

Risk Assessment of Dangerous Substances

KEY INFORMATION

The UK **Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR)** require employers to control the risks to safety from fire, explosion and similar events, arising from dangerous substances that are present in the workplace.

GLOSSARY

DANGEROUS SUBSTANCES

Create a risk because of their physico-chemical or chemical properties and also by the way they are used and stored.

The UK **Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR)** put a duty on employers and the self-employed to protect people from risks to their safety from fires, explosions and similar events in the workplace. The people who must be protected include visitors to the workplace and members of the public who may be affected.

The UK **Regulatory Reform (Fire Safety) Order (RRFSO) 2005** makes special reference to “dangerous substances”. Part 1 in schedule 1 sets out matters to be considered when undertaking risk assessments with regard to dangerous substances, and Part 4 also specifies the measures to be taken with regard to dangerous substances.

The **DSEAR 2002** and the **RRFSO 2005** both complement the requirements to manage risks under the UK **Management of Health and Safety at Work Regulations 1999**.

WHAT ARE DANGEROUS SUBSTANCES?

Dangerous substances are any substances used, or are present in the workplace, that could cause harm to people as a result of fire or explosion. Such substances are classified as explosive, oxidising, extremely flammable, highly flammable, or flammable, and can be found in most workplaces. Examples of dangerous substances include:

- Solvents.
- Paints.
- Varnishes.
- Petrol.
- Liquefied Petroleum Gases (LPG).
- Dusts from machining or sanding.
- Dust produced when dealing with foodstuffs, e.g. flour, sugar, etc.

The **DSEAR** apply in all situations where there is work being carried out by an employer or self-employed person and there is a dangerous substance(s) present. The following examples illustrate the types of activities covered by **DSEAR 2002**:

- Storage of petrol as a fuel.
- Use of flammable gases for welding, particularly on containers that have held flammable materials.
- Handling and storage of waste dusts and fuel oils.
- Use of flammable solvents in laboratories.
- Storage and display of flammable goods, such as paints.
- Transporting flammable substances in containers around a workshop.

These activities could be happening in industrial and commercial premises, land-based and offshore installations, mines and quarries, construction sites, and even in domestic properties if people are at work there.

There are a few exceptions where only part of the regulations apply. These include:

- Certain activities involving ships.
- Medical treatment areas.
- Mines, quarries and boreholes.

WHAT ARE THE REQUIREMENTS OF DSEAR 2002?

DSEAR 2002 places duties on employers (and the self-employed) to assess, and eliminate or reduce risks from dangerous substances. Before work is carried out employers must assess the fire and explosion risks that may be present by investigating the hazardous properties of substances used, how the substances are used and the ways in which people may be harmed. This will enable the employer to understand what is needed to eliminate, or reduce the risks from, dangerous substances. If the risk assessment shows there are risks present, the employer must consider what steps must be taken to comply fully with the regulations.

The steps should include:

- Putting control measures in place to:
 - remove (eliminate) the risk; or
 - reduce the risk as far as reasonably practicable; or
 - reduce the effects of any incidents involving dangerous substances.
- Preparing plans and procedures to deal with accidents, incidents and emergencies.
- Making sure employees are properly informed and trained to control and deal with the risks.
- Identifying and classifying areas of the workplace where explosive atmospheres may occur and avoiding ignition sources in those areas. Such areas should be classified into zones based on the likelihood of an explosive atmosphere occurring. Any equipment used in these areas should ideally meet the requirements of the **UK Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 1996**.

Regulatory Reform (Fire Safety) Order 2005 Schedule 1

Part 1: Matters to Consider

Matters to be considered regarding the risk assessment of dangerous substances include:

- Their hazardous properties.
- Information available on safety (Safety Data Sheet).
- Circumstances of the work:
 - Special, technical and organisational measures and the substances used and their possible interactions.
 - Amount of the substance involved.
 - Risk presented by substances in combination.
 - Arrangements for the safe handling, storage and transport of the dangerous substances and of waste containing dangerous substances.
- Activities (such as maintenance) where there is the potential for a high level of risk.
- Effect of measures which have been taken.
- Likelihood that an explosive atmosphere will occur and its persistence.
- Likelihood that ignition sources will be present.
- Scale of the anticipated effects.
- Places connected to where explosive atmospheres may occur.
- Additional safety information the Responsible Person (under the **RRFSO**) may need, in order to complete the assessment.
- Legislative requirements.

Part 4: Measures to be Taken

Risk control for the use of dangerous substances should be considered in the following priority:

- Reduce the quantities of dangerous substances to a minimum.
- Avoid or minimise the release of a dangerous substance.
- Control the release of a dangerous substance at source.
- Prevent the formation of an explosive atmosphere, including the application of appropriate ventilation.
- Ensure that any release of a dangerous substance which may give rise to risk is suitably collected, safely contained, removed to a safe place, or otherwise made safe, as appropriate.
- Avoid:
 - Ignition sources.
 - Adverse conditions which could result in harmful physical effects from a dangerous substance.
- Segregate incompatible dangerous substances.

Mitigate the detrimental effects of a fire by:

- Reducing to a minimum the number of persons exposed.
- Providing measures to avoid the propagation of fires or explosions.
- Providing explosion pressure relief arrangements.
- Providing explosion suppression equipment.
- Providing plant which is constructed so as to withstand the pressure likely to be produced by an explosion.
- Providing suitable personal protective equipment.

Manage the risks arising from the use of dangerous substances by ensuring that:

- Premises are designed to reduce risk.
- Measures are in place to reduce risk, and are maintained.
- Equipment and protective systems are designed to reduce risk.
- Systems of work are in place to reduce risk, including permit-to-work procedures.

PREPARING EMERGENCY PLANS AND PROCEDURES

DSEAR 2002 builds on existing requirements for emergency procedures which should cover safety drills, suitable communication and warning systems. The information in the emergency plan must be made available to the emergency services to allow them to develop their own plans if necessary. If an emergency occurs, the persons involved must be provided with appropriate equipment to carry out their duties safely.

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PROVIDING INFORMATION, INSTRUCTION AND TRAINING FOR EMPLOYEES

Employees must also be provided with relevant information, instructions and training, including details of the:

- Dangerous substances present and the risks they present by providing the relevant safety data sheets and any details of legislation that apply.
- Findings of the risk assessment, the control measures that have been put in place, including their purpose and how they should be followed.
- Emergency procedures that are in place.



Special consideration must be given to hazards relating to the use of dangerous substances

REVISION QUESTION

8. A company uses solvents that are classified as dangerous substances and is carrying out a risk assessment.
- (a) What information could be used to assess the risks?
 - (b) What else should be considered by the employer?

(Suggested Answer is at the end.)