LONDON METROPOLITAN UNIVERSITY

Control of Substances Hazardous to Health, Dangerous Substances and Explosive Atmosphere Policy

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1. Introduction

London Metropolitan University fully accepts their legal obligations to take all reasonable steps to minimise risks arising from their activities which may affect their employees, students, visitors and members of the public.

The University will, so far as is reasonably practicable, ensure that all goods and substances purchased are safe for their intended purpose and that appropriate information is available to ensure safe use.

There is also a general duty imposed on designers, manufacturers, importers and suppliers of any article or substance used at work to ensure that it is safe when properly used and adequate information is provided about

- The use for which it is designed and has been tested and when put to use, it will be safe and without risk to health and safety
- Prior assessment and evaluation by each school/department of the products to be used and the level of any risks
- Assessment of the competence of the user before work commences and recommended control measures are understood and the provision of relevant information to ensure the health and safety of all users.
- Substance data sheets must be available regarding their use, testing, emergency procedures in case of an accident or spillage and conditions in relation to their safe use.

2. Scope

This policy applies to all work materials hazardous to safety and health within London Metropolitan University. They include recognised hazardous classifications such as toxic, harmful, corrosive, sensitiser, irritant, carcinogen, mutagen and toxic to reproduction. Biological hazards are classified according to their potential and ability to cause infection and harm.

Control of Substances Hazardous to Health (COSHH) Regulations 2002 and the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) 2002 require employers to assess the risks to workers (and any others who may be affected by their work or business) which may arise because of the presence of dangerous substances in the workplace.

COSSH applies to virtually all hazardous substances except:

- Asbestos and lead which have their own regulations
- Substances which are hazardous because they are radioactive, at high pressure, at extreme temperatures or have explosive or flammable properties (these are covered by other regulations)
- Biological agents that are outside the employer's control e.g. catching an infection from a workmate (if in doubt, contact H&S team for advice)

3. Definitions

3.1 Hazardous substance

a substance (or preparation) which is/are

- Classified as hazardous, has a hazard warning label indicating danger such as very toxic, toxic, harmful corrosive, irritant or explosive
- Carcinogens, mutagens and teratogens
- Micro-organisms which create a hazard to health
- Dust of any kind when at a substantial concentration in air
- Any substance not mentioned above which creates a hazard to health
- Asphyxiants

3.2 Unclassified substances

should be considered hazardous where there is a reasonable expectation that they have any of the above harmful properties.

- **Preparation**: mixture/solution of two or more substances
- **PPE**: Personal protective equipment
- **Precursor**: a substance from which another is formed, especially by metabolic reaction
- **Workplace Exposure Limit (WEL)**: A WEL is the maximum concentration of an airborne substance averaged over a reference period to which employees may be exposed by inhalation
- **Hazard statement**: a phrase assigned to a hazard class or category that describes the nature of a hazard or a hazardous substance or mixture, including, where appropriate, the degree of hazard
- **Precautionary statement**: a phrase that describes recommended measures to minimise or prevent adverse effects resulting from exposure to a hazardous substance or mixture
- **Dangerous Substances and Explosive Atmospheres Regulations (DSEAR)** : require employers to assess the risk to employees and to ensure a safe working environment and protect workers (and any others who might be affected by their work) from fires, explosions and other similar events.
- **Thermal radiation**: the safe use of substances that can create thermal radiation effects (burns)
- **Over-pressure effects**: the safe use of substances or materials that could create blast injuries
- **A summary of Dangerous Substances**: any natural or artificial substance which is explosive, oxidising, extremely flammable, highly flammable, of flammable

3.3 Examples of Dangerous Substances

DSEAR is principally concerned, therefore, with the safe use of substances that can create thermal radiation effects (burns) and over-pressure effects (blast injuries). In summary, a dangerous substance is any natural or artificial substance which is explosive, oxidising, extremely flammable, highly flammable, or flammable (see CLP pictograms below):

- Most common organic solvents
- Benzoyl Peroxide
- Ammonia Gas
- Petrol
- Varnishes
- LPG
- Methyl Ethyl Ketone
- Styrene Monomer
- Acrylamide Monomer

3.4 Examples of some activities to which DSEAR applies :

- Storage of petrol and LPG as fuel for cars, machinery etc
- Use of flammable gases such as acetylene for welding
- Handling and storage of waste dusts in woodworking shops
- Handling and storage of flammable wastes including fuel oils
- Hot work on tanks or drums that have contained flammable material
- Work activities that could release naturally occurring methane
- Use of flammable solvents in laboratories
- Storage of flammable goods such as paints, solvents and reagents
- Storage, use and handling of flammable gases including LPF
- Transport of flammable liquids in containers around the workplace
- Chemical or gas manufacture resulting from research or teaching

4. Rolls and Responsibilities

4.1 Deans and Directors

Deans and Directors are responsible for the implementation of the University's risk assessment procedure within their area of control and must ensure:

- Suitable COSHH and DSEAR assessments are completed for hazardous and dangerous substances used and stored in the department
- Ensure the effective implementation of control measures by conducting termly inspections and ensuring suitable and sufficient risk assessments are in place before introducing new pieces of equipment, especially those that could be used in explosive atmospheres
- All significant hazards are captured on the School or Department hazard register

4.2 Managers, Supervisors and Principal Investigators

Managers, Supervisors and Principal Investigators should ensure that all COSHH and DSEAR risk assessments are completed as part of the risk assessment process and recorded for all work processes involving hazardous substances available in their areas of responsibility.

They should provide staff and researchers, students and visitors with suitable information, instruction and training based on any findings from exposure monitoring and health surveillance.

This should include:

- The nature of the substances they work with or are exposed to, the risks created and ensuring safe disposal of hazardous substances and any precautions that should be taken
- Control measures, their purpose and how to use them
- The use of personal protective equipment (PPE) and the clothing provided (face shields, goggles, gloves, coveralls, safety boots and shoes)
- Spill response
- Emergency procedures

They should also ensure all hazardous areas are identified and that health and safety risks arising from academic activities are identified, assessed and adequate controls are in place before commencement of work.

They must ensure that all hazardous areas are identified, brought to the attention of the Health and Safety Team and information made available to the emergency services.

4.3 Research staff

Research staff are required to follow all information, instruction and training for safe systems of work and standard operating procedures.

They should report any shortcomings and unsafe conditions or equipment that pose imminent danger and avoid putting themselves or others at risk by their acts or omissions.

They should participate in health surveillance and workplace monitoring and when leaving their role, should hand over any hazardous substances to the Principal Investigator/Supervisor/Manager.

4.4 Students

Students will be informed of all hazards and the reason for following safe systems of working. Any PPE supplied must not be interfered with or damaged and they must wear the PPE provided to them, store it as instructed and report any damage.

4.5 Occupational Health

The Occupational Health Service is responsible for the provision a suitable health surveillance scheme with a qualified physician.
The health of individual employees will be monitored to ensure control measures are working effectively by providing feed-back on the accuracy of the risk assessment. The COSHH Assessment should also address exposure monitoring and any respiratory sensitisers, carcinogens and substances known to cause irreversible injury. Records will be maintained for a minimum of 40 years.
Advice from the Health and Safety team must be obtained regarding health surveillance and/or workplace monitoring.

4.6 Health and Safety Team

The H&S team is responsible for training, advice and guidance on the provision of risk assessments, all control measures appropriate to control the risks and ensure fire risk assessments in hazardous areas are available to the emergency services.

5. Risk Assessments

5.1 COSHH Risk Assessment

Hazardous substances found in solids, liquids, dust and fumes with a risk of inhalation, ingestion or absorption through skin, mouth or eyes and the frequency of exposure, must be identified and documented in a COSHH risk assessment. This should contain:

- Type of work activity
- Routes of exposure
- List of identified hazards and risk rating
- Control measures (i.e. fume hood, PPE etc)
- Review date and name of assessors and signature of approving manager

Note: Suppliers' labels, safety data sheets (SDSs) and catalogues are primary sources of safety information about hazardous substances and should always be supplemented with a risk assessment. In some cases, HSE publications should also be used and advice on how to proceed may be obtained from Technical Managers, Senior Technicians, operative personnel and the Health and Safety Team.

5.2 DSEAR Risk Assessment

Provides a similar requirement as a COSHH Assessment but with a different classification under CLP and the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) 2002, such as explosive, oxidising, extremely flammable, highly flammable or flammable. If a Safety Data Sheet (SDS) is available, it will list the applicable Physical Hazard (H) Statements ie H200 Unstable Explosive or H221 Flammable Gas.

The presence of a dangerous substance can also lead to the development of an "Explosive Atmosphere" - a mixture of air and one or more dangerous substances in the form of gases, vapours, mists or dust where combustion could spread to the entire mixture. For example, although diesel is not classified as flammable under CLP, when heated to a high temperature it can present a fire and explosive risk if working with combustible dusts.

5.3 Elimination, Substitution and Separation

The most effective control to avoid the risk from dangerous substances is to remove them from the workplace where possible and to replace a dangerous substance with one that is less hazardous. Storage must be secure and guidance is available from suppliers.

Personal Protective Equipment (PPE**)** should be implemented as a last line of defence only once elimination, substitution and separation have been considered. Exposed persons required to wear PE such as gloves, safety goggles/face shields, Respiratory Protective Equipment (RPE), aprons and other clothing should be suitably trained, and the PPE listed on the COSHH Assessment. PPE should be examined periodically, and defects should be reported to Estates Service Desk, Technical Management and Managers.

5.4 Emergency Procedures and Control Measures

COSHH and DSEAR also requires measures to be put in place in case of an incident. These include:

- Prevent fires and explosion from spreading
- Reducing the number of people exposed to a potential incident
- Providing safety equipment that can safely contain or suppress an explosion or vent it to a safe place.
- Warning and Communication Systems
- Escape Facilities
- Procedures for people to following in the event of an incident
- Appropriate Protective Equipment
- Practice Drills

5.5 Physical and Engineering Measures

- To control risks, the design, assembly, construction, installation, and storage of plant and equipment and use of suitable work processes, including all relevant equipment, control and protection systems should be considered.
- Written instructions and permits to work and the application of appropriate systems of work
- All pipe work conveying flammable gas must be clearly marked
- Appropriate bunding should be in place to prevent leaks and spills
- Where long-term storage is foreseeable, control to ensure timely disposal to prevent compounds from deteriorating when standing (i.e. peroxides).

6. Workplace Exposure Limits (WELs)

WELs refer to concentrations of hazardous substances in the air that people breath by setting limits for exposure, averaged over a specific period of time, referred to as a time-weighted average (TWA). Two time periods are used, long-term (eight hours) and short-term (15 minutes). Some substances for which WELs have been approved have been assigned short-term exposure limits (STELs) and have a 15-minute reference period which is to protect against adverse health effects. **EH40/2005 Workplace Exposure Limits** provides more detailed guidance.

7. Zoning

Where an Explosive Atmosphere may occur, the DSEAR regulations require classification of “hazardous” and Non-hazardous" places, and must be classified into ”Zones" unless otherwise stated in the HSE Guidance.
Any area identified must be clearly marked with appropriate signage with clearly identified zone category.

Any equipment deemed suitable for use in the zone where it will be used, should bear the standard “CE” mark which ensures uniformity of compliance, and a second “Ex” is affixed to indicate the equipment is suitable for use in an explosive atmosphere.

Zone 0 A place where an explosive atmosphere consisting of a mixture of air and dangerous substances in the form of gas, vapour or mist is present continuously, for long periods or frequently	**Zone 20** A place where an explosive atmosphere consisting of a cloud of combustible dust in air is present continuously, for long periods or frequently
Zone 1 A place where an explosive atmosphere consisting of a mixture with air of dangerous substances in the form of gas, vapour or mist is likely to occur	**Zone 21** A place where an explosive atmosphere consisting of a cloud of combustible dust in air is likely to occur in normal operation

occasionally in normal operation	
Zone 2 A place where 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 be for a short period only	**Zone 22** A place where an explosive atmosphere consisting of a cloud of combustible dust in air is not likely to occur in normal operation, or if it does, will be for a short period only

8. Training, Information and Instructions

Persons involved in the work or likely to be exposed to risk are to be informed, instructed, trained and supervised as necessary on the precautions they are required to take including how to use PPE, emergency procedures, spill response, first aid measures and the cleaning, storage and disposal procedures.

9. Disposal/Unknown Substances

All hazardous substances must be disposed of in accordance with the manufacturer's instructions and the Controlled Waste Regulations. If in doubt, waste chemicals shall be quarantined by the relevant manager for disposal in consultation with the manufacturer or supplier.
Containers of unknown chemicals should be stored where it cannot be used and appropriately labelled until disposed of.

10. Precursor Substances

10.1 Drug Precursors

A license may be required to purchase certain precursors and poisons and all guidelines for storing materials must be followed. Check the Home Office website if a license is required and make principal investigators aware that the appropriate authorities may need to be notified.

10.2 Pathogens and Toxins

There are pathogens and toxins Listed in **Schedule 5** which potentially pose the greatest risk to human life if misused. These dangerous substances, in addition to those listed in Schedule 5, include anything such as plant or animal that is infected by or is a carrier unless it is used or kept and satisfies prescribed conditions. Principal Investigators obtaining and holding these substances are responsible for notifying the Home Office within one month of obtaining these substances and further notification must be provided if there is any change in holding once any modifications come into effect.

10.3 Radioactive Materials and Chemical Weapons Convention

Work should not be undertaken on radioactive materials without authorisation in writing from the Health and Safety Team, as most radioactive activities require a licence.

The security of radioactive material is regulated by the Radioactive Substances Act 1993 and the Environmental Permitting Regulations (England and Wales 2010 and there are certain conditions that must be met to hold radioactive materials on site.
Counter Terrorism Security Advisers (CTSAs) act as site security advisers to the environment agencies and f you are holding any radioactive materials, pathogens or toxins, please notify the Health and Safety Team.

Certain toxic chemicals and their precursors are subject to legal requirements under the Chemical Weapons Convention and have three chemical classifications, and a full list can be found in the Organisation for the Prohibition of Chemical Weapons website. The most likely precursors to be found in a potential research setting at LMU are those in Schedule 3.

11 Transport and Storage

Staff or students transporting hazardous substances from one workplace to another on campus or off-campus must include an assessment of transport hazards for these substances. All persons involved must be aware of and understand emergency response measures and other controls. Substances must be fully labelled, in appropriate containers with clear and undamaged signage and transported on a stable trolley with some level of containment in the event of any spillage.
Local storage needs to be documented and emergency procedures considered. For more information visit the Carriage of dangerous goods guidance provided by the HSE.
For transport of cylinders, please see Compressed Gases Safety Policy.

12 Record Keeping

The following documents/records must be retained by the service/department/school for audit purposes on the shared safety drive.

- COSHH register(s)
- COSHH assessments
- Records of statutory inspections, examinations and testing of engineering control measures retained for 5 years
- Evidence of training and instructions (i,e, attendance records)
- Records of emergency response practice drills
- LEV records including commissioning reports, examination and test reports, user manuals, logbooks and training records (to be retained for 5 years).

References and Further Reading

- Working with substances hazardous to health: a brief guide to COSHH (INDG136), HSE 2012
- Control of Substances Hazardous to Health (COSHH) Regulations 2002
- Control of substance hazardous to health: Approved Code of practice and guidance (L5) 2013 HSE
- Clearing the air (INDG408), HSE
- Misuse of Drugs Regulations 2001
- Controlled Waste Regulations 2012
- HSE further information about COSHH
- EH40/2005 Workplace exposure limits: Containing the list of workplace exposure limits for use with the COSHH Regulations, HSE Books 2011
- Dangerous Substances and Explosive Atmosphere Regulations 2002
- HSE Hazardous Area Classifications and Laboratory Operations
- HSE Safe Use and Handling of Flammable Liquids
- HSE Storage of Flammable Liquids in Containers
- British Compressed Gases Association Codes of Practice (ACOPs)