Stockholms universitet

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Document name: Chemical Handling Procedure		
Issued by: Jenny Lilliehöök, Environmental Coordinator		
Approved by: Cynthia de Wit, Environmental Council Chair		

Chemical Handling Procedure

Purpose

The purpose is to support laboratory chemical handling in terms of research and teaching at Stockholm University to prevent negative impact on the environment.

Scope

The procedure should be applied by everyone who handles chemical products and biotechnical organisms in their work.

Responsibility

The Head of Department is responsible for chemical handling at the department level. This duty also includes the responsibility to ensure compliance with the *Chemical Handling Procedure*. The Head of Department may appoint one or several persons in charge of chemical handling, each with a documented, individual area of responsibility. The names and telephone numbers of these people are to be posted clearly in each laboratory, so that they can easily be contacted, e.g. in the event of an emergency.

Purchasing

All those at Stockholm University who handle and purchase chemical products should, in accordance with the Environmental Code, chapter 2, § 4 (product selection rule), attempt to select less environmentally and health hazardous chemical products whenever possible. Efforts should mainly be directed towards finding environmentally friendly alternatives for chemicals that are used in large quantities, as well as products that are being phased out (see below) or that are used in teaching. Purchasers in charge should look into options for better alternatives and provide information about these when available.

The purchase of chemicals should be made through the SU store, which has concluded framework agreements with a number of retailers. The purchase of licensed chemicals must not be done without prior authorisation. Contact the safety engineer in the Technical Department who will assist with the license application. Purchases should also be made by taking the following into consideration:

A) Product selection rule

Two substitutions have been defined in legislation and these should be made provided that the quality of activities can be maintained and that it is financially viable and a practical possibility:

1. Halogenated solvents to be replaced by non-halogenated solvents and
2. Lead, cadmium, mercury and other heavy metals are to be replaced by other compounds.

(The use of mercury compounds requires exemption, which is applied for by the Technical department's environmental officer.)

B) Phasing out

The University's phasing out list can be found in KLARA. The chemical products included in this list are highlighted in red on the chemical list for each research group. The phasing out list comprises licensed products, products that require exemption or investigation prior to use as well as products that for other reasons should be phased out. Purchasers should be fully conversant with this list in order to avoid purchasing these whenever possible and thus minimising the quantities used.

C) Import from non-EU countries
If chemical products are purchased within the *EU*, in accordance with REACH Article 31, the supplier is required to enclose a safety data sheet. The importer of a chemical product *from a non-EU country* is responsible for preparing a safety data sheet or obtaining the necessary written risk and safety information for the imported products (REACH). Special regulations apply concerning activity reporting to the product registry and product reporting (see the website of the Swedish Chemicals Agency) with respect to chemical products imported from outside the EU.

Chemical register

A register of chemical products handled in activities must be maintained according to Regulation (SFS 1998:901) concerning the practitioners' self-inspection. This should include information about the scope and use of the product and details of the product's health and environmental hazards.

Stockholm University uses the program KLARA to register all chemical products https://secure.port.se/alphaquest/app_su/pcmain.cfm. KLARA includes references to legislation concerning each chemical product. Each department should have one or more persons in charge to register the chemicals used in the department. These must undergo inventory training in KLARA. The register should be updated at a minimum annually; the inventory period is 2/1-28/2 each year. However, regular registration in connection with purchasing is recommended. Chemicals that are no longer used should be disposed of regularly.

Safety data sheets and documentation of risk assessments

Everyone who handles chemical products should have access to safety data sheets (in the appropriate language) with information about the risks of the product. These are available and updated in KLARA; therefore, there is no need to print the safety data sheets. Nevertheless, risk assessments of each laboratory/methods should be kept in a binder in the laboratory to be as easily accessible as possible.

All hazardous chemical products should have a current safety data sheet. It is the responsibility of the purchaser to ensure that the supplier provides a safety data sheet when purchasing a new chemical product that does not exist in KLARA.

Storage of chemicals

Stockholm University uses a very large number of chemical products with vastly different characteristics in its research and teaching. As a result, comprehensive storage information for all chemical products cannot be given here. General rules are set out below. Otherwise, refer to the information given in the product's safety data sheet.

The Head of Department or those delegated responsibility for handling are responsible for ensuring that chemicals are stored in a satisfactory manner.

General rules

Health or environmentally hazardous chemicals should be stored in such a way that the health and environmental risks are prevented.

Vermiculite (or other suitable absorbent) should be available in sufficient quantities for the amount of chemicals in the lab in order to clean up spillage. It is appropriate to place this easily accessible, fully visible and marked. Consumed absorbents should be left as hazardous waste.

Chemical stores and laboratories should not have open drains. If there is a floor drain, it must be equipped with protection to prevent leakage. This means, for example, a tight-fitting cover, manual opening and closing function on the drain or other comparable devices.

Chemicals should not be kept in fume cupboards with an open drain. Limited storage can occur in e.g. a tray to prevent spillage. Alternatively, the drain can be plugged or collared. Once the work has been completed the chemicals should be returned to the ordinary storage cupboard. Note that bottles, etc., affect the air circulation in the fume cupboard, and it is not recommended to store chemicals in the fume cupboard. The fume cupboard hood must be pulled down completely when not in use (if this does not take place automatically) as it has a significant effect on power consumption.

Chemicals should be stored with covers if the chemical involved is not being used, partly due to the risk of leakage and partly due to volatile chemicals being emitted into the air. This applies in particular to chemicals in the fume cupboard. Storage should be in containers intended for the chemical in question, for example, corrosive chemicals should be kept in containers that can withstand this, see also SFS 2008:245, §19.

Licensed chemical products should be stored in such a manner that unauthorised persons cannot gain access to them (Code of statutes of the Swedish Chemicals Agency, KIFS, 2008:2 chapter 2). Examples of such storage are locked storage cupboards, locked laboratories or areas that require an access card/code. Other hazardous chemicals should be stored so that they are well separated from products intended for human consumption. Volatile solvents, etc., which if inhaled can be expected to cause intoxication should be stored in such a way that this type of use is prevented/discouraged (SFS 1977:994).

Particular consideration should be given to the risk of incompatibility when co-storing chemicals. Appropriate recommendations to avoid improper co-storage are to have different storage cupboards for chemical products with different hazard classifications: toxins, acids, bases, and flammable liquids.

- Acids and bases may not be co-stored, either with each other or with other substances.
- Flammable liquids must not be co-stored with flammable gas or highly flammable materials.
- Strongly oxidizing agents should not be kept with oxidizable substances. Appropriately, strongly oxidizing agents should be kept in a separate cabinet. Oxidizable substances may be stored in fire or poison cupboards.

Storage in storage cupboards

- Indoor storage facilities for flammable liquids should have ventilation.
- Each fire cell may at most accommodate 50 litres of flammable liquid and 5 litres of flammable gas.
- Flammable liquids should be stored in retaining embankments so they cannot spread uncontrollably.
- Ethers and other peroxide substances should be stored in a dark and cool place in tightly sealed containers.
- Corrosive substances should not be stored above eye level.
- Refrigerators and freezers for the storage of chemicals that can form flammable vapours must be specifically designed for this purpose.
- Chemicals and the like may not be stored in refrigerators or freezers intended for food storage.

Storage cupboards, often older cupboards that do not meet applicable regulations, should be replaced. Shelves in cupboards should have raised edges that, for example, prevent a bottle if bumped from sliding off the shelf and falling down. Bottom shelves/cupboard floor should have a higher edge/embankment.

Marking of packages

All packages should, according to KIFS 2005:7, § 10, be labelled with the product name and hazard symbol, etc. If such labelling is missing due to decanting or outer packaging it should be labelled. However, in some exceptional cases labelling is not required such as on small vessels, e.g. test tubes that are being used.

Introduction before laboratory work

All new personnel and all new students should receive an introduction before being allowed to work independently in the laboratory. The completed introduction should be documented and signed by participants.

The introduction should contain information about conduct according to this “Chemical Handling Procedure”. It should also include other basic regulations for safe laboratory work from both environmental and health perspectives including risk assessments and knowledge of potential risks and emergency preparedness. Departments with laboratory activities should prepare local instructions as a supplement to these general procedures.

Flammable goods

Professional handling of flammable goods requires a license, and the terms of this and all applicable legislation should be taken into consideration. The University has a central license for handling flammable goods. Each department that accommodates more than 5 litres of flammable liquid or flammable gas should have at least one manager trained in flammable materials. The technical department’s safety engineer coordinates training for these.

Radioactivity

Work with sources of radiation is embraced by extensive legislation. The University has a central radiation protection expert who can be reached through the safety engineer at the Technical Department. Departments with such activities should have appointed an operations manager for radiation protection, for which the University requires and provides specific training. Departments should comply with the comprehensive documentation with procedures included in the quality manual and which cover health and the environment. All such activities should be reported to the safety engineer and with the requisite license in place.

Biological materials

Specific legislation applies to work with biological materials such as biological agents, GMOs (genetically modified organisms), GMM (genetically modified microorganisms), ABP Animal by-products and human biological material.

The University has a biosafety expert appointed by the Vice-Chancellor who convenes a biosafety committee as support for the departments. Departments that in their research conduct experiments with GMOs, GMMs or other biological material, should have knowledge of relevant legislation, adopt particular procedures for their activities and appoint one or more persons in charge. All such activities should be reported to the biosafety committee and with the requisite license in place.

Animal experiments

Specific legislation for licensing and training applies to laboratory work involving animals. A veterinarian is available and can be reached through the safety engineer at the Technical Department. Departments that in their research conduct animal testing should adopt particular procedures for this activity and appoint one or more persons in charge. License applications should be submitted through the safety engineer at the Technical Department, while an appointed animal keeper has certain local areas of responsibility.

Waste and sewage

It is important that everyone contributes in order to reduce environmental impact from the discharge of hazardous substances from activities. Liquid chemical residues may only be discharged into drains if they are listed in the “Procedure for the Discharge of Liquid Chemical Residues in Sewage”. Other chemical residues should be disposed of as hazardous waste to the waste disposal contractor in room M212 at the Chemical Practice Laboratory (KÖL), see "Waste Procedure for Stockholm University".

Evaporation should not be used as a method to dispose of a chemical residue. All chemicals should be handled in such a way that emissions into the air are minimised. In some cases, evaporation may be used as a means to reduce the water content of a solution, for example, inorganic substances in aqueous solutions. In the event of water evaporation from organic solutions, it should be completely assured that nothing dangerous evaporates together with water.

Risks and emergencies

All personnel who work in laboratories where chemical products and biotechnical organisms are handled should be aware of what to do in case of an emergency. Environmental risk assessments should be available. A list of persons/agencies to contact in case of emergency should be easily available. The use of safety equipment should be practised continuously. Appointed persons in charge should have general knowledge of the chemicals stored in the laboratory. For further instructions, see the documents “Procedure for Environmental Risk Assessment” and “Environmental Risks in Emergencies and Accidents”.

Reporting documents

Documentation should be provided at each department that handles hazardous chemicals products in accordance with:

- Delegated areas of responsibility
- Chemical registers in KLARA
- Risk assessments for laboratory work
- Environmental risk assessment of activities
- Near accidents and non-conformity reports in SAMIR
- Documentation of the introduction of students and new staff to laboratory work

References

- Stockholm University, Environment web: www.su.se/miljo
- Swedish Chemicals Agency: www.kemi.se
- SU's Environmental Legislation List (via Notisum https://www.notisum.se/rn/nLawList.aspx?listid=26568)
- Swedish Work Environment Authority www.av.se