



**EUROFEU PORTABLE FIRE EXTINGUISHER SECTION**

**FIRE PROTECTION  
GUIDELINE FOR THE SELECTION AND INSTALLATION OF PORTABLE AND  
MOBILE FIRE EXTINGUISHERS**

Eurofeu Fire Protection guideline for the Selection and installation of portable and Mobile fire extinguishers	
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## Foreword

The standards EN 3 and EN 1866 in which the fire performance of extinguishers on class A and class B fires, as defined in EN 2, are assessed on the basis of their ability to extinguish specified test fires, are used in this document for the determination of the distribution of extinguishers on premises.

Users of this document should be aware that the provision of fire extinguishers forms part of the general fire precautions for a location. As such there may be Government Regulations or official recommendations, which set the level of provision.

## Introduction

It is important for the fire protection of a building to be considered as a whole. Portable and mobile fire extinguishers form only part, although an important part, of such facilities, and it should not be assumed that their provision entirely obviates the need for other protection, e. g. internal rising main, hose reels, sprinklers, fire blankets or other automatic or manual extinguishing systems, or trolley mounted or large mobile extinguishing units. Portable fire extinguishers are valuable in the early stages of fire when their portability and immediate availability for use enable a prompt attack to be made. They cannot be expected to deal with a large fire since they are essentially first aid fire-fighting appliances of a limited capacity.

Because of the need to consider the total fire protection of a building, this guideline assumes that a fire risk assessment has first been carried out on the premises and that the locations, types and consequences of possible fires have been identified. A fire risk assessment is the overall process of identifying fire hazards and evaluating the risks to life and property arising from them, taking account of existing risk controls (or, in the case of a new activity, proposed risk controls). Risk assessments are generally carried out by competent trained personnel.

In some countries a fire risk assessment is required by legislation.

The recommendations of this guideline are intended to assist the person responsible for the safety of the building in planning to control the consequences of the possible fires. It is important to note that the performance of this risk assessment is part of the duty of care legally required of a person having control of a workplace.

It is recognised that in certain European countries there may already exist national regulations and/or a guideline for the selection and installation of portable and mobile fire extinguishers.

However, this document has been prepared to assist those stakeholders to develop their own document where appropriate.

## 1 Scope

This document concerns the selection and installation of portable and mobile fire extinguishers installed in industrial, commercial or public buildings. The recommendations are based on the performance achieved by extinguishers complying with EN 3 or EN 1866 that can be used for the protection of buildings and other premises and their contents.

This guideline does not give detailed recommendations for small private dwellings. The selection and location of portable extinguishers in aircraft, caravans and marine craft are also excluded.

## 2 Normative references

The following normative documents contain provisions, which, through reference in this text, constitute provisions of this document. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the publication referred to applies.

EN 2, Classification of fires.

EN 3 (all parts), Specification for portable fire extinguishers.

EN 1866(all parts), mobile fire extinguishers

### 3 Terms and definitions

#### 3.1 Extinguishing medium

Substance contained in the extinguisher, which causes extinction.

#### 3.2 Charge

Mass or volume of the extinguishing medium contained in the extinguisher, expressed as a volume (litres) for the charge of appliances water based extinguishers and as a mass (kilograms) for other extinguishers.

#### 3.3 Classes of fire

EN 2 divides the various types of fires into five groups according to the type of combustible concerned:

- Class A

Fires involving solid materials, usually of an organic nature, whose combustion usually results in the formation of embers.

- Class B

Liquid or liquefiable solid fires.

- Class C

Gas fires

- Class D

Metal fires

- Class F

Fires in cooking appliances that involve combustible cooking media (vegetable or animal oils or fats).

*There are other types of fires, such as some chemical (for example: alcohol), plastic, and rubber fires, etc.*

*To determine which extinguishing medium is most appropriate to use, a specialist should be consulted and, if necessary, practice extinction tests should be performed.*

#### 3.4 Extinguisher

Appliance containing an extinguishing medium, which can be expelled by the action of internal pressure and be directed on to a fire. This pressure may be stored pressure or by the release of an auxiliary gas.

#### 3.5 Portable extinguisher:

Extinguisher which is designed to be carried and operated by hand and which, in working order, has a mass of not more than 20 kg.

#### 3.6 Mobile extinguisher

Mobile extinguisher designed to be transportable and operated by hand and that has a total mass of more than 20kg

#### 3.7 Flammable liquids

Regardless of their nature, flammable liquids are separated into three categories<sup>1</sup>, according to the following definitions:

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<sup>1</sup> Annex 1 CLP Regulations

### 3.7.1 Category 1 flammable liquids

Diethyl ether and any liquid whose Flash point < 23°C and initial boiling point ≤ 35°C

### 3.7.2 Category 2 flammable liquids

Any liquid whose Flash point < 23°C and initial boiling point > 35°C

### 3.7.3 Category 3 flammable liquids

Any liquid whose Flash point ≥ 23°C and initial boiling point ≤ 60°C

### 3.7.4 Less flammable liquids:

Heavy fuel oils (or bunker oils).

Excluding particularly flammable products, flammable liquids, which are bulk heated to a temperature higher than their flash points, are associated with Category 1 flammable liquids.

Domestic fuel oil is considered to be a Category 2 flammable liquid.

## 3.8 Competent person

Person with the necessary training and experience, with access to the relevant tools, equipment and information, manuals and knowledge of any special procedures recommended by the manufacturer and/or holder of the approvals of portable and Mobile fire extinguisher to be capable of carrying out the compliance review (see Appendix 1).

## 3.9 Responsible Person

Person or persons responsible for, or having effective control over, fire safety provisions adopted in or appropriate to the premises or building or risk where an extinguisher is installed

## 4 GENERAL CONSIDERATIONS

### 4.1 Purpose of the installation of extinguishers

Portable and Mobile fire extinguishers represent a first line of defence against fires.

Fire extinguishers are designed to be used by persons who notice the first sign of a fire. Quick intervention is of primary importance, since they can only be effective on an incipient fire. Indeed, the quantity, type and performance of available extinguishing agent, and thus the time in which it can be applied is critical.

### 4.2 Product Certification requirements

Portable fire extinguishers have to be certified to EN 3 by a European accredited certification body member of the multinational agreement.

Mobile fire extinguishers have to be certified to EN 1866 by a European accredited certification body member of the multinational agreement.

Portable and mobile fire extinguishers have to comply with Pressure Equipment Directive (97/23) be CE marked to show compliance.

### 4.3 User training

The competent person should bring to the attention of the responsible person the legal requirement for training. Every opportunity should be taken to instruct personnel in the use of extinguishers, and to demonstrate their performance.

#### 4.3.1 Instruction of the employees

The employer shall instruct employees about the hazards involved with their activities.

That includes measures to overcome emerging threats.

The instructions should be given at the start of employment and change of activity.

The instruction shall also include measures against incipient fires, explosions, and the behaviour in case of danger.

The training shall be repeated at appropriate intervals, at least once a year.

#### **4.3.2 Fire safety assistant**

The employer must train a sufficient number of employees in handling of fire fighting equipment to fight incipient fires.

The required number of fire safety assistants shall be determined in the risk assessment.

A five percent share of the workforce is usually sufficient.

For example a larger number of fire safety assistants may be necessary in the following cases:

- Workplaces with increased fire hazard
- The presence of many people
- The presence of disabled people
- Workplaces with large spatial extension

The fire safety assistants are referred to teach expertly on their tasks. The instructions should have the following contents:

- Principles of fire prevention
- Knowledge of the fire protection organization of the company
- Function and operation of fire fighting equipment
- Risk of fire
- Behaviour in case of fire
- Practical exercises in the use of fire extinguishing equipment

## **5 Selection Criteria**

### **5.1 Choice of extinguishing medium**

#### **5.1.1 Main extinguishing media**

The main extinguishing media are:

- Waterbased including water, water with additive (this also includes foam) and wet Chemical
- Powders (BC- ABC and D-powder),
- Carbon dioxide (CO<sub>2</sub>),
- Gaseous media (halon and clean agents) .

#### **5.1.2 Classes of fire**

The extinguishing agent selected must be effective for the predominant class of fire within the area covered by the extinguisher.

Note: When dealing with several different classes of fire at the same time, these rules will indicate, hereafter, how such other classes of fire should be dealt with (please refer in particular to § 5.2.2).

Table 1 describes the classes of fire corresponding to the combustible materials and their rated performance. Extinguishing media and their corresponding classes of fire are found in table 2.

Table 1 Relations between classes of fire and combustibles











CLASS <sup>1</sup>	EXAMPLE OF COMBUSTIBLE	FIRE CLASS RATING <sup>2</sup> (permits the classification of units defined by the EN 3 Standard in terms of their extinguishing capacity)
A (Solids) 	Wood; Paper; Cloth; Certain plastic materials, such as PVC; and other freely burning materials	Designed by a number, followed by the letter "A". This number corresponds to the size of the standardised fire load.
B (Liquids and Liquefiable Solids) 	Hydrocarbons (oil, fuel oil, Petroleum; acetone; alcohol solvents; grease, oils, paints, liquefiable plastic materials)	Designed by a number, followed by the letter "B". This number corresponds to the size of the standardised fire load.
C (Gases) 	Propane, butane, natural gas, industrial gas.	No European standardised fire load. <sup>3</sup> Designated by the letter "C", without a number specification.
D (Metals) <sup>4</sup> 	Iron filings; aluminium powder magnesium powder; sodium, titanium; etc.	No European standardised fire load. <sup>3</sup> Special test, which should be performed by the user and the supplier.
F (cooking oils) 	Fats and oils used for cooking	Designed by a number, followed by the letter "F". This number corresponds to the size of the standardised fire load.
<p><sup>1</sup> See § 3: «Definitions»</p> <p><sup>2</sup> Fire class ratings are marked on extinguishers on a standard label, above the instruction for use.</p> <p><sup>3</sup> The EN 3-Standard does not include any standard fire tests for C and D classes of fires. Nor does it provide a pictogram for class D fires</p> <p><sup>4</sup> Class D Extinguishers shall not be marked for suitability with any other class of fire</p>		

Table 2 Relations between extinguishing media and classes of fires

EXTINGUISHING AGENTS	CLASSES OF FIRES				
	 1)	 1)			 1)
Water <sup>1)</sup>	X				
ABC powder	X	X	X		
BC powder					
Special extinguishing media for metal fires <sup>2)</sup>				X	
Foam (water + foaming media)	X	X <sup>4)</sup>			
Carbon dioxide (CO <sub>2</sub> )		X			
Wet Chemical					X <sup>3)</sup>
Gaseous media		X			

X: Class of fire for which the extinguishing agent can be used.

1) The pictogram can only be shown on the extinguisher where it meets the minimum requirements of EN 3-7. Where the existing additives is added to improve the effectiveness of water extinguisher also the method of delivery of the water may improve the effectiveness or allow the use in other classes.

2) Specific studies are required for class D type fires.

3) This extinguishing media may also be effective on class A and/or class B type fires

4) If a foam is used on water miscible (polar) solvents (e. g. alcohol, acetone etc.) then ensure the extinguishant is suitably resistant.

### 5.1.3 Other parameters to consider in selecting an extinguishing medium

#### 5.1.3.1 Fires involving electrical equipment

All extinguishers to be sited near any electrical equipment that might be involved in a fire should be of a type that is suitable for use on electrical fires.



Extinguishers intended to protect against fire risks involving live electrical equipment should be powder, CO<sub>2</sub>

#### **5.1.3.2 Distance and direction**

The distance over which an extinguisher can expel its content should be taken into account when specifying an extinguisher for a defined hazard. A jet type discharge will travel a considerably further distance than a spray type discharge.

This affects both horizontal and vertical discharge distance and might be of particular importance in areas that have shelving or racking. Gaseous extinguishing media should not be specified where wind or draughts could adversely affect the distance of the discharge or unexpectedly change the direction of the discharge away from the fire. Such media should be specified where the medium is required to search for the fire, e.g. through a vent or grille and into the shell of electrical equipment.

#### **5.1.3.3 Visibility**

The discharge of a powder extinguisher within buildings can cause a sudden reduction of visibility and can also impair breathing, which could temporarily jeopardize escape, rescue or other emergency action. For this reason, powder extinguishers should generally not be specified for use indoors, unless mitigated by a health and safety risk assessment.

#### **5.1.3.4 Climate sensitivity**

The operation of extinguishers is affected by temperature, and those conforming to EN3 are therefore marked with the temperature range within which they will perform satisfactorily. Extinguishers should not be exposed to storage temperatures outside the range marked on the extinguisher.

#### **5.1.3.5 Life hazards**

Discharging a CO<sub>2</sub> or other gaseous media extinguisher, even inside a room, will not cause the atmosphere to become toxic. However, it is advisable to ventilate the room afterwards to restore oxygen levels.

*Note 5 kg of CO<sub>2</sub> released in a small room equivalent to 68 m<sup>3</sup> will lower the equilibrium oxygen content from 21% to 20.1%, with a CO<sub>2</sub> content of 4%, which normally does not cause any noticeable problems.*

Advice should be sought on the suitability and toxicity for all extinguishing media.

#### **5.1.3.6 Possible effects from the use of portable extinguishers**

The extinguishing agents used in portable fire extinguishers may cause damage to objects not directly related to the fire event. Selection of extinguishers must be based primarily on effectiveness and safety, but this possible damage should be taken into account.

#### **5.1.3.7 Extinguishing powder**

The use of powder extinguishers in the proximity of extremely sensitive devices, electronic equipment or foodstuffs is not recommended.

#### **5.1.3.8 Water based extinguishing media**

The use of water based extinguishing media in the proximity of extremely moisture sensitive or irreplaceable objects is not recommended.

#### **5.1.3.9 Gaseous extinguishing media**

Gaseous extinguishing media (CO<sub>2</sub>, halon-alternatives) cause virtually no collateral damage and are therefore recommended when highly sophisticated equipment or irreplaceable objects are stored in the protected area.

#### **5.1.3.10 Environmental impact**

Consideration should be given to the environmental impact of the extinguishing media chosen notwithstanding that the primary goal is to extinguish the fire.

## 5.2 Determining the correct number of extinguishers

A facility protection package consists of:

- general protection (see § 5.2.1),
- additional protection for special activities (see § 5.2.2),

Determining the correct number of extinguishers:

- must be done on a zone-by-zone basis;
- is unrelated, in the case of general protection, to the potential existence of one or more automatic fire extinguishing systems, or other manual response fire-fighting means, such as hose reels, dry risers, sprinklers and so on.

Consideration should be given to the activities within each zone and additional extinguishers may be necessary at locations where the likelihood of fires is above average.

### 5.2.1 General protection

The number of fire extinguishers depends on the floor-area (m<sup>2</sup>) of a zone and the maximum walking distance to the nearest extinguisher.

#### 5.2.1.1 Basic Zones

A basic zone is defined as a zone in which:

- the same type of activity is performed (industrial, offices);
- the same predominant class of fire exists (A, B or C);
- all of its parts are communicating.

*Note: A basic zone with an area of less than, or equal to, 30 m<sup>2</sup> can be considered as a localised danger and treated as such (see § 5.2.2.1).*

#### 5.2.1.2 Communication

Certain zones or parts of zones are considered to be non-communicating if they are:

- non-adjoining;
- adjoining but separated by obstacles which would prevent access to an extinguisher in the event of fire.

*Note: Zones located on both sides of a fire-resistant separating structure with, or without, openings (i.e., a fire-resistant partition wall, ordinary partition wall, or fireproof compartment) will in cases be considered as non-communicating zones.*

*Note: Closed doors may transform communicating zones into non-communicating ones.*

#### 5.2.1.3 Basic Units

Basic units are the following:

For industrial purposes

- for maximum 200 m<sup>2</sup>:
  - one 9-litre water-base extinguisher, or
  - one 9-litre water-with-additives type extinguisher, or
  - one 9-kg ABC powder extinguisher, or
  - one 9-kg BC powder extinguisher, or
  - one 9-litre foam extinguisher.

*Note: larger units may be used in the place of the 9 litre and 9 kg extinguishers.*

*Note: 6liter or 6 kg may be used in place of 9 liter or 9 kg for respectively 150 m<sup>2</sup> in place of 200 m<sup>2</sup> (where extinguishers are too heavy for the personnel)*

For offices, basic units are

- for maximum 150 m<sup>2</sup> (recommended if 9 litre or 9 kg extinguishers are too heavy for the personnel.)
  - one 6-litre water-base extinguisher, or
  - one 6-litre water-with-additives type extinguisher, or

- one 6-kg ABC powder extinguisher, or
- one 6-kg BC powder extinguisher, or
- one 6-litre foam extinguisher.

*Note: larger units may be used in the place of the 9 litre and 9 kg extinguishers.*

The use of CO<sub>2</sub> is not recommended for the general protection of buildings. But it is recommended for the protection of electrical hazards and small flammable liquid fires.

#### **5.2.1.4 Basic Equipment**

Each basic zone must be equipped with one basic unit for every 150 m<sup>2</sup> or 200 m<sup>2</sup> ground area or fraction thereof.

**Please Note:** in the particular case of an isolated building (security guard's premises, for example) or a level (including a mezzanine, grating, platform, etc.) with a surface area (S) less than, or equal to, 200 m<sup>2</sup>, the following minimal equipment will be required for this building, or this level, according to the particular activity performed therein:

- S less than 100 m<sup>2</sup>: 1 basic unit;
- S of between 100 m<sup>2</sup> and 200 m<sup>2</sup>: 2 basic units.

**Note:** where applicable, please refer to the specific regulatory provisions that may require a different equipment allocation.

#### **5.2.1.5 Maximum walking distance**

The extinguishers must be located in such a way that the distance to reach one unit from any single point inside the zone does not exceed 20 metres.

#### **5.2.1.6 Unoccupied buildings**

Where buildings, or parts thereof are unoccupied, the provision of extinguishers should be assessed with a minimum provision as for an office building.

### **5.2.2 Additional protection**

In special hazard zones, the basic equipment previously stated in § 3.2.1 (General Protection) must be supplemented by additional equipment.

When the same zone has been allocated several additional devices, it is not allowed to combine them, particularly if they require the same extinguishing agent. In such cases, it is advisable to provide the most significant additional allocation.

Regardless of the layout of the premises, a fire extinguisher must always be available within less than 5 metres of the hazard. Extinguishers should be located such that the risk does not prevent their use.

#### **5.2.2.1 Localised hazards**

In the same building, some localised hazards may deserve very close attention.

**Note:** Some examples of localised hazards are: heating units, paint booths, lift machinery, office automation systems, electrical power cabinets, transformers, compressors, electric motors, electric generator sets, welding and other hot works areas, etc.

All localised hazards must be handled by using additional equipment unless the extinguishing agent selected to protect the localised hazard is housed inside a unit located less than 5 meters from the hazard and is suitable for the basic zone in which it is located.

In cases involving additional protection, extinguishers can be used which have a smaller capacity than that of the basic units, or which contain extinguishing agents other than those found in the basic units.

### 5.2.2.2 Flammable liquid or gas inside above ground storage areas

The general protection of flammable liquid or gas interior aboveground storage areas must be maintained at least at the levels indicated in table 3:

Gas supply should be shut off before fighting the fire

**Table 3: Protection of flammable liquids inside above ground storage areas**

Quantities of Flammable Liquids (in litres) or Gas (in kilograms)	Additional Equipment
Less than 100	No additional equipment
Between 101 and 500	One suitable 9-kg ABC or BC powder extinguisher or 9 l foam Extinguisher
Between 501 and 3000	Two 9-kg ABC or BC powder extinguishers or two 9 l foam extinguishers
Above 3000	Two 9-kg ABC or BC powder extinguishers or two 9 l foam extinguishers, and one 50-kg ABC or BC powder Mobile extinguisher or 45 l or 50 l foam Mobile extinguishers

Note: for gas storage, foam extinguishers are not suitable

However, interior aboveground storage areas for category 2 flammable liquids and not easily flammable liquids do not require a mobile extinguisher unless such liquids exceed 30000 litres.

### 5.2.2.3 High Storage Areas

Unless the storage area concerned is already protected by a fire hose station system or by an automatic fire extinguishing system, the general protection of storage areas that are over 3 meters high must in addition be assured by at least:

- one 50-kg BC or ABC powder mobile extinguisher;

or

- one 45-litre, mobile extinguisher water with, or without additives or foam per base fraction of 1,000 m<sup>2</sup> of high storage area, and for a minimum of 400 m<sup>2</sup> of high storage area.

A high storage area includes the area occupied by the shelving itself, plus the area covered by the aisles.

### 5.2.2.4 Paintwork Areas

Unless the areas reserved for flammable paintwork, whose surface exceeds 25 m<sup>2</sup>, are already protected by a foam-type fire hose station system or by an automatic fire extinguishing system, they must also be equipped with at least:

- one 50-kg BC or ABC powder mobile extinguisher;

or

- one CO<sub>2</sub> mobile extinguisher of 20 kg (minimum);

or

- one 45-litre mobile extinguisher, water with additives or foam.

The surface of this area covers that open or closed part of the workshop reserved for paintwork; i.e. excluding the parts of the workshop not specifically reserved for painting (for example: the small mobile work stations in the workshop with no fixed location).

A flammable paint buffer storage area may be maintained inside the paintwork area only as a supply source required for daily work. If it is housed outside this area, or, if it exceeds the daily paint supply requirement, but is located in the paintwork area, it must be treated as a flammable liquid interior storage area. In the event that this paintwork area has a surface of less than 25 m<sup>2</sup>, it must be considered as a localised hazard and/or flammable liquid interior storage area.

#### 5.2.2.5 Flammable liquid or gas outside aboveground storage areas

*This relates to tanks aboveground, at or below grade, and without backfill.*

Flammable liquid or gas outside aboveground storage areas must be equipped, per fraction of 200 m<sup>2</sup> ground area, with the minimum equipment indicated in table 4:

Gas supply should be shut off before fighting the fire

**Table 4: Protection of flammable liquids outside above ground storage areas**

Quantities of Flammable Liquids (in litres) or Gas (in kilograms)	Additional Equipment
Up to 2500	One suitable 9-kg ABC or BC powder extinguisher or 9 l foam extinguisher
Between 2501 and 5000	Two 9-kg ABC or BC powder extinguishers or two 9 l foam extinguishers
Above 5000	Two 9-kg ABC or BC powder extinguishers, or two 9 l foam extinguishers and one 50-kg ABC or BC powder mobile extinguisher or 45 l or 50 l foam Mobile extinguisher

Note: for gas storage, foam extinguishers are not suitable

Aboveground storage areas for category 2 flammable liquids, and not easily flammable liquids, do not require a mobile extinguisher, unless such liquids exceed 50,000 litres.

Facilities subject to special regulations (such as petrol storage depots and filling stations) should comply with the requirements of those regulations.

#### 5.2.2.6 Miscellaneous exterior storage areas (pallets, cartons, plastics, wastes, garbage containers, etc.)

Permanent exterior storage areas located less than 10 meters from buildings equipped with mobile fire extinguishers must be equipped either with a minimum of one 9-litre or one 9-kg extinguisher, per fraction of 200 m<sup>2</sup> ground area, or with one 50-kg ABC powder mobile extinguisher, or with one 45- or 50-litre mobile extinguisher water with additives or foam per fraction of 1,000 m<sup>2</sup> ground area.

### 5.2.2.7 Refrigerating chambers and cold storage warehouses

Refrigerating chambers and cold storage warehouses must be equipped with one basic unit per fraction of 200 m<sup>2</sup> ground area. Only surface areas of mezzanines that offer at least one external access are included in the calculation of the total equipment area.

No additional equipment is required for high storage areas (higher than 3 meters) inside refrigerating chambers and cold storage warehouses. Fire extinguishers reserved for the protection of refrigerating chambers and cold storage warehouses shall be placed outside these areas, near each access, or dispatched near each access.

Some extinguishers can be replaced by one or several mobile extinguishers, provided that:

- each access door is equipped with at least one (non-replaceable) basic unit;
- if there are mezzanines without external access, every external access located less than 10 meters from the stairway leading to such mezzanines is equipped with at least two (non-replaceable) basic units, with a minimum of one access so equipped, per sight proof level;
- one mobile extinguisher replaces at most 5 basic units.

Non-cumulation of equipment required for the loading platforms is permitted if:

- the same class of fire predominates in regard to general protection;
- equipment for refrigerating chambers and cold storage warehouses is more extensive than the equipment required for loading platforms (general protection does not take into account mobile extinguishers that replace 5 basic units for a refrigerating chamber or cold storage warehouse, but, if properly adapted, they can be taken into account by the additional protection);
- fire extinguisher siting also complies with general and additional protection requirements concerning loading platforms.

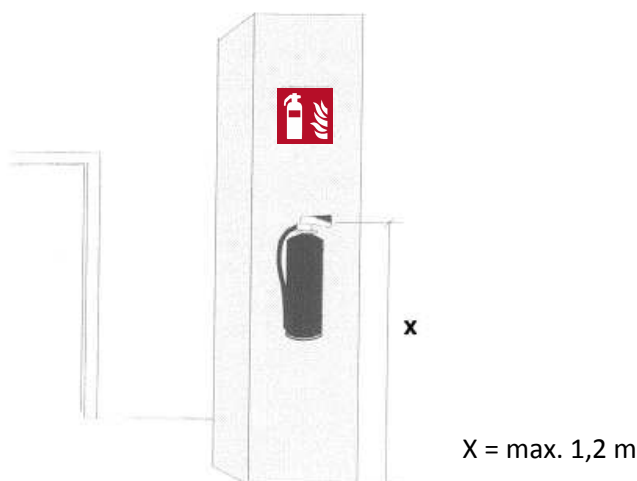
### 5.3 Fire extinguisher locations

Normally, extinguishers should be located in conspicuous positions on brackets or stands where persons following an escape route will readily see them. Siting positions near to room exits, corridors, stairways, lobbies and landings are most suitable. Extinguishers should not be located where a potential fire might prevent access to them.

Where it is required, attention should be drawn to the position of extinguishers where necessary by signs, and the user should keep a record (conveniently on a plan) of the type, number and location of the extinguishers.

Units located outside the building must be housed in appropriate enclosures to protect them from weather hazards.

The locations of extinguishers shall be marked with the necessary pictograms.



## APPENDIX 1 (informative)

### COMPLIANCE REVIEWS

The purpose of compliance review, which should be performed by a Competent Person after the equipment has been installed and a Responsible person at periods to be defined by their specific needs, is to check the conformity of that installation with this document

The layout and usage of buildings is often subject to changes therefore a compliance review should be carried out at minimum annually to ensure that the extinguisher installation is in line with the risk assessment or other national regulations

#### I. Review of installation

The responsible person should undertake a review to ensure the safety of the installation and that the installation complies with the original plan.

He or she should record that the check has been made. This should include the location and identity of each extinguisher.

The competent person should undertake for compliance inspection as part of the annual service visit to ensure the safety of the installation.

He or she should provide a report for the responsible person, which should include a floor plan of the installation and the location and identity of each extinguisher.

*Note This plan is not required if the facility's basic protection equipment consists of 5, or fewer, extinguishers.*

#### II. Compliance inspection

At least once a year the responsible Person should check the following:

- a) that each extinguisher location is marked
- b) that it is the correct type and it occupies its designated place (according to the plan);
- c) that it is suitable for its environment;
- d) that it is visible and accessible;
- e) that its seal and locking device have not been tampered with;
- f) that it seems to be in good operating condition (absence of surface damage or accidental deformation) and that all of its external accessories (including lines and hoses, valves, carrying devices) are actually present and in good condition;
- g) that it has been maintained annually by a competent person and/or company in accordance with the applicable documents (national regulations, standards, rules) and as proof thereof it bears the correct maintenance label
- h) that a Maintenance report has been issued by the competent person and/or company

At each annual Service/maintenance visit, unless the contact specifies otherwise, the competent person should complete actions a) to f) above.

The age of the extinguisher should follow the specific limitations as detailed in national regulations or as specified by the manufacturer.

Note: Typically a number of European Countries limit the age to a maximum of 20 years from date of installation.

#### III. Certificate of compliance

A Competent person should provide a certificate of compliance to the responsible person attesting to the fact that the selection and installation complies with this document in accordance with the checks in I and II.

## APPENDIX 2 EXAMPLES

In these examples we will determine the correct number of extinguishers corresponding to:

- general protection (see § 5.2.1)
- additional protection (see § 5.2.2)

In order to determine the number of extinguishers corresponding to general protection, we will perform the following operations:

### I. Description of the facility

### II. General protection

Identify the type of activity: industrial or offices. Then:

- First Operation: to differentiate between zones according to the class of fire: A, B or C. Superposing the zones differentiated during operation 1 makes it possible to show the zones with the same class of fire (A, B or C).
- Second Operation: to differentiate between communicating, and non-communicating, zones (with the same class of fire).
- Third Operation: to determine, for each basic zone, the number of extinguishers referred to as basic equipment and expressed in basic units according to the following ratio: one basic unit per 200 m<sup>2</sup> respectively 150 m<sup>2</sup>, or fraction thereof (see § 5.2.1.4).

### III. Additional protection

### IV. Summary of the facility's protection plan

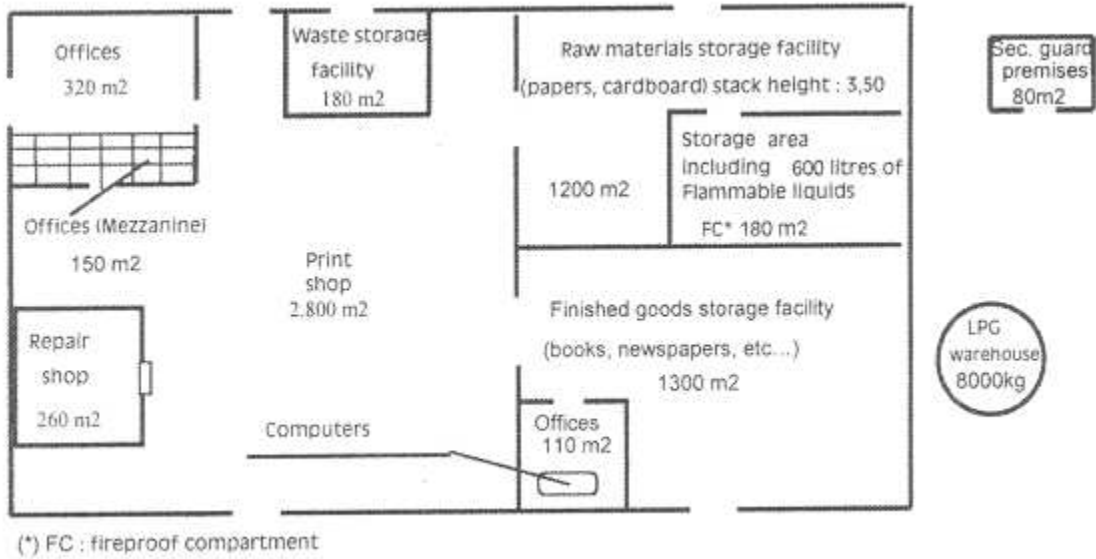
*Note: certain selections were made to better illustrate the principles of the rule.*



**EXAMPLE No. 1**

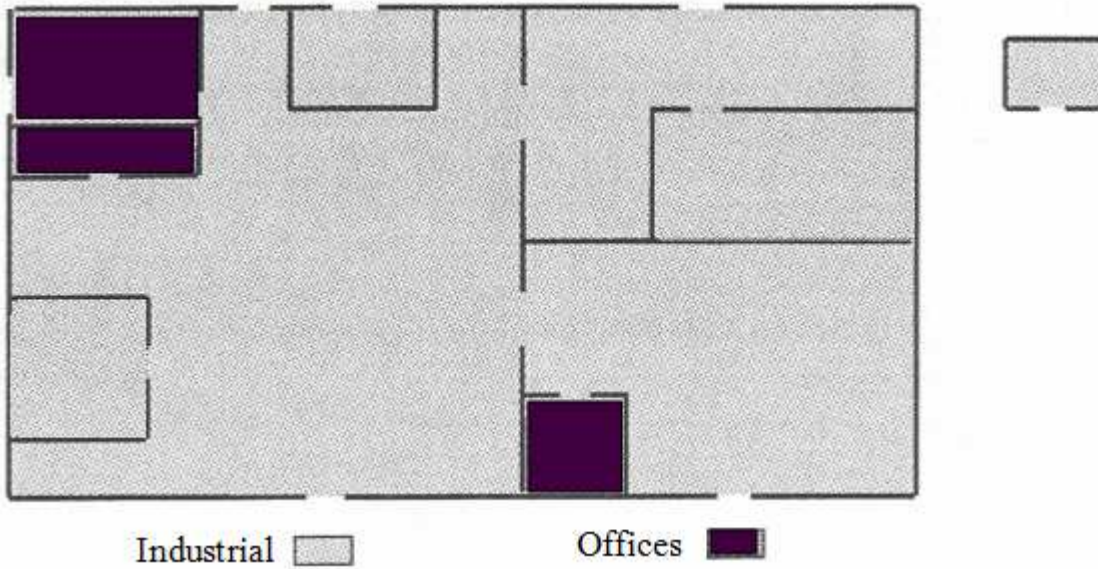
**I. Description Of The Facility**

**PRINTING PLANT**



**II. GENERAL PROTECTION**

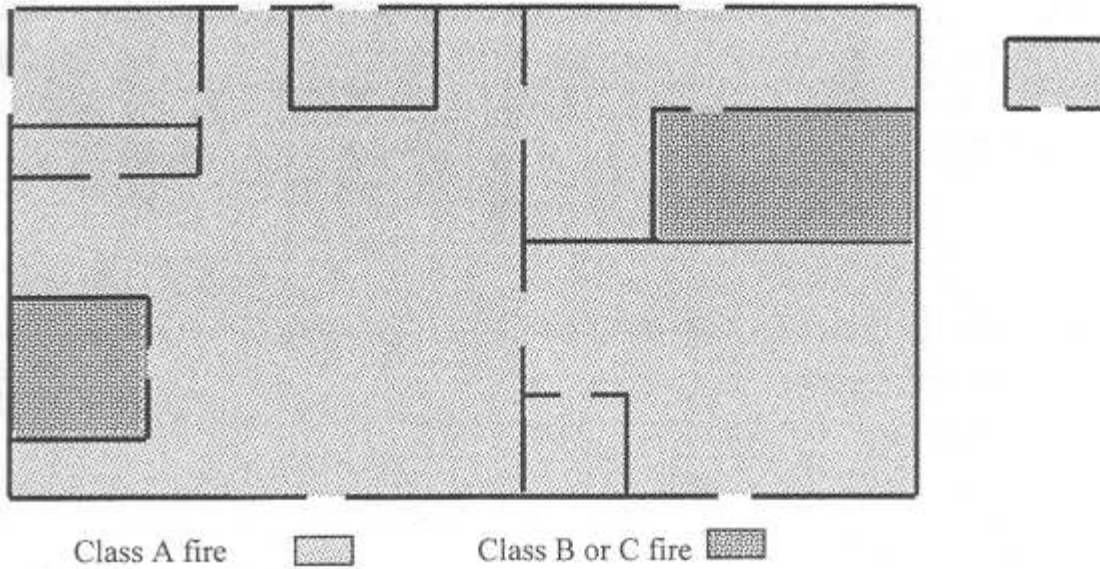
Identify types of activity industrial / offices:



**1st Operation: Class of Fire**

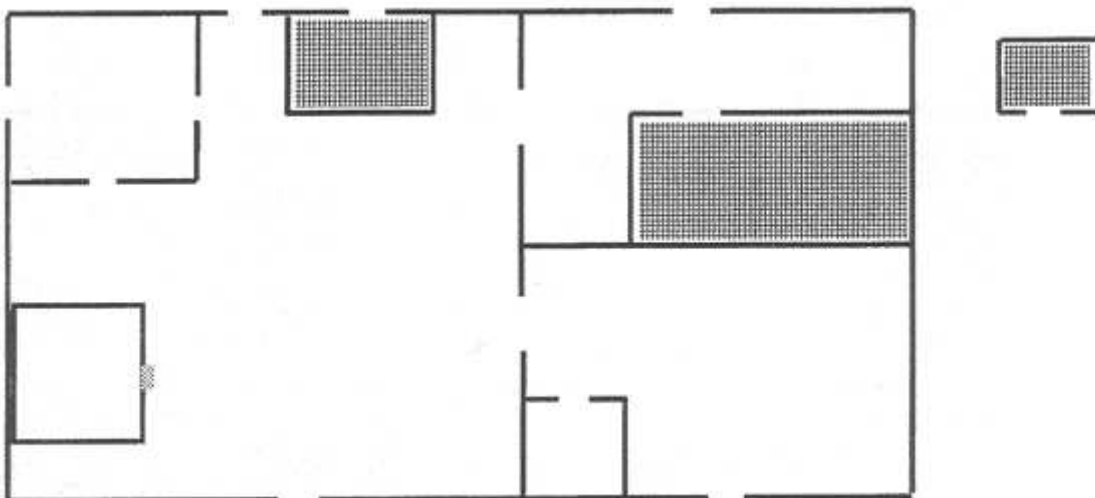
**Class A** fires involve the security guard premises, offices, storage facilities for raw materials, finished goods, and wastes, and the print shop.

**Class B or C** fires involve the repair shop, and flammable liquids storage area.



**2nd Operation: Communication**

The security guard premises, waste storage facility (both non-communicating with the rest of the building) and the flammable liquids storage area (fireproof compartment) will be covered separately. All the other premises communicate with each other.



These operations allow us to identify the basic zones numbered 1 through 7.

### 3rd Operation; Basic equipment

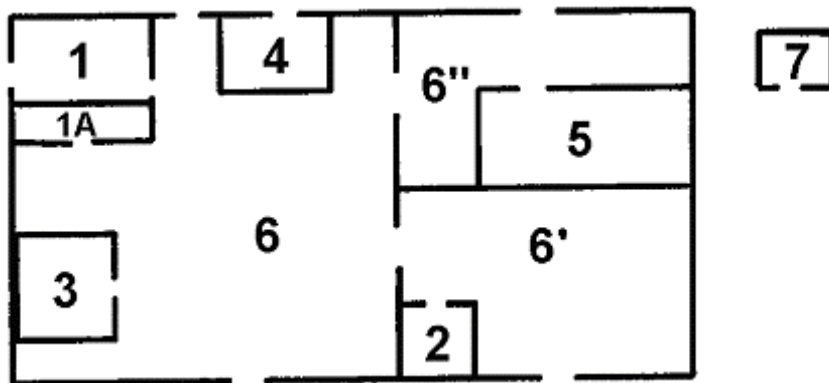


Table 5: Basic equipment

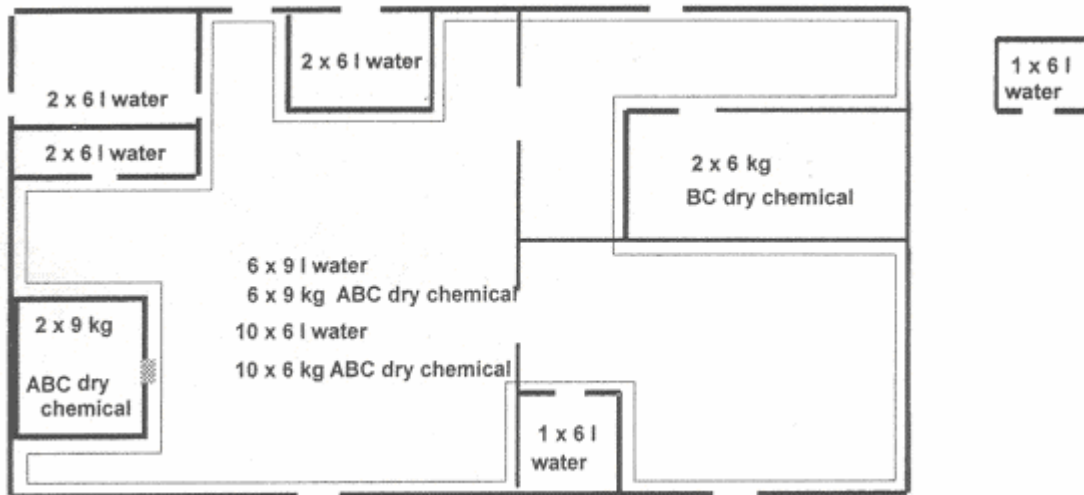
Basic Zone	Class of fire	Area	Basic Equipment
No 1 Offices	A	320 m <sup>2</sup>	2 x 6 litres of water
No 1 A Mezzanine Offices	A	150 m <sup>2</sup>	2 x 6 litres of water
No 2 Offices	A	110 m <sup>2</sup>	1 x 6 litres of water
No 3 Repair Shop	B or C	260 m <sup>2</sup>	2 x 9 kg of ABC powder (or BC if no mixt risks)
No 4 Waste storage facility	A	180 m <sup>2</sup>	2 x 9 litres of water (or 2x 6l)
No 5 Flammable Liquids storage area	B or C	180 m <sup>2</sup>	1 x 9 kg of BC powder or 9l foam
No. 6, 6', 6'' Workshop and storage facilities	A	2800 + 1200 + 1300 = 5300 m <sup>2</sup>	see note (1)
No 7 Security guard Premises	A	80 m <sup>2</sup>	1 x 6 litres of water

(1) In view of the fact that there are personnel inside basic zone No 6 who would find it difficult to handle 9-litres (9 kg) capacity extinguishers, it would be advisable to equip part of that area with 6-litre (6 kg) extinguishers in a ratio of 1 extinguisher per fraction of 150 m<sup>2</sup>. In addition, in view of the fact that there are flammable liquids in the print shop, we recommended that half of the equipment consist of ABC powder extinguishers. For example, we could have:

for 3000 m<sup>2</sup> areas: 10 x 6 litres of water + 10 x 6 kg of ABC powder extinguishers

for 2300 m<sup>2</sup> areas: 6 x 9 litres of water + 6 x 9 kg of ABC powder extinguishers

### Distribution of basic equipment



### III. ADDITIONAL PROTECTION

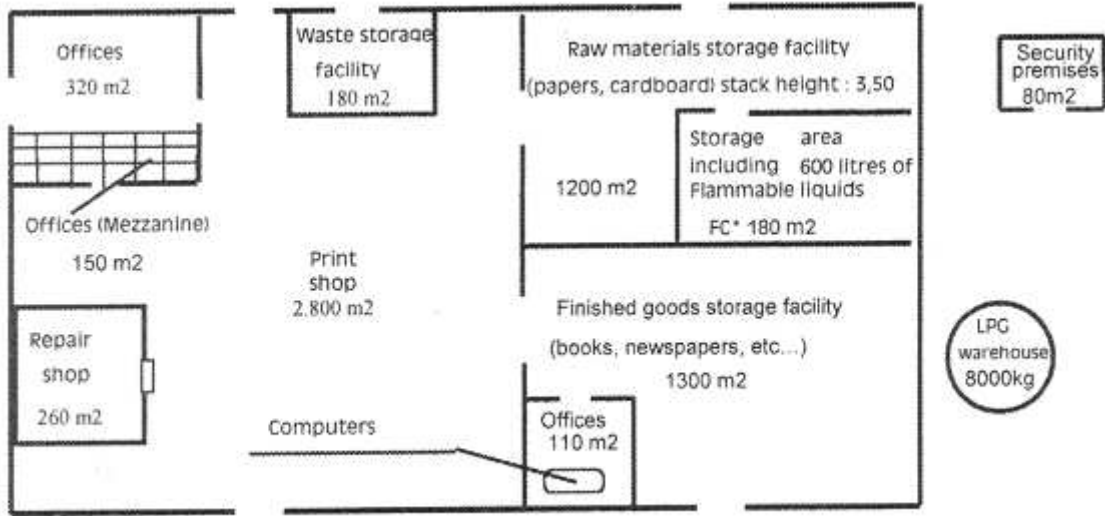
Computers: 1 x 2 kg CO<sub>2</sub> (in view of the limited equipment)

High storage area of 1200 m<sup>2</sup>: 2 x 45 litres of water or foam (mobile extinguisher)

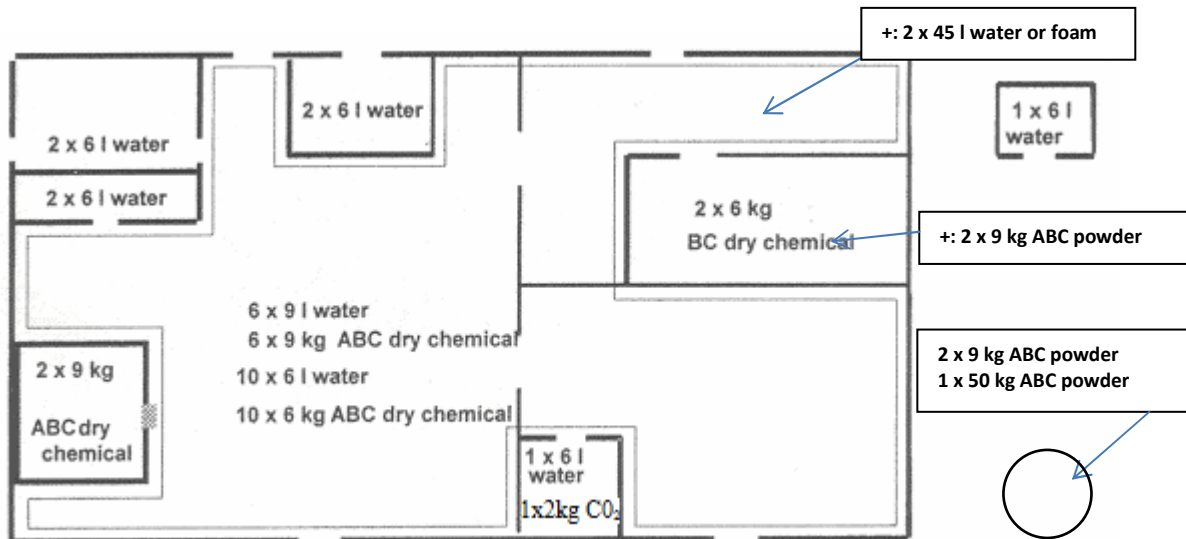
Storage area (including 600 litres of flammable liquids): 2 x 9 kg of ABC powder

8000 kg capacity LPG warehouse: 2 x 9 kg and 1 x 50 kg of ABC powder (mobile extinguisher)

**IV. SUMMARY OF THE FACILITY'S PROTECTION PLAN (Printing plant)**

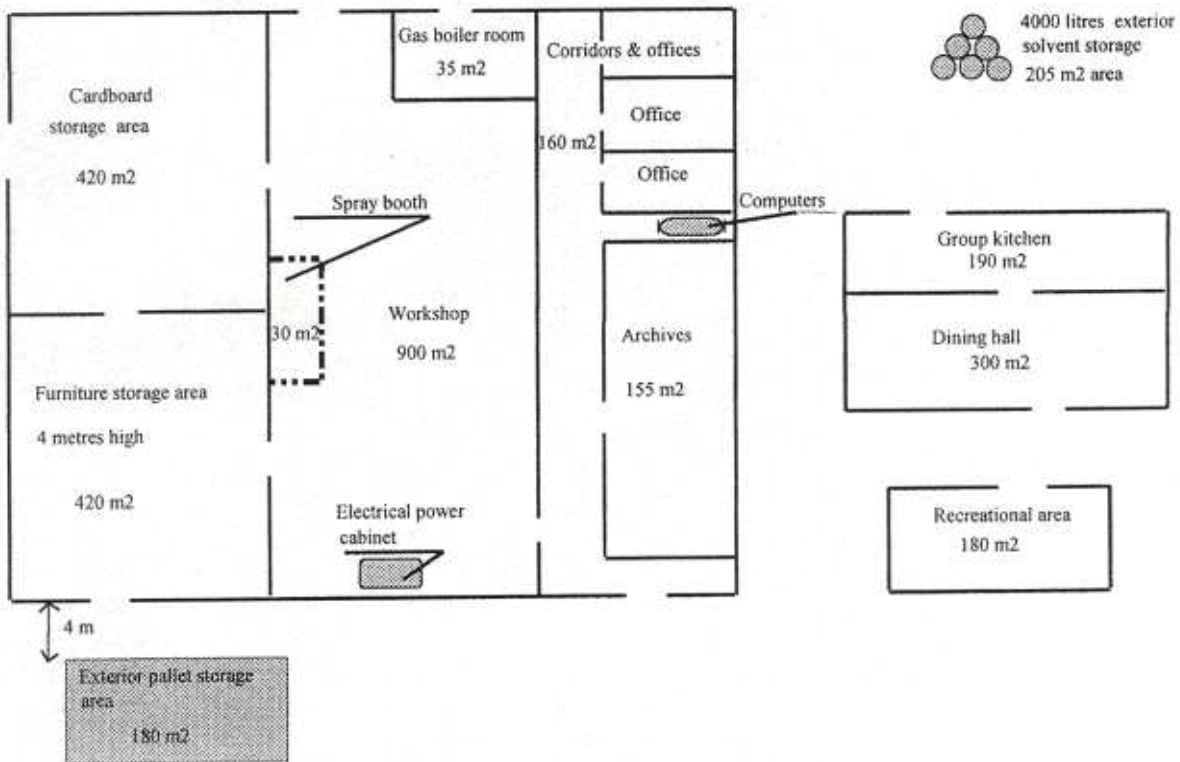


(\*) FC : Fireproof compartment



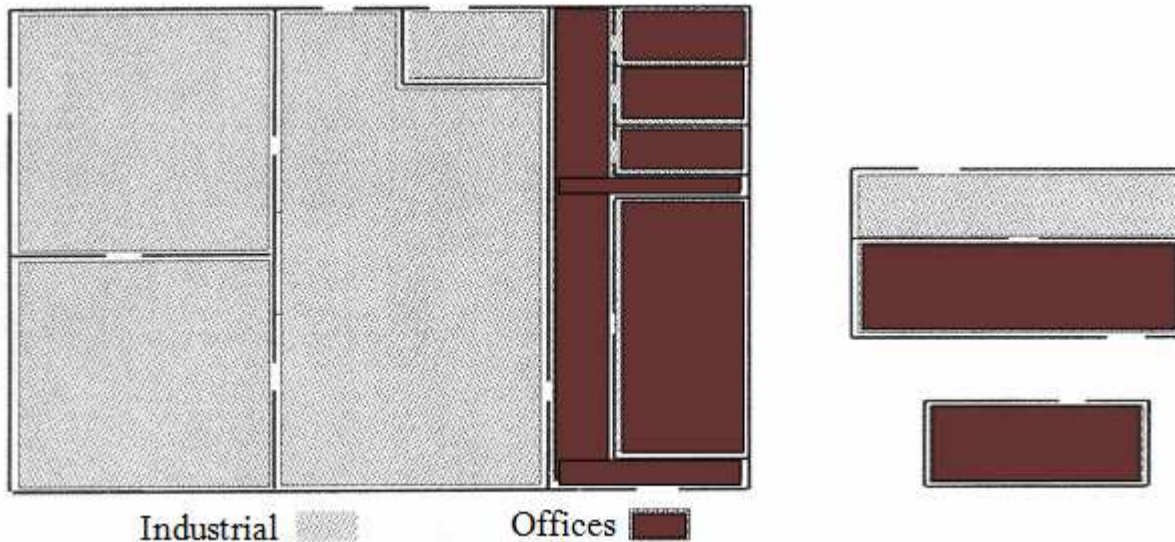
**EXAMPLE No. 2**

**I. DESCRIPTION OF THE FACILITY  
WOODWORKING PLANT**



**II. General Protection**

Identify the type of activity (industrial or offices):

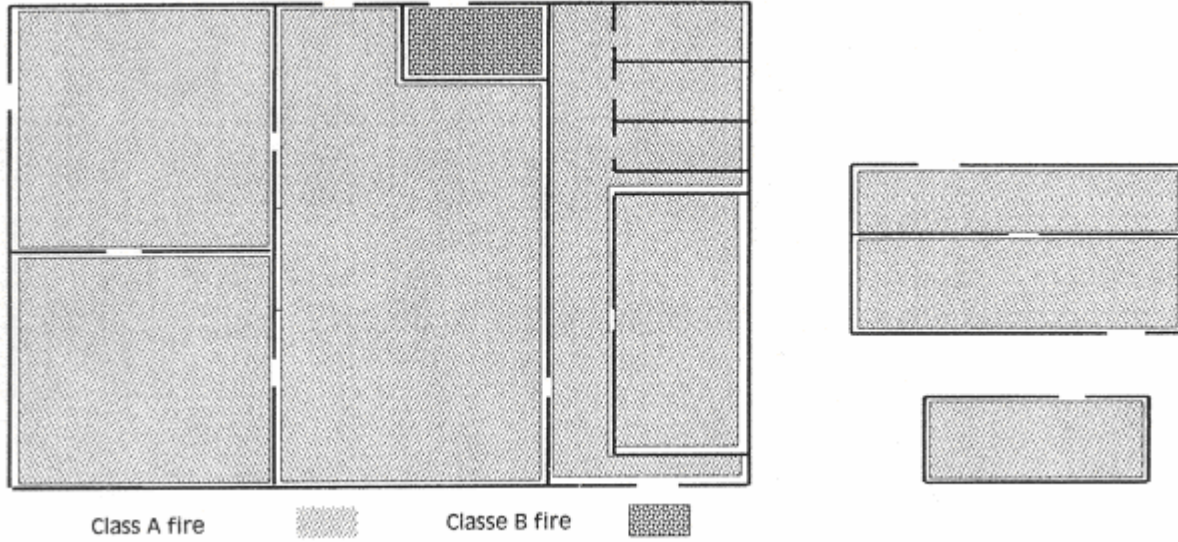


**1st Operation: Class of Fire**

**Class A** fires involve the cardboard and furniture storage areas, workshop, offices, archives, dining hall, and the recreational area.

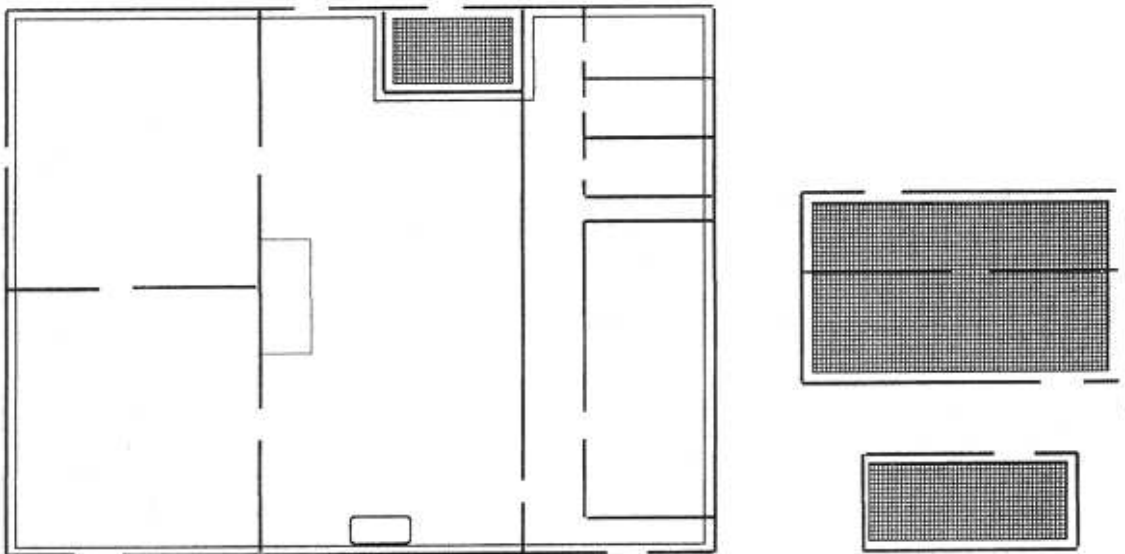
Class A and and F for the group kitchen.

**Class B or C** fires involve the boiler room

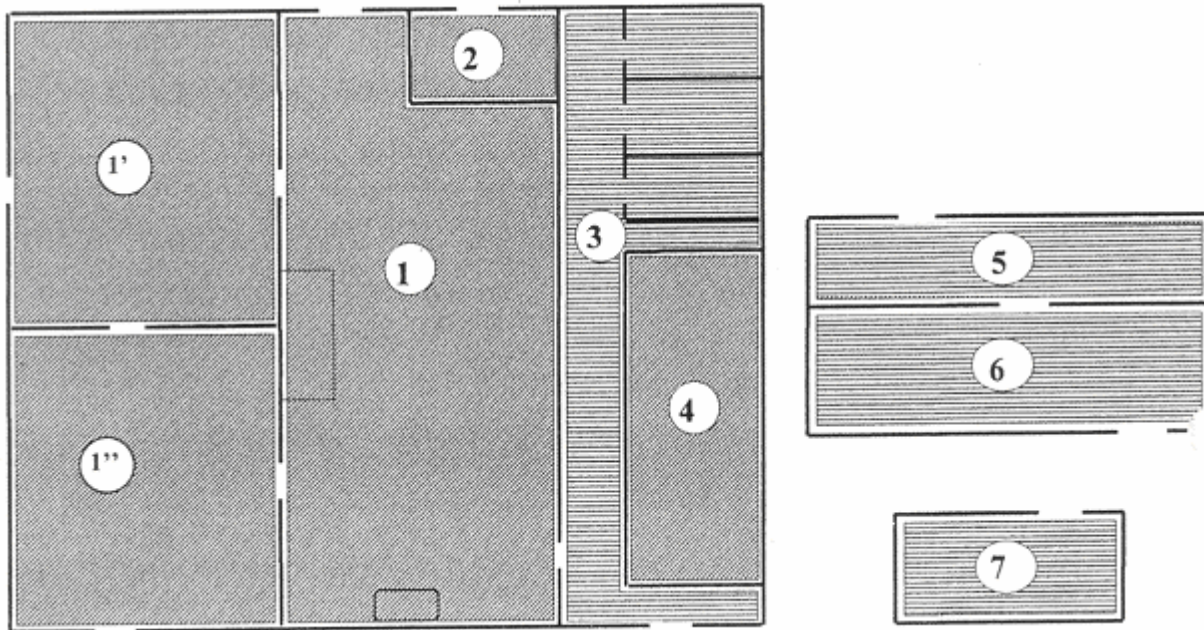


**2nd Operation: Communication**

The gas boiler room, food service building and recreational area will be covered separately.  
All the other premises communicate with each other.



These operations allow us to identify the basic zones numbered 1 through 7.



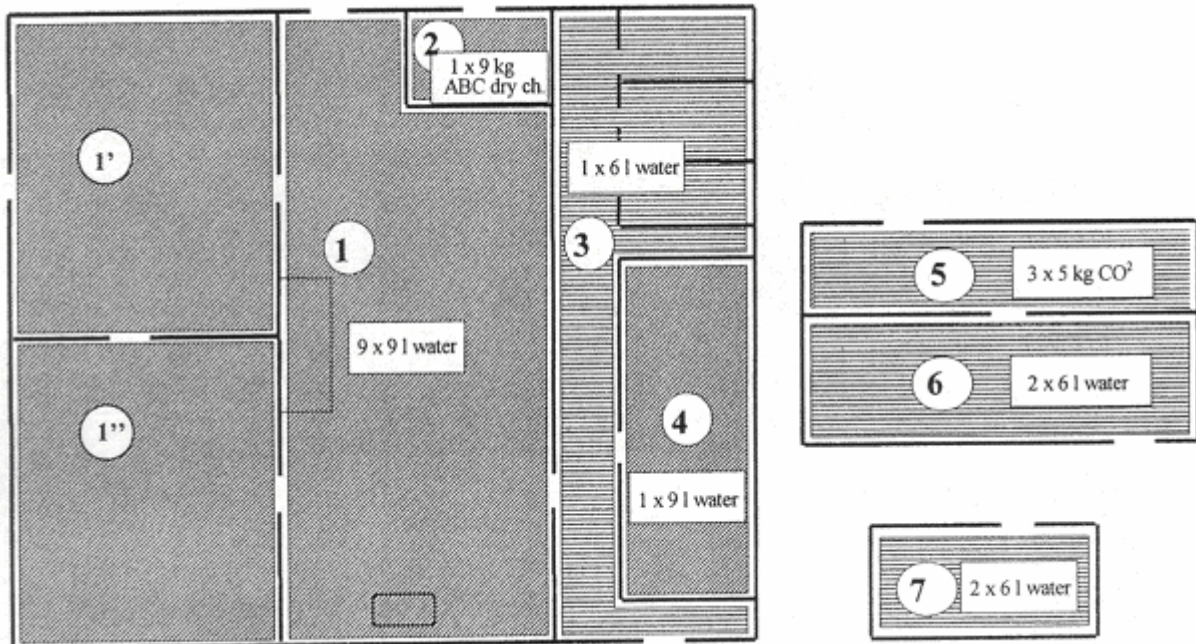
### 3rd Operation: basic equipment

**Table 6: Basic equipment**

Basic Zone	Class of fire	Area	Basic Equipment
No 1, 1', 1'' Workshop and storage area	A	1740 m <sup>2</sup>	9 x 9 litres of water
No 2 Gas boiler room	B or C	35 m <sup>2</sup>	1 x 9 kg of ABC powder
No 3 Corridors and offices	A	160 m <sup>2</sup>	1 x 6 litres of water (if walking distance to next extinguisher is less 20 m; if not 1 more )
No 4 Archives	A	155 m <sup>2</sup>	1 x 9 litres of water
No 5 Group Kitchen	A or F	190 m <sup>2</sup>	2 x 6 litres of class AF extinguishing medium or 2 x 6 litres of class A + 2x 6 liters of class F
No. 6 Dining hall	A	300 m <sup>2</sup>	2 x 6 litres of water
No 7 Recreational area	A	180 m <sup>2</sup>	2 x 6 litres of water



### Distribution of basic equipment



### III. ADDITIONAL PROTECTION

Computers: 1 x 2 kg CO<sub>2</sub> (in view of the limited equipment)

Electrical power cabinet: 1 x 5 kg CO<sub>2</sub>

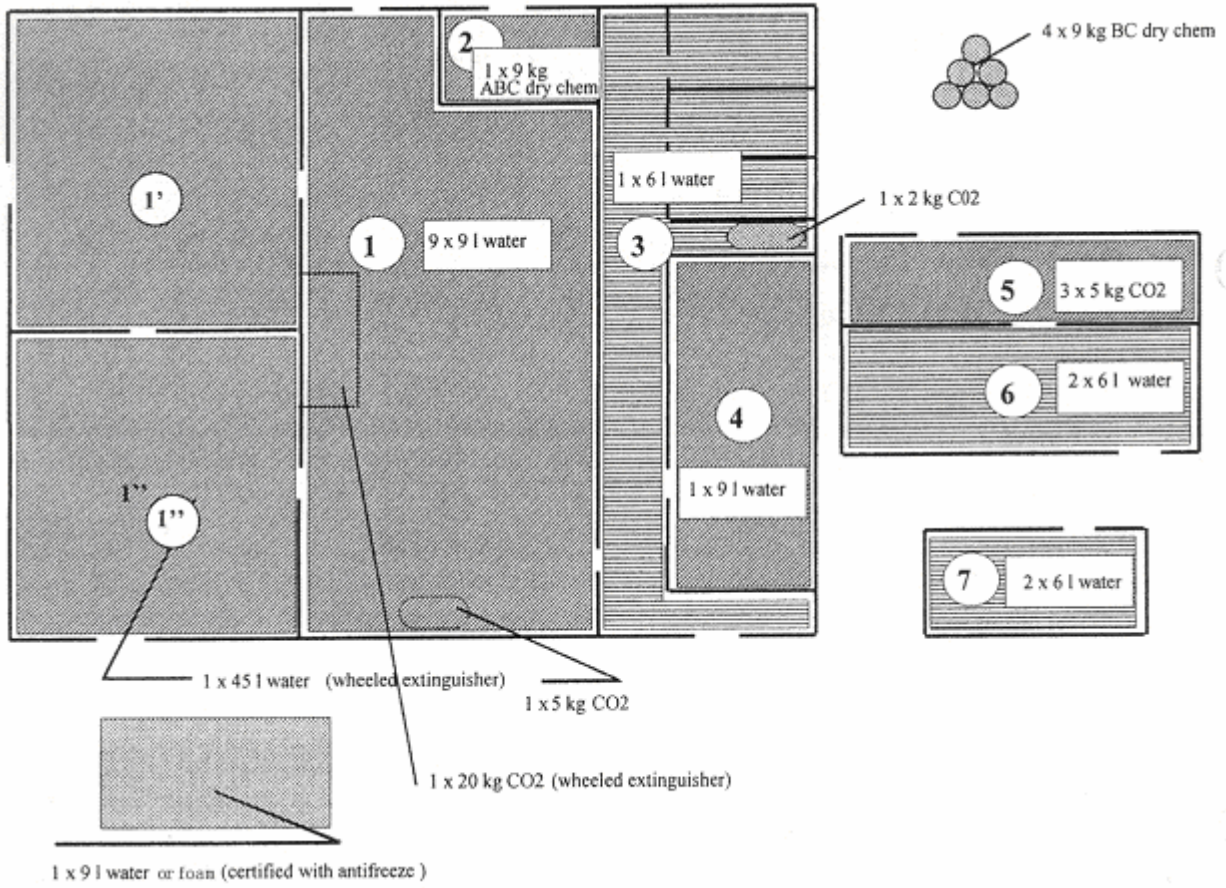
420 m<sup>2</sup> furniture high storage area: 1 x 45 litres of water or foam (mobile extinguisher)

Spray booth (30 m<sup>2</sup>): 1 x 20 kg CO<sub>2</sub> (mobile extinguisher)

205 m<sup>2</sup> exterior storage area for 4000 litres of solvent: 4 x 9 kg of BC powder

180 m<sup>2</sup> exterior pallet storage area: 1 x 9 litres of water (certified with antifreeze)

IV. SUMMARY OF THE FACILITY'S PROTECTION PLAN (woodworking plant).



## Appendix 3

## Minimum fire ratings relating to extinguisher's size Resulting from EN3-7 requirements

		Fire classes (as per EN2)				
		A	B	C	F	(Polar) Solvent
Liquid extinguishing media	6 liter water	8			note 1	
	6 liter water based	8	113		25	only if test succeeded
	6 liter wet chemical	8	113		25	only if test succeeded
	9 liter water	13			note 1	
	9 liter water based	13	183		40	only if test succeeded
	9 liter wet chemical	13	183		40	only if test succeeded
	6 kg BC		113	adequate		adequate
	6 kg ABC	21	113	adequate		adequate
Extinguishing powder	9 kg BC		144	adequate		adequate
	9 kg ABC	27	144	adequate		adequate
	12 kg BC		183	adequate		adequate
	12 kg ABC	43	183	adequate		adequate

Note 1: some water mist units can achieve the minimum requirement but depending on the water delivery method, some water based units could achieve the minimum requirement but due to the risk of confusion and the very high danger of direct water spraying into an F class fire, this usage is not recommended.

 Forbidden