NHS National Services Scotland

NHSScotland 'Firecode'

Scottish Health Technical Memorandum 85

Fire precautions in existing healthcare premises

Health Facilities Scotland
Property and Capital Planning

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Contents

About this publication

This document, Scottish Health Technical Memorandum (SHTM) 85 Version 4, contains guidance on fire safety applicable to NHSScotland and other healthcare premises and replaces SHTM 85 Version 3, dated April 2003. It supports and may be read in conjunction with the practical Fire Safety Guidance for Healthcare premises, the primary Scottish Government guidance to support compliance with the Fire (Scotland) Act 2005 as amended and the Fire Safety (Scotland) Regulations 2006.

The guidance applies to patient access areas of healthcare premises, but may also be used where the guidance is clearly appropriate for other areas of healthcare premises in conjunction with the Scottish Building Standards Technical Handbook for non-domestic premises.

The 'sister' publications to SHTM 85 are:

- SHTM 86, Part 1: Fire risk assessment in community healthcare premises; and
- SHTM 86, Part 2: Fire risk assessment in healthcare premises.

These documents together, provide a fire engineering approach to fire risk assessment based on the balancing of life risk, fire hazards and existing fire precautions. Using such an approach it is possible to determine what, if any, additional precautions are necessary on the principle of equivalency with specified fire safety benchmarks.

The primary remit of healthcare bodies, with regard to fire safety, is the safety of all patients, visitors, and staff. For premises under their control, healthcare bodies will need to select and effectively implement a combination of measures to achieve an acceptable level of fire safety, taking into account:

- the guidance in this Scottish Health Technical Memorandum;
- the relevant guidance contained in the other component documents of NHSScotland Firecode;
- the Practical Fire Safety Guidance for Healthcare Premises to support compliance with the Fire (Scotland) Act 2005 as amended and the Fire Safety (Scotland) Regulations 2006.

All those with responsibility for fire safety in NHSScotland, and those with similar responsibilities in the premises of other healthcare providers, should be familiar with the extent of their responsibility, and to the extent necessary, the content of this and other relevant guidance documents.

REVISIONS:

SHTM 85 Version 4 updates and replaces Version 3, and is amended to take account, in particular, of the following requirements, guidance and standards;

- the Fire (Scotland) Act 2005 as amended;
- the Fire Safety (Scotland) Regulations 2006;
- SHTM 86 Version 4; Parts 1 and 2;
- the Scottish Building Standards Technical Handbook Non-Domestic.

The Practical Fire Safety Guidance for Healthcare Premises to support compliance with the Fire (Scotland) Act 2005 as amended and the Fire Safety (Scotland) Regulations 2006.

1. Introduction and scope

General application

1.1 This Scottish Health Technical Memorandum (SHTM 85, Version 4) provides guidance on fire safety standards for existing NHSScotland and other healthcare premises. It should be used:

- to support and assist compliance with the Fire (Scotland) Act 2005 as amended and the Fire Safety (Scotland) Regulations 2006;
- when upgrading existing fire precautions;
- when considering fire precautions for alterations in existing healthcare buildings that require building warrant approval;
- when considering fire precautions for minor alterations not requiring a building warrant;
- to support and assist the conduct of SHTM 86 fire risk assessments.

1.2 This revision SHTM 85, Version 4 came into operation in December 2007.

1.3 The major part of this document, Sections 4 to 7, considers fire safety in areas of the healthcare premises to which patients have access. Section 8 provides guidance on the provision of access and facilities for fire fighting and Section 9 considers fire safety in other areas of the healthcare premises.

Scope of SHTM 85

1.4 This document provides guidance on the standards of fire safety for existing NHSScotland healthcare premises and takes account of the wide range and age of buildings likely to be encountered. The fire safety issues encountered will vary considerably, and will not, in any case, be exclusively dependent on the physical fire precautions that are provided. SHTM 85 considers the fire safety implications of:

- the dependency of the patient;
- fire hazards within the healthcare premises;
- management policies;
- the availability of sufficient and adequately trained staff.

1.5 The fire safety benchmarks relating to structural fire safety specified in this document are consistent with those contained in the Scottish Building Standards Technical Handbook for non-domestic premises supporting compliance with the Building (Scotland) Regulations 2004. These standards provide benchmarks against which the existing fire safety provisions can be

measured, and the standards to be aimed for when considering the fire precautions in existing buildings.

1.6 Where it is not possible to achieve the full standard specified by the benchmark, the responsible person must in any case be satisfied that an appropriate standard of fire safety has been achieved. This may be done by the application of compensating measures identified as a consequence of an SHTM 86 fire risk assessment, or by physically improving the fire safety provisions so that an adequate and appropriate standard of fire safety is achieved. In any case, the standard specified in the relevant benchmark should be achieved whenever reasonably possible taking into account all the circumstances of the particular case.

1.7 SHTM 85 may also be used when considering the standard of fire safety that should be applied when proposals are made for minor works such as simple refurbishments in existing buildings. On completion, the existing fire risk assessment should be reviewed.

Note: The Practical Fire Safety Guide for Healthcare Premises provides the primary supporting guidance for compliance with Fire (Scotland) Act 2005 as amended and the Fire Safety (Scotland) Regulations 2006.

SHTM 85 Version 4 provides the benchmarks that should be used when assessing the fire safety standards in accordance with SHTM 86: 'Fire Risk Assessment in healthcare premises'. In addition, it supports the primary guidance contained in the Practical Fire Safety Guidance for Healthcare Premises. SHTM 85 Version 4 should therefore be applied in association with both these documents.

SHTM 86: Fire risk assessment in existing healthcare premises

1.8 SHTM 86, Parts 1 and 2, provide a method of assessing:

- the physical fire precautions;
- the dependency of the patients (where applicable);
- the fire hazards within the building;
- the management policies;
- the availability of sufficient adequately trained staff;

following any additional fire safety measures required within the healthcare premises may be determined.

Use by competent persons

1.9 This document may be used by competent persons employed as:

- Property/Estates/Building/Engineering Officers, Facilities Managers and Health/Fire Safety staff employed by NHSScotland;
- architectural, building and engineering consultants;
- Building control officers;
- Fire safety consultants;
- Enforcement Officers of the local Fire and Rescue Service.

Persons will be considered competent where they have sufficient technical knowledge and experience, both to understand fully the requirement of fire safety procedures and management involved, and to undertake properly the measures referred to in this document.

SHTM 81: Fire precautions in new healthcare premises

1.10 The guidance contained in SHTM 81 should be applied to the design of new hospitals and major extensions/refurbishments of existing hospitals, in addition to the standards specified in the Scottish Building Standards Technical Handbook for non-domestic premises, for compliance with the Building (Scotland) Regulations 2004. This is commonly referred to as the Non-domestic Handbook.

SHTM 81 recognises the special requirements of healthcare premises with regard to fire precautions, and provides standards relating to aspects of fire safety in addition to those covered by the Scottish Building Standards Technical Handbook for non-domestic premises, that may be necessary in order to achieve or support compliance with the Fire (Scotland) Act 2005 as amended and the Fire Safety (Scotland) Regulations 2006.

1.11 The guidance in SHTM 81 is specific to the applications listed in that document. It should not be used as an alternative to SHTM 85. Similarly the guidance in this document should not be used as an alternative to SHTM 81.

2. Glossary of terms

2.1 For the purposes of this document the definition of terms provided in the Scottish Building Standards Technical Handbook for non-domestic premises for compliance with the Building (Scotland) Regulations 2004 should be referred to. The standard specified for 'hospitals' in the non-domestic handbook applies to all healthcare premises where there is patient access. The following additional definitions also apply:

circulation space: the communication routes both within the department/management unit giving access to other parts of the premises, including routes to fire exits.

combustible: capable of burning in the presence of oxygen.

compartment: part of a building (that may contain one or more rooms, spaces or storeys and includes, where relevant, the space above the top storey of the compartment) constructed so as to prevent the spread of fire to or from another part of the same building.

element of structure: part of the structural frame of a building which is load-bearing.

emergency door: a door which may be a fire door intended for use only during an emergency.

emergency lighting: lighting designed to come into, or remain in, operation automatically in the event of a local and general power failure.

escape route: a route forming part of the means of escape from any point in the building to a final exit.

final exit: termination of an escape route from a building, giving access to a street or open space, where people are no longer in danger from fire.

fire damper: a device within a duct, which operates automatically and will stop the passage of fire and smoke, which together with its frame has the same fire resistance as that element of building construction through which the duct passes.

fire door: a fire door is rated by its fire resistance performance under test conditions. A door rated to 30 minutes (short duration) will be described as FD 30 (when tested to BS 476 Part 22) or E30 (when tested to BS EN 1634 Part 1). A suffix is added to denote a door with a smoke control function FD 30S or E 30Sa respectively. An equivalent 60-minute (medium duration) fire door will be designated FD 60S or E 60Sa. This test rating is an indication of test performance and not necessarily how a door will perform in a real fire.

fire-fighting shaft: a shaft enclosed by walls forming the enclosing structure of a protected zone with long fire duration.

fire hazard: a situation that can give rise to a fire.

fire precautions: measures which can be taken to reduce the likelihood of ignition occurring and/or to mitigate the consequences should ignition occur. Precautions are considered under five headings, each of which is defined as follows:

- **prevention:** precautions to control potential ignition and fuel sources, to ensure that fires do not start; prevention also includes general fire precautions;
- **communications/detection and alarm:** precautions that automatically inform the occupants and Fire & Rescue Service when a fire starts;
- **means of escape:** precautions which enable the occupants of the building to turn their back on the fire, and escape to a place of safety away from the effects of the fire;
- **containment:** precautions which contain the fire to the smallest possible area, and control the threat to life, safety and the extent of property damage;
- **extinguishment:** precautions which ensure that the fire can be extinguished quickly and with minimum disturbance or damage to the function of the premises.

fire resistance: ability of an element of building construction, component or structure to fulfil, for a stated period of time, the required load-bearing capacity, fire integrity and/or thermal insulation and/or other expected duty in a standard fire-resistance test.

fire risk: the potential for fire to occur (likelihood) and cause death or injury (consequence).

fire stopping: The seal between elements, components or any joints in the construction of the building in order to prevent the passage of fire and smoke through the building.

hospital street: A protected zone in a hospital provided to assist in facilitating circulation and horizontal evacuation, and to provide a fire-fighting bridgehead.

ignition sources: heat sources or flames that may cause ignition.

means of escape: safe routes provided for people to travel from any point in a building to an unenclosed safe area beyond the premises including fire safety measures to maintain those routes.

non-combustible: the material is certified non-combustible throughout according to the test specified in BS476: Parts 4 and 11.

place of safety: a place where persons are in no danger from fire.

place of special fire risk: any place within or attached to, or on a roof of a building in which is installed one or more:

- solid fuel appliances, with an output rating more than 50kw, other than kitchen appliances, or
- oil or gas fires appliances, with a total installed net input rating of more than 70kw; or
- fixed internal combustion engines, including gas turbine engines, with a total output rating more than 45kw; or
- fuel oil storage tanks having a capacity of more than 90litres.

progressive horizontal evacuation: evacuation of patients away from a fire into a fire-free compartment or sub-compartment on the same level.

protected door: a fire door giving access to:

- a protected zone (including a protected lobby); or
- a fire-fighting shaft; or
- another compartment; or
- an enclosed safe area beyond the premises; or
- an open access balcony; or
- an escape route across a flat roof or access deck.

protected lobby: a lobby within a protected zone but separated from the remainder of the protected zone so as to resist the movement of smoke from the adjoining accommodation to the remainder of the protected zone.

protected zone: that part of an escape route within a building, but not within a room, and to which access is only by way of a protected door from which there is an exit directly to an unenclosed safe area beyond the premises.

protected shaft: a shaft which enables persons, air or objects to pass from one compartment to another, and which is enclosed with fire-resisting construction.

refuge: a place of temporary safety within a building; this should be an adjoining compartment or sub-compartment capable of holding all those threatened, without a significant change in level and from which there is potential for further escape should that become necessary.

sub compartment: part of a building (which may contain one or more rooms, and includes, where relevant, the space above the top storey of the sub compartment), constructed so as to aid progressive horizontal evacuation.

unprotected zone: that part of an escape route which is separated by walls, glazed screens or any other permanent form of demarcation from any space intended for human occupation, including a protected zone.

3. Statutory requirements

Building (Scotland) Act 2003

3.1 The National Health Service and Community Care Act 1990, removed Crown immunity from Health Boards and other specified Health Service bodies from 1st April 1991. All building work is therefore subject to the requirements of the Scottish Building Standards Technical Handbook for non-domestic premises. Appropriate approvals must be obtained from the building control authority before the commencement of any works to which the Building (Scotland) Regulations 2004 apply.

Fire Precautions Act 1971 (as amended)

3.2 Fire certificates previously issued under this Act covering some healthcare buildings or parts of buildings, ceased to have statutory effect from 1st October 2006. Conditions imposed by virtue of such certificates no longer have any effect.

Where a notice has previously been issued under Section 10 of the Fire Precautions Act 1971 it shall continue to have effect as if it was issued under section 63 (4) of the Fire (Scotland) Act 2005 as amended.

It is recommended that fire safety standards achieved in NHSScotland premises that resulted in the issue of a fire certificate should be maintained, even though the statutory requirement to do so no longer applies.

Previously certified standards do not confer or imply compliance with the Fire (Scotland) Act 2005 as amended and the Fire Safety (Scotland) Regulations 2006, however, it is likely that they will contribute significantly towards such compliance.

Fire Precautions (Workplace) Regulations 1997 (as amended)

3.3 These Regulations ceased to have statutory effect from 1st October 2006.

Fire risk assessments carried out in pursuit of compliance with them should be reviewed, having specific regard to the conditions now applying under the terms of the Fire (Scotland) Act 2005 as amended and the Fire Safety (Scotland) Regulations 2006.

Such assessments do not confer or imply compliance with the conditions of the Fire (Scotland) Act 2005 as amended and the Fire Safety (Scotland) Regulations 2006, however, it is likely that they will contribute significantly towards such compliance.

Other legislation

3.4 Other relevant legislation includes:

- The Construction (Design and Management) Regulations 2007;
- The Management of Health and Safety at Work Regulations 1999;
- Disability Discrimination Act 1995;
- Dangerous Substances and Explosive Atmospheres Regulations 2002;
- The Civic Government (Scotland) Act 1982 (Licensing of Houses in Multiple Occupation) Order 2000 as amended.

The list above is indicative only and fire safety provisions may be contained in other enactments.

As a consequence of the Fire (Scotland) Act 2005 as amended, Part 3 and the supporting regulations coming into force, both primary and secondary legislation has been withdrawn or amended where it is replaced by the new Act or where provisions are modified or amended by the Act.

The various statutory instruments detailing these revocations and amendments may be accessed at www.infoscotland.com/firelaw

The Fire Safety (Scotland) Regulations 2006

3.5 The Fire (Scotland) Act 2005 Part 3 as amended, together with the Fire Safety (Scotland) Regulations 2006, came into force on the 1st October 2006 and now form the primary fire safety legislation in Scotland.

The Act and Regulations are applicable to all NHSScotland healthcare premises, including care homes and houses in multiple occupation. Specific guidance for these and other occupancy types is accessible online at the address indicated below and care should be exercised at the outset to ensure the appropriate guidance document is referred to when carrying out fire risk assessments.

The enforcing authority is the Fire and Rescue Authority in whose area the premises are situated and compliance with the Act and associated regulations is based on a fire risk assessment regime.

Those with specific duties include owners, employees, employers and others who may have control to any extent (subject to some provisos) and they are responsible for compliance with the Act and Regulations. Such persons are required to take steps to prevent and mitigate the effects of fire. The enforcing authority is likely to exercise its powers by means of an audit regime related to the life risk profile of the occupancy.

Guidance for those affected by the legislation, titled ‘Fire Safety Guidance – Are you aware of your responsibilities’ has been widely distributed and is also

available online at www.infoscotland.com/firelaw, or in print from Blackwell's Bookshop, 53 South Bridge Street, Edinburgh, EH1 1YS. Orders and enquiries should be made to 0131 622 8283 or 0131 622 8258. The Act itself, Regulations and Statutory Instruments together with sector specific guidance documents to support compliance will also be found on the website.

Employment of young persons

3.6 The Fire Safety (Scotland) Regulations 2006 (Scottish Statutory Instrument 2006 No.456) Part II; regulations 4 and 5 prohibit the employment of young persons, defined as persons who have not reached the age of 18, unless an assessment relating to their conditions of work has been undertaken, or reviewed where one has previously been done.

The assessment should be carried out or reviewed for each young person prior to their employment, to ensure the workplace is safe having regard to the specific conditions of their employment, including the work they have to undertake and the environment in which they will work.

The specific matters the assessment should take account of are detailed in regulation 5 of Part II of the Regulations, and include the following matters:

- their immaturity, inexperience and lack of awareness of fire safety matters;
- the layout, fittings and fixtures in the place where they will be expected to work;
- the nature, degree and duration of any potential exposure to physical or chemical agents;
- the hazards to which they may be exposed relating to the handling and use of any work equipment;
- the organisation of processes and activities;
- risks from agents, processes and work detailed in the Annex to Council Directive 94/33/EC, relating to the employment of young persons. This Annex may be accessed online at www.dehp-facts.com/upload/documents/document40.pdf.

3.7 The assessment relating to the employment of young persons should be undertaken separately from the SHTM 86 fire risk assessment. However as an integral component of the fire safety regulatory compliance regime it is recommended that it, or a copy of it, is appended to the SHTM 86 assessment as it will be relevant, and may be requested in the event of any audit undertaken by the enforcing authority.

3.8 An assessment is not required if no young persons are, or are proposed to be, employed. However, in order to demonstrate that the issue has properly been addressed it is recommended that the findings should still be recorded.

3.9 The assessment should identify any additional measures to ensure the safety from fire, or its products, of young persons employed in the assessment area. The Annex to Council Directive 94/33, identified previously in paragraph 3.6 provides a comprehensive, but not exhaustive, list of the criteria that should be considered.

3.10 Whilst the fire safety provisions adopted for the protection of all occupants will be equally applicable for the protection of young persons, it should also be recognised that additional measures may be necessary to take account of the particular vulnerabilities of young persons in this regard. Examples of the additional measures that may be necessary include:

- specific fire safety training to raise their awareness of the dangers of fire, having particular regard to their immaturity and lack of workplace experience;
- limitation or prohibition of their use of work equipment, work processes or materials and substances, including highly flammable liquids, cylinder gases, toxic substances, asphyxiants and other similarly hazardous materials;
- enhanced supervision of their workplace activities.

3.11 The requirements relating to the employment of young persons apply equally in both patient and non-patient access areas.

Other NHSScotland Firecode guidance

3.12 This SHTM should also be read in conjunction with the guidance contained in the latest revisions of the NHSScotland Firecode documents. See the References Section for a full list.

4. Patient access areas

General

4.1 Patient access areas includes all areas containing escape routes used by patients, and for the purposes of this document only, are those areas of healthcare premises to which patients have authorised access, either with or without supervision. However, patient access areas do not include those areas containing commercial enterprises even though patients may frequent them, as escape from patient access areas should be independent of those areas containing commercial enterprises. Similarly, escape from areas containing commercial enterprises should be independent of patient access areas. See also paragraph 9.2.

Fire safety

4.2 Fire safety in patient access areas is considered in Sections 5, 6 and 7, having regard to:

- **the dependency of the patient** – considering their mobility, and ability to comprehend and respond to instructions (Section 5);
- **the fire hazards** – considering the presence of combustible materials and potential ignition sources (Section 6);
- **the fire precautions** – considering the measures to prevent or mitigate the potential for fires to start, and the effects of fire (Section 7).

Fire hazards

4.3 Examples of fire hazards are:

- **potential ignition sources** – fires started by patients, fires spreading from other parts of the hospital, cooking sources, deliberate fire-raising, lightning, smokers materials, equipment fires and fires involving work processes;
- **combustible materials** – textiles and furniture, surface finishes, furniture and room contents etc.

Fire precautions

4.4 Section 7 of this document sets out the objectives relating to fire precautions and these are considered under the following five headings:

- **prevention** – precautions to ensure that fires do not start by controlling ignition sources and combustible materials;

- **communications** – precautions to ensure that if ignition occurs, the occupants and the fire and rescue service is informed;
- **escape** – precautions to ensure that the occupants of the building are able to move to places of safety before they are threatened by heat and smoke;
- **containment** – precautions to ensure that the fire is contained to the smallest possible area, limiting the amount of property likely to be damaged and the threat to life safety;
- **extinguishment** – precautions to ensure that the fire can be extinguished quickly with the minimum of consequential damage to the building.

5. Patients

Standard

5.1 Guidance in this document is appropriate for all areas to which patients have access.

5.2 Guidance for non-patient access areas should be drawn from the Scottish Building Standards Technical Handbook for non-domestic premises and additionally, where appropriate, from this and other component parts of Firecode Scotland. See also paragraphs. 6.25 to 6.35.

5.3 Most patients require, to some degree, staff assistance to escape. Some patients because of their clinical dependency, age, frailty, inability to respond safely or properly to an alarm of fire due to a learning or mental health difficulty and/or treatment, will require extra assistance to move in the event of fire.

5.4 Hospitals, and in some cases other healthcare premises, will commonly accommodate a mix of people with a wide range of dependencies. Some will be able to escape without assistance whilst others will require considerable extra help to do so. Assessment of the risk should be based on the clinical dependency of the majority. In any case sufficient staff must be available to ensure that the evacuation of all those present, including patients, staff, visitors and others, can be safely undertaken.

6. Fire hazards

General

6.1 This Section identifies a comprehensive range of fire hazards for which the fire precautions recommended in this document provide an appropriate standard of protection. The fire precautions together with the fire hazards in the assessment area are an integral component of the SHTM 86 fire risk assessment, or other appropriate method of fire risk assessment, that must be conducted.

6.2 Fire hazards are considered under the following headings:

- potential ignition sources;
- combustible materials.

Potential ignition sources

6.3 Healthcare premises have many potential sources of ignition. Broadly these can be categorised as:

- natural phenomena, (e.g. lightning strike);
- human carelessness, (e.g. careless disposal of smokers materials);
- technological failure, (e.g. for example wiring and appliance faults);
- deliberate fire-raising.

Whether these constitute a hazard or not depends on a number of factors, such as the physical fire precautions within the building, the quality and regularity of staff training, the maintenance procedures and the adequacy and supervision of security measures.

This Section provides guidance on identifying potential sources of ignition and the measures that can be taken to ensure that they do not result in a significant risk.

6.4 Potential sources of ignition found within healthcare premises are considered below:

- smoking;
- fires started by patients;
- deliberate fire-raising;
- work processes;

- fire hazard rooms;
- equipment;
- non-patient access areas;
- lightning.

Smoking

Standard

6.5 'Smoking' and 'No smoking' areas should be clearly marked by appropriate signs. Sufficient and suitably placed ashtrays and bins of an approved type should be provided for the safe disposal of smoking materials, where smoking is permitted.

6.6 Rooms in which smoking is permitted should be inspected at regular intervals and about half an hour after they have been vacated for the night to ensure that discarded smoking materials are removed and that they have not ignited other materials.

6.7 Smoking should be prohibited in healthcare premises, subject to the limitations and exceptions permitted under the terms of the Smoking, Health and Social Care (Scotland) Act 2005 and the Prohibition of Smoking in Certain Places (Scotland) Regulations 2006.

6.8 The guidance provided in 'Smoke Free Scotland' on smoking policies for NHSScotland, local authorities and care service providers provides an exemplar standard that may be adopted and as a source of further information. The guidance is available at www.clearingtheairscotland.com

6.9 Smoking has shown a marked decline in recent years, however, a significant potential for fire remains, due to the possible careless disposal of matches and smoking materials. The statutory smoking restrictions in occupied buildings means that those who do smoke are likely to do so in remote and inconspicuous places where they are unlikely to be found. The clear aim should be to eliminate smoking in healthcare premises generally, but especially in those areas where smoking may incur an elevated potential for fire and increased risk.

6.10 Smoking is permitted in adult residential care homes and residential psychiatric hospitals and units, subject to certain conditions.

Fires started by patients

Standard

6.11 The guidance in this document is appropriate for all areas to which patients have access. Non-patient access areas are covered in Section 8.

6.12 The incidence of fires started by patients often depends on the patient care group for which the facilities are provided. Statistics show that in areas where care is provided for elderly patients and those suffering from a mental illness there is likely to be a higher incidence of fire.

This is due to several factors:

- age and frailty;
- inability to appreciate fire hazards;
- the careless disposal of smoking materials;
- deliberate starting of fires.

6.13 In areas providing care for a range of patient groups, where the ratios are constantly changing, assessment should be based on the condition of the majority of patients.

Deliberate fire-raising

Standard

6.14 The fire safety policy for the premises should include specific reference to the need for measures in relation to the prevention of deliberate fire raising.

6.15 Guidance on the prevention of deliberate fire-raising is available in NHSScotland Firecode: Scottish Fire Practice Note (SFPN) 6: The prevention and control of deliberate fire-raising in NHSScotland healthcare premises. Particular issues that may require specific consideration are:

- site access and security;
- building access and security;
- the design of staff circulation routes to increase passive surveillance;
- the reduction of the number of unfrequented areas;
- the use of CCTV and specialist security staff;
- restricting access to sensitive areas such as stores, plant rooms, etc and to disused or derelict buildings.

Work processes

Standard

6.16 All (fire) hazardous work processes should be identified. Measures should be taken to ensure that all those working in these areas receive adequate training and are made aware of the potential fire hazards to themselves and to all others who may use the premises. Safe working practices once established should be supervised, adhered to and periodically re-evaluated.

6.17 Work processes in the following areas may present particular fire hazards if adequate precautions are not taken:

- physiotherapy departments; having particular regard to the storage and use of cellular foam mats and soft foam equipment;
- X-ray departments: having particular regard to film storage.

6.18 Guidance on the particular hazards within these areas and effective measures to reduce them is contained in SHTM 83: 'Fire safety in healthcare premises: general fire precautions', which also contains guidance on the hazards associated with building and maintenance work within patient access areas.

Fire hazard rooms

Standard

6.19 Fire hazard rooms and areas should be enclosed to the fire resisting standard specified in the Scottish Building Standards Technical Handbook for non-domestic premises; Annex 2B; para 2B1.

6.20 Certain rooms within patient access areas of healthcare premises constitute a particular fire hazard. Walls providing short fire resistance duration fire resisting construction should enclose these rooms. Refer also to the Scottish Building Standards Technical Handbook for non-domestic premises, Annex 2B, additional guidance for hospitals.

- chemical stores;
- cleaners' rooms;
- clothes storage;
- dayrooms with a floor area greater than 20 m^2;
- smoking rooms;
- disposal rooms;
- laboratories;

- lift motor rooms;
- linen stores;
- bedrooms in a building other than a hospital.
- bedrooms in a hospital where they are used by:
  - elderly people; or
  - those with mental illness; or
  - those with learning difficulties;
- kitchens, other than separate hospital departments;
- laundry rooms;
- staff changing and locker rooms;
- store rooms;
- X-ray film and record stores;
- all rooms within a main laundry in which delivery, sorting, processing packing and storing are carried out.

Equipment

Standard

6.21 There should be an effective programme of planned preventative maintenance throughout the healthcare premises, and a procedure for reporting faults. Once reported, action should be taken to repair the fault and ensure the equipment is made safe. Each room or area should have sufficient electrical sockets for the equipment used in that room. Where necessary, equipment should have clear user instructions and a specific system of work supported by training for staff in its safe use. The wiring of plugs or carrying out electrical repairs of any sort should not be permitted other than by properly qualified staff.

6.22 A policy on the limited use of properly fused electrical extension leads should be adopted, and in no circumstances should un-fused multiple adaptors or extension leads be permitted. Personal electrical equipment belonging to staff, patients or others should not be used in healthcare premises unless it has been tested and approved for use by a person properly qualified to carry out such tests.

6.23 The number of fires in healthcare premises caused by defective mechanical and electrical plant, or damaged electrical cables, may be reduced by implementing a programme of planned preventative maintenance to ensure that all equipment is regularly checked and maintained in accordance with a strict maintenance regime.

6.24 It is important to ensure that faults and defective equipment that are identified by staff are brought to the attention of the maintenance section that should then take action in accordance with a repair procedure.

Fire separation: patient and non-patient access areas

Standard

6.25 The relative locations of non-patient and patient access areas, the level of fire safety performance of separating walls and floors, the provision of automatic fire control systems and other relevant standards should comply with the requirements of the Scottish Building Standards Technical Handbook for non-domestic premises.

6.26 Comprehensive guidance on the safe use, storage and handling of medical gases in cylinders, in NHSScotland premises, is contained in SHTM 2022, Part 2: 'Medical gas pipeline systems'; section 8, or other appropriate guidance such as that provided by manufacturers, installers, suppliers and/or the Health and Safety Executive.

6.27 The fire separation of areas containing ignition sources from patient access areas increases the safety of patients. Should a fire occur, the degree of fire separation indicated in this document is intended to provide sufficient time to extinguish the fire without the need to evacuate patients.

6.28 Separating walls and floors should be provided between patient access areas and non-patient access areas. Additional provisions are required to protect operating theatres, intensive therapy units and special care baby units from the hazard presented by specific departments. These additional provisions may also be adopted to protect against the inherent hazard presented by other areas not specifically named in the Scottish Building Standards Technical Handbook for non-domestic premises, such as loading bays.

6.29 A separating wall or separating floor should be provided between parts of a building where they are in different occupation. Separating walls and separating floors should have a medium duration (60 minutes) fire-resistance. There should be no openings and doors should not be installed in separating walls.

6.30 A separating wall or separating floor with a medium duration (60 minutes) fire-resistance should be provided between parts of a building where one part is in single occupation and the other is in communal occupation. However, this is not necessary between any part of premises in single occupation and a common external stair, access balcony or deck.

6.31 Self-closing fire doors are permitted in separating walls between single and communally occupied areas provided each fire door has the same fire-resistance duration as the separating wall in which it is installed. Fire shutters should not be installed in a separating wall or a separating floor.

6.32 Separating walls and separating floors between the different occupiers of multi-occupied premises may not be provided when the premises have a common fire alarm system and evacuation strategy and are under a single management regime. However, where each unit is under the control and management of an independent occupier then separating floors and walls should be provided between the areas intended for different occupation.

6.33 Every part of a separating wall or separating floor should be constructed from materials that are non-combustible. Where materials are combustible then they should possess at least the same fire-resistance as that stated in paragraph 6.30 above, or higher as stated in paragraph 6.35 below.

6.34 The wall should contain no pipes, wires or other services within the wall but where these already exist then they should be fire-stopped and protected by intumescent materials that achieve a medium duration (60 minutes) fire-resistance.

6.35 The fire resistant duration should be the most stringent applicable, in respect of any abutting occupancy with reference to paragraphs 7.57 to 7.74. However, there are some situations where the wall or floor should have a greater fire-resistance. For example, if the separating floor is also an element of structure in a building where the topmost storey is at a height of more than 18m, long duration (120 minutes) fire-resistance would be necessary in most cases.

Protection against lightning

Standard

6.36 The need for an appropriate lightning protection system should be assessed taking into account the guidance contained in BSEN 62305. Where installed, they should also be maintained in accordance with BSEN 62305 and where existing systems have been installed in accordance with BS6651 they should be inspected annually. All inspection and maintenance should be conducted by a person properly qualified to do so and appropriate records kept.

6.37 The distribution of lightning strikes in the UK is not uniform and certain areas have a higher incidence of strikes than others. Nevertheless, the provision of a lightning protection system will reduce the possibility of fire starting due to a lightning strike. BS EN 62305 provides comprehensive guidance on the design of systems for the protection of structures against lightning. The design of lightning protection systems is specialised and advice should be taken from a competent installer suitably qualified in the specific protection required for each building.

Combustible materials

Standard

6.38 Combustible materials comprising wall, ceiling and floor surface finishes, textiles and furniture and other materials including substances subject to the Dangerous Substances and Explosive Atmosphere Regulations 2002, should be subject to appropriate control measures identified as a consequence of risk assessment, in accordance with the specified relevant standards.

6.39 Healthcare premises contain a great deal of combustible material in the form of textiles, furniture, surface finishes, paper based consumable products, bagged combustible waste, etc. Whether these constitute a particular hazard will depend on a number of factors such as how and where they are used, how they are stored, proximity of possible ignition sources, their age and physical condition, accessibility etc. This Section provides guidance on identifying combustible materials and also on standards relating to their use and storage.

6.40 Combustible materials are considered under the following headings:

- surface finishes;
- textiles and furniture;
- other materials.

Surface finishes

6.41 The finishes applied to walls, floors and ceilings can contribute to the spread of a fire. Some finishes will transfer fire from one area to another very quickly by ‘surface spread of flame’. This not only makes the fire difficult to control, but also provides additional fuel, which will increase the severity of the fire.

6.42 Small areas with non-permanent surface finishes that have a lower standard of surface spread of flame performance than specified in the Scottish Building Standards Technical Handbook for non-domestic premises are permitted, provided that they do not amount to more than 5% of the total wall areas in the assessment area, e.g. notice-boards. Where walls are covered by temporary surfaces such as posters, fabrics, prints, decorations, etc, the significance of these should also be considered.

6.43 Notice boards should have a continuous maximum length not exceeding 3m and where there is more than one such board they should be not less than 1m apart. In corridors, notice boards should not be sited immediately opposite each other.

6.44 Where walls have been subject to repeated painting with gloss paints over a number of years, the accumulated thickness of paint film may present a problem and provide for the rapid transfer of fire over its surface. Where this

exists, specialist technical advice should be obtained. The use of intumescent paints requires careful consideration, especially when they are applied over existing painted surfaces and these materials generally require to be used in conformity with very specific application standards and instructions, supplied with the material. However, full technical guidance should be obtained from the manufacturer where there is doubt as to the suitably of the material being considered or the application conditions, such as the thickness or condition of the substrate.

6.45 The following wall surfaces should be taken into account in the assessment:

- glazing, except glazing in doors; and
- any part of a ceiling that slopes at an angle of more than 70^0 to the horizontal.

6.46 The following surfaces need not be taken into account:

- doors and door frames;
- window frames and frames in which glazing is fitted;
- skirting and facings, cover moulds, picture rails, and similar narrow members; and
- fireplace surrounds, mantle shelves and fitted furniture.

The following ceiling surfaces should be taken into account in the assessment:

- the surface of glazing; and
- any part of a wall that slopes at an angle of 70^0 or less to the horizontal.

The following surfaces need not be taken into account:

- the frames of windows or roof lights and the frames in which glazing is fitted; and
- facings, cover mouldings, picture rails, and similar narrow members.

6.47 The use of plastics and thermoplastics is a complex issue and beyond the scope of this document. Guidance on the suitability of plastic or thermoplastic materials can be found in the Scottish Building Standards Technical Handbook for non-domestic premises.

Category 0: means the surface material or where it is bonded throughout to a substrate, the surface material combined with the substrate has a surface of Class 1 when tested to BS 476 part 7 and, when tested in accordance with BS 476: Part 6 has an index of performance (I) not more than 12 and a sub-index (i1) not more than 6 or has achieved a classification of B-s3, d2 or better when tested in accordance with BS EN 13823 and BS EN ISO: 11925-2. Materials, which may fall into this category, include brickwork, blockwork, concrete, ceramic tiles, plaster finishes (including rendering on wood or metal lathes), wood-wool cement slabs and mineral fibre tiles or sheets with cement or resin binding.
Category 1: means the material when tested to BS 476: Part 7 attains a Class 1 surface spread of flame or has achieved a classification of C-s3, d2 or better when tested in accordance with BS EN: 13823 and BS EN ISO: 11925-2. Materials which may fall into this category are timber, hardboard, blockboard and particle board, which have been treated to achieve Category 1.
Category 2/3: means the material when tested to BS 476: Part 7 attains a Class 2 or Class 3 surface spread of flame or has achieved a classification of D-s3, d2 or better when tested in accordance with BS EN 13823 and BS EN ISO: 11925-2. Materials, which may fall into this category, include timber, hardboard, blockboard, particle board, and certain dense timber or plywood.

6.48 The wall and ceiling surfaces of internal linings should have a reaction to fire as shown in the following table:

Surface linings by reference to use.

Surface	*Rooms not more than 4m^2 (category)*	*Rooms 4m^2 to 30m^2 (category)*	*Rooms more than 30m^2 (category)*	*Protected zones & unprotected zones* (category)*
walls	2	1	0	0
ceilings	2	1	1	0

** includes any toilet or washroom within a protected zone*

Table 1

6.49 In a room any part of the wall may be of one category less stringent than that shown in Table 4, but not less stringent than category 2/3, where the total area of those parts in any one room is not more than half the floor area of the room. This is subject to a maximum of 20 m^2 in residential buildings and 60 m^2 in non-residential buildings.

Floors

6.50 The finish applied to a floor may, in exceptional circumstances, contribute to the spread of fire. Hard flooring is not generally considered a significant problem, but the finish applied to certain flooring materials may, over a period of time, accumulate and constitute a fire hazard e.g. the accumulation of wax polish applied to a timber floor over a number of years is likely to pose a significant fire hazard.

Textiles and furnishings

Standard

6.51 The potential fire hazard due to textiles and furniture will be considered acceptable if more than 75% of all items of textiles and furniture achieve the standard required in SHTM 87 and there is an agreed policy of planned replacement and maintenance to comply with SHTM 87.

6.52 Textiles and furniture are likely to make a significant contribution to the fire load (fuel) within a building. SHTM 87: 'Textiles and furniture' gives guidance on their selection for healthcare premises. The aim should be to achieve 100% compliance with the requirements of SHTM 87. In existing healthcare premises, it is recognised that this may take time to achieve.

Other materials

Standard

6.53 The potential fire hazard will be considered acceptable where all combustible materials are identified and stored in accordance with the guidance in SHTM 83 'Fire safety in healthcare premises - general fire precautions'.

6.54 The following are examples of other combustible materials that may be found in healthcare premises:

- flammable liquids;
- aerosol sprays;
- medical gases;
- liquefied petroleum gases;
- disposable goods and packaging made from paper, plastic and expanded foam;
- combustible waste.

6.55 The above list is not definitive and other combustible materials are likely to be present in patient access areas.

6.56 If stored and disposed of correctly, combustible materials should not constitute a significant fire hazard. However, overstocking, lack of waste control and untidy, indiscriminate or inappropriate storage arrangements may incur a significant fire hazard. Further guidance is provided in SHTM 83 'Fire safety in healthcare premises: general fire precautions'.

7. Fire precautions

7.1 This Section provides guidance on the minimum acceptable level of fire precautions applicable to patient access areas of healthcare premises.

Prevention

Objective

7.2 The design, management and operational policies of healthcare premises should ensure that all practicable measures are taken to prevent fires.

7.3 It is recognised that a constant potential for fire in healthcare premises exists and that because of the wide range of dependencies of patients, and the purpose and use of healthcare buildings, a clear imperative exists to ensure that the probability of fire is reduced to the lowest practicable level consistent with the effective provision of healthcare services.
This obligation should be met by the implementation of a comprehensive system of fire risk assessment.

7.4 Effective management policies should include fire prevention measures that are firmly embedded in the working practices of all healthcare premises, and are underpinned by a fire safety strategy.

7.5 SHTM 83 ‘Fire safety in healthcare premises – general fire precautions’ contains guidance on fire safety measures and much of this Section refers to the effective implementation of the guidance contained in that document.

Management

Standard

7.6 Chief Executives should:

- ensure that their management policies regarding fire safety comply with the relevant guidance in the Scottish Government Health Department’s 'Fire Safety Policy';
- ensure that sufficient and adequately trained staff are available at all times (day and night), to provide for the safe evacuation of patients, in accordance with the emergency evacuation plan;
- maintain an up-to-date set of drawings that identify: alarm and detection systems, means of escape, emergency lighting, structural fire containment, first aid fire-fighting equipment and the provisions to assist the Fire and Rescue service, including access to buildings;

- keep records for a minimum period of three years of all routine testing, maintenance work, instruction, training and fire drills.

7.7 The responsibility of management to maintain an effective fire safety policy is identified in the Scottish Government Health Department 'Fire Safety Policy for NHSScotland'.

7.8 Comprehensive records should be kept of the testing and maintenance of fire safety facilities, including the following:

- the means for detecting and for giving warning in the case of fire;
- the means for fighting fire;
- any smoke management, smoke control or smoke venting systems;
- emergency and escape lighting, including the testing and maintenance regime of engine driven generator systems;

together with details of:

- instruction and training;
- fire drills.

7.9 Records should further include:

- the date on which the testing and maintenance was carried out and by whom;
- the date on which any fire safety related defects were reported and the action taken to remedy such defects;
- the date on which the defect was remedied and by whom;
- the significant findings of fire risk assessments, including the action taken, or proposed, to deal with any fire safety failures identified as a result of the fire risk assessments, and the result of follow up inspections.

Training

Standard

7.10 All staff, including managers and staff in all professions regardless of their position or seniority, part-time and agency staff, should receive training appropriate to their responsibilities in accordance with the guidance contained in SHTM 83 and the Scottish Government Health Department's 'Fire Safety Policy', or other fire safety policy and training standards adopted in non-NHS healthcare premises.

7.11 Non-NHS staff employed within NHS healthcare premises should also receive training on fire safety matters, appropriate to their responsibilities. Additional training should be provided for Nominated Officers (fire) and their deputies, or those with specific duties or responsibilities, to enable them to effectively carry out their duties, and ensure that they are aware of their statutory responsibilities.

Fire notices

Standard

7.12 Fire notices detailing what to do in the event of fire or hearing an alarm of fire should be sited in conspicuous locations throughout the premises. They should be sited adjacent to fire alarm break glass call points, final exit doors, at the entry point to stair enclosures and elsewhere considered appropriate. Additional notices giving further detailed instruction relevant for staff should be displayed on staff notice boards, in staff common rooms and residential accommodation.

7.13 The purpose of fire notices is to give clear instructions on the action to take when a fire is discovered or when the fire alarm is heard or perceived. Details of the evacuation procedure should be included and general notices for the direction and information of visitors should be displayed adjacent to each fire alarm break glass call point, and elsewhere considered appropriate e.g. waiting rooms, public notice boards etc.

7.14 Notices containing more specific information and guidance should be provided in staff areas such as staff rest rooms, at the staff base in wards or other departments, changing rooms etc.

Fire signs

Standard

7.15 Fire signs should be provided where appropriate in conspicuous positions. A planned programme for the replacement of signs not complying with the latest guidance should exist and form part of the ongoing fire safety programme.

7.16 Fire signs should be recognisable, clear and concise. They should convey essential information to regular and irregular users of the premises and the Fire and Rescue service. The visibility, illumination and height of display should be carefully considered.

7.17 Escape route signs should meet the following criteria:

- if the escape route to the nearest exit is not obvious then it should be indicated by a sign(s);
- signs should provide clear, unambiguous instruction on the route to take with sufficient information to enable people to safely leave a building in an emergency;
- escape route signs should, wherever necessary, incorporate a directional arrow. Arrows should not be used on their own;
- escape route and exit signs should not be fixed to doors as they will not be visible if the door is open;
- signs mounted above doors should be at a height of between 2m and 2.5m above the floor. Signs on walls should be mounted between 1.7m and 2m above the floor.

7.18 Signs should be in pictogram form, supplemented by text where considered necessary to make the sign easily understood. Escape route signs should not use only text.

7.19 For NHSScotland signage requirements further guidance may also be found in SHTM 83: 'Fire safety in healthcare premises: general fire precautions'. In both NHSScotland and other healthcare premises all signs should in any case comply with the specifications contained in BS 5499: Parts 4 and 5.

Communications

Objective

7.20 The management policy and operational procedures of healthcare premises should include the detection of fire at the earliest possible opportunity and suitable and appropriate warning for staff, occupants and the emergency services.

7.21 The provision of adequate means for detecting a fire and raising the alarm is of primary importance in healthcare premises. Early detection maximises the time available for orderly evacuation and provides an opportunity to tackle the fire at an earlier stage. Fire detection is provided both by staff observation in their workplace and by automatic fire and/or smoke detection and alarm systems.

Observation

Standard

7.22 In wards, a minimum of 30% of beds should be visible from the staff base.

7.23 The early detection of fire by staff is desirable as it contributes significantly to the overall fire safety of the premises. The observation of space as a component of the design and layout of an area can make a positive contribution to fire safety e.g. in a sleeping area the number of beds visible from the staff base. Although it is unlikely that the staff base will be permanently staffed, a location that provides good observation will improve the likelihood of a fire being detected at an early stage.

7.24 Observation is of particular value in patient sleeping areas and is considered in SHTM 86 risk assessments. However, in non-patient care areas it is assumed that observation is 'acceptable' for the purposes of fire risk assessment under the terms of SHTM 86.

If an alternative fire risk assessment method is used staff observation in patient sleeping areas should be one of the matters considered.

Detection and alarm systems

Standard

7.25 The detection and alarm systems should comply with the guidance in;

- SHTM 82: 'Fire detection, alarm and control systems';
- BS5839: Part 1: 'Fire detection and alarm systems for buildings: code of practice for system design, installation and servicing', and;
- the criteria specified in the Non–domestic handbook, Annex 2.B.5.

7.26 The provision of effective fire alarm systems in healthcare premises is a vital component of the overall fire safety strategy for protecting patients, staff and property from fire. SHTM 82: 'Fire detection, alarm and control systems' provides general principles and technical guidance on the design, specification, installation, commissioning, testing, operation and maintenance of fire alarm systems in healthcare premises. It should be read in conjunction with BS5839: Part 1: Fire detection and alarm systems for buildings: code of practice for system design, installation and servicing of fire alarm and detection systems, and the criteria specified in the Scottish Building Standards Technical Handbook for non-domestic premises, Annex 2.B.5.

Note: Consideration should be given to the sensory impairment of occupants including patients, visitors and staff, when considering communication of the fire alarm signal to occupants of the premises.

Means of escape

Objective

7.27 The design, management and operational policies of in-patient healthcare premises should ensure that all occupants can be moved away from a fire to a place of safety as quickly as possible.

7.28 In most patient access areas of healthcare premises the immediate and total evacuation of a storey or building may not be desirable. Non-ambulant or partially ambulant patients cannot negotiate escape routes unaided, particularly stairways, and will require staff assistance to escape to a place of safety. The scale of such an undertaking and the time it may take, make this type of evacuation difficult. For this reason the progressive horizontal evacuation of patients is considered essential for in-patient healthcare premises.

7.29 The principle of progressive horizontal evacuation is that in the event of a fire in one area, patients are evacuated initially to an adjoining area on the same level which is designed to protect the occupants from the immediate dangers of fire and smoke (a 'refuge'). The patients may remain there until the fire is dealt with or until further evacuation to another adjoining area or down the nearest stairway is commenced. This procedure will provide sufficient time for non-

ambulant and partially ambulant patients to be evacuated down stairways to a place of safety should it become necessary to evacuate an entire storey.

7.30 To facilitate this, the storey should be divided into compartments and sub-compartments.

Number of exits

7.31 The number of exits should comply with the requirements of Section 2.9 and Annex 2.B.3 of the Scottish Building Standards Technical Handbook for non-domestic premises, and in any case a minimum of two independent exit routes should be provided from patient care areas.

Escape routes

7.32 Any room with an occupant capacity of more than 60 should have at least two exits. Where more than one exit from a room is required, the directions of travel from any point within the storey or from any point within the room should:

- diverge at an angle of at least 45o; or
- be combined for a distance of not more than 9m and then diverge to two exits at an angle of at least 45o plus 2½o for every metre travelled in one direction.

7.33 An escape route should give access to a safe area beyond the building or to another compartment:

- directly;
- by way of a protected zone or unprotected zone;
- by way of an unprotected zone to a protected zone;
- by way of a flat roof or access deck for staff use only;
- in the case of escape from an inner room not intended to be used as sleeping accommodation, by way of one other room, but not through a place of special fire risk.

7.34 An escape route from a hospital department to which patients have access should be to:

- a place of safety;
- a protected zone; or
- an unprotected zone in another compartment or sub-compartment.

Bed-patients may be moved to another ward in a different compartment or sub-compartment.

7.35 An escape route and circulation area should have clear headroom of at least 2m. In a doorway it may be reduced to not less than 1.9m. An escape route should not be by way of a lift.

Escape route width

7.36 The unobstructed width of each individual escape route from a room or storey should be at least 1,200mm. However, in premises where the rooms or storey are used by low dependency patients, the width may be reduced to not less than 1,000mm. Doorways can reduce the width of escape routes by 150mm. This nominal reduction allows for the construction of door frames, but the clear opening width of the doorway should be at least 800mm in any case. An escape route should not narrow in the direction of escape except that an escape route may pass through a wider circulation area leading to a narrower circulation area provided the latter is of a width at least that recommended for the escape route.

7.37 The unobstructed width of every escape route intended for bed-patient evacuation should be at least 1,500mm. Doors should be designed to accommodate bed-patient evacuation.

7.38 A side-hung door across an escape route may open against the direction of escape where the occupancy capacity in the building or part of the building is sufficiently low. Where the occupancy capacity is 60 or more, the door should open in the direction of travel. However, if the door is an emergency door or a door serving a place of special fire risk, the door should open in the direction of escape regardless of occupancy levels.

Subdivision of corridors

7.39 For purposes of smoke control, certain corridors should be subdivided with a wall or screen with a short duration (30 minutes) fire-resistance (insulation criteria need not be applied to the wall, screen or any door). Any door in the wall or screen should be at least an FD 30S self-closing fire door and:

- where the corridor is a single direction of travel more than 4.5m long and provides access to a point from which more than one direction of escape is possible, it should be divided at that point or points;
- where the corridor provides at least two directions of escape and is more than 12m in length between the exits it serves, it should be divided in the middle third of the corridor. This does not mean that the corridor should be subdivided into 12m lengths.

Travel distance

7.40 Travel distance is the distance measured along the actual route of escape (having regard to the layout of furniture and fittings) from any point within a storey to the nearest protected door giving direct access to either:

- another sub-compartment;
- another compartment;
- a protected zone; or
- a final exit.

7.41 The escape route should not subsequently pass through a fire hazard room.

7.42 A compartment or sub compartment, where it may have to receive persons evacuating from an adjacent compartment, should be capable of holding the combined occupant capacities of both. If there is more than one adjacent compartment, it should be capable of holding the occupant capacity of itself plus the largest adjacent compartment or sub compartment.

7.43 Where a compartment or sub-compartment does not contain either a final exit or direct access to a protected zone, then each of the adjoining compartments or sub-compartments should contain either a final exit or direct access to a protected zone.

Travel distance: single direction

Standard

7.44 The maximum horizontal travel distance in a single direction of escape before there is a choice of escape routes should not be more than 15m (see Figure 1).

7.45 Single direction of escape is escape before there is the choice of escape routes, and it may mean moving towards or past the fire if the fire occurs between the occupant and the choice of escape routes. This includes escape from the room of origin of a fire and any horizontal travel distance prior to the choice of escape routes. Single direction of escape ceases at the point where there are alternative escape routes.

7.46 Single direction of escape may include escape from an inner room i.e. a room only accessible through an access room, provided that;

- the maximum travel distance from any point in the inner room to the exit from the access room should not exceed 15m, unless there are alternative exits from the access room;
- the inner room is not a bedroom;
- the access room leading to the inner room should not be a fire hazard room.

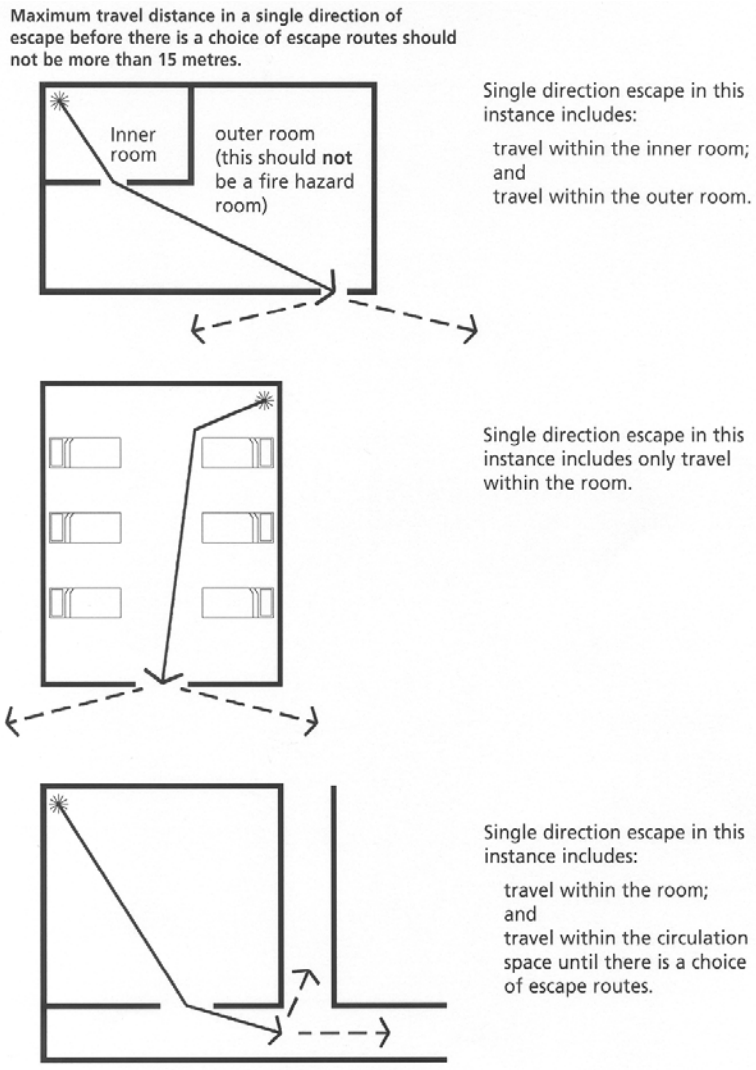

Figure 1

Travel distance: at least 2 directions of escape

Standard

7.47 The maximum horizontal travel distance from any point to a protected door in a compartment or sub-compartment wall, or to an escape stairway, or to the outside, should not be more than 32m (see Figure 2).

7.48 In addition, the maximum travel distance from any point within a compartment should be not more than 64m to:

- each of 2 adjoining compartments;
- an adjoining compartment and an escape stair or a final exit;
- an adjoining compartment and a final exit; or
- an escape stair and a final exit.

7.49 A hospital street is a protected zone and should have an unobstructed width of at least 3m. It should be divided into at least 3 sub-compartments and not contain a shop or other commercial enterprise.

A door from a hospital street to an adjoining compartment should:

- be located so that an alternative independent means of escape from each compartment is available; and
- not be located in the same sub-compartment as a door to a protected zone containing a stairway or lift.

7.50 At ground level a hospital street should have at least 2 final exits. At upper storey level a hospital street should have access to at least 2 escape stairs accessed from separate sub-compartments located such that:

- the distance between the escape stairs should be not more than 64m;
- the distance of single direction of travel within the hospital street should be not more than 15m;
- the distance from a compartment exit to an escape stair should be not more than 32 m.

7.51 Where an escape stair opens into a hospital street, the travel distance from the escape stair exit to a door leading directly to a safe area should be not more than 64m.

7.52 Where a measurement of travel distance includes an internal escape stair not in a protected zone, the travel distance should be measured along the pitch line from the centre of the nosing of the topmost tread to the lower landing, including the length of any intermediate landings.

7.53 The combined travel distance includes the escape in a single direction.

Escape in two directions

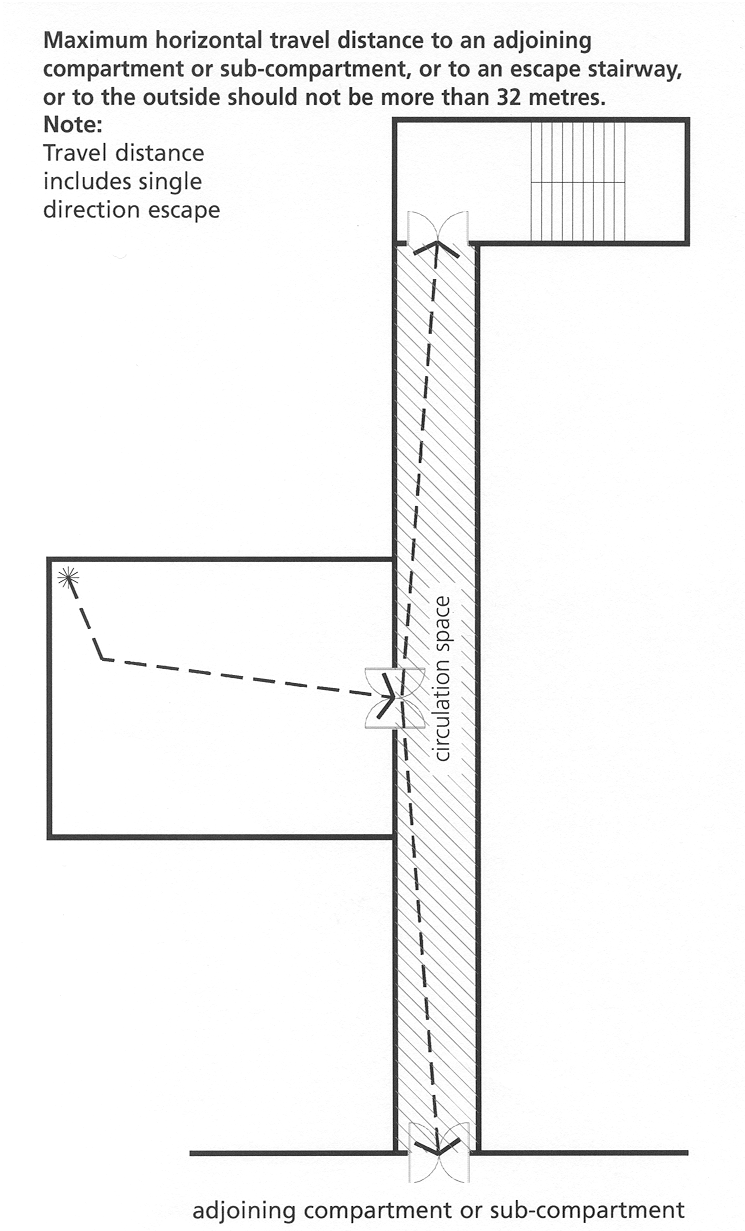

Figure 2

Circulation spaces

7.54 The design of circulation spaces should consider the evacuation needs of patients. The emergency evacuation plan should clearly identify the methods of evacuation to be adopted.

7.55 Circulation spaces need not necessarily be corridors. They may also be clearly defined routes in otherwise open areas.

Escape across a flat roof

7.56 A flat roof may form part of an escape route provided:

- the use of the route would not be prejudiced by smoke and fire issuing from an opening in the building envelope;
- the roof construction provides medium fire resistance duration for the length of the route across the flat roof and 3 metres on either side of it;
- the route is clearly defined, has a non-slip finish and is provided with a wall or protective barrier on both sides of the route;
- escape lighting is provided along the route;
- the route will be used only by staff;
- no exhaust or other outlets exist within 2 metres of the escape route;
- the escape route should comply in full with the requirements of the Scottish Building Standards Technical Handbook for non-domestic premises 2.9.17.

Refuge: provision of compartments and sub compartments

Standard

7.57 Each storey of healthcare premises containing patient access areas should be sub-divided into fire compartments and sub compartments in accordance with the standards specified in the Scottish Building Standards Technical Handbook for non-domestic premises.

7.58 Evacuation should be planned as a series of progressive horizontal moves from one compartment or sub-compartment, to another compartment or sub-compartment. The receiving compartment or sub-compartment should be capable of holding all those being evacuated, and the route should have no significant change in level. In any case, potential for further escape from the receiving compartment or sub-compartment should be available.

7.59 Hospitals with a total storey area of more than 1,500m^2 should be sub-divided by compartment floors, walls, ceilings and fire doors with a medium duration (60 minutes) fire-resistance.

- every compartment should be limited to a maximum area of 1500m^2;
- every upper storey and every basement storey should form a separate compartment;
- every floor should be a compartment floor with a medium duration (60 minutes) fire-resistance;
- where the topmost storey is at a height of more than 18m compartment floors should be long duration (120 minutes) fire-resistance and walls medium duration (60 minutes) fire-resistance.

7.60 Every compartment should be divided into at least two sub-compartments by a sub-compartment wall with a short duration (30 minutes) fire-resistance so that each sub-compartment is not greater than 750 m^2 (see Figure 3).

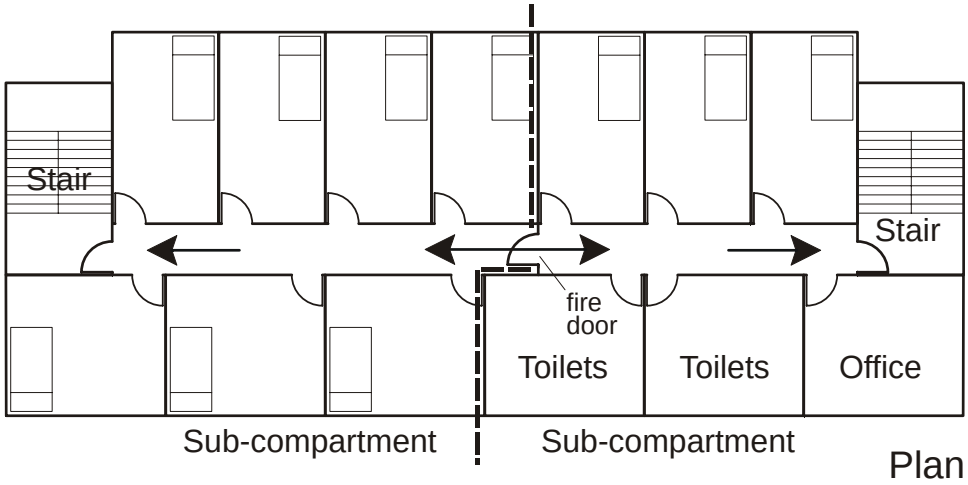

Figure 3

7.61 Every storey at a height of more than 7.5 m containing departments to which patients have access should either:

- comprise at least 4 compartments, each with an area of at least 500m^2;
- have a hospital street and at least 3 other compartments.

7.62 Every storey at a height of more than 18 m containing departments to which patients have access should either:

- comprise at least 4 compartments, each with an area of at least 500m^2;
- have a hospital street and at least 3 other compartments each with an area of at least 500m^2.

7.63 A compartment wall with a medium duration (60 minutes) fire resistance should be provided between different hospital departments and between a hospital department and a protected zone. However, short duration (30 minutes) fire resistance is sufficient in a single-storey hospital.

7.64 Table 2 contains two lists of fire hazard departments. The departments in List A should never be directly below nor directly adjoin an operating theatre, intensive therapy unit or special care baby unit. If they are directly below or directly adjoin any other hospital department to which patients have access they should be provided with an automatic fire suppression system.

7.65 A department in List B should be provided with an automatic fire suppression system where it is directly below or directly adjoins an operating theatre, intensive therapy unit, or special care baby unit.

LIST A	LIST B
• Boiler house • Central stores • Commercial enterprises • Flammable stores • Laundry • Main electrical switchgear • Main kitchens • Refuse collection and incineration • Works department	• Central staff changing • Central sterile supplies • Hospital sterilising and disinfecting unit • Health records • Pathology • Manufacturing pharmacy

Table 2: Fire hazard departments

7.66 The rooms in the list below are considered to be fire hazard rooms. In order to contain a fire in its early stages, these rooms should be enclosed by floors, walls, doors and ceilings with short duration (30 minutes) fire-resistance.

- chemical stores
- cleaners' rooms
- clothes storage
- day rooms with a floor area greater than 20m^2
- smoking rooms
- disposal rooms
- laboratories
- lift motor rooms
- linen stores
- kitchens (other than separate hospital departments)
- laundry rooms
- staff changing and locker rooms
- store rooms
- X-ray film and record stores
- all rooms within a main laundry in which delivery, sorting, processing packing and storing are carried out
- bedrooms where they are used by:
  - elderly people; or
  - those suffering with mental illness; or
  - people with learning difficulties.

7.67 Every intensive therapy unit should be divided into at least 2 sub-compartments by sub-compartment walls with short duration (30 minutes) fire-resistance. Every entrance to an intensive therapy unit should be either from a hospital street or through a lobby that is enclosed with the same fire-resistance duration as that recommended for a sub-compartment.

7.68 Compartment walls or compartment floors in a hospital should be constructed of non-combustible material. However, a sub-compartment wall can be constructed with combustible material provided the wall has short duration (30 minutes) fire-resistance.

7.69 Unless enclosed within an escape stair enclosure, a lift should be enclosed in a shaft having compartment walls with a medium duration (60 minutes) fire-resistance and, where the lift shaft is not the full height of the building, a compartment floor with a medium duration (60 minutes) fire-resistance at the

highest level of the shaft. A compartment wall is not needed between a lift well and a protected zone. Where a lift is installed, the landing and lift car controls should be of a type that will not operate on heat or pressure resulting from a fire.

7.70 Where an element of structure provides support to a compartment wall or compartment floor that attracts a higher fire-resistance duration, the supporting element of structure should have at least the same period of fire-resistance.

7.71 Where services pass through a compartment floor, wall or cavity barrier then fire stopping of medium duration (60 minutes) fire-resistance should be provided. All pipes should in any case be fitted with a proprietary sealing system capable of maintaining the fire-resistance of the floor, wall or cavity barrier.

7.72 Where ventilation ducts penetrate compartments or sub-compartments, fire dampers actuated by smoke detection should be provided to close the dampers automatically thereby maintaining the fire-resistance duration of the compartment or sub-compartment concerned. BS 5588 Part 9 provides guidance on design and construction including fire-resisting duct enclosures, fire-resisting ductwork and the use and activation of fire dampers.

7.73 Any door in a compartment wall, sub-compartment wall or fire hazard room should be a self-closing fire door with the same fire-resistance duration as the wall.

7.74 A place of special fire risk should be enclosed by compartment walls with a medium duration (60 minutes) fire-resistance. Where a place of special fire risk contains any appliance or equipment using a hazardous liquid, the room and any opening in a dividing wall or floor should be constructed in such a manner that, in the event of any liquid spillage, the room will contain all the liquid in the appliance or equipment plus 10%.

Stairways and storey exits

Standard

7.75 Storey exits including stairways should be provided from all storeys and protected against the effects of fire to the standard specified in the Scottish Building Standards Technical Handbook for non-domestic premises.

7.76 The location and design of storey exits and stairways should ensure that it is possible to evacuate all patients. In order to assess the suitability of storey exits and stairways there should be an emergency evacuation plan stating the preferred methods of evacuation.

7.77 At least two escape routes should be provided from any storey in a hospital. However, additional escape routes may be required having regard to patient occupant capacity.

7.78 The following table can be used to determine the number of storey exits including stairways that may be required from any storey;

Number of patient beds on any storey	*Number of storey exits*
001 – 100	2
101 – 200	3
201 – 300	4
301 – 400	5

For each additional 100 beds, or part thereof, provide an additional storey exit (stairway).

7.79 Where a storey is divided into 3 or more compartments, each compartment should have exits to:

- a compartment and a hospital street;
- a compartment and an escape stair;
- a compartment and a final exit.

7.80 Each sub-compartment should be provided with at least 2 exits (which may be by way of protected and unprotected zones) to adjoining, but separate, compartments or sub-compartments.

7.81 Every escape stair should give access directly to a safe area or a hospital street, or in the case of escape routes that will be used by staff only, an escape route across a flat roof or access deck to a safe area. For conditions relating to the use of flat roofs for escape, see paragraph 7.56.

7.82 A stairway may serve more than one area, but the aggregate width of the stairways provided shall be sufficient for the number of persons likely to evacuated, taking into account the evacuation policy of the healthcare premises.

7.83 The effective width of an escape stair should be the greater of 1200mm or the width of any escape route giving access to it. The effective width of an escape stair is measured between handrails. An escape stair should not narrow in the direction of escape.

7.84 In patient sleeping accommodation, an escape stair width should be not less than 1300 mm and designed so as to facilitate mattress evacuation. The landing configuration should also follow the guidance in Table 3 below in order to assist the evacuation of bed patients. The additional 200 mm for the landing width allows for the return of the balustrade between stair flights. In a straight through stair, the landing width need only be the same as the effective width of the stair.

Stair width (mm)	Minimum landing width (mm)	Minimum landing depth (mm)
1,300	2,800	1,850
1,400	3,000	1,750
1,500	3,200	1,550
1,600	3,400	1,600
1,700	3,600	1,700
1,800	3,800	1,800

Table 3: Stair and landing configuration for mattress evacuation

7.85 An escape stair should be within a protected zone and where an escape stair in a protected zone serves an upper storey containing a department to which patients have access, access to the protected zone should be by way of a protected lobby, or, in the case of a storey at a height of not more than 18m, by way of a hospital street.

7.86 The enclosing structure of the protected zone should have at least a medium duration (60 minutes) fire-resistance; any door in the enclosing structure should be at least an FD 60S self-closing fire door. However, the floor of the lowest storey or an external wall (other than an external wall described below), need not be fire-resisting.

7.87 Where an escape stair also serves a basement storey, the protected zone enclosing the escape stair in the basement storey should be separated from the protected zone containing the escape stair serving the rest of the building, by a wall or screen, with or without a door, at the ground storey floor level. The wall, screen and self-closing fire door where provided, should have a medium duration (60 minutes) fire-resistance.

7.88 Every part of an escape stair (including landings) and the floor of a protected zone or protected lobby should be constructed of non-combustible material. Where the stair is combustible it should be protected on its underside with material that offers at least a nominal medium duration (60 minutes) fire-resistance. However, this guidance does not apply to:

- any handrail, balustrade or protective barrier on an escape stair;
- an escape stair which connects two or more levels within a single-storey where the difference in height between the highest and lowest level is not more than 1.8m;
- an escape stair from a gallery; or
- a floor finish (such as laminate flooring) applied to the escape stair (including landings) or to the floor of a protected zone or protected lobby.

7.89 Where any part of a protected zone enclosing an escape stair is not more than 2 m from, and makes an angle of not more than 135^0 with any part of an

external wall of another part of the building, the escape stair should be protected for a distance of 2m, by construction with a:

- short duration (30 minutes) fire-resistance where every storey in the building is at a height of not more than 7.5 m above the ground; or
- medium duration (60 minutes) fire-resistance where any storey is at a height of more than 7.5 m above the ground.

7.90 However, where the external wall of the protected zone is used to protect the escape stair, it is not sufficient to use the final exit door as a barrier between the evacuees and the fire. In such cases, the external wall adjoining the protected zone at the final exit level should be constructed from materials that are non-combustible.

7.91 Certain small rooms, described below may be sited within protected zones enclosing escape stairs because the fire risk is considered to be low. However, all other parts of the building served by that escape stair should have at least one other escape route. This allows the occupants in other parts of the building to evacuate without the need to enter the protected zone enclosing the escape stair that has the additional permitted rooms within it. No flammable materials should be stored in these rooms. The types of rooms are:

- toilets and washrooms; and
- a cleaner's cupboard not more than $3m^2$.

7.92 More than one toilet, washroom or cleaners' cupboard may be located in a protected zone enclosing an escape stair. The walls, floors and ceiling separating the cleaner's cupboard from the protected zone should have a short duration (30 minutes) fire-resistance. A door to a cleaner's cupboard should be at least an FD 30S fire door but need not be self-closing provided it is kept locked. Where toilets or washrooms are located within the protected zone, then the walls and doors need not have fire-resistance.

Escape lighting

Standard

7.93 Detailed specifications for standby (emergency) and escape lighting provisions and the areas they should cover in healthcare premises, are contained in SHTM 2011: 'Emergency electrical services'. This standard should be applied in NHSScotland premises and should be read in conjunction with BS5266 Part 1 and Parts 7 and 8 (BS EN 1838).

7.94 Where the escape lightning provided does not comply with the guidance there should be a planned programme for upgrading, identified and recorded in the fire risk assessment for the premises. This should form part of the overall fire safety programme for the premises.

7.95 Escape lighting is that part of an emergency lighting system used to illuminate escape routes. Standby (or emergency) lighting is provided for when the normal lighting fails. Escape lighting is required in all healthcare premises to illuminate the circulation spaces and escape routes in the event of a failure of the electrical supply. Healthcare premises with patient access areas to which SHTM 86 Part 2 may be applied will generally require the installation of a comprehensive standby (emergency) lighting system that incorporates an escape lighting component for escape routes. In smaller healthcare premises to which SHTM 86 Part 1 may apply, only an 'escape lighting' system may be required. In either case, this will be determined on the basis of the fire risk assessment and this benchmark standard.

7.96 Essential lighting circuits should be installed throughout a hospital and designed to provide not less than 30% of the normal lighting level. In an area where a 15 second response time would be considered hazardous, (e.g. a stairway), emergency lighting should be provided by battery back-up giving a response time of not more than 0.5 seconds. The distribution boards for essential and non-essential circuits may be in the same location but should be in separate cabinets.

7.97 Emergency lighting may be self-contained units (stand-alone or incorporated into normal light fittings). Power supplies for self contained units are rechargeable batteries, trickle charged from the normal lighting supply, integral to each lighting unit. A changeover switch is incorporated so that when normal lighting power fails, the switch operates and power is automatically supplied from the battery specified period of time, commonly 3 hours. Power may alternatively be supplied from a central battery system or an automatic engine driven generator/s. Single 'stand-alone' emergency lighting units may be sufficient in some premises and may be combined with exit or directional exit signs.

7.98 An escape lighting system provided to ensure escape routes are adequately illuminated should operate in the event of local circuit failure as well as normal power failure and should cover the following areas:

- at each exit door;
- escape routes;
- at the junction of corridors and any changes of direction;
- outside each final exit and on external escape routes;
- to illuminate escape signs;
- to illuminate each flight of stairs for safe escape;
- at any changes in floor level;
- in windowless rooms and toilet accommodation exceeding 8m² (excluding en suite facilities);
- to illuminate fire-fighting equipment;
- to illuminate fire alarm 'break glass' call points;

- to illuminate equipment that would need to be shut down in an emergency; and
- lift cars.

7.99 'Maintained' emergency lighting consists of luminaries that are on all the time. 'Non-maintained' emergency lighting consists of luminaries that illuminate automatically when the normal lighting fails.

Staff

7.100 It is the responsibility of the management to ensure suitable arrangements are in place to ensure that adequate numbers of staff are present and available at all times to provide for the safe evacuation of patients, in accordance with the emergency evacuation plan.

Containment

Objective

7.101 The design, management and operational policies of healthcare premises should ensure that when a fire starts it is contained within the smallest area possible, to limit the spread of a fire and to provide time for escape and extinguishment.

7.102 The ability of a building to withstand and contain the effects of fire and smoke will largely determine the amount of time available for the execution of effective progressive horizontal evacuation.

7.103 In healthcare buildings the maximum size of a compartment should be no more than 1,500m^2.

7.104 Openings in the compartment structure should be protected to provide the same level of fire safety performance as the compartment structure.

7.105 Any door in a compartment wall, sub compartment wall or fire hazard room should be a self-closing fire door with the same fire-resistance duration as the wall in which is situated. See also paragraph 7.120, fire doors.

7.106 Healthcare buildings providing in-patient care should be divided into a series of separate compartments, which are bounded by fire-resisting walls and floors. The objectives and purpose of doing so is:

- to inhibit the rapid spread of fire within the building;
- to reduce the amount of fuel available in the initial stages of a fire;
- to facilitate horizontal evacuation by providing refuge for patients;

- to assist Fire and Rescue service personnel with fire-fighting and/or rescue operations.

Structural elements

Standard

7.107 All elements of structure (structural frames, load-bearing elements, and floors) should have at least the fire-resistance duration required by the Scottish Building Standards Technical Handbook for non-domestic premises:

• single storey hospital.	medium duration
• hospital with a topmost storey height of no greater than 18m.	medium duration
• hospital with a topmost storey height greater than 18m.	long duration
• compartment walls of a hospital with a topmost storey height greater than 18m.	medium duration
• hospital basement.	medium duration

7.108 For the purposes of this document, see Figure 4, structural elements are:

- a column, beam, or other member forming part of a structural frame;
- a load-bearing wall;
- a floor.

7.109 A roof structure should not be considered as an element of structure unless the roof provides support to an element of structure, or which performs the function of a floor, or where the collapse of unrated roof elements would cause the consequential collapse of fire rated elements, or premature collapse of the roof on the means of escape.

Structural elements

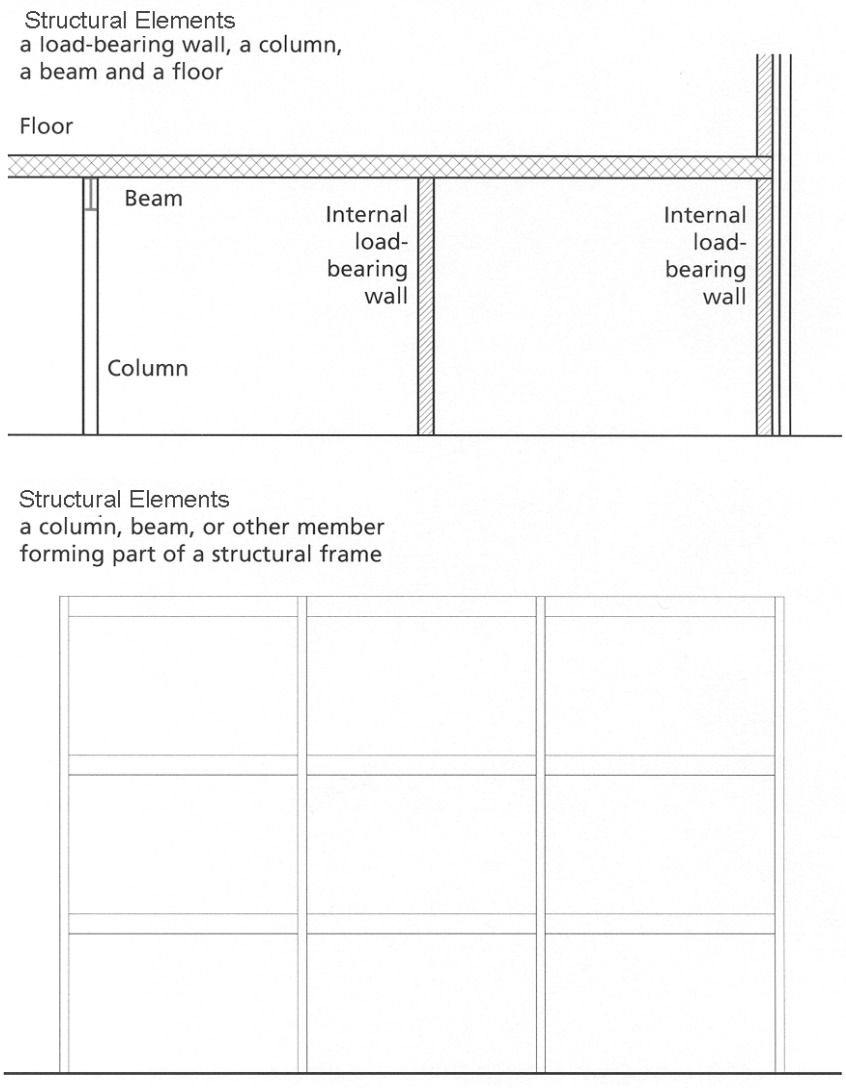

Figure 4

7.110 Where an element of structure provides support to another element of structure that is required to be non-combustible, the supporting element of structure should also be constructed from materials that are non-combustible.

7.111 Where an element of structure provides support to another element of structure that attracts a higher period of fire-resistance, the supporting element of structure should have at least the same period of fire-resistance.

Openings in a compartment structure

7.112 To maintain the integrity of compartments, openings should be adequately fire-stopped and limited to:

- services that pass through a compartment floor, wall or cavity barrier where fire stopping should be provided to a medium duration (60 minutes) fire-

resistance, and all pipes are fitted with a proprietary sealing system capable of maintaining the fire-resistance of the floor, wall or cavity barrier;

- ventilation ducts that penetrate compartments or sub-compartments provided with fire dampers actuated by smoke detectors which close automatically and maintain the fire-resistance duration of the compartment or sub-compartment concerned. BS 5588 Part 9 provides guidance on design and construction including fire-resisting duct enclosures, fire-resisting ductwork and the use and activation of fire dampers;
- refuse and laundry chutes of non-combustible construction that are accessed through fire-resisting doors;
- protected shafts.

Protected shafts

7.113 Openings in compartment floors for stairways, lifts, escalators, and pipes and ducts should be enclosed in a protected shaft that has the same level of fire safety performance as the compartment floor.

7.114 The protected shaft should form a complete barrier to fire between the different compartments that the shaft connects.

7.115 Access to a protected shaft from a circulation space should be through FD60S or E60Sa doors and doorsets that provide a minimum level of fire safety performance of medium duration.

7.116 Access to a protected shaft from a room should be through a lobby. The two sets of doors and doorsets should have a minimum level of fire safety performance of short duration.

7.117 Means for ventilating protected shafts in the event of fire should be provided as follows:

- for a protected shaft containing a stairway: at the top of the stairway, a ventilator providing an area of at least $1m^2$; or an openable window, at each storey;
- an opening window at each storey with an openable area of $0.5m^2$.

Lift motor rooms

7.118 Lift motor rooms should be enclosed by compartment walls with medium fire resistance duration. A compartment wall is not required between a lift well and a protected zone. Refer to the Scottish Building Standards Technical Handbook for non-domestic premises 2.1.11.

Places of special fire risk

7.119 A place of special fire risk should be enclosed by compartment walls with a medium duration (60 minutes) fire-resistance. Where a place of special fire risk contains any appliance or equipment using hazardous liquid, the room and any opening in a wall or floor dividing should be constructed in such a manner that, in the event of any liquid spillage, the room will contain all the liquid in the appliance or equipment plus 10%.

Fire doors

7.120 New fire doors should be procured only from a reputable supplier who can provide documentary evidence of the result of the fire performance test to which samples of the door were subject.

7.121 If glazed fire doors are required e.g. on double swing doors in corridors for health and safety reasons, they should be specified and procured as a complete manufactured unit. Glazing should not be retrospectively fitted on site, or post-installation of the fire doors as their fire performance cannot be determined or validated where such work has been undertaken locally. The door, complete with glazing should be procured only from a supplier who can provide documentary evidence that a sample of the door has achieved the specified rating according to the accredited test method.

7.122 Fire doors should be fitted only in accordance with the specifications, fitting tolerances and guidance contained in BS 8214: ‘Code of practice for fire door assemblies with non-metallic leaves’.

7.123 A well fitting fire door will provide a barrier to fire and smoke but will only fulfil its function if it is closed at the time a fire occurs. Normally it will be necessary to fit an automatic self-closing device to each fire door to ensure that the door is returned to the fully closed position and is held there so that it can restrict the spread of fire and smoke, however this is subject to the specific location, purpose and specification of the door in question. Controlled self-closing devices should comply with BS EN 1154.

7.124 A self-closing door could be a source of injury to some patients, or the door may be difficult to open, and these matters should be considered when selecting or assessing the suitability of the type of self-closing device.

7.125 Self-closing devices may pose an obstacle to the movement of patients and staff and the normal operation of healthcare premises. Staff may need to keep doors open for ventilation or communication or for movement of beds and equipment. It can therefore be of operational value to have doors open so that the staff can check the patients with the minimum of disturbance.

7.126 It is acceptable for fire doors to be held open on automatic door releases, provided the door is not an emergency door, a protected door serving the only escape stair in the building (or the only escape stair serving part of the building)

or a protected door serving a fire-fighting shaft, provided that the following criteria can be satisfied:

- the door release mechanism should conform to BS 5839: Part 3 and be fail safe to the closed position in the event of a fault or loss of power;
- all doors fitted with automatic door releases should be linked to a detection and alarm system which complies with the guidance in SHTM 82: 'Fire detection, alarm and control systems';
- all automatic door releases in the premises should be triggered by any of the following:
  - (i) the actuation of any automatic fire detector;
  - (ii) the actuation of any manual fire alarm call point;
  - (iii) any fault in the fire warning system;
  - (iv) any loss of power to the fire warning system;
- automatic door releases should be provided with a ready means of manual operation from a position at the door;
- each door fitted with an automatic door release should be closed at a predetermined time each night and remain closed throughout the sleeping hours. If for reasons of management this is impractical, it should be the specific responsibility of a competent member of staff to operate the release mechanism at least once a week to ensure:
  - (i) that the mechanism is working effectively; and
  - (ii) the doors close effectively onto their frames.

7.127 BS 7273: Part 4 contains detailed guidance on the conditions under which fail-safe actuation of a hold-open release should occur. It introduces a system of three actuation categories and identifies the type of door locations to which each actuation category may be appropriate.

7.128 Acoustically activated door release devices are not acceptable in the following circumstances:

- if the door is a fire door serving the only escape stair in the building (or the only escape stair serving part of the building);
- if the initial fire alarm warning signal is intended to alert staff only e.g. patient access areas;
- when the fire alarm sounders may be muted or the sound level reduced e.g. patient access areas including wards; or
- the fire alarm system incorporates a voice alarm.

If, after risk assessment, an acoustically activated door release device is considered appropriate for a particular application, it should comply with BS EN 1155 and be correctly fitted. Acoustically activated door release devices have limited application in respect of the actuation category guidance in BS 7273: Part 4.

7.129 A possibility exists that this type of device will fail to operate;

- in the event of a single or multiple fire alarm sounder failure, resulting in a drop in sound pressure and consequently, possible failure of door release;
- in the event of an electrical mains failure; or
- when a fire alarm and automatic detection system fault or failure occurs.

7.130 Where door hold open devices are used, they should be fitted in a manner that avoids twisting of the door as this may prevent it closing properly against the rebate i.e. the hold open device should be fixed to the door at the same height as the self-closing device. They also may not be suitable for prolonged use over an indefinite period due to the potential for warping of the door, hinge drop and damage to the self-closing device.

7.131 A further type of self-closing device comprises a 'swing free' arm that operates by allowing the door leaf to work independently of the closing device in normal conditions. An electro-magnetic device within the self-closer, linked to the fire alarm system, ensures the door closes on the operation of the fire alarm or power failure. This type of device has the following advantages:

- it may allow a door to be open at night;
- it may be more compatible with individual patients' needs and preference;
- it facilitates staff procedures when administering treatment or care to the patients; and
- there is no diagonal line of force through the door between separate holding and closing devices therefore little potential for warping.

7.132 The automatic closing of a door fitted with a hold open or release device, should occur when the fire alarm operates as a result of fire or test. It may also operate (depending on type) by a remote release switch, or on a programmed time release, or on power failure. The sudden closing of a door may take patients by surprise as they pass through the opening and may be a source of injury. The previous paragraphs 7.125 to 7.131 identify types of self-closer and their use. Precautions should be taken to avoid injury during tests and other similar planned maintenance.

Door fastenings

7.133 Healthcare premises can present difficulties when assessing the risks associated with security against the need to ensure appropriate and adequate means for evacuation in the event of fire e.g. elderly confused patients, those who are mentally infirm or with a learning difficulty and children and young persons who will require assistance incur a significant potential for harm if inadequately supervised, directed and physically assisted to escape. In such cases it may be appropriate to vary the following recommendations regarding the fastenings on doors where such a determination has been made on the basis of a properly conducted and recorded assessment of all the risks involved.

7.134 If a higher standard of security is justified on the basis of a thorough risk assessment, taking into account specific requirements for the safe escape of vulnerable patients, it will be appropriate to determine and record the management arrangements and procedures that will be adopted in the event of evacuation being necessary.

7.135 Where an exit door from a room, storey or a door across an escape route has to be secured against entry, it should only be fitted with a lock or fastening which is easily operated manually, without a key, from the side approached by people making their escape. Similarly, where a secure door is operated by a code, combination, swipe or proximity card, biometric data or similar means, it should also be capable of being manually overridden from the side approached by people making their escape.

7.136 For outward opening final exit doors, push pad devices to BS EN 179 are suitable where occupants can be expected to be familiar with the devices e.g. staff who have been trained. In other cases e.g. where the general public may be expected to use the escape door, push bar devices to BS EN 1125 should be fitted.

7.137 Where a door has a fastening that permits it to be opened from one side only, a potential for persons to be prevented from re-entering via this door exists, especially if is fitted with a self closing device and the door closes automatically behind them as they enter the stair. Re-entry may be necessary to assist patients or if the stairway becomes smoke logged. Doors to escape stairs should have a means to open them from both sides of the door.

Electrically powered locks

7.138 Electrically powered locks should not be installed on a protected door serving the only escape stair in the building (or the only escape stair serving part of the building) or on any door that provides the only route of escape from the building or part of the building.

7.139 Electrically powered locks should return to the unlocked position:

- on operation of the fire alarm system;
- on loss of power; and
- on actuation of a manual door release unit positioned at the door on the side approached by people making their escape (where the door provides escape in either direction, a unit should be installed on both sides of the door).

7.140 A locking mechanism that remains locked in the event of a power failure or system malfunction is not appropriate for use on exit doors and doors across escape routes.

7.141 Electrically powered locks can be operated by electromagnetic or electromechanical means.

- electro-mechanical devices are operated by a spring mechanism to return the lock keep or draw bolt(s). The mechanism can jam when pressure is applied to the door and are normally unacceptable on escape doors unless it can be verified that they do not rely on a spring mechanism, they fail-safe to the unlocked position and are not affected by pressure;
- electromagnetic devices operate by the interruption of electrical current to an electromagnet. They are generally considered to be more reliable than electromechanical devices due to the absence of moving parts and their inherent 'fail-safe' operation. For the reasons identified in this guidance electromagnetic devices are preferred.

Automatic opening doors

7.142 Where an internal swing door is an automatic door to facilitate movement of patients, the automatic opening mechanism should be linked to the fire alarm system so that on operation of the fire alarm system, the automatic opening function is disabled (but still permitting the door to be manually opened). Automatic opening doors should not be placed across exits unless they are designed in accordance with BS 7036 and are either arranged to fail safely to outward opening from any position of opening or;

- be provided with a monitored fail-safe system for opening the door from any position in the event of mains supply failure and also in the event of failure of the opening sensing device; and
- opens automatically from any position in the event of operation of the fire alarm in the fire alarm zone within which the door is situated.

7.143 Automatic opening fire doors should not detract from their essential function as fire doors. Where doors giving direct access into protected zones, or any other doors required for fire resisting or smoke stopping purposes, open automatically to facilitate the movement of occupants, they must be fitted with suitable self-closing devices and fail safe to the closed position (but still permit the doors to be manually opened) following:

- actuation of the fire alarm system; or
- on loss of power or system error.

Powered sliding doors

7.144 Powered sliding doors normally open in response to a motion sensor. Where a powered sliding door is acceptable across an escape route, it is important that the door has suitable fail-safe operation to enable the escape route to be used. The door should open:

- on operation of the fire alarm system, where installed;
- on loss of power; and

- on actuation of a manual door release unit positioned at the door on the side approached by people making their escape (where the door provides escape in either direction, a unit should be installed on both sides of the door).

7.145 BS 7273 Part 4 contains detailed guidance on the electrical control arrangements for fail-safe operation of powered sliding doors.

Sub-division of floor, ceiling, roof voids and cavities

7.146 Concealed spaces within the building permit the rapid spread of fire and smoke. It is possible for fire and smoke to be transferred to areas remote from the seat of the fire by way of uninterrupted concealed spaces. For this reason it is essential that fire-resisting barriers be provided to restrict the size of these concealed spaces.

7.147 Every cavity should be divided by cavity barriers so that the maximum distance between cavity barriers is not more than 20m (10m where the cavity has surfaces which are Category 1 or less stringent; see Section 6: paragraph 6.49). Cavities should be measured horizontally or vertically, as the case may be, along the centre line of the cavity and not diagonally.

7.148 Cavity barriers are not necessary to divide a cavity:

- above an operating theatre and its ancillary rooms;
- formed by 2 leaves of masonry or concrete at least 75mm thick, or where cavities are closed at the top and around openings;
- below a floor next to the ground where the cavity is either inaccessible or is not more than 1m high; or
- formed by external wall or roof cladding, where the inner, outer or other exposed surfaces of the cladding are low risk materials or non-combustible and attached to masonry or concrete external wall or a concrete roof, and where the cavity contains only non-combustible material.

7.149 Reference to surfaces in a cavity is intended to include the surface of the enclosing envelope of the cavity (including insulation material) but excludes timber roof trusses or lintels, joist ends, pipes, conduits or cables.

7.150 A cavity barrier should be fixed so that its performance is not affected by:

- movement of the building due to subsidence, shrinkage or thermal collapse in a fire of any services penetrating it;
- failure in a fire of its fixings; or
- failure in a fire of any material or element of structure to which it abuts.

7.151 All cavity barriers should be tightly fitted to rigid construction. Where this is not possible as in the case of a junction with slates, tiles, corrugated sheeting or similar materials, the junction should be fire-stopped.

7.152 Where cavity barriers are installed between a roof and a ceiling above an undivided space, the maximum limit of 20m should be applied.

7.153 In a building with a storey height of more than 18m, thermal insulation material situated or exposed within an external wall cavity, or in a cavity formed by external wall cladding, should be non-combustible.

Openings in barriers

Standard

7.154 Fire resisting barriers should be provided to sub-divide any concealed floor, ceiling, roof or other void such that the distance between barriers does not exceed 20m and the barrier has a minimum level of fire safety performance of short duration. Cavity barriers should be provided as specified in this section and in accordance with the specifications contained in the Scottish Building Standards Technical Handbook for non-domestic premises.

7.155 Openings in barriers should be limited to those for:

- doors that have a minimum level of fire safety performance of short duration;
- pipes or other services that pass through a fire barrier sub dividing a cavity should be appropriately fire stopped with proprietary materials to provide a fire safety performance of at least short duration. See also paragraph 7.67, Openings in a compartment structure.

External envelope protection

Junction of walls and low-level roofs

7.156 Where a lower roof abuts an external wall, the roof should provide a medium duration (60 minutes) fire-resistance for at least 3m from the wall. Where a compartment wall, sub-compartment wall or protected shaft abuts an external wall, a 1m wide projection of external wall having the same fire-resistance duration as the compartment or sub-compartment wall to prevent lateral fire spread. See Figure 5.

7.157 The external wall or roof should provide sufficient fire resistance to prevent external fire spread from adjacent buildings or parts of the same building in different compartments. The importance of external envelope protection for existing buildings depends on the proximity of adjacent buildings, or compartments within the same building. In an isolated building, surrounded by parkland, for example, the external envelope protection may not be important. However, where the building is bounded by similar buildings on a compact urban site, the external envelope protection becomes important.

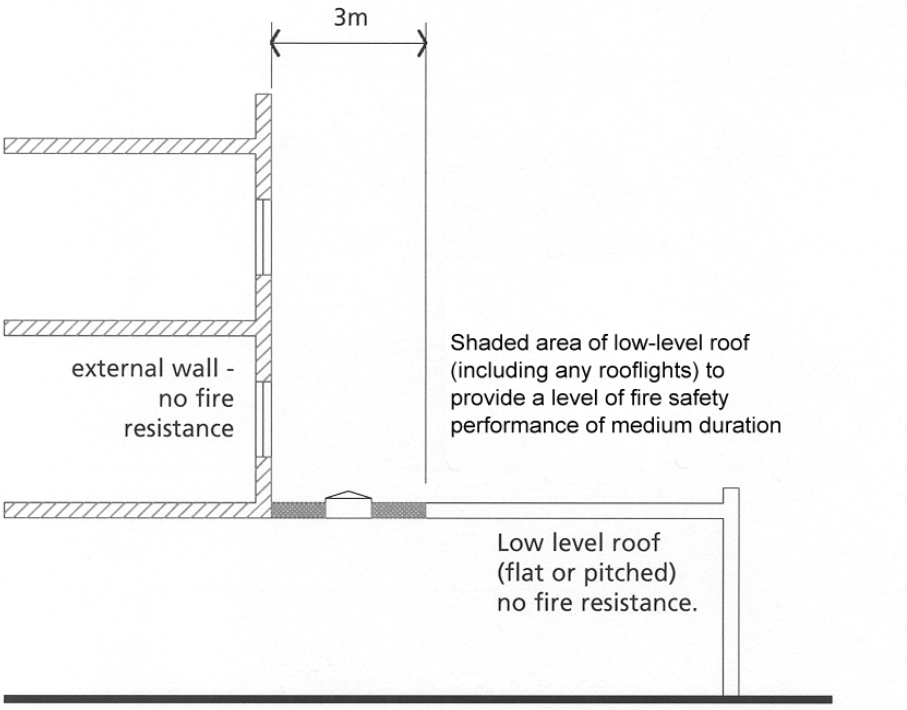

Figure 5

Junction of compartment and sub-compartment walls and external walls

7.158 Where a compartment wall or floor forms a junction with an external wall, a separating wall, another compartment wall or a wall or screen used to protect routes of escape, the junction should maintain the fire resistance of the compartment wall or floor. See Figure 6.

Hatched area indicates a one metre wide storey height strip of external wall, which has a level of fire safety performance at least equal to that of the compartment or sub-compartment wall.

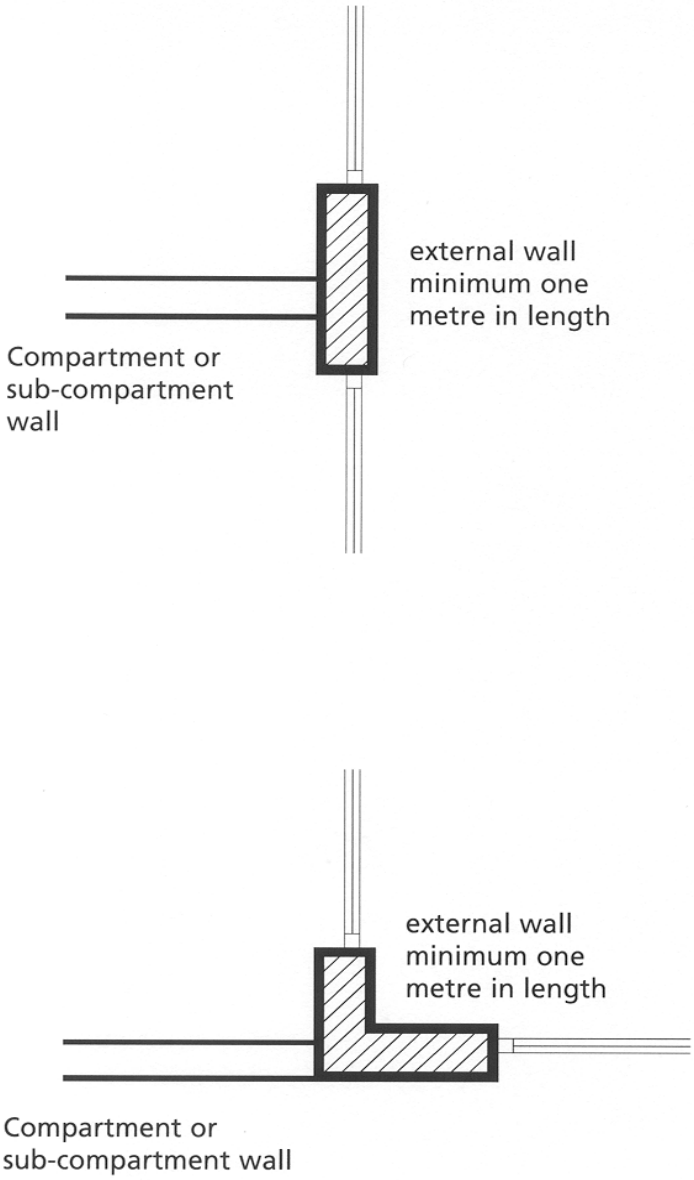

Figure 6

Unprotected area

7.159 The maximum percentage of unprotected area in an external wall should be determined from the graph in Figure 7.

Method used to determine the amount of unprotected area in an external wall

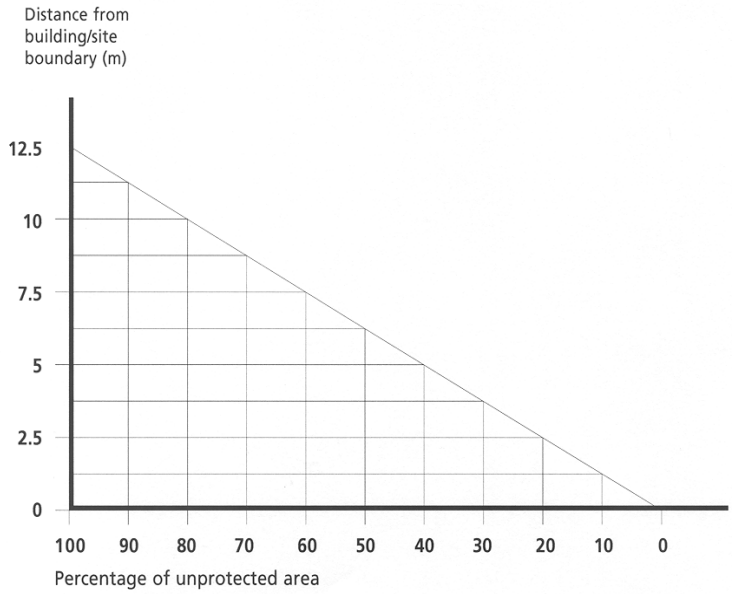

Figure 7

7.160 Where the building is less than 1 m from a boundary or notional boundary, and there is a different building or structure on or within 1 m of that boundary, and from which there is the potential for fire to spread, then the external wall should be at least medium duration (60 minutes) fire-resistance and any supporting element of structure should also have at least the same fire-resistance duration as the external wall. It is probable that there will be unprotected areas (including doors or window opening) with a lower fire-resistance within the wall structure, and then these door or window openings should provide a short duration (30 minutes) fire-resistance.

7.161 Other methods of determining space separation are described in a Building Standard Scotland Scottish Building Standards Technical Handbook for non-domestic premises 2.6.

7.162 External wall cladding includes non load bearing external wall cladding systems attached to the building structure, for example, clay or concrete tiles, slates, pre cast concrete panels, stone panels, masonry, profile metal sheeting including sandwich panels, weather boarding, thermally insulated external wall rendered systems, glazing systems and other ventilated cladding systems.

7.163 The external wall cladding (including any insulation core) not more than 1m from the boundary should be of a non-combustible material.

7.164 Where the cladding is more than 1 m from the boundary and constructed from combustible material more than 1 mm thick it should be Category 0 as specified in paragraph 6.39.

7.165 The boundary distance identified in paragraph 7.163 is not relevant unless there is a different building, structure, or activity on or within 1m of that boundary, and from which there is the potential for fire spread.

7.166 For buildings more than 18 m in height where the external cladding is more than 1 m from the boundary the cladding should be Category 0 as specified in paragraph 6.39.

Fire extinguishment

Objective

7.167 The design, management and operational policies of healthcare premises should ensure that fires may be extinguished effectively and quickly by the occupants, by the Fire and Rescue service or automatically by a system of fire suppression (fire sprinklers or an alternative system). Portable fire-fighting equipment should be provided so that staff has an opportunity to attempt the extinguishment of a small fire, where it is safe to do so and they have received appropriate practical training. Provision should also be made for the Fire and Rescue service to have appropriate safe access to the building.

7.168 Hand-held extinguishers, fire blankets and hose reels should be provided as necessary.

7.169 Portable extinguishers should comply with BS EN 3 and BS7863 and be inspected and maintained in accordance with BS5306: Part 3.

7.170 Hose reel installations should conform to the relevant section of BS5306: Part 1 and BS EN 671.

7.171 If provided in a hospital, an automatic life safety sprinkler system should be designed and installed to comply with:

- Firecode SHTM 82: Supplement A: Automatic fire control systems and voice alarm systems.
- BS EN 12845, including the relevant hazard classification together with the special requirements for life safety systems; or
- Rules for Automatic Sprinkler Installations' LPC 2004, including all additional life safety recommendations. Sprinkler heads should be 'quick response type' with a response time index (RTI) of not more than 50 (m.s)1/2 and a conductivity factor (c) of not more than 1 (m/s)2.

Manual fire-fighting equipment

7.172 Generally there should be two water extinguishers, of 9 litre capacity or the equivalent, for every 400 m2 or part thereof. Extinguishers using CO2 or other mediums should be provided as required. Fire blankets should be provided in all cooking and pantry areas. Guidance on the means of extinguishing various classes of fire is provided in SHTM 83: 'Fire safety in healthcare premises: general fire precautions'.

7.173 The provision of extinguishers can be determined by their extinguishing capacity and size. They are marked with a letter and a number: the letter denotes the class of fire the number denotes the size of fire tested against. An extinguisher could therefore have a rating of, for example '9A' or '13B'.

7.174 A guide to the level of provision of class A extinguishers is obtained by multiplying the floor area of a storey by 0.065. For example, a floor area of 400m^2 would have a rating of 26A (400 x 0.065 = 26), which is the total value of class A extinguisher and can be achieved by combinations of extinguishers with different ratings to achieve the total value. Where there are other classes of fire risk, appropriate extinguishers for these risks should be provided. In small premises, multi-purpose extinguishers that can cover a range of risks may be appropriate.

7.175 Fire extinguishers should be positioned on escape routes, close to room or floor exits, final exits from the building or, if necessary, adjacent to hazards. They should be placed on a dedicated stand or hung on a wall at a convenient height so that employees can easily lift them off (at about 1m for larger extinguishers, 1.5m for smaller ones, to the level of the handle). Ideally no one should have to travel more than 30m to reach a fire extinguisher. The weight of extinguishers and manual handling by staff should be taken into account.

7.176 Whenever possible, it is good practice to group extinguishers together in fire points clearly and conspicuously indicated and at a similar position on each floor.

7.177 Extinguishers are red and may have a colour-coded area, sited above or within the instructions and denoting the type of extinguisher. Older extinguishers that have been manufactured with the body of the extinguisher painted entirely in a single colour remain acceptable until they are no longer serviceable.

Information on the selection and installation of fire extinguishers is contained in BS 5306 part 8.

Automatic fire suppression

7.178 For a suppression system such as sprinklers to be effective it is essential that there is an appropriate water supply. Designers need to discuss with the water undertaker what supply is likely to be available and what pressure can be expected. It is recognised that pressures will vary during the day, over the year and perhaps in future years. Therefore it is imperative that the system is designed on the basis of what the minimum pressure and flow is likely to be.

Further guidance on the provision of automatic fire suppression is contained in SHTM 82: Version 1; Supplement A; Automatic fire control and voice alarm systems.

8. Access and facilities for the Fire and Rescue Service

General principles

8.1 Facilities for fire-fighters such as;

- adequate access for fire appliances;
- sufficient and appropriately accessible water supply for fire-fighting;
- dry or wet internal rising fire mains to which hose may be connected;
- fire protected ventilated stairs to provide access to upper floors
- fire-fighting lifts;
- smoke clearance facilities.

All contribute very significantly to the speed and outcome of fire fighting operations and the safety of fire-fighters.

8.2 In new healthcare premises and where major alterations or extensions are undertaken to which SHTM 81 applies, access and facilities for fire-fighting must comply with the relevant requirements of the Scottish Building Standards Technical Handbook for non-domestic premises; 2.12; 2,13 and 2,14 and Annex 2.B.6 which must form a component of the design and subsequent application for building warrant.

8.3 In existing premises those with duties under the terms of the Fire (Scotland) Act 2005 as amended are required to maintain existing access and facilities in premises where they have been provided for the use and protection of fire fighters. It is therefore essential that the issues identified in this section be considered during fire risk assessments. Improvements should be made so far as reasonably practicable where deficiencies are identified.

Standard

8.4 In existing premises, those with duties under the terms of the Fire (Scotland) Act 2005 as amended are required to maintain existing access and facilities in premises where they have been provided for use by fire-fighters or for the protection of fire-fighters.

8.5 A system of maintenance and periodic checks should therefore be in place to ensure facilities for fire fighting are properly maintained e.g. routine wet or dry rising mains tests, traffic and vehicle parking control measures are effective on access routes, protected access stair ventilation is effective, internal fire

hydrants (where provided) are regularly tested etc. The result of such tests should be recorded and kept readily accessible and available for inspection.

8.6 Provisions regarding access and facilities for fire fighting should be assessed in accordance with SHTM 86 worksheet A33. Where deficiencies are identified following risk assessment, improvements should be made so far as reasonably practicable, using as the benchmark standard, the Scottish Building Standards Technical Handbook for non-domestic premises; 2.12; 2.13 and 2.14 and Annex 2.B.6.

9. Fire safety in areas to which patients do not have access

General principles

Application

9.1 The guidance in this Section is for those areas of healthcare premises to which patients do not have access, termed 'non-patient access areas'.

Commercial enterprises

9.2 Commercial enterprises, mainly shops, are commonly accessible to patients. However, they are excluded from consideration in this document. Firecode: SFPN 5: 'Commercial enterprises on hospital premises' deals in detail with the specific standards for fire safety in these areas. The guidance in that document should be followed when any commercial enterprises in in-patient healthcare premises are provided.

Residential premises

9.3 Staff residences, nurses' homes and similar accommodation may be subject to licensing conditions imposed as a consequence of being licensed under the terms of The Civic Government (Scotland) Act 1982 (Licensing of Houses in Multiple Occupation) Order 2000 as amended.

Activities for which a licence may be required

9.4 Occasional activities and events such as receptions or social events at which alcohol is sold or public entertainment is provided, may require to be licensed by the local authority, in accordance with the specific licensing regime applicable for the particular event in question. Where these or similar activities are being considered, guidance should be sought from the local licensing authority as to whether or not a licence is required.

Licensed Activities: General

9.5 The Fire (Scotland) Act 2005 as amended, (Part 3; Chapter 3; para. 71) makes clear that a term, condition or restriction imposed by a licence shall have no effect if it relates to any requirements or prohibitions also covered by the Fire (Scotland) Act 2005 as amended.

9.6 Licences issued by the local authority commonly contained 'conditions' that require standards of fire safety (amongst other things) to be maintained throughout the term of the licence. Compliance with these conditions was a condition of their issue.

9.7 Such conditions, in relation to fire safety, are superceded by the Fire (Scotland) Act 2005 as amended as this is now the primary legislation and takes precedence in matters of fire safety covered by the 2005 Act. In any such case the provisions of the Fire (Scotland) Act 2005 as amended and the Fire Safety (Scotland) Regulations 2006 must be complied with.

Further guidance related to such activities is available at http://www.infoscotland.com/firelaw

References

Acts and Regulations

Fire Precautions Act 1971; as amended

Fire (Scotland) Act 2005 Part 3; as amended

Fire Safety (Scotland) Regulations 2006 (Scottish Statutory Instrument 2006 No. 456)

Fire legislation website: http://www.infoscotland.com/firelaw

Building (Scotland) Regulations 2004

Scottish Building Standards Technical Handbook Non-Domestic: http://www.sbsa.gov.uk/

Dangerous Substances and Explosive Atmospheres Regulations 2002 (www.hse.gov.uk/fireandexplosion/dsear.htm)

Guidance on smoking policies for the NHS, local authorities and care service providers. (www.clearingtheairscotland.com)

Scottish Executive Health Department Fire Safety Policy for NHSScotland. (www.pcpd.scot.nhs.uk)

The Construction (Design and Management) Regulations 2007;

The Management of Health and Safety at Work Regulations 1999;

Disability Discrimination Act 1995;

Dangerous Substances and Explosive Atmospheres Regulations 2002;

The Civic Government (Scotland) Act 1982 (Licensing of Houses in Multiple Occupation) Order 2000 as amended.

Smoking, Health and Social Care (Scotland) Act 2005 and the Prohibition of Smoking in Certain Places (Scotland) Regulations 2006.

Rules for Automatic Sprinkler Installations LPC 2004

NHSScotland Firecode

Available from Health Facilities Scotland.

SHTM 81 Version 3: Fire precautions in new hospitals, 2002

SHTM 82 Version 3: Alarm and detection systems, 2004

SHTM 83 Version 3: Fire safety in healthcare premises: General fire precautions, 2004

SHTM 85 Version 4: Fire precautions in existing hospitals, 2007

SHTM 86 Version 4 Part 1: Fire risk assessment in community healthcare premises, 2007

Part 2: Fire risk assessment in healthcare premises, 2007

SHTM 87 Version 4: Textiles and furniture, 2004

SFPN 3 Version 3: Escape bed lifts, 1999

SFPN 4 Version 3: Hospital main kitchens, 1999

SFPN 5 Version 3: Commercial Enterprises on Hospital Premises, 2004

SFPN 6 Version 3: The prevention and control of deliberate fire-raising in NHS healthcare premises, 2007

SFPN 7 Version 7: Fire precautions in patient hospitals, 2004

SFPN 10 Version 3: Laboratories on hospital premises, 1999

SFPN 11 Version 1: Reducing unwanted fire signals in healthcare premises, 2006

A Model Management Structure for Fire Safety, 1999

Scottish Health Technical Memoranda

SHTM 2022: Medical gas pipeline systems**,** 2001. Health Facilities Scotland

SHTM 2011: Emergency electrical systems, 2001. Health Facilities Scotland

British Standards

British Standards: British Standards Institution (www.bsi-global.com). The following standards are those applicable at the time of publication.

BS 5839; Part 1; 2002 Fire detection alarm and control systems.

BS 476; Part 22;1987 Fire tests on building materials and structures. Methods for determination of the fire resistance of non-loadbearing elements of construction

BS EN 179; 1998 Building hardware, emergency exit devices operated by a lever handle or push pad

BS EN 671; 2001 Fixed fire fighting systems

BS EN 1634; Part 1; 2000: Fire resistance tests for door and shutter assemblies. Fire doors and shutters

BS EN 3; 2006 Portable fire extinguishers

BS EN 62305; 2006 Protection against lightning

BS 8214; 1990: Code of practice for fire door assemblies with non-metallic leaves.

BS 6651;1999: Code of practice for protection of structures against lightning.

BS 5266; Part 1, Part 7 and Part 8; 2005: Emergency lighting

BS 5306; Part 1, 2006: Code of practice for fire extinguishing installations and equipment on premises. Hose reels and foam inlets.

BS 5306; Part 3; 2003; Code of practice for the inspection and maintenance of portable fire extinguishers.

BS 5499;Parts 4 and 5; 2000: Safety signs, including fire safety signs

BS 5588, Part 9; 1999: Fire precautions in the design, construction and use of buildings

BS EN 3, 2004: Portable fire extinguishers.

BS 7863, 1996: Recommendations for Colour Coding to indicate the extinguishing media contained in portable fire extinguishers.

BS EN 671, 2001: Hose reel systems

BS 7273, Part 4, 2007: Code of Practice for the operation of fire protection measures. The actuation of release mechanisms for doors.

BS EN 1125; 1997: Building hardware. Panic exit devices operated by a horizontal bar

BS EN 1154; 1997: Building hardware. Controlled door closing devices

BS EN 1155; 1997: Building hardware. Electrically powered hold-open devices for swing doors

BS EN 12845; 2004: Fixed fire fighting systems, automatic sprinkler systems