



Instant Risk Guidance

TR 06b Fire Protection

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It is important that fire protection measures and systems such as fire doors, fire extinguishers and fire detection and alarm systems are correctly designed, installed, and effectively managed and maintained.

Fire Detection and Alarm Systems

The majority of commercial and industrial premises will require the installation of a fire alarm ranging from a basic manually operated system of call points, through to an extensive fire detection and alarm system satisfying life safety and property protection objectives often incorporating remote signalling to an alarm receiving centre.

Irrespective of the type of system, the following general considerations should apply:

The fire detection and alarm system should be designed, installed, commissioned and maintained in accordance with BS 5839-1: *Fire detection and fire alarm systems for buildings. Code of practice for design, installation, commissioning and maintenance of systems in non-domestic premises*.

The system should be designed to the specified protection Category – Category M (Manual systems), Category L (Life Safety), Category P (Property Protection) and the appropriate sub-categories.

- The system should be designed, installed, commissioned and maintained by a company which is approved by a suitable third-party certification scheme, of which the *Loss Prevention Certification Board (LPCB) LPS 1014* and the *British Approvals for Fire Equipment (BAFE) SP 203-1* schemes are examples. Details of LPCB approved installers can be found at <https://www.redbooklive.com/> and BAFE registered installers at <https://www.bafe.org.uk/>
- Where required, the system should incorporate dual-path remote signalling by utilising a product, tested and certificated to Loss Prevention

Council standard LPS1277 Issue 3 as conforming to ATS5, configured as such, and installed in accordance with Annex C of that standard, connected to a National Security Inspectorate (NSI) or Security Systems and Alarm Inspection Board (SSAIB) certificated alarm receiving centre.

- The fire alarm system should be serviced periodically in accordance with the recommendations of BS: BS 5839-1: 2017 by a company which is approved by a suitable third-party certification scheme, of which the Loss Prevention Certification Board (LPCB) LPS 1014 and the British Approvals for Fire Equipment (BAFE) SP 203-1 schemes are examples.
- Where the installation of a fire detection and alarm system is a requirement of insurers, it is important that a pre-contract design specification is submitted to them for approval.

For detailed guidance concerning the sourcing of fire safety products and services, reference should be made to the RISC Authority publication RC66: *Recommendations for sourcing fire safety products and services*, available at [RC66 - Recommendations for the management of fire detection and fire alarm systems in the workplace](#)

Also, the excellent guidance on the management of fire detection and alarm systems in the workplace in the RISC Authority publication RC47 is strongly recommended and available at [RC47 - Recommendations for the management of fire detection and alarm systems in the workplace](#)

In considering the potential protection benefits which may be obtained from a remotely monitored fire detection and alarm system, it is important that the response policy of the local Fire and Rescue Service to automatic fire alarms (which can vary considerably) is firmly established.

Fire Safety Training

The actions of staff if a fire breaks out are likely to be crucial to their safety and that of other persons on the premises.

In accordance with legislation, all employees are required to be provided with adequate fire safety training as part of the normal training and induction process.

Of particular importance is the need to ensure that all staff and contractors are informed of the emergency plan and are shown the escape routes.

The type of training should be based on the particular features of the premises and should:

- Take account of the findings of the fire risk assessment;
- Explain the emergency procedures;
- Take account of the work activity and explain the duties and responsibilities of staff;
- Be easily understandable by staff and other persons who may be present; and
- Be tested by fire drills.

In simple premises this may be no more than showing new staff the fire exits and giving basic training on what to do if there is a fire. In complex premises with a high staff turnover and many shift patterns, the organisation of fire safety training will need to be planned.

Fire safety training should include the following measures:

- Action on discovering a fire;
- How to raise the alarm;
- Action upon hearing the fire alarm;
- The procedures for alerting contractors and visitors including, where appropriate, directing them to exits;
- The arrangements for calling the fire and rescue service;
- The evacuation procedures for everyone in the premises to reach an assembly point at a place of total safety;
- The location and, when appropriate, the use of firefighting equipment;
- The location of escape routes, especially those not in regular use;
- How to open all emergency exit doors;
- The importance of keeping fire doors closed to prevent the spread of fire, heat and smoke;
- Where appropriate, how to stop machines and processes and isolate power supplies in the event of a fire;
- The reason for not using lifts (except those specifically installed or nominated, following a suitable fire risk assessment, for the evacuation of disabled persons);

- Arrangements for the safe use and storage of highly flammable and explosive substances; and
- The importance of general fire safety, which includes good housekeeping.

All the staff identified in the emergency plan that have a supervisory role if there is a fire (e.g., heads of department, fire marshals or wardens and, in complex premises, fire parties or teams), should be given details of the fire risk assessment and receive additional training as required, with refresher training every 6 months.

Training should be formally recorded in writing and repeated as often as is necessary. It is important to recognise that alterations to the emergency plan, working practices or processes, or to preventative or protective measures are likely to influence training programmes. It is generally recognised that refresher fire safety training should be provided for all employees at least annually.

Fire Exits

Under UK fire safety legislation, the responsible person(s) in control of non-domestic premises have a duty of care to ensure that routes to emergency exits from premises and the exits themselves are kept clear at all times and that these emergency routes and exits must lead as directly as possible to a place of safety. The emergency routes and fire exits must be well lit and indicated by appropriate signage. In locations that require illumination, emergency lighting of adequate intensity must be provided and illuminated signs employed.

Of fundamental importance is the need to ensure that all fire exit doors and associated hardware are the subject of routine inspection and maintenance at appropriate intervals to guard against malfunction. This is in addition to ensuring that the exit itself is kept clear of any obstruction that would hinder the working of the exit hardware or the escape of people from the building. All such activity should be formally recorded as part of the fire safety management programme.

Where an emergency escape lighting system is installed, this should be tested at monthly and annual intervals as prescribed in BS EN 50172:2004/BS 5266-8:2004: *Emergency escape lighting systems* and all such tests recorded. In addition, it is recommended that the system be inspected and maintained annually by a competent engineer.

Fire Doors

Fire doors are to be found in almost every non-residential building constructed in the UK, (also in many residential buildings) installed in accordance with the relevant national fire safety regulations in connection with compartmentation, means of escape and, in some cases, providing the emergency services with a protected route to access the building. These regulations contain reference to the relevant British and European Standards which define the test requirements and performance for fire doors. Fire doors can also be installed as an outcome of a fire risk assessment to further protect life and property.

In addition to ensuring correct installation, it is vitally important that fire doors are inspected and maintained by competent persons for which reference to the Fire Door Inspection Scheme operated jointly between BWF -CERTIFIRE and the Guild of Architectural Ironmongers is strongly recommended - <https://fdis.co.uk/>

Inspection of timber fire doors should be carried out at least once every six months as recommended in BS 8214, or more frequently, where determined by a risk assessment.

Detailed information on all aspects of fire doors published by the BWF Fire Door Alliance is available at <https://firedoors.bwf.org.uk/>

Fire Stopping

As a key measure of achieving the designed fire resistance of compartment walls and floors in accordance with Building Regulations, all openings and penetrations for the passage of services such as electrical cable and trunking, water and gas services, process pipes, heating and air-conditioning services etc. should be fire protected. Also, gaps at the interface between compartment walls and floors and external cladding systems require to be sealed with cavity barriers. Cavity barriers and screens restricting the spread of fire will often be installed within floor, ceiling and roof voids.

All such measures fall within the commonly used term of 'fire stopping'.

Air-handling ducts at the point of piercing compartment walls and floors should be installed with automatic fire dampers, operated by independent fusible links,

or by motorised valves linked to the fire detection and alarm system. In some cases, intumescent fire dampers are employed.

In addition to ensuring that fire stopping products are correctly specified and installed during building construction, it is vitally important that they are maintained in-situ during the life of the building as part of planned inspection and maintenance, where necessary employing a specialist contractor.

Fire compartmentation is often seriously compromised by contractors' operations such as when installing new equipment and services, during which no regard has been taken of the need to ensure the integrity of the existing fire stopping measures, typically in floor and ceiling voids, electrical/mechanical service risers and other out of sight areas.

Fire Extinguishing Appliances

A complement of fire extinguishers should be installed to the following requirements:

- Fire extinguishing appliances should be installed throughout the premises in accordance with the requirements of BS 5306-8: 2012 – *Fire extinguishing installations and equipment on premises – Code of practice for the selection and installation of portable fire extinguishers*.
- All extinguishers to be certified as BS EN 3-7 compliant such as those certified by the Loss Prevention Certification Board (LPCB) or British Approvals for Fire Equipment (BAFE) and installed by a specialist contractor such as an LPCB approved contractor or BAFE registered company. Details of LPCB approved installers can be found at <https://www.redbooklive.com/> and BAFE registered installers at <https://www.bafe.org.uk/>
- All fire extinguishing appliances should be wall-mounted or positioned on stands by exits and fire alarm call points, or near to the specific hazard for which they are provided.
- Fire extinguishing appliances should be maintained under an annual service contract by a specialist contractor such as a Loss Prevention Certification Board (LPCB) BS5306-3 approved contractor or a British Approvals for Fire Equipment (BAFE) registered company.

In accordance with BS 5306-3: 2009 *Fire extinguishing installations and equipment on premises - Commissioning and maintenance of portable fire extinguishers - Code of practice*, the responsible person should carry out visual inspections of all extinguishers regularly. These visual inspections should be carried out at least monthly or more frequently when circumstances require. When carrying out these visual inspections, it should be ensured that:

- Each extinguisher is correctly located in the designated place.
- Each extinguisher is unobstructed and visible.
- The operating instructions of each extinguisher are clean and legible and face outwards.
- Each extinguisher has not been operated and is not obviously damaged or has any missing parts.
- The reading of any pressure gauge or indicator fitted to an extinguisher is within operational and safety limits.
- The seals and tamper indicators of each extinguisher are not broken or missing.
- The responsible person should record the results of these visual inspections and arrange for corrective action, where necessary, by a competent person. In the event of doubt, the responsible person should arrange for a competent person to examine the extinguisher.

In addition to ensuring the provision and maintenance of extinguishers, employees should be instructed and trained in their use as appropriate.

Local Application Fire Suppression Systems

Local application, automatic fire suppression systems have a vital role to play in the protection of assets and business activity and should be installed as an outcome of a risk assessment.

A wide range of systems are available, most employing inert gas or synthetic/chemical extinguishing agents with automatic activation and discharge, commonly by linear heat and flame detection methods. Systems are typically low pressure in operation and will normally be employed for the protection of hazardous plant and machinery, and/or equipment that is highly business critical.

Common protection applications include:

- Electrical control cabinets and server racks
- CNC/EDM (computer numerically controlled and electrical discharge machines) automated machinery
- Industrial ovens and dryers
- Cooking ranges
- Fume cabinets and laboratory equipment
- Engine bays of fork-lift trucks

Where appropriate, systems should be designed, installed, commissioned and maintained in accordance with recognised UK or other international standards or codes, and should be installed and maintained by a company which has applicable third-party accreditation.

In addition to ensuring that the installation is inspected and maintained in accordance with the manufacturer's design, installation and maintenance manual by the system installer or an approved contractor, end user checks should be carried out weekly by a trained member of staff, making sure that the system is undamaged and operational. Remote system monitoring may also be incorporated.

Fire Sprinkler Systems

Sprinklers are by far the most widely used and most reliable automatic means of fire protection and have been successfully deployed in the UK since the late 19th century for the protection of property and business operations. They also have a major bearing on life safety.

In basic terms, a sprinkler system consists of a pipework distribution system charged with water, with a network of sprinkler heads, supplied by mains water or a tank/reservoir. Each sprinkler head operates independently, typically at a temperature of 68°C. In the event of a fire, the rising hot gases cause the sprinkler head(s) in the immediate vicinity to open. As water flows from the head, it strikes a deflector plate creating a water spray on the fire below and the ceiling or roof above.

It is a common misunderstanding that in the event of a fire all sprinkler heads in the system operate simultaneously, resulting in widespread water damage. This

is not the case owing to the fact that the water flowing from the operating head(s) has a desired cooling effect, preventing the remaining sprinkler heads in the system from reaching their operating temperature.

According to the British Automatic Fire Sprinkler Association (BAFSA), of all fires which occur in buildings protected by a correctly designed, installed and maintained sprinkler system, 99% are controlled or actually extinguished by sprinkler operation, with the majority involving fewer than 4 sprinkler heads.

Common types of sprinkler systems are:

- Wet system: the most common system, in which the whole system is fully charged with water permanently to its design pressure, allowing water to be discharged immediately on activation of a sprinkler head.
- Dry system: these systems are permanently charged with air under pressure, and the resulting pressure drop on activation of a sprinkler head activates a water control valve. This should generally only be used where a wet or alternate wet and dry system cannot be used.
- Alternate wet and dry system: the system is full of water during warm months and drained and charged with air under pressure in winter months where there may be a risk of freezing. When the system is charged with air it operates as described for dry systems above.
- Pre-action system: this system incorporates an electronic form of detection to pre-arm the system with water. The system is generally filled with air under pressure, and activation of a sensor or detector lets water into the system. Water is then released into the space on activation of the sprinkler head. These are used in applications where it is not acceptable to have the pipework full of water at all times.

In order to ensure effective and reliable protection, the following should apply:

- Except for 'permitted exceptions', all areas of the building(s) should be protected by the sprinkler system.
- The system should be designed, installed, commissioned and maintained in accordance with the LPC (Loss Prevention Council) Rules for Sprinkler Installations incorporating BS EN 12845, and by contractors whose competence is third-party certified to the appropriate approval level of the Loss Prevention Standard LPS 1048-1 Approved Sprinkler Contractors Scheme.

- All equipment used in the system should be listed as approved by the LPCB (Loss Prevention Certification Board).
- Weekly testing of the system should be conducted and formally recorded.
- Key members of staff should be trained in the operation and testing of the system, and the actions to be taken on sprinkler activation.
- System activation should be continuously monitored by an approved alarm receiving centre.

For further information and guidance, reference should be made to the BAFSA Library of Technical Information, available at <https://www.bafsa.org.uk/>

Sprinkler System Impairments

Sprinkler systems (and, for that matter, other fire protection systems) are considered to be impaired any time that the system(s) are out of service, either partially or wholly. Such impairments are inevitable and fall into three categories:

- **Planned Impairments.** These occur during scheduled maintenance or in connection with modification or extension of the sprinkler system.
- **Unplanned Impairments.** Unplanned impairments arise when the sprinkler system is out of service due to damage or malfunction.
- **Concealed Impairments.** These are potentially the most dangerous and occur, for example, when unknown to the personnel concerned, the system is left out of service following work on the system, or when control valves are deliberately or inadvertently isolated.

It is of vital importance that a written sprinkler impairment system is established, which should include, but is not limited to ensuring that:

- A suitable and sufficient risk assessment of the work proposed, and its impact is undertaken prior to a planned impairment.
- The appropriate authorities (Fire and Rescue Service, insurance provider, etc) are given prior notice that the system will be inoperative.
- Prior to the isolation, draining or decommissioning of any part of the system, a thorough examination of all areas of the premises is to be made to confirm that there are no indications of fire.
- The extent and duration of sprinkler impairments to be kept to a minimum.

- In the case of manufacturing premises, planned impairments of an extended nature should preferably be deferred until the plant is idle.
- Where impairment would deny protection to hazardous processes, consideration should be given to suspending such activity or deferring impairment to idle hours.
- All hot work to be strictly prohibited. Where absolutely unavoidable, it is essential that an effective hot work permit system is rigorously pursued.
- Fire extinguishers are placed in readiness, a sufficient number of trained staff made available and constant manning provided as required.
- Management and staff continue to remain extremely vigilant as regards fire safety throughout the period of impairment and all established fire precautions observed.
- On completion of work, verify by inspection and testing that the system has been returned to full operational status.

To reduce the risk of concealed impairments occurring, the following measures should be taken:

- All sprinkler control valves to be secured in the correct position by the use of substantial padlocked chains or straps.
- Improved protection provided to main control valves by the use of continually monitored anti-tamper alarms.
- Visual inspection of all control valves undertaken at least weekly.
- Weekly drain tests and, where appropriate, pump tests to be conducted ensuring that the system remains fully operational.