

NHS in Scotland Firecode

Scottish Fire Practice Note 4

Hospital main kitchens

Guidance revised December 1999 All previous guidance is superseded



About this publication

In this Scottish Fire Practice Note (SFPN) and the associated NHS in Scotland Firecode documents, reference to "chief executives" means chief executives of NHS Trusts.

SFPN 4 – Version 2.0 replaces the guidance which was previously issued as FPN 4 in NHS in Scotland Fire code - Version 1 and dated April 1998.

Fire safety measures for the whole hospital

The primary remit of healthcare bodies with regard to fire safety is the safety of all patients, visitors, and health service staff. For each particular scheme involving a main kitchen, healthcare bodies will need to select a combination of measures to produce a fire-safe design, taking the following points into account:

- this Scottish Fire Practice Note and associated Firecode documents (see Chapter 8);
- all statutes and guidance relevant to the scheme as a whole; in this respect, Chapter 8 of this Note gives a short list of statutes and guidance to consult when formulating fire precautions schemes;
- the advice and approval of • local building control and fire authorities.

LIST OF REVISIONS

Some document references have changed to reflect Scottish versions recently issued.

Guidance revised December 1999 All previous guidance is superseded

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1.0 Introduction and scope

General application

1.1 This Scottish Fire Practice Note (SFPN) provides general and technical guidance relating to the additional fire precautions which may become necessary when main kitchens are about to be, or have been, established on hospital premises.

1.2 In the case of new hospitals, the recommendations of this Note should be considered at the initial planning stage. It is also intended that the recommendations should be applied when main kitchens are converted, extended, adapted, modernised or refurbished at existing locations either within, or adjacent to, patient care areas of hospitals.

1.3 The recommendations of this Note cannot take account of all the circumstances which may be found in any particular hospital, but they are intended to highlight particular health service aspects which may need to be considered.

Exclusions

1.4 The guidance in this Note excludes central food processing units. However, it may be used as a basis for providing useful guidance in appropriate circumstances for premises of this type.

Purpose of this Note

1.5 This Note provides sufficient general, management and technical guidance to ensure that when hospital main kitchens are planned or designed, they will not subvert the fire safety precautions agreed for adjacent patient care areas. This Note refers to a number of other Scottish Health Technical Memoranda within the Firecode series, listed in Chapter 8. Its provisions take into account the special fire hazards of kitchens and their equipment.

Management

1.6 This Note supplements the managerial and organisational provisions of the Scottish Office, Department of Health's – 'Fire Safety Policy' as a means

of ensuring that the extra fire hazards in hospital main kitchens are taken fully into account at the onset of new projects and upgrading of existing premises.

1.7 The statutory powers of local authorities with regard to environmental health, building control and fire, and of the Health and Safety Executive, must be taken into account when new work on main kitchens is planned. Important statutory requirements are those of the Fire Precautions Act and the Building Standard (Scotland) Regulations which are referred to in Chapter 8 and Appendix 1 of this Note.

Fire certificates

1.8 When the Health and Safety Executive consider that a hospital main kitchen is undertaking a factory process, for example a cook-chill process, they may define the premises as a factory. The Fire Precautions Act 1971 requires that such a premises must be considered by the local fire authority for inclusion as part of the Fire Certificate covering all premises having designated uses within the hospital building.

Co-ordination of fire precautions facilities

1.9 This Note must be applied in such a way that the increased fire risk, with regard to any part of the patient care areas of a hospital premises, is kept to the minimum possible. It requires consideration, among other things, of the need for additional fire detection, alarm, extinguishing and control systems, which in particular circumstances may be beyond those normally provided in the remainder of the hospital premises. Where such facilities are to be provided by a party other than the health authority, it is recommended that the extent of the other party's responsibilities is clearly defined in writing or by specification. Careful attention is recommended for ensuring proper co-ordination, interfacing and commissioning of the various fire safety measures, through the use of effective project management techniques.



2.0 Definitions

2.1 Similar terms which are used in SHTM 81, Home Office guidance, and associated British Standard Codes of Practice (see Chapter 8) have the same meaning:

- cavity barrier: a construction provided to close a concealed space against penetration of smoke or flame, or provided to restrict the movement of smoke or flame within such a space;
- **compartment floor:** a fire-resisting floor used in the separation of one fire compartment from another;
- **compartment wall:** a fire-resisting wall used in the separation of one fire compartment from another;
- fire compartment: a building or part of a building comprising one or more rooms, spaces or storeys, constructed to prevent the spread of fire to or from another part of the same building, or an adjoining building;
- fire door: a door or shutter provided for the passage of persons, air or objects which, together with its frame and furniture as installed in a building, is intended when closed, to resist the passage of fire and/or gaseous products of combustion and is capable of meeting specified criteria to those ends;
- fire load: calorific energy, expressed in SI units, of the whole contents in a space, including the facings of the walls, partitions, floors and ceilings;
- fire resistance: ability of an element of building construction, component or structure to fulfil, for a stated period of time, the required stability, fire integrity and/or thermal insulation and/or other expected duty in a standard fire resistance test;
- **fire stop:** a seal provided to close an imperfection of fit or design tolerance between elements or components to restrict or prevent the passage of fire and smoke;
- high fire load areas: those rooms or areas of hospitals which contain large amounts of combustible materials and thereby constitute a fire load in excess of that normally found within

parts of such buildings;

- high fire risk areas: areas which due to their function and/or content are more than usually susceptible to an outbreak of fire or rapid spread of smoke or fire;
- high life risk areas:
 - a. areas in which persons may reside and are not all able to move unaided away from a fire; or
 - b. undivided areas in which more than 50 people normally congregate;
- material alteration of a building: as defined in the Building Standard (Scotland) Regulations 1990;
- non-combustible: as defined in Part D of the Building Standard (Scotland) Regulations 1990;
- purpose group: a classification of buildings according to the purpose to which they are intended to be put – as defined in Schedule 3 to the Building Standard (Scotland) Regulations 1990;
- service duct: an enclosure for the accommodation of building services;
- separated part of a building: a form of compartmentation in which a part of a building is separated from another part of the same building by a compartment wall. The wall runs the full height of the part and is in one vertical plane – as defined in Part D of the Building Standard (Scotland) Regulations 1990;
- unprotected areas: relates to a side or external wall of a building as defined in Part A of the Building Standard (Scotland) Regulations 1990.

2.2 The following additional terms are defined to facilitate understanding of this Note:

- Nominated Officer (Fire): the person with the responsibilities described in NHS in Scotland 'A Model Management Structure for Fire Safety'.
- Hospital Fire Safety Adviser: the person with the responsibilities described in NHS in Scotland – 'A Model Management Structure for Fire Safety'.



3.0 The management and organisation of fire precautions

Firecode

3.1 The Scottish Office, Department of Health's - 'Fire Safety Policy' states that the overall responsibility for fire safety devolves on the general manager/chief executive. Each health authority must have for each of its premises a programme, prepared with the advice and assistance of the local fire authority, for installing and maintaining an adequate level of physical fire precautions. These are designed to prevent the occurrence, ensure detection and warning, and to stop the spread, of fire. Fire safety policies and programmes of work must not remain static but must be regularly reviewed and updated to take account of changes in the structure of buildings, their functions and contents, and any other matters which may have a bearing on fire safety.

Fire safety policy

3.2 This Note, largely directed at the safety of patients and hospital staff, gives general guidance and provides technical recommendations for maintaining fire safety. The general manager/chief executive should have already considered, in accordance with the provisions of Firecode, and in consultations with the local fire authority, the fire safety implications of introducing a main kitchen within the hospital, or in such a position as may affect the fire safety of the hospital.

Consultations with the local building control and fire authorities

3.3 All proposals must be discussed and agreed with the local building control and fire authorities at the planning stage. No main kitchens on hospital premises are to be brought into use before agreement to the scheme has been obtained from these authorities (see paragraph 3.6).

Commercialisation of existing hospital services

3.4 If commercialisation of an existing main kitchen in hospital service occurs, this should not result in increased risk to patient care areas, provided the management arrangements in this section are

observed with the associated NHS in Scotland Firecode guidance.

Exchange of information

Responsibility for design to ensure the adequacy of fire safety precautions

3.5 Before work on new or materially altered hospital main kitchens is started, a project manager from, or acting on behalf of, the health authority should be appointed to co-ordinate the design and construction of the project.

Consultation and co-ordination

3.6 Satisfactory consultation procedures to ensure coordination of different aspects of the work should be established at the commencement of the project. The possibility of further development within, or adjacent to, the current project should also be considered carefully at this stage.

- 3.7 Attention should be paid to:
 - a. project management arrangements;
 - b. local authority consultation procedures;
 - c. consultations with suppliers of special services such as automatic fire detection and extinguishing systems;
 - d. correct interfacing of new or additional fire precautions with existing hospital services;
 - e. proper commissioning of new services;
 - f. preparation of fire drawings.

Supervision of progress

Project management

3.8 The project manager appointed in accordance with paragraph 3.5 should ensure that all necessary consultations take place and approvals are obtained. In particular, it should be established that the safety of the occupants in the high life-risk areas of the hospital will not be subverted by the establishment or material alteration of a main kitchen.



Fire hazards during building operations

3.9 Building and installation work should only be undertaken in an occupied hospital after specific arrangements have been made with the hospital fire safety adviser. This is necessary to avoid lapses in fire safety and carelessness by contractors undertaking processes involving hot working.

3.10 A more extensive treatment of this subject is given in Scottish Health Technical Memorandum (SHTM) 83 – 'Fire safety in healthcare premises: General fire precautions', which also recommends the use of the Department of the Environment booklet P5, now replaced by 'Standard fire precautions for contracts engaged on Crown civil and defence estates'.

Statutory duties

3.11 Reference should be made to Appendix 1 of this Note for certain statutory duties in relation to fire and building regulations. Chapter 8 lists some relevant statutes and other appropriate guidance.



4.0 Fires in kitchens and their causes

Hot cooking oils and fats

4.1 The main fire hazard arises from overheating of oils and fats in frying equipment. Human error, and temperature monitoring devices failing to control correctly, can quickly lead to rapid increases in the temperatures of oils and fats.

4.2 Safe cooking in oils and fats takes place generally below 200°C. Flammable vapours are given off at 200/230°C, and spontaneous ignition occurs at 310/360°C. The timescale in moving from a safe condition to a dangerous one is quite short. The flashpoint of oil is reduced by progressive oxidation through repeated use.

4.3 The subject of oils, fats and their temperatures is covered in greater detail in SHTM 83, and in the Fire Protection Association's (FPA) guide to safe practice with flammable liquids. Guidance is also given in the Health and Safety Executive's guidance document HS(G) 51, with regard to the storage of flammable liquids in containers.

Other causes of fire

4.4 Careless procedures while cooking, poor planning of kitchen layout, failure to maintain equipment to satisfactory standards, and an unsatisfactory system for managing waste disposal, all increase the risk of a serious fire:

- a. carelessness with hot oils and fats includes:
 - (i) spillage and overfilling of equipment, especially when hot;
 - (ii) unattended equipment and the closing of pan covers over hot or heating oil;

- b. poor layout of equipment includes:
 - (i) the close positioning of cooking equipment with naked ignition sources next to deep fat-fryers, leading to flash-over fires;
- c. unsatisfactory maintenance includes:
 - (i) inadequate attention to the condition of equipment, equipment controls and safety devices;
 - (ii) infrequent removal of grease from traps and internal ductwork of ventilation extraction systems, leading to flash-fires;
- d. faulty equipment includes:
 - (i) escapes of gas from mains or LPG operated equipment;
 - (ii) leaks of oil or fat from pans which penetrate to parts with naked flames, causing fire to occur;
 - (iii) faulty, overheated, or unsuitably insulated (non-heat-resisting) electrical wiring, leading to fire or loss of effective control by protective devices;
- e. unsatisfactory disposal procedures with waste, involving highly flammable plastic packaging, etc include:
 - (i) infrequent removal of accumulated rubbish;
 - (ii) failure to deposit rubbish in non-flammable containers, with closed sides and hinged lids, while awaiting collection;
 - (iii) accumulation of spent oil and fat containers.

(See also SHTM 83 for further guidance.)



5.0 General fire safety recommendations

Planning and location of a main kitchen

5.1 A hospital main kitchen is required to deliver an almost non-stop service. Consequently, when a new one is planned, early and careful consideration must be given to its location, design and operational policies, including those required for fire safety. The same criteria would apply when an existing kitchen is to undergo a major alteration or upgrading.

5.2 This Note concentrates on fire precautions for the cooking areas of main kitchens, but where necessary the interfacing requirements for the remainder of the catering department are included for completeness. Where a dining room and its supporting services with local cooking facilities are located remotely from the main kitchen, the provisions of this Note will nevertheless form a sound basis for considering this alternative arrangement.

5.3 A main kitchen is assessed as having both a high fire risk and a high fire load, centred on its main areas of cooking. However the "dining room" (taken here to include seating areas for cafeteria, snacks and coffee lounge, etc) is assessed as having a low fire risk and fire load. To maintain the low fire risk classification of a dining room, a servery with call-order bars must form an individual sub-compartment. In practice, the main kitchen with its supporting services, and the dining room with its supporting services, in the majority of cases may be in close proximity, and for fire safety purposes they must be considered together, as forming the core of the catering department.

Fire hazards

5.4 Fire in a hospital main kitchen is a serious matter. The need to separate high fire risk, high fire load areas, such as kitchens, from high life risk areas is referred to in SHTMs 85 – 'Fire precautions in existing hospitals' and 86 – 'Fire risk assessment in existing hospitals' (for existing hospitals). Main kitchens must be well-segregated for fire safety purposes, both vertically and horizontally, from high life risk patient-care areas and they should never be located beneath or immediately adjacent to such areas. The consideration of effective fire precautions, both passive and active, forms an essential part of the planning process, and the recommendations of this Note, especially in Chapters 6 and 7, when

implemented with the overall design and other recommendations of SHTMs 82 – 'Alarm and detection systems', 83, 85 and 86, will lead to a satisfactory arrangement.

5.5 The fire safety criteria for establishing the location of a main kitchen in a hospital requires that a fire in a kitchen must be contained until extinguishment, to ensure that the evacuation of patients in adjoining healthcare areas will not be necessary. The fire compartment/building shape of the kitchen and of these adjacent areas, and their space separation, should fulfil this requirement.

5.6 Trolley access doors to the main kitchen should be approached from a services corridor, and not via a hospital street used by patients and staff.

Avoidance of fire

5.7 Fire involving a deep fat-fryer and its extraction system may develop very rapidly and reach a stage of such violence that it cannot be contained within the main kitchen and perhaps not even within the catering department. Damage to equipment will be significant, leading to an immediate disruption to normal service, perhaps lasting days or weeks. The costs of repairing damage, and provision of an alternative service during the period of disruption, may be considerable. Such costs may be averted by careful design, care with the selection of kitchen equipment, provision of adequate structural fire precautions, and suitable first aid and fixed fire-fighting equipment. In addition, keen management procedures must ensure that the level of fire precautions, once set, is maintained to a high standard of effectiveness.

The location, installation and operation of cooking equipment

Location of equipment

5.8 Cooking equipment must not be located anywhere other than in the designated areas of kitchens, which should have non-combustible walls, floors and ceilings. Deep fat-fryers should be separated from other equipment with ignition sources by at least



500 mm. Adequate screening should be provided and screens must always be provided to deep fat-fryers.

Installation and operation of equipment

5.9 The installation, operation and servicing of cooking equipment must be fully in accordance with manufacturers' instructions. Energy supplies, piping and electrical distribution systems should be connected in accordance with current industry standards, British Standards and all relevant regulations. It should be possible to isolate supplies automatically or manually in an emergency, and for general safety and maintenance purposes, in close proximity to each item of equipment. To maintain limited kitchen facilities outside of normal working hours, and to take account of locked parts of the department, it will be necessary to consider whether further points of isolation are required elsewhere. In a fire emergency it should be possible to isolate each of the mains services supplying energy to the main kitchen, for example, main electrical switches and gas stopcocks, at a point external to it on an exit route. The provision of emergency lighting, that is, safety lighting to allow escape, and stand-by lighting to enable essential activities to be continued with safety in an emergency, should be in accordance with the provisions of the CIBSE Lighting Guide – 'Hospitals and healthcare buildings'.

Staff training

5.10 Kitchen staff must be thoroughly instructed in the safe use and operation of all equipment. They should be instructed to report faulty controls, sensors and indicating devices to enable dangerously faulty equipment to be withdrawn from service immediately, until it is repaired. The consequences of overheated oil and fats, the need for strict observance of manufacturers' recommended minimum and maximum pan filling levels for oil and fat, and maximum temperature limits for safe operation, must be known and stressed to staff. Staff must appreciate the potentially serious fire consequences which may arise from the exposure of temperature-sensing devices and electrical heating elements while equipment is in use.

Note: The guiding principles and recommendations of this Fire Practice Note, although written primarily for application to main kitchens, may be of use where smaller-scale activities remote from the catering department, but involving similar hazards, are planned or are in existence. Examples might be a small fast-food facility established in an area dedicated to that purpose or part of a snacks service in a licensed premises. In such circumstances the risks must be fully

assessed and suitable precautions established to ensure that life-threatening aspects of the activities are minimised and that existing fire precautions for patient care areas are not subverted. Such facilities must never be located within a circulation space forming a means of escape. Estates staff, the hospital fire safety adviser and the local fire authority must collaborate to achieve a satisfactory result when such arrangements are contemplated.





6.0 Structural fire precautions and means of escape

Structural precautions

6.1 In Chapter 5, the fire hazards for the main cooking areas of the hospital main kitchen are reviewed. Emphasis is given to the need for care in choosing its location with respect to high life risk patient-care areas.

6.2 The diagram illustrates the principles for applying fire precautions in a modern catering department. It is drawn for the case where a main kitchen is located immediately adjacent to a staff dining room (that is, cafeteria area, etc). The catering department, when it is in this form, will form a complete fire compartment. Where the main kitchen is located separately from a dining room, each of these areas should be designed as a fire hazard room.

6.3 The diagram shows the fire-resistance of walls surrounding the catering department of one-hour rating. Within the catering department, the kitchen and the dining area are considered as fire hazard rooms with half-hour fire-resisting construction. The servery is also considered as a fire hazard room only if (as shown) it provides back-up cooking facilities.

6.4 A new main kitchen must be designed and constructed to accord with the requirements of the Technical Standards, so as to inhibit the internal spread of fire, both within the kitchen and to the remainder of the catering department.

6.5 Large trolley equipment and tug-trains are used by the catering department for providing the meals service to patients throughout the hospital. To accommodate this form of transport, it is necessary to provide recessed double-leaf/double-swing doors with electro-magnetic detents, linked to the automatic fire alarm and detection system, in order to maintain the integrity of fire compartments.

Means of escape

6.6 The main kitchen area comprising cooking, preparation, washing-up and stores areas, must not be accessible from patient care areas as a means of escape.



7.0 Technical recommendations

Ventilation and extraction systems

General requirements

7.1 The mechanical ventilation to a hospital main kitchen can exacerbate the consequences of a fire, and its design must be such as to contain any extensive damage from smoke and toxicity, if one occurs. The provision of a mechanical ventilation system to the main cooking area of a kitchen is essential, and it should be separate from, and independent of, those serving other hospital departments.

System design

7.2 Generally, all cooking equipment in a main kitchen will need mechanical ventilation to extract heat, vapours and combustion products. Ventilation duct runs, for both supply and extract, should be as short as possible, particularly those provided as extracts for equipment using oils or fats. The latter is to prevent an opportunity for an extensive build-up of precipitation from vapours on internal surfaces. Certain equipment particularly deep fat-fryers, will require dedicated extract ducting via an overhead canopy. It is essential that ducting is provided with grease-tight access panels for cleaning, at intervals not exceeding 3 m, and at changes in direction. A grease residue trap should be installed at the base of any vertical riser. Such panels will serve additionally as suitable points of access for fire-fighting.

7.3 The best arrangement of extraction system for deep fat-fryers will result from a ducting system which deals with heat and vapour extraction separately from the products of combustion. The two systems should be separated physically from one another, or thermally insulated, to prevent high heat transfers between systems, which may lead to the occurrence of fire.

7.4 The short extract ductwork from equipment using oils or fats, wherever possible, should discharge to the external atmosphere directly above the equipment it serves. BS5588: Part 9 recommends that extract ductwork from kitchens should not be provided with fire-dampers and should discharge directly to open air. Where this is impracticable and extraction systems need to pass through an adjacent fire compartment, specific fire precautions must be applied to ducting, to maintain the required level of fire separation between compartments. In some cases, this means that such ductwork must be enclosed within a building services duct, constructed to the highest standard of fire-resistance of the structures it penetrates. Alternatively, the necessary fire-resistance may be achieved by designing it into the ductwork material itself, or by the application of a suitable protected shaft or by the application of a suitable protective material.

7.5 If fire originates within ducting it may spread beyond its initial location due to heat radiation or direct contact of the ducting with adjacent combustibles. The routing of extract ductwork must take account of such potential hazards. A separation of at least 150 mm, but preferably 500 mm, should be maintained between uninsulated ducting and any combustible materials. Permanent notices should be displayed prominently at vulnerable locations to warn of this hazard. Where space is limited, the use of short runs may obviate this requirement.

Ventilated ceilings

7.6 Such ceilings are designed to permit the passage of air from the kitchen below to the void above, whence air is extracted to the atmosphere. Some suspended ceilings include metal cassettes which can trap exhausted airborne grease and other gaseous by-products. A fire hazard can be created in ventilated ceilings by the accumulation of greasy dirt, aggravated by the intrusion of other building services, involving pipework for example, and where cassettes are not cleaned regularly. In view of the problems experienced with these ceilings their use should only be considered where the recommendations of paragraph 7.7 can be achieved.

7.7 Provisions to avoid the occurrence of fire in ventilated ceilings and to contain them are as follows:

- a. the area of a single unit of ventilated ceiling should be not greater than approximately 60 m²;
- b. the free area of ventilation into the void should be not less than 25% of the area of the suspended ceiling, evenly distributed over the entire area;
- c. each ceiling unit must be completely segregated from any adjacent unit by non-combustible imperforate downstands extending from structural soffit to suspended ceiling. The perimeter of such units or series of units must be segregated by cavity barriers from any other conventional ceiling void by imperforate fire-



resisting construction, and fire-stopped;

d. all cassettes must be easily removable for frequent cleaning and it should be possible to gain access to each void for the purposes of inspection and cleaning.

Corrosion

7.8 The fire integrity of ductwork and any installed parts, such as fire-dampers (which may be necessary to maintain the fire separation between fire compartments), may be impaired as a result of corrosion from deposits. They should be protected from the expected conditions by galvanising, or by the application of further appropriate protective barriers against corrosion, or be constructed of other non-corrosive and non-combustible material such as stainless steel. The possibility of galvanic action between dissimilar metals should not be overlooked.

Fire-fighting controls

7.9 Suitable provision of extraction equipment can control the removal of hot smoke and gases following a fire, and schemes should be agreed with the local fire authority. Where fire-dampers are required (see paragraph 7.4), effective control of them should be arranged automatically, using heat actuated devices such as fusible links. Faster and more reliable operation will be achieved if fire detector activation is provided in addition. Switches designed initially to isolate extraction fans, in order to prevent flames spreading through extraction systems, should be positioned on an exit route and clearly indicated. Preferably, extraction fans should be linked to the automatic fire detection system, to ensure that they are automatically stopped in the event of fire.

Maintenance of ventilation systems

7.10 A high standard of maintenance of extract systems, in particular those serving deep fat-fryers, is essential in order to prevent fires starting, and to restrict their effects should they occur. Grease extraction filters can become progressively greater fire hazards with use, and must receive regular inspection and cleaning. Internal cleaning of ductwork must be undertaken as part of the planned maintenance system. Kitchen canopies are available with selfcleaning/washing filters which will reduce the manual maintenance of filters and the build-up of grease deposits. However, they will still require close attention. The correct functioning of fan motors, firedampers where fitted, and all associated control devices, are key elements requiring attention. All the equipment described should be inspected and tested in accordance with manufacturers' instructions.

Automatic fire detection and alarm systems

Consideration of protection

7.11 The hospital main kitchen has both a high fire risk and a high fire load. It is necessary to ensure that the catering department in general, particularly the cooking area of the main kitchen, is provided with an automatic fire detection and alarm system. Manual call points should supplement the automatic detectors and be suitably located at exits to escape routes. The overall system should be designed, installed and maintained to the requirements of SHTM 82 and BS5839: Part 1: 1988, and it should be arranged that the catering department forms a single fire zone, appropriately compartmented (see paragraphs 6.1 to 6.4).

7.12 The main features of automatic detectors, their performance, classification and use are summarised in SHTM 82. Consideration must be given to the careful siting of detectors so as to minimise disturbance from false alarms and to prevent failure of activation due to grease contamination. Table 3 recommends the use of heat detectors in main kitchens and heat or smoke detectors in storage rooms to suit the type of commodities stored. Attention is drawn to BS5588: Part 9 1999, refers to the advantages of actuating firedampers (where fitted) by means of optical or ionisation smoke detectors, in addition to heat detectors, to increase their speed of operation. However, extract ductwork should not be provided with dampers (see paragraph 7). Certain suppliers of fixed fire-fighting equipment may also consider that there may be merit in recommending a mix of detector types. It is not possible within the scope of this SFPN to consider all options for fire alarm equipment, dampers and fire-fighting equipment, and designers should seek the guidance of the relevant experts when deciding on the most satisfactory arrangements to suit their particular circumstances.

Fire-fighting

Fire safety training of staff

7.13 Catering staff must receive regular and thorough instruction and training in fire safety. This must include information about good housekeeping, the prevention of fire, and the particular hazards associated with the use of cooking equipment in the main kitchen, particularly the risks from fires involving oils and fats. As part of the training programme, any agency or contract staff employed in main kitchens must be given instruction in the fire safety procedures of that



kitchen before they start work. Training should be supplemented by additional written instructions and details of the training and instruction should be recorded in a logbook kept for the purpose. Fire instruction notices describing the actions to be taken in the event of fire should be displayed at a number of conspicuous locations in cooking areas, and at fire exits. Notices giving instructions about the manual isolation of all mains and locally distributed supplies to cooking equipment should be displayed at the points of mains intake, and adjacent to the equipment supplied.

First aid fire-fighting

7.14 It is essential that the provision of first aid firefighting equipment is suited to the fire hazards present in the cooking areas of the kitchen and adjacent storage areas etc. In a premises covered by a fire certificate, the means for fighting fire, including the nature of the equipment and the places where it is to be provided, will be specified in the fire certificate. In general, staff must be aware of the location of extinguishers, etc and of their correct method of operation, and they must know which equipment is appropriate for use on a particular fire. Further general guidance may be obtained by reference to Appendix 4 of SHTM 83. Advice should be sought from the hospital fire safety adviser, in conjunction with the local fire authority, as a matter of course.

7.15 Kitchen fires originating in equipment using oils and fats produce considerable quantities of heat and smoke. Attempts at first aid fire-fighting in confined locations by means of heavy-duty fire-blankets and hand-held appliances may be difficult and dangerous. Such equipment, in the hands of inexperienced operators, may even spread the fire and the use of incorrect extinguishing methods may produce alarming consequences for those in the vicinity. To avoid such incidents, consideration must be given to the provision of fixed fire-fighting equipment for deep fat-frying ranges. It is to be expected that the overall fire-fighting arrangements within the main kitchen of a modern hospital will be formed by a combination of both manual and fixed methods.

7.16 Automatically-operated, fixed fire-fighting systems are recommended for all new installations of deep fat-fryers having oil or fat capacities exceeding 10 litres. This recommendation applies whether the quoted capacity is contained within a single appliance or is the aggregate figure represented by a number of adjacent appliances.

Fixed fire-fighting systems

7.17 It is not possible within this SFPN to make detailed recommendations about the suitable choice of a fixed system to deal with fires involving deep fat-fryers, for example. Nevertheless, sufficient information is given to allow meaningful discussions to be arranged with equipment suppliers. In general, cooking equipment suppliers do not provide the means for fire-fighting as an integral part of their cooking equipment. As a consequence, it is recommended that the services of a specialist fire consultant are obtained, where this may appear necessary. Alternatively, discussions should be arranged with companies specialising in attaching or retrofitting fixed extinguishing systems to fire-prone cooking equipment.

System design and installation

7.18 The following paragraphs provide guidelines for the design and installation of fixed fire-fighting systems. A variety of extinguishants may be used for such systems, namely gaseous, dry powder, foam, wet chemical (alkali), and water spray. It is recommended that, whenever possible, systems are selected whose components, system design and installation methods meet with recognised approval and certification procedures. Unfortunately, at the time of writing, the **UK Loss Prevention Council/Loss Prevention** Certification Board (LPC/LPCB) have not published any list of approved equipment. Nevertheless, the British Fire Protection Systems Association (BFPSA) has recommended that there are systems available in the UK which have been fully tested and approved for use in the USA. It is recommended that these should be acceptable in the UK provided the UK installer is an approved distributor, and equipment has been verified by an approval authority and listed as such.

7.19 Systems should be capable of both automatic and manual operation. Manual control devices should be easily identified by means of prominent and suitably worded notices fixed nearby. At least one manual control should be located at a height not greater than 1500 mm above floor level. It should be readily accessible at all times, simple to operate and situated adjacent to an escape route. Both manual and automatic actuation of the system should initiate the fire alarm and cause the shutdown of all fuel and electrical power sources supplying heating energy to the protected cooking equipment. It should also actuate and control any associated devices as may be required by this SFPN, such as fans and fire-dampers (if installed), as agreed with the fire authority.



Performance requirements

7.20 It is recommended that when the selected extinguishing system is actuated, by automatic or manual means, the following requirements should be met:

- a. during the system discharge time, the fire should be effectively extinguished such that after completion of the discharge no re-ignition of the fire should occur within a period of one minute;
- burning oil should not be forced out of the protected cooking appliance during discharge of the extinguishant;
- c. at actuation, primary sources of fuel supply to the protected appliance must be shut off and any control of associated ventilation equipment completed successfully.

Types of fixed system

7.21

a. carbon dioxide (CO_2) systems have been in existence for a number of years, particularly in the USA. The difficulty with a CO_2 system, especially in the usual case of an open kitchen, is the need to maintain gas pressure levels around the fire zone.

Kitchen range hoods may need a combination of total flooding and local application of CO_2 . Ductwork sections above grease filters may need total flooding with the surfaces of deep fat-fryers being protected by local application;

b. dry powder systems are available and appear to work satisfactorily, but suffer from the problem that the significant quantities of dry chemical powder discharged at high pressure by the expellant gas cannot be confined to the fire zone. Powder flows into most of the surrounding kitchen area and cleaning-up can be timeconsuming.

Extinguishant powders based on monoammonium phosphate must not be used for the protection of deep fat-fryers as they decompose in hot oil, leaving a residue which is difficult to remove from equipment;

- c. wet chemical systems are more recent but the wet chemicals may be more difficult to apply. It is not uncommon to utilise combined wet/dry chemical systems. Wet chemicals are directed at the hot oil and the surfaces of appliances, the dry chemical or CO_2 being used to protect the associated ducting;
- d. water-spray systems may be considered for

installation in kitchen canopies;

e. halon systems are not included here as their utilisation is now strictly limited under the terms of international and European agreements. Further information is given in SHTM 83.

Discharge arrangements

7.22 The location of system discharge points for all types of system to ensure proper distribution and effective fire-fighting must be in accordance with the requirements of the original system type approval. This information is fully detailed in design manuals of the equipment concerned, with the quantities of extinguishants required and their rates of discharge. This work will be the responsibility of the appropriate technical expert.

Safety of personnel

7.23 The sudden discharge of large amounts of extinguishant from fixed systems can create problems for staff working in the vicinity, both during and after discharge. For example, CO₂ can cause local concentrations to occur, which may be hazardous if cooking equipment is located in a confined space, and a pre-warning must be arranged to allow staff to leave the area. Otherwise, CO₂ disperses quickly at a low level and is not normally a hazard. Dry and wet chemical discharges can cause temporary problems of skin and eye irritation, but washing in water will usually solve these problems. Water-spray methods may cause floor areas to become covered with a mixture of water and oil. Any method using water introduces the possibility of electric shock from energised electrical equipment. Nevertheless, if these potential hazards are recognised and steps are taken to avoid them, they may be minimal in comparison with the dangers from uncontrollable fires, and from problems with staff fighting fires with hand-operated extinguishers.

7.24 In addition to the training of kitchen staff within the normal Firecode hospital fire safety strategy (see SHTM 83), they must be forewarned about the operating characteristics of any fixed fire-fighting system. They should be alerted to any potential hazards which may occur during discharges, by the conspicuous placing of suitably worded warning notices. Kitchen staff must become, and remain, familiar with all fire-fighting equipment, under the direction of the hospital fire safety adviser.



Inspection and maintenance of systems

7.25 It is recommended that the following visual inspections are completed in accordance with manufacturers' guidance, on a monthly basis, to ensure that:

- a. extinguishing systems are operational and undamaged, and nozzles remain correctly positioned for effective discharge;
- b. system equipment is free from leaks;
- c. manual actuating controls are serviceable and unobstructed and any obvious defects are reported and quickly corrected;
- d. range hoods and extract ducts are clean and free from build-up of fatty deposits.

7.26 The pressure vessels forming part of fixed firefighting systems are subject to statutory inspections. In addition, systems must be serviced by specialists or their approved agents to maintain their reliability and effectiveness. A formal maintenance procedure should be established and should include, among other things:

- an external examination of the complete system and any ancillary equipment for damage, corrosion or displacement of components;
- checks to ensure that the contents of extinguishant containers are within limits;
- checking the effectiveness of all associated fire detectors, alarms, releasing devices and manual controls for correct operation (checks to be undertaken with the elements of the system placed in the "isolated" mode);
- checking the need for repair or replacement of any damaged components if the system has operated to extinguish a fire;
- the keeping and updating of maintenance records.



8.0 References and further reading

Health authorities must ensure that they use the latest editions of, and take account of, all amendments to statutes, British Standards and guidance published by other government departments, professional institutions, etc.

Statutes

Building, Scotland Act 1970

Factories Act 1961. The Stationery Office 1961. ISBN 0108500276

Fire Precautions Act 1971. The Stationery Office 1971. ISBN 010544071X

Fire Safety and Safety of Places of Sport (Scotland) Act 1988. The Stationery Office 1987.

National Health Service and Community Care Act 1990. The Stationery Office

Offices, Shops and Railway Premises Act 1963. The Stationery Office 1963. ISBN 0108501116

Health and Safety at Work etc Act 1974. The Stationery Office 1974. ISBN 0105437743

SI 2768: 1991 The Building Standard (Scotland) Regulations. The Stationery Office 1990.

SI 76: 1989 The Fire Precautions (Factories, Office, Shop and Railway Premises) Order. The Stationery Office 1989. ISBN 0110960769

SI 77: 1989 The Fire Precautions (Application for Certificate) Regulations. The Stationery Office 1989. ISBN 0110960777

British Standards

BS 476 Fire tests on building materials and structures.

BS 4422 Glossary of terms associated with fire.

Part 1:1987 General terms and phenomena of fire.

Part 2:1990 Structural fire protection.

Part 3:1990 Fire detection and alarm.

Part 4:1994 Fire extinguishing equipment.

Part 5:1989 Smoke control.

Part 6:1988 Evacuation and means of escape.

Part 7:1988 Explosion detection and suppression means.

BS 5266 Emergency lighting.

Part 1:1999 Code of practice for the emergency lighting of premises other than cinemas and certain other specified premises used for entertainment.

BS 5306 Fire extinguishing installations and equipment on premises.

Part 2:1990 Specification for sprinkler systems.

BS 5499 Fire safety signs, notices and graphic symbols.

Part 1:1990 Specification for fire safety signs.

BS 5588 Fire precautions in the design, construction and use of buildings.

Part 4:1998 Code of practice for smoke control using pressure differentials.

Part 9:1999 Code of practice for ventilation and air conditioning ductwork.

BS 5839 Fire detection and alarm systems for buildings. **Part 1:1988** Code of practice for system design, installation and servicing.

BS 7671:1992 Requirements for electrical installations. IEE Wiring Regulations: Sixteenth edition.

BS 8313:1997 Code of practice for accommodation of building services in ducts.

Other publications

Standard fire precautions for contractors engaged on works for Crown civil and defence estates. Department of the Environment, The Stationery Office 1991. ISBN 0117525235.

Guide to fire precautions in existing places of entertainment and like premises. Home Office, The Stationery Office 1990. ISBN 0113409079.

Fire Precautions Act 1971: guide to fire precautions in existing places of work that require a fire certificate: factories, offices, shops and railway premises. Home Office, The Stationery Office 1989. ISBN 0113409060.

Fire safety at work management guide for places of work. Scottish Office, The Stationery Office.

Code of practice for fire precautions in factories, offices, shops and railway premises not required to have a fire certificate. Home Office, The Stationery Office 1989. ISBN 0113409044.

Emergency lighting (TM 12). Chartered Institution of Building Services Engineers (CIBSE) 1986.



Appendix 1

The Building Standard (Scotland) Regulations 1990, as amended

Control

1. The Technical Regulations control the erection of a new building, the extension of a building, and the material alteration of a building. Fire safety is controlled both by the Fire Precautions Act 1971 and by the Technical Standards, and there is some overlapping of control between these two statutes.

Purpose groups and uses

2. In many hospitals there may be a complex mix of uses (called "purpose groups" in the Technical Standards). The possible risk that one part of a complex may have on another must be considered with any special measures to reduce this risk. These measures may include such items as smoke control, additional fire detection, alarm and extinguishing systems beyond those normally provided in hospital premises.

Application of Technical Standards/Fire Precautions Act

3. Parts D and E of the Technical Standards cover fire safety and structural fire precautions:

D2 - Fire Resistance and non-combustibility;

E2 – Means of escape from fire: Exits, escape routes and travel distance;

E3 – Design for horizontal escape.

Scottish Office guidance

4. Parts D and E of the Technical Standards must be followed for the erection of a new building, the extension of a building and the material alteration of a building.

Alterations and extensions

5. The Technical Standards apply to the alteration or extension, but not to existing unaffected parts of the building. However the alteration or extension must not directly cause a failure to conform (or a greater failure to conform) in any existing part of the building.

Means of escape in case of fire

6. The Technical Standards control means of escape for purpose groups, which are defined in Section A, Regulation 6, Schedule 3 of the Technical Standards. When premises are designed and constructed in accordance with the Technical Standards in respect of means of escape in case of fire (and no material alterations have taken place), it is likely that the duty under the Fire Precautions Act with regard to means of escape from fire will also be met, provided the standard required by the Technical Standards is being maintained effectively.