HEALTH & SAFETY

Safety Code of Practice:

Management of Dangerous Substance and Explosive Atmospheres

UNIVERSITY OF SUSSEX

Executive Summary

A Safety Code of Practice (SCoP) is a university-wide document that supports policies to provide detailed practical information on how to ensure compliance with relevant laws, standards, and regulations, and must be followed by all Faculties and Divisions.

SCOPs are supplemented by associated Guidance documents, which provide additional advice and information on specific topics and are intended to assist in the development of local procedures.

This document is the fourth in the Safe Management of Chemicals, Other Hazardous Substances and their Waste C800 series of SCoPs and is intended to support managers and teams in drawing up local operational documents.

Health, Safety & Wellbeing, HR Division

Contents

1. Introduction

The purpose of this Safety Code of Practice (SCoP) is to ensure a consistent approach to the management of dangerous substances and explosive atmospheres (DSEAR) across the University. The SCoP also defines the key terms related to the management of dangerous substances and explosive atmospheres and sets out areas of responsibility.

This SCoP aims to ensure that:

- The University complies with the Dangerous Substances & Explosive Atmospheres Regulations 2002 (DSEAR).
- Dangerous substances present at the University and their location are identified.
- Dangerous substances are risk assessed in line with DSEAR.
- Dangerous substances are eliminated wherever possible and where this is not possible, kept to the minimum necessary number and quantity.
- The effects of a fire or explosion are mitigated.
- Areas where an explosive atmosphere may form are identified and appropriately classified as hazardous areas (i.e. EX zoning).
- Emergency procedures for dealing with an incident involving dangerous substances and explosive atmospheres are put in place.
- Suitable training provision is available.

2. Scope

This SCoP applies to all staff, students, contractors, third parties and visitors who work with dangerous substances as part of their role, for research or education, either on or off campus.

The SCoP also applies to locations under the control of the University where dangerous substances are, or liable to be, used or present in connection with work, research and education. This includes those dangerous substances that are purchased and those that are produced as part of a work process.

This document covers the whole life cycle of dangerous substances, including ordering, receiving, transporting, storing, using and disposing of such substances.

3. Definitions

ATEX – the name commonly given to the two European Directives for controlling explosive atmospheres i.e. ATEX 137 on minimum requirements for improving health and safety protection of workers potentially at risk from explosive atmospheres, and ATEX 114 equipment and protective systems intended for use in potentially explosive atmospheres.

Dangerous Substance – any substance or preparation used or present at the University that could, if not properly controlled, cause harm to people as a result of fire or explosion, or corrosion to metal. They include such things as solvents, paints, varnishes, flammable gases,

dusts from machining and sanding, dusts from foodstuffs, chemical dusts, pressurised gases and substances corrosive to metal.

Energetic Event – includes things such as runaway exothermic reactions involving chemicals e.g. the decomposition of unstable substances such as peroxides.

EX – the abbreviation used on signage to notify others of the presence of an explosive atmosphere where special measures will need to be followed. The signage includes a black EX in a yellow triangle with black border

Explosive Atmosphere – when under atmospheric conditions, the presence of a mixture of air and a flammable substance in the form of a gas, vapour, mist, dust or fibres. The mixture can catch fire or explode when exposed to an ignition source such as a spark, flame or high temperature.

Hazardous Area Classification – the process of identifying where an explosive atmosphere may form and its extent.

4. Responsibilities

4.1 Executive Dean of Faculty / Director of Professional Services Division

Executive Deans of Faculty and Directors of Professional Services Division have overall responsibility for the management of dangerous substances and explosive atmospheres within their Faculty or Division. They must ensure that:

- DSEAR risk assessments are carried out when dangerous substances are present, or liable to be present, in connection with work, research or education.
- Areas where an explosive atmosphere may be present are classified as hazardous areas and display EX signage from reputable suppliers at entrances.
- Significant findings from DSEAR risk assessments are communicated to those who may be affected.
- Control and mitigation measures identified through DSEAR risk assessments are implemented.
- Pipework and other containers holding dangerous substances are labelled with their contents.
- Staff and others under their control are competent to carry out their duties by ensuring they attend relevant training.
- Emergency response procedures are in place to deal with foreseeable incidents.
- Workplace inspection programmes include the management of DSEAR.
- Monitoring processes are implemented to ensure that staff and others follow control and mitigation measures, and procedures.
- There is resource for complying with this SCoP.
- Significant DSEAR risks are discussed at Faculty Health and Safety Committees.
- Colleagues in the Faculty of Science, Engineering and Medicine (FoSEM) Health and Safety Team and University Health, Safety and Wellbeing Team are consulted if DSEAR risk increases or decreases.

- When delegating DSEAR related tasks, that these are delegated to competent individuals.
- People in the Faculty/Division are aware of how to report DSEAR related incidents.
- Local reporting and escalation processes are put in place for reporting defective equipment.

4.2 Line managers, Supervisors, Technical Managers and Principal Investigators

Line managers, Supervisors, Technical Managers and Principal Investigators are responsible for ensuring that they and their teams are aware of the arrangements in place for any work, research or education involving dangerous substances: They must ensure that:

- They support the Executive Dean of Faculty / Director of Professional Services Division in meeting their responsibilities.
- DSEAR risk assessments are carried out when dangerous substances are present, liable to be present or in use in the areas they are responsible for.
- Key information from these risk assessments is communicated to their staff and others who may be affected.
- Those affected are made aware of areas classified as hazardous and the precautions they must follow when working in these areas.
- Staff they are responsible for have attended DSEAR training and are familiar with the hazards presented by the dangerous substances they use.
- DSEAR risks are discussed at team meetings.
- Staff they are responsible for are aware of the emergency procedures to follow should there be a DSEAR related incident.
- Incidents relating to DSEAR are reported on Sussex Direct and that they support health and safety colleagues with investigations where required.
- Contractors and other third parties working for the Faculty/Division are provided with the outcomes of DSEAR risk assessments where this is applicable to their work e.g. hazardous area classification.

4.3 All staff, students, contractors, third parties and visitors

All individuals working for, working with or studying at the University have a responsibility to:

- Comply with all DSEAR safety arrangements, including, but not limited to, following this SCoP and supporting guidance.
- Co-operate with and follow any safety instructions or directions from line managers, Supervisors, Technical Managers and Principal Investigators or safety personnel in relation to DSEAR.
- Report any DSEAR related incidents or defects with work equipment through local reporting and escalation channels.

4.4 Estates, Facilities and Commercial Services Division

Colleagues in this Division have responsibility for ensuring that:

- A robust permit to work system is in place that covers hot works where dangerous substances are used.
- This permit to work process is followed for Estates projects.
- Stakeholders across the University are consulted where projects may impact existing, or introduce new, DSEAR risks.
- Contracted works on campus, arranged by the Division, are reviewed in advance of them commencing to ensure consideration has been given to DSEAR where necessary.
- For contracted works on campus, arranged by the Division, the specification and procurement of any ATEX rated equipment is selected following competent advice, and that installation and maintenance is undertaken by a CompEX certified contractor.

4.5 DSEAR Assessors

DSEAR Assessors have responsibility for:

- Maintaining their competence by attending DSEAR Assessor training and regular refresher.
- Supporting those with the responsibility for carrying out DSEAR risk assessments to do so.
- Seeking advice and support from either the FoSEM Health and Safety Team, or University Health, Safety and Wellbeing Team, where they believe the hazards/work activity to be assessed are outside their level of competence.

5. Requirements

5.1 Risk Assessments & Approvals

Where dangerous substances are present, or liable to be present, in connection with work, research or education, a suitable and sufficient risk assessment must be carried out. The purpose of the assessment is to help decide what measures are required to eliminate or reduce, so far as is reasonably practicable, the risks from the dangerous substances and to ensure that control measures and mitigation measures are implemented. Faculties and Divisions must:

1) Identify the dangerous substances and their properties by carrying out a chemical analysis.
2) Identify who may be harmed.
3) Identify ignition sources.
4) Describe organisational/technical measures taken to control and mitigate the risk.
5) Evaluate the scale of the anticipated effects.
6) Implement additional control and mitigation measures to reduce the risk to an acceptable level.

Faculties and Divisions must consider control measures and mitigation measures following the DSEAR hierarchies:

Control measures

- Eliminate the dangerous substance.
- Reduce the quantity of the dangerous substance.
- Avoid/minimise releases.
- Control release at source.
- Prevent the formation of an explosive atmosphere.
- Collect and remove dangerous substances (i.e. mists, vapours, dusts and gases) to a safe place (e.g. by ventilation).
- Avoid/remove ignition sources.
- Avoid adverse operating conditions.
- Keep incompatible substances apart.

Mitigation measures

- Reduce the number of employees and others exposed to a minimum.
- Implement measures to control or minimise the spread of fires or explosions.
- Provide explosion pressure relief arrangements.
- Provide explosion suppression equipment.
- Provide plant or equipment that is explosion pressure resistant.
- Provide suitable Personal Protective Equipment (PPE).

The significant findings of the assessment must be recorded, and the risk assessment must be reviewed and updated when significant changes are made to the process.

The risk assessment must be signed off by the assessor and the responsible person for the activity or area for which the assessment covers.

Where hazardous area classification (See section 5.3.1) has been identified as a required control measure, the risk assessment must also be verified by the University Health, Safety and Wellbeing Team, Technical Services and Fire Safety Team.

The risk assessment must be reviewed periodically, and also if there is a change in the way the activity is undertaken, a change in staffing, a change in the law or best practice, or if an incident occurs.

5.2 Physical Controls

There are a number of physical control measures which must be considered through Faculty and Division DSEAR risk assessments. These include:

5.2.1 Facilities

General Ventilation

Provision of natural or mechanical general ventilation to disperse flammable gases, vapours and dusts to prevent the formation of an explosive atmosphere.

Gas detection

Gas detection may be required where a flammable atmosphere may be present. This detection may need to be connected to ventilation systems so they automatically switch on

or increase the number of air changes per hour to address the formation of a flammable atmosphere.

Control of dust accumulation

This may include using water to dampen the air and prevent dust from becoming airborne.

Separation distances and physical barriers

The use of distance, walls, enclosures or containment to limit the spread of fire or explosion.

Hazardous Area Classification

Where an EX Zone needs to be established, this informs some of the physical controls required to manage ignition sources such as upgrading fixed electrics to ATEX rated equipment if it cannot be removed from the area (See section 5.3.1).

5.2.2 Equipment

Local exhaust ventilation

Used to draw flammable gases, vapours and dusts away from their source, to avoid the formation of an explosive atmosphere. These systems can be either ducted or non-ducted.

Explosion mitigation systems

Building explosion relief panels into equipment where this is a risk, the use of blast resistant enclosures, suppression systems and containment systems.

Earthing and bonding

Consider reducing static electricity as a potential ignition source by ensuring proper earthing and bonding of containers, equipment and systems used to transfer dangerous substances.

Venting and pressure relief

Ensuring plant and equipment have pressure relief valves built in to disperse over pressure, or venting systems to ensure flammable atmospheres are removed to somewhere safe.

5.3 Management Controls

5.3.1 Hazardous Area Classification

As part of their DSEAR risk assessments, Faculties and Divisions must identify where an explosive atmosphere may be present in the workplace. Where this may be the case it must be designated as an EX Zone and the extent of this zone estimated.

Faculties and Divisions must create schematic plans to illustrate where the zone is located. A List of Equipment for Area Classification (LEAC) must also be put together.

Faculties and Divisions must arrange for their DSEAR assessments to be verified where an EX Zone needs to be established.

5.3.2 Training, Competency and Supervision

Those involved in the activity or working in the area must be provided with training commensurate with their role. This must include training around the DSEAR risks present

and control and mitigation measures in place. Staff should also attend DSEAR Risk Assessor training where they are required to carry out DSEAR risk assessment and refresh this periodically by attending COSHH and DSEAR Refresher training.

5.3.3 Information and Instruction

Faculties and Divisions must communicate relevant information and instruction about their DSEAR risks, controls and mitigations to those who may be affected. This includes third parties, such as contractors, who may be required to work in or near an EX Zone, or other DSEAR related hazard.

Where works are arranged on campus that involve the use of dangerous substances, the person contracting the works must ensure that suitable arrangements have been put in place to control and mitigate any additional risk presented, and that any safety procedures, such as permit to work processes are followed.

Where a Faculty or Division establishes an EX Zone, clear signage must be displayed at the entrance/s to that area. Where a hazardous area is identified, the Health, Safety and Wellbeing Team, Technical Services and Fire Safety Team must be consulted so that teams can coordinate verification of the DSEAR risk assessment and arrange for this information to be added to the University's MiCAD system.

5.3.4 Other

Substance separation

Keeping incompatible substances apart.

Reducing the number of people who could be exposed

This may include reducing the number of people involved in an activity to the least required to carry out the work.

Housekeeping

Ensuring dusty environments are cleaned regularly to prevent build-up that may become airborne, ensuring spills are cleaned up immediately and ensuring solvents and other substances that can produce an explosive atmosphere are capped when not in use.

Labelling of pipes and containers

Faculties and Divisions must identify the dangerous contents of containers and pipes and ensure these are clearly labelled and carry appropriate markings and safety signage where applicable.

Reducing the quantity of dangerous substances

Using the smallest amount of a dangerous substance to carry out the work. Storing the smallest amount of a dangerous substance to allow you to do your work.

Avoidance of Ignition Sources

Eliminating sparks, hot surfaces, static electricity, friction or mechanical impacts in areas where an explosive atmosphere may form and upgrading electrical equipment to ATEX-rated equipment where it is has to be used within an explosive atmosphere.

5.4 Personal Protective Equipment (PPE)

Personal protective equipment must be considered as part of the risk assessment process, as the final control measure in the hierarchy. In relation to DSEAR, personal protective equipment may include antistatic footwear, antistatic overalls, flame resistant coveralls etc. In most instances, personal protective equipment specifically for DSEAR will only be required where hazardous area classification has been carried out and an EX zone has been established.

6. Emergency Arrangements

6.1 Emergency Planning & Preparation

Faculties and Divisions must put in place plans for responding to foreseeable emergencies such as spillages of flammable substances and power outages that affect ventilation etc. These plans must be documented and link into the University's bronze, silver and gold emergency response plan.

6.2 Emergency Response & First Aid

Faculties and Divisions must test their emergency plans periodically to ensure these remain effective and those with responsibilities under them remain aware of what they need to do. Testing could take place as a desktop exercise or as a live scenario.

If Faculties and Divisions plan to introduce new dangerous substances to campus or carry out work with dangerous substances that introduce new hazards, they must ensure that first aid provision is suitable to accommodate the additional hazards. This may require a local first aid needs assessment to be carried out and additional staff trained as first aiders.

6.3 Reporting Incidents & Accidents

Faculties and Divisions must ensure that any incidents, accidents or near misses involving dangerous substances and explosive atmospheres are reported on the University's incident reporting system, Sussex Direct.

Where an incident, accident or near miss occurs, Faculties and Divisions must investigate these with the aim of preventing or reducing the risk of these events occurring again.

7. Transport

Where dangerous substances are to be transported, Faculties and Divisions must consult the Health, Safety and Wellbeing Team before doing so, as advice may need to be obtained from a Dangerous Goods Safety Advisor (DGSA).

8. Monitoring & Assurance

Faculties and Divisions must implement local arrangements for ensuring that control measures and mitigation measures from DSEAR risk assessments are implemented and followed.

The University Health, Safety and Wellbeing Team will monitor the implementation of this Safety Code of Practice through audit and inspection.

9. Records & Retention Requirements

DSEAR risk assessments must be retained for 5 years once they have been superseded by an updated version.

Any formal procedures relating to DSEAR must be retained for 10 years once superseded by an updated version.

Inspection records and audits relating to DSEAR must be retained for 10 years following completion of any actions that were identified.

10. Further Information / Guidance

- HS G807 Guidance on Completing DSEAR Risk Assessments (Link to follow)
- HS G804 Guidance on DSEAR Laboratory and Workshop Standard (Link to follow)

11. Legislation & Standards

- The Dangerous Substances and Explosive Atmospheres Regulations 2002
- HSE Dangerous Substances and Explosive Atmospheres (L138)

12. References

- Dangerous Substances and Explosive Atmospheres webpage

13. Appendices

This section is not relevant to the scope of this document.

14. Document Control

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