**General risk assessment Ms students, PhD students, post docs etc. work in organic chemistry laboratories[[1]](#footnote-1)\***

Date:

Name:

Title (Ms. student, PhD student, post doc etc.):

Title of Ms-thesis, PhD or post doc project:

Name of supervisor(s):

**Dangerous chemicals - General rules of special relevance to organic chemistry**

* Before starting an experiment the student / researcher shall go thru the safety information relevant for all chemicals to be used (HSE-data sheets).
* The researcher shall wear eye protection at all time in the lab.
* Gloves shall be used when organic chemicals or toxic inorganic chemicals are handled.
* All work with organic chemicals and toxic inorganic chemicals shall be carried out in a hood.
* In case of especially toxic or bad-smelling compounds, also rotavapors and balances must be moved to the hood
* All handling, transportation and disposal of chemicals / chemical waste shall be done according to instructions given in the Departments HSE-manual and HSE-data sheets
* All flasks containing chemicals shall be properly marked with content. Take care when chemicals are not stored in original flasks, so there are no misunderstanding regarding content
* Flasks containing synthesis products shall as a minimum be marked with synthesis number
* Chemicals not in immediate use shall be stored in chemical cabinets or refrigerators
* The student or researcher shall be familiar with the location of other safety equipment such as fire extinguishers, eye-wash flasks, fire alarms

**General risk assessment - working with chemicals in organic laboratories**

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| **What can go wrong** | **What can we do to prevent** | **What can we do to reduce the consequences if something happens** |
| Toxic chemicals can be spilled | Transport according to rules and regulations  Make sure all glass ware etc. used are not damaged  Take care when mixing chemicals | Keep working area as tidy as possible  Work in the hood  Make sure waste (paper etc.) is destroyed properly  Be aware of the chemical consequences (gas evolvement, heat formation, flammability) before mixing chemicals, and have necessary safety equipment near by  Make sure you are properly dressed and wear glows and safety glasses  Make sure all flasks etc. is properly marked with content, so you (and others) know what is spilled |
| Flammable chemicals can be spilled | as above | as above, make sure waste paper etc. also is treated as flammable material |
| Spill of liquid nitrogen | see SJE / SOP in the Departments HSE manual | see SJE / SOP in the Departments HSE manual |
| Accidents with gas cylinders  Gas leak or the gas cylinder fall over | Make sure the cylinder is closed when not in use  Make sure the cylinder is stored in a way they do not easily tip over.  Use designated equipment for transportation | Transport cylinders according to rules and regulations. Do not transport with the manometer attached. Make sure the cylinder is closed when transported and not left leaking unattended  When the cylinders are in use in a lab, they shall be properly attached to the wall |
| A fire can start | Handle flammables including waste according to instructions  Make sure you know potential consequences when mixing or destroying chemicals. Pay special attention to hydrides and organometallics  Work in the hood  Be extremely careful with the use of gas burners and electrical equipment which may produce sparks near-by flammables  Store and destroy flammable waste according to rules and regulations | Be ready to carry out the right type of fire extinguishing (think about these maters before starting the experiment). Have safety equipment close by. Know the rules and procedures for the use of fire alarm, evacuation of the lab and first aid  Keep the lab as tidy as possible, so not more chemicals catch fire. Make sure all flasks etc. is properly marked with content, so what else might cause fire. Keep flammables in closed chemical cabinets when not is use |

**Equipment - Risk analysis of equipment of special relevance to organic chemistry**

SOP's for some of the equipment commonly used are found in the folder "HSE Rules and Regulations – Organic Chemistry Research Group" in Ø316 and at our web page.

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| **Equipment** | **What can go wrong** | **What can we do to prevent** | **What can we do to reduce the consequences if something happens** |
| Rotavapor | Explosions  Water leaks  Flask falls off  Exposure to volatile toxic and/or bad smelling material | Use according to SOP. Make sure there are no cracks in the glassware. Do not use on solutions containing explosive material. Do not heat more than necessary.  Make sure all hoses for water are properly attached, the material of the hose is not damaged and that the sink, is working properly | Always wear safety glasses  Do not store too many things close to the rotavapor  Move to the hood of toxic or bad smelling chemicals are used |
| Flash chromatography (manual) | Columns break (explodes)  Uncontrolled leakage of solvents  Fire if spilled solvents are ignited | Use according to SOP  Make sure there are no cracks in the glass. Do not apply pressure if the stop-cock in the bottom is closed  Do not leave a columns containing solvent without a suitable size beaker under | Work in the hood. Wear eye protection. Store a minimum of other chemicals and equipment in the hood when running the column |
| Flash master | Uncontrolled leakage of solvents  Fire if spilled solvents are ignited | Use according to SOP | Work in the hood. Wear eye protection. Store a minimum of other chemicals and equipment in the hood when running |
| Micro wave own | Danger of electric shock can be caused by spilled liquid | Use according to SOP  Make sure that the cap sits properly on the vial. Always check for cracks in the glass (exceptional). | In case of spilled liquids plug off the main cables of the instrument, ventilate the area. |
| A blind pin with broken PEEK-stick could lead to injuries caused by released toxic substances. | Use according to SOP  Always check that the PEEK-stick should work properly. | Do not use the blind pin if its PEEK-stick has been broken off. |
| Danger of burns and injuries | Use according to SOP  Do not touch or open the reaction vials without proper safety measures | Always wear goggles, protective gloves and appropriate protective clothing, and keep the vial in in the hood. |
| Distillation of solvents (stills in Ø336) | Fire if spilled solvents are ignited | Use according to SOP  Always inspect the equipment for cracks, do not heat more than recomended, make sure cooling water is on | Store a minimum of other chemicals and equipment in the hood |
| Solvent dryer equipment | Uncontrolled leakage of solvents  Fire if spilled solvents are ignited | Use according to SOP | Wear eye protection. Store a minimum of other chemicals and equipment close by when running |
| NMR | The NMR magnet(s) might quench fast or slow, resulting in low oxygen level (asphyxiation) and very low temperatures (frost bites) | Use according to SOP  Change O-rings every ten year. (Not done due to lack of money). Use Oxygen sensors and change batteries when worn out. Have installed pressure relieving windows that reduce nitrogen over pressure. NB! these are jobs for the NMR lab personel, not the individual users | Run out of the room and press fire alarm button to evacuate the building |
| You may get electrical shock | Use according to SOP  Do not touch faulty electrical cables. | Nothing. |
| The magnet may tip over you (resulting in extreme frost bites and asphyxiation.) | Use according to SOP  Do not lean on magnet. | Nothing |
| You may spill / get expesed to toxic or flamable compounds, get | Use according to SOP  Also see above | See above |

All experiments described in this book are performed according to the Departments HSE rules and regulations and the risk assessment above. For chemicals and equipment where separate SOP's and or SJA's are available, these are followed. If an experiment with risks not evaluated in this document is performed. A separate SJA is included in the beginning of the experiment description. If such an experiment is carried out more than once, it is referred to the first time the experiment was done (Journal No, date, synthesis No).

In additions to the rules, regulations and risk assessment specified below. The following applies for this specific project:

Student / post doc Supervisor

(sign) (sign)

1. \* A signed version is to be glued in the the first pages of the lab journal [↑](#footnote-ref-1)