

**ROUTINES  
AND  
REGULATIONS**

**FOR WORK AT THE  
UNIVERSITY OF GOTHENBURG**

**DEPARTMENT OF CHEMISTRY  
AND MOLECULAR BIOLOGY**

**CAMPUS JOHANNEBERG**

## **In case of serious accidents involving bodily injury, fire or chemicals**

**RESCUE** Move injured people away from the area of immediate danger.  
Stop severe haemorrhage.  
Start Cardiopulmonary Resuscitation (CPR) in case of heart failure.

Note that three (3) defibrillators are available, one each in the far ends of the main entrance hall, and one in the goods receipt. Contact the Work Environment Officials for a demonstration.

**Do this before you get into an emergency situation and need to use the equipment!**

### **RAISE THE ALARM**

Call for attention **SHOUT FOR HELP!!**  
**Alert the Fire and Rescue Service if deemed necessary by calling 112 or by activating a manual alarm button.**  
Appoint someone to meet the Fire and Rescue Service outside the building at the alarm address.

Address: Kemigården 4, Kemihuset, Chalmers.

**WARN** by informing people in the vicinity about the danger.

**CONTROL** Put out the fire or decontaminate the spill if you think it is possible to do so safely. If this is not possible, try to contain the fire/gas by closing doors and wait for the rescue service.

In case of a severe accident at the **Department of Chemistry and molecular biology, Campus Johanneberg**, the Head of department, Deputy Head of department, Work Environment officer, Environmental Coordinator or director of studies must be notified immediately (see Appendix 1 “Staff members in the Department’s organisation and their roles”).

**Important contact information in case of urgent matters** is available at <http://medarbetarportalen.gu.se/sakerhet/om-nagot-hander/>

In case of a major accident, the Chalmers switchboard at 031-772 10 00 must be notified as well.

**Procedures for handling other unforeseen situations on Chalmers premises**, see <http://www.chalmers.se/insidan/EN/about-chalmers/when-unexpected-happens>.



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## **Receipt**

# 1 Introduction

Welcome to the Department of Chemistry and molecular biology, University of Gothenburg!

This document provides information about important routines and regulations that **you are required to know** and that apply at the Department of Chemistry and Molecular biology, Campus Johanneberg, in the following text referred to as “the workplace”. Many of them are based on Swedish law, whereas others are routines and rules developed and formulated by the University of Gothenburg and the Department. In addition, you may receive complementary information in your research group since some types of work and equipment require particular procedures. Most of the text in this document concerns safety and the work environment, yet it provides some other useful information. **Take your time to read and consider what is said in detail, and to study the specified websites.** The workplace website at [www.cmb.gu.se](http://www.cmb.gu.se) (login with x-account) contains information on administrative routines, services, work environment inspections and much more.

**The information contained in this document applies to ALL individuals engaging in any type of work or studies at the workplace. Your co-workers have the right to demand that you know how to perform the work at hand in a safe manner and that you know what actions to take in case of a serious event. Similarly, you are to demand that they know the routines and regulations stated herein.**

## 2 Responsibilities of the employer and the employee

The Head of Department represents the employer – the University of Gothenburg – and is therefore responsible for the physical and psychosocial work environment. The work related to the physical work environment is delegated to the Work Environment Officers whereas the Head of Department is in charge of the work related to the psychosocial work environment. The work related to the external environment is managed by the Environmental Coordinator. Appendix 1 shows the names of the persons serving in the different positions of the work environment organisation.

**It is the responsibility of the employer** to secure a good work environment and to ascertain that all applicable legal requirements are fulfilled. The Work Environment Officer cooperates with the Head of Department and the Research Group Leaders to accomplish these tasks. Each individual at the workplace shall be assigned to a group. The staff directory the website above indicates to which groups the staff members belong.

New co-workers shall confirm that they have read and understood the content of *Routines and Regulations* by signing the receipt on the last page of this document. By signing the receipt, you also confirm that you have viewed the GU produced film *Safety ventilation* (14 min) available under "instruktioner" at [Safety ventilation](#) (English subtitles). Your keys/keycard comprise your proof of signing. **It is the responsibility of the supervisor/contact person** to inform an individual who works or studies at the Department but who has not applied for keys/keycard about *Routines and Regulations* and **to require the signing of the receipt form** before any work is commenced. It is the responsibility of the Group Leader to see to it that you are fully introduced to the work tasks that you are to perform.

The employees are represented by work environment representatives, often representing the trade unions. Students as well as PhD students must be represented in the local work environment group and at work environment inspections.

**It is the responsibility of the employee or student** to comply with the regulations and instructions related to the work environment at the University and at the workplace. An employee who, despite having been explicitly notified, fails to comply with the work environment regulations has neglected the responsibilities associated with his or her employment. If the neglect is severe, the Human Resources Board of the University may take disciplinary action. When students are involved, action may be taken by the Disciplinary Board of the University.

It is your obvious responsibility to draw the attention of the Group Leader, Work Environment Officer or Head of Department to any perceived weaknesses in the work environment. Such weaknesses include inappropriate or lost safety equipment, malfunctioning eye and safety showers, insufficient safety ventilation or operations that are carried out in a hazardous manner. Although work environment inspections are conducted regularly, it is those who carry out the work who have the best possibility to discover any risks.

In practise, this means that as soon as a concern related to safety or the work environment is raised, you are **required** to discuss the matter with your Group Leader or with the Work Environment Officer. The group meetings that all research groups are to hold at least monthly during terms, serve as an appropriate forum for such discussions. Please assist by giving reminders of the need to discuss the safety aspect of any ongoing or planned work.

Before initiating a new work task, you must discuss with your supervisor how it is best performed. There is no point in repeating past mistakes. While you work, you should ask yourself: What are the risks involved in carrying out this work? How do I avoid these risks? What do I do if something still happens? A risk assessment must always be conducted according to Section 3.6 below. If a work task is assessed as “risky” or “very risky”, then the risk assessment must be carefully documented and measures to reduce the risks must be implemented.

You are required to be familiar with the location of emergency exits, the evacuation assembly point, fire extinguishers and hoses, eye and safety showers, and the nearest telephone and first aid kit. The work is to be conducted according to our work environment policy presented in Appendix 2.

## ***2.1 Our commitments for environment and a sustainable society***

We are certified and are constantly working with the environment and a sustainable society for the eyes. In January 2006, GU was awarded environmental certificates according to European standards ISO14001 and EMAS. Our action plan for environment and a sustainable society are available at the following link:

<http://www.mls.adm.gu.se/sustainability>

Feel free to contact the environmental coordination if you would like to know more about what impact this will have on your daily work.

## 3 Routines and regulations to be applied at the workplace

### 3.1 In case of serious accidents

Serious accidents include incidents that involve fire or release of gas or chemicals and that pose a threat to life or property. The basic rule is

#### **THE SAFETY OF PEOPLE ALWAYS COMES FIRST!**

The appropriate order of actions is: RESCUE - RAISE THE ALARM - WARN - CONTROL

RESCUE means that injured people are moved away from the area of immediate danger, that the power is turned off in case of accidents involving electricity, that severe haemorrhage is stopped, that cardiopulmonary resuscitation (CPR) is initiated in case of heart failure etc.

Note that three (3) defibrillators are available, one each in the far ends of the main entrance hall, and one in the goods receipt. Contact the Work Environment Officials for a demonstration. We also advice you to watch this intstruction video:

<http://www.youtube.com/watch?v=CJasVOaFMuM>

**Do this before you get into an emergency situation and need to use the equipment!**

RAISE THE ALARM by calling for attention. This should be done while RESCUE is underway by shouting for HELP!! **The Fire and Rescue Service should be alerted by calling 112 or by activating the manual fire alarm (Section 3.3.1 below).**

Appoint someone who can meet the Fire and Rescue Service outside the building at the alarm address and show them to the location of the accident.

Alarm address            Kemihuset, Chalmers, Kemigården 4

WARN by alerting people in the vicinity to the danger.

CONTROL by putting out the fire or decontaminating the spill if you think this is possible without danger to yourself or others. Equipment for handling small spills is available in room 6139A. Try to contain fire, smoke and gases by closing doors.

**Someone from the group: Head of Department, Deputy Head of Department, Work Environment Officer, Environmental Coordinator or Director of Studies must be notified immediately in case of a serious accident at the workplace (Appendix 1). These individuals can activate the Department's crisis group.**

**Important contacts in urgent matters** can be found on the University's website <http://medarbetarportalen.gu.se/sakerhet/om-nagot-hander/>

The Chalmers switchboard tel. 031-772 1000 and the Chemistry Building Manager tel. 031-772 27 58 or 0730-34 63 01 must be informed in case of a serious accident at the workplace. For information on how to deal with **certain other abnormal incidents on Chalmers premises**, see Chalmers' website <http://www.chalmers.se/insidan/EN/about-chalmers/when-unexpected-happens>



## **3.2 In case of a crisis or a catastrophe**

The Department's local crisis plan may be activated in case of a situation that can be classified as a crisis or a catastrophe. This is done by notifying anyone in the group: Head of Department, Deputy Head of Department, Work Environment Officer, Environmental Coordinator or Director of Studies about what has happened (Appendix 1).

## **3.3 Alarms**

### **3.3.1 Evacuation alarm**

Commonly known as "fire alarm". It is given via bells or buzzers marked "brandlarm" (fire alarm). The alarm may be given for one or several sections of the building or for the entire building.

The fire alarm may be set off manually by using alarm buttons or automatically via smoke and heat detectors. Alarms set off are automatically transmitted to the Fire and Rescue Service, so-called automatic alarms. Despite the automatic alarm, somebody must call 112 if a fire alarm is set off in order to provide information about what has happened. This helps the Fire and Rescue Service take proper action upon arrival. Somebody must call 112 and provide information what has happened in case of a false alarm as well. When an alarm is set off, it takes the Fire and Rescue Service at least 10 minutes to arrive.

**ALL INVOLVED SECTIONS MUST BE EVACUATED WHEN A FIRE ALARM IS GIVEN!**

If you evacuate from your office and if there is enough time, bring your coat, lock your office door and evacuate through the nearest evacuation route. Although the routes are sign-posted, you must familiarise yourself with them in advance. The best evacuation route need not be the way you entered the building. If you are teaching when the alarm goes off, it is your responsibility to see to it that your students evacuate.

Individuals who belong to the Department's crisis group are to bring the crisis binder if this can be done without risk.

After evacuating the building, you must go to the assembly point. The assembly point for the Chemistry Building is Chemistrygården, outside the Chemistry Building main entrance ("Snurran"). Locate your work mates and see if somebody who should be present is missing.

**If somebody is missing, the chief rescue officer (red or yellow helmet) must be notified**

All evacuees **MUST** meet at the assembly point. No one is allowed to go back into the building, leave to have a cup of coffee or go home before the alarm is called off, the timing of which is decided by the chief rescue officer.

The smoke detectors usually detect particles. Thus, not only smoke from a fire but also gas flames, welding smoke, cutting wheels, cooking and other particle sources may set off the alarms. The charge for a false alarm is currently 8000 SEK.

### 3.3.2 Fan alarm

Fan alarms are installed in parts of the workplace and are activated when the fans serving the ventilated hoods fail. An operating technician at Chalmersfastigheter (the property management company) is normally automatically notified in case of fan failure. Close the hoods and wait for restart. Following an alarm, remember that you often have to restore electricity to the power points in the ventilated hoods by activating the switch located next to each hood.

### 3.3.3 Flow alarm for ventilated hoods

Flow alarms for ventilated hoods are installed in parts of the workplace and go off when the flow in the opening of the hood becomes too low (<0.5 m/s). The alarm is automatically reset when proper flow is re-established. An activated alarm indicates a malfunctioning only of the ventilated hood to which the alarm is connected. The purpose of the alarm is to notify the person using the hood that it is not working according to specifications and therefore does not provide the intended protection. A common reason for an alarm going off is that too many hood windows are open at the same time. The hood system is, with only few exceptions, designed so that not more than one hood window in each group may be fully open, or alternatively that not more than two windows may be open enough to allow work in the hood, without exceeding the capacity and thus setting off the alarm.

If the alarm still goes off, make sure that all hood windows where no work is in progress are completely closed. You must always keep hoods that are not in use – even if only temporarily – fully closed. Moreover, hood operation is associated with significant energy consumption since they evacuate large amounts of heated air from the building. Try to work with the window at least half-closed since this makes the window an effective splash and splinter shield. The benefits and limitations of the ventilated hoods are shown in the film *Skyddsventilerade arbetsplatser*, which is accessible under "instruktioner" (with English subtitles) at [Safety\\_ventilation](#)

There are a number of additional alarms installed, for example indicating problems with measuring equipment and various instruments. It is the responsibility of the Group Leader to inform each staff member about alarms not discussed in detail in this text.

## 3.4 Reporting of accidents and incidents

**Always report accidents, incidents, accidental releases of chemicals and any deviation from normal lab standard (“everything from a dropped bottle to a computer link that doesn’t work”) to the Working Environment Official or alternatively, by using the online tool GURIA.**

### 3.4.1 Work injury and incident

All workplace accidents resulting in personal injury and all incidents that could have led to personal or other injury must be reported in writing, and the Work Environment Officer must be notified immediately. If students are involved, the events should be reported to the Swedish authority Kammarkollegiet. This includes accidents occurring during travel to and from the workplace. For more information on how to report accidents and incidents, see <http://www.arbetsmiljo.gu.se/arbetsmiljo-a-till-o/arbetskador/>

### 3.4.2 Incident that may affect the external environment

You must report events that have, or could have, affected the external environment. Unintentional release of environmental hostile chemical (e.g. chlorinated solvents, petrol or xylene) to the sewerage system in the extractions fume hoods or the sinks is an example of such

an event. Reports are to be submitted to the Environmental Coordinator using the form *Avvikelseförbättring*, available at <http://www2.chem.gu.se/insidan/miljo/4531bl1.doc>

### 3.5 Handling of chemicals

The rules and procedures given below are a consequence of for example the content of the Swedish Work Environment Act or the Swedish Environmental Code, the Swedish Work Environment Authority's Provisions (AFS), regulations set out by the Swedish Chemicals Agency, the Swedish Civil Contingencies Agency and the Swedish Medical Products Agency and decisions made by the Board of the University of Gothenburg. Routines are summarised in the subsequent sections.

The Department is required to keep a register of "Chemical risk sources" according to § 6 in AFS 2011:19 ([AFS 2011\\_19eng](#)) and to provide materials safety data sheets (MSDS) for all chemicals handled on the premises. The University of Gothenburg, as well as most other Swedish universities and schools uses the online chemical registration system KLARA to keep track of all chemicals kept in stock:

[https://vgrgu.port.se/alphaquest/app\\_gu/pcmain.cfm](https://vgrgu.port.se/alphaquest/app_gu/pcmain.cfm)

Click on "KLARA produkt databas" and state the name or cas number on a chemical substance. The system is based on an annual inventory of our chemicals and contains detailed information about all chemicals kept in stock at GU. The register also provides access to the required MSDS, which indicate the risks associated with a certain substance and the safety measures that are deemed appropriate in connection with handling and spills (pictograms and H, R- and S-phrases). The access to MSDS also enables execution of vital parts of risk assessment (Section 3.6). The students can use the computers on the 5<sup>th</sup> floor, in the north corridor and on the 6<sup>th</sup> floor of Kurshuset to read the MSDS. **In case of an accident or incident related to chemicals, KLARA is the primary source of information of how to act properly.**

**In case of an inspection from Swedish authorities, all people ranging from professors to unemployed students at the labs are obliged to prove that they have knowledge about KLARA.** Feel free to contact the Environmental Coordinator if you need more information or if something is unclear.

**When a chemical is purchased, it must be entered into the register immediately upon arrival.** This is normally done by the Department's central purchasers (see Appendix 1) and requires that information on the research group and future location of the chemical is provided with the purchase order. Use of stored chemicals does not need to be registered. Instead, inventory of stored chemicals is taken once a year, usually soon before Christmas.

#### 3.5.1 Purchase

**Always check whether a chemical already might be available before ordering a another batch! The department's central chemical purchasers can quickly give you information regarding this. We have a large surplus stock and it is often possible to get the chemical you need in minutes and at no cost.**

Chemicals are purchased by the Department's central purchaser (Appendix 1) or, as an exception, by the research group. **If a research group has bought chemicals by themselves, the purchase delivery note (or other information about the order) must invariably be given to the Department central purchasers, this is to make sure that the chemical are registered in KLARA.** The University has purchase agreements with a number of suppliers that we are obliged to use but that offer competitive prices and a wide range of products. Contact the department's central purchasers, if you have questions about which companies we have purchase

agreements withwith. If a chemical is not available from any of the listed suppliers, we are allowed to obtain it from another source. Please note that special and complicated import regulations apply if a supplier is based in a non-EU country. The contracted suppliers may only sell chemicals to the registered purchasers.

### 3.5.2 Handling of certain chemicals

Handling of certain chemicals requires a permit issued by the Swedish Work Environment Authority. These chemicals are listed under Group A and B in "Chemical Hazards in the Working Environment" AFS 2011:19 available at [AFS 2011:19eng](#) Particulars are given in § 45. Here it is necessary to be alert since also salts and hydrates, not explicitly listed, are also included in the permit requirement. As an example, o-tolidine (CAS 119-93-7) is included in the B-list which means that also 3,3'-dimetoxybenzidine dihydrochloride (20325-40-0) requires a permit. Contact the Environmental Coordinator if anything is unclear.

It is the responsibility of the Group Leader to see to it that the proper permit is obtained before purchasing a chemical and that time-limited permits are renewed as needed. A copy of the permit must be submitted to the Work Environment Officer. If this regulation is violated (i.e. if a listed substance is stored or handled without a permit) the Work Environment Authority must issue a sanction charge of 50000 SEK. The basic principle is that the research group causing the violation also pays the sanction charge.

#### 3.5.2.1 Special requirements for chemicals which are carcinogenic, mutagenic and toxic to reproduction

When handling substances classified with a hazard statement or risk phrase H350, H340, H360, R45, R46, R49 och R60 and for some specific processes, § 39-43 in "Chemical Hazards in the Working Environment" AFS 2011:19 available at [AFS 2011:19eng](#) are applicable. Hazard statements and risk phrases for a substance may be found in the Material Safety Data Sheet available through KLARA. Among other things, a detailed examination of the technical possibility to substitute the substance must be made according to § 39. If the substance cannot be exchanged, an extended, detailed risk assessment must be made according to § 40. Paragraph § 41 states that **the employer must keep a register over employees**. Please check the chemicals you use! Violation of this rule (if a register is not kept) brings a sanction charge of 30000 SEK.

Employees who work with **ethylen oxide, lead, cadmium and polyester resins** must contact the Workplace Safety Officer to find out if a medical examination is required. Also here is a sanction charge of 30000 SEK in effect if the rules in § 50 are not followed. The basic principle is that the research group causing the violation also pays the sanction charge.

#### 3.5.2.2 Occupational Exposure Limit Values

If there is reason to suspect that limits listed in Appendix 1 to "Occupational Exposure Limit Values" AFS 2011:18, available at [AFS 2011:18eng](#) are exceeded at the workplace, then measurements must be conducted. Contact the Work Environment Officials if you need more information.

### 3.5.3 Storage

#### 3.5.3.1 Chemicals in general

Chemicals in general must be stored in a way that prevents access by unauthorised persons. This implies that chemicals can be stored in storage cabinets for chemicals or in other

appropriate places in the laboratory. Solvents should be stored in clearly marked storage cabinets intended for the purpose. For highly toxic chemicals, locked cabinets (including refrigerators and freezers) are available on each floor. However, the door to the laboratory must be locked whenever nobody is working there. This includes before and after normal working hours and during lunch and coffee breaks unless the entrance doors to the section are always locked, also during working hours. The cabinets must be marked with appropriate warning symbols that represents the content of the cabinet.. Symbols can be obtained from the Environmental Coordinator.

**Please note that the storage positions for all chemicals are defined in KLARA. Always put back on the chemicals they intended positions when you have taken the amount you need.**

### 3.5.3.2 Highly poisonous chemicals

Substances marked with the skull-and-crossbones symbol, narcotic substances ([drugs list](#)) and also theft-prone material that can attract someone to "unauthorized use" of the substances must always be locked away.

### 3.5.3.3 Flammable substances

"Flammable substances" comprise flammable gases, meaning gases that can be ignited at 21°C in air; flammable liquids, meaning liquids with a flash point below 100 °C; and substances with a potential to cause a fire, for example self-igniting substances, peroxides etc. Storage and use of these chemicals are subject to special regulations.

The excerpts below are from a document issued by the Gothenburg Fire and Rescue Service that summarises some of the regulations public authorities impose on handling of flammable substances and gas in general.

"As small a quantity as possible (one workday's consumption) may be kept in the open in a laboratory. In general, not more than 10 l gas or liquid may be kept in the open. Up to 50 l gas or liquid may be kept in ventilated cabinets in a laboratory. If gas is stored in the laboratory, the cabinet must be of fire class EI 60 (A60) or better."

This means that not even small gas cylinders may be kept in ordinary cabinets but must be stored in gas storage cabinets of class EI 60. (In the Chemistry building, these cabinets are most often found in the corridors.)

"Gas may be handled in the laboratory. Propane cylinders on desks etc. must not exceed the equivalent of one P11 cylinder (contains a maximum of 11 kg of propane). Any amount exceeding this quantity must be placed in gas cabinets."

"If gas cylinders, in exceptional cases, are to be handled (in a laboratory), regardless of type of gas, they must be placed on gas carts. A chain must then secure them and the total volume may not exceed 20 l. The cylinders must be returned to the storage area after use. Gas cylinders and flammable substances must not – not even temporarily – be stored in evacuation routes, such as corridors."

Warning signs must be displayed on the doors when gas cylinders are present in a laboratory. The signs must be removed or turned back to front when cylinders are removed. (All laboratory doors must be equipped with "keyhole signs" that can be turned back to front. However, they sometimes get stolen. The Work Environment Officer can provide replacement signs.)

Chemicals that must be stored in a refrigerator or freezer and that may give off flammable vapours must be stored in cabinets designed for this purpose. Regular household cabinets contain various electric equipment, which may cause sparks and thus fire or explosion.

### 3.5.3.4 Chemicals that may form peroxides

Certain chemicals, e.g. 1,4-dioxane, tetrahydrofuran, ethers and other chemicals related to the R-phrase **R19** (Appendix 4) tend to form peroxides when stored. The shelf life of these chemicals are six (6) months. Never buy larger volumes than what you plan to use during this time. When the incoming package is opened, the batch must always be labeled with name and date on the provided labels obtained via the the Departments central purchasers. After 6 months, any remnants of the substance must be sent for disposal. **NB: If unlabelled substances are found, they will invariably be confiscated and sent for disposal without further notice regardless of the age of the product!**

### 3.5.4 Transportation by lift/elevator

Priority operation of the lifts without passengers is MANDATORY when transporting:

Condensed gases

Chemical waste containers

Chemicals in containers from which a leakage cannot be excluded. This possibility can be ruled out when the chemical is still in the supplier's original transport container e.g. bottle + box with absorbent.

When the own risk assessment indicates that the transport constitutes a risk.

In the Chemistry building, the lift from the goods entrance (H3 north lift in research building 1), the lift in the course building (H4) and the large lift in research building 2 (H5) are equipped for this type of transport. A key for priority lift operation may be borrowed at the office on the 6<sup>th</sup> floor; see Appendix 1. The lock is located near the "floor buttons" in the lift.

Priority operation of the lift normally requires one "sender" and one "receiver". After putting the lift in priority-operation mode with the key, the "sender" sends off the dangerous goods to the "receiver" by (with the door open) pressing the corresponding "floor button" and then leaving the lift. The lift will then proceed directly to the destination without any possibilities to get on or off the lift. On arrival, the "receiver" removes the goods from the lift, resets it to its normal mode of operation and removes the key.

When gas cylinders are transported within the building, the pressure regulator must be removed, the sealing nut fitted and tightened and the protective cap put on (if applicable).

When transported in a lift, gas cylinders must be secured for example by being chained to a cart so that they cannot overturn. A cart is available in the gas storage room, Kemivägen 4.

### 3.5.5 Handling of chemical waste

Consider our routines for handling of various kind of waste fractions summarized in the **Waste Sorting Guide**, see:

<http://www.lundberg.gu.se/internet/Avfallssorteringsguide%20140521.pdf>

The **Waste Sorting Guide** is also posted in the chemical waste room. Think about how you take care of hazardous waste that your work will generate, this should always be done before the work begins.

Familiarize yourself with our rules about what you can pour down the drain (Green List), see: [http://www.science.gu.se/digitalAssets/1383/1383491\\_riktlinjer-avlopp\\_120928.pdf](http://www.science.gu.se/digitalAssets/1383/1383491_riktlinjer-avlopp_120928.pdf)

The Green List shows the exceptions from rule providing that all chemical waste must be sent for destruction. The rules are the same at both the University of Gothenburg and Chalmers University of Technology. **In case of an inspection from Swedish authorities, all people ranging from professors to unemployed students at the labs are obliged to prove that they have knowledge about the Green List.** Contact the Environmental Coordinator if you want more information or if anything is unclear.

All other chemical waste and other hazardous waste (e.g. used pump oil) must be sent for destruction. Follow the routines in the **Waste Sorting Guide**. Organic solvents should not be mixed with chlorinated organic solvents and mercury-containing waste must also be kept separate. Aqueous solutions of inorganic salts should, if possible, be evaporated (crystallisation bowl in the ventilated hood) and left as dry waste. The waste must be put in clearly labelled containers that enable safe long-term storage. Before any fraction is left in the chemical room, it should be clearly labelled according to the instructions. The disposal of chemical waste is paid by GU centrally, i.e. the cost will not be faced by the research group to which you belong.

Chemical waste is left to the receiver STENA between 10.00 am and 11.00 am on Thursdays of weeks with an even number (see a Swedish calendar). The waste is left in person, and a content declaration is signed by the individual leaving the waste, who then receives a copy of the declaration. This document is to be sent to Jennica Kjällstrand, at the Environmental Unit at the Chalmers University of Technology.

### 3.5.6 Handling of gas cylinders

Any staff member handling a gas cylinder must possess the knowledge necessary to minimise the risk associated with the work at hand. The Department provides basic training on gas handling to staff members who handle gases.

Gas cylinders, together containing a maximum of 20 l of gas may be used in a laboratory on an exception basis. After completion of work, the cylinders must be disconnected and returned to the storage area. Thus, 50 l cylinders may not be used in a laboratory. Cylinders must be chained to keep them from tipping over. Storage of flammable gas together with oxidising gases (air, O<sub>2</sub>, NO<sub>2</sub>, N<sub>2</sub>O, Cl<sub>2</sub> etc.) is prohibited.

Bringing sealed gas lines into operation and installation of “own” gas lines for example from a gas cabinet without first contacting the Work Environment Officer is prohibited.

Each gas cylinder is labelled with a unique number (individnummer). The number can be found either on the neck of the cylinder or electronically on the “plastic button” located at the top of the cylinder. The supplier reports which cylinder has been delivered to which receiver, and documentation containing this information is kept at the goods reception, research building 1. Make sure that you select the right cylinder in the reception storage area when more than one cylinder with the same content have been delivered. If cylinders get mixed up, you risk having to pay rent for a cylinder used by somebody else. You must order collection of empty cylinders and label these with your customer number to facilitate registration of the return of your cylinders. If a cylinder has contained special gas that cannot be transported without ADR labelling, you must indicate this when ordering the collection.

The normal rent for a gas cylinder is about 5 SEK per 24-hour period, which quickly adds up to significant amounts of money. Make sure to order collection of empty cylinders as soon as possible.

### 3.6 Risk assessment

Knowledge of the dangers associated with various substances, including the risk of fire or explosion, their toxicity, substances that cancel unwanted effects and various precautionary measures are essential. Detailed information regarding the above should always be obtained before an experiment is carried out. A risk assessment analysis must be carried out when working with hazardous substances (AFS 2001:1 and AFS 2011:19). If it is concluded that an operation is risky or very risky, any necessary risk reducing measures must be carried out before any work begins. It is the responsibility of the group leader to see to it that the necessary risk assessments are undertaken.

The risk involved in an operation is a combination of the probability of the operation going wrong and the seriousness of the ensuing consequences. The same technique is used when assessing risks associated with measurement equipment etc. What may go wrong? What is the probability that something goes wrong? What are the possible consequences?

Clearly, it is time consuming to conduct an assessment of, for example, each and every synthesis in a series of similar experiments. Good judgement must be applied in such situations. However, a general risk assessment should, if possible, be considered whenever there is a new series of experiments. An assessment should also be made whenever a new activity is started or when new experimental equipment is first put to use.

When assessing the risk associated with work involving chemicals, the assessor must identify the dangerousness of each reactant and expected product. Here the MSDS for the chemicals are necessary.

KLARA provides a possibility to generate risk assessments. **However, it must be clear that it is not only the risk associated with chemicals that must be considered.** There are several forms available for structuring risk assessment work. One useful example is given in Appendix 3.

A copy of each conducted risk assessment of a laboratory activity must be accessible in the lab binder while the original should be sent to the Work Environment Officer.

### 3.7 Rules for working alone

Applicable rules for working alone are provided in AFS 1982:3 [http://www.av.se/lagandratt/afs/afs1982\\_03.aspx](http://www.av.se/lagandratt/afs/afs1982_03.aspx) (in Swedish). A person “working alone” implies that he or she is alone, either due to the location of the place of work, time of day/night, or day of the week. Whether work conducted alone shall be permitted is determined by the risk assessment of the work at hand (which must be documented). The risk assessment documentation must for example indicate in advance the presence of planned communication channels that will enable the person working alone to call for help in case of an unexpected event. It must also be clearly stated *who* will provide help and *how* the help will be provided. In case of fieldwork, somebody must be made aware that the person conducting the fieldwork is working alone. He or she must also be made aware of the expected time of return of the person conducting the fieldwork. The risk assessment must specify in detail which work tasks the assessment concerns, that is, which work tasks are “permitted” so that the worker does not perform other work tasks “by mistake”.



Or in fewer words:

Chemical laboratories are and will never be a completely safe environment...

**Avoid as far as possible working alone!**

### **3.8 For pregnant and breastfeeding employees**

Please contact the Work Environment Officer or the Occupational Health Service for an extended exposure evaluation. Applicable rules and regulations are given in “Gravida och ammande arbetstagare” AFS2007:5 available at [Gravida och ammande arbetstagare \(in Swedish\)](#)

### **3.9 Service requests**

Non-urgent problems with fans and ventilation and requests for heating, cooling, water, sewer and electricity services in the Chemistry building at Campus Johanneberg shall be reported to <mailto:kb-service.chem@chalmers.se>

Serious problems encountered during regular work hours in the Chemistry building at Campus Johanneberg shall be reported at tel. 0730-346301.

Serious problems in the Chemistry building at Campus Johanneberg such as broken windows and major water leaks, encountered outside regular work hours shall be reported to Cubsec bevakning tel. 0771-761900.

To request regular maintenance services such as bulb replacement, see (in Swedish) [Service request](#)

### **3.10 When leaving the Department**

At a minimum, the following tasks must be completed when an employee leaves the Department, for example after completing a post doc period/doctoral studies or when moving or retiring. It is the responsibility of the **Group Leader**, or the responsibility of the Head of Department when it is a Group Leader who is leaving, to see to it that this requirement is fulfilled.

Return keys and keycard.

Clean up office area, empty desk drawers etc.

Dispose of chemical waste, if applicable.

Chemicals, for example synthesised products, saved for future work must be clearly labelled to prevent mistakes.

Clean up work area in laboratory.

The stock of chemicals in KLARA transferred to appropriate research group.

### **3.11 When working in a workshop**

Staff without proper training may not perform work in the Department’s workshops. Exceptions from this rule may be made for work with hand tools and if workshop staff gives permission.

### **3.12 When using cooling water**

Cooling water is used in many operations at the Department. Use of tap water for this purpose is a well-known flooding hazard and also contributes to our rental charge. Permanent installations must be connected to the building's closed cooling system. Use of reinforced tubing connected to tap and apparatus by hose clamps is a minimum requirement if using tap water for a temporary system. It is also mandatory to anchor the drain tube by clamp or weight in the sink. Do not use a higher flow than necessary and shut off the water when no work is in progress. Remember that the pressure in the lines tend to increase when the water consumption decrease, a phenomena that often result in an accidental detachment of the tubing. **If overnight cooling is required, the risk assessment documentation must state clearly how the flooding risk has been eliminated.**

### **3.13 Handling of other waste**

Procedures for waste recycling of non-chemical waste are available at all Department workplaces.

In the Chemistry building at Campus Johanneberg, waste is sorted into fractions according to the instructions at <http://www2.chem.gu.se/insidan/miljo/4462bl1Chemistry.pdf>.

### **3.14 Use of non-CE labelled electrical equipment**

Electric high-voltage equipment connected to the main power grid must be CE labelled. In the case of a device connected to the main grid, the CE label means that it is designed, made and equipped to prevent electricity-related risks. However, research activities may sometimes involve use of unique electronic equipment and temporary systems connected to the main grid.

Such equipment must be designed so that live parts are effectively covered to prevent unintentional contact. Parts that may be touched must be grounded. The grounding must always be confirmed by means of measurement before first use of the equipment and following any repairs. The Department technician must always be consulted if anything regarding this control procedure is unclear.

If the equipment is used in a facility where residual current circuit breaker (RCCB) is not installed or for example in connection with outdoor electricity work, an external RCCB must be connected between the power point and the equipment. Although most laboratories are equipped with a RCCB as part of the power supply system, you should always get this confirmed.

It is the responsibility of the **Group Leader** to see to it that this be done.

## **4 “Musts” and “Must nots”**

### **4.1 You must not**

Eat or drink in the laboratory!

Set up gas cylinders permanently in the laboratory!

Use the corridors as storage rooms (corridors are evacuation routes!).

Put experiment safety equipment out of operation. Such equipment includes

electric ground connections, splinter screens, rupture discs, safety valves, pressure-, water flow-, or temperature interlocks!

Tamper with the building's gas-, electrical-, plumbing and ventilation systems!

Dispose of chemicals through the drain (but see also [http://www.science.gu.se/digitalAssets/1383/1383491\\_riktlinjer-avlopp\\_120928.pdf](http://www.science.gu.se/digitalAssets/1383/1383491_riktlinjer-avlopp_120928.pdf))

Keep fire doors open by using wedges, strings etc. Such doors are intended to stop the spread of smoke and fire and must always be closed. One exception is doors held open by magnetic door holders. They close automatically when the fire alarm goes off. Today, most fire doors are of this type.

Manipulate the alarms and functions of the ventilated hoods!

Use anything but hand tools in the workshops!

Smoke in department facilities!

Stay overnight in the department!

Let unknown people through locked doors. If you are not familiar with someone who want access to the departments, always ask who he or she is looking for and/or for what purpose he or she is coming. Please also follow the visitor to the person sought.

Throw stabbing/cutting (needles, razors, broken glass etc.) in the waste bins!

Wear lab coats etc. in the lunch and coffee areas!

## **4.2 You must**

Know the evacuation routes, the location of alarms and safety equipment as well as how they work!

Check the lab binder before commencing work in the laboratory!

Wear protective goggles and coat when working in the laboratory if this is not obviously unnecessary and also use additional safety equipment as prescribed in the risk assessment document for the work at hand!

Label containers to make clear what they hold. There must not be any container with “unknown” content. Note that written text on bottles etc. have a tendency to fade over time...!

Document in writing the operations that involve a risk! This is done by conducting a risk assessment according to Section 3.6.

Follow the rules for transport and storage of chemicals and gases!

It is just you that know if a spill is harmful or not...  
Clean up all spills including water immediately!

The consequences of mistakes (e.g. improper handling of ultracentrifuges) may be fatal...

Prior to use, always ask if you are doubtful about the handling of any piece of equipment!!!

Always notify the assigned staff (see the “Areas of responsibility list”) if any equipment behaves, or appears to behave, in a faltering or erratic way.

Inform your group leader and the Work Environment Officer if you handle chemicals with a hazard statement or risk phrase H350, H340, H360, R45, R46, R49 and R60.

## 5 Other useful information

The Department of Chemistry and Molecular biology is led by the Head of Department (*Prefekt*) with support from the Department council and the Steering group. Part of the Department is located in the Chemistry building at Campus Johanneberg on Chalmers premises where also the Department of Chemical and Biological Engineering (KB) at the Chalmers University of Technology is located. The department is divided into research groups. Names of groups are found in Appendix 1. A Group Leader informally heads each group. A description of who is doing what in the support functions of the work place are available on [Personalsida](#).

Part of the administration of the workplace is located on floor 6 of research building 1. A description of who does what in terms of administrative and technical support at the Department is found at [Personalsida](#) (in Swedish)

All rooms in the building at Campus Johanneberg have a four digit number ABCC (with the exception of large lecture halls and seminar rooms) where A indicates the floor on which the room is located and B indicates the section of the building with 0 = research building 1, 1 = the course section (*kursdelen*) and 2 = research building 2. CC is a number, identifying a particular room and where the rooms are located in sequence on each floor.

If any material that is required for your work is missing or finished, ask the Central purchaser to order what you need. This enables you to always get the Best deals, low surcharges and shortest possible delivery times (just a couple of minutes if we already keep what you need in stock!).

The ventilated hoods consume energy since they evacuate large quantities of warm air. You should therefore always keep the hoods closed when no work is in progress. In addition, turn off the lights in offices and labs in which nobody is working at the time.

There is a possibility for employees and students to participate in further training during work hours. There are for example courses in fire protection (*brandskydd*) and Cardiac Pulmonary Resuscitation (*hjärt- lungräddning*). Current courses are listed at <http://www.pa.adm.gu.se/kompetensutveckling/programandkategorier/arbetsmiljo/>

New employees are required to attend a mandatory introduction course described at <http://www.pa.adm.gu.se/english/introduction>

## 6 Tour of the workplace

To introduce you to the workplace, the Group Leader should see to that you make a guided tour of your workplace and during which at least the following locations/functions should be visited and commented upon, if needed.

- Your laboratory
- Introduction of your workmates
- Location and function of your group's "special equipment"
- Eye and body showers in the neighbourhood
- Fire fighting equipment in the neighbourhood
- First aid-kit
- Evacuation routes
- Assembly point
- Storage of chemicals
- Decontamination equipment
- Printer/photocopier
- KLARA-demonstration (How to find MSDS information)
- Where is the deputy Head of department located?
- Where is our administrative staff located?
- Where is the workplace safety officer located?
- Waste and recycling (lunch room, recycling room and garbage room)
- Lunch and coffee facilities
- Toilet and shower facilities

## Appendix

### 1. Staff involved in the Department's work environment organisation and their roles

| Function                        | Name                 | Telephone                           |
|---------------------------------|----------------------|-------------------------------------|
| Head of department              | Per Sunnerhagen      | 3830                                |
| Deputy Head of department       | Göran Hilmersson     | 9022                                |
| Manager of flammables           |                      |                                     |
| Deputy manager of flammables    | Mikael Håkansson     | 9025                                |
| Environment Work (chairman)     | Leif Lundh           | 3960                                |
| Environment Work Official       |                      |                                     |
| Environment Work Official       |                      |                                     |
| Environmental coordinator       | Leif Holmlid         | 9076                                |
| Husansvarig, Kemihuset Chalmers | Maria Liritsi        | 0730 346301                         |
| Radiation safety GU             | Annhild Larsson      | 0705 640457                         |
| Central purchaser of chemicals  | Valida Jarmetova     | 3954,<br>valida.jarmetova@cmb.gu.se |
| Keys                            | Helena Bergkvist     | 9007                                |
| Keys priority lift operation    | Ingrid Kubista       | 9028                                |
| Director of studies             | Johan Boman          | 9009                                |
| Director of studies             | Jürgen Gräfenstein   | 9016                                |
| <b>Research group</b>           | <b>Group Leader</b>  |                                     |
| Analytical Chemistry III        | Gulnara Safina       | 9061                                |
| Analytical Chemistry I          | Andrew Ewing         | 9113                                |
| Analytical Chemistry II         | John Fletcher        | 9105                                |
| Atmospheric sciences I          | Johan Boman          | 9009                                |
| Atmospheric sciences II         | Geert Cornelius      | 9064                                |
| Atmospheric sciences III        | Mattias Hallquist    | 9019                                |
| Atmospheric sciences IV         | Evert Ljungström     | 9029                                |
| Atmospheric sciences V          | Jan Pettersson       | 9072                                |
| Atmospheric sciences VI         | Leif Holmlid         | 9076                                |
| Dermatochemistry                | Ann-Therese Karlberg | 9109                                |
| Environmental Nanochemistry I   | Martin Hassellöv     | 9020                                |
| Environmental Nanochemistry II  | Caroline Jonsson     | 9066                                |
| Fundamental Chemistry II        | Elisabet Ahlberg     | 9002                                |
| Fundamental Chemistry I         | Zareen Abbas         | 9015                                |
| Fundamental Chemistry III       | Kim Nygård           | 9036                                |
| Marine Chemistry I              | Katarina Abrahamsson | 9051                                |
| Marine Chemistry II             | Leif G. Anderson     | 9005                                |
| Marine Chemistry III            | Per Hall             | 9062                                |
| Marine Chemistry IV             | Stefan Hulth         | 9024                                |
| Marine Chemistry V              | David Turner         | 9054                                |
| Medical Chemistry I             | Anna Börje           | 9012                                |
| Medical Chemistry II            | Marica Ericson       | 9030                                |
| Medical Chemistry III           | Morten Grötli        | 9017                                |
| Medical Chemistry IV            | Kristina Luthman     | 9031                                |
| Organic Chemistry I             | Mate Erdelyi         | 9033                                |
| Organic Chemistry II            | Göran Hilmersson     | 9022                                |
| Organic Chemistry III           | Per-Ola Norrby       | 9034                                |

|                          |                   |      |
|--------------------------|-------------------|------|
| Organometallic Chemistry | Mikael Håkansson  | 9025 |
| Physical Chemistry I     | Johan Bergenholtz | 9078 |
| Physical Chemistry II    | Gunnar Nyman      | 9035 |



## 2. Work environment policy, Department of Chemistry and Molecular Biology, University of Gothenburg

The work environment efforts at the Department are to be conducted systematically and with a preventative focus, with active involvement by all staff members. The work is based on the assumption that each employee/student will contribute to a good work environment at the Department. The Department's work environment policy provides a foundation for this work and constitutes an addition to the policies established for the University of Gothenburg and the Department of Science. [PolicyGU](#) and [PolicySci](#), both in Swedish).

It goes without saying that the work carried out at the Department is to comply with Swedish law and all applicable ordinances. This implies, among other things, that:

- ✓ No person working at the Department shall suffer physical or mental ill health as a result of the work.
- ✓ No person working at the Department shall be discriminated against based on gender, religious affiliation, disability, sexual orientation or other factors.
- ✓ All persons who work at the Department shall possess the knowledge necessary to carry out the work in a safe and satisfactory manner. This means, for example, that new employees shall be introduced to their new work tasks. Those who are assigned tasks within the work environment organisation shall, in addition to possessing necessary knowledge, also have the authority and resources needed to successfully complete their tasks.
- ✓ Risks related to the work shall be assessed, documented and minimised.
- ✓ Responsibilities and scope of authority shall be documented and made known at all organisational levels.

In addition to merely complying with the available regulations concerning the work environment in general, the following special efforts are taken to control and create awareness about work environment risks associated with chemicals:

- ✓ Department staff shall be well equipped to respond to incidents via continual training on fire protection and first aid.
- ✓ Decreasing the amounts of chemicals handled reduces chemical work environment risks.
- ✓ Our students are given good and modern knowledge regarding safety and the work environment at Chemistry laboratories. The students shall be trained to assess risks in connection with laboratory work.

The work environment policy was decided on at the Department of Chemistry Board meeting on 24 April 2003, revised December 2006, December 2007 and January 2010.

### 3. RISK ASSESSMENT

Group:

Date:

Brief description of activity/experiment:

Handled substances: (name/amount/dangerousness of reactants and products if applicable)

Risks associated with the activity: (What can go wrong, how likely is it that something will go wrong and if something goes wrong, what will the consequences be?)

Risk assessment table for estimation of probability/consequence

|                    |                      | <b>Probability of an incident occurring</b> |                        |                 |               |
|--------------------|----------------------|---|------------------------|-----------------|---------------|
|                    |                      | <b>Unlikely</b>                             | <b>Not very likely</b> | <b>Possible</b> | <b>Likely</b> |
| <b>Consequence</b> | <b>Insignificant</b> |   |                        |                 | Risky         |
|                    | <b>Minor</b>         |   | Risky                  | Risky           | Risky         |
|                    | <b>Serious</b>       |   | Risky                  | Risky           | Very risky    |
|                    | <b>Very serious</b>  | Risky                                       | Risky                  | Very risky      | Very risky    |

Final assessment of risk associated with the described operation:

Measures must be implemented to reduce the risk if the operation is assessed to be “risky” or “very risky”.

Measures implemented to reduce the risk:

Risk assessment conducted by:

Verified by:

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#### **4. Peroxide-forming solvents frequently used at KMB**

1,2-dimethoxypropane (cas.nr: 7778-85-0)  
1,4-dioxane (cas.nr: 123-91-1)  
Butyl vinyl ether (cas.nr: 111-34-2)  
Diethylene glycol diethylether (cas.nr: 112-36-7)  
Diethylene glycol dimethylether (cas.nr: 111-96-6)  
Diethyl ether (cas.nr: 60-29-7)  
Diisopropyl ether (Isopropyl ether, cas.nr: 108-20-3)\*  
Dimetoxymethane (cas.nr: 109-87-5)  
Ethylen glycol dimethylether (a.k.a. 1,2-dimethoxyethane, cas.nr: 110-71-4)  
Ethyl vinyl ether (cas.nr: 109-92-2)  
Furan (cas.nr: 110-00-9)  
Tetraethylen glycol dimethyl ether (cas.nr: 143-24-8)  
Tetrahydrofuran (cas.nr: 109-99-9)  
Triethylene glycol dimethyl ether (cas.nr: 112-49-2)

\* = The shelf life is three (3) month from the date the container was opened.

## Receipt

I have received, read and understood *Routines and Regulations for Work at the Department of Chemistry and Molecular Biology, Campus Johanneberg, University of Gothenburg* version 2013:1.

I have viewed the film *Skyddsventilerade arbetsplatser (English subtitles)* available under "instruktioner" at [Safety ventilation](#)

-----  
Signature

-----  
Date

-----  
Printed name

-----  
my Group Leader/Supervisor

I am (please mark one alternative)

permanently employed

a post doc

a doctoral student

a project/degree project worker

other: