

## **INDUSTRIAL PROCESSING SITES – COMPLIANCE WITH THE NEW REGULATORY REFORM (FIRE SAFETY) ORDER 2005**

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The aim of this paper is to inform Managers of industrial processing sites about the fire legislation that came into force on 1st October 2006. The paper will go through the main parts of the legislation, highlighting key areas and requirements. The main body of the paper will then discuss the responsibilities and the tasks required by Senior Managers in order to ensure all parts of the sites, including the administration, process and storage areas, will comply with the new legislation. A key area that will be discussed will be the potential conflicts with the existing DSEAR legislation that applies to many processing sites.

**KEYWORDS:** Process, Industrial, Fire, RRFSO, DSEAR, Compliance, Responsible Person, Competent Person, Risk Assessment, Emergency Plan.

### **INTRODUCTION**

As part of a commitment to reduce death, injury and damage caused by fire, the Government has reviewed the current fire safety law and has made a number of changes through the Regulatory Reform (Fire Safety) Order 2005 (RRFSO) which became law in England and Wales on 1st October 2006. Similar requirements have also been introduced in Scotland under the Fire (Scotland) Act 2005. Two thirds of all fire deaths occur in the home and the government is directing the efforts of the fire brigades in prevention strategies in this area and consequently less direct attention on the commercial sector.

The main effect of the changes is a move towards greater emphasis on fire prevention in all non-domestic premises – for offices, shops, factories, leisure and other buildings. Hence, industrial processing sites come under these new regulations and it includes all the offices, and process buildings on the premises as well as storage areas and any other places where personnel can get access. Fire certificates are abolished and cease to have legal status. Responsibility for complying with the law now rests with the ‘Responsible Person’. Non-compliance could ultimately lead to prosecution, with the maximum penalty being two years in gaol. The role of the fire and rescue service has also changed as they become enforcers of the new regulations, in a similar manner to the HSE with regard to DSEAR and COMAH. The new law means a much greater emphasis on fire prevention and businesses need to be taking steps to identify and deal with fire risks.

On industrial processing sites the demarcation lines between what is enforced by HSE and what comes under the Fire & Rescue Service is not particularly clear to many people. The HSE are responsible for ‘Process Fire Precautions’ (PFP) which are specific process related fire safety requirements. Whereas ‘General Fire Precautions’ (GFP) as defined in the Regulatory Reform (Fire Safety) Order are enforced by the Fire Service.

## OVERVIEW OF THE FIRE LEGISLATION

The new fire legislation covers all non-domestic premises and communal areas of domestic premises, e.g. blocks of flats, care homes, houses of multiple occupancy. For processing sites this will cover all manned operational sites and offices. The main requirements are:

- Appoint a ‘Responsible Person’
- Appoint at least one ‘Competent Person’
- Undertake a Fire Risk Assessment
- Take general fire precautions
- Formulate an Emergency plan

The RRFSO also contains six other legal duties covering the safety of employees, consultation with employees, informing other employers in buildings under your control, issues of other buildings that are in your control, means of contacting emergency services and employee co-operation. Once again the onus is the ‘Responsible Person’ to ensure that their business meets the requirements of the new law.

## RESPONSIBLE PERSON

The collection of fire safety duties which form the core of the order are placed upon the person called the ‘Responsible Person’. As part of the requirements to comply with the Order, the ‘Responsible Person’ is required to carry out a fire risk assessment of the premises, or instruct a ‘Competent Person’ to undertake this task on their behalf. The responsible person is:

- a) The person who is the employer or has a workplace which is to any extent under his ‘control’.
- b) in relation to premises not falling within a) the person who has control of the premises in connection with carrying out a trade, business or other undertaking; or the owner, where the person in control of the premises does not have control in connection with carrying out a trade, business or other undertaking.

For small to medium sized companies this would be the Managing Director or Chief Executive. For large organisations such as utility companies that have very large numbers of sites, the Responsible Person will need to be appointed at a senior executive management level, who will be responsible for ensuring compliance at a corporate level. There will also undoubtedly be a Responsible Person to ensure compliance at individual sites or groups of sites, who will be required to ensure fire safety measures are implemented locally. For example, if the enforcing authority finds that there is a problem when inspecting a site with the management systems or a company policy relating to fire then the corporate Responsible Person would be informed of the non-compliance. If the problem found was a local issue, e.g. fire exit blocked by someone placing a filing cabinet in front, then the local Responsible Person would be informed. The Responsible Person must:

- identify the significant findings of the risk assessment and the details of anyone who might be especially at risk in case of fire
- record the significant findings of the risk assessment

- provide and maintain such general fire precautions as are necessary to safeguard those who use your workplace
- provide information, instruction and training to employees about the fire precautions in the workplace.

It should be emphasized that it is the Responsible Person who is liable in law for ensuring their workplace is in compliance with the RRFSO.

### COMPETENT PERSON

The 'Competent Person' may be appointed in-house from available staff with sufficient training, and/or experience, in fire risk assessment, or companies may choose to appoint an external consultant to undertake the risk assessment on their behalf. If internal staff are tasked with undertaking these assessments then they must have sufficient training and experience to fulfill this role to the satisfaction of the enforcing Fire & Rescue Service.

In appointing an external consultant there are a number of key factors that should be borne in mind:

Have they sufficient experience in undertaking fire risk assessments?

Since the introduction of the new legislation it seems everyone is now an expert in fire risk assessment! Contractors offering this service should be asked to provide examples of their previous work. For example, companies whose main work has been in asbestos surveying or servicing fire extinguishers may now also be offering fire risk assessments, but have they the technical knowledge and experience in risk assessment techniques to undertake this role?

Are they truly independent?

Many companies are now offering this service and a 'bolt-on' to their usual services for little or no cost. However, the client should be aware that many of these companies may be biased towards directing the assessment to focus on a certain area to the detriment of other more important areas. If a company whose main business is providing fire extinguishers or smoke detectors undertakes your fire risk assessment don't be surprised if the report recommends more extinguishers or detectors!

Have they had sufficient training?

Contractors should be able to show that they have been through a suitable training course and preferably have a Certificate of Competence. There are a number of reputable companies that are providing training on how to undertake fire risk assessments, with some also providing an assessment of competency. Unfortunately, there is no Government requirement or scheme to benchmark against. So it is left to the person being trained to ensure that the training provided is by a reputable company.

Does the fire risk assessor have sufficient insurance cover?

In undertaking a fire risk assessment, the assessor is taking on a certain amount of liability for the report produced and therefore must have sufficient Professional Indemnity and

Public Liability Insurance cover. This will be of particular importance if, as an operator of a large number of sites, you decide to place all your fire risk assessments for all your sites with a single service provider.

#### Quality of report

The key output from the fire risk assessment exercise is the production of the report. This must stand up to scrutiny by the local Fire & Rescue Service. If, in their opinion, the report is not suitable and sufficient to meet the requirements of the RRFSSO, then they could issue an Enforcement Notice that will require the assessment to be undertaken again.

### FIRE RISK ASSESSMENT

A properly carried out fire risk assessment will help to decide the nature and extent of the fire precautions that need to be taken. There is a general requirement to reduce the risk to a level which is as low as reasonably practicable.

Fire Risk Assessments must also consider all employees and all other people including contractors, visitors and members of the public, who may be affected by a fire in the workplace. There is also a requirement to make adequate provision for any disabled people with special needs who use, or may be present, at the premises. A key point to note is that they must not be seen as 'one off' exercises but as 'living documents', and should be kept under review and revised where necessary. Changes may need to be made, for example, when the fire risk or hazard may have changed due to alterations to the building, the nature of the work, the number of employees, or changes to the fire safety management processes.

The assessment must include as a minimum the following:

- Management systems
- Active fire protection systems
- Passive fire protection systems
- Detection
- Staff Training records
- Maintenance records
- Evacuation/emergency routes
- Significant findings
- Actions and timescales
- Plans/drawings of the buildings
- Photographs to illustrate potential hazards or non-compliances

### GENERAL FIRE PRECAUTIONS

There is a requirement in the regulations to undertake what is known as 'general fire precautions'. In relation to the premises, this means;

1. measures to reduce the risk of fire on the premises and the risk of fire spread;
2. measures in relation to the means of escape from premises;

3. measures for securing that the means of escape can be safely and effectively used;
4. measures in relation to the means for fighting fires,
4. measures in relation to the means for detecting fires and giving warning in case of fire on the premises; and
6. measures in relation to the arrangements for action to be taken in the event of fire, including: instruction and training of employees and measures to mitigate the effects of fire.

The above does not include special, technical or organisational measures required to be taken in any workplace in carrying out work processes, e.g. explosion protection systems on process equipment which come under DSEAR.

## **GUIDANCE**

Twelve guidance documents have been produced to assist those people tasked with undertaking fire risk assessments. Working for the Department for Communities and Local Government (CLG), BRE has written eight of the thirteen guides, that have been produced to date. The guides cover the following categories of buildings and work places:

- Offices and Shops
- Premises providing sleeping accommodation
- Residential care
- Small and medium places of assembly
- Large places of assembly
- Factories and warehouses
- Theatres and cinemas
- Educational premises
- Healthcare premises (responsibility of the Department of Health)
- Transport premises and facilities
- Open air events
- Means of escape for disabled people
- Animal premises and stables

For industrial and processing sites the factories and warehouses guide<sup>[1]</sup> is probably most applicable.

## **ENFORCEMENT**

For the vast majority of sites the enforcing authority is the local Fire & Rescue Service. The inspecting officer has the power to do anything necessary for the purposes of carrying out his duties to enforce the Order. There are three Notices that can be issued to the Responsible Person.

### ALTERATIONS NOTICE

If the enforcing authority is of the opinion that something on the premises constitutes a serious risk, they may serve an Alterations Notice to the responsible person in order that they notify the authority of any alterations to the premises that might result in a significant increase of the risk.

### ENFORCEMENT NOTICE

If the Responsible Person has failed to comply with any provisions of the order, the enforcing authority may issue an Enforcement Notice that requires the responsible person to take steps to remedy the failure.

### PROHIBITION NOTICE

A Prohibition Notice can be served on the Responsible Person if, in the opinion of the inspector, the use of the premises involves or is likely to involve a risk to persons that is so serious that the use of the premises should be prohibited or restricted. In effect they have the power to stop work at the site.

### DANGEROUS SUBSTANCES

Throughout the RRFSo there is reference made to ‘dangerous substances’. These are substances that can be classed as explosive, oxidising, extremely flammable, highly flammable or flammable; a preparation that because of its physio-chemical or chemical properties creates a risk, or any gas, vapour, mist or dust that can form an explosive mixture in air.

If dangerous substances are present in the workplace, their use must be eliminated or reduced as is reasonable and have to be taken into account in the risk assessment. In addition, the use of dangerous substances comes under the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR). Under these regulations a written risk assessment is also required and, depending on the volumes and the nature of the substance and usage, could involve hazardous area zoning.

For industrial processing sites typical substances that can be deemed a ‘dangerous substance’ would include:

- Flammable gases, e.g. methane, hydrogen, propane
- Flammable vapours, e.g. solvents, paints
- Flammable dusts, e.g. chemicals, pharmaceuticals, foodstuffs, paints, rubber

A risk assessment report compiled to satisfy DSEAR would not be sufficient in itself to meet the requirements of the RRFSo but could inform or form part of the fire risk assessment. For those companies yet to undertake their DSEAR risk assessments on their premises, it can be useful to have it undertaken together with the fire risk assessment, as there are areas which may overlap and substantial cost savings may be made by having them done at the same time.

## COMPLIANCE OF INDUSTRIAL PROCESSING SITES

Industrial processing sites can vary in size and complexity enormously from simple small operations that may have half a dozen employees in a single building with an office area, to large sites that can comprise of numerous process buildings, office blocks, power plants, storage tanks, warehouses and complex process equipment.

### UNMANNED AREAS

For parts of sites which are usually unmanned but will have personnel present for short periods, these sites will still be required under the RRFSO to have a fire risk assessment, although the assessment would be expected to be quite brief. It could take the form of a simple checklist that may be compiled in a generic form to cover these types of areas or buildings.

### PROCESS BUILDINGS

In the main works there can be numerous buildings in which personnel will be working and which come under the RRFSO. As well as the obvious need to assess the office accommodation and meeting rooms, other buildings that contain process plant would also need to be assessed as staff can be expected to undertake work activities in them. In addition, these types of buildings may contain dangerous substances which would also need to be assessed under DSEAR as well as the RRFSO.

Buildings containing processing plant that use or produce flammable materials could pose particular risks to persons working on the process plant. Some plants are large complex processes that encompass numerous multi-storey levels and can virtually fill a building. There are a number of concerns with these plants:

- Fires from self-heating
- Dust or gas explosions
- Means of escape
- Building structure comprising of flammable materials

#### Fires from self-heating

This phenomenon occurs with certain types of material, for example dried sewage sludge, due to exothermic chemical/and/or biological action. It can occur at numerous stages of a process either with relatively small quantities of the material under hot fully oxygenated conditions for short periods or when stored in bulk in silos or hoppers in cooler temperatures but for longer periods. In respect of the substance being liable to undergo spontaneous combustion, it can be classed as a 'dangerous substance' and thus comes under the requirements of both DSEAR and also the RRFSO. In either case it would be necessary to show to the enforcement authorities that an isothermal self-heating assessment has been undertaken to the European Standard prEN 15188, which includes testing of the

material and use of Thermal Ignition Theory to calculate the safe operating parameters, in terms of critical ignition temperature, safe storage volumes and time to ignition for the full scale process.

### Dust and gas explosions

Organic materials in the form of a dust cloud suspended in the atmosphere can form an explosible cloud if present in sufficient concentration, typically above 40 g/m<sup>3</sup>. Similarly, flammable gases and vapours can also form explosible mixtures in air, when present a concentration above their lower explosive limit. As such, these processes will come under the requirements of DSEAR and thus requires a risk assessment and hazardous area zoning exercise, in addition to the other requirements of these regulations. Explosions, either gas or dust, do not explicitly fall under the RRFSO. However, a consequence of an explosion in many cases leads to a subsequent fire in the building that contains the process. Thus, it may be argued that for processes that are inside buildings, the possibility of a dust or gas explosion leading to a fire **must** be taken into account and assessed as a risk when undertaking a fire risk assessment for the building. Hence, some knowledge of dust and gas explosions must be required by the person undertaking the fire risk assessment in order for this risk to be adequately assessed.

### Means of escape

Some of the larger types of process plant have complex arrangements for access to parts of the process, which can pose problems for means of escape in case of fire. Of particular concern are those plants that virtually fill the building in which they are housed, with very little space between the top level of the process and the roof and/or the sides of the building. To make matters worse, a single exit point from the process to ground level could mean excessive travel distances from certain areas of the plant to the place of safety outside the building. This issue would again need to be addressed when undertaking a fire risk assessment and in forming an emergency plan under the RRFSO.

### Building structure

As part of the fire risk assessment an important area that should not be neglected should be the building itself. As an example, some buildings particularly in the food processing industry, may be constructed from insulated core panels. It is important that the nature of the insulation used is determined as typical materials used vary greatly in their behaviour. Some materials, particularly expanded polystyrene (EPS), can be particularly hazardous if ignited in a fire both from the rate of heat release (size of the fire) and the toxic combustion products. The risk is increased significantly if the wall panels are cut through to allow the passage of equipment or services (see Figure 1).

### Vehicles

There are particular hazards associated with the use of vehicles such as fork lift trucks which must also be considered. For example, battery charging can give rise to hydrogen





**Figure 1.** Expanded polystyrene insulation panel in thermal dryer building cut to allow conveyor access through side wall

which is highly flammable and could cause an explosion if it is present in sufficient concentration. Charging points should therefore be located in well ventilated areas and, if inside a building, sited against a 30 minute rated fire-resisting wall.

### STORAGE AREAS

Large storage buildings and warehouses have their own particular hazards, mainly arising due to the very large volumes of combustible materials present and the lack of compartmentation. Fires in these buildings can result in very rapid spread leading to the loss of the whole building and contents. For this reason extensive use of sprinklers is normally found throughout the building and on the storage racking in many cases. Although, this fire protection provision is not primarily for life safety, usually being required by the insurance company for property protection reasons, it needs to be assessed and taken into account in the fire risk assessment. Experiments<sup>[2]</sup> have shown that fires started in boxes stored on a 10m high racking system frequently reached to the top of the racking within two minutes.

Areas which aren't buildings as such but would also come under the DSEAR and possibly the RRFSO are items such as flammable material storage tanks. This would be due to the presence of a flammable material which could form an explosive atmosphere or fire hazard in case of leakage or spillages. In most instances this would not lead to a subsequent fire but this would still need to be taken into consideration when assessing the risk to life safety of personnel working on top of or around these tanks. If fire is a potential hazard then a fire risk assessment of the tanks would need to be undertaken to comply with the RRFSO, perhaps as part of an overall site fire risk assessment.

## **MANAGEMENT SYSTEMS**

A key element of the RRFSO is the requirement to have in place suitable management systems. This encompasses keeping records and information in a number of areas, including having a written record of the Responsible and Competent person(s). Specific documentation that the Fire and Rescue Service may wish to see during a site visit could include:

- Fire Safety Policy
- Emergency Plan
- Fire Risk Assessment
- Permit to work system for hot working
- Staff training
- Evacuation drills
- Maintenance records

## **FIRE SAFETY POLICY**

Most responsible companies will have a written statement outlining their corporate policy on fire safety, either specifically or perhaps as part of a general Health & Safety Policy. Many large companies will also have a Health & Safety Manual which would be expected to cover fire issues.

## **EMERGENCY PLAN**

This will detail the expected actions on personnel in the event of a fire occurring. It would be expected to be specific to a building or site, although it may also contain corporate safety instructions as well. For example, an internal emergency phone number for personnel to use in the event of a fire that alerts a receptionist to call the fire service may be a corporate action, but specifics assembly points for staff to evacuate to would be specific to a building.

## **FIRE RISK ASSESSMENT**

As described in detail in this paper, a fire risk assessment for each building on a site would be expected to be made available to the Fire and Rescue Service when requested. These documents should also be available for staff.

### PERMIT TO WORK

Where hot working may be undertaken, particularly in high risk areas such as process buildings, it is good practice to use a permit to work scheme. These can help to reduce the risks from fire started accidentally by repair and maintenance works.

### STAFF TRAINING

A requirement of the legislation is that staff know what to do in the event of a fire and where they are expected to muster on evacuation of the building. For process areas other specific tasks may also be required of the staff. If staff are expected to use a fire extinguisher they should be trained in their use and must know what type of extinguisher to use for the different classes for fire. A higher level of training would obviously be required for those staff given specific fire fighting roles. Records of the staff training can be expected to be requested by the enforcing authority.

### TRAINING

It is important that personnel undertaking duties under the RRFSO have training to undertake these tasks. In particular, depending on the nature of the buildings being assessed, the fire risk assessment may be quite a complex document requiring knowledge of a wide range of fire safety systems such as detection, passive and active fire protection, means of escape and travel distances, dangerous substances, human behaviour and the ability to interpret building plans and drawings. There is guidance available, as described earlier, to assist in this process, but specific training may be required if a suitable and sufficient assessment is to be made that satisfies the enforcing authority.

The role of the Responsible Person is fundamental to compliance with the RRFSO and they need to be clear what their duties entail and the possible penalties they could face by not undertaking them to the requirements of the legislation. Training in the duties of this role is another area for consideration.

### EVACUATION DRILLS

These are a key part of ensuring everyone knows what to do in the event of the fire alarm sounding and where they need to evacuate to so that everyone can be accounted for when the Fire Service arrive. These drills should be undertaken at least annually and records kept detailing when they were undertaken and any outcomes or actions to be taken from them.

### MAINTENANCE RECORDS

It is important that records are kept showing that the fire safety systems used are properly maintained. This includes **portable fire fighting equipment, automatic fire detection systems** and fixed fire fighting installations (e.g. sprinklers). Passive systems, such as fire doors, should not be overlooked. It is also important when purchasing fire protection systems,

that they have been independently certified, by a body such as LPCB, which will assess the performance of the system or component against a standard.

## **CONCLUSIONS**

The new fire legislation is aimed at cutting deaths from fires in non-domestic premises and indirectly this will reduce damage to buildings and reduce business interruption. The responsibility is laid squarely at the door of the Responsible Person to ensure the regulations are met. A key part of interpreting the RRFSO is recognising who the Responsible Person is for different types of business. For large businesses with many sites there will need to be an overall corporate Responsible Person but with specific sites also having a Responsible Person to ensure local compliance.

Many industrial processing sites will come under DSEAR as well as the RRFSO. A DSEAR risk assessment alone will not cover all the requirements of the RRFSO. There will be some overlap between DSEAR and the RRFSO but with someone who is competent in both these areas, conflicting risk assessments should be avoided.

A key aspect of the new fire legislation is the need to maintain good records, have suitable management procedures in place and to ensure adequate staff training and awareness for fire. The importance of good Management Systems should not be underestimated.

## **REFERENCES**

1. Fire Safety Risk Assessment: Factories and Warehouses. Department for Communities and Local Government, 2006.
2. 'Sprinklers: High piled and rack storage'. Fire Surveyor, Vol. 9 No. 1, 21–26. February 1990.