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## PROCEDURE FOR CHEMICAL MANAGEMENT

### Purpose

This procedure supports chemical management at the university related to both research and education as well as in other contexts in which chemicals are used. The guidelines are based on legislated requirements and are adapted to the needs of the University of Borås. The purpose is to summarise the extensive legislation into concrete and implementable instructions adapted to the university.



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## Responsibility

The Deans of Faculty as well as the Head of Professional Services are responsible for chemical management at each Faculty and at Professional Services. These persons appoint one or more staff members who are responsible for chemicals within those organisations in which chemical management takes place as support for other employees and students.

### ***Chemical Coordinator (Kemikalie- samordnare)***

The chemical coordinator handles the university's procedure for chemical management and coordinates the university's chemical group. The chemical coordinator monitors developments in legislation about chemicals, participates in internal audit work, and takes part in the provision of internal training that deal with chemicals. The chemical coordinator handles the university's permit applications and advises the organisation when it comes to chemical questions. The chemical coordinator is a link between the chemical area and the university's overall work with issues of work environment and sustainable development and collaborates with other employees within these areas.

### ***Chemical Manager (Kemikalie- ansvarig)***

Each chemical manager is responsible for ensuring that the procedure for chemical management is complied with in specific units.

### ***Chemical Group (Kemikalie- grupp)***

The chemical managers collaborate in a university-wide chemical group that can perform risk assessments upon the purchase of new chemicals, exchange experiences, and update the procedure for chemical management together with the chemical coordinator. A convener for this group shall be appointed.

Questions are responded to primarily by the chemical manager for each respective Faculty/unit.



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## Description

### *Introduction*

Chemical management is affected by a variety of provisions relating to the protection of persons and health as well as the environment. The latter in particular has developed to a large degree during the last decade in the Swedish Environmental Code and European regulations. Current environmental legislation on chemicals can be found in the university's list of laws M06; this is updated regularly.

An overall goal should always be to reduce the volume of environmentally hazardous and harmful chemical products. One way to reduce the consumption is to perform laboratory experiments on a smaller scale both in research and education. Anyone who performs a laboratory experiment should select a method that minimises the use of environmentally hazardous and harmful chemical products.

### *Purchase of chemicals*

Anyone at the university who handles and purchases chemical products must, according to the Swedish Environmental Code, Chapter 2, § 4 product selection rule, strive to substitute in less environmentally hazardous and harmful chemicals.

Chemical purchase should be conducted via contact with a chemical manager. The chemical manager will investigate possibilities for better alternatives as well as provide this information when such exist. The greatest effort should be made to find environmentally friendly alternatives when it comes to those that will be used in large quantities, are particularly toxic, or are used in teaching.

Purchase of licensed chemicals and/or those classed as dangerous should be preceded by a risk analysis in consultation with the chemical manager. The risk assessment is based on the safety data sheet and other



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information about the chemical, taking into account all aspects in this procedure, i.e. reduction of volume, storage, transport, and disposal.

Purchase should also be based on:

A) Product selection rule

Two substitutions have been defined by legislation and should be made provided that quality can be maintained and it is economically reasonable and practicable:

(1) Halogenated alternatives are exchanged for non-halogenated alternatives and (2) lead, cadmium, mercury, and other heavy metals are exchanged for other alternatives.

B) Phasing out

In the Swedish Chemicals Agency's database PRIO ([www.kemi.se/en](http://www.kemi.se/en)) there are a number of substances listed for phasing out according to legislation. Chemical managers must keep themselves updated on this list in order to, as much as possible, avoid the purchase of listed substances.

C) Import from countries outside of the EU

Every effort should be made to purchase from sellers within the EU. Those who import chemicals from a country outside of the EU are responsible for drafting a safety data sheet or acquiring the necessary written risk and safety information for the imported substances (REACH).

For purchases made within the EU, according to REACH, a safety data sheet must be attached. For purchases made outside the EU, a registration must be made to the product registry if those products to be imported have certain tariff headings (see the university's list of laws M06). When importing more than 100 kg of one single particular chemical product per year, product registration should be completed.

D) Subject to mandatory authorisation

Upon the purchasing of *chemicals, preparations, or substances*, check whether these are subject to mandatory authorisation.



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### ***Safety Data Sheet***

All chemicals must have a safety data sheet from the supplier written in Swedish. The safety data sheets should also be available in any other appropriate languages. If a safety data sheet does not accompany the purchase of new chemicals, the chemical manager is responsible for ensuring that such documentation is produced via the supplier's website or similar. Safety data sheets should also be updated as needed, however at a minimum of every three years. For older products that are no longer sold, however, the latest safety data sheet available can be used.

The safety data sheets should be kept current and available in every relevant setting (e.g. lab) for all who handle the products. This is done by the chemical manager.

### ***Chemical Registry***

The laboratories at the University of Borås are not subject to mandatory authorisation but, as a preventative measure, the regulations on self-monitoring should be considered. According to this regulation, a chemical registry should exist with information about:

- The scope and use of the product
- Information about the product's or organism's health and environmental harmfulness
- Classification with respect to health or environmental hazard
- Storage placement/number of packages/amount
- Safety data sheet
- Supplier

### ***Storage of chemicals***

It is difficult to provide comprehensive information on the storage of chemical products due to the large number of chemicals with very different characteristics. On the Swedish Chemical Agency's website much information can be found about the safe handling of chemicals. Another good source of information about how each chemical product should be stored is the products' safety information sheets.

The chemical managers are responsible for ensuring that all chemicals are stored in a satisfactory manner. Chemical products should be stored in



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such a way that unauthorised persons cannot access them. In the storage of chemicals, attention should also be on the risks of storing incompatible chemicals together and the health or environmental hazards of the chemical.

In general:

- Toxic chemicals are stored separately in specially designed cabinets that should be kept locked.
- Toxic chemicals that also have flammable properties are stored individually and separately from other toxic or flammable chemicals.
- Volatile solvents etc. which when inhaled can be expected to cause intoxication are stored in such a way that this type of use is hindered/neutralised.
- Acids and bases are not stored together.
- Strong acids and organic substances are not stored together.
- Strong oxidising substances and oxidisable substances are not stored together.
- Ethers and other peroxide substances are stored in a cool, dark place in tightly sealed containers.
- Flammable liquids are not stored with flammable gas or flammable materials.
- Chemicals are stored with the lid on when the chemicals are not in use, partly due to the risk of leakage, and partly due to the fact that volatile chemicals can be emitted into the air. This is particularly relevant to chemicals in the fume hood.
- Chemicals are stored in the packaging intended for that chemical. Hazardous chemicals are stored so that they are clearly separated from products intended to be ingested.

#### Requirements for refrigerated storage

- Refrigerators and freezers used for the storage of chemicals that can form flammable vapours must be specially designed for this purpose. Chemicals and the like may not be stored in refrigerators or freezers intended for food storage.



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- Chemical storage and laboratories should not have open floor drains. If a floor drain is present, some form of protection preventing leakage into the drain must be provided. This means, for example, a tight fitting lid, manual opening and closing function of the drain, or other comparable means. If the floor drain cannot be sealed, the chemical containers should be contained in an area that holds the volume of the largest container + 10% of the remaining container volume.
- Chemicals should not be stored in a fume hood with open ventilation. Limited storage can be acceptable if the ventilation is shut off or collecting tanks are used. Note that bottles, etc. affect air circulation in the fume hood. Toxic chemicals should not be stored in the fume hood.
- Evaporation should not be used as a way to get rid of chemical residue. All chemicals should be handled/stored in such a way that air emissions are minimised. In some cases, evaporation can be used as a way to reduce the water content of a solution, for example inorganic substances in an aqueous solution. In cases of water evaporation from organic solutions, it must be completely ensured that nothing dangerous is evaporated along with the water.
- The fume hood window should be pulled to the bottom level when it is not in use as the pull strongly affects energy consumption.

#### Decontamination and risk management

- Equipment for decontamination in cases of spills is available and adapted to the chemicals in use. It is appropriate that the equipment is easily accessible.
- It is important that the fire classification of the storage cupboards and closets is in accordance with the types and quantities of chemicals being stored.

#### ***Markings on packaging***

All packaging must be marked with the product's name and hazard symbols. If such labelling is not present due to, for example, decanting or an outer layer of packaging, this information should be provided via extra annotation.





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***Introduction to laboratory work*** All new staff members and all new students who will be conducting laboratory work will receive an introduction before they are allowed to work independently in the laboratory. The introduction will include information on actions in case of emergency, waste management, risk assessment, and other basic rules for safe laboratory work from both an environmental and a health perspective. Attendance will be documented.

***GMO*** All handling of genetically modified organisms (GMOs) must first be reported to the appropriate authority.

***CMR substances*** Handling of substances classified as carcinogenic, mutagenic, or toxic for reproduction (CMR substances) may only take place if preceded by a study showing that it is not technically possible to replace the products with other chemical products posing lower risks. If it is not possible to replace a CMR product, local rules and routines for how the work should be conducted should be created along with written risk assessments before the work begins.

The following information shall, in particular, be stated in the documentation:

1. In which places and spaces the product may be present and the measures to be taken so that only those needed for the work are present.
2. What safeguards are necessary to ensure that the exposure is minimal.
3. In what situations personal protective equipment is required.
4. How the handling and operation of equipment, processes, or ventilation must be monitored in order to detect abnormalities early that may involve increased risk.

Inadequate procedures and incidents can mean increased exposure of these substances that can lead to ill health in the short or long term. Investigation and risk assessment should be documented.



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***Air  
contamination***

Air contamination may contain elements of both chemical and microbiological contaminants, but also organic air contamination. Air contamination means that a substance or mixture of substances in the air that, over a certain level, can cause illness. The level of air contamination should be assessed through an evaluation as to whether the level of each substance is acceptable. Measurements may need to be made when new equipment is put into use or when, for other reasons, there is reason to suspect that the degree of air contamination is increasing.

***Waste and  
sewage***

To reduce the environmental impact and the risk of emitting harmful substances, it is important that everyone helps to reduce chemical emissions to the sewer system as far as possible. Chemical managers assess whether a substance should be classified as waste or can be put into the sewage. The basic rule when it comes to chemical waste is: *all chemical solution which chemically differ from normal household waste shall be collected in a waste container and sent for destruction as hazardous waste.*

All chemical residues that cannot be poured into drains count as hazardous waste. Different types of chemical waste should not be mixed; rather, they should be put in separate containers for chlorinated and non-chlorinated solvents, acids, bases, and oxidising agents, etc.

In order for hazardous waste to be able to be collected and transported by a waste contractor, it should be put into approved containers and boxes and labelled with the contents. Even glass and plastic products contaminated with hazardous chemicals should be handled as hazardous waste. A suitable space for the storage of chemical waste should be designated.

Wastewater from the university goes to Gässlösa and can only be accepted provided that it can be treated in this treatment plant. The treatment plant is built to treat the contaminants normally found in domestic sewage. Hazardous and harmful substances such as heavy metals and certain organic substances that are difficult to break down, toxic, bioaccumulative (accumulate in living organisms), or inhibiting of nitrification/denitrification inhibition (affects nitrogen separation) must



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not be poured down the drain. It is very important that fluorocarbons, phosphorus-based flame retardants, environmentally hazardous substances (classified with the designation N), and prion substances do not end up in the sewer. Not even the cleaning water that contains small amounts of these substances may end up in the sewer. This restriction is not quantity dependent.

Only solutions that, without any doubt, are completely harmless may be put into drains. Effects on the following should be taken into account; staff, management, plumbers, Borås City treatment plant processes, the river Viskan and its organisms, the Kattegat and the Atlantic Ocean, etc. in both the short and long term. Make sure that the solution does not contain any harmful secondary chemicals. Acidic or basic solutions can damage the sewage system; therefore, the pH of these should be adjusted.

If a chemical is to be put down the drain, these two requirements must be met:

1. Very small amounts of more or less harmless chemicals of the type for household use. This is assessed by the chemical manager with expertise in legislation around chemicals.
2. The pH value shall be no lower than 6.5 and no higher than 10.

**In case of the release of substances that do not comply with these guidelines, immediately notify the emergency services of Southern Älvsborg at telephone number 033-17 29 00 or Borås City's Miljöförvaltningen (Environmental Administration) at 033-35 30 00.**

### ***Transportation of chemical products***

The transportation of chemicals that are considered hazardous goods must be done by a carrier authorised to transport hazardous waste.

Transportation of hazardous goods on one's own on public roads is prohibited. "Hazardous goods" means goods consisting of or containing:

- Explosive substances and items
- Gases,



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- Flammable liquids,
- Flammable solids, self-reactive substances, and solid desensitised explosives, self-igniting substances and substances that emit flammable gases in contact with water,
- Oxidising substances and organic peroxides,
- Toxic and infectious substances,
- Radioactive substances,
- Corrosive substances

Transportation of hazardous waste must be done by an approved carrier. Transportation documentation is considered records and must be signed by those that get, deliver, and receive the transported material. Signed documentation is to be saved in a binder by each chemical manager. See the university's *Procedure for waste management*.

### ***Risks and emergencies***

Risk assessment is included in the systematic efforts around work environment. Those responsible will perform risk assessments for the work operations in which work with chemical products occurs. Risk assessments and action plans for follow-up should be documented and available. Please note that the risk of injury to personnel as well as the risk of damage to the environment and those in the surrounding area is also to be assessed.

Risk assessments should contain:

- Hazardous waste, management, and emissions/disposal
- Air contamination of premises due to fume hoods
- Runoff to sewer, floor drains/sinks
- Accidents/emissions during chemical storage

Risk assessments should be done in relation to the following occasions/situations:

#### *Purchase*



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Upon the purchase of a new product, the safety data sheet should be requested. Based on that, a risk assessment is conducted considering:

- Product's hazards for both humans and the environment; if the product is classified as CMR, this calls for an investigation and specific risk assessment (see previous section on CMR products).
- Air contamination risk for both health and environment
- Specific legal requirements for the handling of chemical/product
- Need for permit application or notification to the product registry
- The product choice principle--goods that are dangerous to the environment should, where possible, be replaced by better alternatives
- Precautionary principle--if there is uncertainty about the hazard of a substance, it should be considered as hazardous.
- REACH--if an item is purchased from a country outside the EU, this may need to be registered or notified to the product registry.

Risk assessments can receive support from the Restricted Substances Database, a database for quickly finding the rules on use prohibitions and other restrictions that apply in Sweden for individual chemical substances or groups, offered by the Swedish Chemicals Agency, as well as the PRIO database from the Swedish Chemicals Agency at [www.kemi.se/en](http://www.kemi.se/en).

#### Laboratory work and projects

Risk assessments should be available for all planned laboratory work and should be documented, current, and accessible for all concerned. At those times that are not included in the regular laboratory activities with instructor support, students and staff should perform their own risk assessments.

Completed risk assessments are documentation that should be saved by each chemical manager.

#### ***Emergencies***



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All staff that is present in laboratories should be aware of what they should do in the case of emergency (save people, raise the alarm, use fire extinguishers and safety showers, as well as knowledge about emergency exists, etc.)

Routines should be in place for how you should act in case of an emergency, e.g. spillage, risks of explosion, or fire. The routines should be communicated and, if they are extensive and complex, they should also be documented and accessible. Emergency preparedness should be regularly practiced.

The Dean of Faculty or Head of Professional Services is responsible for ensuring the functionality of work around safety, regardless of who does the practical work. Safety equipment should be regularly checked.

All emergencies that occur should be reported as incidents to HR.

### ***Incidents and management of irregularities***

#### ***Incidents***

”Incidents” implies a sudden event that could have led to, but did not lead to, an injury to someone. An incident often has the same cause as a work accident. It is therefore important that incidents are noted.

When an incident has occurred, the staff member should describe the events in an incident report (the form can be found on the university website) and handed in to the closest manager. A copy should be sent to HR as well.

If the incident meant serious danger to life and health, this should immediately be reported to the Swedish Work Environment Authority (Arbetsmiljöverket).

#### ***Irregularities***

An irregularity is an event that could have led to an environmental accident. An irregularity is also an action or event that is not in accordance with this procedure for chemical management.



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All irregularities should be sent to [miljoledningssystemet@hb.se](mailto:miljoledningssystemet@hb.se).

Note!

In case of the release of substances that do not comply with these guidelines, immediately notify the emergency services of Southern Älvsborg at telephone number 033-17 29 00 or Borås City's Miljöförvaltningen (Environmental Administration) at 033-35 30 00.

**Documentation** Each location/unit that handles chemicals according to this procedure for chemical management should have the following documentation available:

- Chemical registry
- Risk assessments
- Incident reports
- Documentation of staff and student introduction

**Location/unit specific routines** Locations/units can develop their own adapted routines around, for example:

- Introduction of new students/staff around work with chemicals
- Safety data sheet management
- Follow-up of laws and other requirements that relate to the activities performed
- Responsibility areas for the chemical manager
- Risk assessment templates

**Tips and information**

- Swedish Chemicals Agency (Kemikalieinspektionen):  
[www.kemi.se/en](http://www.kemi.se/en)
- PRIO database [www.kemi.se/en](http://www.kemi.se/en)
- Swedish Work Environment Authority (Arbetsmiljöverket)  
<http://www.av.se/en>
- The university's list of laws/Notisum