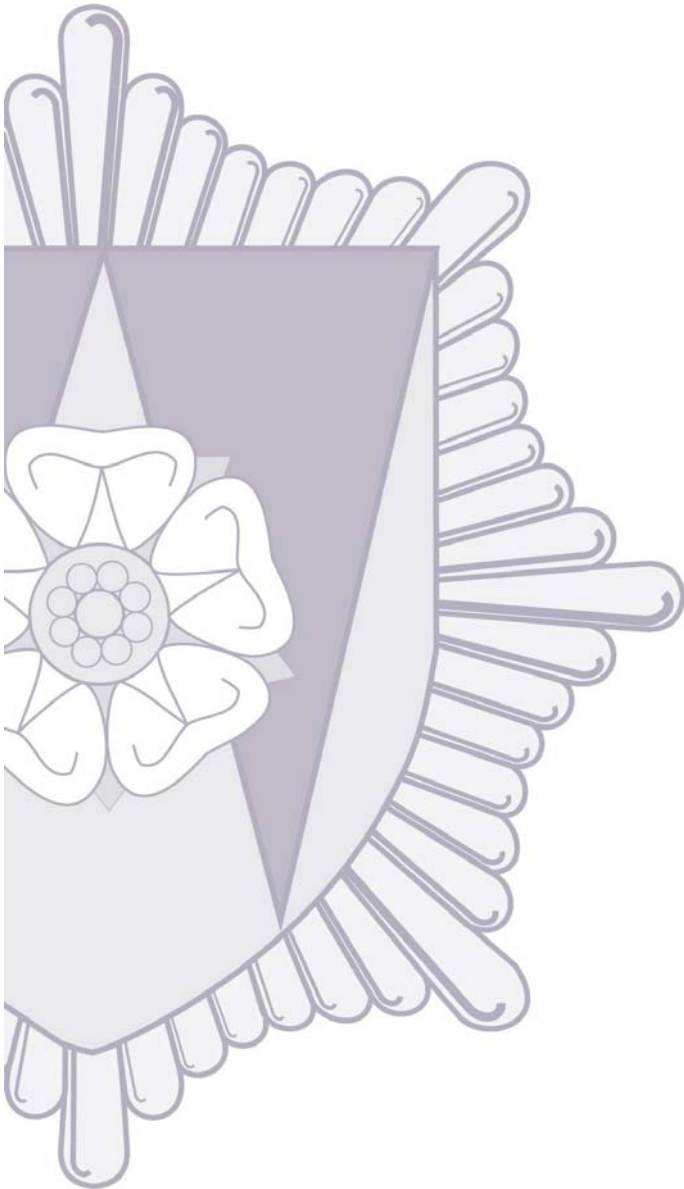


West Yorkshire Fire & Rescue Service

Fire Safety - Information Note FS-INF039

Dangerous Substances & Explosive Atmospheres Regulations 2002 (DSEAR) A Précis of the Employer's Duties



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PREVENTING PROTECTING RESPONDING

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Forward:

This guidance note is intended to give Fire Safety Inspectors an overview of the duty holders' responsibilities under the Dangerous Substances & Explosive Atmospheres Regulations 2002 (DSEAR).

1. Introduction:

1.1 DSEAR is a set of regulations concerned with protection against risks from fire, explosion and similar events arising from the use or presence of dangerous substances in the workplace. The Regulations place a statutory duty on employers and the self-employed; also referred to as 'duty holders'.

Note: For the definitions of 'work' and 'at work', see Section 52 of the Health & Safety at Work etc Act 1974.

2. Definition of 'Dangerous Substance':

2.1 The Regulations give a detailed definition of the term 'dangerous substance', which duty holders will need to refer to for more information. The term does, however, include: -

- Any substance or preparation, which because of its properties or the way it is used could cause harm to people from fires and explosions.
- Petroleum-spirit, liquefied petroleum gas (LPG) and liquefied natural gas (LNG);
- Paints, varnishes and solvents;
- Fireworks and other explosive substances and articles; and
- Dusts, which when mixed with air, could cause an explosive atmosphere. For example, dusts from milling and sanding operations.

2.2 Dangerous substances can be found, in varying quantities, in most workplaces.

3. Explosive Atmospheres:

3.1 An explosive atmosphere is an accumulation of gas, mist, dust or vapour, mixed with air, which has the potential to catch fire or explode. An explosive atmosphere does not always result in an explosion, but if ignition occurred, the flames would quickly travel through it (a deflagration) and if this happened in a confined space (e.g. in plant or equipment) the rapid spread of the flames or rise in pressure could also cause an explosion.

4. Risk Assessment:

4.1 DSEAR applies at most workplaces where a dangerous substance is present or could be present. In order for duty holders to meet their responsibilities they must: -

- Carry out a risk assessment of any work activities involving dangerous substances;
- Provide measures to eliminate or reduce risks as far as is reasonably practicable;
- Provide equipment and procedures to deal with accidents and emergencies;
- Provide information and training to their employees; and
- Classify places where explosive atmospheres may occur into zones and mark the zones where necessary. (This duty has been phased in, see paragraph 8.2.)

4.2 When DSEAR came into force it clarified the existing requirements to manage fire and explosion risks which are set out in the Management of Health and Safety at Work Regulations 1999 (Management Regulations), and expanded those requirements in a few areas (described below).

4.3 The risk assessment is an identification and careful examination of the dangerous substances present or liable to be present in the workplace; the work activities involving them; and how they might fail and cause a fire, an explosion and similar events that could harm employees and the public. Its purpose is to enable the duty holder to decide what needs to be done to eliminate or reduce the safety risks arising from the use or presence of dangerous substances as far as is reasonably practicable. He should take account of such matters as: -

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- The hazardous properties of the substances;
- The way they are used or stored;
- The possibility of hazardous explosive atmospheres occurring; and
- All potential ignition sources.

- 4.4 The duty holder must carry out a risk assessment regardless of the quantity of dangerous substance present, as it will enable him 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, the duty holder will also need to assess non-routine activities, such as maintenance work, where there is often a higher potential for fire and explosion incidents to occur.
- 4.5 The risk assessment should have been carried out straight away (following the coming into force of DSEAR), unless the duty holder had already carried out a detailed assessment under the Management Regulations, of the risks from fire, explosion and other events arising from dangerous substances, including addressing requirements specified by DSEAR.
- 4.6 The duty holder must review the assessment regularly and further assessments should be carried out before starting any new work or before making modifications to existing plant or processes including using a different substance or formulation. The measures identified as necessary by the risk assessment have to be put into place before the work starts.
- 4.7 At workplaces where there are five or more employees the duty holder must record the significant findings of the assessment as soon as is practicable after the assessment is made, including: -
- Measures taken to eliminate or reduce risk;
 - Sufficient information to show that the workplace and work equipment will be safe from risk of fire and explosion during operation and maintenance; and
 - From 1 July 2003: provide details of any areas zoned as hazardous due to the likely presence of explosive atmospheres and where employers share a workplace, any special measures to ensure co-ordination of safety requirements to protect workers from explosive atmospheres.
- 4.8 The duty holder is required to ensure that the safety risks from dangerous substances are eliminated or, where this is not reasonably practicable, to take measures to control risks and to reduce (mitigate) the harmful effects of any fire, explosion or similar event, so far as is reasonably practicable.

5. Substitution:

- 5.1 This is by far the best solution and involves replacing a dangerous substance with a substance or process that totally eliminates the risk. In practice this is difficult to achieve and it is more likely that it will be more practicable to replace the dangerous substance with one that is less hazardous (e.g. by replacing a low-flashpoint solvent with a high-flashpoint one). An alternative is to design the process so that it is less dangerous. This might include, for example, changing from a batch production to a continuous production process; or changing the manner or sequence in which the dangerous substance is added. The duty holder must take care when carrying out these steps to ensure that no other new safety or health risks are created or increased, which then outweigh the improvements implemented as a result of DSEAR.
- 5.2 In reality, where the dangerous substance is handled or stored for use as a fuel, there is often no scope for elimination and very little chance to reduce the quantities handled. Where the risk cannot be entirely eliminated the duty holder must apply control and mitigation measures to reduce the risk as outlined in the following sections, 6 to 9 of this Note.

6. Control Measures:

6.1 Control measures have to be applied in the following order of priority, where this is appropriate to the nature of the activity or operation and supports the findings of the risk assessment: -

- Reduce the quantity of dangerous substances to a minimum;
- Avoid or minimise releases;
- Control releases at source;
- Prevent the formation of an explosive atmosphere;
- Collect, contain and remove any releases to a safe place (e.g. by ventilation);
- Avoid ignition sources;
- Avoid adverse conditions (e.g. exceeding the limits of temperature or other control settings) that could lead to danger;
- Keep incompatible substances apart.

7. Mitigation Measures:

7.1 Mitigation measures should be applied which are consistent with the risk assessment and appropriate to the nature of the activity or operation. These can include: -

- Preventing fires and explosions from spreading to other plant and equipment or to other parts of the workplace;
- Reducing the numbers of employees exposed to a minimum;
- In the case of process plant, providing plant and equipment that can safely contain or suppress an explosion, or vent it to a safe place.

7.2 Measures taken to achieve the elimination or the reduction of risk should take into account the design, construction and maintenance of the workplace and work processes, including all relevant plant, equipment, control and protection systems.

8. Hazardous Area Classification:

8.1 In workplaces where explosive atmospheres may occur, the duty holder must ensure that: -

- Areas where hazardous explosive atmospheres may occur are classified into zones based on their likelihood and persistence;
- Areas classified into zones are protected from sources of ignition by selecting equipment and protective systems meeting the requirements of the Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 1996 although, equipment already in use before July 2003 can continue to be used indefinitely provided the risk assessment shows it is safe to do so. Electrical equipment that is designed and constructed for use in a flammable atmosphere will be marked with a hexagonal Ex symbol.



- Where necessary, areas classified into zones are marked with a specified "EX" warning sign at their points of entry.



- Where employees work in zoned areas they are provided with appropriate clothing that does not create a risk of an electrostatic discharge igniting the explosive atmosphere;

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- Before coming into operation for the first time, areas where hazardous explosive atmospheres may be present are confirmed as being safe (verified) by a person (or organisation) competent in the field of explosion protection. The person carrying out the verification must be competent to consider the particular risks at the workplace and the adequacy of control and other measures put in place.

8.2 These additional requirements were phased-in depending on when the workplace is first used and all workplaces must meet the requirements by July 2006.

8.3 The fact that a dangerous substance is present at the workplace does not necessarily mean that areas where it is used, transferred or stored need to be classified as hazardous. Where the risk of a release is extremely unlikely or the quantity that could be released is small, it may not be necessary to classify the area as hazardous. For example, if a dangerous substance is being transferred through a seamless pipe that has been properly installed and maintained, it is not expected that the substance will be released; therefore an explosive atmosphere would not be expected to occur and the area surrounding the pipe would be safe. A further example would be the spillage from a small bottle of solvent where the release of the highly flammable contents would attract no special precautions other than the general precautions of a no-smoking regime and procedures for the prompt clean-up and safe disposal of the substance.

8.4 **Table of Hazardous Zones.**

<i>Zone 0</i>	In which an explosive air-gas mixture is continuously present, or present for long periods.
<i>Zone 1</i>	In which an explosive air-gas mixture is likely to occur in normal operation.
<i>Zone 2</i>	In which an explosive air-gas mixture is not likely to occur in normal operation and, if it occurs, it will exist only for a short time.
Areas outside these zones are defined as non-hazardous.	

9. Emergency Procedures:

9.1 The requirements of DSEAR build on existing requirements under the Management Regulations. Duty holders will need to supplement those existing arrangements if they assess that an accident, incident or emergency could arise, for example a fire, or a significant spillage, because of the quantity of dangerous substances at their workplaces.

9.2 In these circumstances the duty older is required to arrange: -

- Suitable warning (including visual and audible alarms) and communication systems;
- Escape facilities, if required by the risk assessment;
- Emergency procedures to be followed in the event of an emergency;
- Equipment and clothing for essential personnel dealing with the incident; and
- Practice drills.

The scale and nature of the emergency arrangements should be proportionate to the level of risk.

9.3 The duty holder should make information on emergency procedures available to employees and contact the emergency services to advise them that the information is available; and provide the emergency services with any information that is considered necessary.

10. Informing Employees:

10.1 Duty holders are required to provide their employees (and their employees' representatives), and other people at the workplace who may be at risk, with suitable information, instruction and training on precautions and actions they need to take to safeguard themselves and others, including: -

- The name of the substances in use and risks they present;
- Access to any relevant safety data sheet;
- Details of legislation that applies to the hazardous properties of those substances; and
- The significant findings of the risk assessment.

10.3 The duty holder needs only to provide information, instruction and training to non-employees where it is required to ensure their safety whilst on the site or premises. Where it is provided, it should be in proportion to the level and type of risk.

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11. Enforcing Authorities:

11.1 DSEAR is enforced by: -

- The HSE or local authorities depending on the allocation of premises under the Health and Safety (Enforcing Authority) Regulations 1998. In the main, the HSE will enforce at industrial premises and local authorities (environmental health officers) elsewhere e.g. in retail premises;
- The fire & rescue authorities at most premises (workplaces) subject to DSEAR but only in relation to general fire precautions such as means of escape; and
- Petroleum licensing authorities (PLAs) at premises falling within the definition of 'petrol filling station'. This remit of the PLAs is restricted to the activities associated with the storage and dispensing of petroleum-spirit and other dangerous substances dispensed into the fuel tanks of combustion engines.

12. Repealed Legislation:

DSEAR has repealed a large amount of old legislation relating to flammable substances and dusts. Safety standards are now maintained through the combination of the requirements of DSEAR and Approved Codes of Practice (ACoPs) that reflect good and established work practices and procedures from the old legislation.

13. Further Reading:

Dangerous Substances and Explosive Atmospheres Regulations 2002 S1 2002/2776 HMSO

Seven steps to successful substitution of hazardous substances HSG110. ISBN 0 7176 0695 3¹

Five steps to risk assessment. Leaflet INDG163 (rev1). ISBN 0 7176 1565 0¹

The idiot's guide to CHIP 3: Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 Leaflet INDG350. ISBN 0 7176 2333 5¹

Energetic and spontaneously combustible substances: Identification and safe handling HSG131. ISBN 0 7176 0893 X¹.

Safe handling of combustible dusts: Precautions against explosions HSG103. ISBN 0 7176 0725 9¹.

Safe use and handling of flammable liquids HSG140. ISBN 0 7176 0967 7¹.

The storage of flammable liquids in containers HSG51 (Second edition). ISBN 0 7176 1471 9¹.

Use of LPG in small bulk tanks Chemical Information Sheet CHIS4¹.

Small-scale use of LPG in cylinders Chemical Information Sheet CHIS5¹.

Fire safety: An employer's guide (Home office, Scottish Executive, Department of the Environment (Northern Ireland) HMSO 1999 ISBN 0 11 341229 0.

Unloading petrol from road tankers. Dangerous Substances and Explosive Atmospheres Regulations 2002. Approved Code of Practice and guidance L133. ISBN 0 7176 2197 9¹.

Design of plant, equipment and workplaces. Dangerous Substances and Explosive Atmospheres Regulations 2002. Approved Code of Practice and guidance L134. ISBN 0 7176 2199 5¹.

Storage of dangerous substances. Dangerous Substances and Explosive Atmospheres Regulations 2002. Approved Code of Practice and guidance L135. ISBN 0 7176 2200 2¹.

Control and mitigation measures. Dangerous Substances and Explosive Atmospheres Regulations 2002. Approved Code of Practice and guidance L136. ISBN 0 7176 2201 0¹.

Safe maintenance, repair and cleaning procedures. Dangerous Substances and Explosive Atmospheres Regulations 2002. Approved Code of Practice and guidance L137. 2003 ISBN 0 7176 2202 9¹.

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Dangerous Substances and Explosive Atmospheres. Dangerous Substances and Explosive Atmospheres Regulations 2002. Approved Code of Practice and guidance L138. ISBN 0 7176 2203 7¹.

Department of Trade and Industry guidance on 'Equipment and protective systems intended for use in potentially explosive atmospheres'. Details can be obtained from DTI website:

<http://www.dti.gov.uk/strd/atex.html>