

Dangerous Substances Arrangement

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1.0 Statement of purpose/objectives

This arrangement will assist in meeting Shropshire Council's core value to achieve more by working and learning together also meet the legislative requirements of the Dangerous Substances and Explosives Atmospheres Regulations (DSEAR). The main requirements are to create a safe working environment by ensuring effective control measures are provided for employees who work with dangerous substances.

2.0 Scope

The scope of this arrangement is to promote an active safety culture, where it is necessary to work with dangerous substances, managers are not expected to eliminate all risk, but to reduce risks and to implement measures to control the remaining risks and mitigate the consequences of any fire or explosion or other harmful physical event that could foreseeably arise so far as reasonably practicable; this applies to all Shropshire Council employees, agency workers and volunteers at work, including contractors and subcontractors working for Shropshire Council.

3.0 Definition

The term 'Dangerous Substances' are any substances used or present at work that could, if not properly controlled, cause harm to people as a result of a fire or explosion.

4.0 Duty of care

Shropshire Council has a general duty of care to protect the health, safety and welfare of its employees and others who may be affected by its work, so far as is reasonably practicable by ensuring safe working arrangements for the storage and use of dangerous substances.

5.0 Assessment of risk at the workplace

Managers and employees must work together to identify potential hazards and the subsequent risk. A suitable and sufficient risk assessment must be carried out prior to the storage or use and disposal of dangerous substances.

6.0 Information, instruction, supervision and training

Managers must ensure appropriate information, instruction, supervision and training is provided to employees prior to carrying out work activities involving the use of dangerous substances.

7.0 Implementation

Management guidance in the form of Frequently Asked Questions will be provided and updated to support the implementation of the arrangement.

8.0 Compliance

This arrangement will enable Shropshire Council to conform to statutory requirements and best current practice.

9.0 Review of arrangement

This arrangement will be reviewed periodically and whenever there are changes to legislation by the Health & Safety Team.

Approving Body

Consultation & Approval Health, Safety & Welfare Group – July 2012
Reviewed by Health and Safety Team - May 2018
Reviewed by Health and Safety Team – February 2021

Frequently Asked Questions

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1. What are dangerous substances?

Dangerous substances can be found in nearly all workplaces and include such things as solvents, paints, varnishes, petrol, diesel, flammable gases, such as liquid petroleum gas (LPG), dusts from machining and sanding operations and dusts from foodstuffs, which if not properly controlled, cause harm to people as a result of a fire or explosion.

2. What are the duties for the employer?

Shropshire Council managers and supervisors have a duty to provide a safe workplace and safe equipment for our employees.

3. What is DSEAR?

DSEAR stands for the Dangerous Substances and Explosive Atmospheres Regulations 2002. The primary purpose of DSEAR is to protect the safety of workers and others who may be at risk from dangerous substances that can cause a fire, explosion or similar energy-releasing event, such as a runaway exothermic reaction. Dangerous substances can put peoples' safety at risk from fire and explosion. DSEAR puts duties on employers and the self-employed to protect people from risks to their safety from fires, explosions and similar events in the workplace, this includes members of the public who may be put at risk by work activities.

DSEAR sets minimum requirements for the protection of workers from fire and explosion risks related to dangerous substances and potentially explosive atmospheres. The Regulations apply to employers and the self-employed at most workplaces in Great Britain where a dangerous substance is present or could be present. DSEAR revoked or modified a large amount of old legislation relating to

flammable substances and dusts including the Highly Flammable Liquids and Liquefied Petroleum Gases Regulations 1972 and section 31 of the Factories Act 1961. Safety standards were maintained through a combination of the requirements of DSEAR and the Approved Code of Practice (ACoP) which reflects practices in the preceding legislation, managers are recommended to refer to the ACoP's or to seek advice from the Health and Safety Team when in doubt.

4. **What must managers do?**

Managers must:

- find out what flammable or dangerous substances are in their workplace and what the fire and explosion risks are;
- put control measures in place to either remove those risks or, where this is not possible, control them;
- put controls in place to reduce the effects of any incidents involving flammable and dangerous substances;
- prepare plans and procedures to deal with accidents, incidents and emergencies involving flammable or dangerous substances;
- make sure employees are properly informed about and trained to control or deal with the risks from the flammable and dangerous substances;
- identify and classify areas of the workplace where explosive atmospheres may occur and avoid ignition sources (from unprotected equipment, for example) in those areas.
- **Ensure the premise fire risk assessment reflects the above findings.**

5. **What is a suitable and sufficient risk assessment?**

A suitable and sufficient risk assessment should consider the overall risk presented by dangerous substances as well as assessing each factor individually.

Managers must identify any dangerous substances that may be present at the workplace and the hazards they present (e.g. their flammable or explosive properties). This includes substances which are:

- a) brought into the workplace and handled, stored and used for processing;
- b) produced or given off (e.g. as fumes, vapour, dust etc) by a process or activity, or as a result of an incident or accident;
- c) used for or arise from maintenance, cleaning and repair work; or
- d) produced as a by-product of any work or process (e.g. waste, residues, scrap materials etc);
- e) naturally occurring in the workplace (e.g. methane may be present in tunnelling and mining operations).

When considering information on the hazardous properties of dangerous substances, managers should identify any adverse conditions that should be avoided. These could include excessive heat, sunlight, exposure to air or moisture and contact with other incompatible substances.

Some substances are obviously hazardous to safety, other substances might be hazardous only under certain conditions. Flour dust can form an explosive atmosphere, and liquids such as diesel fuel can be raised above their flashpoint temperature by work activities and present a fire or explosion risk. When carrying out hazardous area classification, relevant properties of a dangerous substance include the boiling point and flashpoint of any flammable liquid, and whether any flammable gas or vapour that may be evolved is lighter or heavier than air.

For dusts which are liable to form an explosive atmosphere, information will be needed on particle size and potential concentration in air.

A mass of solid combustible material as a heap or pile will burn relatively slowly owing to the limited surface area exposed to the oxygen of the air. A dust explosion involves the rapid combustion of dust particles that releases energy and usually occurs when dusts are dispersed in air, generating gaseous reaction products. A basic knowledge of the material's properties together with the avoidance of deposition – and in particular deposition on elevated surfaces – of dusts/powders which are capable of rapid explosive burning in air should minimise the risks of a dust explosion.

6. What are the Classifications of Flammable Liquids?

Flammable liquids are classed as:

- Extremely flammable; Liquids which have a flashpoint lower than 0°C and a boiling point lower than, or equal to 35°C.
- Highly flammable; Liquids which have a flashpoint below 21°C but which are not extremely flammable.
- Flammable; Liquids which have a flashpoint equal to or greater than 21°C and less than or equal to 55°C and which support combustion at 55°C.

Note: The flashpoint is the minimum temperature at which a liquid gives off sufficient flammable vapour to ignite momentarily on the application of an ignition source.

7. What are the training requirements?

Adequate training and knowledge of the properties of dangerous substances including their safe use and handling is required. This can be achieved by ensuring adequate risk assessments have been completed which must specify training needs and the knowledge requirements of employees working with dangerous substances.

8. How do you eliminate or reduce risk to people's safety from the presence of dangerous substances?

Overall approach: managers are not expected to eliminate all risk, but to reduce risks and to implement measures to control the remaining risks and mitigate the consequences of any fire or explosion or other harmful physical event that could foreseeably arise so far as reasonably practicable;

Substitution: consider eliminating the risk if a suitable nonharmful (or, failing that, a less harmful) substitute for the dangerous substance is feasible or if a safer process exists. All aspects of the properties of the proposed substitute must be considered when substituting a dangerous substance, and the risks balanced against all the overall risks, not just its flammability or explosion properties. A substance that is less flammable may not be a suitable alternative if it were of higher toxicity or more harmful to the environment than the original substance.

Control and mitigation measures: Having considered whether risk can be eliminated, e.g. by substitution, you should next consider risk control measures:

- a) the reduction of the quantity of dangerous substances to a minimum;
- b) the avoidance or minimising of the release of a dangerous substance;
- c) the control of the release of a dangerous substance at source;
- d) the prevention of the formation of an explosive atmosphere, including the application of appropriate ventilation;
- e) ensuring 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 rendered safe, as appropriate;
- f) the avoidance of –
 - (i) ignition sources including electrostatic discharges; and
 - (ii) adverse conditions which could cause dangerous substances to give rise to harmful physical effects; and

g) the segregation of incompatible dangerous substances.

Before finally considering **mitigation** measures:

- a) the reduction to a minimum of the number of employees exposed;
- b) the avoidance of the propagation of fires or explosions;
- c) the provision of explosion pressure relief arrangements;
- d) the provision of explosion suppression equipment;
- e) the provision of plant which is constructed to withstand the pressure likely to be produced by an explosion; and
- f) the provision of suitable personal protective equipment.

9. How should dangerous substances be held in the workshop?

Only the minimum amount of dangerous substances needed for the work activity should be kept in process areas, workrooms, workshops, laboratories and similar working areas. Many work activities will require the convenient availability of flammable liquids and/or flammable liquid-based products. To facilitate this, a limited quantity in suitable closed vessels may be stored in suitable cabinets or bins of fire-resisting construction and which are designed to retain spills (capacity should be 110% volume of the largest vessel normally stored in it).

These should be located in designated well-ventilated areas that are:

- a) away from the immediate processing area where possible; and
- b) do not jeopardise the means of escape from process and other areas.

Dangerous substances that are not in use should be returned to the designated storage area.

10. What is the maximum quantity of a dangerous substance that can be held in storage bins in the workshop?

The recommended maximum quantities that may be stored in cabinets and bins are as follows:

- a) no more than 50 litres for extremely, highly flammable and those flammable liquids with a flashpoint below the maximum ambient temperature of the workroom/working area;
- b) no more than 250 litres for other flammable liquids with a higher flashpoint of up to 60 °C.

11. How should compressed and liquefied flammable gas cylinders, oxygen and oxidising gas cylinders be stored and used in process areas, workrooms, laboratories etc?

In general, gas cylinders and cartridges should be kept below 50 °C as there is an increased risk of over-pressurisation and gas discharge or rupture in the event of them being subject to elevated temperatures. For example, this is a risk in the event of a fire in a building containing gas cylinders, even if the cylinders are remote from the source of the fire, you should therefore minimise the number of gas cylinders kept indoors.

Ordinarily gas cylinders containing dangerous substances should not be kept in process areas etc.

An exception is for gas cylinders connected to portable appliances, but the number should be limited to the minimum necessary for operational requirements.

Where the appliance is fixed, the gas cylinders should normally be sited in a safe location outdoors and the gas piped indoors to the appliance.

Gas cylinders that are not in use (i.e. not connected to an appliance) should be stored in safe, secure uncongested locations in the open air that provide ready dispersal of any released gas and prevent accumulations or entry of gas into any enclosed area.

Nominally empty cylinders should also be stored in safe location outdoors to separate them from gas cylinders in use (i.e. connected to an appliance).

Exceptionally, gas cylinders may be stored indoors where there is a specific safety,

security or process quality consideration. Where the number of gas cylinders required indoors is so few that a dedicated storeroom is not justified, a dedicated cabinet/cupboard of adequate fire-resisting construction should be used. The same storeroom/cabinet/cupboard should not be used for both stored gas cylinders and those nominally in use (connected to an appliance). Nor should it be used to store other incompatible substances or materials that pose a risk to the cylinders.

12. What housekeeping arrangements are required?

Housekeeping is fundamental to safety - a good standard must be maintained at all times. Deal with leaks and spills immediately, by using for example, inert absorbent material which can be scooped up using non-sparking tools and transferred into a suitable container for removal. Avoidance of deposition, in particular deposition on elevated surfaces of dusts/powders which are capable of rapid explosive burning in air should minimise the risks of a dust explosion.

13. What is the legislation relating to dangerous substances?

The legislation covering dangerous substances are:

- Health and Safety at Work Act 1974.
- The Dangerous Substances and Explosive Atmospheres Regulations.
- The Management of Health and Safety at Work Regulations.
- Control of Substances Hazardous to Health Regulations.
- The Provision and Use of Work Equipment Regulations 1998 (PUWER)
- The Regulatory Reform (Fire Safety) Order.
- Registration, Evaluation, Authorisation & restriction of Chemicals (REACH) – N.B. The EU REACH Regulation was brought into UK law on 1 January 2021. This is now known as UK REACH.
- Classification, Labelling & Packaging Regulations (CLP).
- Personal Protective Equipment Regulations 1992.
- The Petroleum (Consolidation) Act 1928 and associated regulations.
- The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 1996.

14. What about environmental issues?

DSEAR deals only with risks to people from dangerous substances but such substances could also harm the environment during disposal or in the event of a spill. In undertaking any risk assessment, or developing emergency arrangements, the potential for environmental harm should also be considered. Safety and environmental risks will need to be balanced and judgements will need to be made when considering substitution or other risk control/mitigation measures. Further guidance on environmental considerations is available from:

- the Environment Agency in England www.environment-agency.gov.uk/business/sectors/wastemanagement.aspx

For further advice and information please contact the Health and Safety Team on

