

European guideline



Fire Safety in Restaurants

Foreword

This document is one of a series of guides intended to provide examples of acceptable solutions, concepts and models which may be used to address fire protection problems in the countries of the European Community. The guidelines have been produced by the Confederation of Fire Protection Associations Europe (CFPA E) with the aim of acknowledging best practice and facilitating and supporting a common approach to these issues.

This Guideline is concerned with fire safety in restaurants. In premises where catering is one of the principal activities, and that includes restaurants, almost twice as many fires occur in kitchens as in any other part of the premises. For that reason the measures described in the Guideline tend to dwell on fire safety in the kitchen, although its theme of risk assessment will involve restaurant management in a survey of fire hazards in all areas and a comprehensive approach to such hazards.

This Guideline has been compiled by the Guidelines Commission for adoption by all fire protection associations of the Fire Protection Associations in Europe. It should be used alongside and in conjunction with existing national legislation and technical standards concerning fire safety in restaurants.

Zurich, 1 June 2005
CFPA Europe

Dr. Hubert Rüegg
Chairman

Stockholm, 1 June 2005
Guidelines Commission

Tommy Arvidsson
Chairman

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1. Scope

Although this publication refers specifically to fire safety in restaurants, the hazards from cooking processes arise in a wide variety of other occupancies, including hotels, factory canteens and residential homes and thus many of the measures that are described here are also applicable in those buildings.

The principles outlined here are not, however, necessarily applicable in the case of fast food outlets, the open-fronted restaurants that are found in shopping malls, cooking in a domestic environment or mobile catering facilities.

2. Introduction

A restaurant where people go to eat will often be a premises with three principal areas:

1. The dining area;
2. The kitchen/servery/storage room/cold store;
3. The cloakrooms; all of which should be subject to a fire risk assessment.

The dining area

The risk assessment of the dining area (which may include a bar) will cover such topics as:

- combustible materials such as elements of the structure itself, the surface linings, decorations and furnishings, and their likely performance in the event of a fire;
- diners and their activities (including smoking);
- the use of candles on tables;
- open fires in the restaurant;
- the placement of tables and chairs, and routes to the exits;
- the need to keep the fire exits unobstructed and to permit ready passage through fire exit doors;
- signs (and emergency lighting) for fire routes and exits;
- the evacuation procedure;
- cooking processes carried out in the dining area;
- fire safety equipment.

The kitchen area

The kitchen (which may include its storage area(s) and cold room(s)) is the part of a restaurant which is the area of high hazard and it is dealt with at length in the Guideline. It is essential that if fire breaks out in a kitchen it cannot spread to other parts of the premises, and particularly not to the dining area or into escape routes, hence the need for effective compartmentation described in section 4.

Restaurants vary enormously in their size, layout and style. Their kitchens use increasingly complex equipment to produce food from different cultures. Despite the variety of cooking processes involved, the main fire hazard arising from food preparation is the use of heated fats and the risk of over-heating the fat due to operator error or failure of a thermostat in equipment. This can be a particular problem if the kitchen is unattended.

There are only small differences between the safe cooking temperatures of oils and fats (about 205°C), the temperature at which flammable vapours are given off (about 230°C) and that at which spontaneous ignition occurs (between 310°C and 360°C). The fire related properties of fats change during use; one indication of this is the darkening of the colour resulting from oxidation. Monitoring the discoloration can be carried out using proprietary charts, available from the manufacturers or suppliers of the product. (It should be noted that throughout this guidance the use of the word 'fat' may freely be interchanged with 'cooking oil')

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Other causes of fire include the spillage or over-filling of fats when changing or replenishing supplies whilst the appliance is hot; the proximity to deep-fat fryers of other cooking equipment which might be a source of ignition; and the direct exposure of grease-removal devices in the fume-extraction systems to flame impingement or hot flue gases from the heat sources of the equipment.

Deposits of grease building up in extract ducting and the fuel (gas, LPG or electricity) used for cooking can also be serious hazards. Portable equipment introduces further hazards as gas escaping from LPG cartridges and the careless operation of LPG flambé lamps or chefs' blowlamps can result in fires and serious injury.

In the kitchen, the fire load includes dry goods, packaging and, as mentioned earlier, fats and oils.

The cloakrooms

General good housekeeping measures apply to the cloakrooms. These areas often lack natural daylight, so emergency lighting is essential and it is important that the alarm can be heard in the cloakrooms.

3. Complying with legislation

Riskassessment

3.1 Before a restaurant opens for business for the first time a fire risk assessment of the premises should be made in compliance with national legislation implementing the Framework and Workplace Directives introduced by the European Council. In most cases such a risk assessment will have to be written down and may need to be available for inspection should the local fire brigade choose to visit the premises.

The fire risk assessment will need to consider:

- Identifying and minimising sources of ignition that are present
- Identifying and minimising the combustible materials present
- Estimating the number of staff and visitors who may be present in the premises
- Foreseeing how people present may react. This may be dependent on consumption of alcohol or any permanent or temporary disability they may have.
- Assessing the adequacy of the existing fire protection measures
- Implementing any remedial actions that may be necessary as a result of the assessment
- Planning how the residual risk is to be managed.

The fire risk assessment should be reviewed periodically, especially if refurbishment or construction work is being planned.

3.2 Other national legislation relating to health, safety and hygiene will also need to be addressed.

4. The construction of the restaurant

In addition to measures necessary to comply with legal requirements (see above), the following topics may require consideration.

Compartmentation

- 4.1 Wherever possible the cooking should be undertaken in a dedicated fire compartment separated from the customers by a construction that will provide at least 30 minutes fire resistance.
- 4.2 Storage should be in a separate area.
- 4.3 Any opening between the kitchen and a servery should be protected by a shutter with a fire resistance of the same standard as that of the kitchen enclosure. The shutter should be designed to lower automatically in the event of a fire and be closed outside working hours to prevent unauthorised access to the cooking equipment.
- 4.4 Where the fire compartmentation set out in paragraphs 4.1 and 4.3 cannot be integrated into the design of a restaurant, the kitchen and dining areas should both be contained in a compartment offering at least 30 minutes fire resistance and the risk to life be mitigated by the installation of an automatic fire detection and alarm system in accordance with national or European standards.
- 4.5 The kitchen should have non-combustible walls, floors and ceiling. Any combustible surfaces should be overlaid or lined with non-combustible material.
- 4.6 Gaps around pipes or cable trunking which enter or leave the cooking area should be sealed with suitable material so as to provide at least the same level of fire resistance as the element of construction in which it is located.

Evacuation

- 4.7 The design should be such that all persons present should be able to turn their back on a fire and leave the building safely, progressing through areas of decreasing fire risk. (For example, a fire exit route from a restaurant should not lead through a kitchen area.)
- 4.8 Every effort should be made not to have dining areas from which evacuation is only available in one direction.
- 4.9 In those cases where there is no direct access to the outside or an adjacent fire-resisting compartment, the routes from all areas to the place of safety should be as short as possible and be protected from the remainder of the premises by a construction providing at least 30 minutes fire resistance.
- 4.10 The doors listed below should offer at least 30 minutes fire resistance and be fitted with self closers, or with hold-open devices with smoke detectors (the devices will keep fire doors open during normal business but release the doors to close when a smoke detector is activated). (The hold-open option is not accepted by fire authorities in some countries, for example the UK.):
 - Doors between the kitchen and the restaurant
 - Doors between the kitchen and an escape route
 - Doors between the restaurant and a corridor leading to the final exit
 - Doors opening onto the protected corridor from other areas of the premises.
- 4.11 Escape routes from all areas should be of suitable width to allow the maximum number of persons likely to be present to reach a place of safety in about three minutes.
- 4.12 See also 6.10, concerning staff training in evacuation matters.

5. Fire detection and alarm installation

The fire alarm

- 5.1 There should be means for raising the alarm in case of fire. The sound of the alarm should be of adequate volume and distinct and louder than from any background noises in the building. In some instances consideration may need to be given to linking the fire alarm to mute a sound system to allow the alarm to be heard.
- 5.2 The fire alarm should be tested weekly to ensure that it is operating correctly and can be heard in all parts of the premises.

Automatic fire detection and alarm system

- 5.3 Serious consideration should be given to installing an automatic fire detection and alarm system in accordance with European and national standards and linking the system to an alarm receiving centre to allow the fire brigade to be called without delay in the event of a fire, especially out of business hours. Such an installation should be designed to protect the whole of the premises.
- 5.4 The automatic fire detection and alarm installation should be inspected and maintained according to national standards.
- 5.5 Records should be kept of the servicing and testing of the fire detection and alarm system.

6. Fire safety management

Action in the event of fire

- 6.1 Suitable plans should be formulated, and staff trained, to assist everyone to leave the premises in the event of a fire. This includes anyone with a disability. Fire action notices should be displayed prominently in the building. This is often done by posting the notices next to the fire alarm call points.

Signs and emergency lighting

- 6.2 All fire exit routes should be clearly marked in accordance with the requirements of national legislation implementing the EU Safety Signs Directive. Signs should also be displayed, as necessary, indicating fire doors that should be kept shut and any lift that should not be used in the event of fire.
- 6.3 Emergency lighting should be installed and maintained according to national standards to allow everyone present to find their way to the nearest fire exit, and to reach a place of safety. Luminaires should be installed to ensure that changes in direction and level and fire alarm call points are clearly visible.

Fire fighting equipment

- 6.4 There should be an adequate provision of suitable fire extinguishers and other appropriate fire fighting equipment. All fire fighting equipment, fixed or portable, should be provided in accordance with European and national standards.
- 6.5 All fire protection equipment should be serviced and maintained in accordance with the relevant national standards by competent engineers.
- 6.6 Suitable records should be kept of the servicing and maintenance of all fire protection equipment.

Decorations

- 6.7 All lanterns and table decorations with naked flames should be of a design that automatically extinguish if knocked over.
- 6.8 All materials used to decorate the premises, including artificial flowers and decorations used at the time of Christmas and other festivals, should be inherently flame retardant or treated so as not to produce a sustained flame or melt and drip when a small pilot flame is applied to the material.

Staff training

- 6.9 All new staff should receive induction training on their first day at work and subsequently receive additional fire safety awareness training and instruction in any specific duties they may have in the event of a fire. The staff training should take into account any language difficulties among the staff and should be carried out to ensure that all staff, including temporary staff, attend training sessions periodically.
- 6.10 One of the elements of staff training should be a fire drill but there are practical difficulties in undertaking fire drills in restaurants. Staff may, however, be required to participate in periodic 'walk through exercises' before the restaurant opens for business.
- 6.11 Appropriate records should be kept of all staff training.

7. Housekeeping

Cleaning kitchen equipment

Section 9 deals with the technicalities of equipment in the kitchen. However the equipment is used, it is vital for fire prevention that kitchens and their equipment are kept free from grease and oil residues.

- 7.1 Cleaning of the surfaces of all cooking equipment hoods and canopies, ductwork, fans, burners and fixed fire extinguishing equipment should be carried out at frequent intervals to prevent contamination by grease or oil. Grease tends to accumulate at specific points and particular attention should be given to cleaning concealed areas formed by corners and lips.
- 7.2 Frequent cleaning of filters or other grease removal devices is particularly important. Cleaning intervals depend on the type of equipment and the extent of its use and should be in accordance with the current best practice.

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- 7.3 Cleaning of filters does not remove the need for the periodic inspections of the inside of ductwork and the extraction motor to check for build-up of grease deposits. Cleaning should take place at intervals not exceeding 12 months, preferably by specialist contractors. This may require the cutting of openings in the ductwork if none have been provided (see section 10.7). Such cutting of openings should only be carried out by a suitable method controlled by a hot work permit after an appropriate risk assessment.
- 7.4 Flammable solvents and cleaning aids should not be used.

Storage of materials

- 7.5 Spare butane cartridges for flambé lamps and chefs' blowlamps should be stored securely outside the kitchen.
- 7.6 All cleaning chemicals should be stored away from the cooking area.
- 7.7 Clean linen should be stored in a cool dry place to reduce the likelihood of self heating of any fatty residues.

Waste materials

- 7.8 All refuse which accumulates should be collected at regular intervals and stored outside the premises. Combustible waste materials should be stored in non-combustible waste containers.
- 7.9 The contents of ashtrays must not be collected and stored with other waste materials. Ashtrays should be emptied into special, self-closing metal bins which are to be stored outside the premises.

8. Fire protection measures

In the event of fire

- 8.1 There should be adequate provision of suitable fire fighting equipment. See also 6.4, 6.5 and 6.6.
- 8.2 If an automatic fire detection and alarm system is fitted in the restaurant (see section 5), all staff should be given basic instruction about its purpose and effect.
- 8.3 Kitchen staff should be thoroughly instructed as to the hazards associated with fighting cooking oil and fat fires.
- 8.4 A notice showing the action to be taken in the event of fire should be prominently displayed in the cooking area. In particular, the notice should require the prompt shutdown of the heat supply and extraction system.

Fighting fires

- 8.5 Staff should be made familiar with the operation and correct method of use of portable fire extinguishing appliances and any fixed fire extinguishing system.

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- 8.6 Where deep fat fryers are in use, a wet chemical (Type F) fire extinguisher should be provided. Other extinguishers should be provided as appropriate for use where electrical equipment is in operation.
- 8.7 At least one fire blanket should be available.
- 8.8 All fire fighting equipment should be easily and safely accessible.
- 8.9 Staff training should address the correct method for fighting a fire involving burning gas. Such a fire should not be extinguished before the gas supply has been turned off; this is to prevent the production of an explosive mixture of gas in the air.

Fixed extinguishing system

- 8.10 It is recommended that a suitable fixed extinguishing system, installed by a third party approved company, be provided, with both manual and automatic operation, to protect cooking equipment, overhead canopies and ducting system. The operation of the fixed fire fighting installation should automatically shut down the fuel supply and extraction system.
- 8.11 The advantages of having an automatic fire extinguishing system installed to protect the whole restaurant area should be considered.

9. Equipment in the kitchen

Good spacing

- 9.1 An adequate area should be provided in the kitchen to allow for the safe movement of staff and their escape in an emergency. This area should be kept clear of obstructions.
- 9.2 Adequate means of access and clearance should be maintained around cooking equipment for cleaning and maintenance purposes.

Equipment: Placement and operation

- 9.3 Any appliance where oil or fat is used for cooking should not be located immediately beneath water pipes. Sprinklers should not be installed where the discharge may come into contact with cooking oil.
- 9.4 The installation of cooking equipment should be fully in accordance with the manufacturer's instructions.
- 9.5 The connection of the equipment to the power or gas supply should be carried out either by the manufacturer or by an accredited contractor.
- 9.6 All electrical equipment should be installed in accordance with the national standard and be subject to periodic inspection, which should be recorded.
- 9.7 Where cookers are supplied by liquefied petroleum gas, the installation should comply with relevant national standards or best practice.

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- 9.8 Fuel pipes and electrical wiring and equipment should be sited so that they are not susceptible to the effects of heat, water vapour, grease or mechanical damage. Where appropriate, they should also be protected from the weather.
- 9.9 Means should be provided for the emergency shutdown of power, fuel supply and the extraction system to all cooking equipment. The emergency shutdown device should be clearly labelled and be readily accessible, adjacent to the main escape route.
- 9.10 Deep fat fryers should be equipped with a separate high temperature limit control, of a non-self-resetting type, to shut off the heat source should the temperature of the fat exceed 230°C. This high temperature limit device should not operate the same gas valve as any automatic temperature control.

10. Extraction systems

Extract ventilation and ducting

- 10.1 Mechanical extract ventilation should be provided for all cooking equipment producing heat, fumes and products of combustion. It is important that the heat and fume extraction ducting leading from deep fat fryers is separate from the ducting that extracts combustion products from the burners.
- 10.2 Extraction should be via an overhead canopy and ducting system that discharges to the open in such a manner that grease will not be deposited on the building or adjoining properties.
- 10.3 Hoods, canopies and ducts should be constructed of, and supported by, galvanised or stainless steel of a substantial gauge, having all seams and joints liquid-tight, with smooth surfaces to facilitate cleaning.
- 10.4 Lighting arrangements under canopies should be selected for their suitability in the presence of heat and grease.
- 10.5 Extract ducting should be as short as practicable and the design should comply with any local byelaws. The ducts should preferably pass directly to the open and should not pass through, or be contained within, floor or ceiling voids, or roof spaces where exposed combustible materials are present.
- 10.6 Bends or dips in the design of the ductwork where residues might collect should be avoided and the whole of the ducting should be accessible for cleaning. At each change in direction of the duct an opening with a grease-tight cover should be provided for inspection and cleaning.
- 10.7 In those cases where it is not possible to install the ducting as indicated in paragraphs 10.5 and 10.6, it should be enclosed in a service shaft of non-combustible construction having a fire resistance of at least 30 minutes and with access points to facilitate cleaning of the extract ductwork throughout its length.
- 10.8 Where a duct passes through any combustible material, it should be cut away for a distance of at least 150mm from the duct and the space filled with non-combustible insulation. Ducts, hoods and canopies should have a clearance of at least 150mm from combustible material, including combustible partitions and floors and, where necessary, should be protected with a non-combustible insulating material.

Grease filters and cleaning (see also section 7)

- 10.9 Filters, traps or other grease removal devices should be provided; a residue trap should be installed at the base of any vertical riser. These devices should not be sited where they are liable to be exposed to direct flame impingement or hot flue gases. The distance of the grease removal devices from the heat source should be at least 500mm unless there is suitable protection, for example by a steel baffle plate.
- 10.10 All grease-removal devices, including their frames, should be constructed of non-combustible material and installed in the extract ducting or canopy in a readily accessible position to facilitate cleaning and be as close as possible to the appliance.
- 10.11 Records should be kept of the cleaning of the extract systems.

11. Cooking appliances: safety and operating instructions

- 11.1 Cooking appliances should be operated and serviced in accordance with the manufacturer's instructions.
- 11.2 Operators should be thoroughly instructed in the correct use of the equipment and the danger of ignition from the overheating of fats.
- 11.3 Cooking ranges should be equipped with devices to ensure that the gas or electricity cannot be supplied when the extraction system is not in operation.
- 11.4 Filter equipped extraction systems should not be operated with the filters removed.
- 11.5 Cooking equipment should not be left unattended while the heat source is operating.
- 11.6 The power or fuel supply should be shut off outside working hours, both at the switches at individual appliances and (in the case of electricity) at the kitchen's main control switch.
- 11.7 Where LPG equipment is installed the gas should be turned off at the cylinder(s), which should be located securely outside the building.
- 11.8 In the case of deep fat fryers caution should be exercised when changing or replenishing the pan(s) with fat to avoid spillage or overfilling, especially whilst the apparatus is hot.
- 11.9 The cooking oil level in the pan(s) should be maintained within the manufacturer's recommended minimum and maximum levels for safe operation. The minimum level should be such that under no circumstances is the temperature sensing device or the electrical heating element exposed during operation.
- 11.10 The fuel supply to cooking equipment and extraction system should be linked so as to be cut off automatically in the event of the operation of an automatic fire extinguishing system in the kitchen.
- 11.11 In addition to the measures outlined in paragraph 9.10, a manual shut off for the fuel supply and extract system should be provided on the escape route from the kitchen. This should be operated when the kitchen is evacuated in response to an alert from the fire detection and alarm system.
- 11.12 Relevant staff should receive training in the precautions to be taken when reconnecting the fuel supplies.

12. General advice

Gas safety

If gas is smelled on the premises:

- Shut down frying and other gas fuelled appliances promptly and safely
- Turn the gas supply off at the main stopcock
- Put out all naked flames
- Open doors and windows to ventilate the building
- In the case of a leak of mains gas call the gas supply company for assistance immediately on their 24 hour emergency line
- Keep people away from the area(s) concerned
- Do not search for gas leaks with naked flames
- Do not smoke where there is a smell of gas
- Do not operate electrical switches

In the case of a gas cylinder that continues to leak after the valve has been shut the supplier should be contacted for advice.

Electrical safety

If damage is visible to electrical; equipment in the kitchen, or the plug or flex associated with the item, it should be switched off and unplugged (in the case of portable equipment). The damage should be reported to someone in authority and the appliance not be used again until suitable remedial action has been taken.

13. Summary

If adopted and implemented in a restaurant, the measures in this Guideline will improve the standard of fire safety in the premises. The result, in general terms, will be a restaurant in which:

- the fire hazards have been recorded and taken into account in a full risk assessment;
- the appropriate actions have been taken to remove/reduce/manage the fire hazards;
- an automatic fire detection and alarm system is in operation;
- cooking areas are segregated from dining areas by fire-resisting walls/doors/shutters;
- appropriate fire fighting equipment (portable extinguishers, fire blankets and, if necessary, a fixed extinguishing system) is provided;
- staff are trained what to do if fire breaks out;
- in the event of fire, there is a well signed fire exit route (or routes) for use by diners and staff; and
- no fire exit route leads through a kitchen area.

14. References

CEA 4007, Fire protection systems- specifications for CO₂ systems – planning and installation, Comité européen des assurances, 2003.

15. European guideline

Guideline No 1:2002 - Internal Fire Protection Control

Guideline No 2:2002 - 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 7:2004 - Safety distance between waste containers and buildings

Guideline No 8:2004 - Preventing arson – information to young people