

- **NORMS & REGULATIONS: OFFICIAL BULLETIN OF THE COMMUNITY OF MADRID, NBE-CPI-96, REGULATION OF SECURITY AGAINST FIRES IN THE INDUSTRIAL ESTABLISHMENTS, REGULATION ELECTROTECHNICAL OF LOW TENSION AND UNE 23007-14.**

## **NORMS & REGULATIONS**

### **Official bulletin of the Community of Madrid (B.O.C.M.), published the day January 18 2.000:**

Art.6.12: **FIRE HOSE REEL (F.H.R.):** Group of necessary elements to transport and to project water from a fixed point of a net of supply of water until the place of the fire.

They can be of two types, BIE-45 with section of 45 mm. of nominal diameter and BIE-25 with section of 25 mm. Both should be adjusted to that specified in the norms IN or it UNITES corresponding.

- The FHR 45 mm should be located so that the center of the support it is to a height between 0,90 and 1,50 m. measured from the pavement of the floor. The FHR 25 mm. of diameter should be located so that the mouthpiece of the spout and the manual valve, if it exists, be to a height among 0,90 and 1,70 of the pavement of the floor.

- The supply of water for the CROSS should allow to feed during one hour, at least, the two FHR hydraulically more unfavorable, in the conditions of pressure and indicated flow. All the FHR should be accessible in all moment and easily visible being or to be signalled.

- The static pressure that a FHR should give will be understood between 3,5 and 6 kg/cm<sup>2</sup>.

- For the calculation of the covered area for a BIE one will have in consideration the real journey of the hose and the reach of the jet of water from the mouthpiece that settles down in 5 m.

- The distribution net should be protected against icy in all its layout. The installation should be gifted, as minimum, of:

- Lance that should allow to reach acceptable minimum flows of 3,3 l/s. for mouths of 45 mm. of diameter, and 1,6 l/s. for those of 25 mm.

- Couplings, type Barcelona that will be adjusted to the characteristics determined in the norms EN or UNE corresponding.

- Gauge, able to measure among zero and the maximum pressure that it reaches the net.

- Valve, resistant to the corrosion and oxidation, being able to being of automatic opening

- Reel support.

Art.26: The camps of tourism should have FHR of 25 mm. in number and such situation that under their action it is covered the whole surface of the camp. It is authorized to prepare, by each BIE, of a complementary tract of hose of 30 m. of longitude to enlarge their covering, whenever the conditions of pressure and flow allow it.

Art.75: It is defined as housing to those buildings, establishments and enclosures in those that some housing type is developed, although they are being part of another primary activity, from unite-family housing to collective housing, including the apartments without community services and the areas dedicated to junk rooms.

The enclosures dedicated to this use, besides completing the conditions settled down in the normative one relative to the construction, they should complete the norms of general character of the present Regulation and the specific of the activities or secondary uses that are exercised in the same ones or develop.

Art.86.10: If their useful surface is superior to 150 m<sup>2</sup>, they should have FHR of 25 mm. in number and such situation that under its action it is covered all its surface.

Art.87: It is defined as garage-parking those buildings, establishments and enclosures in those that is carried out guard and/or stay of vehicles to motor, being included discharged trucks, load areas and it discharges, repair shops, public transportation stations (including aero-port terminals, railroad stations and stations of buses), deposits of used vehicles and similar.

Art.98: The garage-parkings of useful surface for plant superior to 500 m<sup>2</sup>, they should have CROSS of 25 mm. in number and such situation that under their action it is covered all their surface.

Art. 103: It is defined for the sanitary use to those buildings, establishments and enclosures in those that doctor cares are received in régime of hospitalization and intensive or surgical treatment, such as sanitary residence, clinic, sanatorium, dialysis centers and similar, as well as old people's home, of diminished physical and similar.

To the centers that don't have hospitalization, dedicated to consultation, ambulatory or similar treatment, they will be they applicable the conditions of the office use.

Art.116: The enclosures dedicated to use sanitarium will have FHR of 25 mm. in number and such situation that under their action it is covered all their surface.

Art.126: It is defined use of shows and meeting to those buildings, establishments and enclosures in those that the activity of properly this show is developed, that is to say, that in that environment is configured differed between actor and spectator, such as cinemas, circuses, dance rooms and parties with orchestra and/or show, theaters, rooms of conferences, rooms of concerts, squares of bulls, sport or poli-sport establishments with bleacher, flamenco bars, parade of models or similar that gives scene character in closed enclosures or outdoors. Discos, dance rooms and party are also included without show, casinos, bingos, private rocks, game living rooms and of chance, bars, restaurants, coffees, religious and similar meeting centers.

Arts.134,147,160,173 y 184: The enclosures dedicated to use of shows and meeting with surface useful superior to 300 m<sup>2</sup>, they should have FHR of 25 mm. in number and such situation that under their action it is covered all their surface.

The scenario sector should prepare of, at least, a FHR of next 45 mm. to the location of the scenario.

Art.189: It is defined for use of offices to those buildings, establishments and enclosures in those that is developed administrative activity or technique in régime of public or private, such as administration, banks, professional offices, technical and similar offices. The medical clinics, clinical analysis, national health clinics, centers of health and centers of processes of data are also included.

The deposits of books and the files should be governed by the conditions of the warehouse use, when the volume of the enclosure overcomes the 100 m<sup>3</sup>.

Art.200: The establishments dedicated to use of offices with surface useful superior to 500 m<sup>2</sup>, they should have FHR of 25 mm. in number and such situation that under their action it is covered all their surface.

Art.207: It is defined for cultural and educational use to those establishments, buildings and enclosures in those that the gym activities are developed, dance academies, schools, faculties, professional schools, libraries, daycare centers, sport, recreational enclosures, museums, art galleries, exhibitions and similar.

The buildings dedicated to people's teaching with movement disability should be governed by the sanitary use.

Art.219: The enclosures dedicated to cultural and educational use with surface useful superior to 500 m<sup>2</sup>, they should have FHR of 25 mm. in number and such situation that under their action it is covered all their surface.

Art.224: It is defined for use residential public those buildings, establishments and enclosures in those that activities are developed referred to temporary lodgings with hotel denomination, motel, inn, residence, tourist or equivalent and similar apartments, governed by a holder different from the group of the occupants and endowed with common services.

The old people's home, geriatrics, of having diminished physical or psychic, with movement disability, or the areas of the same ones, in those that habitually occupants that cannot carry out an evacuation for their own means exist they should be governed by the sanitary use.

Art.235: The enclosures dedicated to use residential public with surface useful superior to 500 m<sup>2</sup>, they should have FHR of 25 mm. in number and such situation that under their action it is covered all their surface.

Art.243: It is defined for commercial use those buildings, establishments and enclosures whose main activity is the exhibition and sale of products to the public or the benefit of services related with the same such as hairdressers, beauty parlors, video clubs and similar. The exhibition local and sale of vehicles are included.

Art.257: The establishments dedicated to commercial use with surface useful superior to 300 m<sup>2</sup> should have FHR of 25 mm. in number and such situation that under their action it is covered all their surface.

Art.265: It is defined for industrial use those buildings, establishments and enclosures in those that obtaining operations, transformation, elaboration, repair and experimentation of products, film industry and handmade shops are developed.

Art. 274: The process areas with load of fire pondered superior to 100 Mcal/m<sup>2</sup> (420 Mj/m<sup>2</sup>) and surface useful superior to 350 m<sup>2</sup>, they should have FHR of 45 mm. in number and such situation that under their action it is covered all their surface.

Art.283: It is defined for use warehouse those buildings, establishments and enclosures in those that the guard of any matter type is carried out for his later use, distribution or definitive storage. They are included in this use, the closed enclosures where vehicles of transport loaded with goods are harbored.

Art.292. The establishments dedicated to warehouse use with high risk and smaller useful surface to 100 m<sup>2</sup>, the warehouses with half risk and smaller useful surface to 300 m<sup>2</sup> and the warehouses with low risk with same useful surface or superior to 300 m<sup>2</sup>, they should have FHR of 25 mm. in number and such situation that under their action it is covered all their surface.

The establishments dedicated to warehouse use with high risk and same useful surface or superior to 100 m<sup>2</sup> and the warehouses with half risk and same useful surface or superior to 300 m<sup>2</sup>, they should have FHR of 45 mm. in number and such situation that under their action it is covered all their surface.

### **Basic Norma of the Construction. Conditions of Protection against Fires in the buildings. NBE-CPI/96. Real Ordinance 2177/1996, of October 4.**

Art.20.3. The buildings, establishments and areas whose uses are indicated next will be protected by an installation of FHR of 25 mm.:

- housing, except the junk rooms areas with high risk.  
The areas of junk rooms of high risk, of use housing, they should be protected by FHR of 45 mm. in a such way that until all junk room door you can reach with some deployed hose.
- commercial whose built total surface is bigger than 500 m<sup>2</sup>. In areas of risk special high they will be supplemented with one outlet of water for connection of a hose, with coupling of 45 or of 70 mm.
- hospital, anyway.
- administrative and educational whose built total surface is bigger than 2.000 m<sup>2</sup>
- residential whose built total surface is bigger than 1.000 m<sup>2</sup> or that they are foreseen to give lodging to more than 50 people.
- garage or parking for more than of 30 vehicles. The longitude of the hoses will should to reach all evacuation origin and at least there will be 1 mouth in the vicinity of each exit.

**Real Ordinance 786/2001, of July 6, for which the Regulation of security is approved against fires in the industrial establishments (BOE of July 30 2.001).**

Appendix 3.9.1: they will settle FHR in the industrial establishments if:

- they are located in buildings of the type A (those in those that the establishment industrial squatter partially a building that has, also, other establishments, be already these of industrial use or of other uses) and their built total surface is of 300 m<sup>2</sup> or superior.
- - they are located in buildings of the type B (those in those that the establishment industrial squatter totally a building that is embedded to other buildings, be already these of industrial use or of other uses) its intrinsic level is half and its built total surface is of 500 m<sup>2</sup> or superior.
- they are located in buildings of the type B, their intrinsic level is high and its built total surface is of 200 m<sup>2</sup> or superior.
- they are located in buildings of the type C (those in those that the establishment industrial squatter totally a building, or several, in their case that is at a distance bigger than 3 m of the building but next of other establishments), their intrinsic level is half and its built total surface is of 1.000 m<sup>2</sup> or superior.
- they are located in buildings of the type C, their intrinsic level is high and its built total surface is of 500 m<sup>2</sup> or superior.

they are located in buildings of the type D (those in those that the establishment industrial squatter an open space that can have cover but of 50% of the busy surface) and E (those in those that the establishment industrial squatter an open space that can have cover until 50% of the busy surface) their intrinsic level is high and its busy surface is of 5.000 m<sup>2</sup> or superior.

**Official bulletin of the Community of Madrid (B.O.C.M.):**

Art.6.16: **DRY RISER SYSTEMS:** Attack installation to the fire, for the Fire Brigade exclusive use.

It should be adjusted to that specified in the norms EN or UNE corresponding and:

- it should be constituted by an empty conduction, of galvanized steel of 80 mm. of diameter that leaving from accessible place to the vehicles of the Fire Brigade, in their to reflect vertical, be provided of exit mouths in plants, and of valve of expansion of air in their superior part.
- the feeding outlet, with center to 90 cm. of the floor, it should consist of connection siamese with incorporate keys and couplings type Barcelona of 70 mm. of diameter, with covers, and to have key of purge of 25 mm. of diameter.
- the whole group will close in niche or similar of 55 cm. wide, for 40 cm. of high and 30 cm. deep minima. It should be easily traceable and identifiable, and in their closing cover, of simple slide for key of lump of 8 mm. will figure the inscription: "Exclusive use of Firemen."
- *The outlets in floors should be provided of connection siamese with incorporate keys and couplings type Barcelona of 45 mm. of diameter with covers. Their height, approximate to 0,90 m. measure from the pavement of the floor.*
- Each four plants, as minimum, it should have a section key, located above the connection Siamese.
- All the keys of the installation should be of the ball pattern with incorporate lever.
- The installation should be able to resist a pressure of 20 kg/cm<sup>2</sup> during two hours without no flight point appears in the same one.

Art.118: The buildings dedicated to use sanitarium whose evacuation height is superior to 15 m. they should have that installation.

Art.28.14: The buildings whose evacuation height is bigger to 28 m. they should prepare in each one of the floors of all the stairway boxes or in the lobbies of independence that give access to them, outlets of exit of Dry Riser System that, leaving of the low floor, reflect until reaching the last wrought passable of the construction.

Art. 20.2. They will be endowed with an installation of Dry Riser System all the buildings and establishments whose evacuation height is bigger than 24 m. nevertheless, the municipalities will be able to substitute this demand for that of an installation of FHR when, for the location of a building or for the level of endowment of the existent public services of extinction, be not guaranteed the utility of the Dry Riser System.

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Each building will have the enough number of Dry Riser System so that the distance, following evacuation journeys, from an water outlet until any evacuation origin is smaller than 60 m. The water outlet will be located in enclosures of stairways or in previous lobbies to them.

For hospital use the maximum height of evacuation becomes from 24 to 15 m.

The garages or parkings with more of three plants low slope or with but of four above the slope will be endowed with this installation with water outlet in all their floors.

### **Regulation of security against fires in the industrial establishments.**

10.1: They will settle Dry Riser Systems in the industrial establishments, if they are of half intrinsic risk and their evacuation height is of 15 m or superior.

10.2: The outlets of Dry Riser Systems will be located in enclosures of stairways or in previous lobbies to them.

### **Art.6.31: *PORTABLE EXTINGUISHERS: Manual installation of attack to the fire.***

- all the elements that are used as such, should be homologated being adjusted to that specified in the Regulation of Apparatuses to Pressure of the Ministry of Industry and Energy, as well as to the norms EN or UNE corresponding.
- the agents contained extinguishers in the same ones should be adjusted to the norms EN or UNE corresponding.
- they are considered portable extinguishers those whose weight total maximum is of 20 kg. Above that weight they should have a way of transport by wheels.
- the types of extinguishers will be adapted in function of of the established fire classes in the norms EN or UNE corresponding.
- they should be located in easily accessible and visible or signalled places when they are not located.
- in those fixed to vertical parameters, the superior part of the extinguisher should be 1,70 m., as maximum, of the pavement of the floor.
- all the establishments to those that this installation is demanded should prepare, as minimum, of two extinguishers and they should be placed in enough number so that the real journey from

any evacuation origin until an extinguisher the 15 m doesn't overcome. Its grade of effectiveness should be 21A-113B as minimum.

- an extinguisher should be placed in the exterior and next to the door of access of the special enclosures (those that demand special protection conditions against sector fires, of evacuation and of facilities).

That extinguisher will be able to serve simultaneously to several of those enclosures if it responds to the one type of risk of the same ones.

Art.28.11: In the buildings whose evacuation height is bigger than 28 m. they should prepare in all the plants and accessible to all the users of the same ones, portable extinguishers, in number of two for lobby of independence of each stairway box and of grade of effectiveness 21A and 113B respectively, with independence of the elements that are necessary for reason of the use that is developed in each plant.

Art. 39, 40, 41 y 42, 44, 46, 47, 49 y 50: In the vicinities of each access, preferably in the exterior of the enclosure, of the transformation centers, electricity generators, meters and general devices of control and protection, facilities of batteries of accumulators, room of boilers with total power of more than 50 kw., air conditioning enclosures and forced ventilation, enclosures of machinery of apparatuses elevators, enclosures of industrial kitchens or in laundry enclosures, ironing and linen warehouses, two extinguishers of minimum effectiveness 113B should be placed.

Art.44.i: When the fuel is liquid there should have system of automatic extinction on the burners.

Art.82: For housing use they are not exigible if they are unite-family, but the buildings of use community should have them in their common areas.

Art.86: The special enclosures (art.6.55) they should have an extinguisher of effectiveness 21A each 150 m<sup>2</sup> of useful surface or fraction and with a minimum of two.

Art. 97, 115, 133, 146, 159, 172, 183, 199, 218, 234, 256, 273 y 291: For garage-parking use, sanitarium, of shows and meeting, offices, cultural and educational, residential public, industrial and warehouse, all the enclosures should be covered for this installation.

## **Basic Norma of the Construction NBE-CPI/96**

Art.20.1: In all building, except in those of unite-family housing, they will prepare extinguishers in enough number so that the real journey in each plant from any evacuation origin until an extinguisher the 15 m. doesn't overcome.

In big enclosures in those that parameters or supports don't exist in those that can fix the extinguishers according to the required distance, these will have to according to one for each 300 distributed m<sup>2</sup> of built and convenient surface. Each one of them will have a minimum effectiveness of 21A-113B.

In the parkings whose capacity is bigger than 5 vehicles, will prepare an extinguisher of effectiveness like minimum 21A-113B each 15 m. of journey, as maximum, for circulation streets or, alternately, extinguishers of the same effectiveness meetly distributed to reason of one for each 20 squares.

In the local or the areas of special risk will settle extinguishers of effectiveness like minimum 21A or 55B, according to the class of foregone fire, according to the following approaches:

- will be settle an extinguisher in the exterior of the local or of the area and next to the door of access; this extinguisher will be able to serve simultaneously to several local or areas.
- inside the local or of the area they will also settle the enough extinguishers

so that the longitude of the real journey until some of them, included the one located in the one external, be not bigger than 15 m. in local of half or low risk, or 10 m. in local or areas of high risk whose built surface is smaller than 100 m<sup>2</sup>.  
When these last local have a built surface bigger than 100 m<sup>2</sup> the 10 m. of journey longitude they will be completed with regard to some installed extinguisher inside the local or of the area.

In the housings, the junk rooms area will be endowed with extinguishers of effectiveness 21A.

For hospital use, the areas of high risk whose built surface exceeds of 500 m<sup>2</sup> will have mobile extinguishers of 25 kg. of powder or of CO<sub>2</sub>, to reason of 1 extinguisher for each 2.500 surface m<sup>2</sup> or fraction.

For commercial use, in the local of high risk the extinguishers will be of effectiveness 21A-113B, as minimum, in function of the class of foregone fire. All area in which a grouping of local classified exists as of half and high special risk, and whose built surfaces sink more than 1.000 m<sup>2</sup>, it will count, also, with mobile extinguishers of 50 kgs. of powder, distributed to reason of an extinguisher by each 1.000 surface m<sup>2</sup> that overcomes this limit or fraction.

The extinguishers will have such form that you/they can be used in a quick and easy way; whenever it is possible, they will be located in the parameters in a such way that that the superior end of the extinguisher is to a height on the smallest floor that 1,70 m.

### **Regulation of security against fires in the industrial establishments.**

8.2: With a low grade of intrinsic risk of the fire sector the minimum effectiveness of the extinguisher must be 21A and the protected maximum area would reach up to 600 m<sup>2</sup> (an extinguisher more for each 200 m<sup>2</sup> or fraction).

With a half grade of intrinsic risk of the fire sector the minimum effectiveness of the extinguisher must be 21A and the protected maximum area would reach up to 400 m<sup>2</sup> (an extinguisher more for each 200 m<sup>2</sup> or fraction).

With a high grade of intrinsic risk of the fire sector the minimum effectiveness of the extinguisher must be 34A and the protected maximum area would reach up to 300 m<sup>2</sup> (an extinguisher more for each 200 m<sup>2</sup> or fraction).

When the maximum volume of liquid fuels in the fire sector is smaller to 20 l, the minimum effectiveness of the extinguisher will be of 113B, if it is between 20 and 50 l, the effectiveness will be of 113B, if it is between 50 and 100, the effectiveness will be of 144B and if it is between 100 and 200, the effectiveness will be of 233B.

If the 200 l overcomes, the endowment of portable extinguishers will be increased with mobile extinguishers with wheels, of 50 kgs. of powder ABC, to reason of an extinguisher, if the volume doesn't arrive to the 750 l, and of two extinguishers if the volume is between 750 and 2.000 l.

8.4: The location of the portable extinguishers will allow that they are easily visible and accessible, they will be located next to the points where was considered bigger probability of beginning the fire and its distribution, it will be such that the horizontal maximum journey from any point of the fire sector until the extinguisher, 15 m don't overcome.

### **Art. 6.37: *HYDRANT: System of supply of water for exclusive use of the Fire Brigade and another properly trained personnel.***

They should be adjusted to that specified in the norms EN or UNE corresponding.

- the acceptable maximum separation between two elements, when these are necessary, it should be of 200 m. according to real journey.

- they should be located in easily accessible places to the vehicles of the Fire Brigade and properly signalled according to the norms to be EN or UNE corresponding.
- they should be prepared to resist the freezes and mechanical actions.
- the minimum flows that should give in each case will be of 500 l/m. for those of 80 mm. of diameter and 1.000 l/m. for those of 100 mm. of diameter, in both cases these flows should be guaranteed during at least 2 hours. The supply pressure should be, as minimum, of 10 m.c.a.
- A building is considered protected by hydrants, when any point of its accessible facades, at slope level, be to less than 100 m. of one of these elements.

Art.26: The camps of tourism should count, as minimum, with an hydrant of 80 mm. and when the useful surface of the camp overcomes the 50.000 m<sup>2</sup>, the hydrant should be of 100 mm.

Art.28: The buildings whose evacuation height is bigger than 28 m. they should prepare, at least, of a hydrant of 100 mm.

Art. 99,201,220,258,275: For garage-parking use, offices, cultural and educational, commercial or industrial (with activities of half risk), those enclosures of surface useful superior to 5.000 m<sup>2</sup> should have hydrants of 100 mm.

Art.117,135,148,236,275: For use sanitarium, of shows and meeting, residential public or industrial (with activities of high risk), the surface useful superior to have hydrants of 100 mm. is of 2.000 m<sup>2</sup>.

Art. 201. For industrial use, the buildings of surface useful superior to 10.000 m<sup>2</sup> should have hydrants of 100 mm. when their activities are of low risk.

Art. 293. For warehouse use, the enclosures that contain products of grade of danger 1, 2,3,4 or 5 should have hydrant of 100 mm. when the useful surfaces of storage are:

- in warehouses of high risk, superiors to 1.000 m<sup>2</sup>.
- in warehouses of half risk, superiors to 2.500 m<sup>2</sup>.
- in warehouses of low risk, superiors to 5.000 m<sup>2</sup>.

### **Basic Norma of the Construction NBE-CPI/96**

Appendix 2.4: Hydrants should be located in easily accessible places, outside of the space dedicated to circulation and parking of vehicles, properly signalled according to the norm UNE 23033 and distributed in such a way that the distance among them measured by public spaces is not bigger than 200 m.

The hydraulic network that supplies to the hydrants should allow the simultaneous operation of two serial hydrants during two hours, each one of them with a flow of 1.000 l/min. and a minimum pressure of 10 m.c.a. In urban nuclei consolidated in those that could not been guaranteed the flow of supply of water, it can be accepted that this is of 500 l/min., but the pressure will stay in 10 m.c.a.

If, for justified reasons, the hydrants installation could not be connected to a general net of supply of water, it should have a reservation of appropriate water to provide the flow before suitable.

- Appendix 2.5: they should have the installation of at least a hydrant the following buildings or establishments:
- with general character, all building whose height of descending evacuation or upward it is bigger than 28 m. or of 6 m., respectively.
- - the cinemas, theaters, auditories and discos with built surface included between 500 and 10.000 m<sup>2</sup>

- the sport enclosures with built surface included between 5.000 and 10.000 m<sup>2</sup>.
- those of commercial use or of garage-parking, with built surface included between 1.000 and 10.000 m<sup>2</sup>
  - those of hospital or residential use, with built surface included between 2.000 and 10.000 m<sup>2</sup>
  - those of administrative, educational use or housing, with built surface included between 5.000 and 10.000 m<sup>2</sup>
  - any establishment or building of high density not mentioned previously, with built surface included between 2.000 and 10.000 m<sup>2</sup>.

The previous buildings or establishments should have a more hydrant for each 10.000 additional m<sup>2</sup> of built surface or fraction.

The hydrants that protect a building will be reasonably distributed by their perimeter, to be accessible for the vehicles of the fire brigade and, at least, one of them should be located to not but of 100 m. of distance of an access to the building.

### **Regulation of security against fires in the industrial establishments.**

7.2: el área protegida por una boca de agua es la tapa para un radio de 40 m, medido horizontalmente de la situación del mismo.

At least one of the hydrants (located to be possible in the entrance) he/she will have an exit of 100 mm.

The distance between the location of each hydrant and the external limit of the building or protected area, measure usually, it should be included between 5 and 15 m.

Art.6.19: WATER SCREEN: System of mouthpieces open of on-line automatic and manual, placed in line, with the purpose of establishing insulating screen of the heat.

- - this system is not admitted as substitute of resistant elements to the fire neither as smoke screen.
- **it is required to apply a minimum density of water of 14 l/min for each meter of longitude of the curtain, should project on the pavement of the floor a longitudinal fringe with width of 2 m. as minimum.**

### ***SPRINKLERS: Automatic installation of attack water to the fire.***

They should be adjusted to that specified in the norms EN or UNE corresponding.

- - the installation should have connection system, properly identified, type by-pass that allows the supplementary feeding for the corresponding Fire Brigade..
- the positions of control of the sprinklers should be connected with the detection power station and alarm, when this exists.
- this type of facilities that specify of electric installation for its operation, should be supplied by two supply sources, of those that one will be the general net of the activity. The other one should guarantee, as minimum, the time of obligatory operation foreseen for the installation.

Art. 136: For use of shows and meeting, the scenarios that have looms should have this system by means sprinklers of water that they cover the entirety of the environment occupied by that. The enclosures located under slope should have this installation.

## **Basic Norma of the Construction (NBE-CPI/96)**

Art. 20.6: For residential use whose evacuation height exceeds of 28 m. the installation will protect the whole building or establishment.

For commercial use whose built total surface is bigger than 1.500 m<sup>2</sup>, in those that the density of pondered fire load and corrected contributed by the products marketed in the public areas of sales, be bigger than 120 Mcal/m<sup>2</sup>. In general, the trade dedicated to sale or exhibition of barely combustible products, as, for example, agencies of sale of cars, feeding supermarkets, don't end up reaching the mentioned limit. On the contrary, in the department stores it is foregone that this figure is overcome in wide areas of the same ones.

For administrative use, when the built total surface is bigger than 5.000 m<sup>2</sup>, will prepare this installation in the documentation files, databases and warehouses of office material in those that the existence of a bigger volume of combustible matters is foreseen that 100 m<sup>3</sup> and in the printing local or reprography, furniture warehouses and maintenance shops in those that the manipulation of combustible products is foreseen whose volume is bigger than 500 m<sup>3</sup>.

## **Regulation of security against fires in the industrial establishments.**

11.1: they will settle systems of sprinklers when in the industrial establishments production activities are developed, assemblies, transformation, repair or other different to the storage, if they are located in buildings type A, their level of intrinsic risk is half and its built total surface is of 500 m<sup>2</sup> or superior, if they are located in buildings type B, its level of intrinsic risk is half and its built total surface is of 2.500 m<sup>2</sup> or superior, if they are located in buildings type B, its level of intrinsic risk is high and its built total surface is of 1.000 m<sup>2</sup> or superior, if they are located in buildings type C, its level of intrinsic risk is half and its built total surface is of 3.500 m<sup>2</sup> or superior and if they are located in buildings type C, its level of intrinsic risk is high and its built total surface is of 2.000 m<sup>2</sup> or superior.

They will settle systems of sprinklers when in the industrial establishments storage activities are developed if they are located in buildings type A, their level of intrinsic risk is half and its built total surface is of 300 m<sup>2</sup> or superior, if they are located in buildings type B, its level of intrinsic risk is half and its built total surface is of 1.500 m<sup>2</sup> or superior, if they are located in buildings type B, its level of intrinsic risk is high and its built total surface is of 800 m<sup>2</sup> or superior, if they are located in buildings type C, its level of intrinsic risk is half and its built total surface is of 2.000 m<sup>2</sup> or superior and if they are located in buildings type C, its level of intrinsic risk is high and its built total surface is of 1.000 m<sup>2</sup> or superior.

When it is exigible the installation of a system of sprinklers, concurrent with that of a system of detection of fires that uses detecting thermal, the demand of the detection system will be canceled.

Art.6.21: DETECTION AND ALARM OF FIRES: System that has as function to activate an answer installation under the initiation of a fire or to warn to possibly affected people.

All detection system and alarm of fires should be installed completing that specified in the norms EN or UNE corresponding.

It should be compound for:

- central of detection and alarm, where will be reflected the affected area, provided of signs optic and acoustic (for each one of the areas that are projected), able to transmit the activation of any component of the installation.

If it is not watched over permanently it should be located in area qualified sector of risk null and to transmit an audible alarm to the entirety of the building or activity.

- the positions of control of the fixed systems against fires should be connected with

the detection power station and alarm, when this exists.

- detectors that should be of the type that is necessary in each case, but that they should be certified by officially grateful certification organism for it.

- secondary source of electric power supply that guarantees, at least, 24 hours in state of surveillance more 30 minutes in alarm state. This secondary source it can be specific for this installation or common with others of protection against fires.

When an installation of switches of alarm of fires is connected to the central of alarm detection this should allow to differentiate the origin of the sign of both facilities.

Art.29: The buildings whose evacuation height is bigger than 50 m. it will have detection systems and alarm in each level.

Art.44 y 50: The rooms of boilers with total power of but of 50 kw. and the laundry enclosures, iron and linen warehouses, they should have automatic system of detection of fires and alarm.

Art.46: The air conditioning enclosures and forced ventilation should have system of detection of fires connected to device of automatic stop. This device should can to be worked from the power station of detection of fires, when this exists.

Art.86: The special enclosures should have detection systems and alarm of fires when their useful total surface is superior to 50 m<sup>2</sup>.

This installation should be provided of audible alarm in the areas common of the building.

Art.96: The garage-parkings of surface useful superior to 500 m<sup>2</sup> should have this installation.

Art.113: For the sanitary use all the enclosures should have this installation.

Art.131,144,157 y 170: For the use of shows and meeting the areas not dedicated to public that don't constitute sector of null risk, they should have this installation.

Art.197: For the use of offices, the establishments of surface useful superior to 500 m<sup>2</sup> should have this installation.

In false floors and/or false roofs should have this installation when the surface of the same ones is superior to 500 m<sup>2</sup>

Art 216: For the cultural and educational use, the establishments of surface useful superior to 5.000 m<sup>2</sup> should have this installation.

The laboratories that don't constitute sector of null risk should have this installation as well as alarm switches.

The libraries, with surface useful superior to 250 m<sup>2</sup>.

Art.232: For residential public's use all the establishments should have this installation.

Starting from 500 m<sup>2</sup> of useful surface in floor or height of superior evacuation of 15 m. with:

- central of detection and alarm that allows the manual and automatic activation of the alarm systems, located in an enclosure watched over permanently.
- automatic activation of the alarm systems that it can graduate in such way that takes place, as maximum, five minutes after the activation of a detector or switch.

- alert system that allows the audible transmission of local alarms, alarms general and of verbal instructions.

The installation should count with detecting of smoke in the rooms.

Art.254: For commercial use, the establishments with surface useful superior to 250 m<sup>2</sup> should have this installation.

Art.271: For industrial use, the enclosures occupied by industrial activities of high and half risk should have this installation.

Art.290: For warehouse use, they should have this installation those that have high risk and those of low risk with surface useful superior to 300 m<sup>2</sup>.

In both cases it will be exempted from this installation to the open enclosures without consolidated cover.

## **Basic Norma of the Construction NBE-CPI/96**

Art.20.4: They will have a detection installation and alarm, the buildings, establishments and areas dedicated to the following uses:

- **Housing**, if the evacuation height is bigger than 50 m. they will prepare detecting of smoke in corridors, stairways and spaces common of circulation, junk rooms area whose total surface is bigger than 50 m<sup>2</sup>. and areas of service to the such housings as meeting rooms, of games, of sports, etc.

The signaling power station and alarm it should be located in front desk, if it exists, or, otherwise, in visible and accessible place to responsible people. The installation will be provided of general alarm, audible in all point of the building.

- **Hospital**. They will prepare detecting of smoke in the areas of hospitalization, and the appropriate detectors to the class of foregone fire, inside all the local of special risk.

**The control teams and signaling will have a device that allows the manual and automatic activation of the alarm systems and they will be located in a local watched over permanently. The automatic activation of the systems of alarm will be able to graduate in such way that takes place, as maximum, five minutes later of the activation of a detector or switch.**

The alarm system will allow the transmission of local alarms, of alarm general and of verbal instructions

- Administrative, if the built total surface is bigger than 2.000 m<sup>2</sup>.

They will prepare detectors inside the local and of the areas of high risk in the whole building. The detectors will be thermal or of smoke, according to the class of foregone fire.

- Commercial, if the built total surface is bigger than 2.000 m<sup>2</sup>.

In the buildings and establishments in those that should prepare these facilities will prepare appropriate detectors to the class of foregone fire, in such a way that the whole building or establishment is protected by this installation.

- Educational, if the built total surface is bigger than 5.000 m<sup>2</sup>.

They will prepare appropriate detectors to the class of foregone fire inside all the local of high risk.

- Residential, if the built total surface is bigger than 500 m<sup>2</sup>.

In the rooms and in the corridors they will prepare detecting of smoke.

In the local of special risk, they will settle appropriate detectors to the class of foregone fire.

It is not necessary to prepare thermal detectors when an installation exists of automatic sprinklers.

Annex A.6.3.2: In the facilities protected by an automatic system of detection of fires, the division of the facilities in detection areas will fulfill all the following requirements:

or the surface in plant of a single area won't exceed of 2.000 m<sup>2</sup>.

or the search distance won't exceed of 30 m.

or When an area extends beyond a single compartment of fires, the limits of the compartments of fires and the surface in plant of the area it won't should to exceed of 300 m<sup>2</sup>.

Annex A.6.5.2.1.1: The detectors of heat cover a maximum surface of surveillance of 30 m<sup>2</sup>. if the surface of the local is smaller than 30 m<sup>2</sup>. Also if the surface of the local is bigger than 30 m<sup>2</sup>., the inclination of the roof is between 15 and 30° and the slope of the roof it is between 0,2679 and 0,5774. They cover a maximum surface of surveillance of 20 m<sup>2</sup>. if the surface of the local is bigger than 30 m<sup>2</sup>., the inclination of the roof is smaller than 15° and the slope of the roof is smaller than 0,2679. They cover a maximum surface of surveillance of 40 m<sup>2</sup>. if the surface of the local is bigger than 30 m<sup>2</sup>., the inclination of the roof is bigger than 30° and the slope of the roof is bigger than 0,5774.

The detectors of smoke cover a maximum surface of surveillance of 80 m<sup>2</sup>. if the surface of the local is smaller than 80 m<sup>2</sup>, and the height of the local is smaller than 12 m. Also if the surface of the local is bigger than 80 m<sup>2</sup> and the height of the same one is smaller than 6 m., the inclination of the roof is between 15 and 30° and the slope of the roof it is between 0,2679 and 0,5774.

Also if the surface of the local is bigger than 80 m<sup>2</sup> and the height of the same one is between 6 and 12 m, the inclination of the roof is smaller than 15° and the slope of the roof is smaller than 0,2679.

They cover a maximum surface of surveillance of 60 m<sup>2</sup>. if the surface of the local is bigger than 80 m<sup>2</sup>., and if the height of the local is smaller than 6 m., the inclination of the roof is smaller than 15° and the slope of the roof is smaller than 0,2679.

### **Norma UNE 23007-14, of September of 1.996:**

**They cover a maximum surface of surveillance of 100 m<sup>2</sup>. if the surface of the local is bigger than 80 m<sup>2</sup>., the height of the same one is smaller than 6 m., the inclination of the roof is bigger than 30° and the slope of the roof is bigger than 0,5774. Also if the surface of the local is bigger than 80 m<sup>2</sup> and the height of the same one is between 6 and 12 m., the inclination of the roof is between 15 and 30° and the slope of the roof it is between 0,2679 and 0,5774.**

They cover a maximum surface of surveillance of 120 m<sup>2</sup>. if the surface of the local is bigger than 80 m<sup>2</sup>., the height of the same one is between 6 and 12 m., the inclination of the roof is bigger than 30° and the slope of the roof is bigger than 0,5774.

### **Basic Norma of the Construction NBE-CPI/96 (cont.)**

Art.18: The garages or parkings will have natural or forced ventilation for the evacuation of smoke in the event of fire.

The forced ventilation will be able to carry out six renovations per hour, being activated by means of detecting automatic, to have independent switches for each floor that allow the starting of the fans, to guarantee the operation of all its components during ninety minutes, to a temperature of 400°C and to have direct electric feeding from the main square.

Whether with natural ventilation or with forced, no point will be located more than 25 m. of distance of a hole or point of extraction of the smoke.

## **General plan of Urban Ordination of Madrid 1.997**

Seven renovations per hour.

## **Regulation Electro-technical for Low Tension**

Leaf of interpretation nº 12-A: The ventilation will be enough when it makes sure a minimum renovation of air de15 m<sup>3</sup>/h/m<sup>2</sup>

## **Official bulletin of the Community of Madrid (B.O.C.M.):**

Art.47: All the garages, parkings and shops of repair of automobiles, as public as private, they will have the enough ventilation that guarantees that in any point of the same ones accumulation of pollutants can take place due to the operation of the vehicles.

To this respect the prescriptions of the norms of the General Plan of Urban Ordination of Madrid and Ordinances will be completed that develop it.

The measures adopted for the distribution of interior air will get that in any point of the local concentrations of monoxide of carbon superiors can be reached 50 p.p.m.

The forced ventilation facilities will guarantee a minimum of six renovations hour.

Art.50: It will be mandatory to have detection system and measure of monoxide of carbon, properly homologated, directly connected to the forced ventilation system and regulated so that in any case the concentrations overcome the limit before mentioned.

The number of detectors will be in function of the surface, should exist at least one for floor located between 1,50 and 2 m. of height regarding the floor and in representative places.

Each local will have a form of samples for each 300 surface m<sup>2</sup> or fraction.

The number of adaptable intakes to each detector will be in function of the longitude of the connections and of the time of sweeping, in accordance with the following approaches:

- you will proceed to analyze the quality of the air every ten minutes like maximum.
- the duration of the sampling will be such that it allows, previous cleaned of the conduction, the analysis of the surrounding air to the intake of samples in that moment.

## **General Ordinance of Protection of the urban environment of November 28 2.002.**

Art.47.6: The forced ventilation facilities will guarantee a minimum of seven renovations hour of the atmosphere of the local.

Art.50: It will be mandatory he/she has detection system and measure of monoxide of carbon, properly homologated, directly connected to the forced ventilation system if the local has her and regulated so that in any case the concentrations overcome the limit of 50 ppm.

Art.50.2: The number of detectors will be in function of the surface, should exist at least one for plant located between 1,50 and 2 m. of height regarding the floor and in places in those that the ventilation conditions can be more unfavorable.

Each local will have a form of samples for each 200 surface m<sup>2</sup> or fraction.

**Art.50.3: If they settle several sensors, they can be connected they can be connected to detection switchboard, so that each one of them it provides a valid measure at least every ten minutes.**

### Regulation of security against fires in the industrial establishments.

3.1: They will settle automatic systems of detection of fires in industrial establishments that develop production activities, assembly, transformation, repair or other different to the storage, if they are located in buildings type A, and their built total surface is of 300 m<sup>2</sup> or superior, if they are located in buildings type B, its level of intrinsic risk is half and its built total surface is of 2.000 m<sup>2</sup> or superior, if they are located in buildings type B, its level of intrinsic risk is high and its built total surface is of 1.000 m<sup>2</sup> or superior, if they are located in buildings type C, its level of intrinsic risk is half and its built total surface is of 3.000 m<sup>2</sup> or superior and if they are located in buildings type C, its level of intrinsic risk is high and its built total surface is of 2.000 m<sup>2</sup> or superior.

They will settle automatic systems of detection of fires in industrial establishments that develop storage activities if they are located in buildings type A, and their built total surface is of 150 m<sup>2</sup> or superior, if they are located in buildings type B, its level of intrinsic risk is half and its built total surface is of 1.000 m<sup>2</sup> or superior, if they are located in buildings type B, its level of intrinsic risk is high and its built total surface is of 500 m<sup>2</sup> or superior, if they are located in buildings type C, its level of intrinsic risk is half and its built total surface is of 1.500 m<sup>2</sup> or superior and if they are located in buildings type C, its level of intrinsic risk is high and its built total surface is of 800 m<sup>2</sup> or superior.

When it is exigible the installation of a system of sprinklers, concurrent with that of a system of detection of fires that uses detecting thermal, the demand of the detection system will be canceled.

***Art.6.30: AUTOMATIC EXTINCTION: Fixed systems of automatic operation, guided to control a fire from their beginnings and to protect elements of the construction, equipments or process facilities.***

***In function of the fire type to control and of the elements of the construction, equipments and process facilities to be protected establish the following types:***

- fixed systems of powdered water
- fixed systems of extinction for foam physics
- fixed systems of extinction for powder
- fixed systems of extinction for sprinklers of water
- fixed systems of extinction by means of gassy agents

The five types should be adjusted for their design, calculation, reception and maintenance to the norms EN or UNE corresponding. Also the fixed systems of extinction by means of gassy agents should be adjusted to methods sanctioned by the experience, not being not admitted in facilities of new installation the products sanctioned by the normative of protection of the environment.

In the cases in that the system has detectors to activate the shot, in open systems, or of detecting of flow in systems of sprinklers, it will be able to exempt from automatic detection of fires to the enclosures protected by the same, whenever this system it is qualified to transmit the alarm for fire sectors, under the same conditions that they are exigible for the detection system, although this is more slowed lightly, except in the case of commercial use.

***Art.39.b:*** When the dielectrical of the transformers or apparatuses is inflammable or combustible, of point of inferior inflammation at 300°C, with a volume unitary superior to 400 l. or that on the whole

the 1.600 l surpasses., it should have a fixed system of automatic extinction with agent appropriate extinguisher.

When they lack access from the interior of the building, the volumes of mentioned dielectrical can be increased 600 l. and 2.400 l. respectively.

Arts.149,162 y 175: For the use of shows and meeting, the enclosures located under slope and the establishments located on slope with surface useful superior to 500 m<sup>2</sup>, they should have this installation.

Art.202: For the use of offices, the establishments of surface useful superior to 2.000 m<sup>2</sup> for sector, they should have this installation.

Art.237: For residential public's use, the buildings in height should have this installation in the entirety of the activity.

Art.259: For the commercial use, the establishments or group of establishments that constitute sector of half or high risk, with surface useful superior to 1.000 m<sup>2</sup> on slope and the areas always under slope, they should have this installation.

Art.276: For the industrial use, the enclosures occupied by industrial activities of high risk should have systems of automatic extinction in the areas that determine this risk.

The enclosures occupied by industrial activities of risk half, located under slope, they should have this installation type in the areas that determine this risk.

Art.294: For the warehouse use, it should have this installation so that it is covered the whole product stored in:

- the warehouses of high risk
  - the warehouses of half risk and of low risk, when the storage is carried out in height or be automated storages.
- the warehouses Ander slope
  - In open enclosures without consolidated cover will be exempted of this installation.

### **Basic Norma of the Construction (NBE-CPI/96)**

Art.20.7: As much the characteristics of the agents gassy extinguishers as the use of of the same ones they will guarantee the security of the occupants and the protection of the environment.

For the administrative use, the installation of automatic extinction by means of agents gassy extinguishers can substitute to the installation of sprinklers, when they are sought to avoid the damages that it could cause the water in the stored goods (files, office material, furniture, etc).

### **Regulation of security against fires in the industrial establishments.**

15.1.b: They will settle fixed systems of extinction in industrial establishments when it is mandatory their installation and constitute enclosures where calculation centers are located, databases, electronic equipments of control centers or measure and similar, of superior surface to 100 m<sup>2</sup>.

Art.6.71: **SIGNALING:** Installation that has as function to inform on the situation of some protection element (signaling of protection facilities against fires) and about the situation of the evacuation roads and of the different types of exits to evacuate (signaling of journeys).

It should be adjusted to that specified in the norms EN or UNE corresponding.

- signaling of protection facilities against fires:
  - all means of protection against fires of manual use that is not

visible from some point of the enclosure, it should be signalled in a such way that from this point it is traceable.

- signaling of journeys:

- all the enclosure exits, sector or building, of use public, as well as the evacuation roads that are not traceables from the different evacuation origins, should have signs of those exits and indicative signs of address.

They should also be signalled the points of any via of evacuation in those that exist alternative that can induce to error.

the doors that located in evacuation journeys they can for their situation to induce to error, they should be signalled with the sign "WITHOUT EXIT."

- in the elevators that cannot be counted for evacuation, in each access should have signaling of "NOT USE IN CASE OF FIRE"

It is prohibited the placement of posters and other elements that hinder the vision of any signaling type related with the prevention of fires.

Arts.101,120,138,151,164,177,186,204,222,239,261,278 y 296: For garage-parking uses, sanitarium, shows and meeting, offices, cultural and educational, residential public, commercial, industrial and warehouse, all the enclosures should complete the general norms of signaling.

### **Basic Norma of the Construction (NBE-CPI/96)**

Art. 12.1. The enclosure exits, it plants or building will be signalled, except in buildings of use housing and, in other uses, when it is exits of enclosures whose surface doesn't exceed of 50 m<sup>2</sup>, be easily visible from all point of this enclosures and the occupants are familiarized with the building.

They should prepare indicative signs of address of the journeys that should be continued from all evacuation origin until a point from which is directly visible the exit or the sign that it indicates it and, in particular, in front of all exit of an enclosure with more occupation that 100 people that it consents laterally to a corridor.

**In the points of the evacuation journeys that should be signalled in those that exist alternative that can induce to error, they will also prepare before the signs mentioned, in such way that is clearly suitable the correct alternative.**

In this journeys, the doors that are not come out and that they can induce to error in the evacuation, they will be signalled with the corresponding sign defined in the norm UNE 23033 prepared in easily visible and next place to the door.

Art.12.2: The protection means against fires of manual use should be signalled, that are not easily traceable from some point of the area protected by this means, in such way that from this point the sign is easily visible.

The signs will be the defined ones in the norm UNE 23033 and their size will be the suitable one in the norm UNE 81501, which settles down that the surface of each sign, in m<sup>2</sup>, be at least similar to the square of the observation distance, in meters, divided by 2.000.

Art.6.11: ***BLOCKADE AND RETENTION OF DOORS:*** *Mechanisms dedicated to maintain doors or floodgates in position contrary to the function for which is dedicated and that, in the event of emergency or of failure in the supply of the energy that works them, are liberated stopping the door or the floodgate in position to exercise this function automatically.*

They should be connected to the system of detection of fires for their automatic working and to have manual system of working.

The mechanisms or retention automatism or of blockade of doors, they always owe type being closed or of type always free, respectively, for a failure of the energy supply.

Art.6.47: **ALARM SWITCH:** *Installation that has as purpose the transmission from a sign to a detection power station and alarm, centralized and permanently watched over, so that it is traceable the area of the switch that has been activated, or in their defect to a system of audible alarm in the entirety of the building or activity.*

They should be adjusted to that specified in the norms EN or UNE corresponding.

- they should be easily visible or to be signalled.
- the distance to travel from any point of a building protected by a switches installation, until reaching the next switch should be inferior to 25 m.
- they should be located to a maximum height of 1,50 m.
- they should be provided of protection device that impedes their involuntary activation.
- the installation should be fed electrically, as minimum, for two supply sources, of which the main one should be the general net of the building. The secondary source can be specific for this installation or common with others of protection against fires.
- in the cases in that an installation of automatic detection of fires, the installation of alarm switches exists it should be connected to the detection power station and alarm. In this case, this power station should allow to differentiate the origin of the sign of both facilities.

Art.28.10: In the buildings whose evacuation height is bigger than 28 m., should prepare, in the areas common of the building, an installation of switches of alarm of fires.

Art.114,132,145,158,171,198,217,233,255 y 272: For use sanitarium, of shows and meeting, offices, cultural and educational, residential public, commercial and industrial, when any fire supposition cannot be known in its beginning by the entirety of its occupants, it should have this installation.

### **Basic Norma of the Construction (NBE-CPI/96)**

Art.20.4: For hospital use, they will prepare manual switches of fire alarm in the corridors, circulation areas, interior of the local dedicated to intensive and local treatment of high and half risk.

For administrative or commercial use, if the built total surface is bigger than 2.000 m<sup>2</sup>, the whole building will be protected by alarm switches.

For educational use, they will prepare manual switches of alarm inside the local of high and half risk.

For residential use, if the built total surface is bigger than 500 m<sup>2</sup> and the evacuation height is bigger than 28 m. they will settle manual switches in the corridors.

They will also settle in the local of special risk.

### **Regulation of security against fires in the industrial establishments.**

4.1: They will settle alarm switches in industrial establishments that develop production activities, assembly, transformation, repair or other different to the storage, if their built total surface is of 1.000 m<sup>2</sup> or superior and the installation of automatic systems of detection of fires is not required.

They will settle alarm switches in industrial establishments that develop storage activities if their built total surface is of 800 m<sup>2</sup> or superior and the installation of automatic systems of detection of fires is not required.

4.2: When the installation of alarm switches is required it will be located, in any event, a switch next to each exit of evacuation of the fire sector.