

## **NERC GUIDANCE ON STANDARD CONTROLS FOR LABORATORY USES OF HAZARDOUS CHEMICALS**

**Version 1**

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This guidance describes twenty controls that form a basis of safe laboratory chemical practice and can be applied as standard precautions for laboratory work with hazardous chemicals. Not all these standard controls will be applicable to all activities but most will be applicable to the majority of work. The application of these standard controls could form a generic risk assessment applied to medium / low risk activities. This would need to be supplemented for individual experiments by documenting the choices made where there are alternatives, e.g. when / what type of engineering control / Local Extract Ventilation (LEV) to apply, and recording important chemical hazard data (e.g. EU Risk Phrase / Globally Harmonised System Hazard Statement; indication of danger [such as harmful, toxic, corrosive, flammable etc.], key hazard [such as carcinogenic, mutagenic, toxic to reproduction etc.] and HSE COSHH Essentials Hazard Group). High risk work will always need to be subject to detailed risk assessment which specifies all aspects of the precautions to be applied. The standard controls allow a high level of protection but flammability, explosivity and pyrophoricity may need more detailed consideration.

The twenty standard controls (in the rough order they might appear under the Control of Substances Hazardous to Health [COSHH] hierarchy of controls) are:

1. Be aware of and record **key hazards of chemicals handled** (incl. R phrases / GHS statements and HSE Hazard Group) and **substitute** safer alternatives if possible; record **controls** (precautions) where there is a choice or additional ones put in place.
2. Availability of suitable maintained and tested **engineering controls / LEV**, which might include fume cupboards or extract nozzles/grilles for capturing / removing airborne vapours, gases, fumes and diluting flammable concentrations below the explosive limit and safety cabinets or weighing enclosures for dusts or aerosols.
3. All **weighing of hazardous powders** to be done under some form of extracted enclosure unless risk assessments show this not to be necessary.
4. Use methods or techniques which **minimise airborne generation of contaminants**.
5. **Work surfaces and floors** within laboratory to be **smooth, impervious, easy to clean** and resistant to the common chemicals used with any cracks, corners or crevices sealed / coved to prevent trapping of contaminants with regular cleaning / decontamination and / or disinfection taking place.
6. Provision of adequate workplace **temperature, ventilation and fresh air changes** including, where required, suitable humidity and pressure regimes which help ensure safe working conditions e.g. by dilution and removal of odours, vapours and aerosols and preventing their spread.
7. Suitable provisions should be in place to **prevent and contain spread of spills** of hazardous materials and enable ease of decontamination which can include

provision of spill trays, coved benches, suitable bench covering (e.g. absorbent disposable paper, Benchkote).

8. Ensure **good housekeeping, cleanliness and hygiene practices** are followed.
9. Suitable, labeled **storage facilities** available for hazardous materials such as flammable solvents, with segregation of incompatibles such as acids and bases, being secure/lockable or ventilated if necessary.
10. Precautions in place where experimental work may lead to **energetic, exothermic or runaway reactions** and generation of over-pressure, including pressure relief, scrubbing / collection of ejected materials and, where appropriate, venting to a safe place as well as **preventing unsafe mixing of incompatibles**.
11. Means for **safe collection, treatment, storage and disposal of hazardous waste** in place.
12. **No eating, drinking, chewing, application of cosmetics** in laboratories.
13. **No sucking** on tubing, pens / pencils etc. **or mouth pipetting**.
14. **Wash hands** before leaving the laboratory or when contamination occurs, preferably using a dedicated hand-wash basin fitted with taps that are non-hand operated and is located near the exit.
15. Means to **restrict** or help **prevent access by unauthorised personnel** in place.
16. **Signage** at the entrance (or for designated areas) to indicate mandatory safety precautions such as Personal Protective Equipment (PPE) to be worn and prime risks e.g. toxic or carcinogenic materials, biohazards, radioactivity etc.
17. Availability of a **permit to work** system or similar formal **safe system of work** to help ensure safety and decontamination of equipment / facilities when service or maintenance staff undertake work in the laboratory.
18. **Emergency** equipment or facilities to be available within the lab such as eyewash, fire blanket, suitable fire extinguishers. **Emergency showers** to be close by where  $\geq 2.5$  litre quantities of corrosive or toxic substances are stored, dispensed or utilised.
19. **Supervision** of staff and provision of suitable **information, instruction and training** on safe laboratory working, including how to find hazard information on substances, choice / use of engineering controls and waste disposal.
20. Wear appropriate **PPE**:
  - a) Eye protection (glasses as minimum) for all tasks where there is a risk of splashing or ejection of hazardous chemicals or flying materials and when working in proximity to such work. Mandatory 'eye protection' laboratories make ensuring compliance much easier;
  - b) Laboratory coats (fastened up and of appropriate type) for all work with hazardous chemical agents where there is a risk of splashing or ejection of material, or when working in proximity to such work. Remove lab coats before entering clean areas such as offices, rest rooms and canteens. Store personal clothing away from lab coats;
  - c) Gloves of a suitable type when there is a risk of contaminating hands with hazardous or corrosive materials, or always when handling a chemical with a 'skin' risk or 'Sk' notation, ensuring that contaminated gloves are removed and/or changed before making contact with non-contaminated surfaces and
  - d) Sensible shoes that cover the whole of the foot (feet are what are most likely to get splashed or harmed when items are spilt or dropped).