



# Fire Safety in Risk Environments

**Fire safety = fire prevention + fire protection + fire fighting**





# Fire Safety in Risk Environments

**This is the Required P.P.E. for this site!**

- Safety Helmet
- Eye Protection
- Protective Gloves
- High Visibility Clothing
- Laced Safety Footwear

**NO EXCUSES**

**GREENDREAM AGRICULTURAL LLC**



# Fire Safety in Risk Environments

There are **four** essential steps to take if you discover a fire:

**R**



**Rescue**

anyone in immediate danger of the fire.

**A**



**Alarm**

Activate the nearest fire alarm **and** call your fire response telephone number.

**C**



**Contain**

fire by closing all doors in the fire area.

**E**



**Extinguish**

small fires. If the fire cannot be extinguished, leave the area and close the door.

**You should know:**

- Locations of nearest fire extinguishers and alarm pull boxes
- The fire location - room number and building
- All fire exits in your work area



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## Introduction to fire safety

Fire services of England attend around 160,000 fires a year, that is around 450 per day.

There were 251 fire related fatalities and around 10,000 recorded casualties.

Approximately 15,000 fires occur in workplaces or areas where people gather. This can be summarised as more than 40 fires per day.

Read the newspapers and you will see that all different types of property may be affected by fire with varied and different sources of ignition - white goods causing a major tower block fire, careless disposal of smoking materials setting fire to waste bins as happens every day or deliberate starting of fires to conceal other crimes.

The impact of fire on the individual tends to be lifelong, from either emotional or physical scars. Memories of fire are deep-seated and as a fire has its own distinctive smells, sounds or sights those memories can be easily rekindled.



### Important Fact: History of fire safety

Fire safety and firefighting are not new; from **the establishment of fire insurance brigades following the Great Fire of London to the introduction of the Regulatory Reform (Fire Safety) Order 2005**, fire protection and firefighting have been constantly changing.



Modern buildings are designed with in-built fire protection which is there for the benefit of the occupants. However, if you were to walk round a workplace how many doors would you find wedged open, held open by a fire extinguisher or not accessible because the means of escape is temporarily blocked as it has been used for storage?

If you asked anyone in a workplace with the responsibility for fire safety how they would react if someone removed the fire door completely, they would remark how dangerous it would be and someone would be held to account. A wedged-open fire door may as well be missing.

Actions can be taken to reduce the risk of fires in the workplace as well as reduce the impact of those fires



Fire doors **should not** be **wedged open**.

### Important Fact: Regular fire safety checks

Regular workplace fire safety checks

and maintenance of systems and equipment are essential fire prevention measures.



# Fire Safety in Risk **replace** Environments

5  
12  
18  
23  
33



- ➔ Careless use of cooking equipment
- ➔ Faulty cooking equipment
- ➔ Hot works
- ➔ Work equipment
- ➔ Placing articles too close to heat
- ➔ Careless disposal of smokers' materials



In an emergency  
call **and ask for the  
Fire Service.**





# Arson



Deliberate acts by people are one of the main causes of fires in the workplace; arson is a particular problem, so it is worth identifying the reasons why arson is committed:

## Insurance fraud

Fraudulent insurance claims have been known to be made following deliberately set fires. One of the difficulties for insurance companies is being able to carry out a thorough investigation due to the devastation of a fire. However, trained and knowledgeable investigators are able to sift debris and accurately assess contents and often the cause of the fire.

## Revenge

'Turf wars', business competition, feuds and disputes are all known reasons for arson.

## Murder

Numerous high-profile 'murder by arson' cases have been prominent in the news over recent years; one of the reasons for this criminal act is to destroy evidence.

## Concealment of another crime

A criminal may, in order to destroy as much evidence as possible, deliberately set a fire. This may be following crimes such as burglary or murder.

## Pending return to school

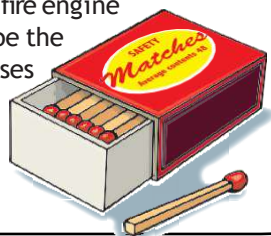
The majority of school fires take place during the holidays; children have been known to deliberately set fire to the school just before the holidays are over.

## Political or ideological views

Some groups or individuals with strong political, ideological or discriminatory views have been known to deliberately commit arson to try to further their cause.

## Suffering from mental illness

Some people suffering from mental illness may set fires. Sometimes it is just for the thrill of a fire, the sight and sound of a fire engine or a chance to be the person who raises the alarm and is thanked for their help and support.



## Terrorism

As fires are frightening and cause maximum disruption, a fire will always be a weapon used by terrorists.



## Preventing arson



Arson is very serious; however, practical common-sense guidance which follows the principle '**don't make it easy**' can help reduce the number of incidents in workplaces. This guidance includes:

- Limit the number of entrances and exits used but do not lock fire exits. Control access to non-employees especially in areas where there is a greater risk of fire.
- Windows and doors should be maintained in good repair with locks which work.
- Waste should be subject to management controls. Arrangements may need to be put in place for more collections if required, and waste should be stored safely away from the building.
- Staff need to be watchful at all times; strangers need to be challenged if not wearing identification or visitor badges.
- Cooperation must exist with neighbouring businesses; activities should always be coordinated especially where there are shared workplaces.
- Keep gaps under doors to a minimum to reduce the possibility of burning material being introduced into the building through the gap.
- Installing a metal box on the inside of letterboxes prevents burning materials being introduced into the premises through the letterbox.
- Secure the perimeter to reduce the ease of access on to the premises.
- Keep the areas adjacent to doors inside the building as clear from combustible materials as possible.
- Leave lights on at night either permanently or on a timed system to give the impression that the building is occupied.



## Fires by location

The majority of fires attended by the fire services of the United Kingdom are to dwellings and road vehicles. Statistics are published every year by the Home Office.



Dwellings



Road vehicles



Other buildings,  
workplaces and  
where people gather



Other outdoor  
locations



## Fire hazards

A fire presents numerous hazards:

- ➔ Heat
- ➔ Smoke
- ➔ Flame
- ➔ Lack of oxygen
- ➔ Other products of combustion (when PVC burns over 100 different toxic compounds are produced)\*
- ➔ Structural collapse



### Important Fact: Fire hazards

Ensure you are aware of potential sources of fuel and heat/ignition in your workplace and implement safe systems of work.



## Fire spread

Once a fire has ignited, if unchecked, it will spread. There are four means of fire spread which are **direct burning, radiation, convection and conduction**. However, fire development is not an exact science - it must always be remembered that other factors need to be taken into account such as openings in doors and windows, the contents of the room where the fire has ignited and the materials which are used in construction.

Direct burning

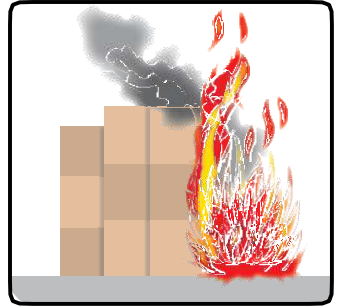
Radiation

Convection

Conduction

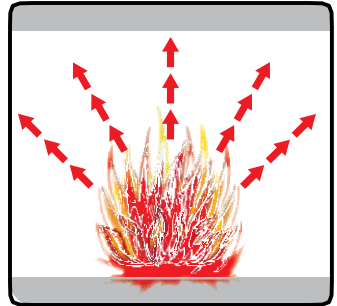
## ➔ Direct burning

Apply a match to a piece of paper and the paper will burn through. Very often direct burning is the only cause of fire spread in the early stages of fire until the heat in the fire builds up.



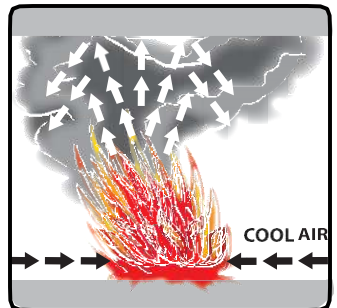
## ➔ Radiation

Radiation is the transfer of heat from the fire to nearby materials; this is how the sun heats up the earth or a piece of clothing placed near a fire continues to heat up until it ignites.



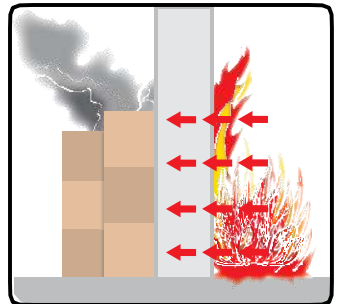
## ➔ Convection

The major proportion of fire injuries are caused by smoke and fire spread by convection. Hot, combustion gases leave the fire and rise to the highest place available - this could be the room ceiling, the loft in the house or the highest floor in a high-rise building. This hot, gas layer continues to rise in temperature. This in turn causes the materials in rooms at higher levels, which could be some distance away from the seat of fire, to rise in temperature until they eventually ignite.



## ➔ Conduction

Some materials, particularly metals, are able to absorb a large amount of heat quickly and to transfer the heat along their length. This is called conduction and can spread fire through walls from one room to another. A further example of conduction is how hot the end of a metal spoon gets if you leave it in a pan of boiling water.





## Flashover

A fire developing unchecked in a room with adequate ventilation will continue to grow; the heat will continue to rise until it reaches such a stage when the entire contents are giving off flammable gases (known as pyrolysis). Flashover occurs when a growing fire suddenly ignites the flammable gases and becomes a fully developed fire involving the entire contents of the space.

### Signs of a flashover:

- ➔ **The fire is occurring in a well-ventilated compartment so lack of air is not an issue**
- ➔ **There is a rapid build-up of heat**
- ➔ **Tongues of flames can be seen in the smoke above the fire**
- ➔ **All combustible materials in the room are giving off flammable gases (pyrolysis)**



## Backdraught

A fire which starts in a room with little ventilation due to closed windows and good fitting doors will grow until all the available oxygen in the air is used up. At this stage the fire will start to reduce in size but the flammable gases given off by the fire will remain at a temperature high enough to ignite, should oxygen become available. The opening of the door will allow air to rush in and the fire will re-ignite. However, due to the large amount of flammable gases which may be present in the room, this re-ignition may be explosive in force and the flames may exit the room seriously injuring those who opened the door.

### Signs of a backdraught:

- ➔ **A large amount of smoke with no visible flame**
- ➔ **Blackened (or browned) windows when viewed from outside**
- ➔ **Smoke appearing to pulse in and out where gaps exist in doors and windows (caused by the volume of smoke expanding and contracting)**
- ➔ **Billowing yellow or brown smoke (sometimes giving the shape of cauliflower florets)**



# Fire safety standards

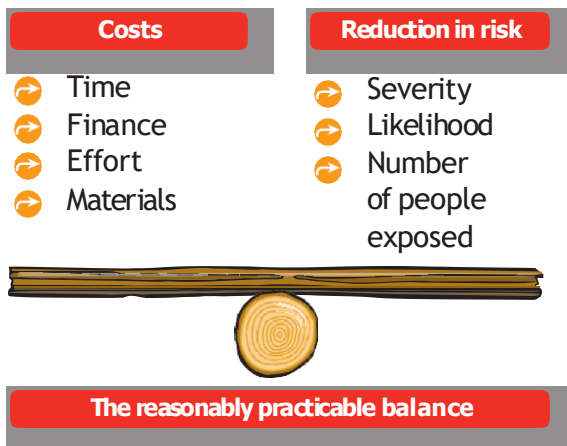
## Health and Safety at Work etc. Act 1974

The Health and Safety at Work etc. Act 1974 describes the general duties of the employer, the employee and others.

### Section 2 of the Act states:

*'every employer must ensure, as far as is reasonably practicable, the health, safety and welfare of all his employees'.*

Reasonably practicable is often quoted in legislation but does need explanation as to what it means. It can be represented with a set of scales showing the balance of the cost of any measures including time, finance, effort and materials against the reduction in the risk of harm, including severity, likelihood and number of people exposed to the hazard.



The section further describes some of the general requirements that the employer must provide. They include:

- ➔ **Safe plant and equipment and safe systems of work for that plant and equipment**
- ➔ **Safe systems of work**
- ➔ **A safe working environment**
- ➔ **Information, instruction, training and supervision**
- ➔ **A consultation process with employees**
- ➔ **A health and safety policy (written if the company has five or more employees)**

Section 3 of the Act extends the duties of the employer to those people other than employees such as visitors, contractors and customers.



# Fire safety standards

## Regulatory Reform (Fire Safety) Order 2005 (RRFSO)



### DEFINITION: Responsible Person (RRFSO)

- This is the employer or any other person who may have control of any part of the premises.
- The person with final responsibility for fire safety as detailed in the Regulatory Reform (Fire Safety) Order 2005.

### Duties of the responsible person:

- Carry out a fire risk assessment
- Appoint one or more competent persons to assist with compliance with the order
- Inform non-employees of relevant risks
- Inform the employer of others present, e.g. contractors or agency staff, and the relevant risks
- Establish a means of calling the emergency service
- Ensure fire-safety equipment is maintained in working condition by a competent person
- Provide clear and relevant information on risks to all relevant persons
- Fire prevention measures
- Provide information to employees under 16
- Consider substances which are dangerous and the risks to relevant persons
- Provide induction training, within working hours, on fire safety followed by refresher training periodically



The RRFSO throughout refers to a **relevant person**; it is important to know who this is.



### **DEFINITION: Relevant Person (RRFSO)**

Any person who is lawfully on the premises or those in the immediate vicinity, but not a firefighter carrying out their duties.



### **Important Fact: Regular checks**

Remember regular checks on all firefighting equipment, e.g. alarm systems and extinguishers, should be undertaken in accordance with fire safety guidelines.



## **Employees' duties**

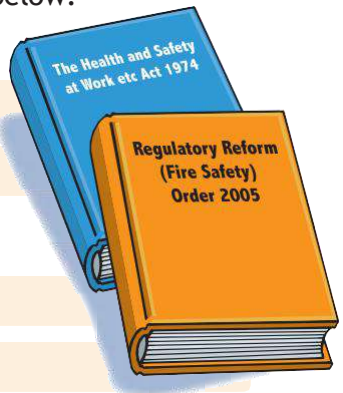
Employees have duties under legislation as detailed below:

### **Health and Safety at Work etc. Act 1974**

- ➔ Take reasonable care of themselves and others
- ➔ Cooperate with the employer

### **Regulatory Reform (Fire Safety) Order 2005**

- ➔ Cooperate with the responsible person
- ➔ Report fire-related matters
- ➔ Do not do anything which will put themselves or others at risk





# Enforcement and penalties



## Informal

Enforcing officers will often issue advice on compliance with the fire safety legislation. This advice will be given in writing if requested.

## All notices

- All notices may be appealed within 21 days to the court.
- Prohibition notices remain in force.
- Alteration and enforcement notices are placed on hold until the appeal is heard.

Penalties for breaching Health and Safety Legislation including the Regulatory Reform (Fire Safety) Order 2005:

- Unlimited fine in a magistrates' court
- Unlimited fine and/or 2 years' imprisonment if convicted in a Crown Court



Fire safety is a serious matter: you can be fined or imprisoned.

## Formal

### Alteration notice

- Issued where there is a risk to relevant persons when a change is going to be made to the premises, or to the use of the premises.

### Enforcement notice

- Issued when there is a failure to comply with the requirements of the Regulatory Reform (Fire Safety) Order 2005.
- Minimum of 28 days to rectify the identified non-compliance.

### Prohibition notice

- Issued when there is an immediate risk of serious injury to relevant persons.



# Protecting people and property

## Detectors

A detector detects a change in state; this may be either through the detection of smoke or the detection of heat. More modern detectors often have multi-function capabilities and may detect either change of state.



### Smoke detectors

#### Ionisation

Ionisation detectors ionise the oxygen and the nitrogen in the air, which causes a small electric current in the detector. When smoke enters the chamber the current is reduced and the alarm sounds.

#### Optical

Optical detectors have a light source and a photoelectric cell in the detector. Smoke entering the chamber either obscures the light between the cell and the source, known as a light obscuration type detector, or causes the light to reflect on to the cell, known as a light scatter type detector; in each case this action will cause the alarm to sound.

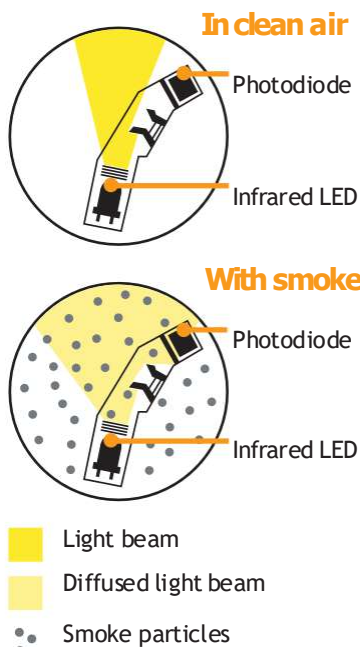
### Heat detectors

#### Fixed temperature

#### Rate of rise

Heat detectors rely on the principle of the expansion of solids, liquids or gases to operate. Fixed-temperature detectors operate when a predetermined temperature has been reached whilst rate-of-rise detectors allow workplaces which generate a slow build-up of heat to do so without actuation. However, should a sudden increase in temperature occur, as would be found in a fire situation, the detector will activate.

### Optical smoke detector





# Fire safety standards

## Electric and manual alarms

Depending on the fire risk assessment different types of alarms are available; these may be as follows:

### Manual

Manual alarms rely on operators to sound them; normally they will be found in small low-risk premises and may consist of the following:

➔ **Handbell**

➔ **Rotary gong**

➔ **Air horn**



### Electrical

Electrical systems tend to cover the whole of the premises and, depending on the activities undertaken and the fire risk assessment, there are a number of different systems. The two main types are:

➔ **A system of manual call points linked to a fire bell or other type of sounder**

➔ **A fully integrated system linking detectors and manual call points to the fire bell or other type of sounder**





# Protecting people and property

## Physical factors - restricting smoke and fire spread

The majority of people who die in a fire are overcome by smoke and combustion gases. Smoke is a serious threat to life, so restricting smoke and fire spread is vital.

Restricting fire and smoke spread is managed by ensuring that the following physical factors are provided, monitored and maintained:

### Compartmentation

Buildings may be divided into different fire-resistant areas known as compartments; fire-resisting doors, walls, floors and ceilings will provide a physical barrier which restricts fire spread. Compartmentation has the objective of saving lives by:

- ➔ Ensuring the number of occupants at immediate risk is reduced
- ➔ Ensuring that fire growth is restricted to allow time for escape
- ➔ Ensuring that occupants do not have to travel too far to reach 'reasonable' safety, (i.e. the other side of the fire door)

### Fire separation

Fire separation is the restriction of fire spread between different occupants in a shared building as one does not usually control the work practices and procedures of co-occupiers; this requires a fire-resistant structure throughout the full height of the adjoining walls.

### Doors

A closed door may hold back fire and smoke and restrict fire spread. A fire door is a door which has been rated to be fire-resistant.

Fire doors are an essential part of compartmentation and means of escape. An essential feature of a fire door as a means of escape is a self-closing device (which would be defeated by the use of a wedge).

**DO NOT  
WEDGE  
FIRE  
DOORS  
OPEN.**





# Protecting people and property

## Physical factors - restricting smoke and fire spread

### Smoke control and ventilation

Shopping complexes and other large buildings with atriums may be equipped with smoke-control systems which allow ventilation of any smoke collecting in the atrium of large areas.

Premises with ventilation systems must be mindful that the ventilation system does not spread the smoke around the building. In this case a ventilation shut-down is usually incorporated into the fire procedures and operates either automatically or manually.

### Internal and external walls

Internal walls should be sterile; multiple layers of wallpaper can increase flame spread as can certain paints.

External walls may contain combustible materials such as wood cladding. The potential of fire spread from within or from outside needs to be taken into account.

### Cavities

A cavity is a hidden space which may put occupants at risk. As part of the fire risk assessment premises must be checked for cavities and if necessary, cavity barriers inserted to restrict the spread of smoke and fire. Examples of cavities are:

- ➔ **voids behind wall panelling**
- ➔ **False ceilings**
- ➔ **Vertical shafts**
- ➔ **Cables or pipework running through walls**
- ➔ **Roof or attic spaces and roof voids**
- ➔ **Ducting throughout the building**





# Protecting people and property

## Escape

### Means of escape

If a fire occurs in a building then the occupants must be able to reach a place of absolute safety without being affected by heat and smoke. In the first instance, this usually involves being able to leave the affected area to a place of reasonable safety such as a protected staircase, corridor or other compartment.

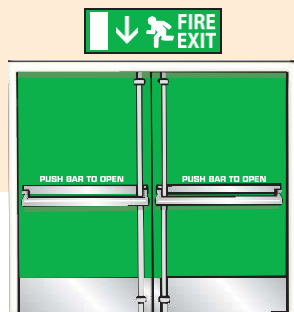


Means of escape are subject to strict guidance and when undertaking fire risk assessments and evacuation plans the requirements must be fully understood.

### Maintaining means of escape

Signs and notices should be used on means of escape to provide relevant information to those using them. Examples of this information include:












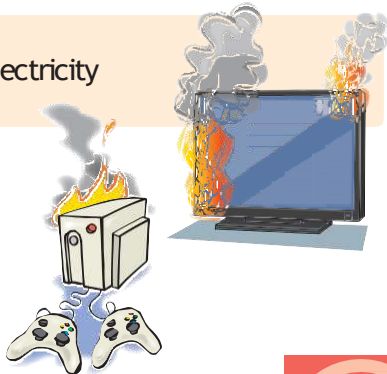
- Fire door keep shut
- How to open the fire door, push bar, use a tumbuckle etc.
- Not to use lifts
- Sprinkler stop valve location
- Fire extinguisher location
- Fixed hose reel location
- Manual call point location

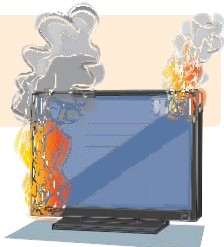
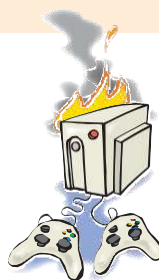
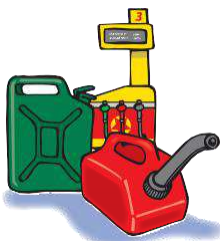


Means of escape should be effectively lit to assist people to escape in case of a fire or if the mains lighting fails.



## Fire classification

Fire classification	Fire risk
 <b>Class A</b>	Paper, wood, textiles and fabrics 
 <b>Class B</b>	Flammable liquids: petrol, oil, paints and solvents 
 <b>Class C</b>	Flammable gases 
 <b>Class D</b> METAL	Metal fires such as magnesium and sodium 
 <b>Class F</b>	Cooking oils and fats 
	Fires involving electricity 





## Methods of extinguishing fire

In its simplest form, the method of extinguishing a fire is to remove one of the sides of the triangle of fire.

If we remove the heat/ignition source we cool the fire; **if we remove the supporter of combustion we smother the fire and if we remove the fuel we starve the fire.**

Fire extinguisher contents each act differently on a fire and extinguish as follows:



Cooling

Smothering

Interfering with chemical reaction



Water



Foam



CO<sub>2</sub>



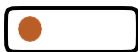
Wet  
Chemical



Fire  
Blanket




Powder





## Fire extinguishers

The following table details the different types of fire and the appropriate extinguisher to use on those fires:

Fire classification	Fire risk	Water	Foam	CO <sub>2</sub>	Powder	Wet Chemical
 <b>Class A</b>	Paper, wood, textiles and fabrics	✓	✓		✓	✓
 <b>Class B</b>	Flammable liquids: petrol, oil, paints and solvents		✓	✓	✓	
 <b>Class C</b>	Flammable gases				✓	
 <b>Class D</b>	Metal fires such as magnesium and sodium				✓	
 <b>Class F</b>	Cooking oils and fats					✓
	Electrical			✓	✓	



## Information on fire extinguishers

- Contents gauge
- Type of extinguisher
- Method of operation
- Class of fire suitable for use
- Service maintenance date\*



\*All extinguishers should be inspected annually by a competent person, e.g. an extinguisher engineer



## Only attempt to fight a fire if...

- The alarm has been raised.
- The emergency services have been contacted.
- The fire is not spreading and is confined.
- You have a clear escape route not threatened by fire.
- You have selected the correct extinguisher.



## Do not attempt to fight a fire if...

- It is bigger than a wastepaper bin size (rule of thumb)
- You need more than one extinguisher
- The room is filling with smoke
- You do not have a clear escape route
- Gas cylinders or chemicals are involved
- Your efforts are not reducing the size of the fire



## Operating an extinguisher

- Select the correct extinguisher.
- Check the contents gauge.
- Pull the pin to break the seal.
- Holding the extinguisher upright, squeeze the trigger.
- Test the range and content (away from the fire).
- Extinguish the fire using the correct technique for that type of extinguisher and the nature of the fire.



- You do not have the correct extinguisher



## Fixed firefighting installations

### Sprinklers

A sprinkler system is an active fire protection measure; it consists of a system of pipework connected to a water supply with sprinkler heads at a designated distance dependent on risk. When a fire occurs and a sprinkler head operates the following occurs:

- The water from the sprinkler head attacks the fire to attempt to extinguish it
- The water from the sprinkler head restricts fire spread
- The actuation of the sprinkler head sounds the alarm

Sprinklers should only be shut down at the request of the senior fire service officer.



### Drenchers

Drenchers are a form of sprinkler fitted to the outside of the building to prevent fire spread from adjoining properties which may be on fire. This type of installation is becoming very rare.

### Flooding systems

Flooding systems are designed to be used in unoccupied rooms where there are high-value contents or areas where a fire may cause major disruption to the activities of the organisation. Examples might be archives, electrical equipment or switchgear. Upon detection of the fire, a fire extinguishing medium (most commonly CO<sub>2</sub>) will be discharged into the room to replace the air and extinguish the fire by smothering.





## Fixed firefighting installations

### Risers

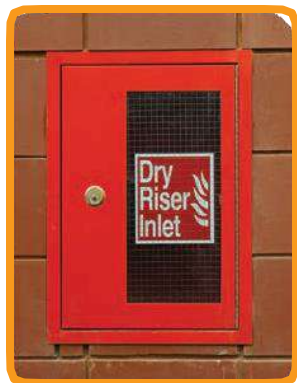
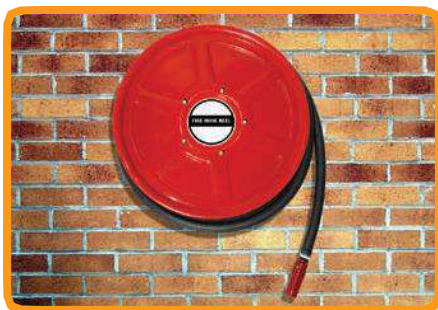
Risers are intended for use by the fire service at high-rise building incidents. Wet risers are always charged with water with the facility at ground level for the fire service to boost the supply. Dry risers consist of empty pipework with an inlet at ground level and with outlets at each level throughout the building. Outlets are normally located near or within protected staircases.

Risers are prone to vandalism and damage and need to be tested and visually inspected regularly.

Buildings over 18 m tall will have either wet or dry risers. Buildings over 50 m tall will have wet risers.

### Internal hose reels

Internal hose reels provide an effective firefighting facility; they are fixed units with a permanent water supply. They may be used instead of, or in addition to, extinguishers. Internal hose reels do have disadvantages. They create a trip hazard; they may stop fire doors closing fully; people need to be trained in their use and they are more expensive than extinguishers.



Fireman's  
switch



Fire  
alarm



Dry  
Riser  
Inlet



Fire  
hose reel



# Fire risk assessments

## Fire risk assessment description

### Q QUESTION: What is a fire risk assessment?

*Answer: A systematic review of the premises*

In particular, an effective fire risk assessment will answer the following:

- ➔ What are the premises used for?
- ➔ What is the likelihood of a fire occurring?
- ➔ Have the fire hazards been identified?
- ➔ Have those at risk been identified?
- ➔ Have steps been taken to reduce the risk to as low as is reasonably practicable?
- ➔ What physical precautions and management arrangements are necessary to ensure the safety of people on the premises if a fire occurs?



Have those at risk been identified?



Accumulations of waste can fuel a fire.



Store and dispose of gas cylinders safely.




# Fire risk assessments

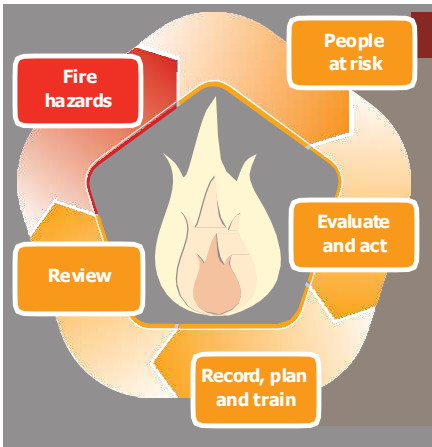
## The Five Steps

# 5 STEP 5

The Government has published numerous fire safety publications. Detailed information can be found on the [www.gov.uk](http://www.gov.uk) website. A key document is the 5 steps to fire safety risk assessment which applies the same principles of general risk assessment.

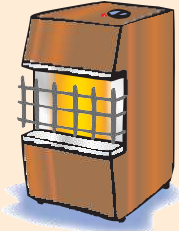
5 Five steps to fire safety risk assessment	5 Five steps to risk assessment
<b>1 Identify the fire hazards</b> <ul style="list-style-type: none"><li>Sources of ignition</li><li>Sources of fuel</li><li>Sources of oxygen</li></ul>	<b>1 Identify the hazards</b>
<b>2 Identify those at risk</b> <ul style="list-style-type: none"><li>Those in and around the premises</li><li>Those who are especially at risk</li></ul>	<b>2 Identify who may be harmed</b>
<b>3 Evaluate the risk; introduce controls</b> <ul style="list-style-type: none"><li>Evaluate the risk of fire starting</li><li>Evaluate the risk to people from fire</li><li>Remove fire hazards</li><li>Reduce fire hazards</li><li>Remove the risks to people from a fire</li><li>Reduce the risks to people from a fire</li><li>Provide fire precautions to protect people</li></ul>	<b>3 Evaluate the risks and introduce further controls, if necessary, to reduce the risk to an acceptable level</b>
<b>4 Record, plan, inform, instruct and train</b> <ul style="list-style-type: none"><li>Record any major findings and action you have taken</li><li>Discuss and work with responsible people</li><li>Ensure an emergency plan is prepared</li><li>Inform relevant people</li><li>Instruct relevant people</li><li>Provide adequate and suitable training</li></ul>	<b>4 Record your findings and implement</b> 
<b>5 Review</b> <ul style="list-style-type: none"><li>Review regularly</li><li>Make changes if required</li></ul>	<b>5 Review your risk assessment and update if necessary</b>

## 1 Identify the hazards



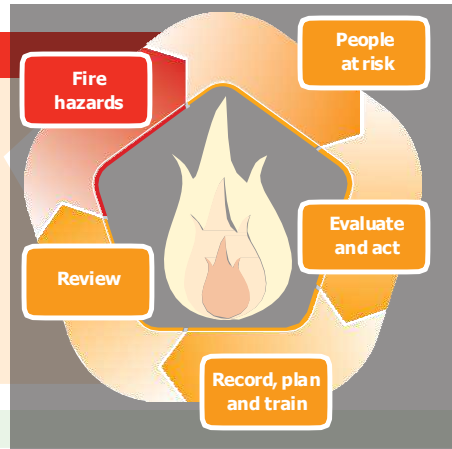
### Sources of ignition

- ➔ Naked flames
- ➔ Welding
- ➔ Grinding
- ➔ Heaters
- ➔ Smoking materials
- ➔ Electrical equipment
- ➔ Lighting
- ➔ Hot processes
- ➔ Hot equipment
- ➔ Activities which create sparks



### Sources of fuel

- ➔ Waste
- ➔ Packaging
- ➔ Fixtures and fittings
- ➔ Flammable liquids
- ➔ Stock
- ➔ Wall coverings
- ➔ Bin stores
- ➔ Ceiling coverings
- ➔ Production waste
- ➔ External
  - ➔ Pallets
  - ➔ Vehicles



## 2 Identify who may be harmed



### People at risk

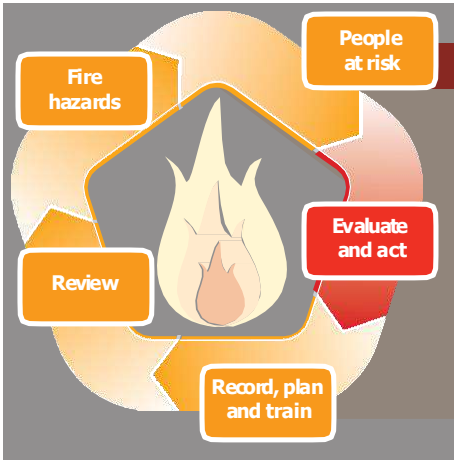
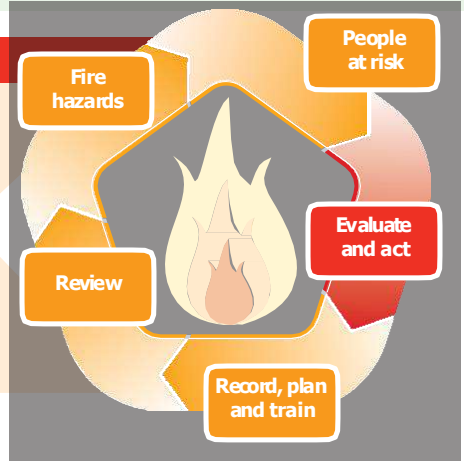
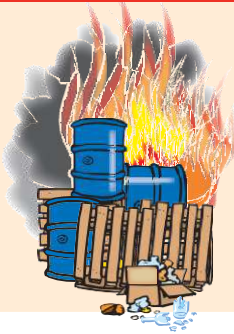
- ➔ Employees
- ➔ Visitors
- ➔ Contractors
- ➔ Customers
- ➔ High risk
  - ➔ Lone workers
  - ➔ Night staff
  - ➔ Elderly
  - ➔ Children
  - ➔ Disabled



### 3 Evaluate the risk

## Evaluate and act

Ensure at all times that sources of **fuel** are not allowed to come into contact with sources of **ignition**.



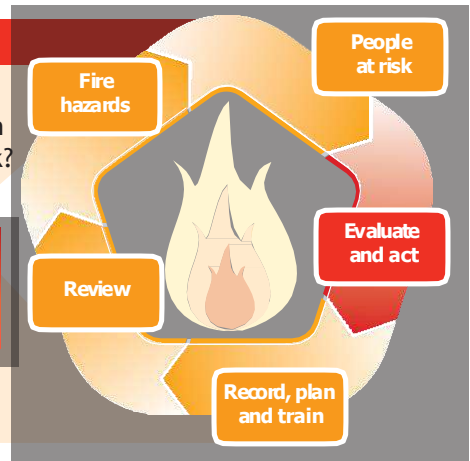
## Evaluate and act: Ensuring Safety

- ➔ Are you certain everyone will know there is a fire?
- ➔ Is there a way of warning others?
- ➔ How will you ensure everyone is able to get out?
- ➔ How will the fire service be contacted?
- ➔ Is there a chance of putting out a small fire quickly?

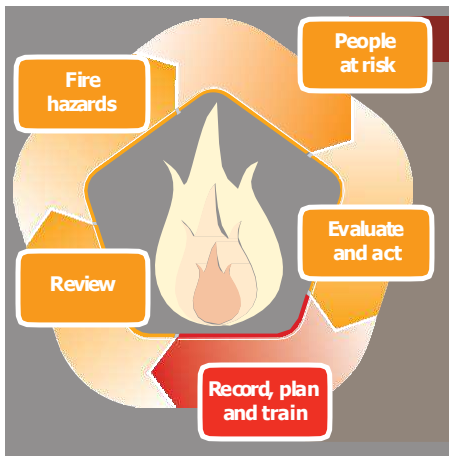


## Evaluate and act: Escape

- ➔ Are escape routes planned?
- ➔ Can everyone find their way out safely even when escape route lighting fails or it is dark?
- ➔ Is all fire-safety equipment maintained and tested by competent persons?
- ➔ Will everyone know what to do in case of fire?
- ➔ Will everyone know what to do on hearing the alarm?
- ➔ Are those required to use equipment adequately trained on its use?



## 4 Record your findings



## Record, plan and train

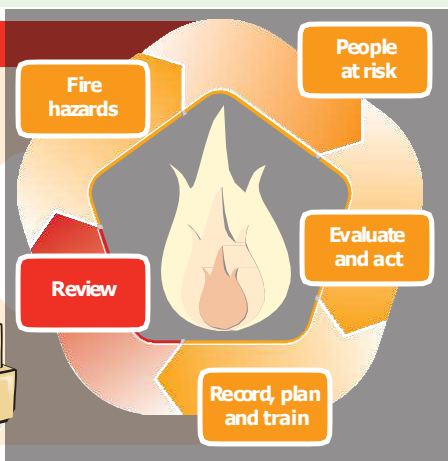
- Make a record of your findings
- Ensure there is a fire plan
- Ensure the fire plan has been communicated
- Training requirements:
  - Fire drill practice
  - Fire wardens
  - Information
  - Temporary staff
  - Contractors
  - Visitors
  - Shared buildings



## 5 Review and update

### Review

- Before, during and after building alterations
- After staff changes
- After fires or potential fires
- If there are any changes in stock or processes
- If the use of, or the storage of, hazardous substances has been amended
- If there is an increase in stock levels due to work activity



## Risk Assessment Checklist: 5 steps

- 1 Identify hazards
- 2 Identify who may be harmed
- 3 Evaluate the risk
- 4 Record your findings
- 5 Review and update





# Fire procedures



## Fire Action

Any person discovering a fire

- 1 Sound the alarm
- 2 **999 or 112** to call the fire brigade
- 3 Attack the fire if possible using the appliances provided

On hearing the fire alarm

- 4 Leave the building by **safest possible route**
- 5 Close all doors behind you
- 6 Report to assembly point

Car Park



Do not take risks

Do not return to the building for any reason until authorised to do so

Do not use lifts



CALL 999/112

Too often people do not know what their full responsibilities are when it comes to fires in the workplace. People will be faced with either:

## Discovering a fire, or hearing the alarm

In either case it is important that the correct actions are undertaken and all staff must know and understand the following:

- The company fire procedures
- What to do if they discover a fire
- How the emergency services are called
- The location of all the exit routes
- The correct evacuation procedures
- The safest fire exit and alternatives
- The location of the appropriate fire extinguishers
- The fire assembly point

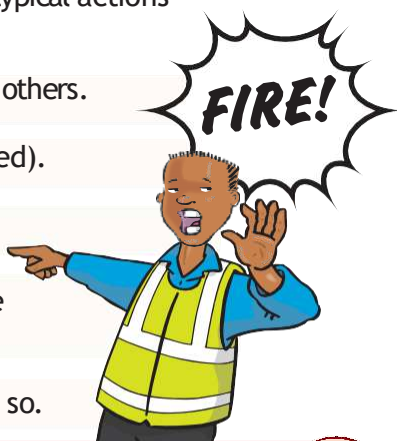




## Action in the event of fire

Risk assessments will describe the organisation's own procedures for the action to be taken in the event of fire. However, typical actions when discovering a fire would be to:

- ➔ Raise the alarm - yell '**Fire, Fire, Fire**' to warn others.
- ➔ Operate the nearest manual call point (if fitted).
- ➔ Call the Fire Service (**999** or **112**).
- ➔ Evacuate your areas by the nearest safe route and report to the assembly point.
- ➔ Attempt to fight the fire only if it is safe to do so.



### On hearing the alarm...

#### Do



- ➔ Leave the building by your safest available exit
- ➔ Ensure all doors are closed behind you if you are the last one to leave a room
- ➔ Report to the assembly point
- ➔ Report any persons not accounted for to the person undertaking the roll call
- ➔ Only re-enter when told it is safe to do so by the fire service

#### Do not



- ➔ Delay evacuation for any reason including to collect personal belongings
- ➔ Use lifts
- ➔ Take any risks



Don't use the lifts; use the stairs to evacuate. The lift may open directly onto the fire or may become inoperable as a consequence of the fire.





## Contractors

Contractors must have a hot-work permit if they are introducing ignition sources into the workplace; this will require a documented procedure to be in place for these activities. Responsible persons must ensure that an increased level of fire prevention is in place.

It is also important that contractors on arrival at the premises are given a comprehensive safety briefing with any specific risks identified. **Contractors must always be sure that they know the correct actions to be taken on discovering a fire or hearing the alarm.** Contractors must be accounted for at the assembly point which of course relies on accurate and detailed signing in/out procedures for contractors.



## Good housekeeping

Not only is good housekeeping a key requirement for reducing the chances of workplace fires but it is also key in reducing the risk of slips, trips and falls or manual handling injuries.

Waste needs to be effectively managed; **waste bins need to be emptied frequently; floors should be kept neat and tidy and waste should never be allowed to accumulate near ignition sources.** External waste areas should be maintained and secure to prevent easy access to a deliberate fire setter.

**A key role in reducing the risk of fire is start-and-end-of-work checks,** as well as general housekeeping; fire extinguisher locations should be checked to ensure free access and fire exits should be kept clear and accessible with particular attention paid to the external areas to ensure doors are able to open fully.





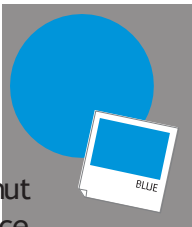
# Fire signs and symbols



Fire door  
Keep shut

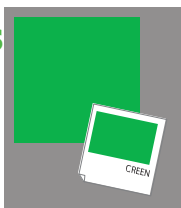
## Mandatory signs

- Fire exit keep clear
- Fire door keep shut
- Fire door keep locked shut
- How to call the fire service
- Fire instructions
- Automatic fire door keep clear



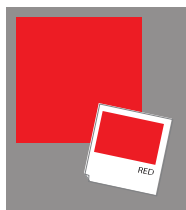
## Safe condition signs

- Fire exits
- Directional fire exits
- Emergency exits
- Fire assembly points



## Information signs

- Fire extinguisher information points
- Fire extinguisher keep clear signs



Fire escape  
Keep clear



### Note:

Fire safety information signage is red, which is not to be confused with general health and safety signage in red which prohibit actions, e.g. no smoking.

Health and safety warning signs may also be present in the workplace. These signs are yellow and black and indicate a hazard/danger.





# Role of the fire warden

## General duties



Fire wardens (sometimes called fire marshals) should be nominated for an area of responsibility within their workplace; the number of wardens will depend on the processes, activities undertaken and the general layout. They should assist the responsible person in order to allow them to fulfil their duties under the Regulatory Reform (Fire Safety) Order 2005. The following list, although not exhaustive, details some of the specific actions the fire warden may need to undertake to fulfil their role:

- Check fire doors are not wedged or propped open - inhalation of smoke and the products of combustion may be fatal - these are the only defence.
- Ensure escape routes are free from obstructions through good housekeeping - remember the means of escape may be used by a large number of people.
- Ensure final exit doors are free from obstructions and available for use. Ensure that situations such as flagstones lifting or overgrown vegetation do not restrict the doors.
- Assist with fire risk assessments when required by the responsible person.
- Assist with the development of evacuation and emergency plans particularly from their own area of responsibility.
- Ensure extinguishers are sited where they should be and are of the correct type, functional and in date of test.
- Check fire alarms can be heard in the allocated area. It is good practice to stand in different rooms/areas on each occasion the fire alarm is tested. Remember to always factor in busy times, especially when machinery is working at full capacity.
- Ensure corridors and walkways are kept free of combustible materials through good housekeeping. Be particularly observant of introduced items such as noticeboards or temporary storage.





## Role of the fire warden

### General duties (continued)



- ➔ To be involved in post incident debriefings to ensure all aspects of fire safety are effective.
- ➔ Ensure call points are accessible and not obstructed by fixtures or stock for example.
- ➔ Ensure all means-of-escape signs are in place and lighting is working.
- ➔ Ensure all door and extinguisher signage is where it should be and is legible.
- ➔ Ensure outdoor areas are well lit and allow clear routes to the assembly point.
- ➔ Ensure assembly point is clearly identified.
- ➔ Check arson risk areas and take action on any findings.
- ➔ Check electrical equipment:
  - ➔ Electrical wiring, plugs and sockets are sound, correctly fused and there is no overloading
  - ➔ Cables don't run under carpets or where they can be trapped under furniture
  - ➔ Faulty electrical equipment is reported
  - ➔ Electrical equipment is tested regularly:
    - ➔ Portable equipment according to risk
    - ➔ Every five years for fixed installations.



# Fire Warden



## Role of the fire warden

### Supervisory role in the event of fire

The actions to be taken by the fire warden in the event of fire are primarily detailed within the evacuation plan and fire risk assessment. The main duties are:

- ➔ Assist in evacuation; check disabled persons' safe refuges in case someone is waiting for assistance in evacuation.
- ➔ Perform a sweep of designated area; the fire warden will normally be the last to leave the area.
- ➔ First aid firefighting (without risk and if trained in extinguisher use).
- ➔ Ensure doors and windows are closed (if safe to do so) as the building is evacuated.
- ➔ Coordination of roll call with person in charge of the assembly point.
- ➔ Liaison with fire and rescue service, particularly if the fire is in the warden's area.



## Role of the fire warden

### Away from normal place of work on fire alarm sounding

Situations may arise when the fire warden is away from their normal place of work when the fire alarm sounds. It is ideal to have someone in the area who deputises for the warden in their absence, but if this is not possible then the warden must report to the assembly point and inform the person in charge that their designated area has not been swept. As full confirmation of evacuation cannot be given, this information needs to be passed to the senior fire officer who attends.





# Role of the fire warden

## Undertaking a fire safety briefing

One of the key roles of a fire warden is to carry out fire safety briefings for new members of staff, visitors or contractors. The fire safety briefing must be comprehensive and relevant to the workplace and should contain the following information:

### Fire Safety Briefing - Checklist

- |                                     |  |                                     |   |
|-------------------------------------|--|-------------------------------------|---|
| <input checked="" type="checkbox"/> | The actions to be taken on discovering a fire.   | <input checked="" type="checkbox"/> | The nominated roles and responsibilities in the workplace, e.g. fire wardens, person in charge of the assembly point. |
| <input checked="" type="checkbox"/> | The actions to be taken on hearing the alarm.  | <input checked="" type="checkbox"/> | Non-employee procedures - how to deal with contractors, visitors or other persons on the premises.                    |
| <input checked="" type="checkbox"/> | How to call the fire service - remember some workplaces may have a telephone system which requires a specific number to be dialled for an outside line or they may have their own emergency systems. | <input checked="" type="checkbox"/> | Fire prevention and protection measures including alarms and firefighting equipment.                                  |
| <input checked="" type="checkbox"/> | The routes to be taken as means of escape.   | <input checked="" type="checkbox"/> | Managing fire doors, for example not propping them open, and ensuring they are accessible.                            |
| <input checked="" type="checkbox"/> | How to open escape doors: slide bolts, break glass bolts, use turnbuckles or push bars.  | <input checked="" type="checkbox"/> | The importance of good housekeeping in reducing fire risk/spread.   |
| <input checked="" type="checkbox"/> | The evacuation plan including the assembly point.  | <input checked="" type="checkbox"/> | The risks from any flammable materials.   |
| <input checked="" type="checkbox"/> | The significant findings of the fire risk assessment.  | <input checked="" type="checkbox"/> | Special arrangements for high-risk areas or activities.   |
| <input checked="" type="checkbox"/> | How to operate and read the alarm panel (if fitted).   | <input checked="" type="checkbox"/> | Special arrangements for disabled persons, e.g. refuges and communications.   |

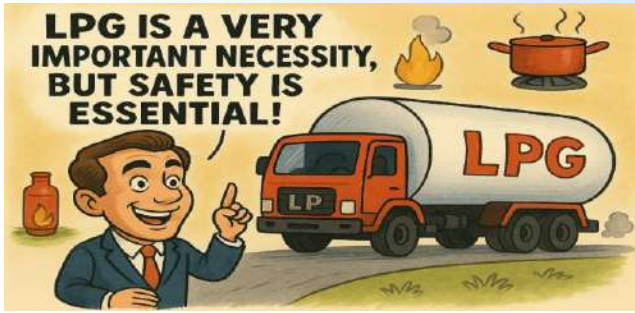




## Summary

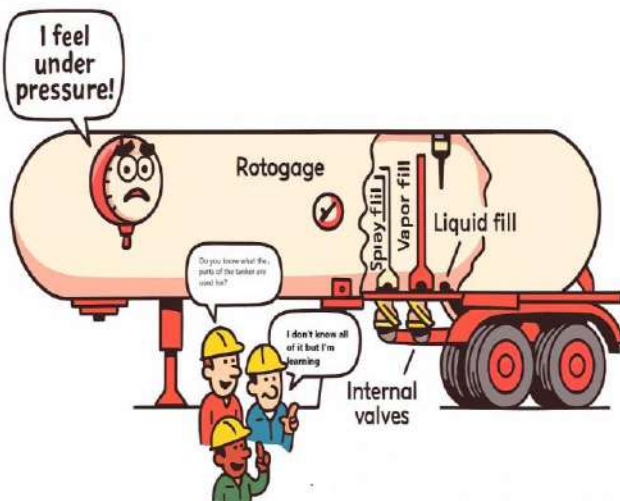
Fire safety is all about the protection of life and property; in the case of fires in the workplace think of the worst thing that could happen and you will probably find that this is the case.

Management of fire safety in the workplace should be a priority; effective policies and procedures, regular checks, constant observation and a well-trained workforce are key to success. Historic evidence tells us that the worst incidences of fire have usually involved a failing of one or all of these



## Fire Safety Measures in Road Transport of LPG Tanker Trucks.

Technical Specifications and Safety Equipment of Road LPG Tanker Trucks. Tanker trucks that transport LPG by road are designed and manufactured in accordance with national and international regulations regarding the transport of hazardous materials (e.g. ADR - European Agreement Concerning the International Carriage of Dangerous Goods by Road). These transport vehicles must meet special engineering criteria in order to transport liquefied petroleum gas (LPG) safely under pressure.



a. Tank Structure and Material Properties: LPG tanks used in tankers are generally cylindrical in section and horizontally positioned and are manufactured using high-strength alloy carbon steel. The tank body is tested with non-destructive testing (NDT) methods to provide resistance against both internal and external effects (radiographic testing, penetrant testing, hydrostatic testing, etc.). In addition, the outer surfaces are protected with paint against corrosion.

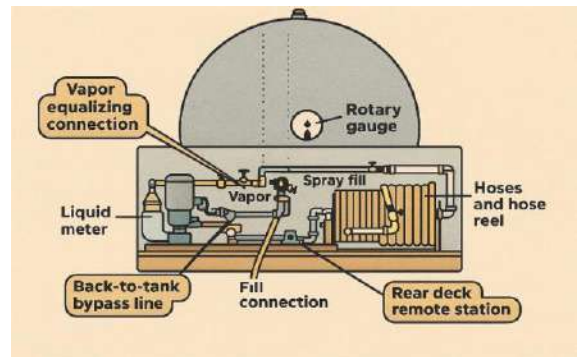


b. Pressure Relief Valves (PRV): When the pressure in the tank exceeds a certain pressure set value, it automatically opens and provides a controlled discharge. Pressure safety valves are activated in over-pressure conditions such as fire or overfilling and are very critical equipment for the integrity of the tank.



c. Emergency Shut-Off Valves (ESV): These valves, usually integrated into the tanker's bottom or inside connections of the tank, are closed remotely or automatically in the event of an accident or leak, cutting off the LPG flow. They must be closed position while the vehicle is moving on the road.

d. Level Indicators: These are systems that allow the LPG level in the tank to be monitored. The level on the tank can be monitored with systems called Rochester or Rotogauge.



e. Pump and Transfer Systems: The pumps used during LPG transfer are mounted on the tanker and are used to supply gas to customers. Transfer hoses used during supply are special hoses resistant to LPG that comply with the relevant standards.

f. Excess Flow Valves: In the event of a connection line break or unexpected high flow rate, it automatically cuts off the LPG flow in the line.

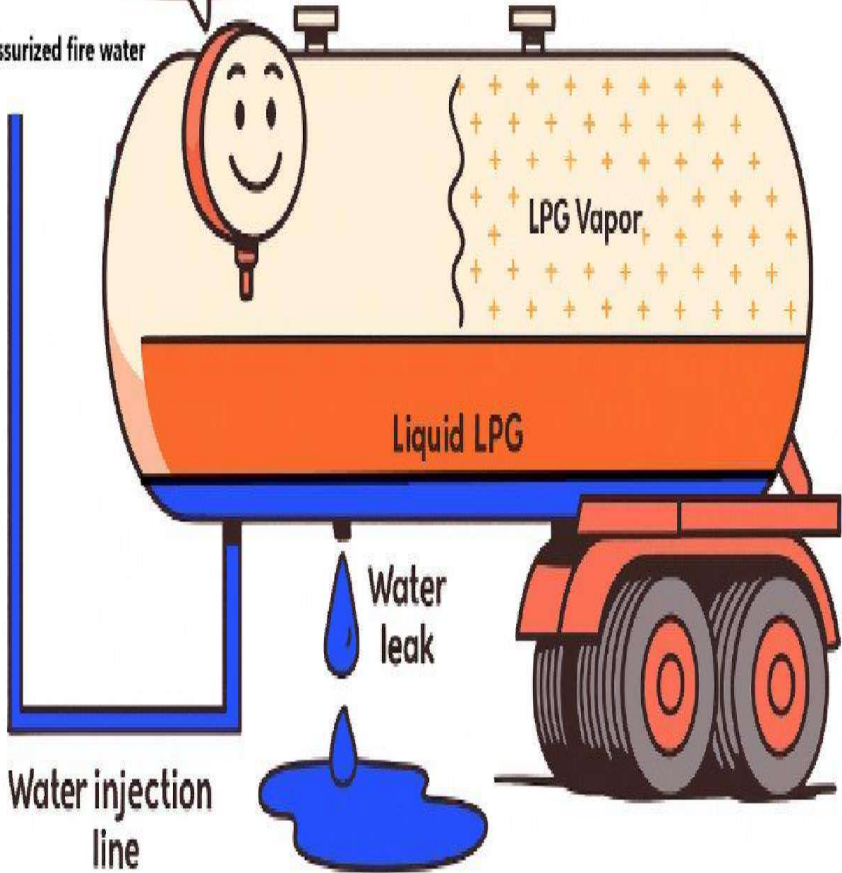




Water pressure must be higher than the pressure

This method can also be used in cases of fire or LPG leakage, because the water density is high, it will flow to the point where the LPG leakage occurs, and the LPG will float on the water.

Pressurized fire water



Water injection line

Water leak

LPG Vapor

Liquid LPG

