

SAFETY MEASURES AND SAFETY REGULATIONS BOKU Core Facility „BioIndustrial Pilot Plant“

Instruction

According to §14 „ArbeitnehmerInnenschutzgesetz“

1 GENERAL GUIDELINES

This document is only to be considered complete in conjunction with the document "Safety Training DBT". Attention is drawn to the entry and exit of persons and materials in the document "Instruction for Entry into the Pilot Plant Area" and in SOP GO002. Unauthorized persons are to be kept away.

The attached hazard warnings must be observed during all activities in the plant.

The safety regulations specified in the operating instructions, operating manuals and work instructions must be observed.

Instructions of a safety-related nature as well as instructions for personal protection must be observed, even if one is in a hurry. This applies in particular to the use of personal protective equipment. Eating, drinking, chewing gum and smoking are strictly prohibited in the entire Pilot Plant area.

2 TIDINESS AND CLEANLINESS



An important prerequisite for safety is to pay attention to tidiness and cleanliness in the working environment.

Parts lying around, cables, tubes, etc. form a dangerous tripping hazard and must be avoided.

The workplace must always be kept in a clean and orderly condition. After completing work, each user must ensure that the workplace is completely tidied up again. Any samples, solutions, etc. that are left standing around or unlabeled must

be disposed of.

3 PERSONAL PROTECTIVE EQUIPMENT

According to §69(3) "ArbeitnehmerInnenschutzgesetz BGBl Nr. 450/1994", employees are obliged to use personal protective equipment. Employers are not allowed to tolerate any behavior that contradicts this. Compliance with the obligation to use personal protective equipment must be continuously monitored by the respective supervisor.

Personal protective equipment must always be kept in a clean and proper condition. Damaged protective equipment must be replaced (report to supervisor).

3.1 Protective goggles / face shield:



Protective goggles must always be worn in the designated areas (also applies to visitors and during guided tours). Storage boxes can be found in the aisle area.



Face protection must be worn when opening the autoclave (after the autoclaving process) if a boiling delay cannot be completely ruled out.

3.2 Ear protection:



When working with the separator and other noisy machines, use ear protection (dispenser is in the aisle area)

3.3 Working clothes



Working clothes (long-sleeved, made of cotton) are to be always worn in the Pilot Plant without exception (also applies to visitors, etc.). In exceptional cases, a lab coat may also be worn (express permission of the Pilot Plant management required). This must always be used buttoned up and may not be worn in the office or corridors. Care must be taken not to touch the floor with the work clothes when putting them on.

3.4 Disposable gloves:

Disposable gloves must be worn when working with biological materials and when working in the sterile workbench.

Do not touch door handles, telephones, keyboards, water fittings, switches, etc. while wearing gloves.

3.5 Chemical protection gloves:



Chemikalienschutzhandschuhe sind bei Arbeiten mit Gefahrstoffen zu verwenden. Wurden die Handschuhe kontaminiert, sind sie zu wechseln, um eine Verschleppung der Kontamination zu vermeiden.

Do not touch door handles, telephones, keyboards, water fittings, switches, etc. while wearing gloves.

Attention: Observe penetration time for the corresponding substances.

3.6 Thermal / cold protection gloves:

Thermal protection gloves must be worn when working with the gas burner and the autoclaves.

Cold protection gloves must be worn when working with the freeze dryer and the ultra-low freezer.

3.7 Chemical apron:



A chemical apron must be used when working with large quantities of corrosive and/or irritating substances. In the event of contamination, it must be rinsed off with water after the work has been completed. Chemical aprons must be stored clean and dry in a non-contaminated room.

3.8 Safety shoes:



Safety shoes must be worn without exception for all work in the pilot plant area. Employees from external projects must bring their own. Persons such as visitors may use overshoes for short stays in the pilot plant.

→ Attention: Danger of slipping with overshoes!

4 WHERE YOU CAN FIND

- ✓ Fire extinguishers: are located at the corridor, personnel lock, cell culture and fermentation hall, downstream laboratory, and control room.
- ✓ Fire blankets: located by the fire extinguishers.
- ✓ First aid kits: located in the control room, downstream lab, and fermentation hall.
- ✓ First aiders: the names and phone numbers of first aiders are posted on the respective notice boards near the first aid kit.
- ✓ Eye showers: eye showers are installed in the fermentation and cell culture hall, downstream laboratory, chemical storage room, and acid/alkali storage room. In addition, disposable eye showers are available.
- ✓ Emergency showers: an emergency shower is in the passageway between the fermentation and cell culture hall and in the downstream laboratory.

5 OCCUPATIONAL ACCIDENT

5.1 Types of accidents:

Near miss accident:



An incident in which no one was injured. There was almost an accident.



Minor accident:

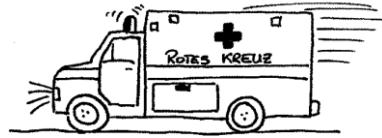
A minor injury. Either no sick leave or max. up to 3 days.

Occupational accident:

A moderate to severe injury. Sick leave duration more than 3 days.

Way accident:

An accident that happens on the way from home to work (or vice versa).



Accidents at work equated to:

Visit to a doctor, accident in the form of a training event, employment-related deposit, transportation, maintenance, or replacement of work equipment.

5.2 What is to be done?

- In the event of skin contact with chemicals and/or biological samples, these must be rinsed off immediately. Depending on the affected skin area, this can be done in the sink or under the emergency shower.
- In the event of eye contact with chemicals and/or biological samples, these must be immediately rinsed extensively using an eyewash. Open the eyelids wide and then consult an eye doctor.
- In case of inhalation of toxic, corrosive, and biologically contaminated aerosols, consult a physician immediately.
- In case of CO₂ or oxygen alarm, leave the room immediately and report to the supervisor / technical management (30800).

5.3 Behavior after accidents:

Keep calm!

Report accident

WHO reports?

WHAT happened?

WHERE did it happen?

HOW MANY injured?

Are other people in danger?



Rescue: 144

Fire department: 122

Porter: 37335

First aid

- Call in first aiders.
- Secure the accident site.
- Care for the injured.
- Follow instructions.
- Do not leave injured persons alone.



Further measures

- Instruct fire department and/or ambulance.
- Turn away onlookers.

The accident report form (BOKU Homepage - " Staff Unit Employee Protection & Health ") must also be completed within the next 5 days and sent to the respective insurance company and to the Personnel Management Department. Near-accidents must be reported to the health and safety officer (form).

6 FIRE PROTECTION

In areas marked with the notice "Handling with open light or fire prohibited", this must be observed accordingly.

6.1 Behavior in case of fire:

- ✓ Keep calm!
- ✓ Report fire immediately with exact details of fire location and extent of fire.
- ✓ Warn employees.
- ✓ Leave danger areas immediately via stairwells and the marked escape routes and emergency exits.
- ✓ Do not use elevators.
- ✓ Walk in a stooped position. (Protection from smoke and heat)
- ✓ Rescue of human lives takes precedence over firefighting!
- ✓ In any case, do not endanger your own safety or that of others.



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7 TREATMENT OF...

7.1 Hazardous substances:

7.1.1 Transport of hazardous substances only with protective precautions:

The transport of hazardous substances (corrosive, flammable, explosive and toxic substances) between production rooms, cold storage rooms and warehouses is only allowed in tightly closed containers or in containers with appropriate safety precautions (protective covers, transport boxes or use of special transport trolleys with trough).

7.1.2 Working in a fume hood: organic solvents, highly concentrated acids or alkalis, toxic substances

Work with volatile substances such as organic solvents, highly concentrated acids or alkalis, as well as toxic substances etc. must be carried out in the fume hood with closed front window. The window may only be opened after

the reactions taking place in the fume hood have been completed (e.g. cooling of the reaction vessel).

7.1.3 Working with hazardous materials:


The hazard warnings on the respective containers must be observed.
When decanting or adjusting the pH value, use decanting and dosing aids.
Ensure a low drop height.

Use PPE: Safety goggles, chemical protective gloves and, for larger quantities, chemical apron.

7.2 Containers:

If a container other than the original container is used, the new container must be labeled **according to GHS labeling**, at least with:

- Substance name
- Hazard label for hazardous substances
- If required, signal word

 GHS08: Health hazard	 GHS02: Flammable	 GHS05: Corrosive	 GHS09: Environmental hazard	 GHS07: Harmful
 GHS03: Oxidizing	 GHS01: Explosive	 GHS04: Compressed Gas	 GHS06: Toxic	

7.3 Tools and machines:

- The operating manual / operating instructions must be read before initial operation and, if necessary, training / instruction must be provided.
- Hand tools, machines and other equipment may only be used for the respective intended activity.
- Before putting machines into operation, they must be subjected to a visual inspection for existing defects.
- Damage to machines or tools (especially cables) must be reported to the supervisor.
- Never work with defective work equipment! (Risk of accident and damage)
- All work equipment must be stored in the areas provided for this purpose.
- Protective devices on machines or tools must not be removed without authorization.
- If you are uncertain about the operation of machines or tools or the handling of working materials, ask your supervisor or a competent person.

- During maintenance, servicing or setup work, machines and systems must be switched off and secured against being switched on again.

7.4 Electric hand tools, lights and devices

- Check cables or switches for proper insulation before commissioning. Do not use obviously defective devices.
- Do not make any provisional repairs.
- Only use splash-proof electrical wiring.
- In principle, repairs may only be carried out by skilled personnel.



7.5 Crane

- Only trained personnel may operate the crane.
- Observe the maximum load capacity! Use only in accordance with the operating instructions.
- Drive with special care, warn bystanders! Do not transport persons.
- Lifting gear (ropes, chains, hooks, etc.) must be checked for perfect condition before use (pay attention to expiration date!).
- A safety helmet must be worn when working with the crane.
- Do not work/walk under suspended loads.

7.6 Ladders and climbing aids

- Select sufficient length, projecting 1 m above the exit point if exit is required!
- Use tested equipment and do not modify or provisionally repair it. Check stepladders for intact securing against spreading. Leaning ladders must be secured against sliding away.
- Use access aids (e.g., stepladders) only with holding device.
- Stepladders are not lean-to ladders!
- Ensure that ladders are securely positioned!

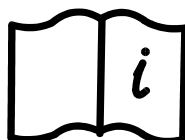
7.7 Pallet truck



Caution when working with walking pallet trucks
"Scooter riding" or riding on walking pallet trucks is prohibited.

8 PLANT- AND DEVICE-SPECIFIC SAFETY INSTRUCTIONS:

8.1 The following applies to all devices:



All devices may only be operated by persons with sufficient technical knowledge. If safe operation is not possible, the device must not be switched on or must be switched off in accordance with the regulations and secured against unintentional operation.

Reasons for this are for example:

- Visible damage to the device
- Failure of the electrical function
- Do not pull on the connection cable, but on the plug to disconnect the device from the mains.
- Repairs and interventions on the device may only be carried out by the customer service, as otherwise considerable dangers may arise for the user.

8.2 Freezer:

- In the event of a fault, disconnect the device from the electricity. Pull out power plug or unscrew fuse.
- When transporting and cleaning the device, make sure that the refrigerant circuit is not damaged. In case of damage, keep ignition sources away and ventilate the room well.
- It is forbidden to store explosive substances or spray cans with flammable propellants, such as propane, butane, pentane, etc. in the freezer, as any escaping gases could be ignited by electrical components. (Exception: Ex-protected devices)



8.3 Pressurized equipment / mobile containers:

- Before opening the containers, check that they are depressurized.
- When working inside the tank, always ensure that the agitator is locked and secured against accidental start-up.
- If it is necessary to enter the tank, it is imperative that a second person is on site outside the tank.
- Before boarding, "purge" the tank with fresh air. Only climb in when a risk of suffocation can be ruled out. This also applies when leaning into the tank.
- Work in the tank must be constantly observed from the outside. Visual and voice contact required.
- Use rope protection; the person climbing in must remain connected to the rope protection until he has climbed out again.
- The person climbing in must be held by the taut safety rope from the outside. The end of the rope must also be fastened outside the tank.
- Use safety shoes, gloves, safety harness against falling.



8.3.1 Pressure test, steam pipes:

- Before each pressure test or sterilization process, make sure that all dummy plugs, probes, etc. are correctly screwed on.
- No persons may be present in the danger zone during the pressure test and sterilization.
- Steam lines can become very hot → Risk of burns!
- Flexible tubing can burst during sterilization or during the pressure test.
- Steam can also escape on the condensate side.

8.3.2 Pressurized/vacuum vessels

- Pressurized glass bottles shall be coated, pressure-stable containers that have a pressure equalization closure.
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- The introduction of gases into pressure vessels must be carried out via a pressure reduction system with a pressure indicator and a coarse and fine control. The maximum pressure on the containers must not be exceeded (marking of pressure gauge, type plate).
- Suction bottles for various filtration processes must also be coated and pressure-stable.

8.4 Autoclaves:

Users must be trained according to the "Handling autoclaves and steam sterilizers" training protocol.

- Allow to steam off at the end of the autoclaving process.
- Do not open the lid until the temperature display has fallen below +80°C.
- Before opening the closing mechanism, check that the autoclave is pressure-free (pressure gauge).
- Never open the autoclave by force.
- Thermal protective gloves must be worn.
- If a boiling delay cannot be ruled out, a face shield must be used.

9 STORAGE OF GOODS AND MATERIALS



- Escape routes, staircases, corridors and fire protection equipment must always be kept free of storage.
- Flammable liquids (hazard classes A1, A2 and B) in larger quantities (> 5 L total volume of flammable liquids per laboratory area) must be stored in the "Flammable Liquids" storage area or in the safety cabinet. In general, the number of containers must be limited to what is absolutely necessary.
- Acids and alkalis in larger quantities are stored in the "Acids and alkalis" store or in the safety cabinet. In the Pilot Plant, these may only be stored for current use in containers up to a maximum of 2.5 L or to the extent of the daily required quantity, whereby the number of containers must be limited to what is absolutely necessary.
- The chemical storage may only be entered by authorized persons.
- The gas supply is maintained via a house supply network. If other gases or gas cylinders are required, this must be agreed in advance with the management of the CF BioIndustrial Pilot Plant or the BOKU safety officer.

10 STAYING IN HAZARDOUS AREAS

Staying in areas with special hazards is prohibited.

These areas are in particular:

- close to places where there is a risk of falling
- underneath lifted loads (especially when working with cranes)



11 PHYSICAL FITNESS

If employees are not suitable or temporarily unable to perform certain activities for health reasons, this must be reported to the supervisor before the work is performed. In the event of impairment due to alcohol and/or addictive substances or medication, work may not be commenced. Obviously impaired persons must be prevented from working and the supervisor or the department management must be informed.

12 DUTIES OF COOPERATION

12.1 Employees have:

- to use the personal protective equipment provided.
- type of malfunctions and ailments and who was notified must be documented in the logbooks.

Immediately report to the head of Pilot Plant or its deputy:

- all types of accidents (including near misses),
- any identified serious and immediate danger to safety or health
- any defect detected in the protection systems.

**Never be inattentive,
careless or negligent!**