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Risk assessment for laboratory work at the Department of Ecology and Environmental Science

Extent of risk assessment

Normally the following 12 points are included in the risk assessment for all the chemicals that is used. In chemical work (e.g. chemical syntheses, experiments, sample preparation and analyzes) not only starting materials but also solvents and products should be included in the assessment.

Risk assessment is based on the Swedish Work Environment Authority regulations: AFS 2011:19 Chemical health hazards and AFS 2018: 1 Hygiene limits (in Swedish).

1. The intrinsic properties of the substances that may affect health: reactivity, toxicity and classification. For example, corrosive, intoxicating (CNS), cancer or allergenic, mutagenic or reproductive toxicity.
2. Chemical and physical properties, such as explosive, violent reactions with other substances, volatility and dust. Properties such as boiling point, melting point, flash point and density are important to consider.
3. Health hazards, for example inhalation and skin contact.
4. First aid measures, eye and skin contact, inhalation or swallowing.
5. Risks at:
 - a. Normal handling - the normal way of working.
 - b. Incorrect handling - possible malfunctions.
 - c. Leaks or spill.
 - d. Equipment failure.
 - e. Accident.
6. Assessment of risks in the different laborative steps, such as handling, transfer and mixing of chemicals, heating, reflux and distillation, etc.
7. Protective gear and measures taken (preventive) for eliminating risks. What is available and where is it? What else might be needed?
8. Cleaning, sanitizing and disposal.
9. The risk assessment should also include what may happen in case of power failure, water interruption, ventilation loss or evacuation and how then to act (for example, how to quick stop an ongoing experiment). How are non-monitoring experiments, for example reflux overnight, secured?



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10. If the experiment includes flammable goods, assessment of the risk of emergence of an explosive environment shall also be made, considering the general or possibly specific classification plans applicable in the particular lab.
11. Other: marking and storage.
12. Overall risk assessment. Included chemicals (starting materials, intermediates and end products) hazard, different laboratory factors and consequences if something goes wrong.

All risk assessments shall be filed in a binder placed in the laboratory and kept available to staff and supervisory authorities.

Basis for risk assessment

REACH

According to the EU Chemicals Directive REACH, companies and organizations that produce, sell or distribute chemicals are required to declare the properties of chemicals, etc., in a Chemical Safety Report (CSR), registered with the European Chemicals Agency (ECHA) in Helsinki.

Based on CSR for each substance or product, companies and organizations that produce, sell or distribute chemicals establish a Safety Data Sheet (SDS). These sheets should be similarly designed according to GHS (Global Harmonization System) with 16 different sections and refer to the entire life cycle for the intended use. The safety instructions specified in the SDS must be followed when the substance or product is used for its intended use. Other uses are prohibited without the creation of a new CSR and SDS for this use.

Safety Data Sheet (SDS) and other information

SDS is an important risk assessment document, as it contains a lot of information about the intrinsic properties of the substances and the dangerous effects that they may cause. Companies that sell chemicals (such as Sigma-Aldrich, Fluka etc.) can also have other information about their chemicals in addition to SDS. You can also get information from many places, for example from different government agencies and authorities in Sweden (such as the Swedish Chemicals Agency (KemI), the Swedish Environmental Protection Agency (Naturvårdsverket), or in other countries, NIOSH and OSHA in the United States).

Databases that can be used

1. At the Department of Chemistry, there is also the web-based database "Chemicals", which contains data of more than 36,000 substances. Information in that database can be used as a basis for SDS. For access see the document "Regulations and First Aid at EMG".



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2. National Institute for Occupational Safety and Health (NIOSH) provides links to a large number of databases on this page:
<http://www.cdc.gov/niosh/topics/chemical-safety/>
3. International Programme on Chemical Safety compiles the database “Chemical Safety Information from Intergovernmental Organizations (INCHEM)”: <http://www.inchem.org>
4. The chemical company Sigma Aldrich has its product register linked to a database with SDS for the products that are sold. There you can easily find their SDSs or search products and obtain SDSs with CAS number for the item or article number for the product. <http://www.sigmaaldrich.com>
5. National Institute of Health supervises the National Library of Medicine. There is also a database for searching information on health and safety with chemicals. <http://sis.nlm.nih.gov/chemical.html>
6. Certain chemical information can also be obtained from the Swedish Chemicals Agency (KemI). Here you can find information about REACH as well as R and S codes (risk and safety codes) and the meaning of the codes for chemical substances. <https://www.kemi.se/en>

General rules for laboratory work

- Working alone at the lab should be avoided as far as possible.
- Lab coat and safety goggles must be used for lab work where there is a risk, and protective gloves when handling chemicals.
- In case of an accident or if you are not well, go out of the lab, contact your colleague or teacher, and indicate which chemicals you have handled. In case of health effects, immediately contact the Emergency.
- In case of spillage or splashes in the eyes, rinse immediately with water for at least 15 minutes and contact the Emergency.

Extended risk assessment

An extended risk assessment includes the following items.

State:

1. At which places and spaces (rooms, benches, trunk cabinet, storage room or cabinet) the CMR substances used may occur and cause exposure.
2. What measures have been taken to limit availability so that only persons needed for the work are exposed to the risk.
3. What safeguards are necessary to ensure that exposure is minimal.
4. In what situations personal protective gear is required and what type of gear.
5. How the functioning of equipment, processes or ventilation should be monitored and checked so that early detection of deviations can be identified that could increase risk.



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Enter the Extended risk assessment by filling in the text boxes below.

Registration of cancerogenic and mutagenic substances; H350 and H360

If exposure has occurred when working with substances marked with H350 or H360, a register must be established and stored for 40 years. The register shall contain information about:

1. Employee Name.
2. Working tasks.
3. What chemical risk source has the employee been exposed to and what are its risks?
4. Measured or estimated exposure level:
 1. Concentration/amount.
 2. Time/occasions.

Information and education with certificate, handling of allergenic substances

Information about risks and how to protect oneself and when work is going on is to be given to those who manage and work with the substances, but also to those who work in the same lab and may be exposed.

Education with a certificate shall be given to those who are leading or are working with products or substances labeled with H317 or H334 which may lead to exposure to:

1. Diisocyanates.
2. Epoxy plastic components.
3. Organic acid anhydrides.
4. Formaldehyde resins.
5. Acrylates or methacrylates which should be labeled with H317 or H334.

Education is also required for work that causes thermal decomposition which releases isocyanates or processes that release formaldehyde.

The education shall contain information on the risks of work and the safeguards that may be required to carry out the work safely. The education cannot be more than 5 years old and there must be a certificate of education. Missing certificate is subject to penalty.



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Medical controls

Medical examination shall be offered when working with products containing:

1. Epoxy plastic components.
2. Formaldehyde resins.
3. Acrylates or methacrylate's which should be labeled with H317 or H334.

Medical examination with service assessment is required for work:

1. With chemical products containing diisocyanates or organic acid anhydrides which must be labeled with H334.
2. With chemical products containing ethyl 2-cyanoacrylate or methyl-2-cyanoacrylate if the work lasts more than 30 minutes per week.
3. Which may cause exposure to isocyanates formed in thermal decomposition.



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Risk assessment:

Name

Date

Lab group

Laboratory work



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If CMR substance is included, state here the substance (CAS) as well as hazard labeling

Are allergic substances included?

Tick the appropriate boxes

H317 May cause skin allergy

*Education with certificate
(requirement see next page)*

H334 May cause asthma

*Medical check
(offer/requirement see next page)*

*Extended risk assessment
(requirements see next page)*

*Labeling of rooms, benches, draw cabinet
(requirements)*

Are A- or B-substances included?

Is there a permission from AV (requirement)?

Handling methods

For example, open handling, vacuum, pressure, heat, boiling, reflux or distillation

Fill in handling:



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Risk factors and preventive measures

For example, drop, spill, over/shock cooking, glass crush, pressure/vacuum, fire/explosion, etc.

Fill in risk and measure:

Measure in case of incidents

Assess potential incidents, but also consider more unlikely incidents.

Fill in incidents and the handling of these:



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Final assessment. (Tick the box at the number you judge is correct)

Combined assessment of the probability of an accident occurring and its consequences.

1 2 3 4 5 6 7 8 9 10

1 = No risk

4 = Moderate risk/consequence

10 = High risk/consequence

1 - 4 corresponds to a work that requires only normal protective measures, i.e. lab coat, safety goggles, work in drawers and gloves when needed.

5 - 7 applies to work requiring additional precautions.

8 - 10 applies to work that cannot be carried out in this way but must be planned to reduce the risks.

Other supplementary information is attached separately - tick here

Date (YYYY-MM-DD)

Signature

Verified by



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Attach risk assessment for waste. Use "chemical substances" at Prevent as a tool,

<https://www.prevent.se/KemiskaAmnen/?ReturnUrl=https://www.prevent.se/kemiskaamnen/amnen/>