

Safety Code of Practice 34: Part B

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FIRE SAFETY DESIGN GUIDE



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1 SUMMARY

This Code of Practice sets out the standards that apply to designing for fire safety for University of Reading premises (new buildings and refurbishment of existing premises). It is provided to assist Estates and Facilities design and project management staff, engineering consultants, architects and all others working on behalf of the University who are responsible for specifying and designing University buildings (henceforth described as 'designers'). It is provided to ensure consistency, flexibility of future use and a common high standard in all new and refurbished University premises.

Building design aspects include:

- Means of escape doors
- Signage
- Fire alarm systems
- Secondary lighting
- Means of escape facilities for disabled persons
- Access for fire fighting purposes
- Provision of building emergency folders
- Provision of fire hydrants, fixed fire fighting installations, and portable fire fighting equipment
- Fire safety implications for ducting and ventilation systems
- Provision of lifts, refuges, and associated communication systems

Designers working on behalf of the University must follow the standards set out in this Code. These refer to UK regulations, government guidance and British Standards. The Code is not intended to be a comprehensive list of all relevant standards, but it identifies those elements of building design where the University has specific requirements. **It is essential to note that for some aspects of building design the University requires a higher standard than that set out in legislation.**

Estates and Facilities projects staff and the University Fire Safety Adviser must be consulted in good time at the planning stage of any project. This is particularly important if the building contains any novel features, or if it proposed to apply standards different to those identified in this Code.

Safety Code of Practice 34 Part A sets out the organisational responsibilities for fire safety within the University and provides practical guidance for building occupants. Designers should refer to Part A to gain a full understanding of the day-to-day issues that occur in the management of University premises.

2 INTRODUCTION

This Code sets out the standards that apply to designing for fire safety for all University of Reading premises (new buildings and refurbishment of existing premises). It covers the following types of premises and accommodation:

- Academic buildings, including lecture theatres, teaching areas and rooms, laboratories and offices
- Service and support buildings
- Catering facilities, places of assembly, sports and social facilities and workshops
- Farm buildings
- Houses of Multiple Occupancy (HMOs)
- Other residential accommodation

Designers must take into account the fact that all University premises will be used by a range of people, with differing physical and cognitive capacities. This may vary from young children under the age of 5 years to the elderly, and will include disabled people with a range of physical and cognitive impairments.

This Code identifies those elements of building design where the University has specific requirements, which designers must follow.

2.1 Halls of Residence

As at 2014 all University of Reading Halls of Residences are managed independently by UPP Residential Services Ltd which is part of the UPP (Universities Partnerships Programme). Contractually this Code does not specifically apply to a University of Reading Hall of Residence under the control of UPP. However UPP are required to comply at all times with Building Regulations and all other applicable legislation, guidance and good industry practice; this includes taking into account university standards and guidance on good management practice for new builds, upgrades and refurbishments.

3 NATIONAL LEGISLATION AND STANDARDS

The University will comply with all relevant legislation and regulations relating to the design and structure of the building. Academic, administrative buildings, and all residential property are subject to the requirements of the Regulatory Reform (Fire Safety) Order 2005 and the Building Regulations (the latter only for new build and refurbishment projects).

In addition, residential accommodation, including Halls and Houses of Multiple Occupancy, are subject to the Housing Act 2004 and the LACORS (**Local Authorities Coordinators of Regulatory Services**) Housing – Fire Safety Guide.

Clubs and bars are subject to the conditions contained within the Licensing Act 2003.

Where reasonably practicable, the University will comply with national Codes of Practice and guidance relating to building design and fire safety management. This includes Approved Documents in support of the Building Regulations for new build and refurbishment projects (mandatory unless acceptable alternative means of meeting the requirements of the Building Act are identified and agreed with Building Control); fire safety guidance produced by the Department for Communities and Local Government (see Table 1 below); and relevant British Standards.

Table 1

Department for Communities and Local Government Publications

Fire Safety Risk Assessment Guidance

Guide	Applies to
Fire Safety Risk Assessment: Offices and Shops ISBN-13: 978 1 85112 815 0	University offices and catering outlets

Guide	Applies to
Fire Safety Risk Assessment: Sleeping accommodation ISBN-13: 978 1 85112 817 4	University Halls and other hotel-style sleeping accommodation e.g. Cedar Hotel Common areas of flats and Houses of Multiple Occupancy
Fire Safety Risk Assessment: Educational premises ISBN-13: 978 1 85112 819 8	All teaching, research and administrative areas in academic and service buildings
Fire Safety Risk Assessment: Factories and Warehouses ISBN-13: 978 1 85112 816 7	Storage units and workshops
Fire Safety Risk Assessment: Small and medium places of assembly ISBN-13: 978 1 85112 820 4	Buildings containing lecture rooms and theatres, up to a maximum capacity of 60 people (small premises) and up to 300 people (medium premises)
Fire Safety Risk Assessment: Large places of assembly ISBN-13: 978 1 85112 821 1	Buildings containing lecture rooms and theatres, sports centres above 300 people capacity
Fire Safety Risk Assessment: Theatres, cinemas and similar premises ISBN-13: 978 1 85112 822 8	Theatres and cinema facilities, places of entertainment
Fire Safety Risk Assessment: Healthcare premises ISBN-13: 978 1 85112 824 2	Research units where medical procedures are performed University Medical Centre
Fire Safety Risk Assessment: Animal premises and stables ISBN-13: 978 1 85112 884 2	University of Reading Agricultural Establishments
Fire Safety Risk Assessment: Means of Escape for Disabled People (Supplementary Guide) ISBN-13: 978 1 85112 837 7	All buildings at the University of Reading

Designers must plan for the fact that there are many circumstances peculiar to the University environment that requires variation from the national codes of practice or standards. This is often to take account of potential future changes of use, allow flexibility in the use of buildings, and provide premises suitable for a wide range of users. The University standards may include specific provisions to cater for non-fire safety aspects, in particular special needs requirements under the Disability Discrimination Act 1995 (DDA) etc, to cater for visiting children, or to ensure consistency

of supply. In some circumstances the University may specify higher standards than those set out in legislation, regulations and Approved Documents.

For these reasons it is a requirement that the University of Reading Fire Safety Adviser is invited to comment on the building fire safety strategy and design proposals at an early stage. The University of Reading Fire Safety Adviser or other competent person acting under his direction, and authorised to do so, must approve the building fire strategy at appropriate stages of the design and construction.

If any building or part of a building undergoes a change of use that might affect the fire risk or fire strategy, the Fire Safety Adviser must be consulted to ensure that the building fire risk assessment is reviewed and to confirm that the fire precautions remain appropriate.

The following sections must be applied and are regarded as minimum standards for the University of Reading.

4 FIRE ENGINEERING

A fire safety engineering approach that takes into account the total fire safety package can provide an alternative approach to the fire safety strategy and design for a particular building. This is recognised in the Building Regulations Approved Document B, Volume 2, as providing an acceptable approach to fire safety and thereby provides an alternative means of satisfying the functional requirements of the Building Regulations.

Health and Safety Services and in particular the University of Reading Fire Safety Adviser must be consulted to provide advice on the appointment of a fire safety engineer to assist with the fire safety design of a project.

5 MEANS OF ESCAPE DOORS

To allow flexibility in future usage all room door sets, corridor fire door sets and partitions adjoining circulation corridors must be of a ½-hour fire resisting standard and capable of being fitted with self-closing devices. Each door must be marked as being of fire resisting construction.

Where the fire risk assessment indicates a need for room doors to be designated as fire doors e.g. in laboratory areas, then all doors on the circulation corridor **must** be marked 'Fire Door – Keep Closed' and be fitted with a self-closer. In low risk areas such as offices where the fire risk assessment does not require room doors to be of a fire resisting construction, the fire door sign and self-closer may be removed to allow room occupants to leave the door open when the room is in use (the door set fitted should still be of a ½-hour fire resisting standard). **However it is essential that if the room/area undergoes a change of use, the situation is reviewed and if necessary door signage and self-closers are fitted to ensure a higher standard of fire protection.**

Guidance:

In addition to fire safety considerations, designers should consider the safety of young children when specifying the operation of self-closing doors in areas that young children are likely to use/visit. This includes residential accommodation, Halls of Residence, museums and support buildings used for public events.

5.1 Electromagnetic hold open devices

The provision of electromagnetic hold open devices linked to the fire alarm system is acceptable in certain circumstances, but the University Fire Safety Adviser must be consulted and approval obtained before installation. These devices may be fitted on doors giving access to fire staircase enclosures as long as appropriate fire detection devices are already in place or are installed as part of the hold open device installation works.

Doors held open with electromagnetic hold open devices should be closed outside normal working hours (see Safety Guide 7), so that a higher standard of fire separation is provided during the period when the building is most vulnerable. This is to be achieved by the programming of the building Fire Alarm Control Panel with timings set on the instructions of the University of Reading Fire Adviser.

Door hold open devices that rely only on the sound of the fire alarm to trigger the release of the fire door should not be used at the University of Reading.

Guidance:

Hold open devices can damage doors that will warp over a period of time if held permanently open and then will not provide a tight seal against the doorframe.

In addition to fire safety considerations, designers should consider the safety of mobility impaired persons when specifying the operation of self-closing doors. Some people may have difficulty negotiating self-closing fire-resisting doors. It should be ensured, therefore, that all such doors and their self-closing devices (including those that are normally held open by electromagnets linked a fire alarm system) comply with the recommendations of the appropriate British Standard regarding opening and closing forces.

5.2 Vision panels

Vision panels should be provided in doors giving access to circulation corridors and passageway sub-divisions. The height of installation should take into account wheelchair users and general circulation of occupants, in accordance with Approved Documents M and N.

Rooms containing lasers (see Safety Guide 21) or specialist equipment and processes e.g. photographic darkrooms that would be affected by light should be discussed with the University Fire Safety Adviser. Vision panels are a requirement on all inner offices and workshops, unless approved Automatic Fire Detection (AFD) systems are located in the outer or access room.

Vision panels should also be fitted for general safety e.g. to permit safer movement around the premises and through doors, to permit vision into rooms during the course of an emergency evacuation, to facilitate the movement of disabled people etc. This requirement will not apply to a room used for residential accommodation except where there are working areas i.e. office workshops and kitchens.

6 MEANS OF ESCAPE STAIRS

In addition to the requirements set out in legislation and Building Regulations Approved Documents (excluding domestic properties), all internal means of escape stairs that are used as accommodation stairs in academic buildings must have:

- Guarding appropriate for young children

- An effective slip-resistant surface
- A continuous handrail on each side of the stair.
- Risers that are safe for use by young children and visually and mobility impaired people
- Contrasting nosings to identify the edge of the step

External means of escape stairs must be protected from the effects of weather (algae, moss, water, ice, frost etc) in order to minimise any slip risk.

Guidance:

1. Because of the increased risk of slips and trips on spiral and helix stairs, these designs should be avoided unless space constraints dictate that there is no alternative. If they are specified, they should be designed in accordance with BS 5395-2: 1984 and should be a type E (public) stair. Helical and spiral stairs should not be used for means of escape in buildings where a high percentage of children or disabled people are likely to be in the building at any one time.
2. Stairs that are used for normal access as well as means of escape should not have open risers.
3. Some designs of metal external escape stairs are not considered by the University to provide an effective slip resistant surface.

7 SIGNS

Fire safety signage must comply with BS 5499-10:2006 *Safety signs, including fire safety signs — Part 10: Code of practice for the use of safety signs, including fire safety signs*.

Pictogram signs should be provided adjacent to each Manual Call Point (Fire Alarm) and each fire extinguisher.

An A4 (metal clip) Frame should be provided adjacent to the Manual Call Point (Fire Alarm) for Fire Routine Notices to be inserted.

8 FIRE ALARM SYSTEMS

Confirmation of levels of cover must be obtained from the University Fire Safety Adviser through the Estates and Facilities Project Manager.

The following standards have been agreed with this University's Insurer. These standards will be reviewed every 2 years, or alternatively, when there are changes to the national standard for fire alarms.

The Estates and Facilities Project Manager is to be consulted with regard to which system manufacturer may be used on the University of Reading estate.

8.1 Academic and administrative buildings

Fire alarm installations in academic and administrative buildings that are not used for sleeping purposes must comply with BS 5839-1:2013 *Fire detection and alarm systems for buildings. Code of Practice for system design, installation, commissioning and maintenance*. The category of installation will be determined on the basis of fire risk assessment (e.g. L5). The following general principles will normally be appropriate:

- There must be Automatic Fire Detection (AFD) within rooms of high fire risk. The types of room to be considered as "high risk" will include:
 - Plant rooms
 - Laboratories
 - Lecture rooms with the potential for public use
 - Rooms with high contents values or which are essential to business continuity e.g. computer cluster rooms, special museum collections
 - Licensed areas (e.g. theatres, cinemas)
 - Workshops
 - Libraries
 - Store rooms
- Strategic installations, such as computer machine rooms, provided and maintained by IT Services, must be subject to a risk assessment as detailed in British Standard BS 6266:2011 *Code of practice for fire protection for electronic equipment installations*. The fire risk assessment must be carried out by the University of Reading Fire Safety Adviser. Following the risk assessment appropriate fire protection measures will be recommended commensurate with the risk assessment findings.
- Where buildings are multi-occupied or levels of management control are assessed as less than Level 1, in accordance with BS9999:2008 *Code of practice for fire safety in the design, management and use of buildings* a higher level of detection and alarm must be provided than might otherwise be indicated by building design issues.
- The system must take into account all users and activities in the building, including the need for maintenance staff/contractors to visit or work in areas that would normally be unoccupied. Therefore the fire alarm system must be audible in all areas of the building, internal and external, where staff and contractors may reasonably be expected to work and where early warning is required to enable a safe evacuation to be made. *

***Guidance:**

Such areas would include roofs where plant is installed, plant rooms within buildings, storage areas etc. See also Section 7.6 re: visual alarms.

8.2 Residential buildings and sleeping premises

Fire alarm installations in buildings which are used for sleeping accommodation must comply with BS 5839-1:2013 to L1 or L2 standard. This provides for AFD in all sleeping accommodation.

8.3 Detector heads

Confirmation of the types of detector head to be installed must be obtained from the University Fire Safety Adviser through the Estates and Facilities Project Manager.

Within new buildings it is acceptable under Building Regulations to accept heat detectors within study bedrooms. It is the University's policy to provide the enhanced standard of smoke detection in all study bedrooms and bedrooms within HMOs and hotel-type accommodation. Designers of sleeping accommodation must consult with the University Estates and Facilities Project Manager and Fire Safety Adviser on the use of approved designs and installations.

Detector heads must be appropriate for the conditions of use, to minimise the number of unwanted alarms. Therefore in dusty environments such as plant rooms, the University requires heat detectors to be installed, rather than smoke detectors.*

***Guidance:**

In high risk academic areas such as laboratories, where smoke detectors may be triggered inadvertently by work activities, the University has adopted a policy of mixed detectors, operating on a timer system. During normal work hours, smoke detectors are isolated and reliance is placed on heat detectors. Outside normal work hours the smoke detectors are activated, in addition to the heat detectors.

Detectors used in void areas, in any area of the University premises, must be regularly calibrated so that the detector can continue to differentiate between the local environment and smoke, in order to reduce the possibility of false alarms.

Some variation in the sensitivity of the detector heads may be considered in residential housing accommodation - flats, houses, Houses of Multiple Occupancy (HMOs) - in order to control the number of false alarms. Careful consideration should be given to the location of detector heads in bed-sit accommodation to avoid false activations from steam and aerosols etc.

8.4 Enunciator panels

Enunciator, repeat and mimic panels should be positioned where access by the emergency services is readily available i.e. main entrance lobby. Where possible the installation should be visible from outside the premises. On new installations the mimic panels should incorporate a zone indicator panel. Main panels will normally be sited in a secure, remote part, of the premises accessible to Estates and Facilities engineers.

8.5 Alarm receiving centres

All fire alarm systems should be linked to a continuously manned receiving centre, remote from where the fire alarm system is fitted, where the information concerning that state of the fire alarm system is displayed and/or recorded, so that the fire service can be summoned. Typically this would mean the University Security Control Room or a remote call handling centre. The use of telephone auto diallers is not allowed.

Guidance:

The current system adopted within the University is Redcare.

8.6 Visual alarms

Visual alarms must be provided in all areas where audible sounders would be unsuitable i.e. audio/visual laboratories or where there may be high background noise, such as plant rooms. Roof areas may be fitted with visual signals instead of, or in addition to, audible devices. Consultation with Health and Safety Services may be required in these situations so that noise levels can be assessed.

Visual, pager or vibrator type alarms should be provided where persons with special needs i.e. hearing impaired may be present on a regular working/accommodation basis.

8.7 Fire alarm sound levels at a refuge

Care must be taken when setting the fire alarm sound pressure level at disabled refuges so as not to make intelligent speech impossible. This can normally be achieved by setting the sound level to 65dBA. If intelligent speech is still not possible at this level then consideration can be given to reducing the sound pressure level to between 60dBA and 65dBA but this can only be done after consultation with the University Fire Safety Advisor. In certain circumstances it may be necessary to link the refuge emergency voice communications (EVC) system to the building fire alarm system so that the local refuge fire alarm sounder is turned down/off when the refuge EVC is in use.

9 HOUSING ACCOMMODATION - FLATS, HOUSES, HOUSES OF MULTIPLE OCCUPANCY (HMOS)

The following standards have been agreed with the University's insurers:

- A house with more than 5 residents (HMO) must be provided with a system complying with BS 5839-1: system category EN54-2 M/L2.

For property with up to 5 residents including Self Contained Flats and Houses the standard to be applied is BS 5839-6 *Fire detection and fire alarm systems for buildings - Part 6: Code of practice for the design, installation and maintenance of fire detection and fire alarm systems in dwellings* - system type as listed in Table 1 Minimum Grade and Category of fire detection and fire alarm system for protection of life in typical premises.

In HMOs there must be a fire alarm system that is linked to a continuously manned receiving centre.

Single family accommodation located at remote sites should comply with an agreed fire routine that is prominently displayed within individual premises. The routine should be included within formal documentation (Tenants Handbook) issued to lessees and brought to their attention. This will obviate the need to provide systems that will automatically call for the emergency services, [currently "Red-Care"]

10 LABORATORY DESIGN GUIDE

Estates and Facilities Project Officers, Architects and Designers must consult with Health and Safety Services as well as the laboratory end users when new build projects and major laboratory refurbishment projects are planned. As a general rule the following safety features should be taken into consideration.

10.1 Construction

This should be appropriate to the known or planned fire risks when considering the fire resistance of surrounding walls and the building fabric. Typically laboratories must be surrounded with fire resisting construction to at least 30 minutes rating.

10.2 Electrical

There should be sufficient numbers of switched sockets provided at required locations and these should have 'power on' indicators. If 'high hazard' processes are planned then there should be provision for local emergency shutdown.

All electrical circuits must be protected by residual current devices.

10.3 Space Heating and Air Conditioning

Portable heaters and air conditioning units are not permitted, the designer must include heating and air conditioning in the design if required.

10.4 Fume Cupboards

Refer to Health and Safety Services - Safety Code of Practice 49 Part 2, Fume Cupboards - Selection, installation, use, maintenance and decommissioning.

10.5 Local Exhaust Ventilation

Refer to Health and Safety Services - Safety Code of Practice 46 Part 4 Work Equipment Local Exhaust Ventilation.

10.6 Ovens, Furnaces and Heating Equipment

All free standing equipment must be placed on heat resistant surfaces.

All built in equipment must have appropriate insulation and ventilation.

All ovens and furnaces must be fitted with overriding non-automatically re-setting thermal cut-out devices in addition to normal thermostats.

10.7 Piped Gases

Gas pipelines must be routed to take the shortest practical route and must be located and adequately supported well clear of heat sources, electric cables, and other services where mechanical damage is possible.

Pipework that passes through compartment walls and compartment floors must be 'fire stopped' in order to maintain the fire resistance of the surrounding construction.

10.8 Emergency close down

Where piped natural gas is used in a laboratory a 'Fire Watch' gas proving system should be installed. This is mandatory for new installations.

Where specialist gases are piped into a building isolation valves shall be installed at the point of supply and delivery (to the equipment) and these must be clearly marked.

For piped flammable gases, quick-acting isolation valves linked to the automatic fire detection system should be installed both at the point of supply and delivery.

10.9 Storage of gases

Refer to Health and Safety Services - Safety Code of Practice 46 Part 3 Management and safe use of Work Equipment Gas Safety.

10.10 Storage of Extremely Flammable, Highly Flammable and Flammable Liquids

Storage solutions for 'flammable liquids' (including purpose built cabinets) must provide at least 30 minutes fire resistance and be fitted with integral spillage trays. When it is envisaged that the quantities of stored flammable liquids in a workroom or laboratory will exceed the HSE guide limit of 50 litres then purpose built cabinets or bins conforming to EN 14470-1 Safety Storage Cabinets for Flammable Liquids should be used. All cabinets are to be clearly marked with appropriate hazard warning signs. Ducting to vented cabinets must be of non-combustible construction with plastic linings. Alternatively, thermally actuated dampers on the vent openings of the cabinet may be fitted.

11 DESIGN, COMMISSIONING, INSTALLATION AND SERVICE RECORDS

Designers must consult with Estates and Facilities engineers to confirm arrangements for system maintenance. Estates and Facilities Maintenance Department are responsible for keeping centralised records for fire alarm system servicing. These are available to other authorised persons by accessing the Estates and Facilities Web Portal.

12 SECONDARY LIGHTING

Secondary lighting (emergency lighting) must be installed to comply with the current British and European Standards. The standard is BS EN 1838:2013 Lighting applications.

The wide and varied use of every academic, administrative and residential University building necessitates the universal application of this standard. Premises are routinely used outside normal hours (see Safety Guide 7) and should be provided with systems having a standby time (i.e. period that the system can be powered by batteries in the event of mains power failure) of 3 hours.

Maintained lighting systems with secondary lighting support should be provided in all licensed premises, ranging from purpose designed lecture theatres used as theatres or cinemas to bars and dining rooms that are occasionally used for social events. Public performances require maintained lighting as a full licensing condition.

There are certain circumstances e.g. where sudden loss of light would present a serious risk, where secondary lighting must be provided under the Workplace (Health, Safety and Welfare) Regulations 1992.

13 MEANS OF ESCAPE FOR DISABLED PERSONS

Means of escape facilities for disabled people should comply with BS9999:2008 *Code of practice for fire safety in the design, management and use of buildings* and Building Regulations 2000 Approved Document "M". BS 8300:2009+A1:2010 *Design of buildings and their approaches to meet the needs of disabled people*. *Code of practice* also provides useful criteria in building design when considering the needs of disabled persons.

13.1 Lifts

The University has adopted the following principles for the evacuation of disabled people. These principles are mandatory for all new build projects and for major refurbishment projects where reasonably practicable.

In the context of fire safety and evacuation, the University deems a 'safe place' to be an assembly point outside the building (except where horizontal evacuation is deemed to be an acceptable interim measure, see below).

It is the responsibility of the employer i.e. the University, where it controls the premises, to enable all persons to evacuate the premises as quickly and safely as possible.

Priority must be given to providing means of evacuation that avoids the need for any disabled person to be physically carried out of the building. Therefore:

- All new and where practicable refurbished buildings with accommodation likely to be accessible to, or used by, disabled people above (or below) the ground floor must be provided with 'evacuation lift(s)'. An evacuation lift is a lift which is provided with a secondary power supply, a structurally protected shaft and lobby, and access to a stairway which could be used if conditions in the lift lobby become untenable. More detailed requirements for evacuation lifts, which must be adopted, are set out in BS EN 81-2:1998 *Safety rules for the construction and installation of lifts - Part 2*. All such buildings must have one or more such lifts installed (numbers to be determined by building design, layout and predicted usage). Building designers must liaise with Health and Safety Services and the relevant building duty holder. The services of dedicated lift consultants may be secured to act on behalf of the University of Reading.
- Acceptable alternatives are:
 - The provision and use of a fire fighting lift (see BS9999:2008 Code of practice for fire safety in the design, management and use of buildings). In some circumstances a lift not designed for evacuation may be usable for evacuation in certain situations. If this is to be considered then a suitable fire risk assessment must be undertaken to evaluate whether the lift meets the functional recommendations of an evacuation lift.
 - Horizontal evacuation to a place of safety, provided this does not involve a change in level that necessitates the need to carry a disabled person. Horizontal evacuation would permit a disabled person to be moved to a place of relative safety elsewhere in the building on the same level, protected from potential fire or smoke. Horizontal evacuation must be in accordance with the standards for the type of occupancy in any relevant codes and standards (e.g. fire safety guides issued by the relevant government departments).
 - Any other means that provides an equivalent and acceptable level of safety, meets regulatory requirements, and does not involve manual handling of disabled persons.

- Where it is not reasonably practicable to provide an evacuation lift, the following alternative may be considered:
 - Use of existing passenger lifts, subject to: prior assessment of the fire and smoke protection that can be provided; the provision of secondary power; the provision of independent control systems and electrical circuits, protected from fire; means of control of the lift car that would enable a person in control of the evacuation to 'manage' the operation of the lift; and emergency communications with the lift car. Use of existing lifts in emergency situations may only be considered with the prior agreement of the University Fire Safety Adviser, the University Duty Holder for lifts, and the local Fire and Rescue Authority.
 - Dedicated evacuation chairs or powered stair climbers.

Power supply and communications equipment must be installed into a dedicated control room or space and must not be installed into other rooms such as storage or cleaners cupboards.

New or refurbished lift installations should include Braille and voice guidance facilities to assist the visually impaired.

13.2 Lift communications

All University passenger lifts must be fitted with an emergency communications system that permits contact with the University Security Services (extension 6300) for 24 hours a day for 365 days per annum. When activated from the alarm button or handset the system should automatically dial through to Security Services. Conversely, Security Services staff should be able to communicate with the lift to speak to any one who may be trapped, etc, so that two-way communication is maintained when needed.

Use and operation of these communication systems and lifts in the event of a fire or evacuation situation should be suitably trained competent persons in accordance with a strict management action plan.

Guidance:

1. The preferred University of Reading lift communication system is the 'Windcrest' auto dialler system complete with inductive loop system in the lift car. This should be fitted unless otherwise agreed with the Estates and Facilities Duty Holder for lifts and the University Fire Safety Adviser.
2. Where communications systems are required for evacuation and fire fighting lifts these should also be of Windcrest manufacture.
3. The part numbers for these devices should be prefixed with the letters "REGU" on the end i.e. AD1000EN-4R-REGU when ordering to ensure software compliance with the University central receiving station.
4. In the event of a communications failure the lift Duty Holder (Estates and Facilities) should be informed through the Estates and Facilities Help desk Ext 7000 or University Security (out of hours) and the lift should be taken out of service. The Duty Holder will inform the building users, Security and Health & Safety Services so that alternative evacuation methods can be agreed for the building during the failure period.

13.3 Refuge areas

In addition to the requirements set out in Section 3.12.1 above, multi-storey buildings must be provided with fire enclosures to enable refuge areas to be provided in approved staircase enclosures. Wherever practicable refuge areas these should be designed in accordance with BS9999:2008 *Code of practice for fire safety in the design, management and use of buildings*. Refuge areas in new and refurbished buildings must be equipped with an Emergency Voice Communications (EVC) system approved by Estates and Facilities that will enable any disabled person in the refuge to communicate with the Security Services control room. All refuges must be provided with appropriate signage. In some circumstances it may be appropriate to restrict refuges to one staircase, in order avoid confusion for building evacuation officers (see Safety Guides 5 and 6) and the emergency services attending an incident.

Designers should consult the Fire Safety Adviser about the numbers and locations of refuges to be provided.

13.4 Visual and hearing impairment – visual and vibrating fire alarm systems

All new or replacement fire alarm systems must incorporate a means of alerting deaf and blind persons to the alarm. Normally this will be achieved by means of flashing beacons. In certain circumstances the University may require a system incorporating vibrating message pager devices – see guidance below:

Guidance:

The current system for use for the hearing impaired is "Deaf Alerter" which operates using radio signals.

13.5 Doors

Designers should consider the direction that doors open with respect to the direction of escape for disabled people. The use of electromagnetic hold open devices linked to the fire alarm system can assist disabled people in normal usage of the building, but their automatic release in a fire situation can form a barrier for disabled people who may be unable to open the door to evacuate. The Fire Safety Adviser must be consulted on the use of such devices. Designers should also specify door furniture that will make it easier for disabled people to open doors without assistance.

14 FIXTURES AND FITTINGS

The University has adopted a standard for all supplies of soft furnishings and drapes to comply with the following:

- BS 7176 +A1: 2011 Specification for resistance to ignition of upholstered furniture for non-domestic seating by testing composites. Ignition source 5, medium hazard.
- BS 7177 +A1: 2011 Specification for resistance to ignition of mattresses, divans and bed bases. Ignition source 5, medium hazard.
- BS 5852 2006: Specification for fabrics for curtains and drapes. Flammability requirements. Section 4.
- BS 5867-2:2008 Fabrics for curtains, drapes and window blinds. Flammability requirements.

15 ACCESS FOR FIREFIGHTING PURPOSES

New buildings and extensions to existing buildings require the approval of the local planning authority and Building Control. These authorities currently work to "Building Regulations 2000 – Approved Document "B" Requirement B5 - Access and Facilities for the Fire Service". Variations in the type of fire appliance used by the fire service will require consideration by the Estates and Facilities Project Engineer. These variations mainly affect weight capacities of roadways and height restrictions. Width of roadways and turning circles normally follow the national code of practice. A copy of the original guide issued by the Royal Berkshire Fire and Rescue Service is given in Appendix 1 – this provides a useful *aide memoire* to consider prior to making an application to the local planning authority.

16 BUILDING EMERGENCY FOLDER FIRE PLANS

Building Emergency Folders are maintained by the Fire Safety Adviser. **Consultants and/or project engineers who are responsible for refurbishment and new build projects must provide an (updated) Emergency Folder for the building to the Fire Safety Adviser.** Where necessary this should take account of changes to the fire safety arrangements in adjoining buildings necessitated by the project work.

Consultants and/or project engineers must ensure that essential information and instructions for all fire safety equipment installed in a building is provided to the University.

16.1 Information to be shown on a building emergency folder fire plans

The emergency folder fire plan drawings will show all fire safety related features which may include, but may not be limited to:

- Escape routes indicating maximum as built capacity, minimum width to meet the client occupancy levels and any not suitable for disabled persons or specifically provided for them
- Room use and maximum as built occupancy numbers
- High fire risk areas
- Hazardous areas and storage
- Compartmentation including fire resistance of partitions and floors, fire shutters etc.
- Fire and final exit doors indicating securing, hold open or self-closing devices
- Detection and alarm equipment including zones, ancillary and interfaced items
- Emergency lighting units
- Firefighting equipment including hydrants, dry risers and items for Fire Service use
- Electricity and gas supply cut-offs
- Ventilation systems controls, ductwork and dampers
- Fire related signage
- Smoke control zones and equipment
- Firefighting and evacuation lifts and controls
- Control points for any other fire related equipment (ventilation, gas, electricity etc).

- Access (exterior and interior) for the fire and rescue service and hazards to fire-fighters (e.g. some types of sandwich panels)
- Fire refuges and specialist disabled equipment
- Assembly points and/or muster stations.

Guidance:

The emergency folders are kept readily available in the foyer/main entranceway of the main University buildings. They provide information for the emergency services (layout of the building, high risk areas, locations of gas cylinders, hazardous materials, evacuation routes etc) and provide contact information for University staff who may need to be summoned to the scene of a fire. The University Fire Safety Adviser can provide a template for consultants/project engineers to follow on request.

17 FIRE SAFETY INFORMATION

Building Regulation 38 (formally 16B) requires that where building work is carried out which affects fire safety, and where the building affected will be covered by the Regulatory Reform (Fire Safety) Order 2005 (RRO), the person carrying out the work must provide **sufficient fire safety information** for persons to subsequently operate and maintain the building in reasonable safety.

The level of detail required will vary from building to building and should be considered on a case by case basis. As a general guide the following list should be followed when compiling the fire safety information for a building project:

- a) Fire strategy
- b) The design limits of the maximum numbers of persons who may safely use each space including escape routes, staircases, exits etc. This shall be augmented with the maximum numbers of mobility impaired persons
- c) Design imposed restrictions not shown on the fire plan drawings i.e. fire loading etc.
- d) Any pre-planned procedures agreed with the Fire and Rescue Service
- e) Documentation to describe the use, test, servicing and maintenance of the fire safety features and equipment
- f) Detail the prevention and security measures (including measures for the prevention of arson)
- g) Details interactions with security, building management, other safety systems, etc.

18 FIRE HYDRANTS

The provision of fire hydrants throughout the University has been based upon the locations of original buildings and existing access roads. New development design teams will need to establish the locations of existing installations and provide additional cover where required. A hydrant should be available 90 metres from the main entrance or key access point to each main building.

When a building is fitted with a 'dry riser' (see below) a hydrant should be provided within 90 metres of the dry fire main riser inlet.

19 DRY RISERS

Dry riser facilities should be provided in buildings as required by Building Regulation and in particular where the floor level exceeds 18 metres in height, and the fire fighting staircase(s) would normally comply with BS9999 Para 23.1 Water Supplies for Fire and Rescue Service Use. Special provisions are required for fire appliance access to dry riser installations i.e. Fire Service appliances must be able to park within 18 metres of the riser inlet.

20 FIXED FIRE FIGHTING INSTALLATIONS

Fixed fire fighting installations should be in accordance with the various sections contained within BS 5306: *Fire extinguishing installations and equipment on premises*.

20.1 Extinguishing agents

There are various systems of fire suppression available - the following types of extinguishing agents are the most common:

- Water sprinkler and water mist systems
- Foam of various types including "light" water
- Carbon dioxide
- Dry powder
- Halogenated hydro-carbons (e.g. FM 200)
- Inert Gases such as Argogen, Argonite, Inergen and Inertsafe.

Proposals to use fire suppression systems must be discussed and agreed with Health and Safety Services so that the risk to the health and safety of building occupants can be assessed and management procedures can be agreed.

20.2 Portable fire fighting equipment

New fire extinguishers should comply with BS EN 3-7: 2004+A1:2007 *Portable fire extinguishers - Characteristics, performance requirements and test methods*. Selection and siting of fire extinguisher are based on BS 5306-8:2012 *Fire extinguishing installations and equipment on premises*

Part 8: Selection and positioning of portable fire extinguishers – Code of Practice.

For new projects the University Fire Safety Advisor must be consulted to provide advice on the numbers, type and siting of portable fire equipment, which should be ordered via the Estates and Facilities Project Manager.

20.3 Fire safety implications for ducting and ventilation systems

The installation of ventilation ducting within fire compartments requires careful consideration at the design stage. It is necessary to identify whether the provision is for structural fire separation (i.e. to meet Building Regulations standards for fire compartmentation), or means of escape standards (i.e. to meet the fire authority requirements under fire safety guidance). Intumescent

grills or dampers within ducting or compartment walls will achieve a building regulations standard. To achieve a means of escape standard in accordance with fire safety guidance, the sealing of any opening will need to be operated by some form of smoke detection. This will normally apply where openings forming ventilation grills are set into doors or walls separating a room or occupancy from main circulation routes within a building. The interpretation of this standard can vary and the University Fire Safety Adviser should be consulted at the design stage.

21 TEACHING ROOMS

University teaching rooms must have the agreed maximum permissible occupancy figure, calculated by the University Fire Safety Adviser, posted in a conspicuous position on the wall of each lecture theatre.

The main fire safety design features applicable to teaching rooms are summarised in Table 2 below:

Table 2

Requirements for teaching rooms

	Seminar room	Class room	Lecture theatre
Capacity (persons - approx)	Up to ~60	~60 to ~200	~60 to 410
Floor	Level	Level	Raked
Minimum number of exits (means of escape)	1	2	2
Fire extinguisher(s)	Yes	Yes	Yes
Furniture as specified in Section 11	Yes	Yes	Yes
Foot way side lighting	No	No	Yes

22 HOME OFFICE LICENSING

Any building subject to Home Office, Ofsted or Local Authority licensing may require additional or different features to comply with the relevant Licensing Authorities' conditions. Any such installations must be designed in liaison with the University Fire Safety Adviser.

23 FURTHER INFORMATION

Further information and guidance is available from the University of Reading Health and Safety Services, ext. 8888.

The following University Safety Codes of Practice and Safety Notes are relevant:

- Safety Guide 4 - Risk assessment – principles of risk assessment, hazard, risk, extent of risk, fire safety risk assessments.
- Safety Code of Practice 5 - Fire drills – conducting fire drills, assembly points, evacuation officers and door wardens, building emergency folders, fire routine notices, fire safety induction training.

- Safety Code of Practice 6 - Emergency evacuation procedures – assessment of fire situations, checking buildings in response to a fire alarm, evacuation procedures; response to bomb threats and suspect packages.
- Safety Guide 24 - Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR) (Including Flammable Liquids) – storage and use of HFLs, dangerous substances and high stores, disposal, transportation, petrol and vehicles, print areas and studios, paint and adhesives.
- Safety Code of Practice 34 Part A Fire safety guidance for building occupants – guidance for occupiers on responsibilities, fire safety management arrangements and fire prevention.
- Safety Code of Practice 46 Part 3 Management and safe use of Work Equipment Gas Safety
- Safety Code of Practice 46 Part 4 Work Equipment Local Exhaust Ventilation
- Safety Code of Practice 49 Part 2, Fume Cupboards - Selection, installation, use, maintenance and decommissioning
- Safety Note 20 – Fire Refuge Areas.
- Safety Note 39 – Fire Wardens and Evacuation Officers.

Safety Note 42 - Health and safety-related design and operational issues for University buildings and construction projects

REFERENCES

1. REGULATORY REFORM (FIRE SAFETY) ORDER 2005, SI 2005/1541. THE STATIONERY OFFICE, 2005. ISBN 9780110729459.
2. HOUSING ACT 2004. THE STATIONERY OFFICE. ISBN 978010543047.
3. LICENSING ACT 2003. THE STATIONERY OFFICE.
4. WORKPLACE (HEALTH, SAFETY AND WELFARE) REGULATIONS 1992. THE STATIONERY OFFICE. ISBN 9786133468412.
5. DISABILITY DISCRIMINATION ACT 1995 (DDA). ISBN 9780110790763.
6. DANGEROUS SUBSTANCES AND EXPLOSIVE ATMOSPHERES REGULATIONS 2002, SI 2002/2776. THE STATIONERY OFFICE, 2002. ISBN 9780110429571.
7. THE BUILDING REGULATIONS 2000: APPROVED DOCUMENT B FIRE SAFETY. THE STATIONERY OFFICE. ISBN 9780117539112.
8. THE BUILDING REGULATIONS 2000: APPROVED DOCUMENT M ACCESS TO AND USE OF BUILDINGS, (2004 EDITION). THE STATIONERY OFFICE. ISBN 9781859464878.
9. THE BUILDING REGULATIONS 2000: APPROVED DOCUMENT N GLAZING – SAFETY IN RELATION TO IMPACT, OPENING AND CLEANING (2000 EDITION). THE STATIONERY OFFICE. ISBN 9780117533899
10. BS EN 3-7: 2004+A1:2007 PORTABLE FIRE EXTINGUISHERS - PART 7: CHARACTERISTICS, PERFORMANCE REQUIREMENTS AND TEST METHODS.
11. BS 476-7:1997 FIRE TESTS ON BUILDING MATERIALS AND STRUCTURES. METHOD OF TEST TO DETERMINE THE CLASSIFICATION OF THE SURFACE SPREAD OF FLAME OF PRODUCTS. BRITISH STANDARDS INSTITUTION.
12. BS EN 1838:2013 LIGHTING APPLICATIONS EMERGENCY LIGHTING. BRITISH STANDARDS INSTITUTION.
13. BS EN 50172:2004/BS 5266-8:2004 EMERGENCY LIGHTING. CODE OF PRACTICE FOR EMERGENCY ESCAPE LIGHTING SYSTEMS. BRITISH STANDARDS INSTITUTION.
14. BS 5306-3:2009 FIRE EXTINGUISHING INSTALLATIONS AND EQUIPMENT ON PREMISES –PART 3 CODE OF PRACTICE FOR THE INSPECTION AND MAINTENANCE OF PORTABLE FIRE EXTINGUISHERS. BRITISH STANDARDS INSTITUTION.

15. BS 5306-12: FIRE EXTINGUISHING INSTALLATIONS AND EQUIPMENT ON PREMISES. SELECTION AND INSTALLATION OF PORTABLE FIRE EXTINGUISHERS. CODE OF PRACTICE. BRITISH STANDARDS INSTITUTION.
16. BS 5395-2: 1984 STAIRS, LADDERS AND WALKWAYS. CODE OF PRACTICE FOR THE DESIGN OF HELICAL AND SPIRAL STAIRS.
17. BS 5499-4:2013 SAFETY SIGNS, INCLUDING FIRE SAFETY SIGNS. CODE OF PRACTICE FOR ESCAPE ROUTE SIGNING. BRITISH STANDARDS INSTITUTION.
18. BS EN ISO 7010:2012 GRAPHICAL SYMBOLS. SAFETY COLOURS AND SAFETY SIGNS. REGISTERED SAFETY SIGNS. BRITISH STANDARDS INSTITUTION.
19. BS 9999:2008 CODE OF PRACTICE FOR FIRE SAFETY IN THE DESIGN, MANAGEMENT AND USE OF BUILDINGS. BRITISH STANDARDS INSTITUTION.
20. BS 5839-1:2013 FIRE DETECTION AND ALARM SYSTEMS FOR BUILDINGS. CODE OF PRACTICE FOR SYSTEM DESIGN, INSTALLATION, COMMISSIONING AND MAINTENANCE. BRITISH STANDARDS INSTITUTION.
21. BS 5839-3: 1988 FIRE DETECTION AND ALARM SYSTEMS FOR BUILDINGS. SPECIFICATION FOR AUTOMATIC RELEASE MECHANISMS FOR CERTAIN FIRE PROTECTION EQUIPMENT. BRITISH STANDARDS INSTITUTION.
22. BS 5839-6: 2013 FIRE DETECTION AND ALARM SYSTEMS FOR BUILDINGS. CODE OF PRACTICE FOR THE DESIGN, INSTALLATION AND MAINTENANCE OF FIRE DETECTION AND FIRE ALARM SYSTEMS IN DOMESTIC PREMISES.
23. BS 5839-8: 2013 FIRE DETECTION AND ALARM SYSTEMS FOR BUILDINGS. CODE OF PRACTICE FOR THE DESIGN, INSTALLATION AND MAINTENANCE OF VOICE ALARM SYSTEMS.
24. BS 5839-9: 2011 FIRE DETECTION AND ALARM SYSTEMS FOR BUILDINGS. CODE OF PRACTICE FOR THE DESIGN, INSTALLATION AND MAINTENANCE OF EMERGENCY VOICE COMMUNICATIONS SYSTEMS.
25. BS 5867-2: 2008 SPECIFICATION FOR FABRICS FOR CURTAINS AND DRAPES. FLAMMABILITY REQUIREMENTS. BRITISH STANDARDS INSTITUTION.
26. BS 7176: 2007+A1 2011 SPECIFICATION FOR RESISTANCE TO IGNITION OF UPHOLSTERED FURNITURE FOR NON-DOMESTIC SEATING BY TESTING COMPOSITES. BRITISH STANDARDS INSTITUTION.
27. BS 7177: 2008+A1 2011 SPECIFICATION FOR RESISTANCE TO IGNITION OF MATTRESSES, DIVANS AND BED BASES. BRITISH STANDARDS INSTITUTION.
28. BS 7974: 2001 APPLICATION OF FIRE SAFETY ENGINEERING PRINCIPLES TO THE DESIGN OF BUILDINGS. BRITISH STANDARDS INSTITUTION.
29. BS 8300: 2009 +A1 2010 THE DESIGN OF BUILDINGS AND THEIR APPROACHES TO MEET THE NEEDS OF DISABLED PEOPLE. CODE OF PRACTICE. BRITISH STANDARDS INSTITUTION. ISBN 0 580 38438 1.
30. BS EN 81-2:1998 +A3 2009 SAFETY RULES FOR THE CONSTRUCTION AND INSTALLATION OF LIFTS - PART 2: HYDRAULIC LIFTS. BRITISH STANDARDS INSTITUTION.
31. BUILDINGS FOR ALL TO USE 2 – IMPROVING THE ACCESSIBILITY OF PUBLIC BUILDINGS AND ENVIRONMENTS. CIRIA C610, LONDON 2004.

Appendix 1: Access and facilities for the Fire Service (Royal Berkshire Fire and Rescue Service guidance)

Part B5 of Approved Document "B" of Schedule 1 to the Building Regulations 2000 requires:

Access and facilities for the Fire Service:

- Buildings shall be designed and constructed so as to provide facilities to assist fire fighters in the protection of fire; and
- Provision shall be made within the site of building to enable fire appliances to gain access to the building.

B5 (section 1) – Concerns Fire Mains (Wet/Dry Risers)

B5 (section 2) – Concerns Vehicle Access:

- The access route specification can be varied to take account of different Fire Service requirements. The standard in Berkshire amends the specification as follows: A Table 20: Minimum access route specification: Minimum carrying capacity, high reach application 22 tonnes instead of 17 tonnes.
- Carriageway route designed to 16 tonnes not 12.5 tonnes and bridges etc to 22 tonnes minimum.

B Table 19 and Diagram 43: Agreed with Building Control Authorities that an allowance of 2 metres from a building will be allowed to accommodate footpaths/planting areas etc, any greater distances to be agreed.

C Diagram 44: Will be adopted by Building Control Authorities for pumping appliances as well as high reach, due to access road widths and the need to gain access to vehicle lockers.

B5 (section 17) – Concerns Access to Buildings for:

Fire fighting personnel (fire fighting lifts, lobbies and stairs within a protected shaft).

B5 (section 18) – Concerns the venting of Heat and Smoke:

From basements over 200 m² and more than 3 metres below, adjacent ground level

- Venting may be by natural openings or by a mechanical system provided the basement is fitted with sprinklers.

There is no requirement for sprinklers in basement car parks (see B3 Section 1).

Appendix 2: Version control

VERSION	KEEPER	REVIEWED	APPROVED BY	APPROVAL DATE
X.X	H&S	Every four years	XXXXX	XX/XX/XX
X.X	H&S	Annually	XXXXX	XX/XX/XX