

General laboratory regulations

for Laboratories of the Faculty of Sustainability of the Leuphana University of Lüneburg

(General operating instructions in accordance with § 14 GefStoffV, § 14 BioStoffV, § 12
GenTSV, § 12 BetrSichV)

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1 Preamble

These General Laboratory Regulations lay down basic rules for activities involving hazardous substances, bio-materials and equipment as well as for genetic engineering work in the laboratories of the Faculty of Sustainability of the Leuphana University of Lüneburg. Special regulations for activities with individual hazardous and biological substances as well as for genetic engineering, the use of special equipment, and further rules of conduct for employees (e.g. as part of an experiment's design, instructions for laboratory personnel) are to be made by the respective divisional managers and passed on to the employees in an appropriate manner. These regulations are to be followed as operating instructions.

If individual provisions of these General Laboratory Regulations or of the aforementioned operating instructions become obsolete due to a change in the legal basis the remaining parts shall remain in effect. In which case the invalid passages shall be interpreted as valid. In this case, the passages which have ceased to be valid must be interpreted in such a way that their intended purpose is achieved.

2 Definitions and forms of dangerous exposure

Hazardous substances/hazardous preparations are substances/preparations which are

- explosive,
- oxidizing,
- extremely flammable,
- easily flammable,
- flammable,
- very toxic,
- toxic,
- harmful to health,
- corrosive,
- irritating,
- sensitizing,
- carcinogenic,
- dangerous for reproduction,
- mutagenic or
- are dangerous for the environment-

Substances emitting ionising radiation are excepted.

Damage through hazardous substances (e.g. poisoning, irritation, sensitization) can be caused by absorption through the lungs after inhalation, through the skin or mucous membranes and the digestive tract. Hazardous substances may also cause chemical burns on contact with skin or mucous membranes. They can damage the environment and cause damage and injury as fire and explosion hazards.

Bio-materials or biological materials are

- Micro-organisms, cell cultures and endoparasites including their genetically modified forms,
- agents associated with transmissible spongiform encephalopathy (TSE),

which may endanger humans in the form of infections, communicable diseases, toxin formation, sensitizing or other harmful effects.

The following shall be equated to bio-materials

- Ectoparasites, which cause independent diseases in humans or have sensitizing or toxic effects,
- Technically produced biological units with new properties that can endanger humans in the same way as biological substances.

Damage to the human body caused by biological agents (e.g. infections and poisoning) is possible after inhalation through the lungs, through injuries to the skin, mucous membranes and digestive tract.

Genetic engineering is

- the production of genetically modified organisms,
- the reproduction, storage, destruction or disposal as well as the in-house transport of genetically modified organisms as well as their use in other ways; insofar as no authorisation has yet been granted for their release or to bring them into circulation for the purpose of their subsequent introduction into the environment.

Damage to the human body caused by genetically modified organisms (GMOs) may occur after inhalation through the lungs, absorption through through skin lesions and through the mucous membranes and digestive tract. GMOs pose a risk of environmental damage following (accidental) release.

Equipment includes

- Tools,
- Devices,
- Machines or
- Facilities.

Equipment can damage the human body by releasing mechanical, thermal, electrical or radiation energy. In the case of noise there is an additional risk of damage to the human hearing.

Employees in terms of these general laboratory regulations are all persons who carry out work in the laboratories of the Faculty of Sustainability.

3 Risk assessment, documentation, substitution

Within the course of a risk assessment as part of the assessment of the working conditions, the department head must determine whether the employees are carrying out work with hazardous substances, bio-materials or equipment or conducting genetic engineering. If this is the case, he must assess and document all hazards to the health and safety of employees and students as well as possible hazards to the environment arising from this before commencing the activity.

Information on this can be found in:

- Hazardous Substances Ordinance - GefStoffV,
- Ordinance on Biological Substances - BioStoffV,
- Genetic Engineering Safety Ordinance - GenTSV,
- Industrial Safety Regulation - BetrSichV
- Technical Regulations for Hazardous Substances, in particular TRGS 400, 401 and 402
- Technical Regulations for Biological Agents, in particular TRBA 400
- Technical Regulations for Operational Safety, TRBS 1111
- Material Safety Data Sheets
- Operating Instructions
- Hazard Statements

The person responsible for the area must ensure that all hazardous and biological materials in the area of responsibility are listed in indexes. These indexes must be kept up to date and checked for completeness at least once a year.

The index of hazardous substances must contain the following information:

- Designation of the hazardous substance,
- Location of the relevant material safety data sheet,
- Classification of the hazardous substance or information on its hazardous properties,
- Information on the quantity ranges used in the company,
- Designation of the work areas in which employees may be exposed to the hazardous substance.

The index of hazardous substances must be accessible to all affected employees and their substitutes.

The list of bio-materials must contain the following information:

- Designation of the bio-material,
- Information on the classification of the bio-material's risk group,
- Sensitising, toxic and other health-damaging effects,
- Designation of work areas in which employees may be exposed to the bio-material.

The bio-material index must be accessible to all affected employees and their representatives.

Each department head must check whether hazardous substances or processes with a lower health risk than those envisaged by him are possible. Particularly in the case of carcinogenic and mutagenic substances as well as those endangering reproduction, but also very toxic, sensitising, extremely flammable or explosive substances, there should be a special examination based on the specific situation to find possible substitutes or processes with lower emissions. The result of the examination must be recorded in writing.

4 General protective measures

Department heads may only allow activities involving hazardous substances, bio-materials and work equipment as well as genetic engineering to begin after they have arranged for the necessary protective measures.

4.1 Hazardous substances

Information on protective measures can be found in:

- Ordinance on Hazardous Substances
- Technical Regulations for Hazardous Substances, in particular TRGS 526 (laboratories); 722 (explosion protection)
- BGI/GUV-I8553 "Sicherheit im chemischen Hochschulpraktikum (Safety in Chemical Internships at Universities)
- Material Safety Data Sheets
- Precautionary Statements
- Operating instructions

When handling hazardous substances, at least the general protective measures described in the Ordinance on Hazardous Substances must be taken. If these general protective measures are not sufficient to counteract hazards from inhalation, absorption through the skin or ingestion, the additional protective measures must also be taken. In the case of activities involving carcinogenic, mutagenic or fertility-endangering hazardous substances as well as physical-chemical effects (in particular fire and explosion hazards), special protective measures must also be taken in accordance with the Ordinance on Hazardous Substances.

The interior of the F-90 storage cabinets for flammable liquids, the interior of the F-90 gas cylinder cabinets as well as the rooms U07 (storage for flammable liquids), U08 (transfer room/special waste storage) and 211 (central fuel gas supply) including the respective exhaust pipes are explosion-endangered areas of zone 2 (Ex-Zone 2), in which Annex 1, No. 1, of the Ordinance on Hazardous Substances and TRGS 722 must be particularly observed.

4.2 Bio-materials

In the case of activities in laboratories, in laboratory animal husbandry and in biotechnology, it shall be determined whether targeted or non-targeted activities are carried out. These activities are to be assigned to a protection level in accordance with their hazards.

Information on protection levels and measures can be found in:

- Ordinance on Biological Substances
- Technical Regulations for Biological Agents, in particular TRBA 100 and also TRBA 500
- BGI 853

When handling biological substances, at least the general protective measures described in the Ordinance on Biological Substances must be taken. In addition to the general protective measures, additional protective measures in accordance with Annex II of the Ordinance on Biological Substances shall be taken for activities belonging to protection level 2 or higher in laboratories, in laboratory animal husbandry and in biotechnology.

4.3 Genetic engineering

Genetic engineering activities in genetic engineering facilities shall be assigned to different safety levels according to the Genetic Engineering Act based on their hazard potential.

Information on safety levels and measures can be found in:

- Genetic Engineering Act
- Genetic Engineering Safety Ordinance

According to the classification, at least the measures described in Annex III of the Genetic Engineering Safety Ordinance must be taken. If these basic measures are not sufficient in individual cases, additional safety measures must be taken. Genetic engineering work may only be carried out under supervision or by competent and professionally experienced persons and must be accompanied by a competent representative for biological safety and the project manager responsible for genetic engineering.

4.4 Work equipment

Information on protective measures can be found in:

- Ordinance on Industrial Safety and Health
- Technical Regulations for Operational Safety (TRBS)
- DGUV regulations, rules, information and principles

When taking protective measures, care must be taken to ensure that work equipment is used safely and that the principles of ergonomics are observed. The use of equipment must be designed and organised in such a way that strain, or stress in the wrong areas which could endanger the health and safety of employees is avoided, or, if this is not possible, reduced to a minimum. The department head must ensure that the employees and students are able to use the equipment without endangering themselves or other persons. Furthermore, the person responsible for the area must ensure that the work equipment used is suitable for the task at hand and the work area. The protective measures also include carrying out safety-relevant maintenance and testing of work equipment by qualified personnel.

5. Instructions

Department heads must instruct all employees working in their respective areas of responsibility on possible hazards and on the necessary protective measures. The instructions must be given orally and at the workplace prior to commencing work and at least once a year thereafter. The content and time of the instructions must be recorded in writing and confirmed by the signatures of the persons instructed. The proof of instruction must be kept for two years. The special risks and regulations for expecting and nursing mothers and adolescents must also be taken into account within the scope of the instruction. Students must be instructed in safe working practices by the person responsible for the department at the beginning of their practical laboratory work - also practically in the case of particularly hazardous procedures. The instruction also serves to inform employees about their entitlement to occupational health precautions in accordance with the Ordinance on Occupational Health Precautions and about the purpose of such precautions. During the course of their studies, students must be instructed by the department head before the start of each new course in which hazards can occur. In this case, already imparted basic knowledge can be assumed to be known. The department head can transfer the execution of the instruction to a respectively competent person.

6 Basic rules for behavior in laboratories

6.1 Access to internships

Students must inform themselves about the equipment, hazardous and biological substances and GMOs used as well as the processes before starting the experiments. This knowledge is checked by the supervisors before or during the experiment. In case of ignorance, students will be excluded from the test day.

Access to hazardous areas is to be regulated by the respective department head.

6.2 Supervision

The respective department heads must ensure that attempts at practical work are supervised by competent persons and - if the job requires it - that a second person is always in calling distance. The same applies to work with an increased risk potential.

6.3 Principles of hygiene

Smoking, eating, drinking and applying make-up are prohibited in all laboratories.

Food, beverages and tobacco may not be taken into laboratories.

First aid materials must be stored in such a way that they cannot be contaminated.

Before each work break, the hands and, if appropriate, the forearms and face must be thoroughly cleaned and, when necessary, disinfected. If necessary, skin care products should be used.

Pipetting by mouth is prohibited. Pipetting aids must be used.

Laboratories must be kept tidy and clean. Only the work equipment and materials actually required should be placed on the work tables. Stocks may only be stored in the rooms and cupboards provided for this purpose.

Windows and doors of the work rooms should be closed during work.

6.4 Working hours

For all work in the laboratories, it must be ensured that at least one second person is informed and can intervene if necessary. From Monday to Friday, it is to be assumed that this requirement is met between 8.00 am and 6.00 pm. Appropriate arrangements must be made and documented for work outside this period.

Without supervision experiments may only be carried out overnight or over the weekend and equipment may only be operated if there is no danger. This must be documented in the corresponding risk assessment.

6.5 Technical protective equipment

All persons working in laboratories must inform themselves about the location and, if necessary, the functioning of the following protective and safety equipment:

- Hand-held fire extinguishers
- Fire blankets
- Eye and body showers
- Emergency stop button for fuel gases and electricity
- Operating mode selector switch and signal lamp for ventilation system
- First aid materials

The protective and safety equipment must always be clearly visible and accessible without hindrance. It is prohibited to cover them by placing objects of any kind on or around them.

Laboratories in which significant quantities of hazardous substances may be handled are technically ventilated. Before starting work, the ventilation system in these laboratories must be switched on and the function checked using the signal lamp installed.

If there is a risk of hazardous substances entering the air during handling as steam, aerosol or dust, fume hoods must be used. The fume cupboards are only fully effective when the sash is closed. When working under the fume cupboard, the front pane must not be opened more than necessary. The user's head should always be protected by the front pane. The front pane must be closed when the work has been completed.

Pollutants may only be released in the fume cupboards during malfunctions or when filling the equipment. Excess reaction gases, vapours, aerosols or dusts which arise during normal working procedures must be collected by special measures (e.g. by appropriate washing bottle arrangements or special filters).

6.6 Structural protective devices

Traffic- and rescue routes as well as areas for the fire brigade have to be kept free. The placing of any kind of objects is forbidden.

Fire doors must always be kept closed. The self-closing mechanism has not be blocked. A permanent opening is only permitted by the use of deterrents.

6.7 Personal protective equipment

In laboratories, all persons must always wear protective goggles with an additional eye area cover. People with regular glasses must wear goggles over their own corrective glasses or protective goggles with corrective lenses. A face shield must be worn when decanting corrosive liquids from canisters and when handling liquid nitrogen. Eye protection is not required for activities and work processes for which a permanent eye hazard can be safely excluded. This must be documented in the corresponding risk assessment.

In laboratories, flame-retardant lab coats and closed shoes must be worn. Long hair must be tied together in such a way that there is no danger.

If skin contact cannot be excluded by technical protective measures when working with hazardous or bio-materials, gloves resistant to the material must be worn and replaced before the breakthrough time has elapsed.

Work clothing and street clothing must be changed and stored in the designated rooms. Personal protective equipment must not be worn outside the work area due to the risk of entrainment and must be cleaned separately from street clothing.

7 Basic rules for the practical handling of hazardous substances

The following are general rules of conduct for handling hazardous substances. Special hazards of individual substances/preparations or processes as well as special protective measures can be found in special operating instructions.

Avoid skin and eye contact and inhalation of hazardous substances.

Hazardous substances may only be present under fume cupboards in quantities which are necessary for the progress of the work.

Hazardous substances, in particular those which may release harmful or flammable vapours or gases, may only be stored in the hazardous substance cabinets provided for this purpose or in the hazardous substance storage facility (rooms U07 and U09). Vented hazardous substance cabinets are for non-flammable hazardous substances, only the F-90 storage cabinets are for flammable hazardous substances.

The total quantity of flammable liquids outside F-90 storage cabinets should not exceed 10 litres per laboratory.

Flammable liquids which need to be cooled may only be stored in refrigerators with explosion-protected interiors. The above paragraph must be observed with regard to quantities. Explosion-proof refrigerators must be marked accordingly.

Hazardous substances may only be stored in suitable containers. Special attention must be paid here to chemical resistance, explosion protection and, if necessary, light protection. Storage in food containers or containers that can easily be confused with them is prohibited.

Flammable liquids may only be handled in containers with the following volumes:

- up to 0.1 l for use in non-technically ventilated rooms,
- up to 1.0 l for use in technically ventilated rooms,
- up to 2.5 l when used under the fume hood,
- Transferring of liquid from storage containers over 2.5 l into small containers only in rooms U07 and U08.

If the working process requires larger container volumes, further explosion protection measures (in particular measures against unintentional release) must be taken. If danger can be excluded due to the work process, containers with larger volumes can also be used. This must be documented in the corresponding risk assessment.

Acids and bases must not be stored and decanted above eye level.

Every person working in a laboratory has the duty to clearly label hazardous substances with:

- Substance name (for substances),
- Trade name or designation and the identity of certain ingredients (for preparations)
- Hazard pictogram(s)
- Signal word
- Hazard warnings
- Safety instructions
- Supplementary information, e.g. additional notes such as EU hazard statements.

The following labelling is sufficient for activities:

- Substance name (for substances),
- Trade name or designation and the identity of certain ingredients (for preparations)
- Hazard pictogram(s)

The labels must be resistant to the hazardous material. Fibre pens should not be used for labelling.

When transferring hazardous substances, make sure that the label points upwards when the container is in a horizontal position.

Stoppers and lids of hazardous material containers must not be placed on the table with the part which was in contact with the hazardous material touching it.

All substances and preparations which are very toxic, toxic, carcinogenic (cat. 1 and 2), mutagenic (cat. 1 and 2) or toxic to reproduction (cat. 1 and 2) must be stored separately under lock and key (in a poison cupboard). Employees must be made aware of the special dangers of these hazardous substances before using them.

Hazardous substances may only be transported in safe containers (e.g. buckets).

Liquid nitrogen and dry ice may not be transported together with persons in lifts.

8 Basic rules for the practical handling of bio-materials and for genetic engineering

The following are general rules of conduct for handling bio-materials and for genetic engineering work. Special hazards of individual substances or processes as well as special protective measures can be found in special operating instructions.

Activities involving biological agents and genetic engineering work may only be carried out at the workplaces intended for this purpose.

Genetic engineering work in which aerosol formation is to be expected (e.g. decanting, preparation of dilution series, pipetting, mixing) must be carried out under a microbiological safety workbench. After completion of the activities, the working surface must be cleaned and disinfected in accordance with the hygiene plan.

During the direct handling of infectious material, liquid-tight disposable protective gloves must be worn. Smear contamination (e.g. on telephone handsets, door handles, fittings, writing instruments and keyboards) must be avoided.

Devices used in the black area must be cleaned and, if necessary, disinfected before being moved to the white area.

Before every work break, contaminated clothing must be taken off, work surfaces must be disinfected, and contaminated materials must be disposed of in the collection containers provided!

Tools contaminated with GMOs and/or bio materials must be autoclaved or disinfected before cleaning.

If organic substances or GMOs are spilled, the contaminated area must be closed off and disinfected immediately.

After completion of the work, the hands are cleaned, disinfected and cared for in accordance with the skin protection plan.

9 Basic rules for the practical handling of work equipment

Every person working in a laboratory has the duty to familiarize themselves with the terms of use of the equipment and protective devices before starting work and to handle them carefully.

The condition of the equipment and protective devices must be checked for safety before use. Defective or damaged equipment and systems must not be used if safety is endangered as a result. Defects and damage must be reported to the activity manager or the department head.

When working under vacuum, glass containers must be secured against flying glass splinters due to implosions (e.g. with shrink or adhesive film, protective basket or protective shield).

Compressed gas cylinders may only be operated in gas cylinder cabinets. Exceptions to this are possible under certain conditions and in consultation with the university's occupational safety specialist. Two pressurised gas cylinders must always be connected to the connection units with automatic changeover device in the gas cylinder cabinets in order to prevent sudden pressure relief via an open connection. The storage of pressurised gas cylinders is only permitted in the gas cylinder storage facility by building 14. During parking, storage and operation, compressed gas cylinders must be secured against falling with suitable brackets. The brackets must not grip the valve.

Compressed gas cylinders may only be transported with the protective cap screwed on. Transport in lifts together with persons is prohibited.

Broken glass must be disposed of in the room using the separately installed containers. Affected glass vessels must be blunted or disposed of by round melting of the breaking edge. Glass containers or broken glass which may have been contaminated with biological substances or GMOs must be sterilised by disinfection or autoclaving prior to disposal.

Dirty vessels, objects and equipment must be cleaned immediately. Substance residues must never be left in containers.

Used glass vessels must be cleaned with detergent, tap water, mechanical treatment and then with distilled water, unless otherwise specified.

Bunsen burners may only be operated under constant supervision.

10 Handling of hazardous waste

Hazardous materials that are no longer required must be collected and disposed of separately according to type of waste. Conditions of safe disposal can be found in the relevant operating instructions for the work process. Smaller quantities of hazardous waste must be stored in the hazardous material cabinets, larger quantities must be stored in cellar room C13.U08 until disposal by the specialist for occupational safety at the university.

Containers with hazardous waste must be labelled with:

- Identification of the substance/preparation or naming of the ingredients
- Hazard pictogram(s)
- Associated department/institute
- First name and surname of the waste producer

11. Behaviour in the event of fires, explosions, explosion hazards

Prevent Fires



Fire and naked light are forbidden outside of the workshops and laboratories designed for that purpose.

Behaviour in the Case of Fire

Keep calm

Report fire



Manually activate the fire alarm
Fire department: 112



Emergency manager
(For name and contact information see the notices in the hallways and the first-aid room 001)

Get to safety



Warn endangered people via the fire alarm system or by shouting

Take helpless people with you
Close all doors

Follow the marked escape routes
Don't use the lifts



Convene at the gathering place
Place: Entry hall of the library
Follow instructions

Attempt to extinguish the fire



Use fire extinguisher



Fight burning clothing with fire blankets

Notes on firefighting attempts

Everyone is required to fight fires until the fire brigade arrives. Personal protection takes precedence over the protection of property. Firefighting attempts may only be carried out by the absolutely necessary number of persons and without endangering oneself. In addition to firefighting personnel, however, another person should be within sight but not in the immediate vicinity of the fire so that help can be called in in the event of danger.

Before starting firefighting operations, disconnect burning electrical work equipment from the network as far as possible, close gas taps (if present: activate emergency stop button) and remove combustible materials from the vicinity of the place of fire.

Windows and doors must always be kept closed in the event of a fire. However, windows must be opened if dangerous smoke can be dissipated as a result or if trapped persons have to attract attention. During an evacuation, doors, including those to work areas, must not be locked in order to keep them usable for rescue personnel and endangered persons.

A competent person must meet the emergency services at the main entrance of the university, show them the way to the building and inform them of the situation.

12 Behaviour in case of leakage of hazardous liquids

- Ensure good room ventilation (open windows, switch on ventilation system)
- Liquids must be collected with a binding agent. Contaminated binding agents must be disposed of as hazardous waste in tightly sealed collection containers.
- Avoid sources of ignition if flammable liquids have leaked.

13 Behaviour in the case of gas leakage

- The fuel gas supply must be interrupted with the emergency stop buttons located in the room.
- For other gases, close the valves in the central unit (rooms C13.211 and C13.212).
- Ensure good ventilation (open windows and doors, switch on ventilation system).
- If flammable gases are emitted, sources of ignition must be avoided at all costs (e.g. do not operate any electric switches).

Behaviour in the event of accidents

Keep calm

Report
the
accident



Call ABMULANCE – Phone: 112:

Keyword ACCIDENT REPORT

WHO is reporting?

WHAT happened?

WHERE did it happen?

Leuphana University of Lüneburg

Universitätsallee 1

Building 13

Level ...

Room number ...

HOW MANY were injured?

WHAT TYPE of injuries?

WAIT for questions!

Leave PHONE NUMBER:

The own phone number, that of the emergency manager, and the occupational safety specialist. (Name and contact information see notices in the hallways and in first-aid room 001)

Erste
Hilfe



Call FIRST RESPONDERS

(Name and contact information see notices in the hallway and in the first-aid room 001)

Weitere
Maß-
nahmen

Secure HAZARD ZONE

Give FIRST AID

First-aid material is located in room 001; a defibrillator is in the reading room in the library, Phone: 1100

Position INFORMERS at all access roads for the ambulance

Inform EMERGENCY MANAGER

If the emergency manager cannot be reached the occupational safety specialist must be alerted. Outside of the usual hours the security service (phone: 1050) is to be alerted.

Information on the contamination with hazardous or biological substances

In case of skin contact:	Clean and, if necessary, disinfect the affected skin areas with plenty of water and possibly soap. In case of skin reactions, discomfort or the possibility of infection, seek medical advice.
Wetted clothing:	Remove immediately due to risk of resorption.
In case of eye contact:	Rinse under running water for 10 minutes. Alert ambulance: Tel. 112.
When inhaling vapours:	Fresh air, alarm ambulance if necessary: Tel. 112.
If swallowed:	Call ambulance: Tel. 112.

Show doctors the hazardous substance label.

15 Final clause

The laboratory regulations enter into force on the 01.09.2016. All previous laboratory regulations for the laboratories of the Faculty of Sustainability hereby lose their validity.

Lüneburg, the 25.07.2016

Institute of Sustainable and Environmental Chemistry

Institute of Ecology

Occupational Safety Specialist