Fire Industry Association

Best Practice Guide to Fire Safety

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Introduction

Every year people die or are seriously injured as a result of fires in non-domestic properties. Besides the human risk, fire costs UK business millions of pounds due to property damage, fines, compensation, and insurance premiums. Many businesses find that they are not able to recover from the effects of a fire.

- Who is responsible for fire safety in non-domestic premises?
- What are their duties and responsibilities?
- How can I keep people and property safe?
- What are the possible consequences of failure to act?
- Where can I get help and guidance?

This guide will help to answer these questions and help you to successfully manage fire safety in commercial premises.

UK fire safety legislation places emphasis on preventing fires and reducing risk. Anyone who has some control over premises must take reasonable steps to reduce the likelihood of fire and make sure people can safely escape if there is a fire. The regulations apply to virtually all non-domestic premises in the United Kingdom; in England and Wales the communal areas (common parts) of blocks of flats, are also included.

If you are an employer or have control over the premises or activities that take place on the premises, then you have responsibilities under fire safety legislation. It is your duty to ensure the safety of the people in the premises.

In the case of people who are not employers but have control over premises, the extent of your responsibility will depend on the extent of your control. As this can be a complicated issue, it is sensible for organisations to identify clearly who is responsible for what.

UK fire safety legislation has slight regional variations which result in different terms used for the person on whom the legislation imposes fire safety duties. In England and Wales this person is known as the 'Responsible Person', in Scotland the term 'Duty Holder' is often used, while the term 'Appropriate Person' is often used in Northern Ireland. In this guide we will refer to this person as the 'Responsible Person'. Other differences on requirements of the legislative regimes are discussed in this guide.

Premises Affected

UK fire safety legislation applies to virtually all non-domestic premises and covers nearly every type of building, structure and open space, such as:

- Offices and shops
- Factories and warehouses
- Sleeping accommodation, hotels, hostels, and B&B's
- Residential care premises, including care homes and hospitals
- Community halls, places of worship and other community premises
- The shared areas of properties (HMO's) in which several households live (housing laws also apply) Please note, in Scotland and Northern Ireland the legislation applies to the whole HMO, not just the communal area
- Pubs, clubs and restaurants
- Theatres and cinemas
- Educational premises, school and sports centres
- Outdoor events, tents and marquees

It does **NOT** apply to:

- Private homes
- Anything that flies, floats or runs on wheels (unless it is static and used like a building)
- The underground parts of mines
- Fields, woods or land that forms part of agriculture or forestry undertaking

The Responsible Person

SO WHO DOES FIRE SAFETY LEGISLATION APPLY TO?

The law applies to you if you are:

- Controlling the premises
- An employer or self-employed person
- Responsible for a part of a dwelling that is used for business purposes
- A charitable or voluntary organisation
- A contractor with a responsibility for maintenance of any premises or, for example, the fire protection measures in the premises. Contractors and consultants carrying out fire risk assessments also have duties under the legislation
- Providing accommodation for paying guests
- The owner or managing agent of a block of flats in England and Wales

In any building where there is more than one Responsible Person, they must all work together to co-operate, co-ordinate and share information with others as far as is necessary to comply with regulations.

WHAT ARE THE DUTIES OF THE RESPONSIBLE PERSON?

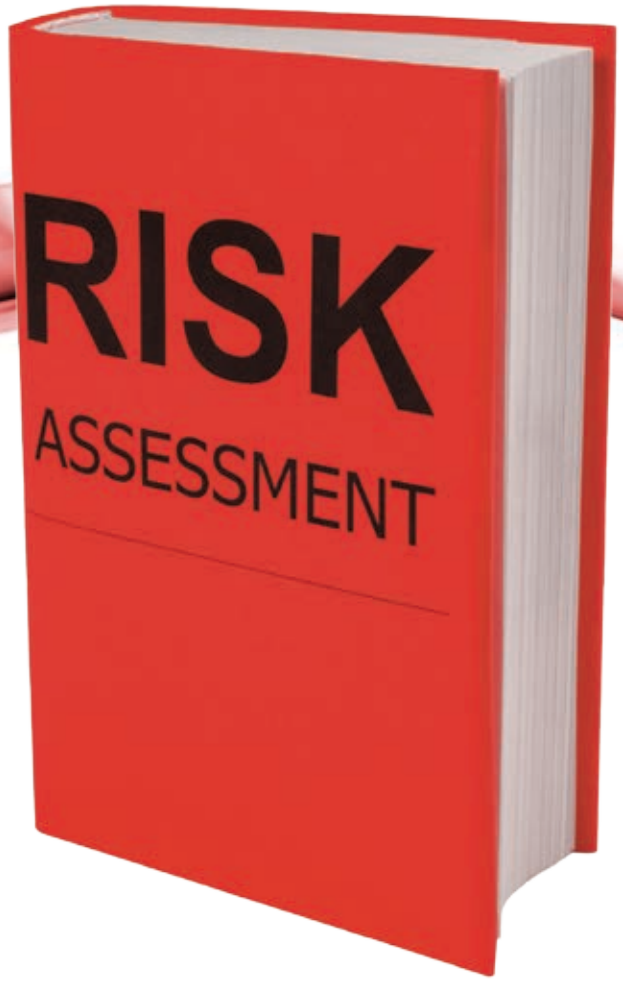
Legislation says that, if you are an employer or a person having control over premises, you are responsible for the safety of everyone who might lawfully be on your premises. This includes employees, visitors or members of the public in the immediate vicinity of your premises (i.e. at an open-air entertainment venue) who might be affected by a fire.

The Responsible Person, either on their own or with any other Responsible Person, must do their best to make sure that everyone on the premises, or nearby, can escape safely if there is a fire. You should pay particular attention to people who may have a disability or anyone who may need special help.

You must address the following issues:

- Carry out a fire risk assessment and identify possible hazards and risks
- Take general fire precautions
- Principles of fire prevention are to be applied
- Fire safety arrangements, fire safety policy and procedures
- Take account of those particularly at risk, i.e. very young people; those with special needs or disabilities; and people working with dangerous substances such as flammable liquids
- Provide suitable arrangements to warn people of a fire in the building such as, a Fire Detection and Alarm (FD&A) system
- Eliminate or reduce risk from dangerous substances (chemicals etc.)
- Additional emergency measures in respect of dangerous substances
- Provide adequate means of escape in the case of a fire such as sufficient and suitable fire exits; fire doors and compartments; signs, notices and emergency lighting
- Take measures for fire fighting e.g. fire extinguishers
- An effective fire emergency plan to be followed in the event of a fire
- Maintenance of all fire safety systems and equipment
- Ensure capabilities of employees who are given special tasks in terms of fire safety and fire procedures, and provide training to all employees and others who may need it
- Regularly review all these processes and amend if necessary

The Fire Risk Assessment



At the core of the legislation lies the Fire Risk Assessment. This is an organised appraisal of your premises to enable you to identify potential fire hazards and those who might be in danger in the event of fire and their location. You should evaluate the risks arising from the hazards and decide whether the existing fire precautions are adequate and identify any measures that need to be taken to further remove or reduce the fire risk.

Fire authorities no longer issue fire certificates and those previously in force have no legal status. However, any fire certificates issued in the few years before the new legislation came into force may be a good starting point for your fire risk assessment. If your premises have been designed, built and approved in accordance with Building Regulations, then the fire precautions forming part of the structure, such as fire doors, fire alarms and emergency lighting, should be acceptable. However, it is critical that these and other elements of the fire precautions are relevant to the risks and hazards. These other elements include the use of the building; the provision of fire fighting equipment; the training of personnel and the management and maintenance of all fire precautions.

If your organisation employs five or more people; or your premises are licensed; or an alterations notice is in force you must record the significant findings of the assessment. But it is good practice to record your significant findings in any case.

It is very important that the person carrying out the fire risk assessment is competent to do it. The law requires that where employers delegate this task to employees they must take into account their capability. Legal liability may arise on the part of both the Responsible Person and the fire risk assessor if the fire risk assessment is inadequate and people are placed at risk of serious injury or death in the event of fire.

Competence does not necessarily depend on the possession of specific qualifications. In small simple buildings and/or where the fire risk is relatively low, it is possible that an employee may study the appropriate guidance document, and with access to external help and advice, conduct a satisfactory fire risk assessment. However, for higher risk or more complex premises a higher level of knowledge and experience is required of the fire risk assessor. In this case, a risk assessor will need to have the specific applied knowledge and skills of an appropriately qualified specialist. Evidence of specialist training and experience, or membership of a professional body, can enable suitable competence to be demonstrated.

Numerous examples of inconsistencies in fire risk assessments have lead to widespread calls for a definition of competence. What is needed is a standard against which to benchmark assessors to offer safety, security, and assurance for the user.

Several professional bodies operate risk assessor registers and there are certification schemes in place for both individuals and companies.The Fire Industry Association believes that companies (including sole traders) trading in the provision of fire risk assessments should be third party certificated for the purpose. Certification should be conducted by a certification body that is UKAS accredited for certification of such companies.

The Five Steps to Completing a Fire Risk Assessment

STEP 1: IDENTIFY THE FIRE HAZARDS

This means looking for sources of heat, fuel and oxygen which together might lead to a fire. You need to identify:

- Sources of ignition such as naked flames, heaters or some commercial processes
- Sources of fuel such as built up waste, display materials, textiles or overstocked products
- Sources of oxygen such as air conditioning, medicinal or commercial oxygen supplies
- You should also consider what existing measures are in place to control the hazards

STEP 2: IDENTIFY THE PEOPLE AT RISK

You will need to identify anyone who may be affected, such as:

- People working near to fire hazards
- People working alone or in isolated areas (i.e. roof spaces or storerooms)
- Maintenance staff, contractors, passers-by and people present outside normal working hours such as, cleaners and security guards
- Visitors and members of the public
- Individuals and groups who may be especially at risk, e.g. young or inexperienced workers, people with mobility or sensory impairment, pregnant workers, children or parents with babies, elderly or infirm people etc.

STEP 3: EVALUATE, REMOVE, REDUCE AND PROTECT AGAINST FIRE RISK

This involves evaluating the level of risk in your premises. You should remove or reduce any fire hazards where possible and reduce any risks you have identified. For example:

- Replace highly flammable materials with less flammable ones
- Make sure you separate flammable materials from sources of ignition
- Have a no smoking policy
- Ensure adequate inspection and testing of electrical installations and equipment

When you have reduced the risks as far as possible, you must assess any risk that is left and decide whether there are any further measures you need to take to make sure you provide a reasonable level of fire safety. The evaluation of risk will take account of the fire risk assessor's opinion of the likelihood of fire, the extent of injury that could occur and the number

of people who could be affected. All equipment and systems required by legislation must be subject to suitable testing and maintenance.

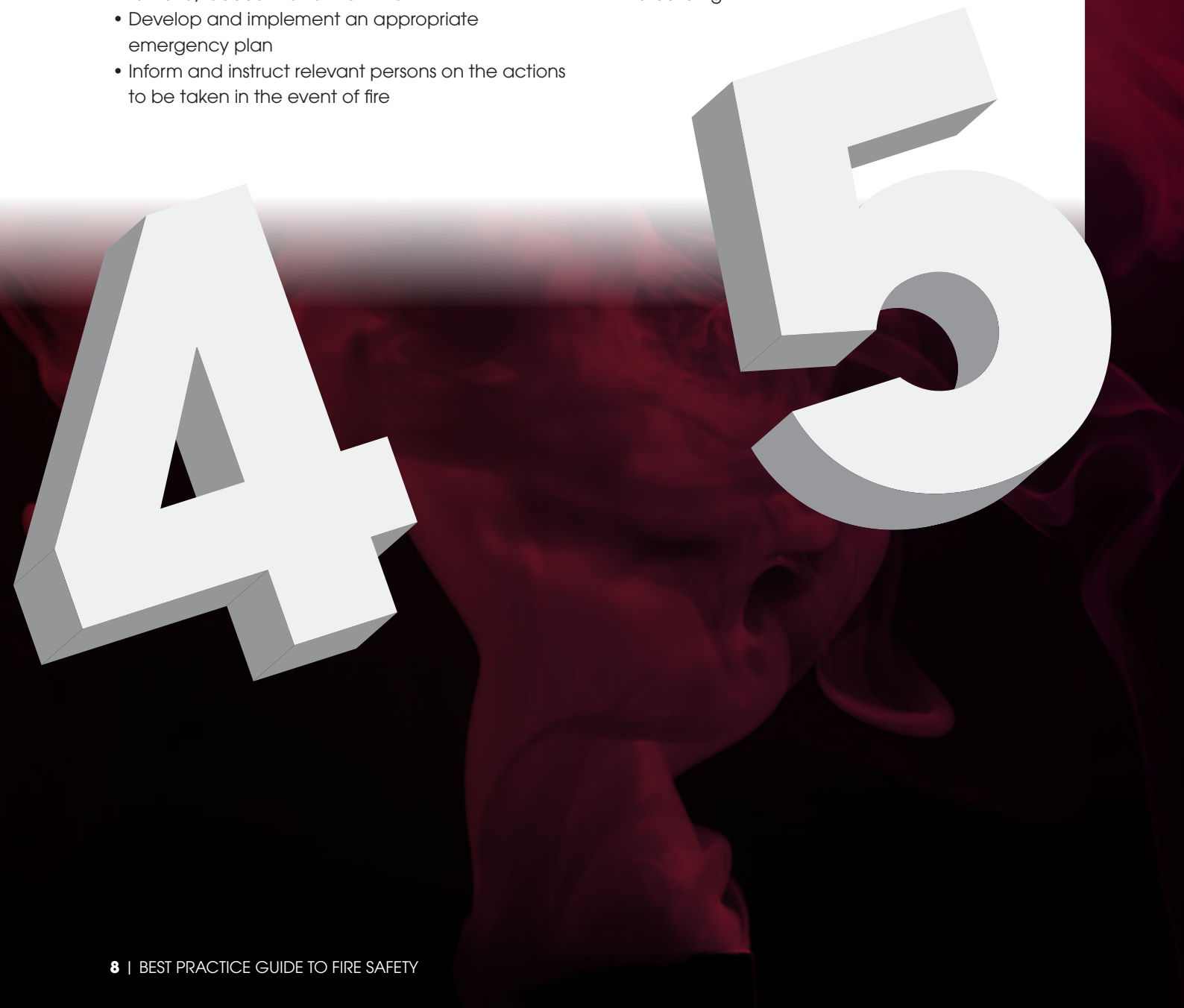
STEP 4: RECORD, PLAN, INSTRUCT, INFORM AND TRAIN

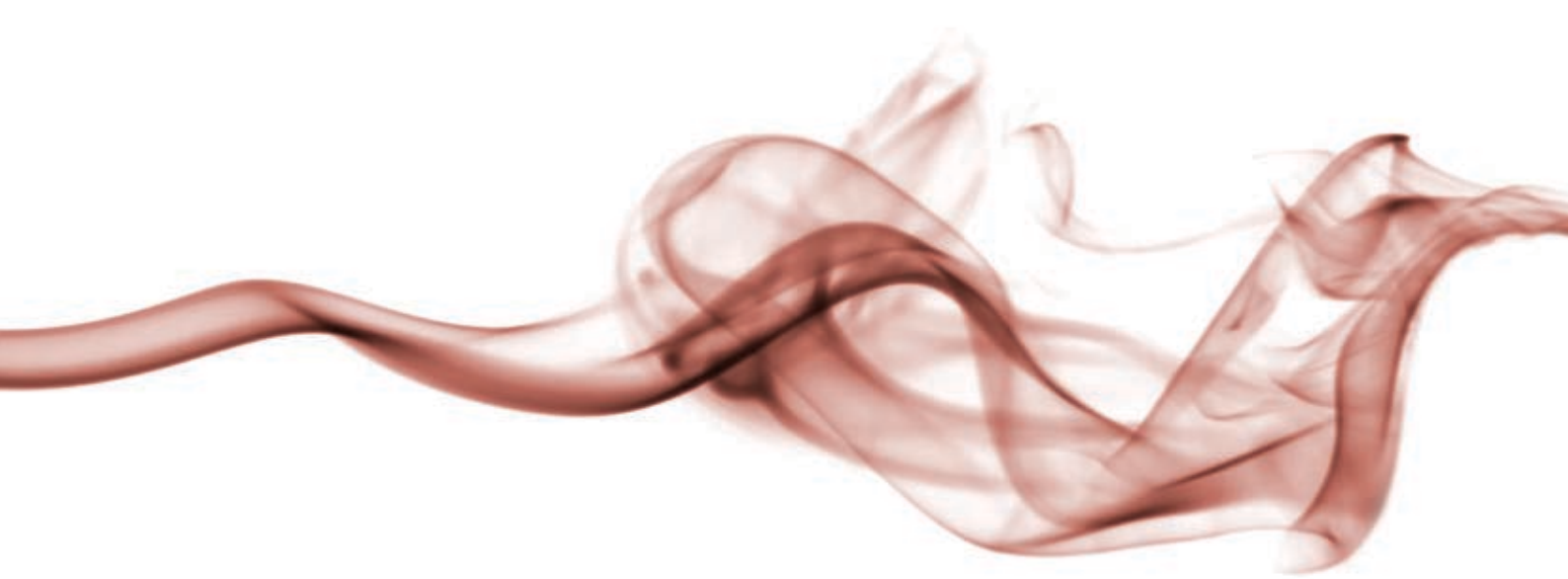
It is always good practice to record the significant findings of the fire risk assessment, the steps that you have already taken and those that you plan to take in order to reduce the risk. In many cases the law requires that the significant findings of the fire risk assessment and details of those persons especially at risk are recorded.

- Record significant findings and actions taken to remove/reduce the risk from fire
- Develop and implement an appropriate emergency plan
- Inform and instruct relevant persons on the actions to be taken in the event of fire
- Deliver training to employees, particularly those with specific duties (fire marshals). See the Fire Safety Training section (page 22) for more detail on aspects of staff fire safety training.

STEP 5: REGULARLY REVIEW THE FIRE RISK ASSESSMENT

- Whenever you have cause to consider it is no longer valid, e.g. after a significant incident or "near miss"
- If there has been a significant change in the workplace, e.g. changes to plant, equipment, processes, or substances used etc.
- If there has been a significant change in the number, character or needs of persons who use the building





Protective Measures

The risk assessment should identify a specific range of protective measures that are appropriate for the particular type of premises and usage of the premises. The combination of measures will vary with the application but the following is a list of topics that need to be considered:

- Structural and passive fire protection
- Fire detection and warning systems
- Means of escape (escape routes), emergency escape lighting
- Signs and notices
- Fire fighting equipment and facilities
- Kitchen fire suppression systems
- Sprinkler and other water-based extinguishing systems
- Gaseous extinguishing systems
- Other fixed fire extinguishing systems
- Recording, planning, informing, instructing and training

STRUCTURAL AND PASSIVE FIRE PROTECTION

Structural and passive fire protection is the primary measure integrated within the constructional fabric of a building to provide inherent fire safety and protection. In the event of fire, these measures will provide the fundamental requirements of structural stability, fire separation through building compartmentation and safe means of escape.

Local building regulations will define the regional requirements for these measures:

- England and Wales: The Building Regulations 2010
- Northern Ireland: The Building Regulations (Northern Ireland) 2012
- Scotland: The Building (Scotland) Regulations 2004, (as amended)

Various structural and passive fire protection measures may be necessary to limit and control the spread of flame, heat and smoke from a fire. The following are some of the measures that need to be considered:

- Structural steel protection
- Fire walls and partitioning
- Fire and smoke curtains
- Fire rated ductwork and dampers
- Fire doors
- Fire resistant glazing
- Intumescent sealing systems
- Cavity fire barriers
- Fire stopping or seals for penetration of fire barriers

Note that penetrations of walls and floors by pipes and other services may provide a ready path for the spread of fire. The linings and decorative finishes of buildings must also be considered as linings can promote the spread and development of fire. In buildings with large areas of drapes, consideration may should be given to the flammability. Similarly, the flammability of furniture and furnishings may need to be considered. Other hazards include excessive layers of paint on the walls and ceiling of escape routes.

Ventilation and air-conditioning systems can also provide a path for the spread of fire and smoke. Measures to reduce the risk may include a combination of fire and smoke dampers, and the interconnection of forced ventilation and air-conditioning systems to the fire alarm system.

Further information on these products and systems may be found on the following websites:

- Association for Specialist Fire Protection: www.asfp.org.uk
- Passive Fire Protection Federation: www.pfpf.org

Fire Detection and Alarm Systems

A fire in your premises must be detected quickly and a warning given, allowing people to escape safely.

Fire can be detected by people and manual fire detection may be all that is required. However an automatic fire detection and alarm system is normally considered necessary in the following buildings/ situations:

- Buildings in which people sleep
- Covered shopping complexes and large or complex places of assembly
- Buildings with phased evacuation
- In compensation for a reduction in standards of certain other fire protection measures (e.g. extended travel distance or reduction in the fire resistance of construction protecting the escape route)
- In lieu of vision between an inner room and its associated access room
- As a means of automatically operating other fire protection measures such as closing fire doors, the release of electronically locked doors or initiation of smoke control systems

An appropriate FD&A system will warn everyone in the building at the earliest opportunity so that they can exit the building or follow other instructions that are issued, and to also alert the Fire Brigade to allow early intervention. The FD&A system may be connected to other systems or equipment for the automatic control of fire protection measures, e.g. fire dampers or fixed extinguishing systems.

Different types of fire detector are suitable for different parts of your premises. Before installing an FD&A system, discuss your proposals with an appropriately qualified and experienced specialist. Fire alarm systems should be installed by companies certified to either LPS1014 or SP203-1 third party certification schemes which prove their competence in that area.

FD&A systems installed in commercial premises should be designed, installed, tested and maintained in accordance with BS 5839-1 recommendations. Systems can vary from small simple systems with one or two manual call points and sounders to systems which incorporate a large number of automatic fire detectors, manual call points and sounders connected to numerous intercommunicating control and indicating panels.

Systems may also be designed to include sophisticated techniques to avoid false alarm. Various audio and visual alarm systems are available to manage the controlled evacuation of a building in the event of a fire.

A wide range of equipment is available that will cater for the FD&A requirements of any type of premises. The types of equipment recommended may include some of the following range of products:

- All systems will include manual call points that allow people to raise a fire alarm, commonly known as "break glass" units
- Point detectors are designed to detect one or more of the four characteristics of fire; heat, smoke, combustion gas (i.e. carbon monoxide), or radiation (i.e. infra-red or ultra violet)
- Multi-sensor detectors combine detector technology to improve the detection characteristics and reject false alarms
- Optical beam detectors provide economical and effective protection of large, open plan spaces where the use of traditional detection technologies would prove to be difficult and/or costly to install
- Line type heat detectors are used in large industrial spaces such as tunnels or car parks with adverse environmental conditions
- Aspirating smoke detectors are traditionally associated with early warning, high sensitivity applications such as the protection of computer rooms but they are also widely used to provide flexible and discrete detection solutions – for example in inaccessible, harsh, unusually high or aesthetically sensitive areas
- Sounders and bells give an audible fire alarm warning but these may be supplemented by voice alarm devices that give spoken instructions, or even

a sophisticated voice alarm system
- Wireless systems are available which provide solutions where wired installations are not suitable
- Other devices, such as visual alarms or beacons, are used if there is a risk of audio signals not being adequately heard by all occupants, either for disability reasons or by use of ear defenders.

The operation of all this equipment is coordinated and controlled by a control and indicating panel.

This piece of equipment allows the day to day test and running of the fire alarm system but is also at the centre of managing what happens in the event of a fire alarm.

The control and indicating panel may indicate only the zone in which a detector or call point has been activated or it may be a fully addressable panel giving details and location of the individual detector or call point that has operated.

There should always be a zone plan displayed alongside the fire alarm control and indicator panel.

Means of Escape

When considering the likely consequences of fire, the fire risk assessor needs to take into account the effects of fire on escape routes; considering how quickly fire could be detected, how quickly it may grow; how it could affect the escape routes; and how quickly people in the building are likely to respond to an alarm.

In general, adequate means of escape are provided if people can immediately, or within a short distance of travel, turn their back on any fire and move away from it to a final exit along smoke-free escape routes.

It is important to consider how many people will use the escape route and make arrangements for disabled or elderly people. The escape route should be as short as possible and the impact of a blocked escape route must be considered. Of course, precautions should be taken to ensure this does not happen! Emergency lighting and escape route signage should be installed and all employees must be informed and trained in how to escape the building. There are several critical factors in the assessment of means of escape:

- Maximum distance occupants must travel to reach a place of relative or ultimate safety such as an exit to a protected stairways or a final exit
- Avoidance of long dead ends in which escape is only possible in one direction
- Number, distribution and width of story exits and final exits
- Means of protecting the escape routes from ingress or build up of smoke that might prevent occupants escaping
- Ability of occupants to use the escape routes especially arrangements for people with disabilities

In large or complex buildings, the advice of specialists on the adequacy of means of escape will often be necessary

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Emergency

The primary purpose of emergency lighting (or emergency escape lighting) is to illuminate escape routes but it is also provided to illuminate signs and other safety equipment.

The size and type of your premises and the risk to the occupants will determine the complexity of the emergency lighting required. In larger more complex premises a comprehensive system of fixed automatic escape lighting is likely to be needed. This will be particularly true in premises where there are significant numbers of staff or members of the public.

If escape routes require artificial illumination, you need to consider whether emergency lighting is necessary. The fire risk assessment will judge the likelihood that a fire will cause the normal lighting on any part of the escape route to fail before occupants escape from the area. This loss of normal lighting could result in injury as people try to evacuate the building.

Risk factors to consider include:

- Length and complexity of the escape routes
- Familiarity of the occupants with the building
- Measures to control the development of fire
- Measures to provide early warning of fire
- Presence of borrowed light (e.g. from street lighting)
- Hours during which people are using the building
- Presence of sleeping accommodation
- Presence of windowless areas

Emergency lighting systems should conform to the recommendations in BS 5266-1 and the requirements of BS 5266-7 and 8.

An emergency lighting system should normally cover the following:

- Each exit door
- Escape routes
- Intersections of corridors
- Outside each final exit and on external escape routes
- Emergency escape signs
- Stairways so that each flight receives adequate light
- Changes in floor level
- Windowless toilets and toilet accommodation exceeding 8m^2
- Fire fighting equipment
- Fire alarm call points
- Equipment that would need to be shut down in an emergency
- Lifts
- Rooms greater than 60m^2

It is not necessary to provide individual lights (luminaires) for each item above, but there should be a sufficient level of light overall to allow them to be visible and usable.

Emergency lighting can be 'maintained', i.e. on all the time, or 'non-maintained', i.e. normally off and only operates when the normal lighting fails. Emergency lights should operate for one, two or three hours, depending on the application but in practice most emergency lights are three hour. Emergency lights will also provide for some use in the premises during a power failure other than in an emergency situation.

Lighting

Self contained emergency lights with the battery and charger built into the light fitting are commonly used. In large buildings central systems may be used where the batteries and charger are remote from the light fittings.

In some cases an emergency light doubles as an internally illuminated exit sign. However it is not recommended to simply stick an exit sign over an emergency light fitting as this will probably reduce the light output and so may become ineffective as an emergency light.

There should be a simple method of testing the emergency lights without interfering with the normal lighting from the consumer unit (see image below):

Example of self contained emergency lights

Example of converted emergency light

Emergency Light tester

Signs and Notices

Legislation requires the Duty Holder (in a workplace, normally the employer) to carry out a formal risk assessment to determine the need for fire safety signs.

The requirements for the characteristics of fire safety signs and notices are encompassed within the Health and Safety (Safety Signs and Signals) Regulations 1996 and the guidance in relevant British Standards.

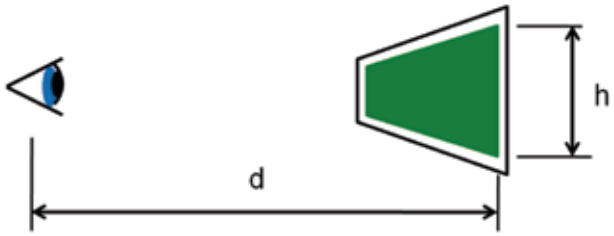
FIRE EXIT AND ESCAPE ROUTE SIGNS

The legislation requires all duty holders to ensure that the means of escape is effectively located and the route to a place of relative safety be clearly identified. Where the building manager, facilities manager/duty holder requires specific guidance to achieve this, a competent person should be consulted. Guidance on the application and siting of means of escape signs is given in BS 5499 Part 4.

The following key elements of escape route signing will influence effective evacuation:

Illumination: All escape route signs should be adequately illuminated to ensure they are conspicuous and legible within the environment. All escape route signs should be visible under power loss conditions. It may be appropriate in some premises that a maintained light source is provided or the same objective can be achieved with a photoluminescent escape route sign.

Sign Height (Graphical Symbol Height): All escape route signs are required to be observed from a distance, this distance alongside the illumination will determine the observation distance of the escape route sign. Full guidance can be found in BS 5499 Part 4. However, a simple guide for an externally illuminated sign at 100 lux will give an observation distance of 17 metres for a sign height of 100mm a ratio of 170 to 1.



Direction of Egress and Escape: From any point within a building it is important that people have immediate sight of an escape route. If they do not or doubt may exist, an escape route sign or series of signs is likely to be necessary. The use of directional arrows within escape route signs are standardised to ensure that egress is intuitive and efficient. Priority for escape route signs should be given to the shortest route to safety.

Figure 1 - BS5499-4 Directional meaning of escape route sign(s)

Progress forward from here (indicating direction of travel)

Progress forward and through from here; when sign is sited above a door (indicating direction of travel)

Progress forward and up from here (indicating change of level)

Progress down from here (indicating change of level)

Progress to the right from here (indicating direction of travel)

Progress to the left from here (indicating direction of travel)

Progress down to the right (indicating change of level)

Progress up to the right (indicating change of level)

Progress forward and across to the right from here when suspended within an open area

Progress down to the left (indicating change of level)

Progress up to the left (indicating change of level)

Progress forward and across to the left from here when suspended within an open area

The series of escape route signs within the designated means of escape should be positioned to progress the person to a place of safety. An escape route sign should be positioned at every change of direction, every change of level and at any decision point within the escape route.

Mounting Height: Escape route signs should be sited at 2.0m from the floor when positioned above doors or where suspended from the ceiling and at 1.7m from the floor when positioned on walls. As people progress along an escape route, the next escape route sign within the series should be in a predictable position following on from its predecessor in the series of escape route signs.

OTHER FIRE SAFETY SIGNS AND NOTICES

Legislation requires that all people are provided with relevant fire safety information such as the location and operation of panic hardware, door opening devices and emergency security override equipment. Legislation requires appropriate identification and location to all building occupants to ensure effective evacuation.

The same applies for people with special needs who may require assistance to locate designated safe areas as part of their Personal Emergency Evacuation Plan (PEEP). All life safety equipment and designated areas should be appropriately signed.

A key element of effective evacuation is the detection of fire and manual activation of alarm call points. Legislation requires the duty holder to ensure building occupants can identify and locate this equipment. It is also a requirement that building occupants know the procedure to adopt in the event of fire and alarm activation. the display of appropriate notices, in clear and precise format is recommended to support good fire safety management and formal training.

Figure 2 - Typical emergency evacuation area/equipment sign(s)

Refuge or temporary waiting space for disabled people

Fire emergency telephone

Panic hardware / door opening devices / security override sign(s)

Figure - 3 - Fire alarm call point sign, fire action notice(s) & Fire extinguisher identification notice

Fire alarm call point

Legislation requires that, where necessary, fire fighting equipment be indicated by signs.

The Duty Holder has an obligation to provide people with information that is essential for their protection. The provision of this information is recommended by government guidance on both building regulations and fire safety legislation.

Further signs that may be required depending on the type and use of the premises. activity, process or practice may require the identification and location of hazards that particularly affect the risk matrix. It may also be prudent that an indication of risk control is displayed where this measure is critical to management of risk. This process will complement the formal risk assessment and the identified significant findings. The measures will form part of the fire safety manual and risk reduction management.

There are important changes that now require duty holders to audit and review the fire safety signs within their buildings. This audit and review should ensure conformance to BS EN ISO 7010 for graphical symbols that have excellent comprehension credentials.

Fire Safety signs should be reviewed periodically to ensure they continue to support the fire safety strategy for the premises.

When purchasing the supply and installation of fire safety signs it should be specified that the design, position and location of the fire safety signs conform to BS EN ISO7010 and BS5499 parts 4 and 10 respectively.

Figure 4 - BS EN ISO 7010 Fire fighting equipment sign(s) & Fire safety notice(s)

Fire hose reel

Fire extinguisher

Figure 5 - Mandatory fire safety instruction notice(s)

Figure 6 - Management of risk - Risk/prohibitive action combination sign(s)

Fire Fighting Equipment and Facilities

Your risk assessment may identify the need for fire fighting equipment such as:

- Portable fire extinguishers
- Fire blankets
- Fire buckets
- Hose reels
- Sprinkler systems
- Watermist systems
- Waterspray systems
- Gaseous fixed fire extinguishing systems
- Foam systems
- Powder systems
- Kitchen fire suppression systems
- Facilities for use by fire fighters including fire mains, fire fighting lifts and fire fighters switches for high-voltage illuminated signs

The sections that follow will give more information about this equipment to help provide a basic understanding of its applications and use.

PORTABLE FIRE EXTINGUISHERS

Critical parts of UK fire legislation are the general fire precautions or fire safety measures that the responsible person will need to take to comply with the law.

Key measures of these general fire precautions can, in part, be met by the adequate provision of portable fire extinguishers, the application of a suitable system of maintenance and effective training in their use.

Portable fire extinguishers are able to control or extinguish small fires, preventing them from developing into big ones before Fire & Rescue Service arrive. Portable fire extinguishers are valuable in the early stages of fire because of their portability, immediate availability and easy use by one person.

People are not expected to deal with a large fire, since extinguishers are essentially first aid fire fighting appliances of a limited capacity. But their ability to help contain the spread of fire may be vital until the Fire & Rescue Service arrive.

The capability to contain and prevent the spread of small fires is an essential tool in meeting general fire precaution measures or fire safety measures required by law. Portable fire extinguishers can reduce the likelihood of the spread of fire on the premises and mitigate the effects of the fire on people, property and the environment.

Fire fighting equipment should be simple to use, essentially, a pull-pin, point and squeeze handle operation. This makes them easy for anyone to use. However, the usefulness of portable fire extinguishers depends on people knowing how to use them. All modern extinguishers have clear instructions on them. Where there are employees some, and preferably all, should be provided with formal training.

Various types of portable fire fighting equipment are available, ranging from the simple fire bucket with water or sand through to water-based extinguishers as well as foam, powder, CO_2 and wet chemical extinguishers.

Guidance in BS 5306-8, the code of practice for fire extinguishing installations and equipment on premises, advises on the selection and installation of portable fire extinguishers. Recommendations are given on the type, quantity and rating of fire extinguishers that should be used and where they should be located such as on escape routes, stairwells, fire exits and corridors. This will ensure that the means of escape can be safely and effectively used at all times.

The type of a fire extinguisher will be dictated by the fire class and this is defined in the table below.

The FIA recommends that fire safety equipment

Fire Class	Description	Example Materials	Extinguisher Type / media
A	Flammable solids	Wood, paper, cloth	Water, Foam, Powder
B	Flammable liquids	Petrol, solvents	Foam, Powder, CO_2
C	Flammable gases	Propane, LPG	Powder
D	Flammable metals	Magnesium, lithium	Class D powder
F	Cooking oils	Cooking oils and fats	Class F (e.g. wet chemical)

should be installed, commissioned and maintained by a competent person.

Although desirable this is not a requirement of legislation.

It is strongly recommended that installation, commissioning and maintenance of portable fire extinguishers be carried out by a BAFE SP101/ST104 certified company. This provides assurance that the service provider is competent.

Portable fire extinguishers form only part of building fire protection, and it should not be assumed that their provision removes the need for other protection.

For more details on the types, use and colours of various portable fire extinguishers see Fact File 11 which is available on the FIA website: www.fia.uk.com.

HOSE REELS

Hose reels can be installed in all types of building, from factories and storage facilities to offices, shops and transport centres as well as schools, healthcare facilities, hotels, and prisons.

SPRINKLER AND OTHER WATER-BASED FIXED FIRE EXTINGUISHING SYSTEMS

Several water-based fixed fire extinguishing systems are available and these systems can be installed in many types of building. The type and size of system and the requirement for pumps and other equipment will be determined by the system designer. Sprinkler systems should be installed to EN 12845 by companies certified to either FIRAS or LPS 1048 third party certification schemes, which will prove their competence in this area.

Most sprinkler systems are installed for property protection but very often they play a part in an engineered fire safety solution for a building. Sprinkler systems can be installed in many types of building. The size of system and the requirement for pumps and other equipment will be determined by the system designer.

Several types of sprinkler system are available to suppress fires in ordinary combustibles:

- The most common sprinkler system is a wet pipe installation in which the system is permanently charged with water under pressure.
- Dry pipe systems are used where the system may experience low temperatures that would freeze the water.
- Pre-action systems are similar to dry pipe systems where the system is maintained dry and water is allowed into the system following activation of a fire detector.
- In deluge systems the pipework is empty and unpressurised, and in this case the nozzles are open (i.e. without heat sensitive elements). A separate fire detection system is used to activate deluge valves, allowing water to enter the piping system. Water flows from all nozzles simultaneously. These systems are used where rapid spread of fire is a concern.
- Waterspray fire protection systems are specialised versions of a deluge system; the piping and discharge nozzle spray patterns are designed to protect a uniquely configured hazard.
- Watermist fire protection systems utilise the large surface area of very small droplets of water to rapidly absorb heat by generating steam. In addition, the steam reduces oxygen in the vicinity of the fire. Watermist systems may use nozzles with glass bulbs (like sprinklers) for fire suppression of limited amounts of ordinary combustibles, or may have open nozzles for fire extinguishment of flammable liquid fires.

GASEOUS FIXED FIRE EXTINGUISHING SYSTEMS

Three groups of gaseous fixed fire extinguishing systems are available:

- **Inert gas systems**
- **Chemical gas systems**
- **CO_2 systems**

Gas extinguishing systems are normally used in computer rooms, IT server rooms, indoor transformers and switchgear; telecommunications, generators, engine enclosures, turbine enclosures, flammable liquid stores, archive storage areas, warehouse, cold stores and laboratories.

Inert gases and chemical gases, often referred to as clean agent systems have replaced halon 1301 as an extinguishing agent except for certain critical uses. Generally gaseous fire protection systems are operated by specific automatic fire detection systems in which detector provision and spacing is configured to give very early detection. Usually the activation of two detector heads is necessary to discharge the gas, (coincidence detection). A warning is normally given in the protected area before the gas discharges to allow personnel to leave the area. CO_2 systems have been used for many years for industrial hazards, but should not be used in occupied areas for safety reasons.

Gaseous extinguishing systems should be designed, installed and maintained to EN 15004, (inert and chemical gases) or BS 5306-4, (CO_2) by companies certificated to either LPS 1204, SP 202 or SP 203-3 third party certification schemes, which prove their competence in this area.

OTHER FIXED FIRE EXTINGUISHING SYSTEMS

There are other fixed extinguishing systems that are available and will suit certain applications. Some of the most common systems are described below.

Foam systems are used for areas where flammable liquids and/or plastics are handled and stored. Foam forms a blanket over the surface of flammable liquids to extinguish the fire. Foam may also be used to enhance watermist and waterspray systems. Typical applications include; flammable liquid hazards; storage tanks and bunds; warehousing (foam enhanced sprinklers); process areas (foam enhanced waterspray); machinery; aircraft hangers and flammable liquid transport. Foam systems should be designed, installed and maintained to EN 13565-2.

Powder fire protection systems are used in areas where ordinary combustibles, electrical hazards, flammable or combustible materials may be present but which are not normally occupied. Applications include turbines; hydraulic machinery and engines, flammable liquid handling/storage; storage of liquid natural gas. Powder fire protection systems should be designed, installed and maintained to EN 12416-2.

Kitchen fire extinguishing systems are fixed fire extinguishing systems designed for the protection of catering equipment where cooking oil or fat is present, such as cooking appliances and their related extract systems and filters. These systems can be used to protect all commercial cooking equipment and are not just limited to kitchens. Whilst there are no British or European product standards for these products they can be tested and approved to LPS 1223 or UL 300. Industrial fryers are often protected by water mist systems (see DD8489-1 and DD8489-6).

Hypoxic systems are sometimes used to prevent fire occurring in enclosures, such as critical archive storage, where the area is normally unmanned but may be entered for short periods.

Maintenance

UK Fire safety legislation requires that the responsible person must ensure that the premises and any protective measures are subject to a suitable system of maintenance. Maintenance is essential for any equipment but particularly for safety critical uses such as fire safety equipment. All protective measures for fire safety must be safe, reliable, efficient, effective and ready for use at all times. The maintenance system should cover all fire safety equipment, systems and facilities such as, fire detection and alarm systems; means of escape; emergency lighting; signs; notices and fire fighting equipment.

In order to fulfil the requirement of a suitable system of maintenance, all facilities, equipment or devices must be:

- In an efficient state
- In efficient working order
- In good repair

This is achieved by regular checks and proper maintenance procedures. Regular inspection and testing by the responsible person and a competent person is necessary at suitable intervals. These checks ensure that any faults or failings will be found and rectified as quickly as possible.

The appropriate checks and procedures can be found in the relevant codes of practice such as BS 5306 for portable extinguishers and BS 5839 for fire detection and alarm systems.

The definition of a competent person will depend on what is being maintained. Generally, a competent person will have undergone a programme of training followed by 'on the job' experience. Ideally training will be administered by an independent body, to maintain competency, the competent person should undergo continual professional development.

The fire risk assessment should indicate broadly what measures are required and any obvious failings in existing measures. A competent person specialising in a particular area of fire safety such as, maintenance of extinguishers or fire detection and alarm, would be able to provide the specialist knowledge necessary to ensure the fire safety measures are not only in good working order but remain adequate and appropriate.

Recording, Planning, Informing, Instructing and Training

FIRE SAFETY RECORDS

You will need to record the hazards and people you have identified as especially at risk from the risk assessment. You should also record what was done to reduce risks and need to make an emergency plan, tailored to your premises.

If your organisation employs five or more people, you must record the findings of your fire risk assessment and the actions you've taken. The record should include:

- Fire hazards you've identified
- People who may be at risk
- Protective measures you've taken or will take to remove / reduce the risk to people
- Procedures that need to be followed in case of fire, including details of any people nominated to carry out a particular function
- Information, instruction and training that people need and how it will be given

In some small low risk premises, record keeping may be no more than a folder containing a few sheets of paper with the significant findings, the action taken and a copy of the emergency plan. It's good practice to attach a simple plan of the premises to your record too. Keep a dedicated record of the following information:

- Significant findings
- Action taken
- Systems for the maintenance and regular testing of fire precautions
- Training given
- A copy of the emergency plan

EMERGENCY PLANS

It is essential to have an emergency evacuation plan for your premises. This plan will need to deal with any fire situation and its purpose is to make sure that people on your premises know what to do if there's a fire and the premises has to be evacuated.

INFORM AND INSTRUCT

Clear, relevant information and appropriate instructions must be given to staff and other people working on site, such as contractors, informing them what they need to do if there's a fire. The information and instructions you provide must be in a form that's easily understood and should take into account those with disabilities, learning difficulties and those for whom English is not their first language. Staff should be given training on induction and regularly thereafter, depending on the level of risk.

The information and instruction you give should be based on your emergency plan and must include:

- Your risk assessment findings
- Measures you've put in place to reduce the risk of fire
- What staff should do if there's a fire
- Clear identification of the people in the organisation who have fire safety responsibilities (such as fire marshals)

In small premises where no significant risks have been identified, information and instruction could simply involve an explanation of the fire procedures and how they're applied. This could include showing staff escape routes, how to use fire extinguishers and where they are located. In bigger premises, you should make sure that written instructions are given to those people who have designated tasks.

Co-operate and co-ordinate: where a premises is owned by someone else or there are multiple occupiers, it's important that you inform others of any significant risks that you've identified. By talking to other occupiers, you can co-ordinate your resources so that your actions and working practices don't place others at risk, and so that a co-ordinated emergency plan operates effectively.

FIRE SAFETY TRAINING

You must provide adequate training for your staff. The type of training will depend on the premises but should:

- Reflect the findings of the fire risk assessment
- Explain your emergency procedures
- Explain the duties and responsibilities of staff
- Take place in normal working hours and be repeated periodically
- Be easily understandable by staff
- Be tested by fire drills

The responsibilities of staff will include, for example, a weekly test of a fire detection and alarm system by operating a manual call point.

In small premises, showing new staff the fire exits and giving basic training on what to do if there's a fire should be adequate. However, in larger premises with a high staff turnover and shift patterns, your staff training should involve:

- The general fire precautions in the premises
- What to do on discovering a fire
- How to raise the alarm
- What to do when you hear an alarm
- Procedures for alerting members of the public and visitors
- Arrangements for calling the emergency services
- Evacuation procedures
- Location and use of fire fighting equipment
- The location of emergency exits
- The importance of keeping fire doors closed

All staff identified in your emergency plan that have a supervisory role (such as fire marshals) should be given details of your fire risk assessment and receive additional training.

Enforcement

The person with primary responsibility for compliance with the legislation is the employer, (i.e. the corporate body that employs people to work in the premises). However, the legislation also imposes duties on other persons who have control over the premises and on those who maintain premises or facilities such as fire protection equipment; this will include landlords and managing agents.

In England and Wales this person is known as the 'Responsible Person', in Scotland the 'Duty Holder' and Northern Ireland refer to the 'Appropriate Person'. Despite different titles, the duties are essentially to ensure safety of the people on the premises.

A critical difference is that legislation in England and Wales extends to cover the communal areas of purpose built blocks of flats, which are not included in the legislation in Scotland or Northern Ireland. The regional legislation that defines the obligations of the person responsible for fire safety is as follows:

- In England and Wales the Regulatory Reform (Fire Safety) Order 2005.
- In Scotland the Fire (Scotland) Act 2005 in conjunction with the Fire Safety (Scotland) Regulations 2006.
- In Northern Ireland the Fire and Rescue Services (Northern Ireland) Order 2006 in combination with the Fire Safety Regulations (Northern Ireland) 2010.

Despite the use of different precise wording and the differences to how the legislation applies to households, the enactment of the legislation is very similar. The following will describe the general principles of enforcement to give an overview but details of the specific legislation that applies to your region may be found at the legislation.gov website.

ENFORCING AUTHORITY

The Enforcing Authority is defined as:

- Normally the Fire & Rescue Service for the area where premises are situated

- The Health & Safety Executive for certain premises such as construction sites, licensed nuclear installations or a ship under construction or repair
- Defence Fire Service for property occupied solely by the armed forces
- The local authority in the case of a sports ground or regulated stand
- A fire inspector or person authorised for premises occupied by the Crown or UK Atomic Energy Authority

POWERS OF INSPECTORS OR ENFORCEMENT OFFICERS

Inspectors can make formal enquiries or require the production of documentation, records or information that will allow determination of compliance with the legislation. The following is a list of the powers of inspection:

- Enter and inspect any premises and anything in them. This may be done at any reasonable time, or if a situation may be dangerous, at any time
- Require you to provide facilities, information, documents, records or assistance as reasonably requested
- Inspect and copy any documents or records on the relevant premises, or remove them from the relevant premises
- Carry out inspections, measurements and tests, to the premises or an article or substance found on the premises
- Take samples from the premises to ascertain their fire resistance or flammability
- Dismantle any article deemed dangerous in event of fire for inspection or testing

ALTERATION NOTICES

Alterations Notices are issued if the Enforcing Authority considers there to be:

- A serious (but controlled) risk to persons, whether due to the features of the premises, their use, any hazard present, or any other circumstances
- A serious risk, if a change is made to the premises, or the use to which they are put

Where an Alterations Notice has been served, you must notify the Enforcing Authority before making:

- Any changes to the services, fittings or equipment in or on the premises
- An increase in the quantities of dangerous substances which are in or on the premises

- A change to the use of the premises which may result in a significant increase in risk

ENFORCEMENT NOTICES

An Enforcement Notice is served when the Enforcing Authority believes that the Responsible Person has failed to comply with the requirements of the legislation.

An Enforcement Notice will state where there is non-compliance with the duties and why. The Notice will indicate steps that need to be taken in order to remedy the non-compliance. The Responsible Person is then required to take action to remedy the non-compliance within a specified period which will not be less than 28 days.

PROHIBITION NOTICES

A Prohibition Notice is used to prohibit or restrict the use of premises in serious cases to prevent loss of life or serious injury. The Notice will be served on the responsible person or those who have control of the premises and requires that those at risk are informed immediately.

When assessing the risks in deciding whether to apply a Prohibition Notice, the enforcement officer will have particular regard to anything affecting the escape from a fire.

A Prohibition Notice may take effect immediately if the enforcing authority considers the risk to be imminent. Otherwise, it will take effect from a specified date.

The Notice will specify the problems and may indicate measures that must be taken to remedy the situation.

OFFENCES AND PENALTIES

Putting people at risk of death or injury by not complying with fire safety duties is a criminal offence.

There are various offences that can be committed and sanctions that may be applied (refer to the actual legislation for details).

Offences are subject to a penalty of a fine if taken through the minor court, or on conviction on indictment, to an unlimited fine and/or a prison term for serious offences.

APPEAL

You can appeal to the court within 21 days of being served an Alteration, Enforcement or Prohibition Notice. The court may cancel, confirm or modify the Notice.

Further Guidance

WWW.FIA.UK.COM

BUILDING REGULATIONS:

England and Wales: The Building Regulations 2010
Northern Ireland: The Building Regulations (Northern Ireland) 2012
Scotland: The Building (Scotland) Regulations 2004, (as amended 2010)

PASSIVE FIRE PROTECTION:

Association for Specialist Fire Protection: www.asfp.org.uk
Passive Fire Protection Federation: www.pfpf.org

PORTABLE FIRE EXTINGUISHERS:

www.fia.uk.com

For England and Wales, the communities.gov.uk website gives further guidance, including documents for different types of premises and the following topics:

- Escape routes, emergency escape lighting
- Guidance on signs and notices
- Guidance on recording, planning, informing, instructing and training
- Quality assurance of fire protection equipment and installation
- Example fire safety maintenance checklist
- Technical information on separation, fire doors and door fastenings

For information on fire safety law for business visit: www.communities.gov.uk/fire/firesafety/firesafetylaw/ and for documents go to: www.gov.uk/workplace-fire-safety-your-responsibilities

FIRE (SCOTLAND) ACT:

www.legislation.gov.uk/asp/2005/5/part/3
www.firelawscotland.org

NORTHERN IRELAND FRS, FIRE SAFETY REGULATIONS:

www.nifrs.org/firesafe/
Practical advice for businesses can also be found at: www.businesslink.gov.uk

Reference

This is a list of all the websites and publications used to create this Best Practice Guide

BIBLIOGRAPHY

- England and Wales: The Building Regulations 2010
- Northern Ireland: The Building Regulations (Northern Ireland) 2012
- Scotland: The Building (Scotland) Regulations 2004, (as amended 2013)
- LPS 1048 Requirements for the Approval of Sprinkler System Contractors in the UK and Eire: LPCB (part of BRE Global) Bucknalls Lane, Garston, Watford, UK WD25 9XX
- LPS 1204 Requirements for Firms Engaged in the Design, Installation, Commissioning and Servicing of Gas Extinguishing Systems: LPCB (part of BRE Global) Bucknalls Lane, Garston, Watford, UK WD25 9XX
- LPS 1223 - Requirements and Testing Procedures for the LPCB Certification and Listing of Fixed Fire Extinguishing Systems for Catering Equipment: LPCB (part of BRE Global) Bucknalls Lane, Garston, Watford, UK WD25 9XX
- UL 300 Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking Equipment, Underwrites Laboratories Inc, 333 Pfingsten Road, Northbrook, IL 60062 USA
- SP101/ST104 Contract Maintenance of Portable Fire Extinguishers incorporating Registered Fire Extiguisher Service Technicians Scheme: BAFE (British Approvals for Fire Equipment), Bridges 2, The Fire Service College, London Road, Moreton in Marsh, Gloucestershire GL56 0RH
- SP203-1 Fire Detection and Alarm Systems Scheme: BAFE (British Approvals for Fire Equipment), Bridges 2, The Fire Service College, London Road, Moreton in Marsh, Gloucestershire GL56 0RH
- SP203-3 Fixed Gaseous Fire Suppression Systems: BAFE (British Approvals for Fire Equipment), Bridges 2, The Fire Service College, London Road, Moreton in Marsh, Gloucestershire GL56 0RH

WEBOGRAPHY

- Association for Specialist Fire Protection: www.asfp.org.uk
- www.gov.uk/government/collections/fire-safety-guidance
- Fire Safety law and guidance documents for business: www.gov.uk/government/organisations/department-for-communities-and-local-government/series/fire-safety-law-and-guidance-documents-for-business
- Fire Safety in the workplace: www.gov.uk/workplace-fire-safety-your-responsibilities
- Legislation.org: www.legislation.gov.uk/asp/2005/5/part/3
- NI Direct: www.healthandsafetyworksni.gov.uk/managing_fire_safety#f1
- Passive Fire Protection Federation: www.pfpf.org
- Southwales-fire: www.southwales-fire.gov.uk/English/business_fire_safety/Pages/default.aspx

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