

Risk Control Guide

LEADING CAUSES OF FIRE LOSS

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Introduction

Every year, thousands of companies suffer major losses due to fire incidents. A few brief examples include:

External Yard Fire - Smoking

A gated yard to the rear of a warehouse building range was being used for the storage of returned stock. An employee leaving the site during the afternoon reported smoke coming from the rear yard. A fire was discovered within a pallet-load approx. 10 metres from the warehouse. By the time the Fire Brigade attended some 20 minutes after the initial call, the fire had spread to the closest warehouse bay. The presence of combustible packaged goods in the open and the prevailing wind conditions contributed to the fire spread. The fire was eventually extinguished and the property handed back the following day. Extensive damage was caused to part of the warehouse including a collapsed roof and severe distortion of structural columns. Adjoining bays suffered heat, smoke and extinguishing water damage. A forensic investigation found discarded cigarette ends close to where the fire started.

Fire in Gas Fired Travelling Oven

A travelling gas fired oven was being used to cure a polymer coating applied to fabric. Flames quickly spread via exhaust ducting to a heat exchanger located outside the factory building.

Major Roof Fire – Hot Work & Contractors

Ignition of expanded foam insulation during roof felt replacement close to a skylight. The fire started in an area where 3rd party contractors were using a blow torch (hot work) to apply the new felt covering. Fire spread via the roof void below causing structural damage.

Arson Fire

A gated yard was used for the overnight storage of vehicles. Despite CCTV being present, an intruder climbed over a security fence without being detected and ignited parked vehicles. A passer-by noticed the flames, but by the time the Fire Brigade attended the fire had spread and destroyed several closely parked vehicles.

In this Guide, ten of the leading causes of fire have been identified, that apply to most industrial and commercial premises, irrespective of what manufacturing processes, service or commerce take place.

Most fires can be avoided. Prevention is absolutely critical when dealing with the issue of fire safety, and there are many different factors that can be implemented to reduce the risk.

This Guide provides generic information on how to control hazards identified and reduce the number of fire incidents occurring. It is based on United Kingdom regulation and practice. References are from UK sources.

Arson

In the UK, arson is the largest single cause of fires. All premises are at risk of arson; however certain types have an elevated risk. These include schools, places of worship, farms, retail units and unoccupied buildings.

Unfortunately, the majority of arsonists are never caught, so motivation cannot always be identified. However, the key causes are known to be vandalism, crime scene evidence destruction (for example following a burglary) and destructive behaviour by disgruntled employees.

Deterring arsonists – Even though arson is an ever present risk, controls can be put in place to minimise the risk of an arson attack. These include:

- Protecting the site perimeter to prevent fly tipping or unauthorised access. Temporary or permanent bollards as well as security fencing are suitable methods.
- Prevent unauthorised access to buildings. Good levels of physical security should be provided and maintained to all doors, windows, roller shutters and other obvious entry points. Robust levels of access control should also be provided, preferably using electronic access control systems.
- Install lighting that illuminates the entire site externally. The lights should preferably be vandal-resistant security lights.
- Install an intruder alarm system. Such a system could deter potential intruders and provide an early warning before an arson attack can occur. CCTV and manned guarding provision are also very good deterrents. We would always recommend the use of approved security providers/installers such as those registered with the National Security Inspectorate (NSI) or the Security Systems and Alarms Inspection Board (SSAIB) in the UK.
- Any flammable or combustible materials used on site such as flammable solvents, petrol, diesel, wooden and plastic pallets, combustible waste etc. should be retained in dedicated fire separated buildings/rooms or well clear of buildings. Anything stored in the open should be sited at least 10 metres away from exterior walls of buildings to minimise the risk of fire spread. Pallets and waste bins should be cleared on a regular basis to prevent overflow as this can aid the spread of fire.

Reducing the scope for damage – In most premises it is best practise to install an automatic fire alarm system which can provide early warnings of a fire. Early warning can assist in minimising the damage resulting from an arson incident. Premises that are considered to be located in high risk areas should consider installation of active fire protection, such as automatic sprinkler systems.

Reducing the business impact of damage – If measures to deter the arsonist ultimately fail, the implementation of a business continuity plan can reduce subsequent losses. Key actions, personnel and the resources needed to maintain supply to customers should be included in the business continuity plan as well as the recovery process.

Further information and guidance is available within the following documents:

- RSA document: [RCG017 – Security Risk Control Guide](#)
- RSA document: [RCG020 – Business Continuity Management Risk Control Guide](#)
- RISC Authority document: [RC48 – Arson Prevention](#)

Electrical Hazards

Electrical equipment is a common fire ignition source. Poor connections or faulty equipment can overheat, smoulder and spark, igniting combustible elements of electrical equipment and wiring. If other combustible materials are nearby, the fire may spread. Even with limited fire spread, loss of critical power supplies can lead to extended interruption to business operations. Regular inspection and maintenance on electrical distribution systems, their components and other powered equipment can help discover electrical faults at an early stage and prevent faults that may lead to fires.

Building owners and operators have a duty to maintain electrical equipment in a safe condition. In the UK this is governed by the Electricity at Work Regulations 1989. Any electrical work or inspections must be undertaken by a suitably qualified 'competent person'. Some of RSA's guidance relating to arrangement and management of electrical distribution systems is as follows:

- Oil filled transformers should be located outdoors, away from buildings. Bunding or containment should be provided. External compounds should be clear of waste and vegetation and not directly adjacent to combustible construction. Indoor oil filled transformers should be within non-combustible fire rated cut-off rooms with fully sealed penetrations (1-hour rated cut-off room if the building is sprinkler protected; at least 2-hour rated if the building is unprotected). Alternatively indoor transformers should be dry cast resin type.
- Electrical switch rooms should be fire-rated. Any wall, floor or ceiling penetrations should be sealed with material of a similar fire rating to the barrier penetrated. Fire detection should be provided within the rooms with alarms sounding at a constantly attended location. Fixed fire protection should be considered for rooms with oil filled switchgear, critical electrical distribution equipment or critical control equipment.
- Installation and testing of fixed installations should be undertaken in accordance with the relevant country regulations that apply. In the UK this is governed by the current edition of the Institute of Engineering and Technology (IET) Wiring Regulations: BS7671. Inspection, testing and maintenance should be by a member of the National Inspection Council for Electrical Installation Contracting (NICEIC), Electrical Contractors Association (ECA), SELECT (Scotland) or similar approved UKAS accredited bodies who are regulated for commercial installations.
- 'Frequency of Testing & Records' – Electrical installation condition reports (or periodic inspections) are recommended 5 yearly for commercial, residential and educational premises and 3 yearly for industrial facilities. Full records should be available for review, along with records to show that defects have been rectified.
- 'Infra-red Thermographic Surveys' – All major electrical switchgear, major cable runs and key equipment such as circuit breakers, conductors and connections should be subject to a programme of infra-red thermographic surveys, preferably annually as a minimum. Full records should be available for review, along with records to show that defects have been rectified.
- Power transformers - Inspection of oil insulated units should be completed annually, with oil samples taken and analysed. Mineral oil analysis should include checks for moisture content, pH, dielectric strength and dissolved gases. Test certificates should be available for review. Load inspections and testing of protection systems and devices should be completed in line with original equipment manufacturers recommendations or 5 yearly, whichever is the lesser interval.

Further detailed information on electrical safety and maintenance is provided in the RSA document [RCG015 – Electrical Equipment Risk Control Guide](#). Additional topics include other aspects of the fixed electrical distribution system (e.g. circuit breakers), High Intensity Discharge Lighting (HIDL), Residual Current Devices, Electrical Equipment in Hazardous Areas, Transient Over-voltages, Portable Electrical Equipment and Electrical Maintenance Safety.

Inadequate Control of Contractors

For the purpose of this guidance, a contractor is defined as a person / company who are under contract to provide materials or labour to perform a service or to do a job.

Contractors carrying out maintenance work are generally less familiar with the workplace and yet often carry out hazardous tasks. Contracting out a task does not mean you contract out the risk or exposure to your business.

Poor management and control of contractors is likely to expose people and property to unacceptable risks, including fire. Any fire incident of significance could easily result in major property damage and potential business interruption.

'Selecting a contractor'– When selecting a contractor, wherever possible, carry out the following:

- Request a copy of the contractors written Health and Safety Policy (this is a UK requirement if five or more people are employed).
- Request and review copies of their completed risk assessments and safe systems of work (RAMS), specifically for the job/tasks to be undertaken.
- Request evidence of their insurance policies to check adequate limits of indemnity are in place.
- Enquire about competence of their employees including experience, training and qualifications. Do they have an independent assessment of competence?
- Request references from other companies who have experienced their work.
- Enquire regarding past safety performance (including specific detail on fire safety).
- Obtain confirmation on what checks and maintenance procedures are conducted on materials, equipment and PPE supplied by the contractor.
- Obtain agreement on what permits to work will be in operation, especially hot work which is a common cause of fire (also see below section on hot work). Other work for which a permit would normally be expected include work in confined spaces (where there could be an enhanced risk of explosion), and high voltage electrical work.

'Managing the work on site'– Actions to manage the contractors on site should include the following:

- Assess the risk of work to be undertaken in conjunction with the contractor and record what actions will be implemented to control the risk.
- Conduct formal induction training with the contractor including fire safety rules and site emergency procedures. Request that the contractor signs to confirm they have received and fully understood the site rules.
- Decide what work procedures are being adopted (including work permits) and how the work will be supervised. Regular checks on Contractors work should be performed by senior site management.
- Provide specific focus on hazardous work (especially hot work). Ensure levels of control are adequate and sufficient and that permits to work cover all expected hazards and controls. We would always recommend the use of your own permit to work systems rather than rely on those proposed by Contractors.

Hot Work Fires

Hot work is defined as any operation that involves open flames or produces heat or sparks e.g. cutting, grinding, brazing, soldering, welding, chipping, use of hot tar boilers or hot riveting.

Inadequately controlled hot work is a major cause of fire. Hot slag from a welding torch can easily ignite combustibles 10 metres away from the work area, and the resulting fire can grow undetected.

Hot work should be avoided wherever possible. If this is not possible, then it is crucial that strict controls are developed, implemented and enforced. Every site should have a formal policy for the control of hot work carried out by own employees and contractors outside of designated maintenance workshops. This should always be controlled by the use of a dedicated hot work permit to work.

The hot work permit system is intended to ensure that contractors and employees use and follow the hot work procedures and protocols for the site. The permit should incorporate the following controls as a minimum:

- Combustibles to be eliminated or otherwise safeguarded within 10 metres.
- Floor penetrations to be properly protected.
- Required fire protection and alarm systems to be fully functional.
- Ensure that hot work equipment is in good repair.
- There is no explosive atmosphere present (no mixture of flammable gases, vapour, dust with air).
- A fire watch should be maintained throughout the duration of the work by someone not actively completing the hot work. The fire watch should be continuous and should extend at least 1 hour after hot work is completed and during any breaks in the activity. Once the fire watch is completed the permit issuer should do a final check of the work area prior to signing off the permit.
- Suitable fire extinguishers should be provided in the work area. Persons completing the fire watch should have received practical fire extinguisher training and understand the site emergency procedures.

Further information and more detailed guidance on hot work and hot work controls (including sample permits) is available in:

- RSA document: [RCG003 - Hot Work Risk Control Guide](#)
- RISC Authority document: [RC7 – Recommendations for Hot Work](#)

Poor Housekeeping and Inadequate Fire Safety Inspections

Poor housekeeping practices, both indoors and outdoors, greatly increases the risk of fire due to the presence of unwanted fuels close to potential sources of ignition.

The lack of, or inadequate, fire safety inspection systems can promote poor housekeeping standards.

Good housekeeping essentials

'Cleanliness'– A business can reduce the risk of fire by keeping all areas clean and tidy. If the workplace is not cleaned regularly, the build-up of dirt, dust, grease and other waste deposits will occur. This can build up on machinery and equipment causing it to overheat, which could cause a fire to start. It can also build up on heating appliances, electrical equipment and light fittings, providing fuel for fire development and spread.

Combustible waste materials such as paper, wood and cardboard will often accumulate and can contribute significantly to fire development and spread, especially if these are left close to fire inception hazards. The management of the facility should support workers by developing an effective cleaning and waste removal programme. This should include all parts of the site, including high level areas where combustible deposits (e.g. grease or dust) can collect, which are often neglected due to access difficulties.

'Materials handling and storage'– Combustible goods and packaging should always be kept clear of potential ignition sources such as heaters, electrical distribution boards, etc. A minimum clearance of at least 1 metre should be maintained at all times. Prohibit storage of combustible and flammable materials in boiler rooms, mechanical rooms and electrical equipment rooms.

'External Storage Discipline' – Maintaining good standards of external storage discipline and housekeeping is also important. Accumulation of waste and overgrown vegetation can present a fire exposure sufficient enough to cause damage to buildings or outdoor equipment such as transformers and gas tanks.

Combustible materials and waste (including idle pallets) should be stored at least 10 metres from any buildings or outdoor equipment (see also Arson section). If these clearances cannot be achieved due to site boundary limitations, then the maximum clearance possible should be maintained. Idle pallets should never be kept closer to buildings than 1.5 x the pallet stack heights. Waste bins should be chained and locked in position as far from buildings as possible. Consideration should also be given to using metal lidded, metal bins with lids locked in position when the site is left unoccupied.

All external waste, idle pallets and other combustible materials should be regularly removed from site by approved contractors to reduce and limit exposures.

Combustible materials or items awaiting despatch should not be allowed to remain on loading docks or beneath external canopies when the premises are unoccupied. Upon receipt, any combustible items should be promptly relocated to an appropriate storage area.

'Fire Safety Inspections' – Establishing a system of regular fire safety inspections (at least monthly) will promote good and consistent housekeeping and storage discipline across your site. More detailed guidance on this topic and an example of a fire safety inspection checklist is provided in RSA document [RCG002 – Fire Safety Inspections Risk Control Guide](#).

Poor Management of Fork Lift Trucks (Including Battery Charging)

The use of lift trucks in commercial and industrial buildings introduces a range of fire hazards associated with both the trucks themselves and the environment in which they operate. Fire hazards include potential ignition sources such as electrical short circuits and sparks from electrical equipment (especially during battery charging of electrical equipment), engine components and exhaust systems. They may also introduce the potential for increasing fuel availability due to leakage of diesel fuel or LPG.

Battery charging will often be undertaken outside normal occupied hours and will be unattended. The charging of lead acid batteries can also produce hydrogen gas which is an explosion hazard.

Some examples of suitable controls are included below:

- Battery charging stations should ideally be located in a dedicated and separate fire compartment (fire rated to at least 1 hour) which is suitably ventilated.
- Battery chargers should not be located in an area where there is a risk of explosion, for example where flammable liquids are stored or handled.
- Battery chargers should never be located in storage racking.
- The chargers should not be directly fixed to combustible walls such as sandwich panels with foam plastic insulation. They should not be sited on combustible platforms such as pallets or timber shelving.
- Chargers should be protected against collision and the cables held off the floor to prevent damage.
- If chargers can't be sited in a dedicated and separate fire compartment, then they should be in well ventilated areas and a minimum clearance of at least 2 metres should be maintained around the charger and equipment under charge. The preference is for a greater clearance if possible. These clearance areas should be defined by barrier rails of adequate strength and/or prominent floor markings.
- Charging areas should be kept clean, tidy and free from rubbish and other combustible materials.
- Ensure that all protective covers and guards remain in place at all times during operation of the unit to prevent, for example, the build-up of combustible materials on hot exhaust pipes.
- Full assessments of the inherent fire hazards of the materials conveyed by the truck should be completed and special care or precautions taken as necessary. For example, drums of flammable liquid should only be handled with lift trucks that are adapted for use in hazardous atmospheres with suitably adapted carrying equipment, e.g. drum clamps.
- Diesel fuel for lift trucks should be contained in drums or tanks located in the open, away from buildings and suitably bunded to contain any leaks or spillages.
- Diesel and LPG refuelling operations should be carried out in the open air at a suitable designated location. Diesel fuel should be dispensed from approved dispensing pumps. Overfilling of tanks and spillage should be avoided. Engines should be switched off and trucks not manned during filling operations.
- Particular care should be taken to ensure that any exhaust system, engine bay and other potentially hot surfaces are kept free from combustible materials. This includes loose packaging and other waste material which may be drawn into the engine compartment. Floors should therefore be swept regularly.
- Where LPG trucks are used, bulk stocks of cylinders should be kept in a suitably caged area in the open, well clear of buildings (other legislative controls will likely apply for this storage).

Further more detailed information and guidance is available in RISC Authority document [RC11- Recommendations for use of Fork Lift Trucks](#).

Poorly Installed or Maintained Space Heating

Poorly installed and maintained heating systems, especially portable heaters, are a common cause of fire incidents.

Only systems appropriate for the environment should be installed and used. We would always promote the use of fixed heating systems that are installed and maintained in full compliance with original equipment manufacturers instructions. Portable heaters should be actively discouraged and should never be used in hazardous process environments or where storage occurs.

The following provides information on some of the common risk exposures from heating systems and appliances. There is a diverse range of heating used in commercial and industrial premises so the details provided are not intended to be exhaustive:

‘Boiler Rooms’ – Boiler rooms for heating systems should be of fire resisting construction and suitably fire separated from other building areas. The boiler room should be kept clear of storage, flammable fuels/liquids, combustible materials and waste. Since boiler rooms are frequently unoccupied and a fire or gas leak could go undetected, fire detection and, if appropriate, a gas detection system should be installed which will provide early warning and emergency response.

‘Safety Devices’ – Automatic shut-off valves on boiler/heater fuel supplies, interlocked to suitably located fusible links, or other heat activated devices, should be installed.

‘Maintenance and Inspection’ – Implement formal maintenance and inspection arrangements for building heating equipment, using appropriately qualified or certified contractors and in accordance with current legislation.

‘Chimneys and Flues’ – Regular inspection and cleaning of chimneys and flues may be necessary, especially where combustible deposits are likely to accumulate (e.g. wood or coal fired systems). This work should only be undertaken by a competent person in accordance with the manufacturer’s instructions. Chimneys and flues should be installed well clear of combustible materials. If such chimneys or flues pass through or close to combustible building construction, the construction should be cut away to provide an air gap of at least 150mm and preferably back-filled with non-combustible material (e.g. mineral wool). A fire rated sleeve (with at least 60 minute fire rating) can also be installed at the point where heating equipment chimneys or flues pass through combustible building elements.

‘Portable Heaters’ – Portable heaters are commonly used to provide supplemental heat, especially during colder periods. Unfortunately, such heaters can increase the risks of fire, usually by them being placed too close to combustible materials. There is also the risk of bringing combustible/flammable liquid and gas, which is often used to fuel the heaters, into production and storage areas. Frequent movement of portable heaters can cause damage to the appliances and increase the potential for fuel leaks, introducing additional fire hazards. The use of portable heaters should always be strongly discouraged and should be prohibited in hazardous process areas and all storage areas. We highly recommend that if you need to use portable heaters, you refer this first to your insurance broker/provider for review.

Further detailed information and guidance is available from the RISC Authority in the following documents:

- [RC15 - Recommendations for the use of Portable Heaters in the Workplace](#)
- [RC27 – Recommendations for Space Heating Hazard Classification](#)
- [RC9 – Recommendations for Oil Fired Heating Installations](#)
- [RC4 – Fixed heating equipment burning waste fuel](#)
- [RC64 – Recommendations for fire safety with small biomass installations](#)

Poor Smoking Controls

Inadequately controlled smoking has always been a historical cause of fire in both commercial and residential buildings. As well as the normal employee risk, this exposure also includes contractors, delivery drivers and other visitors to site.

The introduction of legislation in many countries to ban smoking in commercial premises has no doubt seen a reduction in incidents, however there are still some countries that have not enforced such legislation yet with smoking allowed in designated areas. Smoking will still occur in residential properties, including hotels.

All businesses should have an established smoking policy which is strictly applied, enforced and monitored. This policy should apply to all employees, visitors and contractors employed on site.

Further information and guidance on this topic can be found within the following documents:

- RSA document [RCG006 – Smoking Regulations Risk Control Guide](#)
- RISC Authority document [RC51 - Recommendations regarding smoking at work](#)

Cooking Equipment Fires

There is a high fire risk associated with commercial cooking processes which is enhanced in what is often a fast paced, highly pressured environment. Combine this with large volumes of flammable cooking oil, naked flames and other high temperature heat sources – and you have a perfect environment for fire inception.

In commercial kitchens, the main fire hazard arises from over-heating fats and oils due to operator error or the failure of a thermostat. For food manufacturing, when allied with historic legacy issues around combustible building construction, specifically combustible foam insulated composite panels (also known as sandwich panels), the potential for large fire losses is significant.

Cooking equipment in commercial kitchens includes broilers, deep fat fryers, salamander grills, brat pans, woks, solid fuel or gas pizza ovens, charcoal or gas charrills and ovens, which can be extended in manufacturing environments to include the likes of batch and travelling oil fryers and ovens, thermal oil systems, and smokers.

There is extensive guidance available on fire risk exposures and recommended control systems for the large range of hazardous processes associated with commercial kitchens and the food manufacturing industry. Some key controls are described below. Various additional guidance documents are available for specific processes and hazards. Some of these are provided as links at the end of this section:

- Hazardous equipment such as fryers, ovens, smokers, brat pans, woks, charcoal grills, ovens, thermal oil heaters etc. should be located in dedicated non-combustible kitchens or rooms, fire rated to at least 60 minutes.
- Where extract ducts/flues penetrate through combustible construction or combustible foam insulated panels, they should have a minimum of 150mm of clear space around them (preferably 300mm) with any gaps back-filled with non-combustible material such as mineral wool. Fire rated sleeves/collars can also be fitted around the duct/flue where this penetrates the building construction.
- Extract ducts/flues should be as short as practicable, avoiding bends or dips where residues might collect, and have inspection hatches throughout their length to facilitate inspection and cleaning.
- Equipment should shut-down automatically when potentially hazardous or abnormal conditions occur. Suitable instrumentation should be provided to detect such conditions, with an initial alarm followed by a shutdown if the fault escalates. For food manufacturing a specific risk assessment should be completed to decide whether product should stay within the equipment or be removed as part of the safe shut-down procedure. Some examples of hazardous or abnormal conditions include over-temperature, over-pressure, abnormal oil levels, inadequate extraction/ventilation, abnormal combustion, high/low gas pressures etc.
- Manual emergency stop buttons should be provided in areas which are safe and easily accessible. Staff should be fully trained and empowered to use them.
- There should be automatic fire detection provided at ceiling and roof level for all cooking equipment areas assuming the environment allows for this. Heat or intelligent air-sampling systems can be used to minimize false alarms from process smoke. Alarms should go to a permanently manned location or 24 hour alarm receiving centre.
- Fixed automatic/manual fire suppression systems should be provided to protect hazardous process equipment and associated extraction ducts/flues. Typical systems include steam injection, water mist, sprinkler heads or wet chemical systems. Activation should shut down fuel supplies, extract fans and any conveyors. Coverage should be underneath hoods, inside flues and inside cooking chambers. System activation alarms should be routed to a constantly manned location or off-site monitoring station. NB – many fixed suppression systems will be subject to established international standards for design, installation and maintenance. Details of proposed new fixed suppression systems should be submitted for insurance review and approval.
- There should be a robust inspection and cleaning programme for all cooking equipment and associated extract filters, ducts/flues based on a thorough risk assessment. Extraction ducts/flues should be cleaned along their whole length. Such cleaning to be completed by a suitably competent contractor. Frequency should be established by risk assessment based on usage. For example, heavy use (12-16 hours a day): 3 months, moderate use (6-12 hours a day): 6 months, light use (2-6 hours a day): 12 months. Reports and photographic evidence showing the work has been correctly completed should be kept for review. Cleaning frequencies should be continually monitored and increased if excessive deposits are observed. If there are changes made to the cooking duration, process, food or fats handled, then the inspection and cleaning frequency should be reviewed.

- The colour of oils and fats should be regularly monitored as their fire related properties change with use.
- Charcoal from grills or wood fired pizza ovens should be removed from the cooking appliance at the end of the work period, wetted down and placed in an external metal container.
- Areas around cooking equipment should be free of unnecessary combustible storage, waste materials and debris from cooking.
- Operators should be instructed as to the hazards associated with the cooking equipment and the associated emergency procedures, in particular the location of the manual control for operating any fire suppression system and the cooking equipment emergency isolators.
- Suitable fire extinguishers, including (where relevant) Class F Wet Chemical extinguishers for cooking fats/oils, should be provided and training in use given to employees who work with and around cooking equipment.
- All production equipment should be installed and maintained in full compliance with original equipment manufacturer recommendations. Specific focus should be paid to critical fire safety controls such as alarms and safe shutdown interlocks.

Further detailed risk management guidance is available from the following documents:

- RISC Authority document [RC16B - Recommendations for Fire Safety in Commercial Kitchens](#)
- RISC Authority document [RCB16A - Recommendations for Fish & Chip Frying Ranges](#)
- RISC Authority document [RC26 - Recommendations for Thermal Fluid Heating Systems](#)
- RISC Authority document [RC36 - Recommendations for Fire Prevention on Bakery Ovens](#)
- RISC Authority document [RC44 - Recommendations for Fire Risk Assessment of Catering Extract Ventilation](#)
- RISC Authority document [RC60 – Fire Safety with Food Smoking Processes](#)
- RISC Authority document [BDM9 – Fire Risk Minimisation Guidance for the Food Industry](#)
- Loss Prevention Standard [LPS 2014 Kitchen Extract](#)

Inadequate Control of Hazardous Materials

Poor practices in the storage and use of hazardous materials can easily lead to fire and explosion incidents with the added risk to personnel safety and the environment. Such incidents normally result in major property damage and business interruption.

Hazardous materials include solids, liquids and gases. Examples include combustible liquids, flammable liquids, paints, varnishes, welding gases, heating fuels and combustible/explosive dusts (either as a raw material or as a by-product of a process).

The control of hazardous substances falls under many areas of regulation within the UK, Europe and internationally. It is important that all businesses that may handle or store hazardous materials fully risk assess their exposures to ensure adequate controls are put in place.

Risk management guidance covering the large range of hazardous materials in circulation is extensive. Some key guidance is provided below. Numerous guidance documents are readily available for specific processes and hazards: some of these are provided as links at the end of this section:

Know the hazards - Knowing the hazards of the various types of hazardous substances is a vital first step towards managing the risk. Information on hazardous products will be contained on the “material safety data sheet (MSDS)” that should be supplied with the product. An ATEX (Explosive Atmospheres Directive) risk assessment may be necessary to identify what risks are present and what actions have been taken to eliminate or reduce the risk. In the UK this may be referred to as a DSEAR (Dangerous Substances and Explosive Atmospheres) risk assessment, whilst in Continental Europe this may be referred to as an Explosion Protection Document (EPD). A “hazardous area classification assessment” should be completed where necessary and this should identify all hazardous zones. Zone diagrams should be developed.

Store hazardous materials properly - Make sure all hazardous materials are stored correctly. Storage arrangements are likely to include the following:

- Use of suitable containers for the product.
- Provision of effective containment to prevent any spillage from spreading to other parts of the working area.
- Appropriate ventilation to ensure that any flammable vapours will be dispersed rapidly.
- Separate of hazardous materials well away from other processes and general storage areas.

Control all ignition sources - Potential ignition sources should be removed from all hazardous zone areas. There are many possible ignition sources such as sparks from electrical tools and equipment, arcing from welding equipment, sparks from crushing and grinding operations, sparks from static electricity build up and hot surfaces including boilers, ovens, driers and flues. Many of these ignition sources can be eliminated from hazardous zone areas, or specially designed equipment for use in hazardous zones utilised¹. Use of equipment or processes (including hot work) that can create open flames or sparks should be prohibited in these areas. If hot work has to be completed it should be very strictly controlled (see Hot Work section elsewhere in this document).

Practice good housekeeping and maintenance procedures – Good housekeeping and equipment maintenance are essential whenever any hazardous substances are used. Controls include:

- Procedures in place for spillage control so these are dealt with promptly.
- Procedures in place for disposal of hazardous waste substances.
- Formal cleaning and housekeeping arrangements.
- Planned maintenance programmes and routine inspection, testing and proving of safety controls.

Extensive reference and guidance material on controlling fire and explosion risks is available via a number of sources. Some specific guidance is available as follows:

RSA documents:

- [RCG016 – Hazardous Materials Risk Control Guide](#)

¹ Electrical and non-electrical equipment located within zoned areas should be designed for use in the specific zones (explosion-proof equipment).

RISC Authority documents:

- [RC8 – Storage use and handling of common industrial gases in cylinders](#)
- [RC12 - Recommendations for the prevention and control of dust explosions](#)
- [RC19 – Recommendations for the storage of aerosol products](#)
- [RC30 – Electrical equipment in flammable and explosive gaseous atmospheres](#)
- [RC31 – Recommendations in automotive refinishing and paint spraying](#)
- [RC32 – Recommendations for paint spraying](#)
- [RC46 – Fire safety in the manufacture of Biodiesel Fuel](#)
- [RC49 – Recommendations for the storage, handling and use of acetylene cylinders](#)
- [RC52 – Recommendations for fire safety for waste solvent recovery plants](#)
- [RC53 – Recommendations for fire safety in the use of thermal oxidation plant](#)
- [RC55 – Recommendations for fire safety in the storage, handling and use of flammable and highly flammable liquids](#)
- [RC56 - Recommendations for fire safety in the storage, handling and use of flammable and highly flammable liquids: storage in containers other than external fixed tanks](#)
- [RC57 - Recommendations for fire safety in the storage, handling and use of flammable and highly flammable liquids: storage in external fixed tanks](#)

Health and Safety Executive (HSE):

- [Fire and Explosion Resources](#)

References

Whilst most documents referenced in this guide are hyperlinked, they can also be found at the following websites:

RSA documents @ <https://www.rsabroker.com/risk-management>

RISC Authority documents @ <https://www.riscauthority.co.uk/free-document-library/>

Health and Safety Executive @ <https://www.hse.gov.uk>

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