

O | 2 Lab building Safety Guidelines

(bèta version)



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1. Introduction

Health and safety in the workplace is the responsibility of each and every individual. The following health and safety guidelines have been put together for the O|2 Lab building as a general guide for all employees, students and guests.

These beta version guidelines outline in broad terms how you can – and should – ensure that you have a safe, healthy and pleasant working environment. These general guidelines are supplemented by the more detailed guidelines developed by your own institute or department, which are tailored towards the requirements of each institute's field of research. Each institute also has its own safety officer, who acts as a point of contact for work related health and safety issues.

The first part of this booklet (paragraphs 1 to 4) is of general interest and applies to everyone. Paragraphs 5 to 18 describe the general health and safety guidelines applicable to those working in the laboratories and experimental rooms. Next to this booklet about the safety guidelines the VUNet contains more information about health and safety.

More information about the O|2 Lab building: www.vu.nl/workino2

2. Openings hours O|2 Lab building

Monday – Friday

The building is open from 07.00 - 22.00 hours. From 07.00 - 18.00 hours there will be a hostess in the building. This hostess is the central source of all kinds of information. Office and laboratory work may be carried out during these hours.

Visiting address

O|2 Lab building
De Boelelaan 1108
1081 HZ Amsterdam

Access Pass

In the O|2 Lab building several zones are controlled by accesspass (which person, where in the building, when and under which conditions). Employees can ask their own manager or secretariat of the department about the conditions of use of the access pass for the O|2 Lab building.

Limitations

Laboratory work may only be carried out under the following conditions:

- at least one colleague must be near the laboratory zones (hearing distance)
- health and safety measures must be followed
- bachelor and master students may only work in labs and experiment areas under supervision

Risky experiments (especially with dangerous chemicals or biological agents) may not be carried out after 18:00. It is up to the institute or department's safety advisor to determine the risk limits.

Additional measures are required for:

- prolonged experiments which require analysis/low risk handling etc.
- experiments involving animals and/or plants which need to be cared for
- night-time experiments

Under the exceptions outlined above, the following details must be provided in advance:

- the details of the person carrying out the work, the safety advisor and the person responsible for the experiment
- a description of the experiment
- the duration of the experiment

Saturday and Sunday

The building is open for persons with an access pass. Only office work may be carried out at this time. The conditions for carrying out lab work on the weekend are the same as those for carrying out lab work during the workweek (see above). Risky experiments may not be carried out on Saturdays and Sundays. The risk limits must be discussed with your safety officer.

Public and mandatory holidays This means closure of the building (see Saturday/Sunday). Technical Services are not present and will only take action in case of an emergency. There will be no building In-House Emergency Service or security in the building. For that reason it is **not allowed to work on risky experiments**.

Employees who have urgent reasons for gaining access to the O|2 Lab building during a public or mandatory holiday must get permission from the institute's operational manager or safety officer. The operational manager will determine whether access to the building is necessary.

3. General safety guidelines

3.1 General guidelines

- Everybody is strongly urged to ensure that work is carried out in a safe manner.
- Use common sense when performing your work. Take all reasonable measures for guaranteeing your own safety, as well as that of other people.
- If you notice anything dangerous or careless or a negligent act, you are obliged to take action in order to prevent an accident or mishap.
- Anyone aware of unsafe working practices or working situations, which cannot immediately be rectified, is obliged to notify their supervisor immediately.
- The supervisor has the task of ensuring that everyone in his/her group works in a safe manner and that new employees are made aware of possible dangers related to the work.
- Every accident or near-accident must be reported to your supervisor and/or Health and Safety Coordinator.
- [This form](#) can be used for safety and security incidents, accidents, unsafe situations etc.







3.2 Information and instructions

Be well prepared, and you are halfway there. This is why every employee receives information, and training if necessary, on health and safety matters when they first start working. Make sure you get the information you need and that you are up to date on essential issues such as:

- o alarm numbers in case of emergency (first aid and fire);
- o alarm signals and what you are supposed to do;
- o emergency routes and exits;
- o the safety regulations that apply to your own work station.

Familiarize yourself with the risks associated with neighboring departments. In the O|2-building there are several health and safety signs. Safety signs and signals are required where a significant risk to the health and safety of employees and others remains.

Advice on safety signs can be obtained from your safety officer. A few examples of these signs are:

	<p>use hand gloves, safety goggles and a lab coat</p>
	<p>fire or emergency exit</p>
	<p>first aid kit, available on every lab</p>
	<p>smoking is prohibited in the O 2 Lab building</p>
	<p>bio-hazard, for example a ML-II laboratory</p>
	<p>assembly point in case of evacuation</p>

3.3 Emergency and In-House Emergency Service (BHV)

The O|2 Lab building In-House Emergency Service (BHV) consists of BHV with independent breathing, BHV evacuation assistants and First Aid assistants.

All BHV tasks are aiming at limiting potential damage:

- Extinguishing starting fires using small fire extinction apparatus
- Fencing off the emergency area
- Handling accidents and spill with dangerous goods (chemicals, bio-agents)
- Aiding the evacuation assistants in evacuating the building or location concerned
- Aiding security services facilitating medical crews at the building or location concerned
- Aiding the First Aid assistants in carrying out life-saving actions

- Accompanying people to the emergency assembly point

What do I do in case of an emergency?























- Always remember: do not undertake action on your own, warn others (call out), and do nothing that could endanger your own safety.
- In case of an emergency (fire, injury) **dial 22222 (or 020-5982222)**. State your name, room number and the nature of the incident and follow the relevant guidelines. In case of a fire break the glass of the fire alarm and press the button. After that, the slow-whoop signal will be activated.
















Attention: *the fire alarm unit contains real glass. Smash the little glass with the hard nozzle of the water fire hose or other hard object to prevent cutting of the glass in your skin.*



Alarmnummer: 22222 / 020-5982222

Emergency number: 22222 / 020-5982222

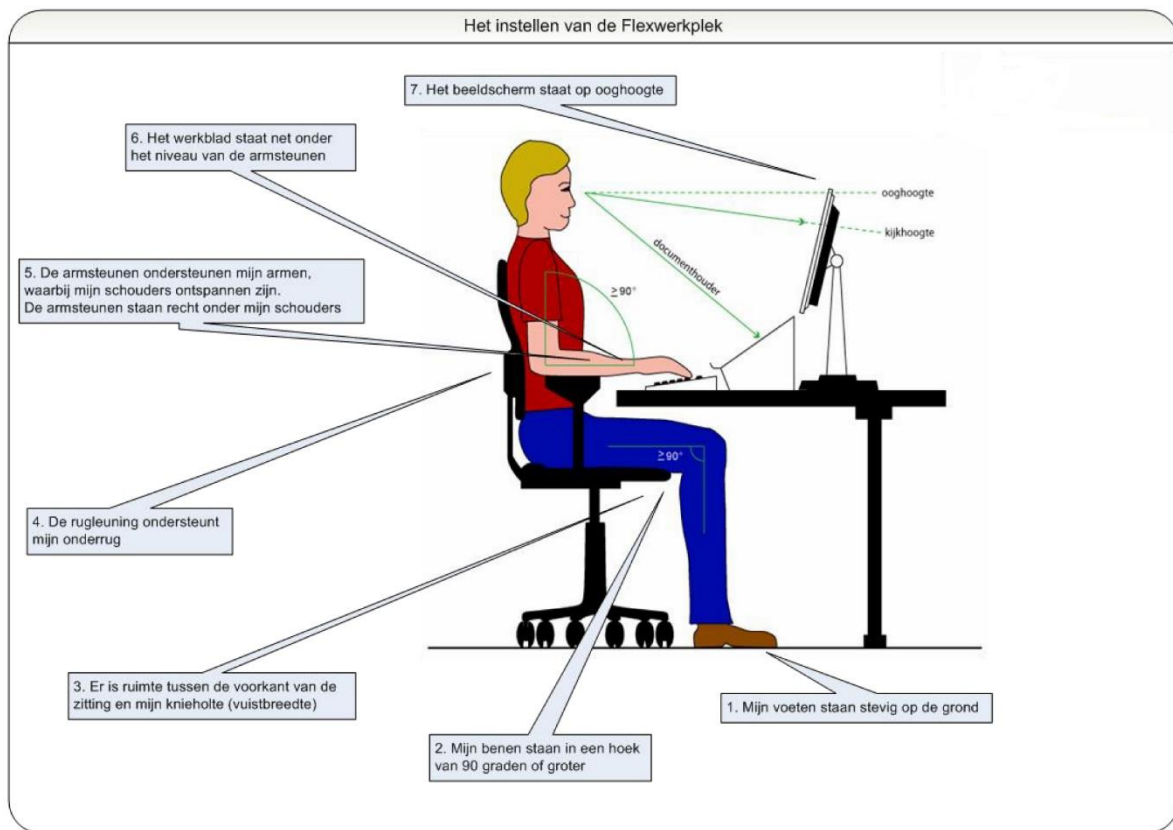
       <p>Bij brand, ongeval en calamiteiten</p> <ul style="list-style-type: none"> • Blijf rustig • Sla de handmelder in • Bel het alarmnummer 22222 / 020-5982222 • Meld: Naam Telefoonnummer Plaats Omvang van de calamiteit • Alarmeer collega's • Sluit ramen en deuren • Indien mogelijk: blus vuur met brandblusser of brandslang • Blijf bij het slachtoffer tot de hulpverlener aanwezig is • Volg ontruimingsinstructies op 	    <p>Bij ontruiming</p> <ul style="list-style-type: none"> • Blijf rustig • Volg de instructies van de locatiedeskundige op (<i>herkenbaar aan de oranje armband</i>) • Maak gebruik van de aangegeven vluchtroute • Gebruik nooit de lift • Loop achter elkaar in trappenhuisen (<i>invoegen volgens ritssluitingsprincipe</i>) • Ga naar het opvangpunt. De locatiedeskundige meldt de afdeling af (<i>opvangplaats voor personeel en studenten</i>) • Wacht daar op instructies
       <p>In case of fire, accident or other emergency</p> <ul style="list-style-type: none"> • Remain calm • Break the emergency seal • Call the emergency number 22222 / 020-5982222 • Report: Name Telephone number Location Extent of emergency • Warn colleagues • Close windows and doors • If possible: put-out the fire with fire extinguisher or fire hose • Remain with the victim until the company aid officer arrives • Follow the evacuation instructions 	    <p>In case of evacuation</p> <ul style="list-style-type: none"> • Remain calm • Follow the instructions given by the evacuation officer (<i>identifiable by an orange armband</i>) • Use the marked escape route • Never use the lift • Use the staircase in a single file (<i>overtake in single file</i>) • Go to the emergency meeting point (Meeting point for personnel and students). The location senior signs out the department • Wait for instructions there
<p>Opvangplaats O 2 -----> Oostzijde Gustav Mahlerlaan Meeting Point O 2 -----> Eastern side Gustav Mahlerlaan</p>	

<p>DIEFSTAL EN VERLIES</p> <p>Neem bij vertrek of diefstal van privé of VU-eigendommen en bij een verdachte situatie direct contact op met de beveiliging 85854 of 020 - 59 85854 VU.nl/veiligheid</p>	<p>GASTVRIJ EN ALERT</p> <p>De VU Campus is een open en gastvrije omgeving. De VU heeft een actieve rol in het herkennen, voorkomen en beheersen van veiligheidsrisico's en incidenten. Medewerkers en studenten aan de VU dragen uiteraard ook bij aan een veilige campus.</p>	<p>BIJ BRAND, ONGEVAL EN CALAMITEITEN</p>		<p>IN CASE OF FIRE, ACCIDENT OR OTHER EMERGENCY</p>	<p>WELCOMING AND VIGILANT</p>	<p>WAT JIJ MOET DOEN BIJ CALAMITEITEN WHAT TO DO IN CASE OF EMERGENCY</p> <p>SAMEN DOEGEN WE DE VU VEILIG TOEGEHER WE KE EEN VU AMSTERDAM SAFE</p> 
<p>CALAMITEITEN</p> <p>Bel in het geval van een calamiteit met het VU alarmnummer 22222 of 020 - 59 82222</p>	<p>NOODSITUATIE In acute situaties die direct hulp vereisen, bel je altijd het VU alarmnummer. De VU BHV wordt dan opgeroepen. Volg bij noodsituaties de aanwijzingen op van de beveiliging, de BHV of de locatiedeskundige.</p>	<p>Blijf rustig</p>		<p>Remain calm</p>	<p>The VU Campus is an open and welcoming place. We therefore actively work to identify, prevent and mitigate security risks and incidents. Naturally, university staff and students have a role to play in ensuring a secure and safe campus.</p>	<p>THEFT OR LOSS</p> <p>In the event of theft or loss of personal or university property, contact security: 85854 or 020 - 59 85854 VU.nl/safety</p>
<p>INFORMATIE OVER EEN VEILIGE CAMPUS EN PLATTEGROND AAN DE BINNENZIJDE</p>	<p>MELD- EN ADVIESPUNT VEILIGHEID Dit is er voor zowel studenten als medewerkers aan de VU. Je kunt hier op vertrouwelijke basis melding maken van interne (fysieke en/of sociale) incidenten, onveilige situaties en bedreiging (ook online). Aan de hand van jouw melding kunnen we maatregelen treffen om herhaling te voorkomen. Zie Vunet: Meld- en Adviespunt Veiligheid</p>	<p>BEL HET VU ALARMNUMMER 22222 (intern) of 020 - 59 82222 (mobiel)</p>		<p>CALL THE VU EMERGENCY NUMBER 22222 (internal) or 020 - 59 82222 (mobile)</p>	<p>EMERGENCIES In emergency situations where help is urgently required, always call the VU emergency number. The Emergency Response Team will be called. In emergencies, always follow the instructions of security staff, the Emergency Response Team or location expert.</p>	<p>EMERGENCY</p> <p>In case of an emergency please dial the VU emergency number 22222 or 020 - 59 82222</p>
<p>Plaatsen van fietsen: houd trottoirs en vluchtroutes vrij, plaats fietsen in de fietsrekken.</p>	<p>Roken: roken is niet toegestaan in gebouwen, maar alleen buiten op de rookplekken.</p>	<p>Meld: Naam Telefoonnummer Plaats Soort calamiteit</p>		<p>Report: Name Phone number Location Kind of emergency</p>	<p>SAFETY AND SECURITY REPORTING CENTRE For both students and staff. Any reports of incidents of social injustice or physical abuse or injury, unsafe situations or threats made in person or online, can be reported to this office or on this hotline and will be treated as confidential. Your report will help us take steps to prevent re-occurrence of such events. See Vunet: Safety and Security Reporting Centre</p>	<p>INFORMATION AND MAP ABOUT SAFETY ON CAMPUS CAN BE FOUND ON THE OPPOSITE SIDE</p>
<p>Alarmeer collega's</p>		<p>Sluit ramen en deuren</p>		<p>Warn colleagues</p>	<p>Bicycle parking: do not block the pavement or escape routes. Use the designated bicycle racks.</p>	<p>Identification: you are legally required to show identification if asked anywhere on the VU Campus.</p>
<p>Indien mogelijk: blus vuur met brandblusser of brandstang</p>		<p>Blijf bij het slachtoffer tot de hulpverlener aanwezig is</p>		<p>Close windows and doors</p>	<p>© VU, FCO, VERSIE 1.1 AUGUSTUS 2016</p>	<p>© VU, FCO, VERSIE 1.1 AUGUSTUS 2016</p>
<p>Volg ontruimingsinstructies op</p>		<p>Legitimatie: indien gevraagd ben je ook op de VU wettelijk verplicht je legitimatie te tonen.</p>		<p>If possible: put out the fire with extinguisher or fire hose</p>	<p>© VU, FCO, VERSIE 1.1 AUGUSTUS 2016</p>	<p>© VU, FCO, VERSIE 1.1 AUGUSTUS 2016</p>
<p>Legitimatie: indien gevraagd ben je ook op de VU wettelijk verplicht je legitimatie te tonen.</p>		<p>Heb je vragen of opmerkingen over de flyer, mail dan naar: servicedesk.fco@vu.nl</p>		<p>Remain with victim until the emergency responder arrives</p>	<p>© VU, FCO, VERSIE 1.1 AUGUSTUS 2016</p>	<p>© VU, FCO, VERSIE 1.1 AUGUSTUS 2016</p>
<p>Heb je vragen of opmerkingen over de flyer, mail dan naar: servicedesk.fco@vu.nl</p>		<p>If you have questions or comments about this flyer, please mail: servicedesk.fco@vu.nl</p>		<p>Follow the evacuation instructions</p>	<p>© VU, FCO, VERSIE 1.1 AUGUSTUS 2016</p>	<p>© VU, FCO, VERSIE 1.1 AUGUSTUS 2016</p>

VU information about useful telephone numbers

3.4 Evacuation

- You are alerted by the Slow-Whoop signal and a broadcast message.
- When possible and without wasting time, switch off instruments and machines.
- Leave on the lights and close all doors.
- If possible take your personal belongings with you.
- Never use the elevator.
- Use the nearest evacuation staircase to descend to ground level and leave the building.
- In all cases, follow the instructions of the Emergency Response Officers (BHV). They can be recognized by their yellow or green vests.
- Go to the meeting point in front of the O|2 Lab building.
- Wait there for further instructions.



5. General laboratory safety guidelines

Common sense Safety is an important issue in a laboratory, both for you and for the people around you. Good common sense is needed for safety in a laboratory. It is expected that all lab-users will work in a responsible manner and exercise good judgment and common sense. If at any time you are not sure how to handle a particular situation, ask your supervisor. Do not touch anything if you are not completely familiar with the handling or operating procedures. It is always better to ask questions than to risk harm to yourself or damage the equipment.

Introduction on safety rules

All new users need to follow an introduction on the safety rules applicable to the lab of their research institute. Ask your supervisor for further information.

Laboratory access

Working in isolation in the laboratories is not allowed at any time (see 2. Opening hours the O|2 Lab building and access pass).

Work and safety wear

- Wearing a laboratory coat is mandatory at all times while you are working in the laboratories and climate chambers.
- Wear safety goggles or face shields when working with hazardous materials, biological agents (pathogens) and/or equipment.

- Wear gloves when using any hazardous materials. Be aware of the one glove policy and replace the gloves regularly.
- Never wear gloves outside the laboratory.
- Never wear lab-coats outside the laboratory zones.
- Rings, watches and other hand jewelry are not allowed in laboratories with restrictions like ML-I, ML-II and ML-III.
- Leave your coats and bags outside the laboratories.
- If you have long hair or loose clothes, make sure they are tied back or confined.

Eating and drinking

- Never eat or drink in the laboratory.
- Food and drinks are not allowed in the labs and cool/freeze rooms.
- Wash hands before leaving the lab.

Working with instruments

Do not touch any instruments before you have had clear instructions from the responsible person on how to operate it.

More HSE information is available on VUnet.

6. Equipment

General guidelines for working with instruments and other equipment:

- Working with equipment is only allowed when you have the required expertise. Otherwise, you should leave it to someone else or obtain proper instruction. Ask your supervisor about the rules that apply.
- If equipment breaks or stops working while being used, report it immediately to your supervisor. Never try to fix the problem yourself.
- Take care when working with pressure and high temperature equipment like autoclaves.
- Always cleanup equipment after use and store properly.
- When using compressed air, use only approved nozzles and never direct the air towards any person.
- Avoid using extension cords whenever possible. If use cannot be avoided, obtain a heavy-duty one that is electrically grounded, with its own fuse, and install safely. Extension cords should not go under doors, across aisles, be hung from the ceiling, or plugged into other extension cords.
- Take care when working with or near hydraulically or pneumatically-driven equipment. Sudden or unexpected motion can inflict serious injury.
- Equipment that made contact with radioactive, biohazardous, or chemical materials must be decontaminated before it is serviced, repaired, moved or otherwise disposed of. Use the 'clearing document' (vrijgave formulier o.a. handbook GMO).

7. Chemicals

Many chemical substances are hazardous (irritating, flammable, corrosive, toxic, carcinogenic, etc.). To be able to work with these substances safely, it is important to be aware of the specific dangers posed by each. A useful source of information is the Netherlands Institute for Working Conditions (see internet). Safety sheets known as Material Safety Data Sheets (MSDS) can also be obtained on the internet. Suppliers are obliged to issue MSDS. You can also ask your supervisor or safety officer about these matters.

General guidelines for using chemicals are:

- Assume that all chemicals are potentially hazardous.
- Proper labeling is obligatory for all packages that contain chemicals. There are standard warning symbols. Solutions should also carry name and contents.
- Work in a clean and orderly manner.
- Always lock chemicals away in a fire safety cabinet after finishing work.
- The use of personal protection items is particularly important when working with chemicals. This includes a lab coat, gloves and safety glasses.
- In spite of working with great care and taking safety precautions, something may nevertheless go wrong. Make sure you know where to find an eye wash, first aid kit, emergency shower, fire blanket, suitable fire extinguisher etc. in case of an emergency.
- There are special absorbing packages for spills. Ask where they are and how to use them, warn your supervisor.
- It is important to know where to dispose the chemical waste you produce while you are working in the laboratories.
- Always report incidents with chemicals or injury to the local safety officer and the Health and Safety Department.
- Segregate all incompatible chemicals for proper storage of chemicals for hazard class codes. Flammable materials should always be stored in a fire safety cabinet.



Store severe poisons in a (dedicated) locked poison cabinet.

8. Genetically modified organism (GMO) and biological agents

Working with genetically modified organisms (GMO), biological agents, patient material and pathogens generate a number of health risks in themselves. These risks are conditional on the nature and the quantity of the materials used and the skills and the manner of work of the employees and students and moreover by the equipment of the laboratory.

In molecular-biological work, recombinant-DNA containing organisms are frequently used. These activities must be carried out with great care. In research with GMO, different measures are required to ensure the safety of the employees and students and to prevent contamination of GMO's into the environment.

The Dutch version of the VU/VUmc GMO handbook "Veilig werken met genetisch gemodificeerde organismen en biologische agentia" gives an overview of the basic principles and official regulations that are important for the safe use of genetically modified organisms (GMO's) and/or pathogenic organisms. Follow these guidelines for working safely in the laboratory or in a biological safety cabinet.

The Biosafety Officer(s) are responsible for biological safety supervision on location. They apply the framework regulations as required to the specific location and supervise the safety of working with GMO's. If you want to work with GMO's, you should contact the Principal Investigator (PI) (in Dutch: Verantwoordelijk Medewerker, VM) of your department. The Principal Investigator is responsible for local supervision at the laboratory, the GMO-permit and the specific workplace regulations. The Principal Investigator will inform you about the local workplace regulations.

More information is available on VUnet (search 'ggo handboek' -> Veilig werken met genetisch gemodificeerd organismen).

9. Ionizing radiation

Particle radiation and electromagnetic radiation above a certain level of energy is called ionizing radiation. Ionizing radiation is harmful to the body. The greater the dosage i.e. the greater the amount of radiation energy that is absorbed, the greater the harm to the body.

Enclosed and open radioactive sources

To maintain the best possible working conditions, attention should be paid to the following points:

- Keep the quantity of radioactivity used as low as possible.
- Keep exposure to a minimum (and/or work as fast as possible).
- Keep as far away from the source as possible.
- Take protective precautions (such as lead shield when working with gamma emitters, perspex protection for beta emitters).
- Use personal protective devices whenever it is obligatory to do so (lead apron, lead gloves, etc.)

10. Non-ionizing radiation

Laser equipment Non-ionizing radiation (NIR) is the collective name for electromagnetic, static electric and magnetic fields with frequencies of 0 to 300 GHz. NIR does not penetrate deeply into tissue but does increase the risk of harm to the skin and the eyes. Depending on the energy and the exposure, NIR can lead to localized heating, or it may lead to photo-chemical reactions with possible permanent harm. Exposure should therefore be restricted as much as possible. Incorrect or improper use and incorrect design increase the chance of physical harm.

To minimize the risk of working with lasers please read the instructions carefully, and try to adhere to these rules and guidelines at all times.

General measures

Ensure that the equipment has been properly constructed and that it has been well maintained. It is the responsibility of the employer to ensure employees are qualified, and to provide clear instructions and regular information updates. These can be requested if necessary.

In order of importance, a number of general measures for reducing risks are given below:

- Only qualified people have permission for aligning the laser beams or modification of the laser equipment.
- The laser safety officer will only give permission to work with lasers after the user has received proper instruction by the supervisor or their colleagues.
- Laser safety rules from the lab need to be followed at all times.
- Protect the source: enclosed cupboards, block off reflections (collective protection takes precedence over personal protection).
- Keep as far away from the source as possible.
- Whenever working with laser sources, appropriate safety glasses should be worn (OD > 5 for the right wavelength).
- Take off wrist watches and rings during alignment.
- Never lower your eyes to the level of the laser beams. Shield your eyes when you have to pick something up from the floor.
- Laser warning lamps should be on when lasers are switched on.
- Risk analyses of each piece of laser equipment are available.
- For more information you can contact the safety officer.

Ultraviolet light

Excessive exposure is primarily dangerous to the skin and the eyes. Never allow the skin or eyes to be exposed to UV radiation sources. In addition UV-light is almost invisible. Acute effects are burns and inflammation of the cornea (arc eye). Long-term effects are skin cancer, swelling of the skin, premature aging of the skin and cloudy vision (cataracts).

Biological Safety Cabinets

- Never work in a biological safety cabinet when the UV light is switched on. If possible, close the cabinet while the lamp is on.

UV Transilluminators

- Never use a transilluminator without the protective shield in place.
- Shields must be kept clean and replaced when damaged.
- Wear (safety) glasses or face protection that block UV light.
- Wear disposable gloves to protect exposed skin on the hands.
- Ensure wrists and forearms are completely covered.

Crosslinkers

- Make sure that the door is closed properly.

11. Sound

When working with equipment or other activities that produce noise (> 80dB(A)1), make sure you're wearing appropriate ear protection. Take extra care when working with ultrasonic sound. Ultrasonic sound can lead to ruptured eardrums. Warn other people in the room before starting the 'noise producing activities'. When you use an ultrasonic sound bath in a fume hood, always close the window of the fume hood to reduce the (high frequency) noise.

12. Gases and gas cylinders

Gas cylinders are potentially dangerous. When handled incorrectly, they can shoot off like a rocket or explode.

Working with gas cylinders is only allowed when you have the required expertise. Otherwise, leave it to someone else, or obtain proper instruction. Ask your supervisor about the rules that apply.

The gases themselves are generally not user-friendly: flammable, harmful, asphyxiants, aggressive and/or toxic. Great care is therefore required. Special ordering procedures, working regulations and good management are the key to proper safety.

Storage

- Gas cylinders with a content bigger than 5 liter that are being used must be stored in the fire-cabinets for gas cylinders in the corridor near the laboratory.
- The installation of a gas cylinder in the laboratory for a short period of time is only allowed with permission from the safety officer.
- The gas cylinders should be protected from falling over (secure them with a chain).
- The gas cylinders must be kept apart according to the type of gas.
- Full and empty gas cylinders, not being used, must be stored outside the building in a dedicated storage area.
- A proper protective cap should always be fitted to gas cylinders that are not in use in order to prevent the master valve breaking off or being damaged.
- Empty gas cylinders should be stored separately from full ones, or at least be labeled 'leeg/empty'. They should be treated with the same care as full cylinders.
- The key to close the valve of the cylinder must be kept together with the cylinder.



13. Cryogenic liquids

Cryogenic liquids are mostly used as cooling agents. The best-known one is liquid nitrogen with a temperature of -196 °C. Liquid helium, oxygen and carbon dioxide are also used extensively in laboratories.

- Contact between cryogenic liquids and the skin causes burn-like injuries. Wear closed shoes, safety glasses (preferably a face mask) and, if necessary, special gloves when transferring cryogenic liquids.
- After instruction you are allowed to enter the room of the fill station of cryogenic nitrogen. This room is monitored by an oxygen detector. Don't enter the room when the alarm is activated. If the alarm is activated call 22222 for help.
- Dewars being transported by elevator should not be accompanied by any persons.
- Be aware that one liter cryogenic gas can produce a few hundreds of evaporated gas. Even if the gas is non-toxic, it displaces air. When there is not enough air or oxygen, asphyxiation and death can occur. Oxygen deficiency is a serious hazard in enclosed or confined spaces.

14. Electricity

Accidents involving electricity can result in three situations: you receive a minor shock or you are seriously injured or even instantly killed (electrocution). The dangers associated with electricity are, unfortunately, often underestimated. Electricity is perhaps at its most dangerous for people working with equipment in a laboratory.

For that reason, electrical installations and electrical appliances must comply with legal regulations (NEN 1010 and NEN-EN 3140 during use of both high and low voltage installations and appliances). In addition, electrical work involving installations on the building (and equipment) may only be carried out by qualified personnel.

15. Vacuum

Implosions often have the same effect as explosions. Vacuum machinery is used with a variety of projects. In general, manufacturers of vacuum machinery incorporate safety measures and provide guidelines for its use. Working with a vacuum pump or other machinery is only allowed when you have the required expertise.

- Vacuum systems at risk of implosion must be properly protected (from noise and splinters).
- Personal protective devices should always be readily available.
- The safety provisions should be monitored and regularly tested.
- If there is any danger of explosion, install an outflow valve and use protective masks or safety glasses.
- The combination of vacuum, localized heating and glass can cause an implosion.
- Monitoring the pressure must be possible at all times.
- Install the pumps in such a way that the noise is kept to a minimum.

- Check all the glassware on damages and scratches before using them in vacuum systems.

16. Magnetic field

In some laboratories machines are operating that create strong magnetic fields.

- Before entering those rooms, first ask permission to the responsible person and note the warning signs attached on the laboratory doors.
- People wearing a pacemaker, medicine pump (e.g. insulin pump) or metal prostheses are not allowed to go into rooms where magnetic fields can occur.
- Also be aware that when you are in these rooms bank cards and other magnetic sensitive stuff (mechanical watches, disks etc.) can be destroyed.
- Do not leave metal equipment (keys, nails, screwdrivers etc.) close to the magnetic fields, they can be attracted to the magnetic field, which causes harm to the machine or even worse, a person.

To cool magnets cryogenic liquids (N₂ and He) are used, please refer to the chapter which handles about these liquids.

17. Fume hoods

Chemical fume hoods reliably help protect you from chemical hazards when properly used, but they do have limitations.

- Confirm the fume hood monitor is functioning properly - both visual and audio components indicate normal operation.
- Keep baffles at the back of the hood unobstructed and intact.
- Keep hoods free of clutter and avoid using them for storage. If absolutely necessary, position equipment deep inside the hood and maintain an air gap around and below the experiment to maintain air circulation.
- Keep the sash closed as much as practical for increased safety and for energy conservation. - Don't use the hood to evaporate unwanted solvents or spills.
- Avoid creating cross-drafts or air currents near the hood. They'll pull contaminated air out of the hood and into the breathing zone. Air currents can be caused by:
 - Air ventilation in the room
 - Open doors
 - People walking by the hood
 - Rapid arm or body movement
- Clean up spills immediately and dispose of waste solvents as hazardous chemical waste. - Always put chemicals, solvents etc. in the fire safety cabinet after finishing work. A fume hood is not a storage cabinet!
- All outlets in the hoods have to be turned off at the end of the day apart from the ones that have a reaction running.
- Ask your supervisor for the procedures if you want to use the fume hood for overnight reactions or other use.

18. Chemical waste

Liquid chemical waste can be disposed in special (10 liter) containers. There are containers for

- Inorganic acids (red container)
- Nitrous acids (orange container)
- Alkaline inorganic substances (green container)
- Halogenated organics substances (blue container)
- Non-halogenated organic substances (container under fume hood) or black containers (20 litre) for the labbutler.

The full containers should be placed temporary in the storage room on each floor. Solid chemical waste must be separated in the waste categories:

- Inorganic
- Organic, halogenated
- Organic, non-halogenated

Ask your safety officer for the current regulations about chemical waste.

Mail to bestellinggasflessen.amd@vu.nl (HSE department) to pick up the 10 liter jerry cans with chemical waste.

Only the laboratories at the 4th floor have a different chemical waste disposal system.

For further information about waste or chemical waste look at the Chemical waste disposal regulations poster or the waste regulations on VUnet (afvoer van afval -> handbook afvalbeheer).

Colofon

This booklet was written on the basis of existing texts from different Health and Safety websites and brochures from universities, FOM Institutes and suppliers, IAVM reports, Health and Safety information sheets from the Ministry of Social Affairs and Employment. Many thanks to all that contributed in whatever way of making this booklet possible, special to the members of the Veiligheid en Milieu Commissie en afdeling Communicatie FNWI UvA.

The editors would greatly appreciate any constructive criticism and will include it in any subsequent edition. Finally, our thanks go to the UvA to make this information available for using it in the the O|2 Lab building.

The O|2 Lab building Kernteam VU, VUmc en UvA, December 2015.

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