



**Instant Risk Guidance**

**TR 05b Common Fire  
Hazards**

## TR 05b Common Fire Hazards

Common fire hazards encountered in commercial and industrial premises include those associated with the use and storage of flammable liquids, industrial gases in cylinders, trade waste, hot work, contractors' operations, smoking and space heating, over which a range of specific precautionary measures should be adopted.

The hazards associated with arson and electrical fires are covered separately within the TOPRisks guidance.

### **Flammable Liquids (The Dangerous Substances and Explosive Atmospheres Regulations)**

The *Dangerous Substances and Explosive Atmospheres Regulations (DSEAR)* require employers to assess the risk of fires and explosions arising from work activities involving dangerous substances, and to eliminate or reduce these risks. Flammable liquids, which are commonplace in many premises (often with disregard to fire safety), are a key consideration.

Liquids (such as petrol and other fuels) and solvents in industrial products (such as paint, ink, adhesives and cleaning fluids) give off flammable vapour which, when mixed with air, can ignite or explode. The ease by which liquids give off flammable vapours is linked to a simple physical test called Flashpoint (i.e. the minimum temperature at which a liquid, under specific test conditions, gives off sufficient flammable vapour to ignite momentarily on the application of an ignition source) which allows them to be classed according to the fire hazard they present in normal use.

Flammable liquids are classed as:

- Extremely flammable - Liquids which have a flashpoint lower than 0°C and a boiling point (or, in the case of a boiling range, the initial boiling point) lower than or equal to 35°C.

- Highly flammable - Liquids which have a flashpoint below 21°C but which are not extremely flammable.
- Flammable - Liquids which have a flashpoint equal to or greater than 21°C and less than or equal to 55°C and which support combustion when tested in the prescribed manner at 55°C.

In addition to the requirements under the *Management of Health and Safety at Work Regulations (the Management Regulations)*, where flammable liquids are intentionally present at the workplace, there is a specific requirement under *DSEAR* for businesses to identify the potential risks such activity may pose to employees and others whose health and safety may be affected, and to determine the measures to be taken to eliminate or reduce these risks so far as reasonably practicable.

Concerning the storage, use and handling of small volumes of flammable liquids in the workplace, risk control considerations include, but are not limited to:

- Investigating the possibility of eliminating the risk, by substitution with a non-flammable or less hazardous material.
- Ensuring that staff are correctly trained in the hazards presented by flammable liquids and the fire safety measures required.
- Providing sufficient ventilation to maintain the concentration of the liquid's vapour below the lower explosive limit.
- Eliminating all possible ignition sources.
- Ensuring that flammable liquids are stored and transported in suitable containers clearly marked, including the use of proprietary 'safety vessels' for dispensing.
- Containment of unavoidable spillages in bunds or catchment trays.
- Quantities of flammable liquids stored in working areas should be kept to a minimum and subject to a process risk assessment. In all cases the volumes should not exceed the requirements for the day or shift being worked, contained in a metal flammables cabinet, with bulk storage, where appropriate, confined to a detached flammable liquids store.

The risk assessment required under *DSEAR* may be carried out as part of the risk assessment requirements of the Management Regulations and general fire safety legislation, which follows the same approach as that used in health and

safety legislation. In particular, given the need to take account of the presence of flammable liquids in the general fire safety risk assessment, businesses may find it of benefit to carry out the required risk assessments as a consolidated exercise.

A risk assessment should be carried out regardless of the quantity of flammable liquid present at the workplace as it will enable businesses to decide whether existing measures are sufficient or whether any additional controls or precautions are necessary. As well as assessing the normal activities within the workplace, consideration should also be given to non-routine activities, such as maintenance work where there is often a higher potential for fire and explosion incidents to occur. If there is no risk to safety from fires and explosions, or the risk is trivial, no further action is needed. If there are risks, control measures must be implemented to comply fully with the requirements of *DSEAR*.

Detailed guidance concerning dangerous substances (including flammable liquids) and the *DSEAR* Regulations are available from the HSE at [hse.gov.uk/fireandexplosion](https://www.hse.gov.uk/fireandexplosion)

In addition to the hazards of fire and explosion, flammable liquids also require consideration under the *Control of Substances Hazardous to Health (COSHH) Regulations* for which reference must be made to product Safety Data Sheets.

## **Common Industrial Gases in Cylinders**

Cylinders of compressed gas are commonly encountered in a wide range of industrial and commercial premises and will also be found for example in schools and laboratories. These include both flammable and non-flammable substances, all of which can introduce serious fire and explosion hazards into the workplace. In addition, inappropriate use and handling of compressed gas cylinders can cause serious injury.

Detailed guidance on gas cylinder fire safety is contained in RISC Authority publication *RC08: Recommendations for the storage, use and handling of common industrial gases in cylinders*, available at [RC08 Recommendations for the storage, use and handling of industrial gases and cylinders](#)

Key risk control measures include ensuring that:

- The hazards presented by gas cylinders are fully considered when conducting assessments for Fire and the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR).
- The numbers of gas cylinders kept on site are carefully managed to minimum operational needs with nominally empty cylinders returned to the supplier at the earliest opportunity.
- All available safety data and equipment operating and maintenance instructions are obtained from the suppliers and fully observed and all users correctly trained in the safe use of gas cylinders and equipment including emergency procedures.
- Cylinders are treated with care and are prevented from falling during use, in storage and when being transported, by chaining them in place in their designated storage area and place of use or by the provision of purpose made trolleys.
- Cylinders are stored externally in a securely fenced compound with protection from the weather and direct sunlight. Full cylinders should be stored separately from nominally empty cylinders and cylinders of different gases should be separated from each other. *(In the event that cylinders are unavoidably stored internally, special precautions are required to be taken of which full details are contained in RC8).*
- The external cylinder compound is located at least 4m from boundary fences, buildings and other structures.
- The compound and adjacent areas are to be kept clear of combustible materials such as idle pallets and vegetation.
- For welding and similar operations, flashback arresters are fitted downstream of pressure regulators on all fuel gas and oxygen supply hoses/lines. In addition, the condition of hoses and connections are checked before each use and that hoses are secured with clips approved by the equipment manufacturer (worm-drive clips are not suitable for this purpose).
- All cylinders and equipment is maintained in a clean condition. Equipment for use with cylinders is returned to the supplier for routine examination and/or servicing at intervals recommended by the supplier.
- No attempt is made to extinguish an outbreak of fire involving burning fuel gas until the gas supply has been shut off. Untrained personnel should not

attempt to tackle a fire involving fuel gases; the area should be evacuated and the fire brigade called immediately.

Acetylene is a particularly hazardous gas for which specific fire safety measures as set out in RISC Authority publication *RC49: Recommendations for the storage, handling and use of acetylene cylinders* should be observed. This can be obtained at [RC49 - Recommendations for the storage, handling and use of acetylene cylinders](#)

Further sources of reference concerning gas cylinder safety include the HSE and BOC online.

## Housekeeping and Waste Control

Implementing and maintaining correct standards of housekeeping and waste control are fundamental in the management of the risk of fire and in accomplishing workplace safety, some of the key measures, where applicable, are summarised as follows:

- The premises should be kept in a clean and orderly condition at all times. Goods and waste should not be stored in aisles and other designated clear areas and unobstructed access to all fire escape routes should be maintained.
- All plant rooms should be kept clear of all storage and locked securely. Similar considerations may also apply to roof spaces and other voids.
- Combustible materials and other storage should be kept clear of heating appliances, electrical switchgear and other plant items, which should be guarded as required. Light fittings will also require clearance from combustibles.
- The internal storage of idle pallets should be kept to a minimum unless external storage is impracticable, or there is a significant risk of external items being the target of an arson attack.
- Hazardous materials such as flammable liquids, gas cylinders, oxidising agents, etc. should be used and stored in a safe manner as determined by the DSEAR risk assessment.
- Outside storage of idle pallets, plastic crates and other combustibles should be strictly controlled. Individual stacks should, where possible, be limited to a maximum height of 6m and storage kept at least 10m (or 1.5 x

the stack height where greater) from buildings and a minimum of 2m from the site boundary.

- Avoid storing combustible materials on loading docks and under external canopies outside of working hours.
- Waste materials should be removed at the end of the working day and transferred to external metal bins or skips, securely sited at least 10m from the buildings and at least 2m from the site boundary. Where this is unachievable owing to spatial restrictions, waste should be kept in lockable metal containers located as far away from buildings as possible.
- Plastic wheelie bins should be secured in position as far away as possible from doors, windows, overhanging roofs and canopies and from external combustible storage. Whilst contravening established practice, it may be necessary for the bins to be retained within the building outside of working hours where open space is limited and there is a perceived heightened risk of arson.
- Special attention should be given to the handling of oil contaminated waste and other waste material which can be liable to spontaneous combustion. All such materials should be held in specific metal bins with close fitting metal lids and should be removed from the workplace at the end of the day or working shift.
- The burning of rubbish in the open should not be undertaken.
- Vegetation surrounding the premises should be periodically cut back and removed as necessary.
- Management procedures should be introduced whereby the above measures are audited at periodic intervals and deficiencies corrected.

## **Hot Work/Control of Contractors**

Hot work such as the use of gas/electric welding and cutting equipment, blowlamps, hot air guns, angle grinders and bitumen boilers is a common cause of major fires and requires suitable controls in the form of a Hot Work Permit system for use by in-house maintenance staff and contractors. In particular, hot work should not be permitted, or at least closely supervised in the vicinity of any combustible construction materials or combustible storage.

- The permit system should be regularly audited.

- Every effort should be taken to ensure that hot work operatives are suitably trained and authority to issue Hot Work Permits is restricted to named personnel who have completed training in hot work control procedures.

Detailed information on hot work precautions is contained in the freely available RISC Authority publication *RC07: Recommendations for hot work* in which can be found a sample hot work permit form and an appending checklist, available at [RC07 - Recommendations for hot work](#)

In addition to the specific hazards associated with hot work, contractors' operations in general can introduce significant fire and safety hazards to the workplace over which the need for close control cannot be overemphasised.

All external contractors working on the premises must provide risk assessments and method statements for their work as well as proof of adequate public liability insurance. Adequate supervision of the contractors must be made ensuring that they work according to their method statements and the working site is safe at all times, whether attended or not. Written records of risk assessments, method statements, insurance and supervision should be retained on file. Also, it is important that all contractors are informed of the premise's health and safety arrangements in force. This will normally involve the provision of written safety rules for contractors which should be issued and signed at the start of the contract, confirming receipt and understanding.

Guidance on the control of contractors is contained in HSE documents *INDG368* and *HSG159*, which are freely available from the HSE website - <https://www.hse.gov.uk/pubns/indg368.pdf> and <https://www.hse.gov.uk/pubns/books/hsg159.htm>

## Smoking Controls

It is important to ensure that smoking is prohibited throughout the workplace and all public areas in accordance with the *Smoke-free (Premises and Enforcement) Regulations*. Suitable no-smoking signs are to be provided in compliance with the *Smoke-free (Signs) Regulations*.



Where required, a designated safe area in the open in which smoking is allowed should be provided, well away from the building and areas of fire hazard such as refuse areas, flammable liquids storage and gas cylinder compounds.

In the event that a smoking shelter is deemed necessary, this should comply with the specific design criteria as prescribed in the stated Regulations. In addition, any partial smoking enclosure should be of non-combustible construction, no materials of a combustible or flammable nature are to be located within 10m of the smoking area, suitable metal receptacles for discarded smoking materials provided and the area around the shelter kept clear of vegetation and windblown debris.

For further information, reference should be made to *RC51: Recommendations regarding smoking at work*, published by the RISC Authority, available at [RC51 - Recommendations regarding smoking at work](#)

## Space Heating

The methods of heating employed in industrial and commercial premises varies considerably, both in respect of the type of the appliance and the fuel used. In addition to the hazards presented by a specific form of heating, the occupancy of the premises and the nature of the operations conducted will also have a bearing on the risk profile.

By way of general guidance, the following risk control measures should be considered:

- The hazards associated with the space heating employed should form part of the fire risk assessment.
- Any method of heating for use in potentially flammable and/or explosive atmospheres will require special consideration in accordance with the *Dangerous Substances and Explosive Atmospheres Regulations (DSEAR)*.

Heating equipment should be installed, operated, maintained and serviced in accordance with the manufacturer's instructions by persons with the required degree of competency. Special fire safety considerations apply to purpose designed heaters burning waste fuel for which detailed guidance is given in

RISCAuthority publication RC04: *Fixed heating equipment burning waste fuel*, available at [RC04 - Fixed heating equipment burning waste fuel](#)

- Combustible materials and other storage should not be located adjacent or in close proximity to heating equipment which should be guarded where appropriate.
- Flue pipes from boilers and heating appliances should be installed clear of combustible material. Where passing through combustible elements such as timber flooring, roof decking, combustible linings, etc., such material should be cut back by a distance as specified by the equipment manufacturer/installer and the space filled with non-combustible insulation.
- Heater flues positioned in the proximity of composite panels are to be located no closer to the panel than three times the diameter of the flue or duct and should not pass through such panelling. If panel penetration is unavoidable, hot flues or ducts are to be enclosed within either a non-combustible insulating sleeve at least 40mm thick or a proprietary sleeve system achieving 60 minutes fire resistance in terms of integrity and insulation. Any gap between the sleeve and panel is to be filled with mineral fibre or other suitable non-combustible material.

Methods of fixed heating is normally the preferred option for industrial and commercial premises. In circumstances where the use of portable heaters is unavoidable, reference should be made to the guidance found in RISCAuthority publication *RC15: Recommendations for the use of portable heaters in the workplace*, available at [RC15 - Recommendations for use of portable heaters in commercial premises](#)

## **Portable Heaters in the Workplace**

Portable heaters will often be used in commercial and industrial premises as a means of supplementing central heating systems, or as the sole method of heating in working environments where the provision of effective fixed heating may be particularly challenging.

By their very nature, portable heaters are more hazardous than fixed heating systems, owing to the risk of them being placed too close to combustible materials. In addition, supply cables to electrical heaters pose a serious tripping

hazard. As a result, the continued use of most portable heaters should be discouraged and, in some cases, may need to be agreed with the insurance provider.

In circumstances where the use of portable heaters is unavoidable, attention should be given to the following key risk control measures:

- Care should be exercised to ensure that the type of portable heater selected is suitable for the environment in which it is to be employed. In particular, portable heaters should not be used in areas where flammable gases, vapour or combustible dusts are present, unless specifically designed for that purpose.
- Portable heaters should be sited and used in accordance with the manufacturer's instructions. It is particularly important that they are positioned on a level, dry, non-combustible surface where the risk of them being damaged or overturned is minimised.
- Portable heaters should be positioned clear of combustible materials and, where appropriate, adequately guarded.
- Unattended operation of portable heaters should be avoided at all times. In circumstances where this may not always be possible, a specific risk assessment should be carried out and appropriate control measures implemented.
- Portable heaters should be isolated from the electrical supply at the end of the working day.
- All portable heaters should be maintained in accordance with the manufacturer's instructions and should undergo periodic portable appliance testing where appropriate.

For further fire safety information on portable heaters, reference should be made to RISC Authority publication RC15: *Recommendations for the use of portable heaters in the workplace*, available at [RC15 - Recommendations for use of portable heaters in commercial premises](#)

## **Oil and Solvent Soaked Rags**

Oil and solvent-soaked rags are highly combustible and present a serious fire risk when improperly discarded.

Oil-soaked rags are liable to spontaneous combustion; as the oil oxidises, heat is released, which if not dissipated can build up to a point when the rags will ignite. This is particularly prevalent with vegetable oils. Whilst solvent-soaked rags are not normally a spontaneous combustion hazard, they nevertheless can be highly combustible and are easily ignited by a lit cigarette, welding spark or other source of ignition.

All oil-soaked rags should be deposited in special oily-waste cans. These metal containers have a specially designed lid which opens to a maximum of 60° degrees and remains closed when not in use, isolating the contents from ignition sources and limiting oxygen to the point where spontaneous combustion is virtually eliminated. Round construction and an elevated bottom encourage air circulation around the can to disperse heat and reduce moisture build-up and rusting. Waste cans should be emptied at the end of each day or shift, and rags stored in metal bins with tight-fitting metal lids located in a safe area outside the building while awaiting disposal.

Solvent-soaked rags should be placed in closed metal containers to reduce evaporation and minimise the chance of ignition. These containers should be emptied daily and rags held in metal bins located in a safe area external to the building, and the solvent allowed to evaporate.

Rags should not be used for absorbing oil leaks or spillages, such as around or under machines, but proprietary, oil absorbent granules or other branded inert products employed for this purpose.

Many businesses nowadays employ the services of companies which provide an industrial wiper rental service in which clean rags are supplied and soiled rags taken away for laundering. In these circumstances, collector bins for the storage of soiled rags are normally supplied. Such services often extend to absorption mats and other related products.

It should be remembered that it is not just oil-soaked rags that are liable to spontaneous combustion, but that this also applies to oil-soaked clothing, overalls and gloves, all of which should be handled with similar caution.

## Fire Safety Self-Inspections

Self-inspections form an integral component of an effective fire safety management programme, the main objective of which is to ensure that housekeeping and fire safety disciplines are maintained and that fire protection measures and procedures are fully functional. This process plays a valuable role in complementing the legal process of fire risk assessment under the *Regulatory Reform (Fire Safety) Order* and the parallel legislation in Scotland and Northern Ireland and will help to demonstrate to insurance providers and enforcing authorities a proactive approach to fire safety responsibilities as well as contributing to the management of property and business interruption risks.

### General Considerations

- The self-inspection process should be designed and managed to ensure that adverse fire safety conditions are identified, and corrective action taken.
- Inspections should be tailored to the specific needs of the premises and the processes and other activities conducted, as regards both the depth and frequency. All areas of the premises should be embraced, including storage yards. A frequency of weekly is a commonly adopted baseline.
- Inspections should be undertaken during normal working hours when the premises are fully operational. Areas of the premises which become silent will require special consideration.
- Inspections should be carried out by responsible, suitably trained and informed persons, with the full support of management.
- Inspections together with the corrective actions should be fully documented and remedial measures taken without delay.
- Inspection reports should be analysed for shortfalls in fire safety discipline.

### Specific Aspects

- Aspects for specific attention when formulating a fire safety, self-inspection programme include, but are not limited to:
- Sprinklers and other fixed fire suppression systems
- Fire alarms
- Fire hydrants and brigade access
- Fire extinguishers
- Means of escape

- Fire safety signage
- Fire doors and shutters
- Structural fire protection and compartmentation
- Computer/telecoms rooms and other key facilities
- Flammable liquids and gases
- Smoking controls
- General housekeeping
- Maintenance of plant and services
- Hot work
- Space heating
- Fork-lift trucks and other mobile plant
- Building and overall site security