane, they may have one or more common stairwells provided they are accessible from each compartment by a connection that meets the requirements of 4.2.2.3.

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 120;
2. access from each stairwell to the evacuation level shall be in accordance with the requirements of 4.2.2.3 with the exception of the case referred to in 4.2.2.9 where access may be through a door with $_{EI1}$ 30.

4.2.2.6 At the top of each interior stairwell there is a ventilation opening with a cross-section 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.

- detection means;

- fire extinguishers, with the exception of wall reels;
- signaling devices;
- lighting equipment;
- heaters;
- ventilation devices;
- DEPARTMENTS;
- blow-in devices.

Electrical conduits, ventilation ducts, smoke ducts and blow-in ducts are permitted only if they serve only for the operation of the aforementioned objects installed in the stairwell.

Water pipes are allowed in the stairwells. Any other

piping is prohibited in the stairwells.

4.2.2.8 In high-rise buildings (HG), the common hall of apartments served by one or more of the same interior stairwells may be considered either as sas of the elevators or as sas of one or more stairwells, if the number of apartments evacuating through this common hall is less than or equal to 6 apartments.

In derogation of 4.2.2.3, a sas (common hallway) may provide access to multiple stairwells, and doors on the common hallway may open against the sense of escape and not be self-closing.

4.2.2.9 In the tall buildings (HG) of maximum 36 m in height, the common hall of apartments served by one or more of the same interior stairwells may be considered at the same time both as the axis of the elevators and as the axis of one or more stairwells, if the number of apartments evacuating through this common hall is less than or equal to 4 apartments.

In derogation of 4.2.2.3, a sas (common hallway) may provide access to multiple stairwells, and doors on the common hallway may open against the sense of escape and not be self-closing.

4.2.3 Stairs.

4.2.3.1 Construction provisions.

The stairs have the following features:

1. Like the spillways, they have R 60 or are designed in the same way as a concrete slab with R 60;
2. they have solid risers;
3. they are equipped with a handrail on both sides, including along the landings;
   For stairs with a useful width, less than 1.20 m, one handrail is sufficient, provided there is no danger of falling;
4. the step tread is at least 20 cm in each point;
5. the rise of the steps should not exceed 18 cm;
6. their slope should not exceed 75% (maximum slope angle 37°);
7. they are of the "straight type."

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 door swing shall not limit the useful width of the overflows to a value less t h a n b_r .

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 stairwells meet the conditions of 4.2.2.2.

Exterior stairwells are enclosed by walls; at least one side shall allow free entry of outside air on each level.

No point of the stairway shall be located less than 1 m from a façade section that does not have EI 60.

The requirements of 4.2.3 apply to it with, however, the following deviation: the risers are not required; no fire stability is required, but the material belongs to class A1.

The connection between the compartment and an outdoor stairwell occurs:
- either through a door $_{EI1}$ 30 ;
- either through escape terrace(s).

One stairwell may be replaced by two external staircases with straight stair arms; these staircases are connected by escape terraces on which any transverse dividers must not form difficult obstacles.

A single external staircase is sufficient at the HG referred to in

4.2.2.9. These external stairs have the following characteristics:

1. width minimum 0.60 m;
2. slope angle no greater than 45°;
3. tread of steps at least 0.10 m;
4. rise of the steps maximum 0.20m;
5. at each staircase two handles.

However, a stairway 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.

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 that meets the requirements of Section 4.4.2 applicable to evacuation routes connecting stairwells to the public road.

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.

4.4.2 At an evacuation level

The vertical interior walls of the evacuation routes connecting stairwells to the public road have EI 120, and the doors of the classrooms giving onto these routes are self-closing and have $_{EI1}$ 60.

Doors may be self-closing in case of fire provided:
- That the building is equipped with an automatic fire detection system of the total surveillance type that automatically provides an indication of the fire alarm and its location and whose detectors are adapted to the risks present;
- and that all compartments served by these evacuation routes, as well as all compartments served by stairwells leading to these evacuation routes, have daytime occupancy only.

However, apartment doors opening onto the evacuation road may be self-closing in the event of a fire provided:
- That these doors are self-closing only in case of fire. In everyday use, these doors are not self-closing (door closer with freewheeling function);
- and that the building is equipped with an automatic fire detection system of the total surveillance type that automatically provides an indication of the fire alarm and its location and whose detectors are adapted to the risks present.

Evacuation routes that do not connect stairwells to the public road must meet the requirements of 4.4.3.

At such level, access to the stairwell shall be in accordance with 4.2.2.3.

The evacuation route may include the entrance hall. This hall may include access to elevators and non-enclosed areas intended for reception and related services with the exception of
Of drinking establishments or dining places.

At an evacuation level, no exit windows of building sections with a commercial function, which do not have EI 120, 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.

4.4.3 On a building level that is not an evacuation level.

In a compartment, connection between and to stairwells is via evacuation routes or over escape terraces. These paths shall not pass through stairwells nor their sashes.

The travel distance between the entrances to the sasses of the stairwells is less than 60 m.

The vertical interior walls of the evacuation routes have EI 30 and the access doors to these routes have $_{EI1}$ 30.

This requirement, as well as the requirement of Sections 3.4.1 and 6.7.2.1 and of the second paragraph of Section 6.9.3.1, shall not apply to day-occupancy-only compartments whose area is less than 2,500 sq. ft. 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.

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.

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

1. access to two exits leading:

    - or, for a technical compartment with an area less than or equal to 100 m², to an adjacent compartment through a self-closing door $_{EI1}$ 60;
    - either to an adjacent compartment via a sas according to 4.1;
    - either to a stairwell via a sas according to 4.2.2.3;
    - or 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 Firing 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;
- Access doors to these boiler rooms and fuel storage rooms are self-closing and 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 boiler rooms are located in the two upper floors of the building sections.

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: Does not apply to combustion units with combustion appliances with a total useful heat output (also called total rated output) greater than or equal to

to 70 kW if the access to the boiler room and the fire resistance of the walls, floors, ceilings and doors of the boiler room meet the requirements of standard NBN B 61-001 +A1 : 1996.

In addition, the heating departments and ancillaries lie:

- either in a neighboring building at a horizontal distance of at least 8 m within which there is no combustible element referred to in section 1.3;

- either in the building, but under the following conditions:
  - they must not be in, nor under, the high part;
  - however, boiler rooms with gas lighter than air may be located on the highest building level;
  - their connections to the other portions of the building are through a shaft of the type described in Section 1.3; their doors turn 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 120, except for the exterior walls;
- the interior doors have $_{EI1}$ 60;
- 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 120.

Access, if not from the outside, is through a door $_{EI1}$ 60.

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 120.

The classroom is accessible

a) either through a sas with the following characteristics:
   1. self-closing doors $_{EI1}$ 30;
   2. walls EI 120;
   3. minimum area 2 m²;

b) either by a self-closing door $_{EI1}$ 30 provided that the room for storage of the

garbage is equipped with an automatic extinguishing system.
This automatic extinguishing system is assumed to be compliant if it meets the requirements of the section 5.1.4.3.

5.1.4.3 Type solution for the premises for the storage of the garbage - Automatic extinguishing system of the sprinkler type directly connected to the public water supply system.

This type solution is applicable only to a room for the storage of domestic waste whose area is less than or equal to 24 m².

This type solution describes an automatic extinguishing system with water connected to the public water supply system without mandatory installation of overpressure equipment (e.g. pump). This system is an installation in which the pipes are always filled with water.

5.1.4.3.1 Environmental and operating conditions

The entire automatic fire suppression system, including the garbage storage room and the piping to it up to the building's water meter, must be protected from frost.

The pressure of the water in this system should not exceed 12 bar.

This automatic extinguishing system must be permanently capable of operation except during testing, checks or maintenance (all valves in the supply lines and the valves in the system itself in open position, components maintained in good working order, ...).

5.1.4.3.2 Features for design and installation of sprinklers

The sprinklers conform to standard NBN EN 12259-1 and have the following characteristics:
- they are of the conventional type, hanging or standing;
- their nominal operating temperature is 68°C or less;
- Their K-factor is between 75 and 85. The K-factor corresponds to the flow rate in l/min of a sprinkler subjected to a pressure of 1 bar.

The sprinklers are installed under the ceiling at a maximum distance of 30 cm from it or are built into the ceiling.

If the area of the room is less than or equal to 12 m², one sprinkler shall be installed in the center of the room.

If the area of the room is greater than 12 m² and less than or equal to 24 m², two sprinklers shall be installed centrally in the room, with a distance of not less than 2 m and not more than 4 m between them.

5.1.4.3.3 Characteristics of the pipes

The pipes of the system are in steel.

Piping from the system and that from the system to the building water meter shall have a nominal diameter (internal) of at least 25 mm.

The pipes are attached to the walls or built in, including in the room for garbage storage.

5.1.4.3.4 Water flow alarm

The water supply line is equipped with an alarm placed outside the room for the

domestic waste storage and complies with standard NBN EN 12259-2 or standard NBN EN 12259-5.

The piping of the system downstream of the alarm device shall only be used for automatic extinguishing of the household waste storage room.

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 tubes have EI 120 and the trapdoors and doors have $_{EI1}$ 60.

   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.

   The tubes should not give out on the stairwells and their sasses.

   In the HG referred to in 4.2.2.9, the ducts may exit onto the common hall.

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 60 and the trapdoors and doors EI1 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 60.

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 60 and the trapdoors and doors EI1 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 60.

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 lot have R 240 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 120;
- or the structural elements of the roof are separated from the rest of the parking lot by a building element EI 120.

5.2.2 Compartment.

The walls and the connections between the parking lot and the rest of the building conform to the point 4.1, with the following modification : the doors of the connections can be self-closing in case of fire.

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 parking that carry it or the tall buildings have R 240 ;
- the structural elements of the parking lot that, in the event of collapse, could cause damage to the structural elements supporting it or the tall buildings have R 240 ;
- the other structural elements of the parking lot have R 120.

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.

The walls between the parking lot and the rest of the building meet the requirements of 4.1.

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

The walls of these classrooms exhibit EI 120 and:
- access is by a sas with walls EI 120 and self-closing or, in the event of fire, self-closing doors EI1 30;
- Whether access to each room is by a self-closing or fire self-closing door EI1 60.

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 level under consideration by a direct exit to the open air;
- on the building level closest to the exit level, the sloped roadway may replace one of the stairwells or external stairs if its walls have EI 120 and 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 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, then these halls may only be arranged underground provided the following conditions are met:
- the difference between the lowest floor level of these halls and the nearest evacuation level should not exceed 3 m;
- the number of exits is determined as for compartments;
- evacuation is done : either by stairs or by ramps that reach a maximum of 10% in the center line. The total width of these roads exceeds the theoretical useful width.

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 classrooms or whole of classrooms have EI 120.

Each passage in the vertical walls is closed by a self-closing or fire self-closing door $_{EI1}$ 60 ; or by an axis of minimum 2 m² bounded by walls EI 120 and by self-closing or fire self-closing doors $_{EI1}$ 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 on an evacuation level and on adjacent levels provided:

1. the complex with its galleries is separated from other building parts by walls with EI 120;
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 with EI 120.

Any passage to the rest of the building shall be closed either by a self-closing or fire self-closing door EI1 60, or by an airlock of minimum 2 m² bounded by walls EI 120 and by self-closing or fire self-closing doors $_{EI1}$ 30.

These doors turn in the escape direction 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 120 when passing through other premises;
- the conveyor system is sealed at the level of the compartment wall(s) with a device $_{EI1}$ 120.

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.

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 installed in the shaft(s).

6.1.2 Opinion.

6.1.2.1 The assembly consisting of one or more shafts and any engine room, as well as access landings to form a shaft, is enclosed by walls with EI 120.

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 shall be separate from the landings and shafts of the stairwells, and shall not be part of the evacuation route, except in the cases referred to in points 4.2.2.8 and 4.2.2.9.

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.

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.

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 is the

storeys of only one compartment consisting of several storeys serves;

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 outside air, provided that the view of such 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 (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 120. The

doors or trapdoors in these walls have $_{EI1}$ 60.

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 through 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 platform 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.

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 engine rooms and shafts have EI 120.

Upon arrival at each served building level, a sas must exist with walls EI 120.

The doors or access hatches are self-closing and have E 30. These doors or access hatches are tested with the platform side facing the furnace.

The area of this bog, which may serve exclusively for the handling of goods, is calculated for judicious arrangement of the loading and unloading facility and for easy accessibility of service personnel.

Between the lock and the shaft are doors or hatches.

The shaft walls on the compartment side and entrances in these walls have EI 60.

The shaft doors or access hatches of these units operate automatically and are normally closed. One element can open only when the other is closed.

Any passages from horizontal conveyors to the paternoster and freight elevators, as well as passages from one compartment to another are through a sas, closed by two shutters or doors with E 30.

These hatches operate automatically and are normally closed; when passing through a container, such a hatch can only open if the other is closed.

If the container transport system follows a horizontal and/or vertical route, passing through building layers or compartments, shafts are provided at each of these passages. The shaft walls have EI 120.

Their two shutters or doors have E 30. They are tested with the platform side facing the furnace. They operate automatically and are normally closed. Such a hatch or door can only open if the other is 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 EI 120.

6.3.2 Access to the stairwell is on each floor, through a sas with the following characteristics:

1. it contains two self-closing or in the event of fire self-closing doors $_{EI1}$ 30;
2. the walls have EI 120;
3. the surface area is a minimum of 2 m²;
4. it is distinct from the landings and sasses of stairwells and should not be part of the evacuation route.

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 level(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 levels 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 gives out directly into the open air, provided that the view of such escalator on the other building levels does comply with the requirements of Sections 6.3.1 and 6.3.2 or with (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 shall permit communication between each elevator landing, the evacuation level and the engine room or emergency operations panel, so that the building floors on which persons with reduced mobility who need to be evacuated can be located

are can be recognized and this information passed on 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.

Each compartment and level equipped with an elevator, with the possible exception of the technical compartment of the higher level, shall be served by at least:

a) 1 elevator intended for the fire department for the buildings whose height is between 25 m and 100 m;
b) 2 elevators intended for the fire department for the buildings whose height exceeds 100 m.

These elevators intended for the fire department shall comply with the following requirements in addition to those listed in Section 6.1.

Notwithstanding the first paragraph, an elevator intended for the fire department is not required in the buildings referred to in Section 4.2.2.9.

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 For buildings whose height is between 25 m and 75 m, all elevators and their electrical equipment must have the same fire protection as the elevator intended for firefighters if a wall EI 60 is not provided in an elevator battery to separate the elevator intended for firefighters from the other elevators in the same shaft.

For buildings whose height exceeds 75 m, each assembly consisting of the shaft and any machine room, as well as the elevator landings, of an elevator intended for fire department shall form an independent assembly from the other elevators that meets the requirements of Section 6.1.2.1.

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 the platform of the fire department access level is provided a switch with "fire department key" that allows the fire department 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.

However, for the buildings whose height exceeds 200 m, this time is extended by 1 second per 3-m slice located higher than 200 m.

6.4.3 Derogations.

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

the following derogatory provisions:

- 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.
- Section 6.4.2, first paragraph: Each compartment and level equipped with an elevator, with the possible exception of the technical compartment of the higher level, shall be served by at least 1 elevator intended for the fire department.
- Items 6.4.2.1 and 6.4.2.3: Not applicable.
- Section 6.4.2.4: The minimum dimensions of elevator cages are 1.1 m (width) x 1.4 m (depth).

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) all elevators, except in the buildings referred to in Section 4.2.2.9 of the non-special elevators not referred to by 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 stand-alone 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 one minute, ensure the operation for one hour of the above installations.

In case the autonomous power source is triggered, the elevator cars of the non-special elevators not referred to by section 6.4 are brought to the designated elevator platform in order to allow

allow them to get off and then take the elevator out of normal service.

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 all guarantees of proper operation.

6.5.5 Lightning protection.

Buildings are equipped with a lightning protection system chosen based on an assessment of the risk.

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 rooms 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 both cases, smoke detection must be installed in the recycling air before the smoke damper. If smoke is detected in the recycling air, the air handling units are shut down, the smoke dampers are closed and, in the second case, the ductwork for the exhaust of the recycling air to the outside is automatically opened and is ready to operate when the air handling units 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 maximum 1 m.

The air ducts in the evacuation paths 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 4.4.3 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:
- or placed in ducts whose walls have EI 120;
- or have EI 120 (ho i ↔ o) or EI 120 (ve i ↔ o) when placed horizontally or vertically, respectively.

The exhaust ducts in the collective kitchens with their suspensions continue to 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 60 or pass through a pipe duct wall requiring a fire resistance greater than or equal to EI 60;

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↔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.

Air ducts located in ducts reserved exclusively for them and attached to their

upper end outlet into 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 three operation types:

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

Type B : valve type A that can additionally be closed by remote control.

Type C : the valve is normally closed but can be opened and closed by remote control.

This type is only applicable in desiccation plants (see 6.9).

The closing of valves type A and B 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 Type B 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	wallFire resistance of the valve
EI 120	EI 120 (ho i ↔ o) S EI 120 (ve i ↔ o) S
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 4.1- 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 valve box includes a valve position indicator at the top and an indelible arrow that shows the

direction of air flow. A rating plate lists the inner 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 must 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.

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:

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 operation of certain elements of the aerial systems must be able to be monitored and operated from a point readily accessible to the fire department and located at the usual level of access.

The fire control sign must contain at least the following elements:

- signaling operation or shutdown of air handling groups and fans (by group or fan);
- control devices to command operation or shutdown of above mentioned groups and fans (per group or fan);
- synoptic diagram of the building with clear localization of the technical premises and air handling systems.

This fire control board is located in the same room and is combined with the central control board for the smoke extraction systems (see 6.9.4.9).

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 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 shall be capable of being immediately communicated to the fire departments by a notification device on each floor and at least one in each compartment.

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 with each other 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.

For special fire hazards, these devices are chosen according to the nature and extent of this 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 these devices 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;

- the inner diameter is at least 70mm and the residual pressure at the least endowed hydrant is at least 2.5 bar when this hydrant flows 500 l per minute without hose nor nozzle;

- in addition, the installation must be able to provide a minimum water flow of 30 m³/h for at least 2 h.

6.8.5.3.3 The devices are fed with pressurized water without prior operation.

Branching from the public water system to the indoor pipe can be performed:

- either with direct passage without meter;

- either with a meter of the "Woltmann" type or similar, whose design and construction characteristics limit the pressure loss to a low value.

The following regulations are valid:

- the general shut-off valves and all intermediate valves are sealed in the open position;

- for a branch with direct passage, the operation of extinguishers is sealed in the closed position;

- the pipes exposed to frost are carefully protected without hindering or delaying their operation;

- the pipelines shall be equipped with the strictly necessary number of barrage valves and drain valves to prevent danger and nuisance in case of breakage;

- at the base of each vertical pipe, at its connection to the main pipe, a shut-off valve and a drain valve shall be provided;

- the handwheels of shut-off and drain valves bear clear indications in connection with their opening direction;

- a pressure gauge with a three-way check valve is installed behind the general shut-off valve and a second one beyond the highest unit in relation to the floor. These pressure gauges allow a pressure reading of up to 10 bar with an accuracy rate of 0.2 bar (see NBN 363).

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 grid cannot meet these conditions, other sources of supply with minimum capacity 100 m³ are used.

6.8.5.4.2 The location and number of hydrants above and below ground shall be determined so that at each entrance to the building, the sum of the distances from that entrance to the two nearest hydrants is less than 100 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.

6.9 Aerodynamic installations for smoke extraction.

6.9.1 General.

Buildings should be equipped with aerodynamic systems for smoke extraction from stairwells and, if necessary, from horizontal evacuation routes or common halls.

Where the following provisions refer to stairwells, they are meant those serving the high parts of the building (i.e., located above the lowest evacuation level).

6.9.1.1 Trial conditions.

One considers a single infested building layer per building located at the evacuation level or any building layer above it.

The air flow rates listed are these under the reference conditions, 20°C and 1013 mbar.

The overpressure and airflow control tests shall be performed with outdoor temperature higher than 10°C and wind speed lower than 4 m/s.

6.9.1.2 Airtightness of stairwells

All doors opening onto stairwells must be of class $_{S200}$ (NBN EN 13501-2).

6.9.1.3 Characteristics of the blow-in fans.

The blow-in fan of a stairwell shall not cause an excess pressure of more than 80 Pa in it, at a flow rate equal to the leakage flow rate of this stairwell with all doors closed.

The fan must provide a flow rate of at least 2 m³/s and in the stairwell the air must be refreshed at least 10 times per hour, when the excess pressure there is zero (doors or sassen open).

6.9.1.4 Pressure balance.

The blow-in and blow-out fans of the common halls or horizontal evacuation paths are interlocked so as not to cause uncontrolled pressures so that, in the absence of flow at the blow-in fan, the other stops.

In the absence of flow at the exhaust fan, the overpressure created in the common halls or horizontal evacuation paths must be lower than the overpressure in the stairwell.

6.9.2 Buildings whose height exceeds 25 m and does not exceed 50 m.

6.9.2.1 Principle.

In case of fire, the interior stairwells are overpressurized relative to the evacuation route.

Putting into positive pressure is obtained by mechanical ventilation. Ventilation is accomplished by blowing outside air into the interior stairwell by means of a fan and an air duct with one or more blower nozzles.

6.9.2.2 Pressures and flow rates.

a) when doors and sashes of the stairwell are closed, the overpressure of the stairwell relative to the horizontal evacuation path of the infested building floor must be understood between 40 and 80 Pa;
b) at all open stairwell doors or sassen, the flow rate of blown air in the stairwell must be at least 2 m³/s and the air in the stairwell must be refreshed at least 10 times per hour.

6.9.3 Buildings whose height exceeds 50 meters.

6.9.3.1 Principle.

In case of fire, interior stairwells are overpressurized relative to their sassen and relative to horizontal evacuation paths.

On the infested building level, the horizontal evacuation paths are additionally ventilated by the blowing in of fresh air and by smoke extraction. This last requirement does not apply to the exceptions listed in section 4.4.3 and to compartments with day-occupancy only that are equipped with an automatic fire detection system of the total surveillance type that automatically indicates the fire alarm and its location and whose detectors are adapted to the risks present and with an automatic fire extinguishing system of the sprinkler type adapted to the risks present.

Overpressurization, blow-in and extraction are done mechanically and only with outside air.

Ventilation is established by:

- blowing outside air into the interior stairwell by means of a fan and an air duct with one or more blower nozzles;
- blowing outside air into the common halls and horizontal evacuation paths, by means of a fan and an air duct with blower nozzles equipped with a valve that opens only at the infested building level;
- extracting and exhausting smoke by means of a fan, an air duct with valves that open only at the infested building level, and possibly a network of air ducts equipped with extraction nozzles in the horizontal evacuation paths.

6.9.3.2 Pressures and flow rates.

a) when the stairwell doors or shafts are closed, the overpressure between the stairwell and the horizontal evacuation path of the infested building floor must be understood to be between 40 and 80 Pa;
b) with all stairwell doors or shafts open, the blow-in flow rate in the stairwell must be at least 2 m³/s and the air in the stairwell must be refreshed at least 10 times per hour.

(c) the blow-in flow rate in the horizontal evacuation path of the infested building layer shall be at least 1 m³/s and the air shall be refreshed there at least 10 times per hour.

6.9.4 Technical Provisions.

6.9.4.1 Outside air intakes.

Outdoor air inlets for smoke exhaust ventilation are installed on the façade exposed to the prevailing wind in the lower half of the protected areas.

Each air inlet to the stairwell of the common halls or horizontal evacuation routes has separate grilles and ducts.

The fresh air supply ducts for smoke exhaust ventilation are equipped with a motorized smoke damper. This damper opens or closes when the associated fan kicks on or fails.

A smoke damper shall meet the requirements specified in 6.7.5.

6.9.4.2 Evacuation of smoke.

Evacuation to the outside of the extracted smoke is along the roof of the building, or possibly at the level of a lower roof.

6.9.4.3 Separate aëraulic circuits.

Each air supply in a stairwell has a fan and air ducts, separate from those of the other stairwells.

For air supply in horizontal evacuation paths, vertical ducts serving the same common hallway or horizontal evacuation path may have a common fan.

The same applies to extraction in the horizontal evacuation paths.

The horizontal evacuation paths served by separate groups of vertical ducts per compartment must have separate blow-in fans. The same applies to smoke extraction fans.

6.9.4.4 Ventilation system fans.

If the fans of the smoke extraction system are placed inside the building, they must be placed in their own room whose walls have EI 120. The doors of the room have $_{EI1}$ 60.

The exhaust fans belong to class F 300 (NBN EN 12101-3).

6.9.4.5 Construction of air ducts.

The air ducts, including their inner or outer linings, are made of Class A1 materials.
The smoke extraction ducts must be able to discharge gases up to 300°C and resist the expansion forces induced by these temperatures.

The air ducts for smoke exhaust ventilation have E-S 120 or are placed in proprietary ducts with walls EI 120.

Notwithstanding the preceding paragraph, a stability to fire of ½ h is sufficient for the horizontal air ducts of the smoke exhaust ventilation, placed in a compartment and serving only this compartment.

6.9.4.6 Blower nozzle in stairwells.

The blower nozzle(s) of a stairwell is located in the lower half of that stairwell.

6.9.4.7 Blow nozzles and valves in the horizontal evacuation paths.

Where a blow-in duct enters the compartment, it is equipped with a fire damper that is closed in normal conditions and that opens automatically in case of fire in this compartment.

The valve is Type C and meets the requirements listed in 6.7.4.

The upper edge of the blowholes or nozzles shall be no more than 1.50 m above the floor.

6.9.4.8 Exhaust nozzles and valves in the common halls of apartments or in the horizontal evacuation paths.

6.9.4.8.1 Where an exhaust duct leaves the compartment, it is equipped with a fire damper that is closed in normal conditions and that opens automatically in case of fire in this compartment.

This valve is Type C and meets the requirements listed in 6.7.4.

6.9.4.8.2 The distance between 2 extraction nozzles or between an extraction nozzle and a blowing nozzle is no more than 10 m if the path followed is rectilinear and no more than 7 m in the other case.

In the areas where there is no air circulation for smoke exhaust (dead-end corridor), the distance between an exhaust nozzle and the door of a room does not exceed 5 m.

Each mouth ensures an equal suction flow rate with a tolerance of ± 10%.

The extraction nozzles are installed as close to the ceiling as possible. Their lower edge is at least 1.80 m above the floor.

The horizontal ducts on which several suction nozzles are placed have a maximum length of 20 m, measured from the vertical duct to which they are connected.

6.9.4.9 Operation of smoke exhaust ventilation systems.

As stated in Section 6.7.6, a central control and command station for all aerial systems for the benefit of the fire department shall be located in the building.

This station should also include a control and operating panel for the smoke extraction systems.

The operation of the smoke exhaust ventilation system is done:
- automatically by combustion gas detectors judiciously distributed along the total length of the horizontal evacuation paths;
- manually by remote control from the central control station.

The central checkpoint provides:
- turn on or off any stairwell fan;

- turn on or off each blower and exhaust fan of a common hallway or of horizontal evacuation paths, simultaneously;
- open the blower and exhaust valves for the smoke exhaust for each compartment.

Re-activation of the smoke exhaust ventilation system must be possible to put the automatics back on hold.

If necessary, the operation of the smoke system is signaled by sound and light signals. Access to

the controls of the central control station shall be by key.

6.9.4.10 Signalization.

6.9.4.10.1 A signage board in the central control station indicates the position of the smoke exhaust ventilation system.

6.9.4.10.2 Blower and suction valves.

For the blower and exhaust valves in the common hall of apartments or horizontal evacuation paths, the signage board for each compartment indicates the following positions :

- all valves are closed;
- all the valves are open;
- all valves are not in the same position.

6.9.4.10.3 Fire detection.

The signaling board indicates for each compartment the functioning of the fire detection system, as well as the faults and failures occurring in the fire detection system.

6.9.4.10.4 Smoke exhaust fans.

The signaling board i n d i c a t e s the operation and shutdown of each fan. This signaling is done with airflow detectors.

6.9.4.11 Electrical power supply.

The fire detection, the light signals and the device for operating the blow-off and exhaust valves for smoke extraction are designed to remain in operation when the mains voltage is interrupted.

The blower and exhaust valves for smoke discharge open in the absence of voltage.

6.9.5 Maintenance - Testing - Control.

6.9.5.1 Maintenance.

The devices (detectors, valves, fans, etc.) are regularly maintained according to the manufacturer's guidelines. The constructor delivers for each device, an instruction which includes the periodicity, the nature of the maintenance to be carried out and any professional competence of the personnel welded with the maintenance. This instruction shall be attached to the safety register.

6.9.5.2 Periodic tests.

The devices from any building be periodic to a sampl subject at
layer e

accordance with their normal operation. Fans shall be tested quarterly and other devices at least once a year.

6.9.5.3 Control.

Verification of operation, including the measurement of flow and differential pressure, shall be performed prior to occupancy, even partial, of the building and at any change that may cause a can affect smoke discharge.

0 GENERAL.

0.1 Objective.

This annex defines the reaction-to-fire classification of materials used in the construction and furnishing of buildings.

0.2 Scope.

These regulations apply to the respective scopes of Annexes 2, 3 and 4.

1 DEFINITION.

See Appendix 1 "Terminology."

2 TRIAL METHODS.

The requirements concerning the reaction to fire of construction products are adapted to the European test methods and classification determined pursuant to and decision of the European Commission, taken in implementation of the Directive of the Council of the European Communities 89/106/EEC of December 21, 1988, on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products.

This adaptation becomes applicable as the references of the standards of harmonized products are published in the Belgian Official Gazette.

The Minister of the Interior will determine the correspondence between the Belgian and European classes, as well as the corresponding transitional provisions, without prejudice to the European provisions on the subject.

The following test methods are available for determining the reaction to fire of materials :

2.1 Method #1.

It is described in the ISO 1182 standard.

2.2 Method #2.

It is described in the French standard NF P 92-501.

This method allows the classification into 4 categories characterized by the indices s, h, c, i and listed in Table 1.

Tab. 1

Categories	s = 0		0,20 < s < 1	1 < s < 5
I	h = 0 c < 1 i = 0			
II		h < 1 c < 1 arbitrary i	h < 1 c < 1 i < 1	
III			h < 1,5 c < 1 arbitrary i	h < 2,5 c < 2,5 i < 2
IV	The materials not included in the previous categories.			

The materials referred to in § 1.3 of the above-mentioned standard NF P 92-501 that melt or get holes before igniting are subjected to the additional test defined in the French standard NF P 92-504.

These materials, based on the criteria in Table 2, are assigned to one of the previous categories.

Tab. 2

Result of the test defined in the standard NF P92-504	Categories
After removing the Bunsen burner, there is neither persistence n o r propagation of the flame	I
There is flame resistance without continuous propagation up to the 2nd mark. There are also no burning drops falling down after removing the Bunsen burner.	III
The materials not included in the previous categories.	IV

Classification at category II is impossible after this additional test.

2. 3Method #3.

This method is described in § 2 "Large scale surface spread of flame test and method of classification" of British Standard BS 476 : Part 7.

This method allows the classification of materials into cl 1, cl 2, cl 3 and cl 4.

3 CLASSIFICATION OF MATERIALS.

The materials are divided into 5 classes A0, A1, A2, A3 and A4.

A0 includes materials considered "noncombustible" according to Method No. 1.

A1 includes all materials of category I according to method no. 2 and all materials cl 1 according to method no. 3.

A2 includes all materials of category II by method No. 2 and all materials cl 2 by method No. 3.

A3 includes all Category III materials by Method No. 2 and all materials cl 3 by Method No. 3.

A4 includes all materials that cannot be assigned to a previous class. Tests on these materials are carried out in their normal conditions of use.

In addition, before being t e s t e d , the floor coverings are cleaned according to the injection extraction method described in Appendix.

4 WALLS OF CLASSROOMS.

The requirements are listed in Table 3 :

Tab. 3

	Floor covering	Cladding of vertical walls	Ceilings and false ceilings
Technical premises and spaces Parking spaces Collective kitchens Engine room and shafts - Of the elevators and freight elevators - Of paternoster elevators, container transport and freight elevators with loading and unloading automation - of hydraulic elevators	A0	A0	A0
Interior stairwells (including sashes and spillways) Evacuation routes Overflowing elevators Home kitchens, except in the LG	A2	A1	A1
Elevator cages and freight elevators	A3	A2	A2
Halls	A3	A2	A1
All other classrooms not listed above were - in the HG - in the MG - in the LG	 A3 A4 A4	 A3 A4 A4	 A2 A2 A2

The conditions for fire response of the walls of premises do not apply to the private parts of private residential units.

5 STEPS.

The construction materials and cladding of stairs belong to Class A2 in MG and HG.

6 STORT COOKERS.

The walls of the shaft of the chutes, their doors and the walls of the room for collecting domestic waste are of class A0.

7 FRAMES.

In addition to the decorative coverings on the first floor that can be of class A3, the facade coverings belong to class A2.

However, this does not apply to the joinery nor to the sealing joints.

8 DAWS.

8.1 Building roofs.

The final coating materials of the roofing belong to Class A1.

If the final coating materials do not meet the requirement set forth in the first paragraph, the products and/or materials for roofing shall exhibit the properties of class BROOF (t1), determined by Decision 2001/671/EC, or conform to Decision 2000/553/EC.

8.2 Roofs of outbuildings.

If the glazed facades project over building elements that may or may not be part of this building, including projecting roofs, canopies, cantilevers or other additions, the final coating materials of the roofing of these elements belong to class A1 over a distance from the base of these facades:

- of at least 8 m in the HG;
- of at least 6 m in the MG and LG.

When the final coating materials do not meet Class A1 or do not conform to Decision 2000/553/EC, the whole roofing exhibits the properties of Class BROOF (t1), determined by Decision 2001/671/EC.

8.3 Sloping roofs.

In the MG and LG with pitched roofs, the covering of the under-roof floor belongs to Class A1.

APPENDIX Injection-extraction of textile floor coverings.

1. They are treated three times, each time at approximately 2-hour intervals.

2. Each treatment is done with an injection-extraction carpet cleaning machine. This machine consists mainly of a spray head and a squeegee attached in solidarity.

   The nozzle spreads under pressure a curtain of water about 25 cm wide on the carpet. The squeegee is positioned so that the sprayed water is immediately extracted during the progressive movement of nozzle and squeegee.

3. Each treatment consists of two courses :

   - In a first pass, water in a quantity of 0.5 l/m² (± 0.10 l/m²) is sprayed onto the carpet and at the same time extracted.
   - In a second movement, the water is once again extracted.

4. The first treatment is done with water at a temperature of 60°C ± 5°C.
   A nonionic detergent is added to this water, pro rata of 0.5 g per liter of water.

   The second and third treatments are done with water at a temperature of 60°C ± 5°C, without any additive.

0 PLATES *[The plates are included with the relevant text]*

Plate 5.1 - Type solutions for mid-rise buildings - Type solution for facade with continuous air cavity
Plate 5.2 - Type solutions for mid-rise buildings - Type solution 2 for façade without continuous air cavity
Plate 5.3 - Type solution for the tall buildings
Plate 5.4 - Buildings with multiple parts of different heights

1 FOREWORD

The requirements for reaction to fire and external fire behavior listed in this Annex shall apply to the buildings referred to in Annexes 2/1, 3/1 and 4/1 of this Decree.

2 CLASSIFICATION OF BUILDINGS ACCORDING TO THE RISK ASSOCIATED WITH OCCUPANCY

Buildings are divided into classes, according to the decreasing risk associated with the type of occupancy:

type 1 : non-self-reliant occupiers;
type 2 : self-reliant and sleeping occupiers;
type 3 : self-reliant and waking occupiers.

When a building consists of several compartments, the occupancy or corresponding type may be determined separately for each compartment ; the relevant regulations shall be applied only to the compartment in question.

On common stairwells and evacuation routes, the regulations belonging to the most serious risk associated with occupancy are applied.

The building owner or the operator determines the type of occupancy of the building and/or compartment and communicates it to the authorizing or controlling authority respectively at the time of the permit application or at the time of inspection.

In the absence of this information, the building is classified as " type 1 ".

3 LOCALS

Fire reaction requirements applicable to building products used
be used for the cladding of vertical walls, ceilings and floors of premises with an increased fire risk because of their use are listed in Table I.

TABLE I : SPACES WITH INCREASED FIRE RISK DUE TO USE

		H.G.	M.G.	L.G.
Technical rooms, parking lots, machine rooms, technical shafts, elevator shafts or freight elevators	Vertical walls	A2-s3, d2	A2-s3, d2	A2-s3, d2
	Ceilings and suspended ceilings	A2-s3, d0**	A2-s3, d0**	A2-s3, d0**
	Flooring	A2Fl-s2 BFl-s2****	A2Fl-s2 BFl-s2****	A2Fl-s2 BFl-s2****
	Thermal insulation of piping*	CL-s3, d2 C-s3, d2***	CL-s3, d2 C-s3, d2***	CL-s3, d2 C-s3, d2***
Elevator cages	Vertical walls	C-s2, d2	C-s2, d2	E-d2
	Ceilings	C-s2, d2	C-s2, d2	E-d2
	Flooring	CFl-s2	CFl-s2	EFl
Collective kitchens	Vertical walls	A2-s3, d2	A2-s3, d2	A2-s3, d2
	Ceilings	A2-s3, d0	A2-s3, d0	A2-s3, d0
	Flooring	BFl-s2	BFl-s2	BFl-s2
	Thermal insulation of piping*	CL-s3, d2 C-s3, d2***	CL-s3, d2 C-s3, d2***	CL-s3, d2 C-s3, d2***
H.G. tall buildings M.G. medium buildings L.G. low buildings * except air ducts ** d2 in classrooms ≤ 30 m² *** for ducts >300 mm interior **** for car parks				

Fire reaction requirements applicable to building products used for cladding vertical walls, ceilings and floors of premises are listed in Table II.

TABLE II : PREMISES

type		1			2 and 3		
		H.G.	M.G.	L.G.	H.G.	M.G.	L.G.
Halls	Vertical walls	B-s1, d2	B-s1, d2	B-s1, d2	C-s2, d2	C-s2, d2	C-s2, d2
	Ceilings and suspended ceilings	B-s1, d0	B-s1, d0	B-s1, d0	C-s2, d0	C-s2, d0	C-s2, d0
	Flooring	BFl-s1	BFl-s1	BFl-s1	CFl-s2	CFl-s2	CFl-s2
All other classrooms	Vertical walls	C-s2, d2	C-s2, d2	C-s2, d2	D-s3, d2	E-d2	E-d2
	Ceilings and suspended ceilings	C-s2, d1	C-s2, d1	C-s2, d1	D-s3, d1**	E**	E**
	Flooring	CFl-s1	CFl-s1	CFl-s1	DFl-s2	EFl	EFl
H.G. tall buildings M.G. medium buildings L.G. low buildings ** d2 in classrooms ≤ 30 m²							

4 EVACUATION ROUTES AND STAIRWELLS

4.1 Fire response requirements applicable to building products used for cladding vertical walls, ceilings and floors of evacuation routes and stairwells are listed in Table III.

TABLE III : FIRE RESPONSE REQUIREMENTS IN EVACUATION ROUTES AND STAIRWELLS

type		H.G	M.G.			L.G.			
	1	2 and 3	2	3		2		3	
				Hor.	Vert.	Hor.	Vert.	Hor.	Vert.
Vertical walls	A2-s1, d1	B-s1, d2	B-s1, d2	C-s2, d2	B-s2, d2	C-s2, d2	B-s1, d2	D-s3, d2	C-s3, d2
Ceilings and suspended ceilings	A2-s1, d0	B-s1, d0	B-s1, d0	C-s2, d0	B-s2, d0	C-s2, d0	B-s1, d0	D-s3, d0	C-s3, d0
Flooring	A2Fl-s1	BFl-s1	BFl-s1	CFl-s1	BFl-s1	CFl-s1	BFl-s1	DFl-s2	CFl-s2
H.G. tall buildings M.G. medium buildings L.G. low buildings Hor. horizontal escape routes except those at the evacuation level Vert. the stairwells (including shafts, landings and the stairs themselves) and the horizontal part of the evacuation path at the evacuation level from the stairwells to outside the building									

4.2 Table IV lists the fire response requirements applicable to the products u s e d for the cladding of vertical walls, ceilings and floors of evacuation routes and stairwells, when the building is equipped with an automatic fire detection system of the total surveillance type that automatically provides an indication of the fire alarm and its location and whose detectors are adapted to the risks present.

TABLE IV : FIRE RESPONSE REQUIREMENTS IN EVACUATION ROUTES AND STAIRWELLS, WITH FIRE DETECTION

type		H.G	M.G.			L.G.			
	1	2 and 3	2	3		2		3	
				Hor.	Vert.	Hor.	Vert.	Hor.	Vert.
Vertical walls	B-s1, d2	B-s1, d2	C-s1, d2	C-s2, d2	C-s2, d2	D-s2, d2	C-s1, d2	D-s3, d2	D-s3, d2
Ceilings and suspended ceilings	B-s1, d0	B-s1, d0	C-s1, d0	C-s2, d0	C-s2, d0	D-s2, d0	C-s1, d0	D-s3, d0	D-s3, d0
Flooring	BFl-s1	BFl-s1	CFl-s1	CFl-s1	CFl-s1	DFl-s1	CFl-s1	DFl-s2	DFl-s2
H.G. tall buildings M.G. medium buildings L.G. low buildings Hor. horizontal escape routes except those at the evacuation level Vert. the stairwells (including shafts, landings and the stairs themselves) and the horizontal part of the evacuation path at the evacuation level from the stairwells to outside the building									

4.3 In evacuation paths, the exposed surfaces above suspended ceilings exhibit class B-s1, d0. However, this requirement does not apply when these spaces between the ceiling and the suspended ceiling are interrupted by vertical partitions E 30 such that they form volumes whose horizontal projection can be inscribed in a square of maximum 10 m side.

5 REQUIREMENTS RELATED TO SMALL AREAS

A maximum of 10% of the visible area of any vertical wall, ceiling or floor is not subject to the requirements of Tables I, II, III and IV for such vertical wall, ceiling and floor.

6 FACADES

6.1 Building facades

6.1.1 Fire reaction requirements applicable to products used for cladding facades are listed in Table V.

TABLE V: FACADES

type			H.G.	M.G.	L.G.	
					1	2 and 3
Type of components of the facade [5]		**Conditions**				
Exterior cladding [6]		in final conditions of application [1]	A2-s3, d0	B-s3, d1	C-s3, d1	D-s3, d1
Essential components [3]	All, with the exception of the exterior cladding and styles of the support structure of the facade	Separately assessed [2] Not fully protected relative to the fire [4]	A2-s3, d0	A2-s3, d0 ***OR*** E if type solutions[7]	E	
	Styles of the supporting structure of the facade	Assessed separately [2] Not fully protected relative to the fire [4]	A1	A1 ***OR*** Wood	/	
	All, except the exterior cladding	Assessed separately [2] Fully protected with respect to the fire [4]	E if type solution[8]	E	/	
Non-substantial parts [3]		-	/	/	/	

H.G. tall buildings
M.G. medium buildings
L.G. low buildings
/no requirements

[1] in other words including the underlying layers and the method of implementation (cf. paragraph 3.4 of Annex 1). However, the underlying layers need not be assessed when determining the reaction to fire of the external cladding, if they are protected from the outside by a building element with:

- A fire protection rating $_{K2}$ 30 or a fire resistance rating EI 30 (tall buildings);
- A fire protection rating $_{K2}$ 10 or a fire resistance rating EI 15 (low and medium-rise buildings).

[2] This means of the product as marketed, the influence of underlying layers is not included in the assessment;

[3] cf. definitions included in section 3.1 of Annex 1;

[4] fully protected with respect to fire: the essential parts are fully protected (along all sides, both with respect to a fire both from inside and outside) by a building element with:

- A fire protection rating $_{K2}$ 30 or a fire resistance rating EI 30 (tall buildings);
- A fire protection rating $_{K2}$ 10 or a fire resistance rating EI 15 (medium-rise buildings).

[5] The window and door profiles and glazing of the façade are not subject to the requirements.

[6] The doors, facade ornaments, joints and technical equipment in the facade, such as signs, lighting fixtures, ventilation grilles, drainage gutters, planters and wall penetrations of heating systems, are not subject to the requirements to the extent that their total visible area is less than 5% of the visible area of the facade in question.

[7] cf. Section 6.1.2 Type solutions for mid-rise buildings.

[8] cf. Section 6.1.3 Type solution for the tall buildings.

6.1.2 Type solutions for mid-rise buildings

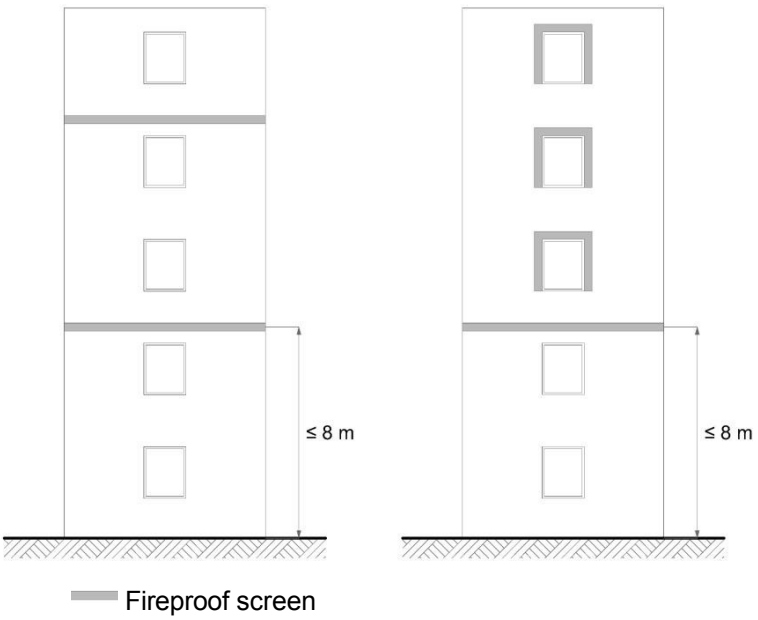
For mid-rise buildings, the essential components of the façade may exhibit Class E if the façade meets one of the following type solutions.

6.1.2.1 Type solution for facade with continuous air cavity

The insulation should not be EPS (expanded polystyrene) or XPS (extruded polystyrene) type.

At the level of the floor between the 1st floor and the 2nd floor, a fireproof screen must be installed. If the vertical distance between this fireproof screen and the ground level exceeds 8 m, one or more fireproof screens must be added every 8 m. (Plate 5.1)

After the previous fireproof screen, a fireproof screen should be installed:
- either every 2 building layers;
- either around each opening.



A fire-resistant screen is a device that interrupts the insulation material and air cavity to reduce the risk of fire spread within the façade.

The type solutions described below make it possible to meet this requirement:
a) A break across the full width of the facade by a steel bib, a wooden horizontal batten, or a horizontal strip made of rock wool;
b) A framing (top and sides) around of each facade opening by a steel or wood framing, or a horizontal and vertical strip made of rock wool.

The steel bib or frame shall have at least the following characteristics:
- Thickness: 1 mm
- Mechanically attached

The rock wool strip has at least the following characteristics:
- Height/Width: 20 cm
- Fire reaction class: A2-s3, d0
- Density: 60 kg/m³
- Mechanically attached

The wooden batten or framing shall have at least the following characteristics:

- Thickness: 25 mm
- Density: 390 kg/m³
- Mechanically attached

In addition, ventilation openings are allowed in the fireproof screens a rate of maximum 100 cm² per running meter.

6.1.2.2 Type solutions for facade without continuous air cavity

6.1.2.2.1 Type solution 1 for facade without continuous air cavity

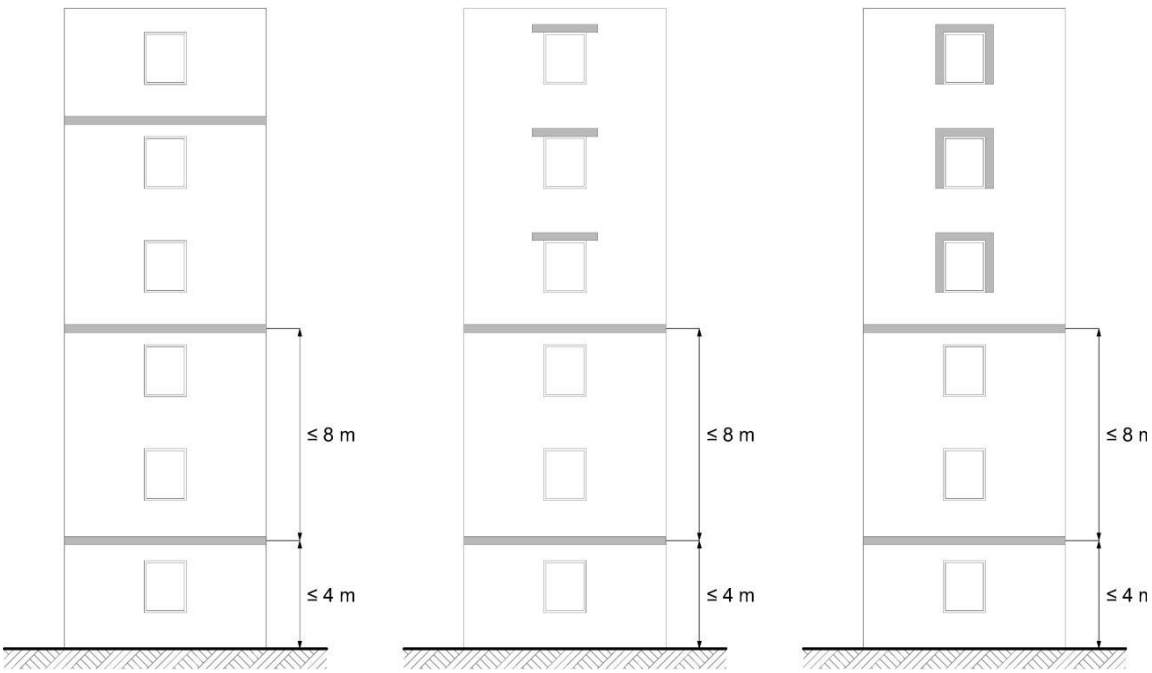
The insulation should not be EPS (expanded polystyrene) or XPS (extruded polystyrene) type.

6.1.2.2.2 Type solution 2 for facade without continuous air cavity

At the level of the floor between the ground floor and the 1st floor, a fireproof screen must be installed. If the vertical distance between this fireproof screen and the ground level exceeds 4 m, one or more fireproof screens must be added every 4 m. (Plate 5.2)

At the level of the floor between the 2nd floor and the 3rd floor, a fire screen must be installed. If the distance between this fire barrier screen and the previous fire barrier screen is greater than 8 m, one or more fire barriers must be added every 8 m.

After the previous fireproof screen, a fireproof screen should be installed:
- either every 2 building layers;
- either above or around each opening.



A fire-resistant screen is a device that interrupts the insulation material to reduce the risk

on spreading the fire within the facade.

The type solutions described below make it possible to meet this requirement:
a) An interruption across the full width of the façade by a horizontal strip made of rock wool;
b) A break above each facade opening by a horizontal strip made of rock wool;
c) A framing (top and sides) around of each facade opening by a horizontal and vertical strip made of rock wool.

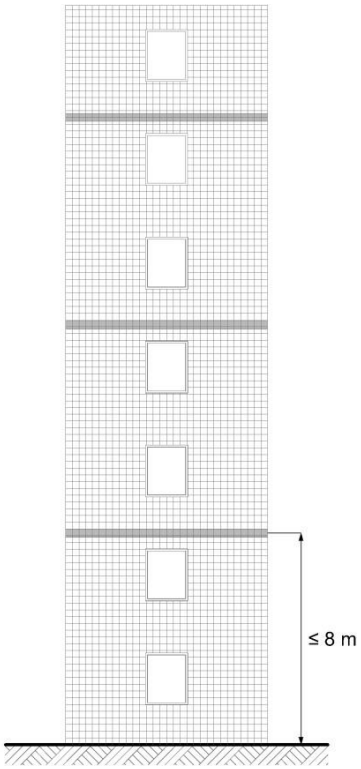
The rock wool strip has at least the following characteristics:
- Height/Width: 20 cm
- Lateral overhang (for type solution b): 30 cm
- Fire reaction class: A2-s3, d0
- Density: 60 kg/m³
- Mechanically attached

6.1.3 Type solution for the tall buildings

For tall buildings, the essential components of the façade may exhibit Class E if all the essential components, except the exterior cladding, are fully protected from the fire (cf. point (4) of Table V of the Section 6.1.1), and if the façade complies with the following type solution.

At the level of the floor between the 1st floor and the 2nd floor, a fireproof screen must be installed. If the vertical distance between this fireproof screen and the ground level exceeds 8 m, one or more fireproof screens must be added every 8 m. (Plate 5.3)

After the previous fireproof screen, a fireproof screen should be installed every 2 building levels.



Fireproof screen
Building element with a fire protection rating $_{K2}$ 30 or a fire resistance rating EI 30

A fire-resistant screen is a device that interrupts the insulation material and any air cavity to reduce the risk of fire spread within the façade.

The type solution described below makes it possible to meet this requirement:
- An interruption across the full width of the façade by a horizontal strip made of rock wool.

The rock wool strip has at least the following characteristics:
- Height/Width: 20 cm
- Fire reaction class: A2-s3, d0
- Density: 60 kg/m³
- Mechanically attached

In addition, ventilation openings are allowed in the fireproof screens a rate of maximum 100 cm² per running meter.

6.2 Large-scale trial

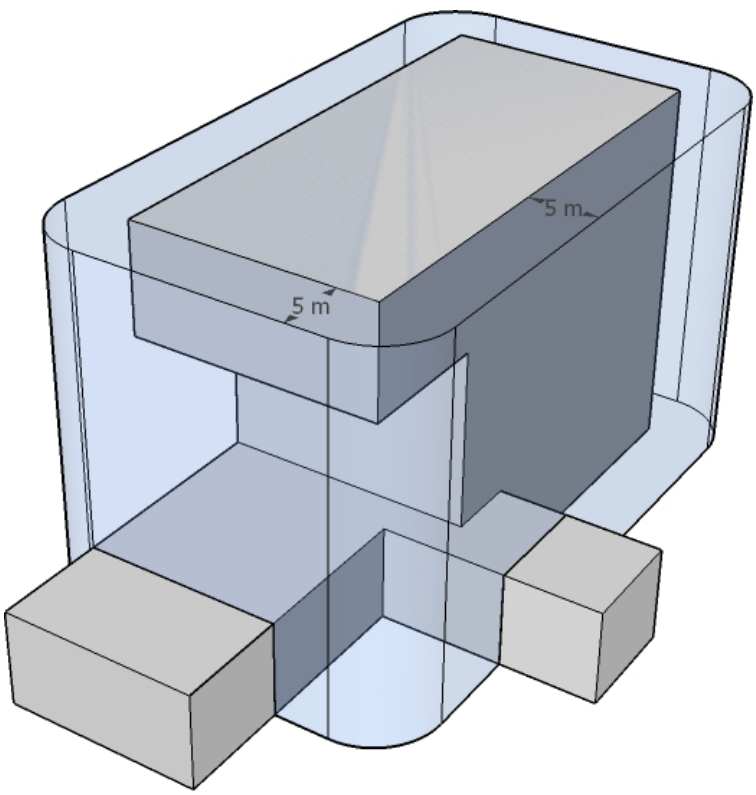
Section 6.1 does not apply to a façade that was tested to one of the following test standards and met the performance criteria defined in the following documents:

Test Standard	Document stating performance criteria		
	H.G.	M.G.	L.G.
BS 8414-1	LPS 1581	BRE 135	
BS 8414-2	LPS 1582	BRE 135	
DIN 4102-20	/	Supreme Court document HR 1882 for protection against fire and explosion	
LEPIR 2	Arrêté français du 10 septembre 1970 relatif à la classification des façades vitrées par rapport au danger d'incendie		
H.G. tall buildings M.G. medium buildings L.G. low buildings			

6.3 Buildings with different parts of different heights

For the buildings containing different parts of different heights, a vertical division according to the conventional height of each part of the building is allowed.

The requirements of sections 6.1 and 6.2 that apply are then those corresponding to the conventional height of the part under consideration, but only from a horizontal distance of 5 m from the facade dominating the part under consideration. (Plate 5.4)



6.4 Divergent provisions

Sections 6.1 to 6.3 do not apply to the facades of a building for which the application for construction was submitted before July 1, 2022 if it meets the following conditions.

The cladding of the low-rise buildings exhibit class D-s3, d1.

The cladding of the medium and tall buildings exhibit class B-s3, d1.

A maximum of 5% of the visible area of the facades is not subject to this requirement.

7 RAISED FLOORS

In the evacuation paths, the exposed surfaces under the raised floors exhibit class B-s1, d2.

In the rooms that a r e not evacuation pathways, the exposed surfaces under the raised floors exhibit class C-s1, d2.

The requirements listed in the first two paragraphs do not apply to electrical and data cables.

8 ROOFS

8.1 Building roofs

Roofing products exhibit the characteristics of class $_{BROOF}$ (t1) or are roof coverings referred to in paragraph 3a3 of Annex 1.

This requirement does not apply to green roofs that meet the provisions of paragraph 5 of Annex 7.

8.2 Roofs of outbuildings

If the glazed facades of a building project over structures, whether or not they include projecting roofs, canopies, cantilevers or other such additions, then the final coating materials of the roofing of these structures shall exhibit the reaction to fire determined in Section 8.1 over a distance to be counted from the base of the facades:

- for the HG of at least 8 m;
- for the MG and the LG of at least 6 m.

8.3 Balconies, galleries, terraces

The cladding of balconies, galleries and terraces exhibits the reaction to fire determined in Section 8.1.

A wooden deck on a flat roof is assumed to meet the requirements mentioned in the section 8.1, in other words to the class $_{BROOF}$ (t1), provided that the following conditions are met:
- wood deck boards: minimum density of 750 kg/m³, thickness from 21 to 40 mm, minimum

width of 120 mm, mechanical fastening on a wooden support structure, parallel or perpendicular to the roof pitch
- width of joints between boards: 4 to 6 mm
- wooden support structure: wooden sub-structure (minimum density of 750 kg/m³, section of 60 x 40 mm), placed directly on the roof or with intermediate placement of polypropylene deck supports (max. 6 per m²)
- roofs under the wooden terrace: all flat roofs (slope from 0 to 20°) belonging to the class BROOF (t1).

9 *[TRANSITIONAL PROVISIONS - CONSTRUCTION PRODUCTS]*

Table V below shows the classes according to the classification system described in Annex 5, which can be accepted for all construction products except floor coverings, with respect to the requirements of Tables I, II, III and IV of the Annex to this Decree. The products are tested in their final application conditions.

TABLE V

Requirements in classes according to Table 1 listed in Section 3.1 of Annex 1.			Classes according to appendix 5
A1			A0
A2	s1 s2 s3	d0 d1 d2	
B	s1 s2 s3	d0 d1 d2	A1
C	s1 s2 s3	d0 d1 d2	A2
D	s1 s2 s3	d0 d1 d2	A3
E		- d2	A4
F			

10 *[TRANSITIONAL PROVISIONS - FLOOR COVERINGS]*

Table VI below shows the classes according to the classification system described in Annex 5 that can be accepted for floor coverings, with respect to the requirements of Tables I, II, III and IV of the Annex to this Decree.

The products are tested in their final application conditions.

TABLE VI

Requirements in classes according to Table 2 listed in Section 3.1 of Annex 1.		Classes according to appendix 5
A1FL		A0
A2FL	s1 s2	
BFL	s1 s2	A2
CFL	s1 s2	A3
DFL	s1 s2	
EFL		
FFL		A4

1 GENERAL

1.1 Objective

This annex defines the requirements that the design, construction and furnishing of industrial buildings 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.

1.2 Scope

1.2.1 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 August 15, 2009:

1. the industrial buildings;

2. extensions that when completed are industrial buildings;

3. the premises or parts of industrial buildings in which non-industrial activities take place and whose total area per compartment is less than or equal to 500 m², under the following conditions:
   - the compartment contains mainly industrial activities; the total area of premises for industrial activity is greater than the remaining area of the compartment;
   - the non-industrial activities in these premises support the industrial activities in the same building;
   - these premises are not below the evacuation level;
   - the compartment in which non-industrial activities take place is not intended for night occupancy;
   - the building is equipped with an automatic fire detection system of the total surveillance type and an alarm system;
   - the premises where non-industrial activities take place comply with the same regulations as those resulting from the industrial activities in the same compartment, with the exception, where appropriate, of the smoke and heat extraction system.
   - evacuation of those premises with non-industrial activities is done in accordance with Section 7.2.2.

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

1. The industrial buildings with only one storey, whose total area is less than or equal to 100 m²;
2. the industrial plants and industrial activities not located in buildings;
3. the parts of industrial buildings, in which no industrial activities take place and the total area of the building floors per compartment exceeds 100 m², except the parts of industrial buildings referred to in point 3 of the aforementioned section 1.2.1;
4. the premises or parts of buildings referred to in point 3 of the 0.2.1 of Annexes 2, 2/1, 3, 3/1, 4 and 4/1.

2 LAYOUT OF INDUSTRIAL BUILDINGS

The industrial buildings or parts thereof may, as a function of the normative fire load

$qf_{,cl}$ are classified into the following classes:

Class	$Aqf_{,cl} \leq 350$ MJ/m²
Class B	$350 MJ/m^2 < qf_{,cl} \leq 900$Class
C	900 MJ/m² $< qf_{,cl}$

An industrial building, or parts thereof, erected for a particular normative fire load or class may be used only for activities with the same or a lower normative fire load or for activities leading to its classification in the same class or a class with a lower normative fire load.

If an industrial building consists of multiple compartments, the corresponding normative fire load or class can be determined for each compartment separately, and the corresponding regulations are limited to the respective compartment.

The building principal shall determine the class and, if applicable, the normative fire load into which the industrial building or parts thereof shall be classified with respect to fire load.
In the absence of this, it is automatically assumed that the building is not used exclusively for storage and belongs to Class C.

3 STRUCTURAL ELEMENTS AND SIZE OF THE COMPARTMENT

3.1 Fire stability of structural elements

In determining the fire stability of the structural elements, one considers the overall stability of the building and the influence of the structural elements on each other. This takes into account the expansions and deformations of the structural elements due to exposure to the fire.

The minimum fire resistance of the structural elements is Type I:
1° for a Class A building or part thereof: R 60;
2° for a building or part thereof of class B or C: R 120.

The type II structural elements, when exposed to the standard temperature-time curve defined in NBN EN 1363-1, shall not fail within a time span equal to the equivalent time duration $t_{e,d}$, determined on the basis of standard NBN EN 1991-1-2:2003, where δ_{q1} is determined on the basis of an acceptable failure probability of collapse equal to 10^{-3} per year.

The fire resistance of intermediate floors and their supporting structure is at least equal to R 30.

3.2 Size of compartments

The area of an industrial building or any compartment thereof is limited so that the total fire load per compartment is less than or equal to 5700 GJ. If this building is sprinklered, this is 34 200 GJ.

The maximum allowable area is determined by dividing the above energy values by the normative fire load.

If there are multiple mezzanine floors in the compartment, the maximum allowable area of a compartment is reduced by multiplying by the values from Table
1a.

Number of mezzanine floors	Reduction factor
1	0,75
2	0,5
3	0,25
More than 3	0,2

Table 1a - Reduction factors for the allowable area of a compartment as a function of the number of intermediate floors in the compartment

If the building or building section consists of several superimposed compartments, the maximum allowable area of a compartment is reduced by multiplying by the values from Table 1b.

	Reduction factor
Multiple compartments located above E_{gg} (low or medium building)	0,25
Multiple compartments located above E_{gg} (tall building)	0,1
Compartments located below E_i	0,1

Table 1b - Reduction factors for the allowable area of a compartment

3.3 Type Solutions

An industrial building with only one storey, or the compartments of that building, is (are) supposed to comply with the requirements mentioned in points 3.1 and 3.2 if its surface area is less than or equal to the maximum permissible surface area determined in Table 2. This surface area is a function of the class, the fire resistance of the structural elements and the presence or absence of a sprinkler system.

The fire resistance of the structural elements is that of the structural element with the lowest fire resistance.

	Fire resistance structural elements			
	Without sprinklers		**With sprinklers**	
Class building	**No R determined**	**R 30 or more**	**No R determined**	**R 30 or more**
A	25 000	25 000	150 000	150 000
B	5 000 (*)	10 000	40 000	60 000
C	2 000 (*)	5 000	7 000 (*)	30 000
Storage Class C	5 000 (*)	5 000 (*)	12 500 (*)	30 000

Table 2 - Allowable area in m² for industrial buildings with only one storey or for its compartments

The areas marked with an asterisk in Table 2 may be increased by 60% if the compartments have improved accessibility in accordance with the provisions of Section 8.1.2.

3.4 Compartment wall

3.4.1 The compartment walls, both horizontal and vertical, have a fire resistance at least equal to the fire resistance listed in Table 3:

Building class	Minimum fire resistance compartment walls
	AEI 60
B or	CEI 120

Table 3 - Minimum fire resistance of compartment walls.

When determining the fire resistance of compartment walls, the overall stability of the building and the influence of the structural elements on the wall are taken into account. This takes into account the expansions and deformations of the structural elements and the wall due to exposure to the fire.

3.4.2 The openings in the compartment walls necessary for the passage of users and vehicles are closed with self-closing or, in case of fire, self-closing doors with a fire resistance $_{EI1}$ 60.

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.

3.4.3 The connection of the compartment wall to the roof or facade is designed and constructed so that in the event of a fire, the risk of fire and smoke spreading to the adjacent compartment is limited.

For the roof, this can be accomplished in two possible ways:
- either the compartment wall extends at least 1 m above the roof surface;
- either connect the compartment wall with the roof which has a fire resistance E 60 or E 120 (depending on the required fire resistance of the wall) locally over a distance of at least 4 m (horizontal distance measured perpendicular to the compartment wall). This part of the roof, excluding the roof seal, is constructed of materials A1 and/or A2-s1, d0.

For the facade, this can be accomplished in two possible ways:
- or the compartment wall protrudes at least 0.5 m from the façade plane;
- either connect the compartment wall with the façade that has a fire resistance E 60 or E 120 (depending on the required fire resistance of the wall) locally over a distance of at least 2 m (horizontal distance measured perpendicular to the compartment wall). This part of the facade is constructed of A1 and/or A2-s1, d0 materials.

The location of compartment walls is indicated on the facades.

3.5 Stability in case of fire of exterior and compartment walls

The exterior and compartment walls are designed and constructed so that in case of fire, the risk of the walls of the infested compartment collapsing outward is limited.

4 INDUSTRIAL BUILDING WITH DIFFERENT PARTS

4.1 An industrial building divided into different parts for the purpose of different industrial activities is designed and constructed so that the different parts form separate compartments.

These parts may form a compartment together, provided that:

- the combined area of the compartment is less than or equal to 2000 m²;
- and the walls between the different sections extend to the roof and have a fire resistance EI 60.

4.2 If the compartmentalization between aforementioned parts of the industrial building runs over different building levels, the vertical compartment walls are part of the same vertical plane.

5 ACTIVE FIRE PROTECTION

5.1 Generalities

The design, implementation, use and inspection of the active fire protection systems shall comply with the rules of good workmanship and the applicable standards on the subject.

Active fire protection systems are thereby designed so that the various components are mutually compatible. They work in synergy so that the operation or failure of one component, does not compromise the operation of the other installations and components.

Active fire protection systems shall be inspected and maintained at regular intervals by a competent body or person.

5.2 Fire detection, warning, notification

Industrial buildings are equipped with an appropriate automatic fire detection system of the total surveillance type. For Class A industrial buildings with an area less than or equal to 2000 m², a fire detection system with manually operated fire detectors is sufficient.

5.2.1 Implementation of the fire detection system

The automatic fire detection system is designed and implemented according to the rules of good craftsmanship. The choice of detectors is adapted to the risks present and as a function of rapid fire detection.

The fire detection system automatically indicates the fire alarm and its location.

This installation shall be inspected upon commissioning and every three years. This inspection shall be carried out by an inspection body accredited in accordance with the law of July 20, 1990 on the accreditation of conformity assessment bodies or in accordance with an equivalent accreditation procedure from another Member State of the European Community or from Turkey or from an E.V.A. country party to the Agreement on the European Economic Area.

5.3 Smoke and heat extraction system

To control the development and spread of fire and smoke in the affected compartment, the

limit, the industrial building is equipped with a smoke and heat extraction system (RWA system).

This requirement does not apply to:

1. an industrial building or compartment classified in Class A with a total floor area less than or equal to 10 000 m² ;

2. an industrial building or compartment classified in Class B, the total floor area of which is less than or equal to 500 m²;

3. compartments equipped with an automatic watermist, foam or gas extinguishing system or an ESFR sprinkler system.

5.3.1 Implementation of the RWA system

The SHEV installation complies with the conditions laid down in standard NBN S 21-208-1, subject to points 18 and 19 of this standard.

However, for compartments whose total floor area is less than or equal to 2,000 m², the geometric area of the RWA vents and air supply shall be calculated at a rate of at least 3% of the total floor area, provided that the height of the stacked goods and the height of the top of the air supply vents is no more than 70% of the height to the RWA vents.

5.3.2 Operation of the RWA system

The RWA system shall be operated by the automatic fire detection system, except in those cases where the compartment is equipped with an automatic fire extinguishing system of the sprinkler or space security type. It shall also be operable manually.

If a compartment is equipped with a sprinkler system, notwithstanding NBN S 21-208-1, the RWA system is automatically operated by the sprinkler system's alarm valve.

5.4 Automatic extinguishing system

When an industrial building or compartment is equipped with a general automatic fire extinguishing system, it meets the following conditions.

1° The automatic fire extinguishing system complies with the rules of good workmanship.
2° The installation is inspected when it is put into service and annually thereafter. For sprinkler installations, the inspection is carried out every six months. This inspection is carried out by an inspection body accredited in accordance with the law of 20 July 1990 on accreditation of conformity assessment bodies or in accordance with an equivalent accreditation procedure from another Member State of the European Community or Turkey or from an E.V.A. country that is a party to the agreement on the European Economic Area.

5.5 Notification of the fire

Any onset of fire is reported to the territorially competent fire department. To this end, the signals from the fire detection center and from automatic extinguishing systems are continuously supervised by one or more competent persons and this locally, remotely or a combination of both.

Upon arrival at the intervention site, firefighters must be able to interact with a

in charge of the industrial building.

5. 6Central control and operating station

Supervision of the operation and control of the building's various active fire protection systems is from a central monitoring and control station. The walls separating this room from the rest of the building shall have at least EI 60.

The location of the room is determined in consultation with the territorially competent fire department so that the maximum walking distance from the outside to the room is 15 m. The room is accessible from outside either directly or through a corridor with walls that have at least EI 60 and doors that have at least $_{EI1}$ 30.

The classroom is equipped with safety lighting.

6 DISTANCE BETWEEN BUILDINGS

6.1 Generalities

To prevent a fire from spreading between two opposite buildings, the radiation of a fire on the opposite buildings should not exceed 15 kW/m².

An industrial building is assumed to comply with this if the distance from opposite buildings - as a function of the fire resistance of the façade and of the openings in the façade - is greater than or equal to the distance determined in Table 4.

Fire resistance of the facade	% openings without fire resistance	Distance [m]
$EI_{(⊠↔⊠)}$ 60	0%	0
	0% ≤ % openings < 10%	4
	10% ≤ % openings < 15%	8
	15% ≤ % openings < 20%	12
	≥ 20% openings	16
No fire resistance or < $EI_{(⊠↔⊠)}$ 60		16

Table 4 - Minimum spacing between opposing buildings as a function of radiation

If opposite buildings are located on the same plot, the distance is determined as a function of the facade with the highest fire resistance.

If opposite buildings are located on the same lot, E 60 is sufficient for both facades if the spacing between them is greater than or equal to the height of the tallest facade.

6.2 Mirror symmetry relative to the property boundary

When determining spacing from buildings on neighboring lots, the

distance to the property boundary to be greater than or equal to half the minimum spacing.

6.3 Combustible stacked goods

Storage of flammable goods is permitted only if these goods are located at a distance from opposite buildings that is at least equal to the distance determined in Section 6.1 and 6.2, respectively.

6.4 Buildings equipped with automatic fire extinguishing system

The minimum spacing determined in Table 4 is halved for the facades of buildings equipped with a sprinkler system.

In addition, if buildings are located on the same lot and both buildings are equipped with an automatic fire extinguishing system, no minimum spacing is required.

6.5 Common walls

The common walls of adjoining buildings shall meet the requirements of compartment walls, as provided in 3.4.

6.6 Fire behavior of roofs

The roofing of the industrial building belongs to class BROOF (t1).

This requirement does not apply to green roofs that meet the provisions of paragraph 5 of Annex 7.

7 EVACUATION

7.1 Number of outputs

7.1.1 General rule

Users shall have at least two exits providing access to a safe place. The first part of the route to be taken to these exits may be common.

The exits are located in opposite zones.

7.1.2 Only one output

One output is only necessary:

- for those premises, compartments or building levels where a limited number of persons are sporadically present during normal operations for maintenance and inspection of the facilities;
- when, for premises, compartments or floors with fewer than 50 users, the depreciable laid way to reach a safe place is less than that which may be common as provided in Section 7.2.

7.1. 3More than two outputs.

If the area of the room, compartment or building level is planned for a possible presence of more than 500 persons, then more than two exits are required. The number of exits is determined as shown in Table 5.

	Number of outputs
Number of users < 50	1 or 2 outputs (cf. 7.1.2)
50 ≤ number of users < 500	2
500 ≤ number of users < 1000	3
1000 × n ≤ number of users < 1000 × (n+1) ; (n = 1, 2, 3,...)	n+3

Table 5 - Number of outputs

7.2 Way to be traveled to an exit

7.2.1 The distance to be traveled to an exit is limited to the distance listed in Table 6.

	Common part [m]	Total [m]
Without sprinklers	30	60
With sprinklers	45	90

Table 6 - Road to be traveled

Roads to those exits are kept clear. They are zoned so that persons present can reach a safe place unhindered.

Any exit or evacuation route can be used immediately in case of fire to exit the building or reach a safe place.

7.2.2 In the premises and parts of buildings referred to in point 3 of section 1.2.1, the distance to be covered in case of evacuation shall not exceed:
- 30 m to an exit to a safe place;
- 45 m to an exit to a safe place when access to that exit is by an evacuation route or stairwell and provided that no more than 30 m need be traveled to that evacuation route or stairwell.

Moreover, the walls of that evacuation route and of the stairwell have a fire resistance EI 60 and are equipped with fire-resistant doors $_{EI1}$ 30.

7.3 Width of exits and evacuation routes.

The useful width of the doors and evacuation routes leading out to the outside or to a safe place is at least equal to 0.8 m. It is greater or equal to the required useful width $_{br}$ calculated according to Annex 1, taking into account the maximum number of persons present in the compartment under normal conditions.

Only doors that open in the sense of escape are considered for determining the useful width.

7.4 Safety signage and lighting

The exits, evacuation routes and fire protection means shall be indicated by easily perceptible and recognizable signs that comply with the provisions on occupational safety and health signage. They shall be equipped with safety lighting.

The serial number of each floor is clearly posted on landings and in evacuation routes at the level of stairs and elevators.

7.5 Alarm and notification

All users are notified in a timely manner that there is a fire and that evacuation of the building may be necessary.

The industrial buildings with an area greater than or equal to 500 m² must be equipped with an appropriate alarm system for this purpose.

In case of fire, the users can notify the fire department in time and the fire department can get in touch with a person in charge of the industrial building.

8 SAFETY OF EMERGENCY CREWS

8.1 Accessibility and accessibility

8.1.1 Generalities

In the vicinity of the industrial building, one or more safe and expedient staging areas are provided that are easily accessible to fire department vehicles at all times.

The number and location of staging areas are determined, in agreement with the appropriate fire department, such that:

1° the distance from the fire department entrance to the building to a staging area is limited;
2° a t least half of the exterior walls of buildings with a ground area greater than or equal to 2500 m² are accessible;
3° all exterior walls of buildings with a ground area greater than or equal to 5,000 m² are accessible and the access routes to them are not dead ends;
4° the erected vehicle cannot be damaged by the fire.

8.1.2 Improved accessibility

The allowable area of compartments in industrial buildings may be increased for certain classes (see Table 2) if these compartments are easily accessible for firefighting.

The following conditions are met:

1° the land on which the building is located is accessible through two independent entrances; these entrances are connected on the plot by a fire department access road;
2° at least half of the walls of the compartment are external walls accessible to the fire department.

8.2 Extinguishing agents and water supply

8.2.1 Extinguishers

In the industrial building there are sufficient adapted extinguishing means. The nature and quantity are determined by the operator in consultation with the territorially competent fire department according to the nature and extent of the fire risk.

8.2.2 Firewater supply

In the immediate vicinity of the industrial building, the fire department has a primary firefighting water supply that can be quickly used by firefighters.

This primary firefighting water supply may be supplemented, in consultation with the fire department, by a secondary and possibly tertiary firefighting water supply.

8.3 Monodisciplinary intervention plans

If requested by the territorially competent fire department, the operator of the industrial building shall provide the necessary information to the fire department for the preparation of an intervention plan for the industrial building.

0 GENERAL

0.1 Scope

This annex contains regulations applicable to low, medium, high and industrial buildings.

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

Plates 7.1a and 7.1b - Building element penetrations Plate
7.2 - Building element penetrations
Plate 7.3 - Building element penetrations Plate 7.4
- Building element penetrations
Plate 7.5 - Relative position of air inlets and air outlets (principle diagrams) Plate
7.6 - Green roofs

1 THE PENETRATIONS OF BUILDING ELEMENTS

1.1 Scope

The provisions of the present chapter apply to penetrations through building elements of piping for fluids, solids, electricity or electromagnetic waves, which shall not adversely affect the required fire resistance of these elements.

These provisions do not apply to air ducts, ventilation ducts, smoke ducts and fire dampers.

1.2 Terminology

The definitions of paragraph 5.12 of Annex 1 apply to the present chapter.

1.3 Required criteria

The sealing of the penetration must maintain the separating capacity of the wall, that is, the ability to meet the criteria of flame density (E) and thermal insulation (I) at the location of the penetrations.

For single penetrations of pipes with diameters less than or equal t o 160 mm without insulation or with non-combustible insulation, the criteria of thermal insulation may be waived; the non-combustible insulation material complies with classification A2-s1, d0.

1.4 Required length of time

The seal must meet the required criteria for at least the same length of time as required for the wall.

However, for a pipe duct wall, the required duration is

- at least half the time duration of fire resistance required for the duct wall, and
- a minimum duration of 30 minutes.

1.5 Determination of product characteristics.

The fire resistance of the seal in terms of flame density E and thermal insulation I may be demonstrated

- by applying the provisions of paragraph 2.1 of the Annex 1 or
- by applying one of the type solutions described in sections 1.6, 1.7 and 1.8 of this annex.

1.6 Type Solution A - Sealing a single penetration with mortar or rock wool

Simple sealing of the penetration with mortar or rock wool provides sufficient guarantees not to adversely affect the indicated required fire resistance if the following conditions are met.

1.6.1 Conditions regarding construction elements

The building elements in which the penetrations are installed have a fire resistance of at least EI 60.

1.6.2 Maximum pipe diameter as a function of required fire resistance

Table 7.1 shows the maximum pipe diameters through building elements for which a simple sealing with mortar or rock wool will not adversely affect the indicated required fire resistance.

Nature of leadership	Seal	Requirement E		
		E 30	E 60	E 120
Combustible pipes and electrical cables	with mortar	50	50	50
	with rock wool	50	25	25
Non-combustible pipes	with mortar and rock wool	160	160	75
	(automatic) filled with water in case of fire	160	160	160

Table 7.1 - Maximum diameter (mm) for pipes simply sealed with mortar or rock wool

1.6.3 Conditions regarding sealing with mortar

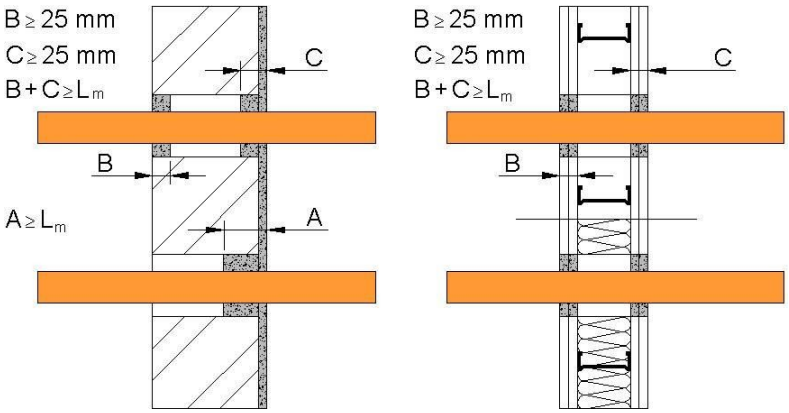
The pipes are completely sealed all around with mortar over a sealing depth (L_m) of at least 50 mm for required fire resistance E 30 and E 60 and of at least 70 mm for required fire resistance E 120; the thickness of any plastering may be taken into account to obtain the sealing depth.

Sealing is preferably done along both sides of the building element; the sealing depth L_m is obtained by adding the thickness along each side with a minimum of 25 mm per side.

If the seal is realized only along one side, the sealing depth along this side should be as follows: A $\geq L_m$. (see plate 7.1a)

In the case of a lightweight partition wall (or a building element with a large hollow interior space in

general), sealing will usually have to be done along both sides to achieve the required thickness. (See Plate 7.1b)



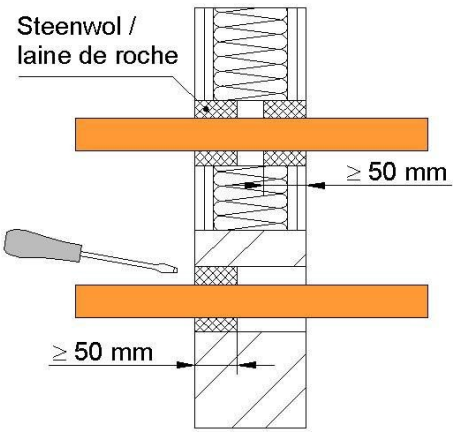
1.6.4 Conditions regarding sealing with rock wool

The pipes are completely sealed all around with rock wool over a total depth of at least 50 mm. (see plate 7.2)

Sealing may be done along one side.

The rock wool should be firmly pressed into the building element.

In the case of a lightweight partition wall, an insulating material of such density is inserted into the core at the location of the penetration that it can be firmly pressed on. Sealing with rock wool is also done along both sides of the building element.

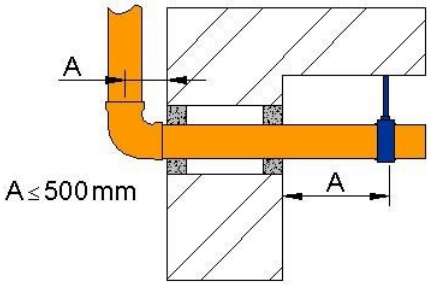


1.6.5 Conditions regarding sealing with mortar and rock wool

The sealing may consist of a combination of mortar and rock wool provided that at least for one of the materials the conditions determined in 1.6.3 and 1.6.4, respectively, are met.

1.6.6 Conditions regarding the suspension and fixing of the pipes

The pipes must be hung and fixed according to the rules of good workmanship. The fastenings closest to the building element must not be located further than 500 mm along either side of it. (see plate 7.3)



1.7 Type solution B - Single conduit with a casing pipe

When the rules of good practice require the use of a casing pipe, the required fire resistance is not adversely affected if the following conditions are met.

1.7.1 Conditions regarding the building elements The

building elements are in masonry or concrete.

1.7.2 Maximum diameter of pipe as a function of required fire resistance

Table 7.2 shows the maximum diameters of pipes through building elements for which the use of a casing pipe made of metal or other non-combustible material or PVC-U, with or without open clearance, does not adversely affect the required fire resistance.

Length of casing pipe	Backlash	Requirement E		
		E 30	E 60	E 120
Metal or non-combustible materials casing pipe L= 300 mm	Open clearance	110	110	90
	Filled backlash	110	110	25
Metal or non-combustible materials casing pipe L= 140 mm	Open clearance	90	90	25
	Filled backlash	50	25	25
PVC-U casing pipe L= 140 mm	Open clearance	40	40	25

Tableau 7.2 - Maximum diameters (mm) of pipes embedded in a metal or PVC casing pipe

1.7.3 Conditions concerning the casing pipe and its seal The

casing pipes are

- non-combustible

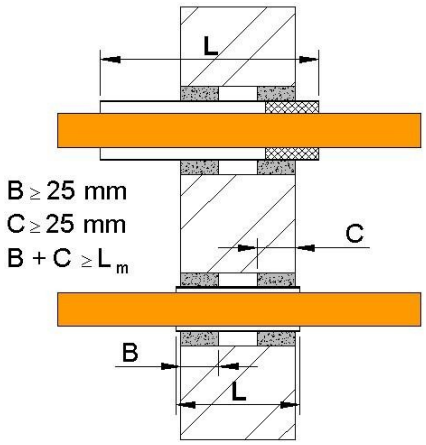
pipes or

- made of rigid polyvinyl chloride (PVC-U) graded B- s3, d0.

The casing pipe is securely fixed in the building element with a mortar seal.

Sealing in mortar should be done along both sides of the building element, with a minimum depth of 25 mm. (see plate 7.4)

The casing pipe is left partially visible and must protrude relative to the building element.



1.7.4 Conditions regarding piping

The pipes are non-combustible or rigid polyvinyl chloride (PVC-U) pipes.

1.7.5 Conditions regarding clearance between casing pipe and pipe

If the clearance between the casing pipe and the pipe remains open, it is a maximum of 4 mm.

If the diameter of the casing pipe is less than or equal to 25 mm, no conditions are imposed regarding the clearance between the casing pipe and the pipe.

If the clearance between the casing pipe and the pipe is filled, it shall not exceed 45 mm and shall be completely sealed all around with rock wool, performed as provided in Section 1.6.6.

1.7.6 Conditions concerning the suspension of pipes

Piping shall be suspended and attached as provided in Section 1.5.6.

1.8 Type solution C - Direct connection to a hanging toilet

Connection to a hanging toilet does not adversely affect the required fire resistance if the following conditions are met:

- the diameter of the pipe shall not exceed 110 mm;
- Mortar or rock wool sealing complies with section 1.6.3 or 1.6.4;
- the toilet is fixed against a building element in masonry or concrete;
- the maximum time required is equal to 30 minutes.

2. THE SASSES

2.1 Scope

The provisions of this chapter apply to sassen required by Annexes 2, 2/1, 3, 3/1, 4 and 4/1 of this Decree.

2.2 Equipment

Only the following items are allowed in the sassen:
- detection means;
- extinguishing agents;
- signaling devices;
- lighting devices;
- heaters;
- ventilation devices;
- DEPARTMENTS.

Electrical conduits, ventilation ducts and smoke ducts are permitted only:
- if they serve only for the operation of the aforementioned objects installed in the shaft,
- or if the sas gives out only on premises not intended for residence (for example : technical rooms, transformer rooms, storerooms, archive rooms, premises for the storage of domestic waste, premises for counters, heating rooms, ...) or car parks.

Water pipes are allowed in the sassen. Any

other piping is prohibited in the sassen.

3 THE PARKINGS

3.1 Object

This chapter defines the conditions that the design, construction and layout of parking lots 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.

3.2 Scope

The provisions of this chapter shall apply to the parking lots referred to in paragraph 5.2.4 of Annexes 2/1, 3/1 et 4/1 of this Decree.

3.3 Fire Protection

The design, implementation, use and inspection of fire protection systems shall comply with the rules of good craftsmanship and the applicable standards in this regard.

Active fire protection systems are thereby designed so that the various components are mutually compatible. They work in synergy so that the operation or failure of one component, does not compromise the operation of the other installations and components.

Active fire protection systems shall be inspected and maintained at regular intervals by a competent body or person.

The specific regulations regarding electrical lines for operation and power supply of the active fire protection systems continue to apply.

3.3.1 Security type

Different protection types are identified based on the fire protection concept applied:
- RWA & Sprinkler
- RWA
- Sprinkler
- Vent
- Open

In parking lots with a total area greater than 250 m² (*), one of these security types must be applied to each parking building layer, as shown in the table below:

		Total area of parking S				
		S ≤ 250 m² (*)	250 m² (*) < S ≤ 60 000 m²			S > 60 000 m²
			Area of the largest sub-compartment S_{sc}			
			S_{sc} ≤ 1 250 m²	1 250 m² < S_{sc} ≤ 2 500 m²	2 500 m² < S_{sc} ≤ 5 000 m²	5 000 m² < S_{sc}
Upper ground level		/	RWA1[1,2,3] ***OR*** Sprinkler1[1,2] ***OR*** Ventilation opening ***OR*** Open	RWA1[1,2] ***OR*** Sprinkler1 ***OR*** Open	RWA1 ***OR*** Sprinkler1 ***OR*** Open	RWA1 & Sprinkler1 ***OR*** Open
Underground building layer	0 m < p ≤ 7 m	/	RWA1[1,2,3] ***OR*** Sprinkler1[1,2] ***OR*** Ventilation opening ***OR*** Open	RWA1[1,2] ***OR*** Sprinkler1 ***OR*** Open	RWA1 ***OR*** Sprinkler1 ***OR*** Open	RWA1 & Sprinkler1 ***OR*** Open
	7 m < p ≤ 14 m		RWA1[1,2] ***OR*** Sprinkler1	RWA1 ***OR*** Sprinkler1	RWA1 & Sprinkler1	RWA1 & Sprinkler1
	14 m < p ≤ 21 m		RWA1 ***OR*** Sprinkler1	RWA1 & Sprinkler1		
	> 21 m		RWA1 & Sprinkler1			

(*) For car parks without a car elevator, this limit is increased to 625 m² provided that no point of the car park is further than 45 m from the entrance to the car park intended for the intervention of the fire department (cf. point 7.2 of Appendix 1).

RWA# = RWA type # Sprinkler# = Sprinkler type #

All underground parking building levels, except open building levels, must be of the same security type. All above-ground parking building levels, except the open building levels, must be of the same security type. However, the security type of the above-ground levels may differ from that of the underground levels.

3.3.2 Fire detection and alarm system

The parking building levels are equipped with an automatic fire detection and alarm system that monitors the entire parking lot (including the premises present in the compartment).

This requirement does not apply to:
a) parking lots with a total area less than or equal to the limit specified in Section 3.3.1 above which one of the security types must be applied to each parking building layer;
b) "Vent" or "Open" type car parks only, provided:
   - That there are no partial compartments;
   - that, except for fire self-closing doors, no other equipment i s present that requires operation by fire detection;
   - And that she doesn't have a car elevator.

3.3.2.1 Implementation of the fire detection system

The automatic fire detection system is designed and executed according to the standard NBN S 21-100-1. The choice of detectors is adapted to the risks present and as a function of rapid fire detection.

For parking building floors equipped with a sprinkler system, this system can ensure the function of automatic fire detection in the zones it protects, provided:
- that the sprinklers have a nominal operating temperature not exceeding 68°C and that they are of the quick response type;
- That the piping system of the sprinkler system is equipped with water flow detectors and/or pressure switches that divide the piping system into detection zones;
- That these detection zones comply with the corresponding requirements of standard NBN S 21-100-1;
- That for parking building layers of the "RWA & Sprinkler" type, each detection zone includes no more than one RWA zone;
- That each subdivision of the piping system is equipped with a test valve;
- and that this installation is supplemented by smoke detectors in the vicinity of self-closing doors in case of fire.

The fire detection system automatically indicates the fire alarm and its location.

3.3.2.2 Operation of the alarm system

All users of the building are notified in a timely manner that there is a fire in the parking lot and that evacuation of the building should proceed.

When the parking lot is supervised by one or more authorized persons, a preliminary warning is sent to those persons who take appropriate action and notify the fire department.

3.3.3 RWA installation

For the parking building levels equipped with a smoke and heat extraction system (RWA system), this system must protect the vehicle parking areas, circulation routes and ramps. It is not required to provide installation for the premises and parking stalls present in the compartment.

3.3.3.1 Implementation of the RWA system

The RWA system has been designed and implemented:
- either according to standard NBN S 21-208-2 for a SHE installation type 1 or 2;
- or according to the provisions of the section 3.3.3.3 for a Type 3 SHEVS installation;

The smoke exhaust from the affected sub-compartment may not occur through another sub-compartment, except for smoke exhaust from ramps without vehicle parking areas. In contrast, air supply to the affected subcompartment may be through another subcompartment.

3.3.3.1.1 Deviation provision - Autonomous power source.

Notwithstanding standard NBN S 21-208-2 and point 6.5.3 of Annexes 2/1, 3/1 and 4/1, the SHEV system does not need to be powered by a stand-alone power source for parking lots that have a total area less than or equal to 2,500 m².

3.3.3.1.2 Derogation provision - Fire dampers.

By way of derogation from point 6.7.4 of Annexes 2/1, 3/1 et 4/1, when the SHEVS system serves several sub-compartments, the smoke dampers and register dampers at the boundaries of the sub-compartment may belong to class $_{E600}$ 60 (ve-ho ⊠↔⊠) MA single according to standard NBN EN 12101-8.

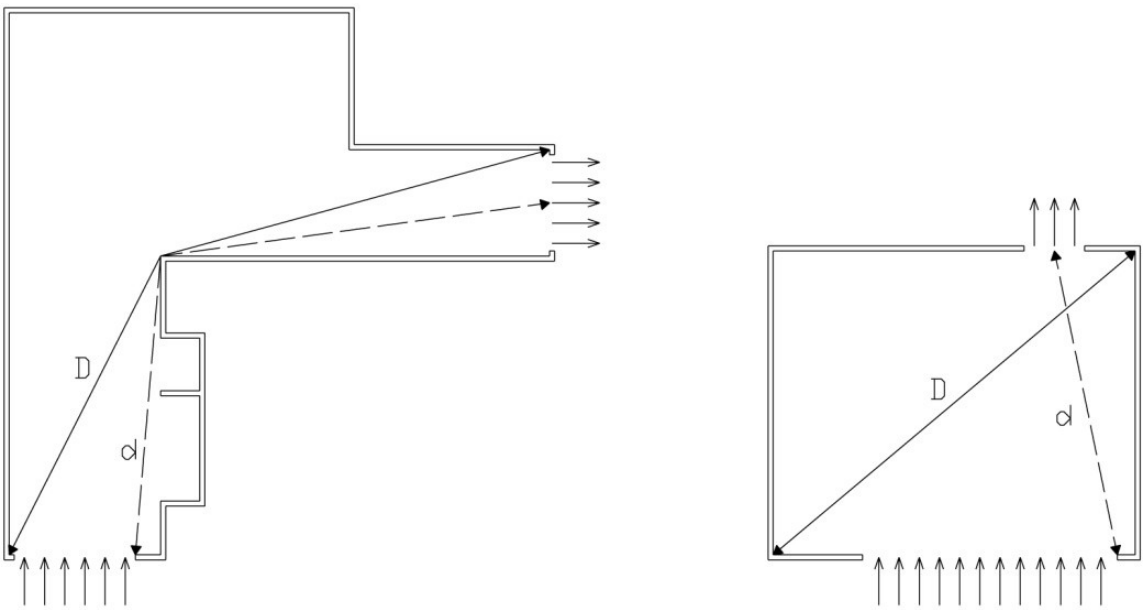
3.3.3.2 RWA system type 2

For a sub-compartment with protection type "RWA":
a) with an area less than or equal to 2,500 m² and above ground;
b) with an area less than or equal to 2,500 m² and a depth less than or equal to 7 m;
c) with an area less than or equal to 1250 m² and a depth less than or equal to 14 m;
and provided that the total area of the parking lot is less than or equal to 10 000 m²; the following deviations from Annex A of standard NBN S 21-208-2 are granted:
- the sub-compartment is divided into RWA zones with an area less than or equal to 1250 m²;
- the width $_{wref}$ of the sub-compartment may be greater than 20 m. In this case, the required velocity to be taken into account is given in Table A.1 for a width w of 20 m.
- the design flow $_{Qd}$ is the largest value between the flow rates $_{Qmin}$ et $_{Qin}$.

3.3.3.3 RWA system type 3

The principle involves allowing firefighters to establish horizontal ventilation without using their own fans to make an intervention path relatively smoke-free from the entrance to the parking lot to the vicinity of the fire scene.

This simplified type solution applies only to a sub-compartment of type "RWA":
a) With an area less than or equal to 1250 m² and above ground;
b) with an area less than or equal to 1250 m² and a depth less than or equal to 7 m;
whose distance d is greater than or equal to 0.6 D (see Plate 7.5);
and provided that the total area of the parking lot is less than or equal to 60 000 m².



in which

Dthe shortest horizontal distance is to be traveled within the sub-compartment between the farthest points of this sub-compartment;
dthe shortest horizontal distance to be traveled within the subcompartment between the center of the air outlet nozzle and the nearest edge of the air inlet nozzle;

Each sub-compartment constitutes an RWA zone.

3.3.3.3.1 Implementation of the RWA system type 3

The smoke exhaust system ensures an exhaust flow rate of at least 120,000 m³/h.

The smoke exhaust system can also be used to control the regulatory maximum concentration of noxious gases as required for permanent ventilation (without fire). In case of fire, control of the smoke exhaust system must take precedence over control of the permanent ventilation.

The smoke extraction devices must comply with standard NBN EN 12101-3. Their accessories (smoke dampers, smoke registers, etc.) that protect them in relation to the external environment must comply with standard NBN EN 12101-2. The exhaust devices and their accessories must also

meet the performance requirements according to the required classification defined in the table below:

Performance requirements	Required classes	Reference Standards
Fan heat resistance	F 300	NBN EN 12101-3 (test: Appendix C)
Operation under snow load of the fan's accessory, placed at the end of a network and in outdoor environment, except for heated buildings where the accessory is not thermally insulated	SL 125	NBN EN 12101-3 (test: Appendix E)
Operation of fan accessories that may be exposed to low ambient temperature and do not operate due to the pressure differential produced by the fan	T (-15)	NBN EN 12101-2 (test: Appendix E)
Reliability of fan accessories not working due to pressure differential produced by the fan	Re 1000 (*)	NBN EN 12101-2 (test: Appendix C)

(*) If the exhaust system has two functions, 10 000 cycles must be performed in the normal position for comfort ventilation before proceeding to the test to determine its reliability class.

The exhaust ducts, their accessories and their suspensions must be made of steel.

3.3.3 . 4Operation of the SHEV system.

The RWA system shall be served by the automatic fire detection system provided in Section 3.3.2.

The RWA system must also be able to be operated manually.

3.3.3.4.1 Derogation provision - standard NBN S 21-208-2

In deviation from standard NBN S 21-208-2, for parking building levels with protection type "RWA & Sprinkler":

- the automatic control may be ensured by a fire detection system whose function of automatic fire detection is through the sprinkler system in the zones it protects, as provided in Section 3.3.2.1;
- the smoke exhaust should be in regime at the earliest 3 minutes after receiving the signal of the water flow alarm of the sprinkler system.

3.3.4 Sprinkler system

For parking building levels equipped with a sprinkler system, this system shall protect the vehicle parking areas, circulation routes and ramps, and premises within the compartment, except those separated from the rest of the parking compartment by fire-resistant walls and doors.

3.3.4.1 Implementation of the sprinkler system

The sprinkler system is designed and implemented in accordance with NBN EN 12845, the standard

NFPA 13 or any other rule of good practice with a similar level of safety. Those standards and rules of good practice should be applied integrally, without mixing their specifications among themselves.

3.3.4.1.1 Deviation provision - Autonomous power source.

Notwithstanding paragraph 6.5.3 of Annexes 2/1, 3/1 and 4/1, any electric pumps of the sprinkler system do not have to be powered by an autonomous power source for the parking lots with the protection type "Sprinkler" that have a total area less than or equal to 2,500 m².

3.3.4.2 Sprinkler system type 2

For a sub-compartment with the protection type "Sprinkler":
a) With an area less than or equal to 1250 m² and above ground;
b) with an area less than or equal to 1250 m² and a depth less than or equal to 7 m;
and provided that the total area of the parking lot is less than or equal to 10 000 m²; the following deviations from standard NBN EN 12845 or NFPA 13 are granted:
- for the standard NBN EN 12845, the risk class is OH1;
- for the NFPA 13 standard, the risk class is LH with a design density of at least 4 mm/min;
- the water supply must have a sufficient capacity to ensure for 30 minutes the conditions of pressure/flow required for the system.

3.3.5 Partial compartmentalization

The principle applies of the automatic subdivision in case of fire of the parking building layers into different sub-compartments to slow down fire spread and limit the infested area.

The area of a sub-compartment is limited as a function of its depth in order to take into account the difficult intervention of firefighters in the deepest building levels.

This requirement does not apply:
(a) in parking lots with a total area less than or equal to the limit specified in paragraph 3.3.1 above which one of the security types shall be applied to each parking building layer;
b) on parking lots with a total area less than or equal to 2,500 sq. m. that extend in height over a maximum of two floors;
c) on parking lots of the "RWA & Sprinkler" or "Open" security type.

A parking building layer may constitute a single sub-compartment provided the requirements below are met.

3.3.5.1 Dimension of sub-compartments

The parking compartment is derisively divided into several sub-compartments that:
- the area of each sub-compartment is less than or equal to the limit specified in point 3.3.1 as a function of the depth of the parking building layer and the security type used;
- each sub-compartment extends over only one parking building layer;
- the surface of the floor of each sub-compartment is continuous; the surface can be horizontal or in slope, but there must be no break (for example: floor in shear or with split-levels).

3.3.5.2 Walls of a sub-compartment

The walls of a sub-compartment have EI 60.

Any opening in the walls of a sub-compartment intended for passage of occupants and the fire department is closed:

- either by a sas with walls EI 60 and self-closing or in case of fire self-closing doors $_{EI1}$ 30;
- either by a self-closing or fire self-closing door $_{EI1}$ 60.

The openings in the walls for partial compartmentation for vehicle passage are equipped with E 60 self-closing closures in case of fire, such as swing doors, sliding walls, roll-up shutters and screens.

In case of activation of the closures mentioned in the third paragraph of this section, the connection to each sub-compartment shall remain assured:

- either through an opening in accordance with the second paragraph of this section, provided in the vicinity of each of the openings referred to in the third paragraph of this section;
- or through another well-defined access determined in agreement with the fire department.

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

3.3.5.3 Operation in case of fire

The doors and closures of the sub-compartments close automatically in case of fire, except those required for the operation of any RWA system.

3.3.6 Vent

The principle involves allowing firefighters to establish horizontal ventilation by using their own fans in order to make an intervention route from the entrance to the parking lot to the vicinity of the fire scene relatively smoke-free.

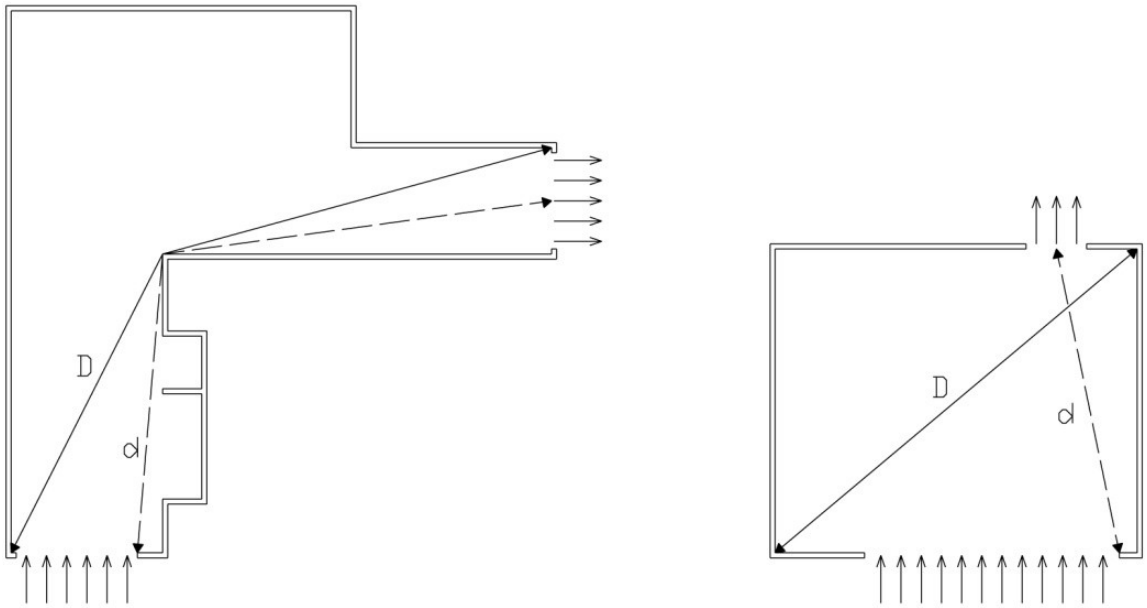
This security type applies only to a partial compartment:

a) With an area less than or equal to 1250 m² and above ground;

b) with an area less than or equal to 1250 m² and a depth less than or equal to 7 m;

whose distance d is greater than or equal to 0.6 D (see Plate 7.5);

and provided that the total area of the parking lot is less than or equal to 60 000 m².



in which

D is the shortest horizontal distance to travel within the sub-compartment between the farthest points of this sub-compartment;
d is the shortest horizontal distance to be traveled within the sub-compartment between the center of the vent and the nearest edge of the entrance to the sub-compartment intended for fire department intervention;

The smoke exhaust and air supply of the affected subcompartment shall not be through another subcompartment.

3.3.6.1 Implementation of the ventilation opening

The ventilation opening opens directly into open air. This opening may be equipped with a valve or valve register.

The ventilation opening has a cross-sectional area of at least 5 m². The cross-sectional area of the ventilation opening is determined by subtracting any obstructions on the inside of the drainage system, such as controls, ventilation hatches and vanes.

The smallest dimension of the vent is greater than or equal to 1 m.

The vent can also be used to control the regulatory maximum concentration of noxious gases as required for permanent ventilation (without fire). In case of fire, the control of the smoke exhaust system must take precedence over the control of the permanent ventilation.

The performance of any valve or valve register of the ventilation opening is determined in accordance with the test methods determined by standard NBN EN 12101-2. The following table defines the classes that the valve or valve register must meet:

Performance requirements	Required classes	Reference Standards
Resistance to heat	B 300	NBN EN 12101-2 (test: Appendix G)
Opening under snow load	SL 125 (**) (***)	NBN EN 12101-2 (test: Appendix D)
Opening to low ambient temperature	T (-15)	NBN EN 12101-2 (test: Appendix E)
Reliability	Re 50 (*)	NBN EN 12101-2 (test: Appendix C)
Resistance to wind load	WL 1500	NBN EN 12101-2 (test: Appendix F)

(*) If the exhaust system has two functions, 10 000 cycles must be performed in the normal position for comfort ventilation, before proceeding to the test to determine its reliability class

(**) An evacuation system classified as SL 0 can be installed according to the manufacturer's instructions, with a minimum installation angle greater than 45° (slopes of the roof and of the evacuation system added up in closed position), except if the snow cannot slide off the evacuation system (due to wind deflectors, for example).

(***) Except for drainage systems classified as SL 0, for drainage systems equipped with deflectors or similar elements, it is sufficient that the classification of the snow load is not less than SL = 2000 d, where d represents the thickness of snow, expressed in meters, that can be retained within the limits of the deflectors.

The opening of any valve or valve register of each vent is commanded as follows:
- automatic in case of fire in the parking lot;
- automatically in the event of a power source, power supply or control failure (device with positive safety);
- manually via a control intended for the fire department.

3.3.7 Open parking building layers

This security type is only applicable to an open parking building layer (cf. Section 7.4 of the Appendix 1).

The principle is that this parking building layer is adequately ventilated, so that in case of fire there is a smooth evacuation of smoke and heat and supply of fresh air, and active protective measures are not necessary in this building layer.

3.3.8 Central monitoring and control station

The supervision of the operation and control of the various active fire protection systems are done from a central monitoring and control station.

The central monitoring and control station has a synoptic board on which the fire can be located, which can be used to identify the various protective devices provided and to check their activation.

The location of the central control and operating station is determined in consultation with the territorially competent fire department.

The central control and operating station is indicated by signage clearly visible and recognizable by the fire department, and is equipped with safety lighting.

3.4 Extinguishers

Notwithstanding paragraph 6.8.5.3 of Annexes 2/1, 3/1 and 4/1, no wall hydrants are required for parking building levels equipped with a sprinkler system. The specific requirements for wall hydrants continue to apply.

3.5 Premises present in the compartment

The following premises may be included in the parking compartment:
- non-residential premises (for example: technical rooms, transformer rooms, storage rooms, archive rooms, garbage storage rooms, counter rooms, heating rooms, etc.);
- the premises that directly serve the operation of the parking lot (pay stations, security rooms, sanitary facilities, offices, workshops, etc.).

Additional activities such as automatic carwash stations, loading docks, fueling stations or fuel filling stations are not permitted in the parking compartment.

3.5.1 Interior walls and doors

The interior walls of the classrooms present in the compartment have the same fire resistance as the walls of the parking compartment and:
- or access shall be through a shaft with walls having the same fire resistance as the walls of the parking compartment and self-closing or, in the event of fire, self-closing doors EI1 30;
- either access to each room shall be by a self-closing or fire self-closing door EI1 60.

This requirement does not apply to the pay stations, security rooms, plumbing and offices that directly serve the operation of the parking lot.

3.5.2 Specific classrooms

The specific regulations concerning the boiler rooms, transformer rooms and garbage storage rooms continue to apply (cf. paragraphs 5.1.2, 5.1.3 and 5.1.4 of Annexes 2/1, 3/1 and 4/1, respectively).

3.6 Equipment

3.6.1 Car elevators

The specific regulations concerning elevators shall continue to apply (cf. paragraphs 6.1 of Annexes 2/1, 3/1 and 4/1), with the application of the following derogation provisions:
- section 6.1.4.1 of Annexes 2/1, 3/1 and 4/1 shall not apply;
- upon fire detection, the cages of the car elevators are moved to the designated platform so that passengers can disembark, then they are removed from normal service, except in case of power failure;

- in case of power failure, the car elevators are brought to the first platform that is technically possible so that passengers can disembark, then they are taken out of normal service. For this purpose, each car elevator has an autonomous power source of sufficient capacity and power.

3.6.2 Parking Box

The parking boxes are part of the parking zones and their main activity must remain the parking of vehicles.

The area of a parking box is limited to a maximum of two parking spaces.

Walls and doors separating parking stalls from vehicle parking areas and circulation routes are not subject to a fire resistance requirement. Fire response requirements continue to apply.

Each parking box shall be equipped with two vents:
- one at the top, with an area of at least 500 cm² and a height of at least 15 cm;
- the other at the bottom, with an area of at least 200 cm².

These vents connect each parking box directly to a circulation path of the parking lot.
These ventilation openings may be equipped with a grille against burglary.

The walls separating the parking stalls from each other or from the vehicle parking areas have no openings or vents.

3.6.3 Gas lines

The presence of gas lines in the parking lot is permitted on condition:
- That these gas lines are made of steel and welded;
- That the piping components and apparatus of these gas pipelines are RHT type, as defined in standards NBN D 51-003 and NBN D 51-004;
- That these gas lines are protected from any impacts coming from vehicles;
- That these gas lines are placed above circulation paths.
  However, if the position of the incoming or of the vertical connection is above a parking lot, then a connecting pipe to the pipes above the circulation ways is permitted;
- and that a shut-off valve for gas supply be provided on the outside of the parking compartment for use by the fire department.

3.7 **Evacuation**

3.7.1 Number of outputs

Each parking building layer shall have at least two exits.

Parking lot exits shall comply with the first paragraph of paragraph 4.4.1.2 of Annexes 2/1, 3/1 and 4/1 with the following modifications:
- connection to a stairwell may be by self-closing doors in the event of fire;
- the connection to an evacuation path from the parking compartment shall be by a connection in accordance with the paragraph 5.2.2 of Annexes 2/1, 3/1 and 4/1.

The exits are located in the opposing zones of the parking building levels and must remain accessible in case of activation of any smoke screens for the RWA system and of any closures of the sub-compartment.

The doors to be opened to the exits shall not have a latch that prevents opening in the direction of escape.

3.7.2 Distance to be covered

No point of parking shall be located at a distance greater than:
- 45 m from access to an evacuation road leading to an exit, except for the open parking building levels;
- 60 m from access to an exit.

These distances are measured taking into account the closing of any partial compartment closures.

3.7.3 A single output

Notwithstanding Section 3.7.1, a single exit per parking building layer is sufficient, provided:
- That the parking extends in height over a maximum of two building levels;
- That neither of these two building layers is located underground at a depth greater than 7 m or above ground higher than 7 m;
- That no point of parking is located at a distance further than 15m from the access to the evacuation road leading to the exit;
- and that no point of parking is located at a distance further than 30m from the exit access.

3.7.4 Evacuation routes

Evacuation routes in a parking lot shall comply with the Section 4.4 of Annexes 2/1, 3/1 and 4/1 with the following modifications:
- the interior walls of evacuation routes have EI 60 and the doors giving access to them have $_{EI1}$ 30 and are self-closing or self-closing in case of fire;
- the connection between stairs should not be mandatorily ensured by evacuation routes or escape terraces;
- For the open parking building layers, the connection between the parking and an interior stairwell serving only the parking can be ensured by a self-closing or in case of fire self-closing door $_{EI1}$ 30.

At an evacuation level, when the route from indoor stairwells to the public road or to an outdoor area that allows access to it is through a parking lot, that connection is ensured by an evacuation path.

3.7.5 Width of exits and evacuation routes

The useful width of evacuation routes, escape terraces, exits and their access, exit or passage doors shall be at least 0.80 m for evacuation routes, exits and doors and at least 0.60 m for escape terraces.

3.7.6 Signalization and safety lighting

The exits, evacuation routes and fire protection means are indicated by easily perceptible and recognizable signs that comply with the provisions on occupational safety and health signage. They are equipped with safety lighting. The specific regulations for this remain applicable (cf. Section 6.5.4 of Annexes 2/1, 3/1 and 4/1).

The serial number of each building level shall be clearly posted on the landings and in the

escape areas at stairwells, elevators and ramps.

3.8 Intervention

3.8.1 Intervention pathways

The specific requirements regarding intervention roads depend on the security type of the parking building layer.

3.8.1.1 Security type "RWA"

Fire department intervention must be able to happen:

- either via a ramp with no parking zones for vehicles;
- either directly from the entrance to the parking lot intended for fire department intervention (cf. Section 7.2 of Appendix 1).

At the level of the affected sub-compartment, access to this sub-compartment from this ramp or the entrance to the parking lot must be intended for the intervention of the fire department:

- or happen directly;
- or through no more than one other sub-compartment.

3.8.1.2 Security type "Sprinkler"

Fire department intervention must be able to happen:

- either via a ramp with no parking zones for vehicles;
- either through a parking exit (cf. Section 3.7.1);
- either directly from the entrance to the parking lot intended for fire department intervention (cf. Section 7.2 of Appendix 1).

At the level of the affected sub-compartment, access to this sub-compartment from this ramp, the exit of the parking lot or the entrance of the parking lot intended for the intervention of the fire department must be direct.

3.8.1.3 Protection type "vent opening"

Fire department intervention must be able to happen:

- either via a ramp with no parking zones for vehicles;
- either directly from the entrance to the parking lot intended for fire department intervention (cf. Section 7.2 of Appendix 1).

At the level of the affected sub-compartment, access to this sub-compartment from this ramp or the entrance to the parking lot intended for the intervention of the fire department must be direct.

3.8.1.4 Security type "RWA & Sprinkler" or "Open."

Fire department intervention must be able to happen:

- either via a ramp with no parking zones for vehicles;
- either through a parking exit (cf. Section 3.7.1);
- either directly from the entrance to the parking lot intended for fire department intervention (cf. Section 7.2 of Appendix 1).

Partial compartmentation does not apply to parking lots of the protection type "RWA &

Sprinkler" or "Open" (cf. Section 3.3.5).

3.8.2 Central monitoring and control station

At each entrance to the parking lot intended for the intervention of the fire department, a signage clearly visible and recognizable to the fire department shall indicate whether the parking lot has a central control and operating station and its location in the building.

3.8.3 Planning the parking lot

A copy of the plans of the parking lot (layout, plans, cross-sections, etc.) is available to the fire department at the central control and operating station, or if it does not have such a station, at each entrance to the parking lot intended for the intervention of the fire department.

Protective equipment, extinguishing agents and intervention routes are indicated on those plans.

4 THE HEATING DEPARTMENTS

4.1 Object

This chapter defines the conditions that the design, construction and arrangement of firing units 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.

4.2 Scope

The provisions of this chapter shall apply to the firing divisions referred to in paragraph 5.1.2.2 of Annexes 2/1, 3/1 and 4/1 to this decision.

4.3 General

Combustion appliances should not be installed in stairwells and evacuation routes.

4.4 Installations for storage and pressure reduction of liquefied petroleum gas

The facilities for storage and pressure reduction of liquefied petroleum gas, used for heating the building and producing hot water, are located outside the building.

This requirement does not apply to the individual second-stage pressure regulator(s) immediately upstream of the combustion appliance of a dual-relief installation complying with the requirements of standard NBN D 51-006.

4.5 Boiler rooms with combustion appliances with a cumulative combustion output greater than or equal to 75 kW

4.5.1 Permitted equipment

Only the following equipment is allowed in boiler rooms with combustion appliances with a cumulative combustion output greater than or equal to 75 kW :
-devices directly involved in the operation of combustion appliances, such as

loaders, shaft handling devices and individual second-stage pressure regulators referred to in the exception included in Section 4.4;
- electric appliances intended for central heating or hot water production, such as electric heat pumps, electric boilers and electric hot water heaters;
- appliances that are part of the central heating system or hot water generation system, such as pump, circulating pumps, hydrophore group, heat exchanger, hot water accumulator, fuel treatment device (preheater, filter, pump, etc.), water meter and electricity board that serves the heating department only;
- task-oriented equipment, such as artificial lighting and gas meters, and the safety equipment, such as firefighting equipment, which serves only the heating department;
- ventilation equipment serving only the heating section;
- water treatment equipment, such as filter and water softener.

4.5.2 Boiler rooms fed with gaseous fuel

4.5.2.1 The energy supply (electric and fuel) of the boiler room is equipped with an automatic shutdown.

The automatic shutdown of the fuel supply is ensured by a solenoid valve located:
- either in the boiler room where the gas supply line enters;
- either outdoors.

4.5.2.2 The boiler room is provided with two ventilation openings, one at the top, the other at the bottom, each with a cross-section of at least 4 dm². These ventilation openings connect the boiler room to the open air, either directly or through a duct system. In addition:
- If the fuel is lighter than air:
  - the upper edge of the upper vent is less than 30 cm from the highest point of the boiler room;
  - the lower edge of the lower vent is less than 30 cm from the lowest point of the boiler room;
  - the duct or ductwork of the upper vent connecting the boiler room to the outside air shall not have a downward slope.
- If the fuel is heavier than air:
  - the upper edge of the upper vent is less than 30 cm from the highest point of the boiler room;
  - the lower edge of the lower vent is flush with the floor of the boiler room;
  - the duct or ductwork of the lower vent connecting the boiler room to the outside air shall not have an upward slope;
  - the floors of premises adjacent to and connected to the boiler room shall not be at a level lower than that of the floor of the boiler room.

The vents may be equipped with motorized vents.

4.5.2.3 Automatic shutdown of the energy supply and opening of any motorized ventilation valves is commanded as follows:
- automatically upon detection of a gas leak in the boiler room ;
- automatically upon detection of a fire in the boiler room;
- automatically in the event of a power source, power supply or control failure (device with positive safety).

4.5.2.4 In addition, it must be possible to manually turn off the energy supply (electric and fuel) via a control located outside the boiler room.

Manual shutdown of the fuel supply shall be ensured by a manually operated sectional valve provided in the gas supply to the firing department, so that the gas supply can be operated from outside the firing department, at an accessible location outside the building or an area within the building to which one has access without a key, at a distance of not more than 20 m from the firing department, without aids in case of emergency.

The valve of the gas meter or intermediate gas meter can perform the function of this sectional valve if the above conditions are met.

4.6 Fuel storage areas

4.6.1 Permitted equipment

Only the following equipment is allowed in the fuel storage areas:
- equipment for storing or transporting fuels;
- task-oriented equipment, such as artificial lighting and gas meters, and the safety equipment, such as firefighting equipment, which serves only the heating department;
- ventilation equipment serving only the heating section.

4.6.2 Liquid fuel storage areas

Fuel storage areas are subject to the requirements of Title 5 "Flammable Liquid Storage Areas" of Book III of the Occupational Welfare Codex.

These regulations also applyto fuel storage areasin buildings where there are no workplaces, subject to the following modifications:
- Article III.5-8 and paragraph 2.1 of Annex III.5-1, which refer to the requirements of Article 52 of the General Regulations on Labor Protection (ARAB), shall not apply;
- the administrator of the building holds the reports of the tests and density tests available to the officials in charge of supervision.

4.6.3 Solid fuel storage areas

4.6.3.1 Protection against flame recoil

The transport system between the boiler room and the fuel storage room is equipped with suitable equipment that avoids the recoil of flames to p r e v e n t the spread of fire.

4.6.3.2 Storage space for a large amount of fuel

In fuel storage rooms whose capacity is such that the total fire load of the fuel storage room exceeds 187.5 GJ :
- devices must be at least Category 3 (devices designed to provide a normal level of protection in an environment that is unlikely to be explosive and where such a hazard is of short duration) in accordance with ATEX regulations;
- electrical appliances must be at least IP 54.

Additionally, these fuel storage areas should be accessible to allow the fire department to intervene and dispose of the fuel after the fire is extinguished.

4.6.3.3 Special provisions for pellet silos

The pellets are stored in silos. Inside the building, these silos must be arranged in a fuel storage room. The fuel storage room can also be used immediately as a silo (custom silo).

4.6.3.3.1 Loading the silos

With pneumatic filling, there should be no overpressure or underpressure in a silo. It is necessary to equip the silo with at least one connection for blowing in the pellets and one connection for suction.

The transmission lines and their suspensions shall be steel and connected to the main grounding terminal by a main quipotential conductor in accordance with the General Regulations on Electrical Installations (A.R.E.I.).

4.6.3.3.2 Protection against toxic gases

The degassing of pellets and malfunctions of the combustion device may release toxic gases, such as carbon monoxide, into the silo. One of the following two provisions is therefore applicable:
- either the silo must be airtight;
- either the fuel storage room must be airtight with respect to the rest of the building and ventilated to the outside, either directly or through a duct system, to prevent the accumulation of toxic gases.

At the entrance to the fuel storage area, specific signage points out the safety regulations:
- access to the fuel storage area is restricted to authorized persons;
- before entering the fuel storage room, it must be ventilated in such a way as to avoid a dangerous concentration of toxic gases.

4.7 Pipes and ducts in boiler rooms with combustion appliances with a cumulative combustion flow rate greater than or equal to 75 kW and fuel storage rooms

Pipes for gas, fluids, solids, electricity or electromagnetic waves and ventilation, smoke and combustion air supply ducts are permitted only if they serve only for the operation of the equipment installed in these heating compartments.

Water and water discharge pipes are allowed in these heating sections.

Any other piping is prohibited in these heating sections.

4.8 Smoke and combustion air supply ducts

The flues:
1. Either have the same fire resistance as required for engineering tubes;
2. Either are placed in their own technical quiver;
3. Either in a technical duct shared with other pipes and ducts, but separated from them by a wall EI 30.

In cases 2 and 3, the combustion air supply ducts may be placed in the same duct or part of duct as the flues.

The design, installation and implementation of the smoke and combustion air supply ducts shall comply with the rules of good workmanship and the applicable standards in this regard.

The penetrations of fire-resistant walls through smoke and combustion air supply ducts designed and constructed in accordance with the rules of good workmanship and to the relevant standards in force are assumed to comply with the requirements of paragraph 3.1 of Annexes 2/1, 3/1 and 4/1.

4.9 Divergent provisions

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

- Section 4.3: Not applicable to combustion appliances installed before July 1, 2022;
- Items 4.5.1 and 4.6.1: Not applicable to equipment installed before July 1, 2022;
- Items 4.5.2.1, 4.5.2.3 and 4.5.2.4: Applicable only to boiler rooms in which one or more combustion appliances were installed or upgraded as of July 1, 2022;
- Items 4.5.2.2, 4.6.2, 4.6.3 and 4.7: Not applicable.

5 GREENDAKEN

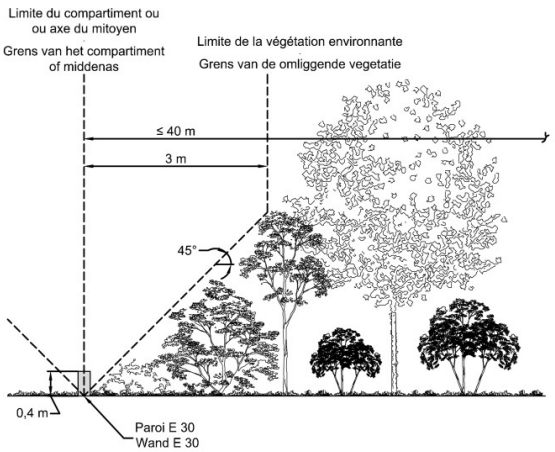
5.1 Object

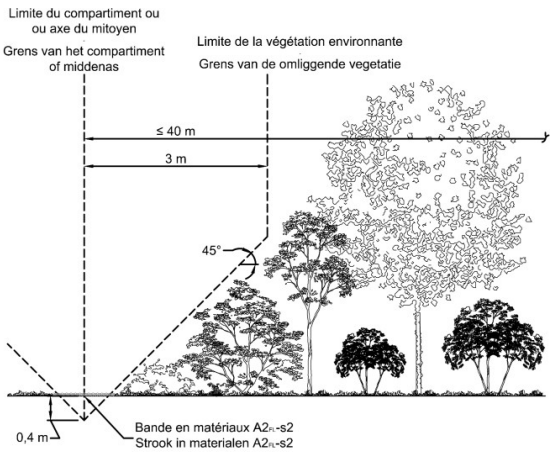
This chapter defines the conditions that the design, construction and layout of green roofs must meet in order to:

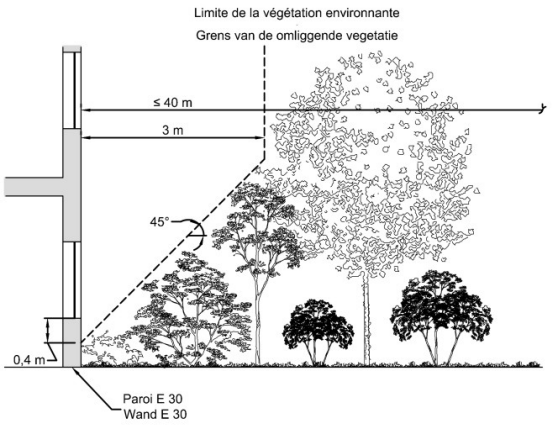
a) prevent the occurrence, development and propagation of fire;
b) ensure the safety of those present;
c) preventively facilitate the fire department's intervention.

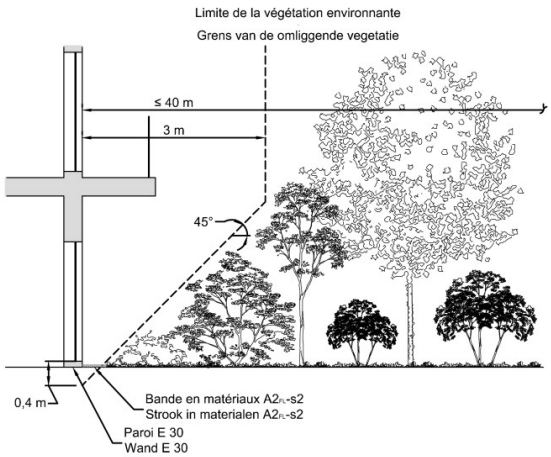
5.2 Scope

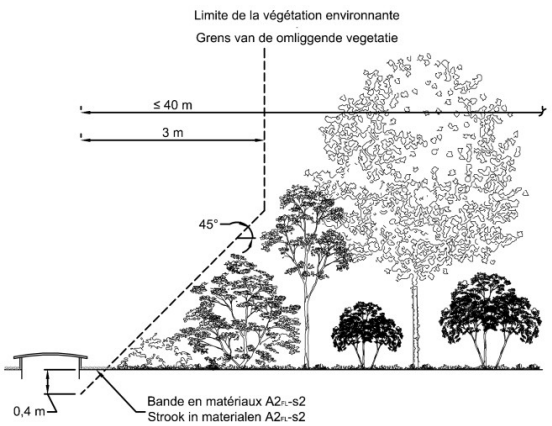
The provisions of this chapter shall apply to green roofs referred to in paragraph 8.1 of Annex 5/1 and paragraph 6.6 of Annex 6 of this Decree.











5.3 Substrate layer.

The substrate layer is a minimum of 3 cm thick.

If the substrate layer has a thickness of less than or equal to 10 cm, the substrate contains a maximum of 20% organic matter (by mass percentage).

If the substrate layer does not meet the requirements specified in the first two paragraphs, it may

substrate layer can still be applied provided the layer belongs to class $_{BROOF}$ (t1) according to a test in accordance with standard CEN/TS 1187 at an angle of 15° in dry condition and without vegetation.

In industrial buildings, the thickness of the substrate layer should not exceed 10 cm.

5.4 Compartmentalization of green roofs.

The green roofs are divided into compartments with a maximum length of 40 m.

On either side of the compartment boundary, the height of the surrounding vegetation is less than or equal to the boundary of the surrounding vegetation calculated relative to the compartment boundary (see Appendix 1 "Terminology").

If there is a wall E 30 at the boundary of the compartment, then $_{he}$ is equal to its height.

5.5 Separation between green roofs and adjacent buildings.

On either side of the center axis, the height of the surrounding vegetation is less than or equal to the boundary of the surrounding vegetation calculated relative to the center axis (see Appendix 1 "Terminology").

If there is a wall E 30 on the center axis, then $_{he}$ is equal to its height.

5.6 Skylights, fans, smoke exhaust pipes or openings in green roofs.

The height of the surrounding vegetation is less than or equal to the boundary of the surrounding vegetation calculated relative to the edge of the opening (see Appendix 1 "Terminology").

If the opening is raised by walls E 30, then $_{he}$ is equal to their height.

5.7 Windows, fans, smoke exhaust ducts or openings built into the facades that give out onto the green roofs.

The height of the surrounding vegetation is less than or equal to the boundary of the surrounding vegetation calculated relative to the opening in the façade (see Appendix 1 "Terminology"), both perpendicular and parallel to the façade.

If the opening has a retaining wall E 30, then $_{he}$ is equal to its height.

5.8 Non-flammable strip.

If there is a strip along the compartment boundary, center axis or opening in which there should be no vegetation because the boundary of the surrounding vegetation there is negative or too small, then this strip must be realized in materials of minimum class A2FL-s2.