

Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) 2002

Introduction

This guidance document aims to clarify the requirements under the above regulations. DSEAR derives from the Health and Safety at Work Act (1974) and came into force in 2002, which in turn was derived from the Chemical Agents Directive (1998) and the Explosives Atmospheres Directive (1999).

This guidance has been written directly from the legislation and Approved Code of Practice from the Health and Safety Executive. The guidance has not covered every regulation or schedule in the regulations but it has included the most significant aspects associated with ensuring compliance.

These legislations are interchangeable with other Health and Safety legislation, for example, where assessments have been done under DSEAR; they do not need to be re-written again under the Management of Health and Safety at Work Regulations (1999) or the Control of Substances Hazardous to Health Regulations (2002).

Dangerous Substances

The first step to assessing whether these regulations apply includes determining what a *'dangerous substance'* is.

The first step is to check if the substance in question is classified by the Chemicals (Hazard Information and Packaging for Supply) Regulations (CHIP) as **explosive** (R1-6), **oxidising**, **extremely flammable** (R12), **highly flammable** (R11) or **flammable** (R10). Examples include petrol, LPG, paint, varnishes and some dusts. This information will be contained in Material Safety Data Sheets (MSDS) from the suppliers.

The second step is to determine whether the substances and the way they are used create a potential fire risk. Even though CHIP should be used (as stated above) to determine if a substance is 'dangerous', there are occasions when a substance is flammable when it is not classified under CHIP, therefore there are cases where DSEAR applies even when CHIP does not.

Consequently, it is important to see if the substance in question meets the technical criteria for classification. For example, DSEAR would apply to diesel if for whatever reason it was heated on site, even though CHIP would not apply.

In order to fulfil step 2, employers need to carry out a risk assessment using information about physical and chemical properties of the substances as well as the way they are used.

The third step is to check if the work activity involves the creation or handling of potentially combustible/explosive dusts.

CHIP will not determine this; it is up to employers to know the physical (boiling point, oxidising properties etc...) and chemical properties (reactivity etc...) of the substance. So that if an ignition occurred it would result in an explosion of the dust in the air (thus DSEAR applies). Examples, where a potential explosion could occur,

include, confined spaces where there was flour, sugar, coal or synthetic material dust for example.

The HSE provide further information on how to assess the risks of combustible and explosive dusts in their guide – Safe handling of combustible dusts (at a price of £10.95).

If it is found that the company is covered by any of the above steps then the next stage is to assess **what duties are placed on employees as a result**.

There are 17 specific regulations in the legislative as well as 7 schedules. The following guidance looks at where the regulations place explicit duties on employers.

1. Risk Assessment (refers to regulation 5 in the regulations)

The assessment can be completed as part of an overall H & S assessment, but must include specific issues relating to DSEAR (i.e. dangerous substances identified) as well as those relating to COSHH. The risk assessment should include consideration of the following: -

- The hazardous properties of the substance;
- Information on safety provided by the supplier (MSDS);
- The circumstances of work (i.e. work processes, substances and amount used and their interactions, the risks of dangerous substances used in combination and handling arrangements);
- Maintenance activities; and
- The likelihood that an explosive atmosphere will occur and the potential scale.

The assessment should be regularly reviewed.

2. Eliminate or reduce the risks from dangerous substances (regulation 6)

This means that employers should try and find alternatives to any dangerous substance currently used. The regulation states that employers should go 'as far as reasonably practical', which means taking into account cost, effort and time.

Where substances can not be substituted, employers should use both control and mitigation measures to ensure safety.

Specific control measures include, reducing the quantity of dangerous substances used, avoiding releases by not leaving containers open and exposed, by reducing the size of the containers used at any one time, by collecting releases through an extraction system, avoid ignition sources (direct sunlight and other heating sources) and separate incompatible sources (such as acids and alkalis).

Specific mitigating (reduce the harmful effects) measures include, reducing the number of employees who may be at risk, implement fire prevention precautions as well as fire/explosion fighting equipment, explosion suppression equipment and suitable Personal Protection Equipment (PPE).

3. Places where explosive atmospheres may occur (regulation 7)

Regulation 7 applies to places where explosive atmospheres may occur.

Those employers covered by DSEAR must ensure that they classify the buildings (parts of buildings) that explosive atmospheres may occur in. These 'zones' (and the extent of the risk) should then be detailed in the site risk assessment (regulation 5).

This must include any mobile devices/equipment that may be brought into the area that has the potential to cause a spark or static charge.

It would be beneficial to complete drawings of the building identifying the 'dangerous' areas in the building as well as giving a description of the dangerous substances used and in what circumstances (not forgetting normal and abnormal working conditions, i.e. maintenance, repairs).

Equipment for use in hazardous areas (as stated in Schedule 2 of the regulations)

This relates to the precautions that have to be taken in order to control ignitions. These controls must be chosen on the basis of what is set out in the Equipment and Protective Systems for Use in Potentially Explosive Atmospheres Regulations (1996) (these regulations mainly apply to those who put the protective systems on the market). Companies providing this equipment have are required to put an 'Ex' symbol on the product (in a hexagon shape), which ensures that it is appropriate for use in explosive atmospheres. There may also be a temperature rating (written as a 'T' which employers should be aware of).

Marking of areas containing dangerous substances

Employers must marked zones or areas of the building were explosive atmospheres may occur. These signs must be visible at the entry points (there are no size requirements) of the 'dangerous areas', of if entry points are not obvious, the areas should be made visible by using painted lines on the ground for example.

The markings must be in place by 30th June 2003 in areas used for the first time. For areas used before this date, employers have until the 30th June 2006.

Additional signs may be needed to warn of the precautions needed in the 'dangerous areas', i.e. no smoking, anti-static footwear only or if dangerous equipment is used periodically in the area. All of the above needs to be documented in the risk assessment (which should have been written in order to comply with regulation 5) which all staff should be aware of and understand the risks.

Verification of places containing explosive atmospheres

Employers must go through what's known as a verification process, which means they will have to ensure the area is safe to work in. This will mean checking equipment complies with the regulations, signs are up and all staff are aware before work can start.

The verification process must include: -

- The dangerous substance used, its properties and substance;
- The equipment used;
- The work processes;
- The control measures, i.e. prevent, control and mitigate against the effects of an explosion and;

- The emergency procedures.

The process can be completed using a number of methods, which may include, conducting checks on equipment provider's paperwork or visual checks to ensure ventilation systems are working.

All paperwork produced as part of the verification process should be documented in the company's safety reports which in turn could become part of the company's risk assessment.

Antistatic clothing

The wearing of antistatic clothing is another preventative measure as certain types of clothing can generate electrostatic discharges during use which can ignite in an explosive atmosphere.

It is important to be note that the wearing of this clothing and foot wear will only protect against small explosion risks and would not be suitable in an area consisting of a mixture of air and 'dangerous' substance (gas vapour or mist) which were present in normal working practices or continuously.

Employers should also ensure that the floor is not highly insulating as well as restricting employees bring in items likely to create static (not just clothes).

4. Arrangements to deal with accidents, incidents and emergencies (regulation 8)

Employers must put in place emergency procedures to mitigate against the affect of an accident/incident.

This includes ensuring a safe evacuation plan, taking into account the type of emergency that could occur (i.e. what toxic chemicals are used on site will dictate the accident to a certain extent).

The depth of the evacuation and management plans will also be dictated by the quantity of dangerous substance used; how it is used; the potential scale of release, and interactions between substances.

Likewise, employers will have to consider what first aid measures are appropriate including appropriately trained first aiders (employers are already required to provide first aid facilities under the Health and Safety (First Aid) Regulations 1981.

Employers must also think about installing alarm systems to warn employees and/or conducting safety drills to prepare employees of the likelihood of an emergency.

5. Information, instruction and training (regulation 9)

Employers have a responsibility to inform their employees of dangerous substances or potential dangerous substances in their workplace. The following information should be included in theory and in practice as to provide employees with the right level of information.

This information should include: -

- The types of dangerous substances and where they are used.

- They type of risk likely and anything which would exacerbate that risk – found on Material Safety Data Sheets (i.e. smoking).
- What control measures are needed.
- Procedures for dealing with accidents/emergencies.

In terms of advising those who come on to your site who are not employees of the company, employers should consider what signage is needed to get the message across. Employers are also advised to get anyone new coming onto the site to sign a visitors book and read (and sign) the site rules as well as familiarising themselves with the site's emergency plans.

The amount of information provision need only be appropriate for the level of risk, for example, it would not be appropriate for customers in a shop (adjacent to the factory shop floor where the dangerous substances are stored) for a short period of time to sign the site rules and read the site's emergency plans.

Schedule 2 Classification of places where explosive atmospheres may occur

Some places and certain situations will obviously present more of a risk than others. Consequently, employers will have to take different precautions in different areas.

The regulations have categorised the following areas/situations and giving them different priorities.

The zones below are set out in the regulations and decided upon by the level of frequency and duration of an explosive atmosphere: -

Zone 0

A place where an explosive atmosphere (gas vapour or mist) is continuously present or for long periods of time.

Zone 1

A place where an explosive atmosphere (gas vapour or mist) is likely to occur in normal working conditions.

Zone 2

A place where an explosive atmosphere (gas vapour or mist) will persist for a short period of time only.

Zone 20

A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is present continuously or for long periods of time.

Zone 21

A place in which an explosive atmosphere in the form of a cloud of combustible dust in air likely to occur in normal operation occasionally.

Zone 22

A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is not likely to occur in normal operation and will only persist for a short period of time.

Schedule 4 Warning sign for places where explosive atmospheres may occur.

Please see the regulations for the specification of the sign needed – i.e. triangular shaped with black letters on a yellow background.