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Summary	
This CoP summarises the requirements under the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) to ensure people are protected from fire and explosion risks related to dangerous substances and potentially explosive atmospheres.	
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2 SCOPE

relevant safety data sheets along with the findings of the risk assessment and the control measures put in place as well as appropriate emergency procedures.

5 LEGISLATION AND GUIDANCE

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The Control of Substances Hazardous to Health Regulations 2002 (COSHH)

The Classification, Labelling and Packaging (CLP) Regulations

The Workplace (Health, Safety and Welfare) Regulations 1992

The Regulatory Reform (Fire Safety) Order 2005

Petroleum (Consolidation) Regulations 2014 (PCR) HSE Guide – Portable Petrol Containers http://www.hse.gov.uk/fireandexplosion/portabable-petrol-storage-containers.pdf

The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009

The Waste (England and Wales) Regulations 2011

Controlled Waste (Registration of Carriers and Seizure of Vehicles) Regulations 1991.

DSEAR implements the requirements of Explosive Atmospheres Directive (ATEX 137). ATEX 137: Requires employers to protect workers from the risk of explosive atmospheres. An explosive atmosphere is defined as a mixture with air, under atmospheric conditions, of dangerous substances in the form of gases, vapours, mist or dust in which after ignition has occurred, combustion spreads to the entire unburned mixture.

6 DANGEROUS SUBSTANCE

DSEAR applies to any substance or preparation (mixture of substances) with the potential to create a risk to persons from energetic (energy- relea

6.1 Determining the presence of Dangerous Substances and Flammable Liquids

Those with health and safety responsibilities where dangerous substances may be in use should check whether the materials in use fall within the following definitions:

a) Have they been classified under the Classification, Labelling and Packaging (CLP) Regulations 2009 as: explosive, oxidising, extremely flammable, highly flammable or flammable?

Use of flammable gases, for example acetylene and LPG for cutting/welding
Handling and storage of waste dusts in a woodworking workshop
Handling and storage of flammable wastes including fuel oils.
Hot work on tanks or drums that have contained flammable material.

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 2016. It should be observed that equipment in use before 1 July 2003 can continue indefinitely provided the risk assessment confirms it is safe.

Where necessary, areas classified into zones are marked with a specified “EX” 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;

Before coming into operation for the first time, areas where explosive atmospheres may be present are confirmed as being safe (verified) by a person (or organisation) competent in the field of explosive protection. The person carrying out the verification must be competent to consider the particular risks within the area and the adequacy of control and other measures put in place. (Seek advice from the Health & Safety Services, Fire Safety Advisor)

Guidance:

Before undertaking work in a room or building designated as a ‘Hazardous Area’ University managers should seek the advice of Health and Safety Services for verification that the risk assessment and related control measures are suitable and sufficient. Depending on the circumstances Health and Safety Service may be required to engage the services of external contractors.

8.4 Classification of Hazardous Places

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Area classification analyses the sources of gas and vapour release, looking at those that arise in normal operation, (primary sources) and those which only occur as a result of some foreseeable equipment failure or operator error (secondary sources). Clearly, not all laboratory hazards will be covered by such an analysis, but it should be part of any overall risk assessment. The aim should always be to minimise releases into the general atmosphere of the laboratory.

On a laboratory scale, a primary source might be the vapour released when a volatile solvent is poured from one container to another, while someone knocking the container off the bench onto the floor creates a secondary source. Primary sources should normally be so small they can easily be controlled by adequate ventilation, and to the extent of any explosive atmosphere is negligible.

Hazardous places are classified in terms of zones on the basis of the frequency and duration of the occurrence of an explosive atmosphere.

Zone 0

A place in which an explosive atmosphere consisting of a mixture with air of dangerous substances in the form of gas, vapour or mist is present continuously or for long periods or frequently.

Zone 1

A place in which an explosive atmosphere consisting of a mixture with air of dangerous substances in the form of gas, vapour or mist is likely to occur in normal operation occasionally.

Zone 2

A place in which an explosive atmosphere consisting of a mixture with air of dangerous substances in the form of gas, vapour or mist is not likely to occur in normal operation but, if it does occur, will persist for a short period only.

Various sources have tried to place time limits on to these zones, but none have been officially adopted. The most common values used are:

> Zone 0: Explosive atmosphere for more than 1000h/year
>
> Zone 1: Explosive atmosphere for more than 10, but less than 1000 h/year
>
> Zone 2: Explosive atmosphere for less than 10h/year, but still sufficiently likely as to require controls over ignition sources.

Strictly, area classification takes no account of the consequences of a release, whether this is a fire or explosion, but selection of the necessary precautions must take the consequence factor into account and this approach is recognised in DSEAR.

For further reading go to HSE at:

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Warning signs must be displayed on or in all areas where explosive atmospheres may occur.

The distinctive features are:

- Triangular shape.
- Black letters “EX” on a yellow background with black edging (the yellow part to take up at least 50% of the area of the sign)

Warning signs displayed in areas where an explosive atmosphere may occur.

8.5 Criteria for the Selection of Equipment and Protective Systems

be clearly displayed on the entrance doors and in prominent positions on the outside of an installation or store.

Persons who operate equipment in areas using dangerous substances should be trained in the use of that equipment, the associated dangers with dangerous substances and flammable liquids. Individuals should be made aware of:

- The properties of dangerous substances and flammable liquids present in the workplace and the risks they present including access to any relevant safety data sheets and information on any other legislation that applies to the dangerous substance.
- The findings of the risk assessment and the control measures put in place as a result (including their purpose and how to follow and use them).
- Emergency procedures.
- Use of correct containers and processes.
- Not allowing hot work close to or within areas using dangerous substances.
- Correct design of equipment, installation and maintenance.
- Control of ignition sources and heating materials above their auto-ignition point.
- The safe disposal and dismantling of equipment containing flammable liquids.
- Correct storage and limited quantities kept in the area.
- Correct decanting, dispensing or movement of dangerous substances.
- The correct method of dealing with spillage.
- The contents of pipes, containers, etc. must be identifiable to alert employees and others to the presence of dangerous substances. If the contents have already been identified in order to meet the requirements of other law, this does not need to be done again under DSEAR.

Guidance

Information, instruction and training need only be provided to other people (non-employees) such as Post Graduate Researchers, Masters Students and visiting contractors where it is required to ensure their safety. It should be in proportion to the level and type of risk.

8.7 Emergency response

Those with health and safety responsibilities in collaboration with the University Fire Safety Advisor must make arrangements to protect employees (and others who are in the area) in the event of an accident/emergency incident. These measures would include the following:

- Suitable warning (including visual and audible alarms) and communication systems.
- Means of escape facilities-as 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.
- Practice drills
- Making information on the emergency procedures available to employees.
- Contacting the emergency services to advise them that information on emergency procedures is available (and providing them with any information they consider necessary)

Spark-proofed equipment, specifically designed and built for this purpose should be used. These units must be clearly indicated “Spark-Proofed” on the outside of the door.

In areas/workplace where flammable sources are in use, non-proofed refrigerant appliances, should be clearly indicated “Explosion Hazard-Not Suitable for Use with Highly Flammable Substances”.

9.4 External storage

The construction of external stores must comply with a very specific standard, detailed below. This standard applies particularly when stores are sited adjacent or close to other buildings. In remote locations there are additional considerations, specifically the provision of lighter roof construction. This would encourage any fire or explosion hazard to vent vertically rather than horizontally, providing a form of explosion relief. This principle relies upon the definition of what is considered “remote”. The advice of the University Fire Safety Advisor should be sought when considering the installation of these units.

External storerooms should be constructed with a concrete impervious “bund” floor (152mm), brick walls (114mm), and concrete cast roof (102mm). Cross flow ventilation is required using high and low level vents fitted with internal flame gauzes. A minimum 1-hour fire resisting, self-closing fire door (outward opening) is required. All electrical fittings should be flameproof to comply with Category 1 equipment. Shelving should be constructed of slatted non-ferrous metal or wooden shelves. To assist in preventing spills the shelves should be provided with lipped edges. “No Smoking” “Highly Flammable” signs must be displayed in a prominent position on the outside of the access door. Fire Extinguishers normally dry powder and a sand bucket should be provided.

The following general points will apply:

An emergency switch to isola

- Must not be flammable (contain more than 24% alcohol)
- Reactive chemicals, e.g. chemicals that may cause and explosion or release toxic gases.
- Not be corrosive and contain a pH between 5 and 9.
- Biological material is to be inactivated by autoclave or disinfectant.

Further information is available from your HSC, Technical Services the sustainability team or H&SS.

Do not mix waste materials collected from different processes before disposal unless the various components are known to be compatible. Consideration will need to be given to the eventual disposal techniques at the early stages of the risk assessment.

11.2 Waste containers

Liquid waste must not be stored in glass Winchesters as they cannot expand and may explode leading to personal injury or environmental damage.

Guidance:

For further information on the transportation of dangerous substances – see SCOP No 52 Driving for Work Purposes

12.2 Transportation of Petroleum

See Safety Note 71 – Transportation, Storage and Use of Petroleum:

13 REFERENCES

1. Statutory Instrument 2002 No. 2776 The Dangerous Substances and Explosive Atmospheres Regulations 2002
   Safety Policy Directorate (Health & Safety Executive)
   Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR) Implementing the Chemical Agents Directive 98/24/EC (CAD) and the Explosive Atmospheres Directive 99/92/EC (ATEX 137)

2. Health & Safety Booklet: - The safe use and handling of Flammable Liquids HSG140. HSE Books. ISBN 9780717666096

3. Health & Safety Guidance Controlling fire and explosion risks in the workplace A brief guide to the Dangerous Substances and Explosive Atmospheres Regulations.

4. Health & Safety Guidance Substance substitution

5. HSE Approv r ƫ SESApBy ŕ ^ Æ ẃ ̏l