Unit 6 Fire Fighting Equipment and Facilities

Learning Outcomes
By the end of this unit the learner will be able to:
✓ Differentiate between the different types of fire extinguishers ✓ Use a checklist to ensure the suitability and availability of fire extinguishers ✓ Know in which instances certain fire extinguishers should or should not be used

Unit 6

Fire Fighting Equipment and Facilities

Fire fighting equipment can reduce the risk of a small fire, e.g. a fire in a waste-paper bin, developing into a large one. The safe use of an appropriate fire extinguisher to control a fire in its early stages can also significantly reduce the risk to other people in the premises by allowing people to assist others who are at risk.

This equipment will usually comprise enough portable extinguishers that must be suitable for the risk.

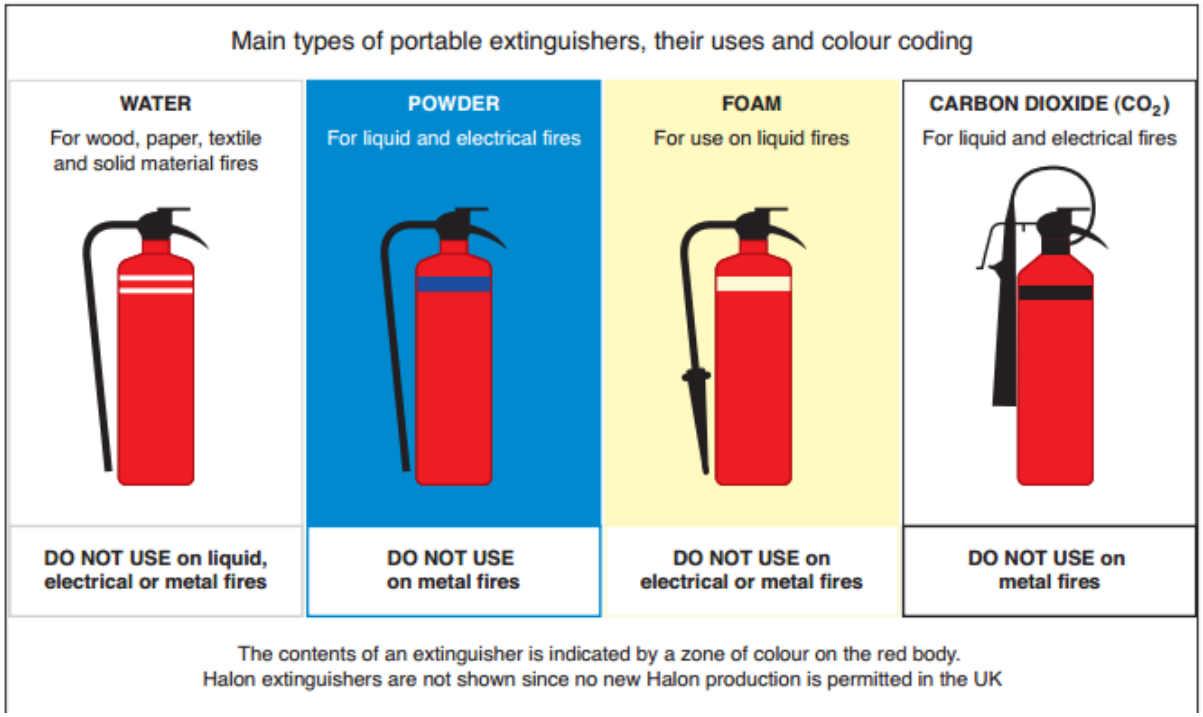

Figure 6.1: *Types of fire extinguishers*

In small premises, having one or two portable extinguishers of the appropriate type, readily available for use, may be all that is necessary. In larger, more complex premises, a number of portable extinguishers may be required and they should be sited in suitable locations, e.g. on the escape routes at each floor level. It may also be necessary to indicate the location of extinguishers by suitable signs.

Some premises will also have permanently installed firefighting equipment such as hose reels for use by trained staff or firefighters.

People with no training should not be expected to attempt to extinguish a fire. However, all staff should be familiar with the location and basic operating procedures for the equipment provided, in case they need to use it. If your fire strategy means that certain people, e.g. fire marshals, will be expected to take a more active role, then they should be provided with more comprehensive training.

Other fixed installations and facilities to assist firefighters, such as dry rising mains and access for fire engines, or automatically operated, fixed fire suppression systems such as sprinklers and gas or foam flooding systems may also have been provided.

Where these have been required by law, e.g. the Building Regulations or local Acts, such equipment and facilities must be maintained.

Similarly, if provided for other reasons, e.g. insurance, it is good practice to ensure that they are properly maintained.

In most cases it will be necessary to consult a competent service engineer. Keeping records of the maintenance carried out will help you demonstrate to the enforcing authority that you have complied with fire safetylaw.

Checklist

- Are the extinguishers suitable for the purpose? ☐
- Are there enough extinguishers sited throughout the premises at appropriate locations? ☐
- Are the right types of extinguishers located close to the fire hazards and can users get to them without exposing themselves to risk? ☐
- Are the extinguishers visible or does their position need indicating? ☐
- Have you taken steps to prevent the misuse of extinguishers? ☐
- Do you regularly check any other equipment provided to help maintain the escape routes? ☐
- Do you carry out daily checks to ensure that there is clear access for fire engines? ☐
- Are those who test and maintain the equipment competent to do so? ☐
- Do you have the necessary procedures in place to maintain any facilities that have been provided for the safety of people in the building (or for the use of firefighters, such as access for fire engines and firefighting lifts)? ☐

You have responsibility for the provision of appropriate firefighting equipment. It is also your responsibility to check that all firefighting equipment is in the correct position and in satisfactory order before the premises are used.

Appropriate staff should be trained in the use of all such equipment.

Portable Firefighting Equipment

Fires are classed according to what is burning. Fire extinguishers provided should be appropriate to the classes of fire found in your premises in accordance with Table 1.1

Class of fire	Description
Class A	Fires involving solid materials such as wood, paper or textiles.
Class B	Fires involving flammable liquids such as petrol, diesel or oils.
Class C	Fires involving gases.
Class D	Fires involving metals.
Class F	Fires involving cooking oils such as in deep-fat fryers.

Table 1.1 Note:

1. If there is a possibility of a fire in your premises involving material in the shaded boxes then you should seek advice from a competent person.
2. It is not safe to fight fires involving aerosols with fire extinguishers.

Number and Type of Extinguishers

Typically for the Class A fire risk, the provision of one water-based extinguisher for approximately every 200m of floor space, with a minimum of two extinguishers per floor, will normally be adequate.

Where the fire risk is not confined to a particular location, e.g. Class A fires, the fire extinguishers should be positioned on escape routes, close to the exit from the room or floor, or the final exit from the building. Similarly, where the particular fire risk is specifically located, e.g. flammable liquids, the appropriate fire extinguisher should be near to the hazard, and located so that it can be safely used. They should be placed on a dedicated stand or hung on a wall at a convenient height so that employees can easily lift them off (at about 1m for larger extinguishers, 1.5m for smaller ones, to the level of the handle). Ideally no one should have to travel more than 30m to reach a fire extinguisher. If there is a risk of malicious use you may need to use alternative, and more secure, locations.

Consider the implications of the Manual Handling Operations Regulations 1992 when selecting and siting firefighting equipment.

Where there are self-contained small premises, multi-purpose extinguishers which can cover a range of risks may be appropriate. Depending on the outcome of your fire risk assessment, it may be possible to reduce this to one extinguisher in very small premises with a floor space of less than 90m.

Extinguishers manufactured to current standards (BS EN 3-7) are predominately red but may have a colour-coded area, sited above or within the instructions, denoting the type of extinguisher. Most older extinguishers, manufactured to previous standards, have bodies painted entirely in a single colour which denotes the type of extinguisher. These older extinguishers remain acceptable until they are no longer serviceable. However, it is good practice to ensure that old and new style extinguishers are not mixed on the same floor of a building.

The following paragraphs describe the different types of extinguisher. The colour referred to is the colour of the extinguisher or the colour- coded area.

Water extinguishers (red)

This type of extinguisher can only be used on Class A fires. They allow the user to direct water onto a fire from a considerable distance. A 9-litre water extinguisher can be quite heavy and some water extinguishers with additives can achieve the same rating, although they are smaller and therefore considerably lighter. This type of extinguisher is not suitable for use on live electrical equipment.

Water extinguishers with additives (red)

This type of extinguisher is suitable for Class A fires. They can also be suitable for use on Class B fires and where appropriate, this will be indicated on the extinguisher. They are generally more efficient than conventional water extinguishers.

Foam extinguishers (cream)

This type of extinguisher can be used on Class A or B fires and is particularly suited to extinguishing liquid fires such as petrol and diesel. They should not be used on free- flowing liquid fires unless the operator has been specially trained, as these have the potential to rapidly spread the fire to adjacent material. This type of extinguisher is not suitable for deep-fat fryers or chip pans.

Powder extinguishers (blue)

This type of extinguisher can be used on most classes of fire and achieve a good 'knock down' of the fire. They can be used on fires involving electrical equipment but will almost certainly render that equipment useless.

Because they do not cool the fire appreciably it can re-ignite. Powder extinguishers can create a loss of visibility and may affect people who have breathing problems, and are not generally suitable for enclosed spaces.

Carbon dioxide extinguishers (black)

This type of extinguisher is particularly suitable for fires involving electrical equipment as they will extinguish a fire without causing any further damage (accept in the case of some electronic equipment e.g. computers). As with all fires involving electrical equipment, the power should be disconnected if possible.

Class 'F' extinguishers

This type of extinguisher is particularly suitable for commercial catering establishments with deep-fat fryers.

Selection, installation and maintenance of portable fire extinguishers

All portable fire extinguishers will require periodic inspection, maintenance and testing. Depending on local conditions such as the likelihood of vandalism or the environment where extinguishers are located, carry out brief checks to ensure that they remain

serviceable. In normal conditions a monthly check should be enough. Maintenance by a competent person should be carried out annually.

Fire blankets

Fire blankets should be located in the vicinity of the fire hazard they are to be used on, but in a position that can be safely accessed in the event of a fire. They are classified as either light duty or heavy duty. Light-duty fire blankets are suitable for dealing with small fires in containers of cooking oils or fats and fires involving clothing. Heavy-duty fire blankets are for industrial use where there is a need for the blankets to resist penetration by molten materials.

Fixed Firefighting Installations

These are firefighting systems which are normally installed within the structure of the building. They may already be provided in your premises or you may be considering them as a means of protecting some particularly dangerous or risk-critical area as part of your risk-reduction strategy.

Hose Reels

Permanent hose reels (Figure 6.2) installed in accordance with the relevant British Standard (BS EN 671-3: 2000) provide an effective firefighting facility. They may offer an alternative, or be in addition to, portable firefighting equipment. A concern is that untrained people will stay and fight a fire when escape is the safest option. Where hose reels are installed, and your fire risk assessment expects relevant staff to use them in the initial stages of a fire, they should receive appropriate training.

Note: It is not safe to fight fires involving aerosols with hose reels.

Maintenance of hose reels includes visual checks for leaks and obvious damage and should be carried out regularly. More formal maintenance checks should be carried out at least annually by a competent person.

Figure 6.2: *Hose reel*

Sprinkler Systems

Sprinkler systems can be very effective in controlling fires. They can be designed to protect life and/or property and may be regarded as a cost-effective solution for reducing the risks created by fire. Where installed, a sprinkler system is usually part of a package of fire precautions in a building and may form an integral part of the fire strategy for the building.

Sprinkler protection could give additional benefits, such as a reduction in the amount of portable firefighting equipment necessary, and the relaxation of restrictions in the design of buildings.

Routine maintenance by on-site personnel may include checking of pressure gauges, alarm systems, water supplies, any anti-freezing devices and automatic booster pump(s).

A competent maintenance contractor should provide guidance on what records need to be completed.

Following a sprinkler operation the sprinkler system should be reinstated by a competent person. A stack of spare sprinkler bulbs should be available on site for replacements, preferably in a separate building e.g. the pump house.

If a sprinkler system forms an integral part of your fire strategy it is imperative that adequate management procedures are in place to cater for those periods when the sprinkler system is not functional. This should form part of your emergency plan. Although the actual procedures will vary, such measures may include the following:

- Restore the system to full working order as soon as possible.
- Limit any planned shutdown to low-risk periods when numbers of people are at a minimum (e.g. at night) or when the building is not in use. This is particularly important when sprinklers are installed to a life safety standard or form part of the fire safety engineering requirements.
- You may need to isolate the area without the benefit of working sprinklers from the rest of the premises by fire-resisting material.
- Avoid higher-risk processes such as 'hot-work'.
- Extra staff should be trained and dedicated to conducting fire patrols.
- Any phased or staged evacuation strategy may need to be suspended. Evacuation should be immediate and complete. (Exercise caution as the stairway widths may have been designed for phased evacuation only.)
- Inform the local fire and rescue service.

If, having considered all possible measures, the risk is still unacceptable then it will be necessary to close all or part of the building. If in doubt you should seek guidance from a competent person.

Other Fixed Installations

There are a number of other fixed installations including water mist, gaseous, deluge and fixed powder systems. If your premises have a fixed firefighting system that you are unfamiliar with, then seek advice. Where a fixed firefighting system forms an integral part of your fire safety strategy, it should be maintained in accordance with the relevant British

Standard by a competent person.

Other Facilities (including those for Firefighters)

Building Regulations and other Acts, including local Acts, may have required firefighting equipment and other facilities to be provided for the safety of people in the building and to help firefighters. Fire safety law places a duty on you to maintain such facilities in good working order and at all times.

These may include:

- access for fire engines and firefighters;
- firefighting shafts and lifts;
- fire suppression systems e.g. sprinklers, water mist and gaseous;
- smoke-control systems;
- dry or wet rising mains and firefighting inlets;
- information and communication arrangements e.g. fire telephones and wireless systems and information to brief the fire and rescue service when they arrive; and
- firefighters' switches.

The Workplace (Health, Safety and Welfare) Regulations 1992 also require that systems provided for safety within a workplace are maintained.

Access for Fire Engines and Firefighters

Buildings that have been constructed to modern building regulations or in accordance with certain local Acts will have been provided with facilities that allow fire engines to approach and park within a reasonable distance so that firefighters can use their equipment without too much difficulty.

These facilities may consist of access roads to the building, hard standing areas for fire engines and access into the building for firefighters.
It is essential that where such facilities are provided they are properly maintained and available for use at all relevant times.

Where a building is used by a number of different occupants you will need to ensure co-operation between the various 'responsible 'persons' to maintain fire and rescue service access. In exceptional cases, where access is
persistently obstructed, you may need to make additional arrangements.

Firefighting Shafts and Lifts

Firefighting shafts (Figure 6.3) are provided in larger buildings to help firefighters reach floors further away from the building's access point. They enable firefighting operations to start quickly and in comparative safety by providing a safe route from the point of entry to the floor where the fire has occurred.

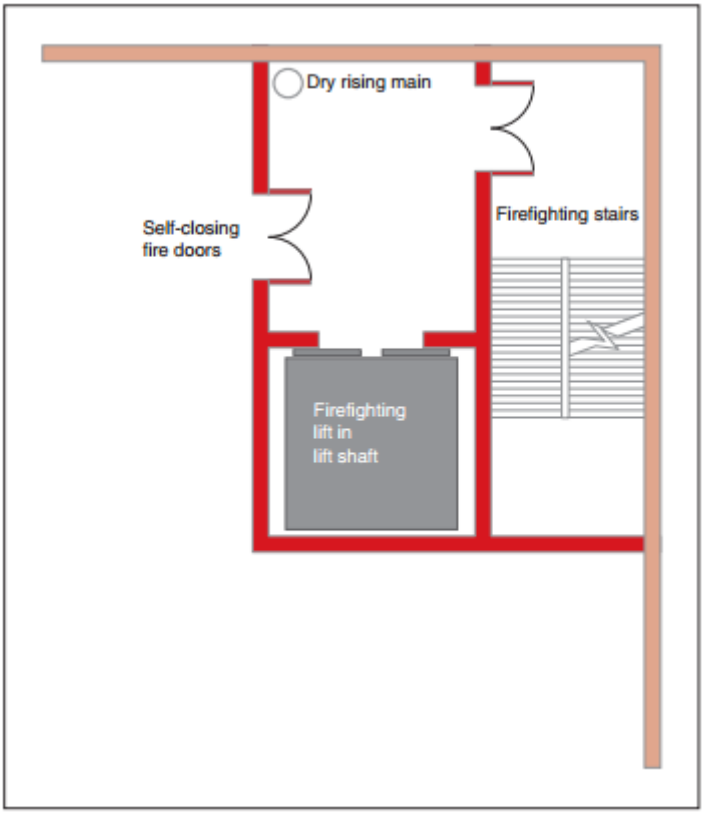

Figure 6.3 *Firefighting shaft*

Entry points from a stairway in a firefighting shaft to a floor will be via a lobby, through two sets of fire and smoke-resisting doors and walls. Many people will use the stairway for normal movement through the building and it is important that the safety features are not compromised by doors being wedged open.

Most firefighting shafts will also incorporate a firefighting lift which opens into the lobby. The lift will have a back-up electrical supply and car control overrides. The primary function of the lift is to transport firefighting personnel and their equipment to the scene of a fire with the minimum amount of time and effort. It may also be used to help evacuate less mobile people.

Alterations that might affect the shaft should not be made without first liaising with other responsible persons, any owners or managing agents and the enforcing authority. Any proposed changes will require Building Regulation approval from a Building Control Body.

Where a firefighting shaft is provided, it should be maintained by a competent person.

Suppression Systems

Fire suppression systems can include sprinklers and other types of fixed installations designed to automatically operate and suppress a fire.
Such systems should be maintained by a competent person.

Smoke Control Systems

These are complex systems that are provided for life safety of occupants, assistance to firefighters and property protection by clearing hot smoke and gases from the building. If you have one of these systems provided in your premises you should ensure you understand how it operates and that it is maintained in full working order. If your system is part of a larger system then you should liaise with other occupiers and building managers.

The smoke control system should be maintained by a competent person who is familiar with the fire engineering performance specifications
of that specific system.

Where these systems are installed in addition to a sprinkler system, then the design and installation of each system should not act detrimentally on one another. A competent person should be employed to confirm this.

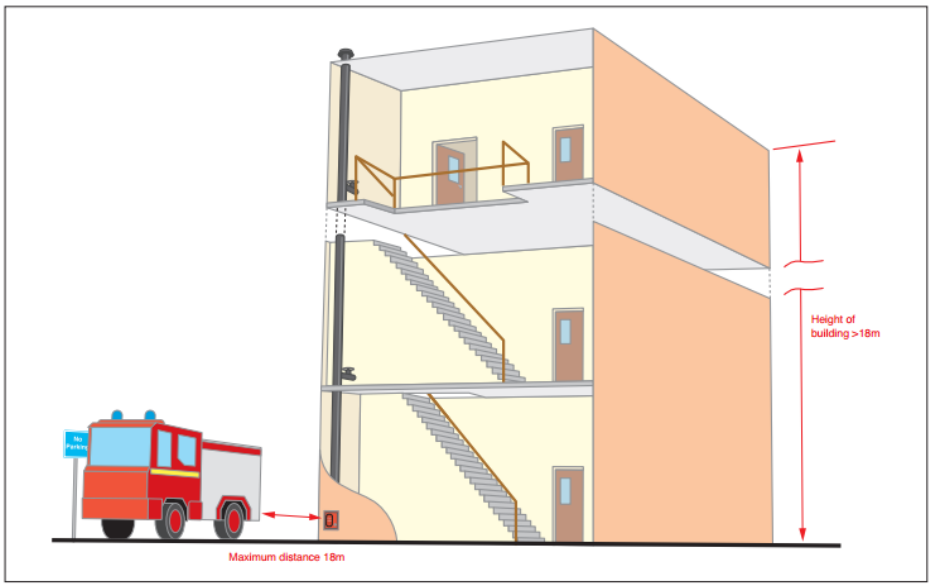

Figure 6.4: *Rising main*

Dry and wet rising fire mainsThe rising fire main (Figure 6.4) is an important facility for the fire and rescue service in taller buildings. It consists of an inlet box where firefighters can connect their hoses, a pipe running up or through the building, outlet valves on each floor level and an air vent at the top.It is important that fire mains remain in good working order. Issues to be considered can include the following:

- The physical approach to the inlet box should be such that a fire engine can park within 18 m with the inlet box in view.
- Prohibit car parking in front of the inlet box.
- Secure the inlet box in such a way that firefighters can open the door without too much difficulty.
- It is advisable to lock the landing valves in the closed position, usually with a leather strap and padlock.

Foam Inlets

Foam intlets are special inlets are usually fitted to provide an efficient way of extinguishing a fire in a basement or other area of high risk such as plant room. In many respects they look the same as rising main inlet boxes, but the door should be clearly marked 'foam inlet'. The risk area should be kept clear of obstructions to allow the foam to spread into the compartment.

Maintenance of Rising Mains and Foam Inlets

All types of rising mains and foam inlets together with associated valves should be maintained and tested on a regular basis by a competent person. Although there are no recommended periods between maintenance checks it would be prudent to carry out an annual service. Firefighters' switches Safety switches are normally provided to isolate high voltage luminous signs or to cut off electrical power. In the case of existing installations, if they have been provided in accordance with previous legislation (e.g. the Local Government (Miscellaneous Provisions) Act 1982), then it is likely that they will comply with the Order. If this is not the case, then you may need to consult the enforcing authority regarding the suitability of its location and marking. Testing should be carried out in accordance with the manufacturer's instructions. If you have no such instructions then an initial test should be carried out by a competent electrician.

Other Firefighting Facilities

As well as those already mentioned, other facilities to assist firefighters may have been installed in your premises, and should be properly maintained by a competent person. Your maintenance audit (see Appendix A for an example checklist) should include these. Such facilities can include:

- information signs for firefighters;
- static water supplies, private hydrants, meter bypass valves and underground tanks;
- standby fire pumps, electrical generators, air pumps and hydraulic motors; and
- manual/self-closing devices for roller shutter doors in fire compartment walls.

Further Reading:

- ✓ An Introduction to Fire Dynamics 3rd Edition, Kindle Edition by Dougal Drysdale ,2011
- ✓ Introduction to Fire Protection 4th Edition by Robert W. Klinoff 2011