

# European guideline



## *Introduction to Qualitative Fire Risk Assessment*

## **FOREWORD**

The European fire protection associations have decided to produce common guidelines in order to achieve similar interpretation in the European countries and to give examples of acceptable solutions, concepts and models. The Confederation of Fire Protection Associations Europe (CFPA E) has the aim to facilitate and support the fire protection work in the European countries.

This guideline is an introduction to a qualitative method of assessing fire risks. There are many methods of carrying out a fire risk assessment and examples are Gardner, Meseri, Frame and the Fire Safety Concepts Tree. An analytical method enables a better fire risk assessment to be made and allows better control to be exercised over the fire hazards.

This guideline has been compiled by Guidelines Commission and adopted by all fire protection associations in the Confederation of Fire Protection Associations Europe.

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## 1 Introduction

Undertaking a risk assessment is now an essential requirement of much of the legislation affecting health and safety management in many countries around the world.

This guideline provides an introduction to a qualitative method of assessing fire risk. It is necessary to apply the principles with care, however, and to carry out a more detailed analysis if the risk is perceived to be high. (See the References section for more advice).

## 2 Scope

This guideline looks at the principles of performing a fire risk assessment in a place of work. Performance of such an assessment will enable those responsible for safety in a workplace to ensure better fire risk management and to exercise better control over the fire hazards which are identified in the assessment. The result should be safer premises and better protected staff and visitors.

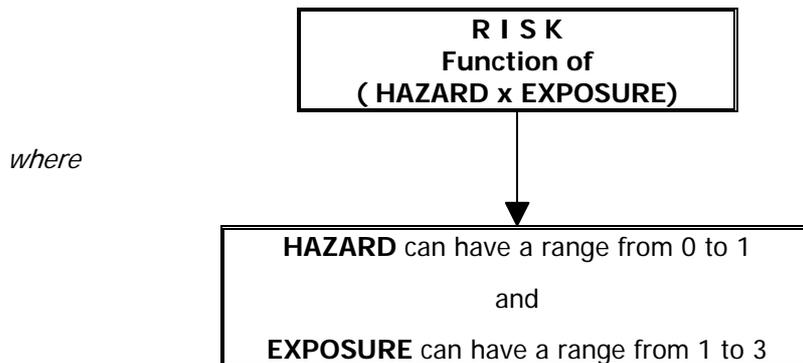
## 3 Key terms

Accident:	undesired event giving rise to death, ill health, injury, damage or other loss
Exposure:	the possibility that people and/or goods are exposed to a particular hazard
Fire Hazard:	a circumstance or feature that has the potential to cause a fire.
Hazard Identification:	the process of recognising that a hazard exists and defining its characteristics
Incident:	an event that gives rise to an accident or has the potential to lead to an accident
Risk Assessment:	the process of estimating the magnitude of risk and deciding whether or not the risk is tolerable
Risk:	product of occurrence probability of an incident with damages and the expected loss dimension.
Safety:	freedom from unacceptable risk of harm
Tolerable Risk:	risk that has been reduced to a level that can be endured by the organisation having regard to its legal obligations and its own health and safety policy

## 4 Summary

We introduce in this guideline a method of carrying out a fire risk assessment, which depends on the two factors, the identification of a Fire Hazard and an estimate of the degree of Exposure to it.

So that:



In other terms **HAZARD** can be present (1) or not (0)

And **EXPOSURE** levels may be considered as follows:

- Level 1:** properties and goods can be damaged; people are not exposed directly to the hazard;
- Level 2:** people can be harmed, but they can leave the workplace if necessary; properties and goods can be seriously damaged;
- Level 3:** possible deaths, people injured, goods and premises destroyed, as an incident develops.

In this way, this function determines 4 risk levels, as follows:

### 4.1 No Risk

No action is required and no documentary records need to be kept.

### 4.2 Low

Where there is hardly any risk from fire, few combustible materials, no flammable substances and virtually no sources of ignition.

### 4.3 Normal

Where there are sufficient quantities of combustible materials and sources of heat to be of greater than low fire risk but where a fire would be likely to remain confined or to spread only slowly

### 4.4 High

Where there is a combination of any of the following: a serious risk to life from fire; substantial quantities of combustible materials; a highly flammable substance; the likelihood of the rapid spread of fire, heat or smoke. High fire risk premises are considered to be those where, apart from the presence of flammable substances and the probability of rapid fire spread, there may also be overcrowding. In these cases the general condition of the premises and their layout may also make evacuation difficult in case of fire.

As a general rule, the existence of a hazard is a matter of fact, but its potential to cause harm depends on the level of exposure of people and of goods.

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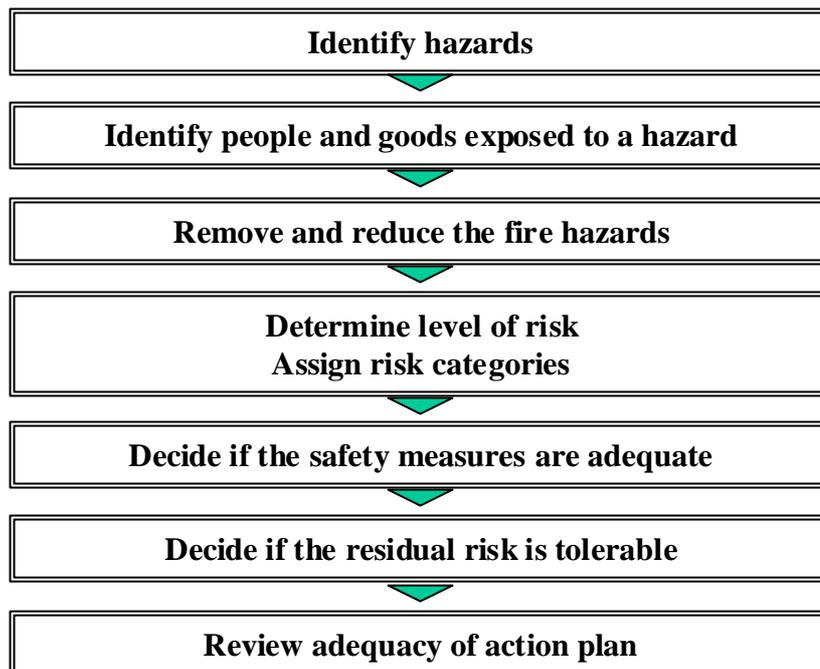
So the opening questions are:

- is there a hazard?
- what is its level of exposure?

<i>Hazard</i>		<i>Exposure</i>			<i>Risk</i>	
<i>0</i>	<i>1</i>	<i>1</i>	<i>2</i>	<i>3</i>		
<i>X</i>					<i>0</i>	<i>No Risk</i>
	<i>X</i>	<i>X</i>			<i>1</i>	<i>Low</i>
	<i>X</i>		<i>X</i>		<i>2</i>	<i>Normal</i>
	<i>X</i>			<i>X</i>	<i>3</i>	<i>High</i>

## 5 Fire Risk Assessment Procedure

The fire risk assessment calculation described in this guideline is intended to be used to determine the risk as shown in the table above. It is important to follow an inspection procedure in order to identify hazards and to decide how to treat them. The flow chart shows the stages in the procedure.



At the end of the procedure, whatever risk remains needs to be understood and managed.

### 5.1 Identify hazards:

#### Internal hazards

- Combustible and flammable gases, liquids and solids
- Ignition sources
- Shortage of facilities and missing or damaged fire safety equipment
- Lack of organisation of the activity
- Lack of ability to respond to an emergency
- etc.

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### External hazards

- Arson
- Natural disasters
- The proximity of neighbouring building
- etc.

### 5.2 Identify people and goods exposed to a hazard

The people exposed may be staff, contractors, visitors or members of the public. Consideration should be given to the numbers of people visiting or working in each area, to ensure that the means of escape are adequate.

Particular note should be made where:

- sleeping accommodation is provided
- large numbers of the public may be present
- people may be unfamiliar with the layout of the building and the location of the exit routes
- staff are working in areas where there is a specific risk, such as spray painting
- people may have lengthy or tortuous escape routes
- contractors are working up ladders or on scaffolding.

Consideration must also be given to the weak points of the structure and to its contents.

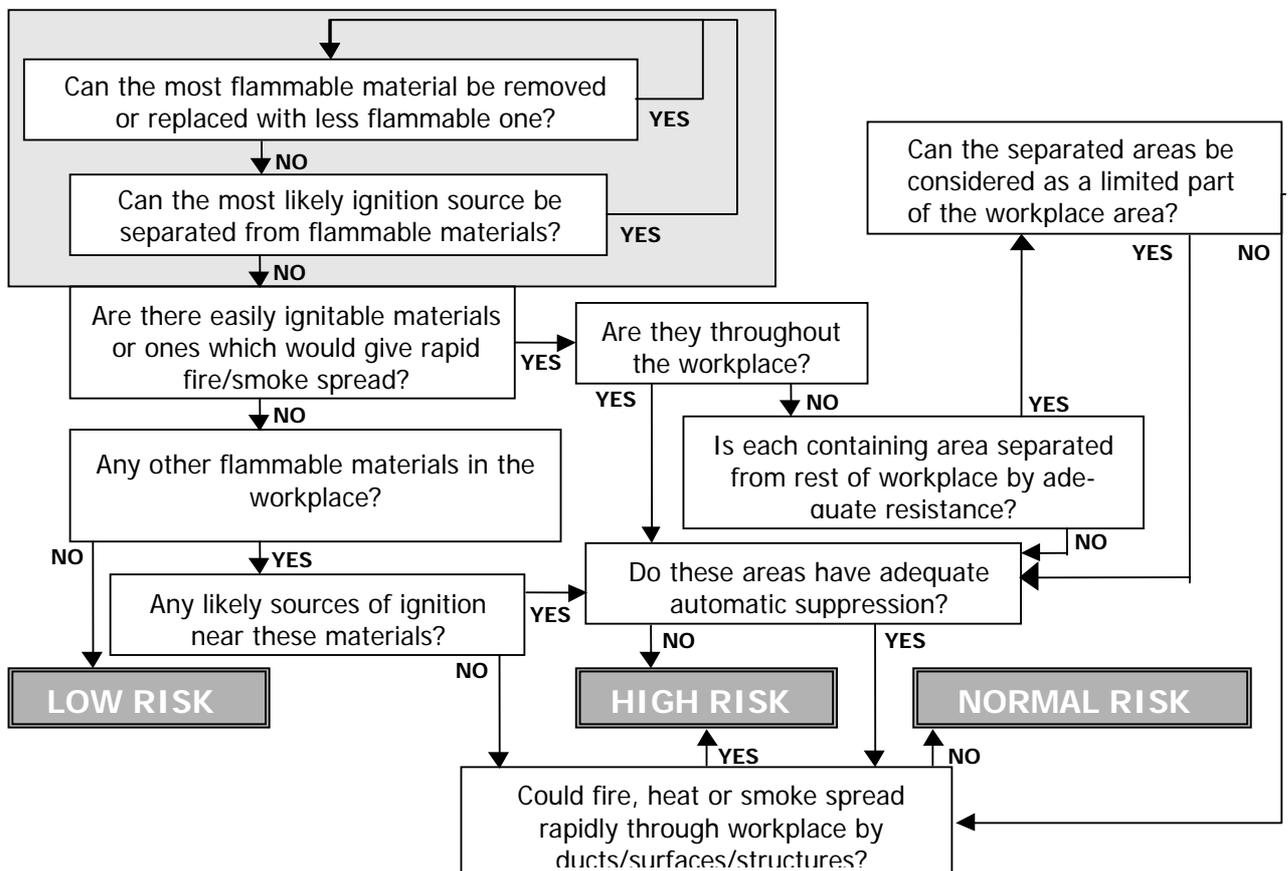
### 5.3 Remove and reduce the fire hazards

For each of the hazards that have been identified in step 5.1, consider whether it could be removed, reduced, replaced, separated, protected, repaired or cleaned and if people in workplaces can be better informed or trained.

Be careful! Don't insert a hazard of a different kind when trying to reduce the level of the existing hazard.

### 5.4 Determine level of risk /Assign risk categories

To determine the level of risk we could use different types of algorithms. The following example is one for risks relating to flammable materials:



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The first two steps in the grey frame, which constitute cyclical loops, correspond to step 5.3 of the procedure (remove and reduce the fire hazards).

### **5.5 Decide if the fire safety measures are adequate**

Decide if the fire safety measures are adequate or meet the adequacy requirements of Directive 106/89, whose objectives are to guarantee that:

- the load bearing capacity of the building endures for a specific period of time;
- the generation and spread of fire and smoke within the works are limited;
- the spread of the fire in the neighbouring construction works is limited;
- occupants can leave the works or be rescued by other means;
- the safety of the rescue team is taken into consideration.

### **5.6 Decide if the residual risk is tolerable**

Where the primary safety measures (i.e. life safety) are deemed to be effective and adequate and the residual risk is tolerable, consider cost/effective measures to cope with the residual risk and consult with the company's insurers about the goods and premise's exposure

Possible improvements would include such steps as:

- the reduction of evacuation times/escape route lengths;
- the provision of additional escape routes;
- the installation of more fire alarm call points;
- the provision of more fire signs;
- the installation of a sprinkler system;
- the institution of better programmes of fire safety training;
- the appointment of additional fire wardens;
- etc.

## **6 Review adequacy of the action plan**

Reassess risks at regular intervals checking the implementation of the plan and planning the corrective action required to demonstrate that the precautions are sufficient to keep the hazard under control and to meet legal requirements.

### **Reference Publications**

Others publications that provide information or guidance are listed in the Bibliography. Specifically, reference should be made to the following publications:

- BS 8800:1996, Guide to occupational health and safety management systems
- EC Directive 391/89
- EC Directive 106/89 and its Interpretative Document No.2

## 7 Bibliography

Adair Lewis, William Dailey, Fire Risk Management in the Workplace. A Guide for Employers, 2<sup>nd</sup> edition, Fire Protection Association, London, 2000.

F. Arruzzoli, P. Belardinelli, D. Poggiali, T. Zuccaro, Analisi del rischio incendio nei luoghi di lavoro. Guida applicativa alla valutazione del rischio in conformità al D.M. 10.03.98, Epc Libri, Roma 1999

## 8 European guideline

- Guideline No 1:2002 - Internal fire protection control
- Guideline No 2:2007 - Panic & emergency exit devices
- Guideline No 3:2003 - Certification of thermographers
- Guideline No 4:2003 - Introduction to qualitative fire risk assessment
- Guideline No 5:2003 - Guidance signs, emergency lighting and general lighting
- Guideline No 6:2004 - Fire safety in residential homes for the elderly
- Guideline No 7:2005 - Safety distance between waste containers and buildings
- Guideline No 8:2004 - Preventing arson – information to young people
- Guideline No 9:2005 - Fire safety in restaurants
- Guideline No 10:2007 - Smoke alarms in the home
- Guideline No 11:2005 - Number of fire protection trained staff
- Guideline No 12:2006 - Fire safety basics for hot work operatives
- Guideline No 13:2006 - Fire protection documentation
- Guideline No 14:2007 - Fire protection in information technology facilities
- Guideline No 15:2007 - Fire safety in guest harbours and marinas