KTH's Guidelines for Work with Chemical, Radiation and Biological Risks in Laboratories

The safety guidelines in this document apply to all of KTH and are intended to complement information provided by the Swedish government relevant to our working environment. Everyone who is active in KTH's labs must familiarize themselves with this document and, as needed, relevant Swedish law.

Follow the steps below to familiarize yourself with the rules and regulations at KTH:

1. Read this document carefully and sign the corresponding form prior to beginning work in the lab. Send the signed, scanned document to your schools Contact Person for Chemical Safety.

2. Register for the onsite Introduction to Lab Safety at KTH Course at the link below.

   https://intra.kth.se/en/campus/sakerhet/verksamhetssakerhet/kemikaliehantering/kemisk-och-biologisk-sakerhet-och-utbildning-1.1206484

3. Register for KTH's digital Radiation Safety Course (if relevant for your work/work environment) at the link below.

   https://intra.kth.se/en/campus/sakerhet/verksamhetssakerhet/stralsakerhet/stralsakerhetsorganisation-och-utbildning-1.1035934

4. Request an account in the KLARA chemical inventory system from your schools Contact Person for Chemical Safety.

5. Familiarize yourself with the rules and laws relevant for your work as needed.

Table of Contents

1 Work with Chemical Risks

Chemical risks is a broad term describing potential exposure to both pure chemicals and chemical products that are CLP marked as having physical, health or environmental risks. For more information regarding the organization of chemical safety work at KTH, see KTH's Management System for Chemical Safety.

1.1 KLARA

KTH uses the chemical inventory system KLARA. In KLARA it is possible to search for chemicals in your lab, view safety data sheets, complete risk assessments and check if the chemicals you work with are subject to additional legal requirements. For access to your workplace at KTH in the KLARA inventory system contact your schools Contact Person for Chemical Safety with your KTH email address.

1.2 Purchase, Import and Export of Chemicals

Chemicals must be purchased through KTH's framework agreement in Wisum and there can be fines associated with breaking this regulation. If a particular chemical or product cannot be found through our framework agreement contact your schools respective purchasing manager for help. Be aware, that the buyer is personally responsible for providing safety data sheets for all chemicals purchased outside of our framework agreement. Products classified as Dual Usage Products may require special permission from the Inspectorate of Strategic Products (ISP) prior to import or export the product. Additionally, there are specific regulations regarding the import of chemicals or chemical products from outside of the EU.

1.3 Permits for Chemicals

Permits are required **prior** to the purchase of select chemicals. Additionally, chemicals may require an end user statement, where you as the user must describe what you intend to do with the chemical. The permit or end user statement must be sent in to the supplier before they can approve any orders.

Chemicals that require permits include:

- A and B listed chemicals
- Narcotics and Narcotic Precursors
- Goods Dangerous to Health
- Mercury
- Hydrogen peroxide (concentration dependent)

If you think you may require a permit for your work, contact chemicalsafety@kth.se to help with the process. Included in the application process is relevant risk assessments and

justification as to why this chemical cannot be replaced with a less harmful alternative. Keep in mind that it may take months to receive permission following the submission of an application and there is no guarantee that an application will be approved by the respective government agency.

1.3.1 Hydrogen peroxide

Hydrogen peroxide is classified as both flammable and reactive. For hydrogen peroxide with a concentration ≥ 20 %, the following storage volumes are permitted:

- A maximum of 1 litre if the concentration is ≥ 80 %,
- A maximum of 5 litres if the concentration is 60-80 %,
- A maximum of 50 litres if the concentration is < 60 %,
- Keep hydrogen peroxide in a spark free refrigerator due to gaseous decomposition.

1.4 Storage of Chemicals

All new chemicals should be registered with barcodes in KLARA prior to being stored in a lab. CLP marked chemicals should be stored in ventilated cupboards or storerooms intended for chemicals.

Reference the safety data sheet for information on correct chemical storage. Special marking is required for flammable and toxic chemicals. General rules regarding storage are listed below.

- Flammable liquids must be kept in ventilated cupboards approved for the storage of flammables and must not be stored together with non-flammable toxic substances.
- Gas cylinders must be anchored with a metal chain
- To minimize fire risk it is recommended that the quantity of flammable liquids (outside of a safe storage place for ex. a flammable storage cabinet) be minimized to what is be used daily or a maximum of 40 liters per fire cell.
- Flammable and toxic chemicals are stored as flammable substances
- Strong acids must be kept in ventilated acid-proof cupboards (separate from bases).
- Strong bases must be stored in ventilated cupboards (separate from acids).
- Organic substances and strong oxidizing agents should not be stored together with strong acids.
- Ethers and peroxide-forming substances should be stored in the dark and be clearly labelled when the containers were opened and when they must be discarded, as explosive compounds form with time.

- All chemicals that require refrigeration must be stored in spark-free refrigerators.
- Chemicals requiring a permit must be stored as specified in the permit.

For safety and security reasons medicines and drugs must **not** be registered in KLARA. Antibodies and proteins do not need to be registered unless they are mixed with CLP marked chemicals (e.g. sodium azide, a common preservative) or if they are considered harmful according to CLP Regulations (in which case they should have an associated SDS).

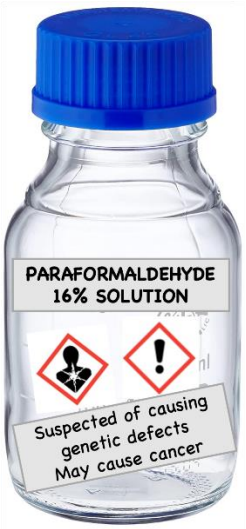
Kits, cell media, buffer solutions and gas containers should be registered in KLARA.

1.5 Labelling of chemicals

There are legal requirements regarding the labelling of solutions that contain CLP marked chemicals. Keep in mind that the goal of labelling is to provide all information that would be required to respond to an accident, even in the event that the individual who made the solution is absent. These requirements also apply to the labelling of waste.

Included in the requirements:

- The chemical contents
- Associated CLP hazard symbols
- Additional marking if the solution contains a CMR chemical or allergen
- Name (of the person who made the solution) and date



1.6 Chemicals marked as higher risk

1.6.1 CMR chemicals

Prior to working with chemicals that are carcinogenic, mutagenic or toxic for reproduction (CMR) there is a legal requirement to complete an investigation into possible substitution. It is possible to complete an investigation regarding replacement in the KLARA risk assessment module or using a separate template available on the SSD's website.

https://intra.kth.se/en/campus/sakerhet/verksamhetssakerhet/kemikaliehantering/cmr-utredningar-och-exponeringsregister-1.541522

CMR chemicals have the following hazard markings:

H350: May cause cancer

H340: May lead to genetic defects

H360: May harm fertility or an unborn child

Additionally, a register of accidental exposure to CMR chemicals must be kept at KTH. If you are accidentally exposed to a CMR chemical, report the incident in the IA incident reporting system and the exposure will be recorded as part of the response measures.

1.6.2 Allergy Causing Chemicals

Exposure to some chemicals can lead to an allergenic response. Allergy causing chemicals are marked with the following hazard statements:

H317: May cause allergic skin reaction

H334: May cause asthma symptoms or breathing difficulties

Additional education and in some cases medical controls are required for work with select allergy causing chemicals listed below. At KTH we include this education as a module in the Introduction to Lab Safety Course.

- Diisocyanates
- Epoxy plastic components
- Organic acid anhydrides
- Formaldehyde resins
- Methacrylates that are labelled with H317 or H334
- Acrylates that are labelled with H317 or H334
- Any work that entails the thermal degradation of materials that release isocyanates or processes that release formaldehyde.

- Chemical products containing ethyl-2-cyanoacrylate or methyl-2-cyanoacrylate, if the work is carried out for more than a total of 30 minutes per week.

1.6.3 Peroxide building chemicals

Peroxide building chemicals are potentially explosive. There is a list of peroxide building chemicals in KLARA including the frequently used examples below:

- Diethyl ether CAS: 60-29-7
- 1,2-Dimethoxyethane CAS: 110-71-4
- 1,4-Dioxane CAS: 123-91-1

The factors that lead to increased production of peroxides include, exposure to oxygen, sunlight or heat and the age of the chemical. Additionally, if the product is distilled stabilizers may be removed, increasing the risk of peroxide formation. If you notice cloudiness, turbidity or crystalization don't touch or move the container but instead report the risk in the IA system and contact SEKA for help with disposal of the product.

To prevent the development of peroxides and potential explosion follow the recommendations below:

- Mark products with the date delivered and date opened
- Store opened products for a maximum of one year
- Store in dark, cool storage locations
- Use peroxide tests strips as needed
- Liquids -check peroxide content regularly
- Solids -discard before the expiration date
- Solutions with peroxide content of ≥3mg/l must be disposed of as hazardous waste

1.6.4 Highly corrosive substances

Strongly corrosive chemicals must not be kept on highly placed shelves. Nor may they be transported or be stored longer term in beakers or flasks. Bottles containing these chemicals should preferably be transported in a plastic bucket or the like.

Safety glasses must be worn when corrosive chemicals are being transported. A face shield must be used when large amounts are handled, and when making diluted solutions from large bottles.

- Perchloric acid is explosive in contact with organic materials. Perchloric acid should be handled in special ventilated fume hoods with, for example, flushable ventilation ducts that are not used for anything else.

- Bottles containing bromine can become brittle after a time, and these bottles shall therefore always be handled carefully

- Concentrated nitric acid can cause a fire when contacting many organic materials. Correct gloves must be worn.

1.7 Working with Gases

Gas cylinders are frequently used in KTH's labs and all rooms containing gas cylinders must be marked with the appropriate signage.

1.7.1 General Guidelines for working with gas cylinders

- A gas cylinder may only be connected to a reduction valve with the same name as that given on the cylinder.

- Only the reduction valves and gas tubing approved for the particular gas may be connected to a gas cylinder.

- Gas cylinders must be treated carefully and must not be subjected to shocks or blows or heat.

- A gas cylinder must be placed so that it cannot fall over. It must always be chained fast and the chain must not be placed around the valve or too far down the cylinder. Alternatively, the gas cylinder can be kept on a wheeled trolley. A nylon strap, or similar, is not sufficient protection as it can melt in the event of a fire.

- Cylinders containing a flammable or toxic gas must not be left standing in the laboratory. They shall be kept in a special gas cupboard approved for the purpose and be clearly marked with the correct warning sign.

- Doors to rooms in which gas cylinders are kept shall be marked with the warning sign for gas cylinders.

1.7.2 Transport of gas cylinders

The carts intended for the transport of gas cylinders shall always be used when cylinders are moved. Do not travel by elevator together with a gas cylinder.

1.7.3 Toxic gases

Gases which are caustic or can cause respiratory paralysis should be purchased in as small bottles as possible, so that they can be placed and handled in fume cupboards when in use, or be placed in a ventilated and fireproof cupboard.

1.7.4 Frequently used gases

1. **Oxygen**

   Oxygen is only stored with non-flammable gases.

2. **Acetylene**

   Gas cylinders larger than 5 litres containing acetylene, which is used with compressed air or oxygen in welding, shall be furnished with a back flow protection device to prevent back flow in the tube system to the gas bottle. The pressure on the regulator must not exceed 1.5 bar.

   The installation shall be checked twice a year and include a leakage test, the test shall be documented. The back flow protection device shall be checked and documented by an authorized person annually.

   Fire protection gloves must be available in the vicinity of the acetylene cylinder in case of a fire.

   Leaking acetylene may smell like garlic if there are impurities present.

3. **Hydrogen**

   An explosive mixture can form with gas concentrations ranging from 4-75% volume.

1.8 Liquid Nitrogen

Liquid nitrogen is colourless and odourless and the gas is non-toxic. However, risks of work with liquid nitrogen include burns and suffocation (as the gas can displace oxygen). Use appropriate personal protective equipment to prevent liquid nitrogen burns including googles, appropriate gloves, a lab coat and close toed shoes. If the ventilation is out of order, do not collect or use liquid nitrogen. 1 litre of liquid nitrogen can produce 800 litres of nitrogen gas leading to a great risk of suffocation. Never transport or handle liquid nitrogen in an elevator or other areas where there is insufficient ventilation due to the risk of suffocation.

1.9 Dry ice

Dry ice is solid carbon dioxide which changes directly from solid into gas at a temperature of -78 °C and higher. Risks of work with dry ice include frost bite and suffocation, as carbon dioxide displaces oxygen. For this reason, dry ice should only be handled in well ventilated areas. Always wear appropriate insulated gloves and eye protection when working with dry ice.

1.10 Technical Alcohol

Alcoholic products which are not alcoholic beverages or medicinal products are classified as technical spirits. Routines for documenting the quantity of technical alcohol purchased and consumed must be maintained at every department or division depending on local routines.

Fully denatured alcohol, or alcohol that has added components making it unfit for consumption, does not require this documentation. For technical spirit to be considered fully denatured, it must contain ALL the components below.

Per 100L of absolute ethanol:

- 1 litre of isopropyl alcohol
- 2 litres of methyl ethyl ketone
- 1 gram of denatonium benzoate.

Most of the technical spirit at KTH is not fully denatured and up to date documentation is required. The following information must be included in the documentation of the handling of technical spirit:

- A yearly inventory of technical spirit
- Changes in the inventory including purchases, usage/disposal

The documentation must be stored for two years onsite. In the event that a difference between the inventoried quantity and the expected stock quantity is detected this must be reported and investigated as an incident.

1.11 Chemical Waste Management

The drains at KTH lead to the local waste water treatment plant and what we pour down the drains is NOT filtered in any additional way. The base principle is that chemical waste MUST be collected, labelled and left with SEKA AB (Stena AB for SciLifeLabs), the company KTH has procured to manage our chemical waste. Chemical waste is subject to the same labelling requirements listed for solutions in the lab. For additional information, see KTH's Routine for handling liquid chemical residues and aqueous solutions.

1.12 Accident Plan

Onsite routines must plan for the management of potential mishaps including spills and accidental exposure. This may include onsite training regarding the use of spill kits and accident response equipment (e.g. eye wash). All accidents, incidents and risks must be reported in KTH's incident reporting system IA.

Spill
Spill kits and accident response equipment must be available in our labs to be used in case of an accident.

Exposure
If you believe that you have or may have been exposed to a chemical in the lab be sure to follow the onsite accident routines and report in the incident in the IA system. If deemed necessary in the investigation of the incident, you may also need to go for medical checks.

2 Work with Radiation Risks

Radiation risks are risks associated with technical equipment or radioactive material that emit ionizing radiation. For more information regarding the organization of radiation safety work, see KTH's Management System for Radiation Safety.

2.1 A Central Permit, Internal Site Registration

KTH has a central permit for work with radioactive materials from the Swedish Radiation Safety Authority. Internally at KTH, individual sites where radioactive materials are used must be inventoried centrally. Contact your schools respective Contact Person for Radiation Safety if you plan to set up a new site to begin work with radioactive materials.

https://intra.kth.se/en/campus/sakerhet/verksamhetssakerhet/stralsakerhet

2.2 Registration or Removal of Radiation Sources from KTH's Inventory

If you would like to add or remove individual radiation sources from your work space, contact your schools Contact Person for Radiation Safety who will coordinate this process with the KTH Department of Safety and Security.

2.3 Educational requirements

KTH employees who plan to work with radioactive material must complete a digital course in radiation safety prior to beginning work in the lab. Register for the course at the following link:
https://intra.kth.se/en/campus/sakerhet/verksamhetssakerhet/stralsakerhet/stralsakerhets organisation-och-utbildning-1.1035934

2.4 Internal Onsite Checks

An internal onsite check is completed once per year for all sites working with radiation risks. Participants of the check include the Radiation Safety Administrator, your schools respective Contact Person for Radiation Safety, a site representative and KTH's Radiation Safety Expert.

2.5 Radioactive Waste Management

A management plan for radioactive waste should be included in your risk assessment. For assistance with developing a waste plan, contact your schools Contact Person for Radiation Safety.

2.6 Accident Plan

Onsite routines must plan for the management of potential mishaps including spills and accidental exposure. This may include onsite training regarding the use of accident response equipment (e.g. eye wash). All accidents, incidents and risks must be reported in KTH's incident reporting system IA.

3 Work with Biological Risks

Biorisks are risks associated with biological materials or infectious agents. Examples include toxins, prions, viruses, bacteria, fungi, parasites, cell cultures, blood and tissue, research animals, plants and contaminated laboratory waste. For more information regarding the organization of biological safety work at KTH, see KTH's Management System for Biological Safety.

3.1 Genetic Modifications

Permission from relevant government agencies is required for work with GMO and GMM organisms.

Genetically modified organism (GMO): An organism that has been altered using genetic engineering techniques.

Genetically modified microorganism (GMM): A microorganism whose genetic material has been altered using genetic engineering techniques.

3.2 Risk Class

Biorisks are classified into risk classes 1-4 with a higher number corresponding to increased risk. Risk class is determined based on the pathogenicity, mode of transmission and availability of protective measures or treatments.

Risk Class 1: Biorisks that are unlikely to cause disease
Risk Class 2: Biorisks that can cause curable or transient diseases
Risk Class 3: Biorisks that can cause serious illness
Risk Class 4: Biorisks that are deadly

3.3 Biosafety or Containment Level

Biosafety Levels 1-4 often correspond to risk classes but take into consideration specific procedures used that may alter exposure level and required control measures. The assignment of a level must be included in you risk assessment. The inherent risk of the biorisk being used, the lab space, equipment and routines required for a safe work environment must all be considered. For example, an organism that is classified as risk class 2, may require additional protective measures if high concentrations of aerosols are generated in procedures used.

3.3.1 Notifications and permits

Before beginning work with new biorisks complete a risk assessment of the biorisk and contact a safety specialist at biologicalsafety@kth.se. Following an evaluation, an assessment as to whether additional notifications and/or permits and protective measures are required will be made. Group leaders are responsible for checking the correct permissions are in place for their work.

3.3.2 Microorganisms

Notifications and/or permits from Arbetsmiljöverket are required before beginning work with wildtype microorganisms belonging to risk class 2 or higher and GMM of all risk classes.

3.3.3 Invasive Species

Permission may be required for work with invasive species or the importation of organisms. Invasive species have the potential to cause great damage to the environment. Before importing any organism, check if special permission or containment is required.

3.3.4 Animal Bi-products

Permission is required for work with animal bi-products, contact biologicalsafety@kth.se for guidance with this process.

3.4 Common Routes of Exposure

It is important to risk assess the potential of exposure through aerosols, puncture wounds and skin contact as these are common means of lab generated infections.

Inhalation risks and aerosols – Procedures that may lead to the creation or aerosols include centrifugation, grinding, blending, vigorous shaking or mixing, sonic disruption.

Sharps Usage – One common route of exposure is via injury when working with sharps. Do not attempt to recap, clip or remove needles from syringes. Dispose of all sharps correctly in designated, puncture proof sharps specific waste containers.

3.5 Protective Measures when Working with Biorisks

Depending on the risk level of your biorisk material, different protective measures are required. The specific measures required for each procedure must be specified in the risk assessment.

3.5.1 Staff training

All new staff working in spaces with biorisks should receive onsite training on regarding work with biological risks.

3.5.2 Vaccination

All employees that work with human tissues including blood are offered vaccination against Hepatitis B through KTH's occupational healthcare provider.

3.5.3 Biological Safety Cabinets

Microbiological safety cabinets (MSCs) are divided into three types that provide varying levels of personal and sample protection. Read under “choose appropriate ventilation to learn more about the differences. MSCs must be inspected yearly to ensure proper functioning.

3.5.4 Handwashing

Hands should be thoroughly washed and disinfected after handling biorisks.

3.6 Limited Access

The international biohazard symbol must be present on the doors of rooms where risk group 2 or higher work is completed. Only trained, authorized personal **are permitted** to enter.

Biological risk

3.7 Biological Waste Management

Biorisk waste including all genetically modified microorganisms and contaminated materials must be either destroyed or sent for destruction with the company procured by KTH to manage hazardous waste at your location. On site autoclaving is the preferred waste treatment for biorisks when possible.

3.8 Accident plan

Onsite routines must plan for the management of potential mishaps including spills and accidental exposure. This may include onsite training regarding the use of spill kits and accident response equipment (e.g. eye wash). All accidents, incidents and risks must be reported in KTH’s incident reporting system IA.

3.8.1 Spill

A spill plan and spill kit should be available in all labs where biorisks are present. If a spill is too large to manage, close off the space and seek help.

3.8.2 Exposure

If you think that you have or may have been exposed to a biorisk in the lab be sure to follow the onsite accident routines. If deemed necessary in the investigation of the incident, you may also be offered medical checks.

4 Protecting Yourself in the Lab

4.1 General Guidelines

- Eating and drinking in the lab is forbidden.
- Solitary work should be limited and if possible completely avoided.
- Masters students are not allowed to work alone in the lab outside of normal working hours.
- Lab coats should be worn when determined necessary during the risk assessment.
- Open shoes, shorts and short skirts/dresses should not be work in the lab.

4.2 Risk Assessment

It is a legal requirement to complete a written risk assessment be completed before a new experiment is undertaken. The risk assessment must be signed by both the supervisor and the individual completing the experiment and indicates that both parties agree the procedure is of acceptable risk.

Risk assessment templates available in KLARA and on KTH's Department of Security and Safety website:

1. The KLARA system has a module for risk assessment of work with chemicals.
2. A paper version of the KLARA risk assessment template on the website
3. Risk assessment for biorisks is available on the website.
4. Risk Assessment template for pregnant and breast feeding employees

4.3 Pregnancy Risk Assessment

As soon as ones nearest supervisor has been informed of the pregnancy, all lab work must cease pending completion of a pregnancy risk assessment. Contact the Department of Security and Safety at chemicalsafety@kth.se for help with the risk assessment process.

4.4 Choose appropriate ventilation

Protective ventilation is one of the best tools we have for reducing the risk of exposure to biological and chemical risks. The ventilation required is specified in the risk assessment and can vary between different steps of a procedure. Using protective ventilation correctly is key to isolating the risk and preventing accidental exposure.

4.4.1 Chemical Fume Hood

Many of our labs are equipped with chemical fume hoods to provide increased ventilation for work with hazardous chemicals. Be aware, that the protection proved is dependent on correct use of the fume hood.

Guidelines for working in the chemical fume hood:

- Minimize disturbance to air flow by shutting doors and limiting movement in and around the hood as much as possible.
- Try to work in the back of the hood and keep it as empty as possible
- Use the brushed holes on the side of the hood for any chords needed for electrical equipment
- The power sockets with a red ring around them are not connected to the ventilation and will still provide electricity in the event of a ventilation failure. Use the red ring power sockets only if the loss of electricity can compromise the safety of the experiment. The other sockets are connected to the ventilation so if there is an electrical failure, the ventilation shuts off and vice versa.
- Leave nothing in the opening to the fume cupboard, which will prevent the window from closing.
- Do not use a fume hood as a storage area.
- The flow rate through a fume hood should be at least 0.5m/s at all times. If the flow rate goes below this rate an alarm sounds to indicate that the hood is not safe to work in. If the power goes out and the ventilation stops working and the hood needs to be closed by hand.
- The front window of the fume cupboard is not intended to provide protection if the work involves an explosion risk. In such cases, a screen of a shatterproof plastic must be used as protection.
- A vacuum pump which is used in connection with a fume cupboard must not be placed under the fume cupboard unless it is EX-classified (explosion protected). In addition, the pump must be placed in a dish (oil leakage) and this shall be connected to the exhaust (oil fog).

4.4.2 Point exhaust

Place the exhaust as close to the source of contamination as possible. The maximum distance for a protective effect is equal to the diameter of the exhaust channel.

4.4.3 Biological Safety Cabinets

In labs that work with biological risks, biological safety cabinets provide protection from aerosols and splashes. There are three different types of biological safety cabinets with varying levels of sample and personal protection. Be sure to choose the protection that is optimal for your work.

4.4.4 Storage cupboards

CLP marked chemicals should be stored in ventilated cupboards when not being used.

4.5 Personal Protective and Emergency Response Equipment

The personal protective equipment required for a particular procedure must be determined in the risk assessment and frequently includes items on the list below. Be sure to understand the limitations associated with all personal protective equipment and to use it appropriately. Personal protective equipment used in the lab must NOT be taken outside of the lab (to for example the offices or kitchen).

- Lab Coat
- Appropriate Gloves
- Safety Goggles
- Face shield
- Face mask
- Respirator

Emergency Response Equipment is available in case of mishaps. Make sure you know how to use the emergency response equipment in your work place.

- Emergency Shower
- Emergency Eye wash

4.6 Medical Controls

In addition to risk assessments and personal protective equipment, medical controls (e.g. blood and lung capacity tests) may be required for work with risks or to control for accidental exposure. Medical controls are required for work with mercury, lead and cadmium. Medical controls are also required for select allergy causing chemicals and in some cases for work with radiation risks. A list of chemicals that require medical controls for your area of KTH is available in KLARA. To arrange a medical control contact KTH's occupational healthcare provider.

5 Yearly Safety Rounds

According to Swedish law, onsite safety rounds (Skyddsronder) must be conducted at least once per year. The rounds include a work environment responsible representative from KTH (usually the prefect for your department), a representative appointed by the union (Skyddsombud) and the schools Contact Person for Chemical Safety. The goal of the safety rounds is to check that rules and regulations are being followed across KTH. Following the safety rounds, a list of necessary action measures with a proposed timeline is made and an individual is assigned responsibility for each task.

6 Fire Safety

Flammable goods can give rise to explosive atmospheres. Explosive atmospheres are characterized by flammable gas or vapor mixed with air that can ignite and cause an explosion. Be aware of any potential source of ignition in work areas of elevated risk. Some common risks in our labs include flammable chemicals, gases, ovens and hot plates.

Corridors and stairways are evacuation routes that must not be blocked. If there is a fire in the lab and it needs to be evacuated, make sure to close the door to the lab as you are leaving.

Common fire hazards to avoid in the lab:

- Maintain a well-organized work space to prevent spills and accidents
- Do not store cardboard boxes on the floor in the lab. The material can soak up spillage and magnify a potential fire.
- Smaller electrical equipment should not be stored on the floor in case of leaks or spills.
- Be careful when using extensions that they are not curled and not avoid pulling too much power from a single outlet.

- Be cautious when working with volatiles and hot surfaces.
- Emergency exits must never be blocked.

6.1 Fire Extinguishers

At KTH carbon **dioxide extinguishers** are placed in all the laboratories. **Powder extinguishers** are placed outside the storerooms for chemicals and solvent storerooms. **Water extinguishers** are placed in office environments.

6.2 Response steps in case of a fire

1. Rescue: People who are in danger
2. Warn: Start the Alarm
3. Call SOS 112: Tell them who you are and where you are calling from
4. Extinguish: If safely possible to do so. If you cannot extinguish the fire, close doors and windows as you exit the space.
5. Evacuate: Take the nearest evacuation route to exit the building and proceed to the assembly point.

*Know the evacuation routes, follow the evacuation signs to exit the building and proceed to the assembly point.

7 Transport

Special training is required in order to receive permission to transport chemicals between buildings. Contact your schools respective infrastructure group for help with this. Do not travel in an elevator together with gas cylinders or liquid nitrogen.

International and national regulations regulate the transport of infectious substances. It is the responsibility of the sender to ensure applicable rules are followed. Please check the information provided by Folkhälsomyndigheten available at the link below.

https://www.folkhalsomyndigheten.se/mikrobiologi-laboratorieanalyser/laboratorieanalyser-och-tjanster/information-for-bestallare/transport-mikrobiologiska-analyser/

8 Reporting Risks, Occurrences and Accidents

If you have been involved in an occurrence or accident at work or notice a risk, there is a legal requirement to officially report this deficiency. The goal of reporting is to prevent future problems and to thereby improve our working environment for employees.

Risk – a potential problem has been identified

Occurrence/Incident – something has happened, no one has been injured

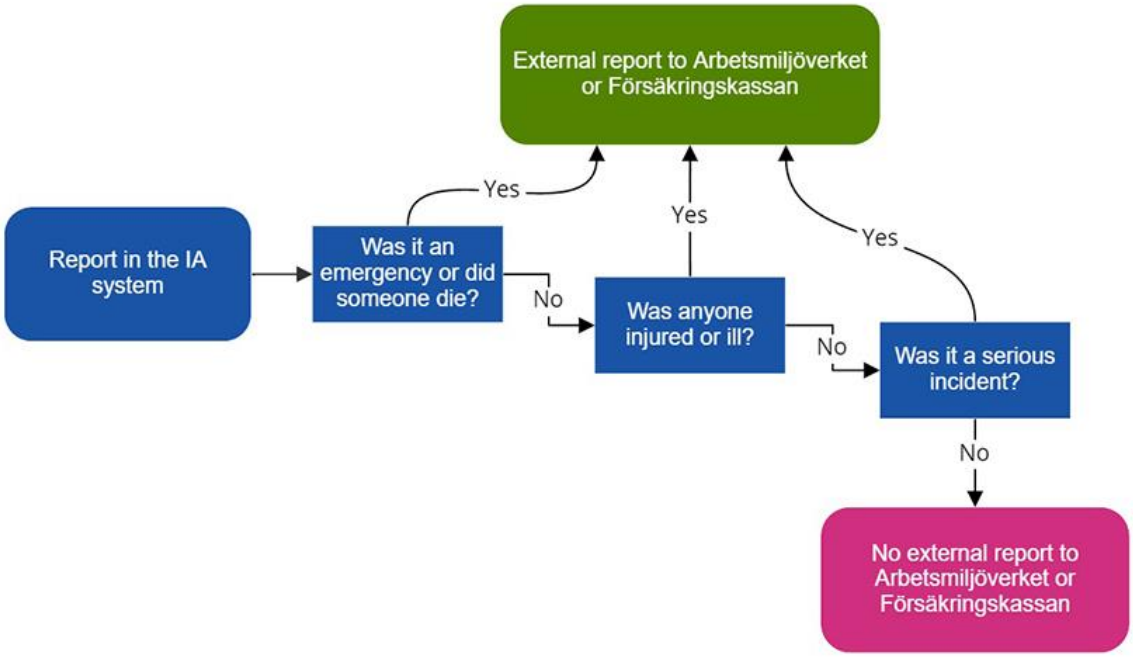
Accident/Injury – someone has been injured or become ill.

The IA System

At KTH we use the IA system found at the link below to report incidents. You can also enter the system using the QR code found on the Aj/Oj signs present in labs across the school.

https://intra.kth.se/en/anstallning/arbetsmiljo/anmalan-av-tillbud-risk-och-arbetsskada-1.490817

Depending on the severity of the incident, it may be required to complete an external report to either Arbetsmiljöverket or Försäkringskassan. If the incident was an emergency situation Arbetsmiljöverket must be notified as soon as possible but no later than within 48 hours. The IA system will inform you if an external report is required. Be aware, that an injury or illness that is not reported may not be eligible for future insurance coverage if needed. Below is a flow chart illustrating the steps taken during reporting, depending on the nature of the incident.



Flowcart - reporting incidents

9 Emergency Contact Information

Swedish Emergency Number 112

Ring this number in case of emergency, serious injury, sickness or fire.

Swedish number for medical guidance (Vårdguiden) 1177

Ring this number in cases where it is not an emergency, but you would like medical advice on how to proceed, for example, in the case of suspected exposure to a chemical.

KTH Alarm Number 08 790 77 00

Ring this number to reach KTH's crisis organization

Akademiska Hus Alarm 010-557 24 00

Ring this number if there is, for example, flooding in the building.