RISCAuthority

administered by FPA Fire Protection Association

RC68: Recommendations for fire safety in catering establishments

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Contents

Summary of Key Points

This document has been developed through the RISCAuthority and published by the Fire Protection Association (FPA). RISCAuthority membership comprises a group of UK insurers that actively support a number of expert working groups developing and promulgating best practice for the protection of people, property, business and the environment from loss due to fire and other risks. The table below summarises the key points of the document.

Fire risk assessment	As part of the fire risk assessments undertaken to comply with fire safety legislation, a specific assessment of the extract ventilation should be undertaken (5.1.3).
Fire safety management	Stocks of packaging, including take away food containers and wrapping, should be stored outside of the cooking area to prevent the possibility of rapid fire spread in the event of a fire (5.3.13).
Fire compartmentation	Staff should be made aware that care must be taken not to position trays of cutlery or other items beneath a fire shutter, and thus compromise its effectiveness in the event of a fire (5.4.5).
Emergency shut offs	Emergency manual controls for fire suppression systems, and isolators for gas and electrical supplies, should be located on escape routes from the kitchen (5.5.3).
Safe operation of equipment	The controls of electrically heated ranges should be interlocked so that it is only possible to switch the heating elements on when the extraction system is operating to remove flammable vapours (5.5.19).
Appropriate suppression system installed	A suppression system suitable for the risk should be installed to protect deep fat fryers, cooking ranges extract canopy and ductwork (5.8.4).
Maintenance	Care should be taken during cleaning and maintenance operations that any wheeled equipment that is moved is returned to its correct position beneath the outlets of fixed fire suppression systems (5.3.14).
Fire protection	Frequent cleaning of filters or other grease removal devices is extremely important (5.7.5).
Competency of contractors	Confirmation by certification should be sought that the kitchen extract ductwork has been cleaned by a competent specialist contractor approved by either LPCB to their certification scheme LPS2084 *Requirements for the LPCB approval and listing of companies carrying out inspection, cleaning and maintenance of ductwork systems* or BESCA through their Vent Hygiene Elite scheme (5.7.10).

Symbols used in this guide


Good practice


Bad practice


Discussion topic

Frequently asked question

1 Introduction

Caterers use an increasingly wide range of equipment to produce food from different cultures. Despite the variety of cooking processes involved, the main fire hazard arising from food preparation remains the risk of overheating fats and oils due to operator error or the failure of a thermostat in the equipment. This can be a particular problem if the kitchen is left unattended, even for a short period.

There are only small differences between the maximum safe cooking temperature of cooking fat or oil (which may vary from about 190°C to 205°C), the temperature at which flammable vapours are given off (about 230°C), and that at which spontaneous ignition occurs (as low as 300°C). The fire related properties of oils and 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. In practice, if the fat is heated to too hot a temperature or is not changed sufficiently often, there will be an effect on the properties of the cooking medium as well as an impairment of the quality and flavour of the cooking.

One specific application of deep fat frying is in the production of fish and chips, which has long been recognised as one of the UK's favourite meals; the method of cooking of which, by immersion of the food in hot fat or oil, has remained unchanged for many years – as have the associated fire hazards.

In this case, frying normally takes place in small premises with fish and chip frying ranges which present a high fire hazard to both life and property as a result of the large volumes of hot fat that are used in the process.

Other common causes of fire in kitchens include:

- the spillage of oil
- the over-filling of fryers when changing or replenishing oil
- adding oil to bratt pans and other cooking equipment when very hot
- spontaneous combustion of fats that have built up in the extract filter or ductwork
- an electrical short circuit (such as in a fan) in the extraction ductwork causing the ignition of built up grease residues
- a spark, flame or hot gases from the cooking range igniting fat or grease in the extract filter or ductwork
- overheating of oil on the range or in the deep fat fryer

If deposits of grease are allowed to accumulate in fume extract ducting, the introduction of an ignition source may cause the deposits to ignite, and the resulting flames may spread rapidly throughout the complete ducting system. The fire may then rapidly spread to other parts of the building, and the resulting damage to the ductwork and the structure of the premises could be serious enough to necessitate lengthy and costly remedial work – resulting in considerable interruption to business operations.

Cooking oil and fat fires develop rapidly, and produce considerable quantities of heat and smoke. In confined cooking areas this makes firefighting using hand appliances difficult and dangerous, even if the operators have suitable types of extinguishers and have received appropriate training and instruction in their use.

Although new technology has been introduced over the years, regular cleaning and maintenance is still required in all cases. For example, even new systems using UV light to break down grease still need regular maintenance – although in this case it is to remove residues of fine ash, rather than grease, from the ductwork. Advances have also been made in developing biological cleaning systems, but these are not yet fully developed.

These recommendations should be read in conjunction with RC44 *Recommendations for fire risk assessment of catering extract ventilation* (ref. 2), which are not reproduced in this publication.

These recommendations replace existing guidance provided in RC16A *Recommendations for fish and chip frying ranges* (2013) and RC16B *Recommendations for fire safety in commercial kitchens* (2013).

2 Scope

These recommendations apply to the installation, management, operation and maintenance of cooking appliances and related equipment in commercial catering kitchens. These include various forms of ovens, grilles, griddles, broilers, rotisseries and bratt pans which – together with deep fat fryers – present serious fire hazards. The advice includes a section specifically concerning frying ranges used in fish and chip shops that are open to the public.

Hazards from cooking and associated processes, such as the packaging of food and washing up operations in commercial kitchens, arise in a wide variety of occupancies, including hotels, restaurants, canteens, fast food outlets, hospitals and some residential homes. The guidance does not apply to areas of premises where cooking only involves the preparation of light snacks and beverages, unless a deep fat fryer is present.

The recommendations are applicable to equipment fuelled by mains gas, LPG and electricity and are not concerned with solid fuel or oil fired appliances. They are also not intended to apply to cooking equipment such as deep fat frying 'cells' in food processing factories.

In addition, cooking equipment installed or used in vehicles or in the open air is outside the scope of this guidance.

Throughout this guidance the use of the words fat and oil to indicate the frying medium are interchangeable.

3 Synopsis

These recommendations provide guidance concerning fire safety in commercial kitchens and in fish and chip shops. They emphasise the need to have a rigorous fire safety management regime – including suitable training for staff concerning the safe use of the increasingly wide range of cooking appliances that are in use in commercial kitchens – to minimise the threat to life. In addition, a key element relates to the installation and cleaning of extraction systems, as experience has shown that a fire in an extraction duct can cause extensive damage to property, with associated implications for business continuity.

4 Definitions

Bratt pan

A large rectangular tilting pan, heated by gas or electricity which may be used for shallow or deep frying, boiling, braising or stewing.

Duct

A circular or rectangular metal enclosure which connects the extract canopy, hood or grille with the outside of the building.

Extract plenum

The space in the canopy between the grease filters and the duct.

Fat

A mixture of combustible organic compounds, containing about 50% saturated fat, that is solid or soft at room temperatures, and often from animal origins.

Griddle

A broad, flat cooking surface heated by gas, electricity or other form of fuel.

Hood

A metal box containing filters, intended to collect contaminated air from above a cooking appliance.

IP55

Ingress protection as defined in BS EN 60529: *Specification for degrees of protection provided by enclosures (IP code)* (ref. 1) to a level that provides limited ingress against dust (the first digit) and protection against low pressure jets of water (the second digit).

Josper oven

A freestanding or countertop form of charcoal oven.

Kitchen fire suppression system

A local fire suppression system designed to automatically apply a suitable firefighting medium to kitchen equipment. The systems are also provided with manual release pull points.

Oil

A combustible organic substance, generally of vegetable origins, that contains about 10% saturated fat and is liquid at room temperature.

Rotisserie

A form of roasting where meat is skewered on a spit while being cooked over a fire (this method is often used for cooking large pieces of meat such as chickens or whole pigs).

Salamander grill

A high temperature overhead grille which is used for toasting, browning or holding dishes at a set temperature.

Type F

A class of fire extinguisher containing a wet chemical agent that is designed to fight fires in cooking appliances involving cooking fats and oils.

Unattended

Equipment without a competent person remaining continuously in full view, or in a position where they can take immediate action to control or extinguish a fire.

5 Recommendations

5.1 Compliance with fire safety legislation

5.1.1 A suitable and sufficient fire risk assessment should be undertaken by a competent person for all premises to which the Regulatory Reform (Fire Safety) Order 2005 (ref. 3), or equivalent legislation in Scotland and Northern Ireland (refs. 4-7), applies. The assessment should include the cooking process and areas occupied by members of the public and staff.

5.1.2 The risk assessment should consider the good practice set out in RC48 *Arson Prevention* (ref. 32) together with the potential for an arson attack from sources within or outside the business. Where necessary, suitable preventive or protective actions should be identified and implemented to protect both the main premises together with any outbuildings, such as timber sheds used to store stocks of unused and waste oil.

5.1.3 Where fire risk assessments or other forms of expert fire safety advice or guidance are sought, a competent, experienced person with a form of professional recognition should be engaged to carry out the task. Wherever possible, all fire safety products purchased should be manufactured to an appropriate standard and carry relevant markings. Systems (such as automatic fire detection and alarm systems) should be installed to recognised standards by installers approved by an accredited third party certification or approvals body.

5.1.4 As part of the fire risk assessments undertaken to comply with fire safety legislation the good practice set out in BESA Guide *TR19 Grease* (ref. 8) should be considered and a specific assessment of the extract ventilation should be undertaken based on the guidance provided in RC44 (ref. 2).

5.1.5 Where LPG cylinders or hazardous substances are stored, an assessment will also need to be undertaken in accordance with the Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR) (ref. 9). Further advice on safe use and storage can be found in RC8 *The storage, use and handling of common industrial gases in cylinders including LPG* (ref. 10).

5.1.6 The response by fire and rescue services to 999/112 calls and signals routed via fire alarm monitoring organisations varies widely throughout the UK, and differs from day to night time. Fire safety managers should refer to the relevant fire and rescue service websites to make themselves aware of the levels of response in the areas in which their premises are located, and consider this information when undertaking and reviewing fire risk assessments.

5.2 Business continuity

Even a small fire can have a disproportionate effect on a business if it occurs in a critical area. Catering kitchens are hazardous areas with deep fat frying presenting a particular challenge to fire safety management in ensuring the efficient functioning of the business.

5.2.1 All businesses should take steps to ensure the continued smooth running of their business by making a suitable emergency plan. Guidance for this is set out in *Business resilience: A guide to protecting your business and its people* (ref. 11). The emergency plan should address the implications of a fire, flood or other perceived disaster on all facets of the business model. It should indicate the lines of communication that should be followed and the contact details for specialist assistance, providers of alternative accommodation and suppliers of equipment, including deep fat frying ranges.

5.2.2 Consideration may be given to applying commercially available computer programmes, such as the ROBUST software (Resilient Business Software Toolkit) that is available free of charge (ref. 12) – or other appropriate product – to develop and check the adequacy of the plan. Consideration should also be given to utilising the free online RISCAuthority Supply Chain Risk Management Toolkit (ref. 13). Reference should be made to the RISCAuthority document *A simple guide to supply chain management for small and medium-sized businesses* (ref. 14), which is available from the RISCAuthority website.

5.3 Fire safety management

5.3.1 Cooking appliances should be installed, operated and serviced in accordance with the manufacturer's instructions.

5.3.2 Operators should be thoroughly instructed as to the hazards associated with the correct use of the deep fat fryers, grilles, hobs, ovens, bratt pans and similar equipment, and the emergency procedures relating to these.

5.3.3 Operators should be made familiar with the correct method of use of portable fire extinguishing appliances and any fixed fire suppression system. They should also be instructed in the actions to take in the event of an escape of burning gas, including the location and correct use of any emergency isolators to initiate shutdown of the gas supply. Ensure that records of staff training are kept.

5.3.4 Cooking equipment should not be left unattended whilst the heat source is operating.

5.3.5 The installation, servicing and user instructions should be kept safely for future reference, together with service records. Service records may be kept digitally but should be archived and made available for at least five years.

5.3.6 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 indicate the location of the manual control for operating the fire suppression system and the emergency isolators. The notice should also require the prompt shutdown of the heat supply and – unless otherwise advised due to the presence of a fire suppression system – the extraction system as well.

5.3.7 To prevent a fire occurring as a result of spontaneous heating, any wipes that have been used to mop up spillages of cooking oil should be stored in a metal container with a metal lid, and removed to a similar storage bin located externally at least 10m from the building (or as far as reasonably practicable) at the end of each period of work, to await disposal.

5.3.8 Charcoal from grills or wood fired pizza ovens should be removed from the cooking appliance at the end of the work period. The material removed should be wetted down and placed in an external metal container with a metal lid, provided specifically for this purpose, which is also located at least 10m from the building (or as far as reasonably practicable) to await safe disposal.

5.3.9 Waste oil that is being recycled should be stored externally in a closed metal (or heat resistant plastic) container. Wherever practicable, this should again be located a minimum of 10m from the building.

5.3.10 Where possible, drums and large containers of cooking oil not kept in bunded stores should be stored on pallets that incorporate sumps to retain any leakage. The sumps should be inspected periodically and emptied and cleaned following any leak. Further information is provided in RC56 *Recommendations for fire safety in the storage, handling and use of highly flammable and flammable liquids: storage in containers other than external fixed tanks* (ref. 15).

- Cooking equipment should not be left unattended whilst the heat source is operating (5.3.3).

5.3.11 Spare butane cartridges for flambé lamps and chefs' blowlamps should be stored securely, such as in a locked metal cabinet, and kept outside of the kitchen.

5.3.12 To avoid the build up of a large fire load, bulk supplies of foodstuffs should be stored in designated locations outside of the kitchen, and well clear of the cooking ranges.

5.3.13 Similarly, stocks of packaging – including take away food containers and wrapping – should be stored outside of the cooking area to prevent the possibility of rapid fire spread in the event of a fire.

5.3.14 Care should be taken during cleaning operations that any wheeled equipment that is moved is returned to its correct position beneath the discharge nozzles of fixed fire suppression systems.

5.4 Compartmentation

5.4.1 Cooking should be undertaken using appliances located in compartments separated from other parts of the premises, by elements of structure providing at least 60 minutes fire resistance where practicable. Kitchens should have non combustible walls, floors and ceilings. Doorsets leading to other parts of the premises should also provide at least 60 minutes fire resistance; doors should be fitted with self closing mechanisms. Shafts such as dumb waiters should also be protected so as to provide 60 minutes fire resistance where practicable, with regard to the enclosure and openings, so as to maintain effective fire compartmentation.

5.4.2 Any gaps around services entering or leaving the kitchen should be filled with proprietary penetration seal/service opening passive fire protection systems, so as to provide at least the same level of fire resistance as the element of construction in which it is located.

5.4.3 Where necessary, any combustible surfaces should be replaced, overlaid or lined with non combustible material before installation of the cooking equipment. This material should at least be of Euro Class A2-s1, d0 as set out in BS EN 13501-1: *Fire classification of construction products and building elements. Classification using test data from reaction to fire tests* (ref. 16)

- Drums and large containers of cooking oil should be kept in bunded stores or stored on pallets that incorporate sumps to retain any leakage (5.3.10).

5.4.4 Any opening between a kitchen and dining area forming 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 maintain compartmentation and prevent unauthorised access to cooking equipment.

5.4.5 Staff should be made aware that care must be taken not to position trays of cutlery or other items beneath the shutter, and thus compromise its effectiveness in the event of a fire.

5.4.6 Where it is not possible to install a fire rated shutter, consideration should be given to designing the area such that the kitchen and dining area form a single fire compartment with a fire resistance of 60 minutes where practicable.

5.5 Installation and use of cooking equipment

5.5.1 When a new kitchen is planned, an adequate area should be provided in the immediate vicinity of cooking equipment to allow for the safe evacuation of staff in the event of fire. This area should be kept clear of obstructions.

5.5.2 Suitable means of access and clearance should be maintained around cooking equipment, including frying ranges for cleaning and maintenance purposes.

5.5.3 Emergency manual controls for fire suppression systems and isolators for gas and electrical supplies should be located on escape routes from the kitchen, and away from equipment, so that they are safely and easily accessible.

5.5.4 A deep fat fryer should not be sited immediately beneath water pipes because of the danger from leaking water. Even a small volume of water coming into contact with hot oil can result in an intense flare and rapidly spreading fire. Similarly, sprinklers should not be installed where discharge may come into contact with hot cooking oil. Specialist advice should be sought with regard to fitting suitable baffles where this may be anticipated to be a problem.

5.5.5 Where deep fat fryers are located immediately adjacent to open flame cooking equipment, a clear space of at least 300mm should be maintained to reduce the risk of ignition of splashing oil or fat. Where this distance cannot be maintained, a stainless steel baffle plate at least 250mm high should be installed.

5.5.6 Portable and fixed electrical appliances should be selected on the basis of their being suitable for use or installation in a commercial, rather than a domestic, kitchen.

5.5.7 Where appropriate, equipment intended to be used or installed in washing areas should provide a degree of ingress protection to at least an IP55 standard, as defined in BS EN 60529 (ref. 1).

5.5.8 The installation of cooking equipment should be fully in accordance with the manufacturer's instructions. With an increasing range of innovative professional cooking equipment (such as josper and pizza ovens) becoming available, care should be taken in their installation and maintenance with staff (including temporary staff) being trained in their use.

5.5.9 The installation of electrical wiring in the premises should be in accordance with the requirements of the current edition of BS 7671: *Requirements for electrical installations (the IET Wiring Regulations)* (ref. 17).

5.5.10 The connection of equipment to electric or gas supplies should be carried out either by the manufacturer or by a nominated person who is competent, who – in the case of electrical equipment – is on the roll of the National Inspection Council for Electrical Installation Contracting (NICEIC) or the National Association of Professional Inspectors and Testers (NAPIT); or is a member of the Electrical Contractors' Association (ECA) (in Scotland the Scottish Electrical Contractors' Association [SECA]). In the case of gas equipment, installation should be undertaken by a registered Gas Safe engineer.

5.5.11 Portable electrical equipment should be inspected and tested at least in accordance with HS(G) 107 (ref. 18) and/or the *IET Code of Practice for In-Service Testing of Electrical Equipment* (ref. 19). A risk assessment should determine the actual programme of inspection and testing.

- Allowing insufficient means of access and clearance around cooking equipment, including frying ranges, for the safe evacuation of staff and for cleaning and maintenance purposes (5.5.1 and 5.5.2).

- A deep fat fryer should not be sited immediately beneath water pipes because of the danger from leaking water (5.5.4).

- Deep-fat fryers should not be located immediately adjacent to open flame cooking equipment without a clear space of at least 300mm being maintained to reduce the risk of ignition of splashing oil or fat, or the provision of a stainless steel baffle plate that is at least 250mm high (5.5.5).

- Gas pipes and electrical equipment should not be sited so that they are susceptible to the effects of heat, water vapour, grease or mechanical damage (5.5.13).

5.5.12 Where cooking or heating is by liquefied petroleum gas (LPG), the recommendations relating to the use of cylinders of liquefied petroleum gas (ref. 20) should be complied with, and cylinders should be stored outside the premises and in accordance with RC8 *Recommendations for the storage, use and handling of common industrial gases in cylinders including LPG* (ref. 10).

5.5.13 Gas pipes and electrical equipment should be sited so that they are not susceptible to the effects of heat, water vapour, grease or mechanical damage.

5.5.14 As the normal temperature for cooking with deep fat fryers is in the range of 170°C to 190°C, they should be fitted with high temperature safety thermostats set to prevent the temperature of the fat rising above 205°C, or the manufacturer's maximum recommended temperature if this is less than 205°C. The possibility in some designs of the temperature overshooting the set point should not be ignored.

5.5.15 Fryers should additionally be equipped with a separate high temperature limit control, of a non self resetting type, to shut off the energy source should the temperature of the fat exceed 230°C. This high temperature safety limit device should not operate the same gas supply valve as any automatic temperature control.

5.5.16 While it is possible to retrofit thermostats to existing frying ranges, the manufacturers of the equipment should be consulted if this is contemplated. This is because retrofitting requires considerable expertise if the thermostats are to operate effectively.

5.5.17 Gas appliances should be equipped with flame failure devices to cut off the fuel supply in the event of flame failure.

5.5.18 Devices should be fitted that prevent gas being supplied to burners when the extract system is not in operation.

5.5.19 Similarly, the controls of electrically heated ranges should be interlocked so that it is only possible to switch the heating elements on when the extraction system is operating to remove flammable vapours.

5.5.20 Deep fat fryers should be equipped with lids or shutters, above the cooking pans, that are capable of immediate and safe closure in the event of fire.

5.5.21 Means should be provided for the remote emergency shutdown of the power, fuel supply and extraction system for all cooking equipment. This emergency shutdown device should be clearly labelled, easily accessible and be strategically located away from equipment on an escape route. The emergency shutdown device may be linked to the automatic fire detection and alarm installation, so as to shut off the source of heat automatically in the event of the fire alarm actuating.

5.5.22 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.

5.5.23 Filter equipped extraction systems should not be operated with the filters removed.

5.5.24 The power or fuel supply should be shut off outside working hours; where LPG equipment is installed, the gas should be turned off at the cylinder(s), which should be located in a secure area outside the building.

5.5.25 In the case of deep fat fryers and bratt pans, caution should be exercised when changing or replenishing the pan(s) with oil to avoid spillage or overfilling. Oil should only be changed after the appliance has been allowed to cool sufficiently for the operation to be undertaken safely. Oil should not be changed when the appliance is hot.

Deep fat frying ranges

5.5.26 Where it may be difficult to approach the range if a fire were to occur, a long handled hook or other device should be provided in an easily accessible location away from the equipment, to enable the lid to be closed from a safe distance. All cooking staff should be instructed in the use of any hook or similar tool provided for this purpose.

5.5.27 Suitable measures should be taken in fish and chip shops to deny access to the oil pans and controls of the equipment by unauthorised staff and members of the public.

5.5.28 Specialist advice should be sought if consideration is being given to installing a second hand gas frying range.

5.5.29 Before use, a check should be made to ensure that the surface of the cooking oil in the pans to be used is between the minimum and maximum levels marked for safe operation.

5.5.30 In the case of gas heated ranges, the extractor fan should be switched on and be allowed to run at least two minutes before lighting up.

5.5.31 Extractor fans should be run at all times during frying and for 20 minutes after frying is finished, to cool down the range.

5.5.32 In addition to turning the burner or heater controls off, the main gas cock or electricity supply should be isolated at the mains after each frying session. In the case of LPG heated ranges, the gas should be turned off at the gas cylinder(s), which should be located in a secure area outside the building.

5.5.33 'Cracklings' should be placed in closed metal containers and removed from the premises at the close of business each day. Operators should be aware that spontaneous combustion of cracklings can occur.

5.5.34 When consideration is being given to the installation of josper ovens and other solid fuel burning devices in a kitchen, advice should be sought from the manufacturer of the equipment and insurer of the premises. Wood fired appliances should be located under a dedicated canopy, with independent ductwork designed so that the fan motor is located out of the airstream. The canopy should overhang the open door (and the rear and sides in some instances) of the oven by 300mm. Any build up of carbon monoxide should be monitored and controlled by suitable interlocks installed on controls as necessary.

5.6 Extraction systems

5.6.1 Mechanical extract ventilation should be provided for all cooking equipment producing heat, fumes and products of combustion. Where heating is by gas, the heat and fume extraction ducting should be separate from the ducting used to extract combustion products from the burners.

5.6.2 Extraction should be via an overhead filter and canopy arrangement with a ducting system, which discharges to the open in such a manner that grease will not be deposited on the building or adjoining properties.

- Before use, a check should be made to ensure that the surface of the cooking oil in deep fat fryer pans is between the minimum and maximum levels marked for safe operation (5.5.29).

5.6.3 Although there are advantages in using proprietary recirculation equipment, this is not suitable for use with gas or solid fuel appliances and cannot remove carbon dioxide and carbon monoxide from the atmosphere. Recirculation can however be effective in small kitchens without deep fat fryers and using electricity for powering cooking equipment. Equipment can be installed within the kitchen within ceiling voids or on a roof. Recirculating systems require a servicing contract, and it is essential that grease filters are changed regularly and as required; and that alarms reporting diminished airflow (indicating inefficient filtering) for example are not disabled, but responded to effectively.

5.6.4 Lighting arrangements under canopies need to be selected for their suitability in the presence of steam, heat and grease.

5.6.5 Ducts, canopies, extract plenum and hoods should be constructed of (and be supported by) galvanised or stainless steel of a substantial gauge, having all seams and joints liquid tight, with smooth surfaces to facilitate cleaning. Spiral ducting is only suitable for the extraction of combustion products, and not for the extraction of oil/fat fumes and steam, as its construction can allow condensed liquid to leak from the joints that run its entire length. Ducts should not be constructed from aluminium because of the low melting point of this material.

5.6.6 Extract ducting should be as short as practicable, and the design should comply with any local byelaws. The duct 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. Ducts should not pass through fire compartment walls or floors.

5.6.7 Bends or dips in the design of the ductwork where residues might collect are to 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. Further information is provided in RC44 (ref. 2).

5.6.8 In those cases where it is not possible to install the ducting as indicated in paragraphs 6.5 and 6.6, it should be enclosed in a service shaft of non combustible construction with a fire resistance of at least 60 minutes, and with access points 2m apart to facilitate cleaning of the extract ductwork throughout its length.

5.6.9 Where ducts pass through any combustible material, it should be cut away for a distance of at least 150mm from the duct, and the space filled with a proprietary sleeving system or 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 – the space should be filled with non combustible insulation. Work should be undertaken by competent persons with third party certification from a UKAS accredited third party certification body.

5.6.10 Brick chimneys or flues should not be used to conduct grease fumes away from cooking equipment unless they are lined with an impervious, non combustible material. It should be borne in mind however that the whole length of the ducting (including lined chimneys or flues) must be accessible for cleaning.

5.6.11 Filters, traps or other forms of grease removal devices should be provided as close to the range or fryer as possible. These should include a residue trap at the base of any vertical riser, or incorporated into the extract unit. They should not be sited where they may be exposed to direct flame impingement or hot flue gases, or be nearer than 500mm to the heat source unless suitably protected – for example by a 250mm high steel baffle plate.

5.6.12 Sufficient air circulation should be provided around air-cooled motors powering fans used for extraction.

5.6.13 Kitchen ventilation systems should be designed, installed and maintained in accordance with the requirements of the BESA (Building Engineering Services Association) *DW/172 Specifications for Kitchen Ventilation Systems* (ref. 21) and *TR19: Guide to Good Practice – Internal Cleanliness of Ventilation Systems* (ref. 8)

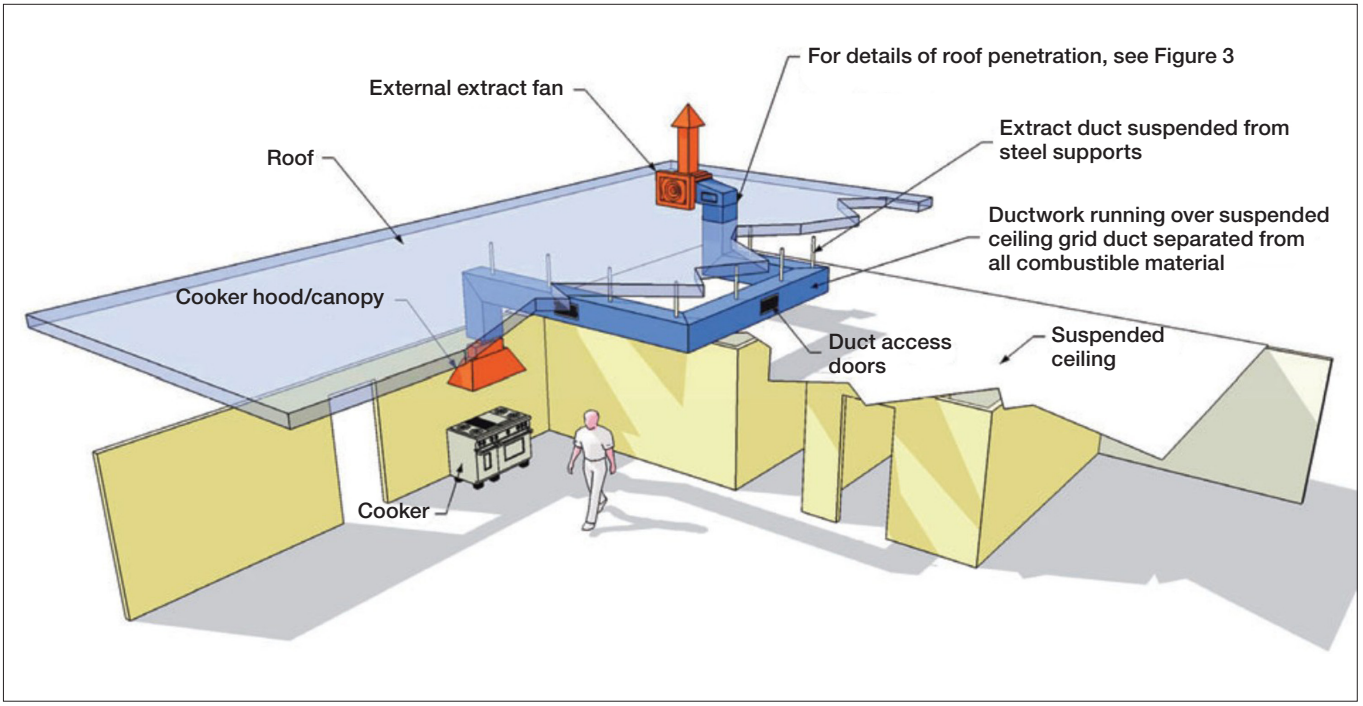

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Figure 1: Typical detail showing cooker extraction system

5.6.14 Particular care should be taken in fish and chip shops that ductwork is routed so that it cannot be touched by staff or customers. Where concealed, ducts should be encased in non combustible material with at least 30 minutes' fire resistance.

Sound attenuators

5.6.15 Where sound attenuators are present in ductwork, these should be identified at the time of the pre-contract cleaning survey, as they may present problems in that grease may have penetrated perforations in the design of the attenuator, and thus not allow consistent or accurate results for a thickness test.

5.6.16 Wherever possible, access doors should be provided, to gain access to enable thorough cleaning of attenuators to be undertaken in the normal manner. The installer should be consulted if problems are identified in providing adequate access.

5.6.17 Where an attenuator has been installed in such a position that access to allow effective cleaning will require significant building works, three options for consideration arise:

- Replacing the attenuator with a standard section of ductwork, but this is only practical where the level of noise pollution is no longer a major factor and will allow the operation of the ductwork without an attenuator.
- Periodic replacement of the attenuator on a risk assessed basis, depending on the level of grease accumulation.

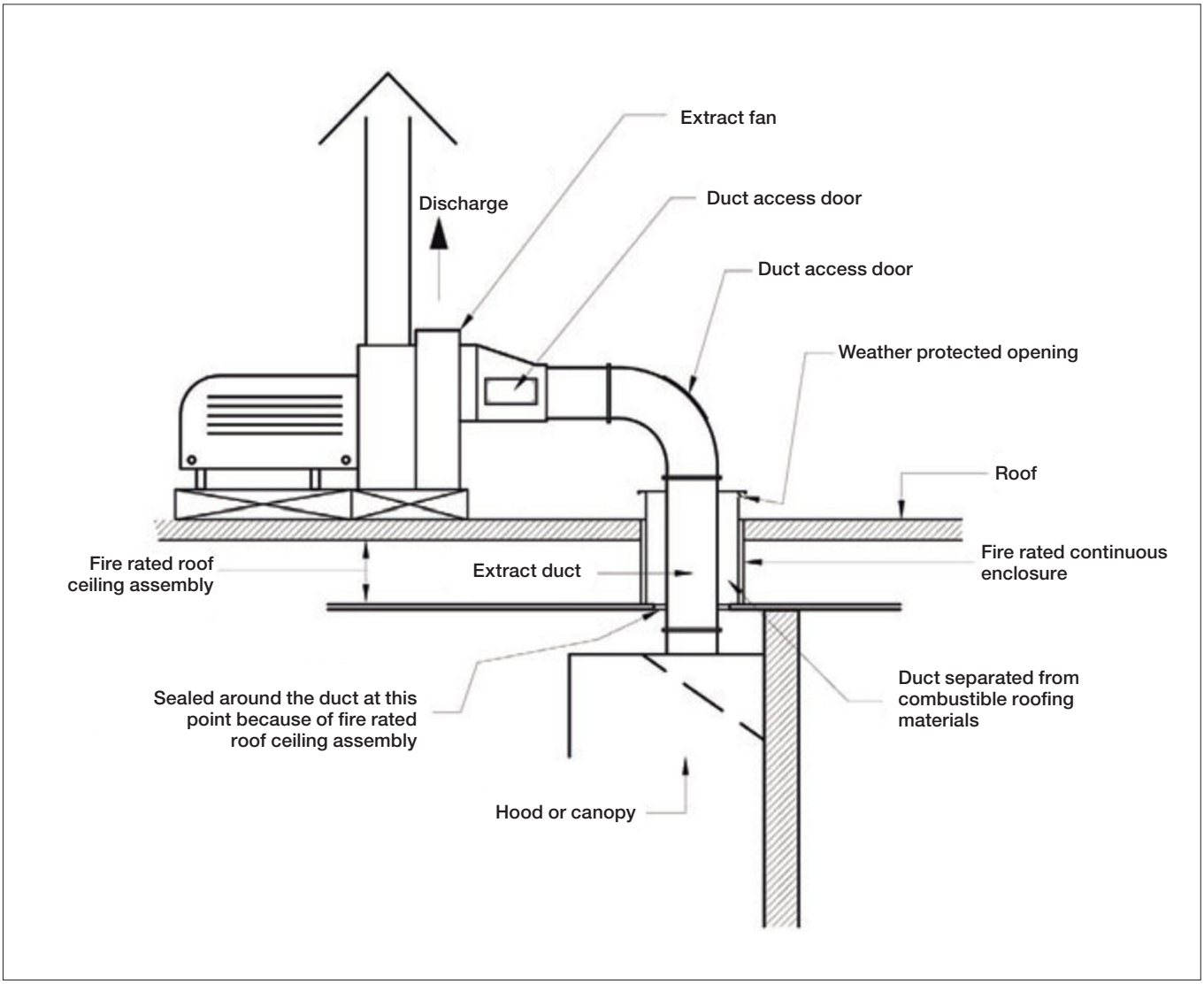

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Figure 2: Typical section detail showing roof penetration for a cooker extraction system

- In exceptional cases where access is problematical and grease build up is slow, cleaning of the relevant section could be omitted, but this action should only be undertaken with the agreement of the insurer and be recorded on the certificate or other records relating to the cleaning of the ductwork.

5.6.18 Where an attenuator is of a design that does not allow effective cleaning or may present a fire hazard following repeated cleaning processes, it should be replaced with equipment that is more resilient to the environment in which it is located.

5.7 Maintenance

Modern developments have seen the introduction of new technology into the kitchen. For example, canopies fitted with high efficiency baffle filters may provide the first stage of grease removal, as well as acting as a physical barrier to restrict the spread of flames. These and similar innovations have led to an emphasis on the quality of the cleaning that needs to be undertaken.

5.7.1 The fire related properties of oils and 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. In practice, if the fat is heated to too hot a temperature or is not changed sufficiently often, there will be an effect on the properties of the cooking medium, as well as an impairment to the quality and flavour of the cooking.

5.7.2 Where large volumes of deep fat frying is undertaken, such as in fish and chip shops, oil should be filtered daily. Grease traps should be emptied, and filters cleaned and maintained or replaced at frequent intervals in accordance with best practice.

5.7.3 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 as determined by risk assessment (see RC44, ref. 2) 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.

5.7.4 Daily checks should be made to ensure that the nozzle caps on the spray heads of the fixed fire suppression system are in place, to prevent oil and fat from building up and compromising the effective action of the installation.

5.7.5 Frequent cleaning of filters or other grease removal devices is particularly important, and should be carried out in accordance with the advice set out in RC44 (ref. 2).

5.7.6 Special attention should be given to the selection of filters to be installed, especially those immediately above griddles, bratt pans, deep fat fryers or other equipment that can produce large amounts of grease or fat in exhaust gases. In these situations stainless steel baffle filters are more efficient in removing grease from the air, and can be washed in hot soapy water, either by hand or mechanically. Stainless steel cartridge filters may also be used; these should be cleaned in commercial dishwashers. A range of automatic washing filter products is now also available commercially.

- What should be done to ensure that there is no build-up of grease in the kitchen extract ductwork? (5.7.6 to 5.7.10)

5.7.7 Care must be taken to ensure that suitable filters are present above appliances when relocating equipment in kitchens where this function is available.

5.7.8 The cleaning of filters does not remove the need for periodic inspection and removal of grease deposits from the inside of ductwork and the extraction motor. The extract ductwork should be inspected and cleaned at periods as determined by a risk assessment, based upon accurate historical levels of grease accumulation to maintain grease deposit levels below 200 microns as a mean across the system. Further details are set out in RC44 *Recommendations for fire risk assessment of catering extract ventilation* (ref. 2) and the *Building and Engineering Services Association Guide TR19 Grease* (ref. 8).

5.7.9 Where extracted air is routed through an ultra violet (UV) reaction chamber to break down organic material, using a combination of photolysis and ozonolysis and leaving a final discharge of cleaned air with a trace of ozone (which is quickly dissipated in the atmosphere) this should be located well away from eyesight level, and be protected with safety interlocks.

5.7.10 Kitchen extract duct cleaning should be undertaken by contractors who have demonstrated competence through independent third party certification to either the LPCB LPS 2084 scheme (ref. 22) or the BESCA Vent Hygiene Elite (VHE) scheme (ref. 23). Third party accreditation via these schemes demonstrates due diligence and best endeavour, avoids costly mistakes, and should provide better protection against possible accusations of negligence.

5.7.11 The initial cleaning operation may require the cutting of openings in the ductwork if insufficient openings have been provided to allow thorough cleaning of all areas to be undertaken. The cutting of openings should only be carried out by a suitable method after an appropriate risk assessment.

5.7.12 Flammable solvents or other combustible cleaning aids should not be used to clean filters or ductwork.

5.7.13 Electric power to the range should be isolated before commencing cleaning or maintenance operations.

5.7.14 Appliances should be serviced at least annually by suitably qualified personnel in accordance with the manufacturer's instructions. This should include all safety devices associated with the equipment, and undertaking all calibration checks. In deep fat fryers this service should include inspection of the pans to ensure that there are no cracks or pitting developing that could lead to the leakage of oil (especially onto the burners), testing the normal method of temperature control, checking ducts and burners, and cleaning if necessary. All fuel and power connections and controls should be checked.

FAQ

- In-service testing of portable electrical appliances is carried out annually, what other forms of servicing are required for kitchen appliances? (5.7.13)

5.7.15 Flues and grease traps should always be cleaned following servicing or cleaning of the burners. This is because the increased heat output following servicing or cleaning of the burners can result in ignition of fat condensate in the flues.

5.7.16 Routine testing should include the operation of dampers in any air handling system installed in the kitchen.

5.8 Fire protection

5.8.1 The kitchen should be protected by an automatic fire detection and alarm installation complying with BS 5839-1 (ref. 24), with suitable heat detectors being provided in the cooking areas.

5.8.2 Sprinklers, where present, should be installed by engineers with third party certification from a UKAS accredited third party certification body. The system should be in compliance with the *LPC Rules for Automatic Sprinkler Installations incorporating BS EN 12845* (ref. 25) (but see paragraph 5.4 above).

5.8.3 As indicated in BS 5306-8 (ref. 26), in circumstances where a deep fat fryer has a surface area greater than 0.4m^2, it should be protected by an automatic suppression system.

FAQ

- Can sprinklers be installed in kitchens where there are electrical appliances and deep fat fryers? (5.8.2)

5.8.4 As well as providing an automatic fire suppression system to protect deep fat fryers, a suitable installation should be provided – with both manual and automatic operation – to protect grilles, hobs, bratt pans, the overhead canopy and ducting system. In circumstances where extract ductwork runs are in excess of 5m in length and/or run internally, consideration should be given to installing suppression along the entire length of the ductwork.

Consideration should also be given to installing a suitable fire suppression installation where innovative or specialist cooking equipment is installed

Upon activation of any fire extinguishing system for a cooking operation, all sources of fuel and electrical power that produce heat to all equipment requiring protection by that system should automatically shut off. This will ensure that the fire is suppressed and secured as the system was designed. Failure to disconnect the electrical power or gas supply to the protected equipment could lead to reignition of the fire due to continued heating instead of cooling of the overheated grease.

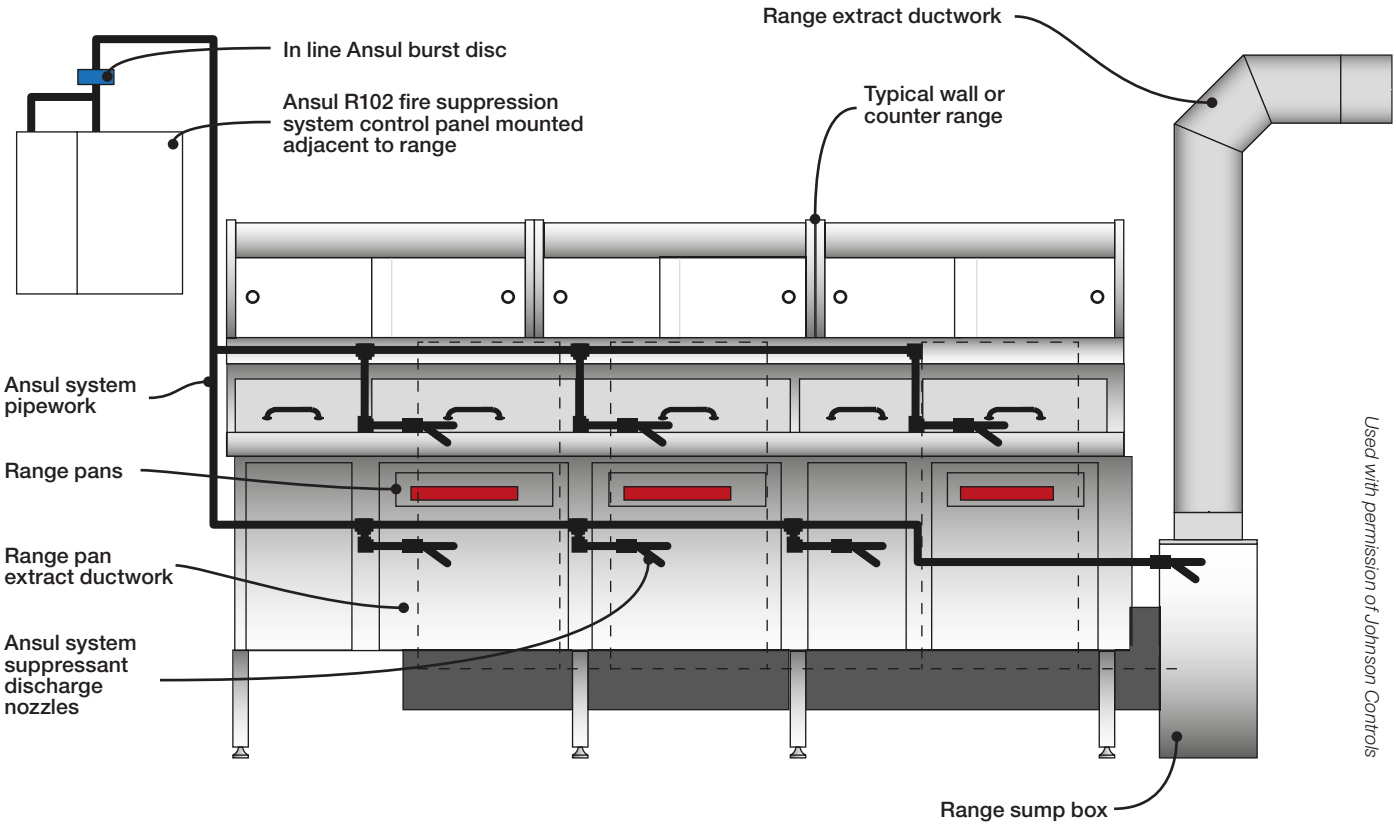

Figure 3: Frying range fitted with a fire suppression system

In the event of fire, exhaust fans in the ventilating system should be left on. The forced draft of these fans will assist the movement of the liquid agent through the ventilating system, thus aiding in the fire suppression process. These fans provide a cooling effect in the plenum and duct after the fire suppression has been discharged.

5.8.5 The choice of fixed fire suppression systems must be subject to a risk assessment undertaken by a competent person, and be suitable for the risk. Water-misting systems may be appropriate in certain circumstances to protect particular risks, but should not be used for long runs where there is potential for water-mist to condense and run back onto a cooking surface. Fixed fire suppression systems installed in kitchens should have been tested and approved to an appropriate standard (such as LPS 1223 (ref. 27)) and be installed by an engineer with third party certification – such as to the BAFE Kitchen Fire Suppression Systems Scheme SP206 (ref. 28) covering the design, installation, commissioning, recharge and maintenance of kitchen fire suppression systems from an independent UKAS accredited third party certification body.

5.8.6 It should be ensured that utensils, pots, pans and cooking materials are not stored in areas where they can obstruct the designed discharge pattern of the fire suppression system.

5.8.7 Before introducing changes to the layout of the cooking equipment, or other measures that may affect the basic configuration of the protected areas, it is important that the supplier/installer of the fire suppression equipment is consulted to review the system, and identify any additional measures that may need to be made.

- What types of portable fire extinguisher are needed in a large commercial kitchen and where should they be located? (5.8.6 to 5.8.8)

5.8.8 A suitable number of appropriate portable fire extinguishers should be available and immediately accessible in the case of a fire. Such portable extinguishers should be approved and certificated by an independent, third party certification body and be installed in accordance with BS 5306-8: *Fire extinguishing installations and equipment on premises. Selection and installation of portable fire extinguishers. Code of practice* (ref. 26) – and inspected and maintained in compliance with BS 5306-3: *Fire extinguishing installations and equipment on premises. Commissioning and maintenance of portable fire extinguishers. Code of practice* (ref. 29).

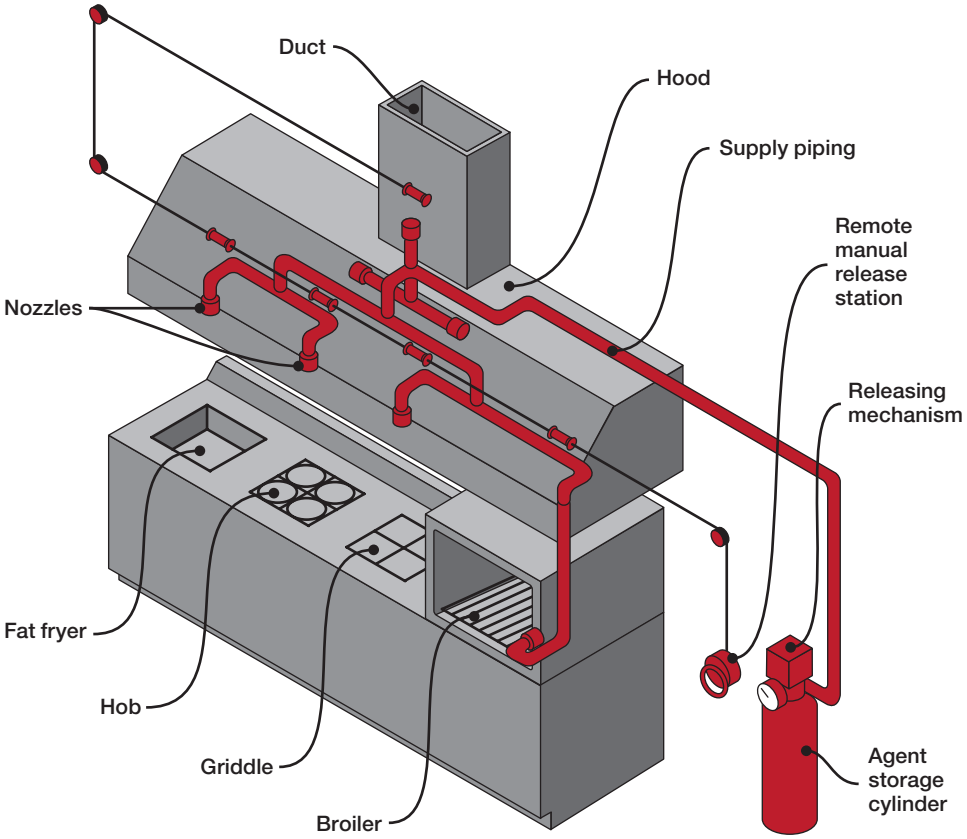

Figure 4: Typical layout and components of a kitchen fire suppression system

5.8.9 Where a deep fat fryer is present the extinguishers provided in the cooking area should be type F as defined in BS EN 3-7: 2004 + A1: 2007: *Portable fire extinguishers. Characteristics, performance requirements and test methods* (ref. 30). A minimum of two of these extinguishers should be provided in the cooking area, each with a fire rating of numerical value equal to the volume of the oil in the largest pan (for example, a pan containing 25 litres of oil should be protected by two extinguishers each having a rating of not less than 25F).

5.8.10 Fire extinguishers should be located so that only suitable type F extinguishers are located in the vicinity of a deep fat fryer. This is to prevent an inappropriate extinguisher being selected for use in an emergency. In many cases this will result in only a type F extinguisher being present in the kitchen, with other extinguishers being located immediately outside. The situation should not arise where a member of staff moving from the fryer passes an inappropriate extinguisher (such as a carbon dioxide or water extinguisher) in order to reach a type F unit.

5.8.11 Where a fire blanket is provided, this should be to BS EN 1869 (ref. 31) and staff should be trained in its use.

5.8.12 All portable firefighting equipment should be easily and safely accessible.

5.8.13 Operators should be made familiar with the location of the main isolator or shut off valves, the operation and correct method of use of portable fire extinguishing appliances, and any fixed fire extinguishing system. They should also be instructed in the actions to take in the event of a fire or an escape of burning gas.

5.8.14 All staff should be made aware that an outbreak of fire involving burning gas should not be extinguished until such time as the gas supply has been shut off. All heat sources should be isolated before tackling a fire.

6 Checklist

This checklist is based on the guidance and certain recommendations made in RC68: *Recommendations for fire safety in catering establishments*, and is designed for use by kitchen staff and in particular members of the maintenance or facilities team as an audit tool for use on site. It is recommended that an audit using this checklist be undertaken at least every 6 months.

The checklist can be printed and a hard copy used, or completed electronically and printed off (if needed); checklists created electronically will be saved with the document on closing as a digital record. The references with each question below and shown in brackets relate to the relevant sections of RC68.

Additional blank copies of the checklist may be created as required for printing or electronic completion

		Yes	No	N/A	Action required	Due date	Sign on completion
6.1	**Fire safety management (section 5.3)**						
6.1.1	Are cooking appliances installed, operated, serviced and maintained in accordance with the manufacturer's instructions? (5.3.1)						
6.1.2	Are the installation, servicing and user's instructions filed safely for future reference, together with service records? (5.3.4)						
6.1.3	Is a metal container with a metal lid provided for storing wipes that have been used to mop up spillages of cooking oil, and is it located externally at least 10m from the building (or as far as reasonably practicable)? (5.3.7)						
6.1.4	Where possible, are drums and large containers of cooking oil kept in bunded stores – or stored on pallets that incorporate sumps to retain any leakage with the sumps – being inspected periodically, and emptied and cleaned following any leak? (5.3.10)						
6.1.5	Is care taken during cleaning and maintenance operations that any wheeled equipment moved is returned to its correct position beneath the outlets of fixed fire suppression systems? (5.3.14)						
6.2	**Compartmentation (section 5.4)**						
6.2.1	Are any gaps around services entering or leaving the kitchen filled with proprietary penetration sealing material, or service opening passive fire protection systems, so as to provide at least the same level of fire resistance as the element of construction in which it is located? (5.4.2)						
6.2.2	Is any opening between a kitchen and dining area forming a servery protected by a shutter, with a fire resistance of the same standard as that of the kitchen enclosure? (5.4.4)						
6.2.3	Are staff made aware that care must be taken not to position trays of cutlery or other items beneath the shutter, and thus compromise its effectiveness in the event of a fire? (5.4.5)						
6.3	**Installation and use of cooking equipment (section 5.5)**						
6.3.1	Are emergency manual controls for fire suppression systems, and isolators for gas and electrical supplies, located on escape routes from the kitchen so that they are safely and easily accessible? (5.5.3)						
6.3.2	Is care taken during refurbishment to ensure that a deep fat fryer is not sited immediately beneath water pipes, because of the danger from leaking water? (5.5.4)						
6.3.3	Are portable and fixed electrical appliances selected on the basis of their being suitable for use or installation in a commercial, rather than a domestic, kitchen? (5.5.6)						

		Yes	No	N/A	Action required	Due date	Sign on completion
6.3.4	Is the installation of cooking equipment fully in accordance with the manufacturer's instructions, especially where innovative professional cooking equipment such as salamander grills, jospers and pizza ovens are installed? (5.5.8)						
6.3.5	Is the installation of electrical wiring in the premises fully in accordance with the requirements of the current edition of BS 7671: *Requirements for electrical installations*? (5.5.9)						
6.3.6	Are gas pipes and electrical equipment sited so that they are not susceptible to the effects of heat, water vapour, grease or mechanical damage? (5.5.13)						
6.3.7	Are deep fat fryers fitted with high temperature safety thermostats set to prevent the temperature of the fat rising above 205°C (or the manufacturer's maximum recommended temperature if this is less than 205°C)? (5.5.14)						
6.3.8	Are fryers additionally equipped with a separate high temperature limit control, of a non self resetting type? (5.5.15)						
6.3.9	Are gas appliances equipped with flame failure devices to cut off the fuel supply in the event of flame failure, and are they in good working order? (5.5.17)						
6.3.10	Are devices fitted that prevent gas being supplied to burners when the extract system is not in operation? (5.5.18)						
6.3.11	Are the controls of electrically heated ranges interlocked so that it is only possible to switch the heating elements on when the extraction system is operating to remove flammable vapours? (5.5.19)						
6.3.12	Before use, is a check made to ensure that the surface of the cooking oil in the pans to be used is between the minimum and maximum levels marked for safe operation? (5.5.29)						
6.3.13	In the case of gas heated ranges, is the extractor fan switched on and allowed to run at least two minutes before lighting up? (5.5.30)						
6.3.14	Are extractor fans run at all times during frying and for 20 minutes after frying is finished, to cool down the range? (5.5.31)						
6.3.15	In addition to turning the burner or heater controls off, is the main gas cock or electricity supply isolated at the mains after each deep fat-frying session? (5.5.32)						
6.4	**Extraction systems (section 5.6)**						
6.4.1	Is mechanical extract ventilation provided for all cooking equipment producing heat, fumes and products of combustion? (5.6.1)						
6.4.2	Where heating is by gas, is the heat and fume extraction ducting separate from the ducting used to extract combustion products from the burners? (5.6.1)						
6.4.3	Is extraction via an overhead filter and canopy arrangement, with a ducting system that discharges to the open in such a manner that grease will not be deposited on the building or adjoining properties? (5.6.2)						
6.4.4	Is extract ducting as short as practicable, with the duct passing directly to the open and not passing through – or is it contained within floor or ceiling voids or roof spaces where exposed combustible materials are present? (5.6.6)						
6.4.5	Is the whole of the ducting accessible for cleaning? (5.6.7)						
6.4.6	At each change in direction of the duct, is an opening with a grease tight cover provided for inspection and cleaning? (5.6.7)						
6.4.7	Where ducts pass through any combustible material, is it cut away for a distance of at least 150mm from the duct, and the space filled with non combustible insulation? (5.6.9)						

		Yes	No	N/A	Action required	Due date	Sign on completion
6.4.8	Is the use of brick chimneys or flues to conduct grease fumes away from cooking equipment avoided, unless they are lined with an impervious, non combustible material? (5.6.10)						
6.4.9	Are filters, traps or other forms of grease removal devices provided as close to the deep fat frying range or fryer as possible? (5.6.11)						
6.4.10	Are the locations of sound attenuators fitted in the extract ductwork known? (5.6.15)						
6.4.11	Are access doors provided so as to allow for thorough cleaning of sound attenuators? (5.6.16)						
6.4.12	Have attenuators that are of a design that does not allow for effective cleaning, or may present a fire hazard following repeated cleaning processes, been replaced with equipment more resilient to the environment? (5.6.18)						
6.5	**Maintenance (section 5.7)**						
6.5.1	Is discoloration of the oil monitored using proprietary charts, available from the manufacturers or suppliers of the product? (5.7.1)						
6.5.2	Where large volumes of deep fat frying is undertaken, such as in fish and chip shops, is the cooking oil filtered daily? (5.7.2)						
6.5.3	Is cleaning of the surfaces of all cooking equipment hoods and canopies, ductwork, fans, burners and fixed fire extinguishing equipment carried out at frequent intervals? (5.7.3)						
6.5.4	Are daily checks made to ensure that the nozzle caps on the spray heads of the fixed fire suppression system are in place, to prevent oil and fat from building up and compromising the effective action of the installation? (5.7.4)						
6.5.5	Is special attention given to the selection of filters to be installed, especially those immediately above griddles, bratt pans, deep fat fryers or other equipment that can produce large amounts of grease or fat in the exhaust gases? (5.7.6)						
6.5.6	Are staff aware that the cleaning of filters does not remove the need for periodic inspection and removal of grease deposits from the inside of ductwork and the extraction motor? (5.7.8)						
6.5.7	Is confirmation by certification sought that the kitchen extract ductwork has been cleaned by a competent specialist contractor? (5.7.10)						
6.5.8	Is the use of flammable solvents or other combustible based cleaning aids prohibited in the cleaning of filters or ductwork? (5.7.11)						
6.5.9	Is electric power to the range isolated before commencing cleaning or maintenance operations? (5.7.12)						
6.5.10	Are appliances serviced at least annually by suitably qualified personnel, in accordance with the manufacturer's instructions? (5.7.13)						
6.5.11	Are flues and grease traps always cleaned following servicing or cleaning of the burners? (5.7.14)						
6.6	**Fire protection (section 5.8)**						
6.6.1	Is the kitchen protected by an automatic fire detection and alarm installation complying with BS 5839-1, with suitable heat detectors being provided in the cooking areas? (5.8.1)						
6.6.2	Where a deep fat fryer has a surface area greater than 0.4m^2, is it protected by an automatic fire suppression system? (5.8.3)						
6.6.3	As well as providing an automatic fire suppression system to protect deep fat fryers, is a suitable installation provided with both manual and automatic operation to protect grilles, hobs, bratt pans, the overhead canopy and ducting system? (5.8.4)						

		Yes	No	N/A	Action required	Due date	Sign on completion
6.6.4	Where a fixed fire suppression system is installed, has it been tested and approved to an appropriate standard and been installed by an engineer with appropriate third party certification? (5.8.5)						
6.6.5	Are all utensils, pots, pans and cooking materials stored so that they do not obstruct the designed discharge pattern of the fire suppression system? (5.8.6)						
6.6.6	Are a suitable number of appropriate portable fire extinguishers available, suitably located and immediately accessible in case of a fire? (5.8.8, 5.8.9 and 5.8.10)						
6.6.7	Have operators been made familiar with the location of the main isolator or shut off valves, and the operation and correct method of use of portable fire extinguishing appliances and any fixed fire extinguishing system? (5.8.11)						
6.6.8	Are staff aware that an outbreak of fire involving burning gas should not be extinguished until such time as the gas supply has been shut off? (5.8.12)						

Signature …….. Name …….. Date ……..

7 References

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8 Further reading

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