date

**Safety Instructions**

According § 17 part 2 GenTSV

**for Research Work in Genetic-Engineering Laboratories**

**Safety Level 1**

Content

[1. Scope 2](#_Toc484680193)

[2. First Aid, dangerous situations 2](#_Toc484680194)

[2.1. Injuries 2](#_Toc484680195)

[2.2. Fire 2](#_Toc484680196)

[2.3. Leakage, Spillage of biological material 2](#_Toc484680197)

[3. Key people 3](#_Toc484680198)

[4. Genetic engineering work 3](#_Toc484680199)

[4.1. Risk assessment and work records 3](#_Toc484680200)

[4.2. Storage of GMOs 3](#_Toc484680201)

[4.3. Transport of GMOs 4](#_Toc484680202)

[4.4. Disposal of GMOs 4](#_Toc484680203)

[5. Access and briefings 4](#_Toc484680204)

[6. General rules, safety instructions 4](#_Toc484680205)

[6.1. Personal protective equipment 4](#_Toc484680206)

[6.2. Rules 5](#_Toc484680207)

[6.3. Work with transgenic animals 5](#_Toc484680208)

[6.4. Supplementary instructions 5](#_Toc484680209)

[6.5. Prohibited activities 5](#_Toc484680210)

[7. Hygiene 6](#_Toc484680211)

## Scope

|  |  |
| --- | --- |
| Reference number: | 40611/xxx/xxx |
| Rooms | Room number and function (e.g. Laboratories: 01 D3 234, 235, 236; autoclave room: 01 D3 237 etc.) |

The rooms above are marked with Safety Level 1.

## First Aid, dangerous situations

|  |  |  |
| --- | --- | --- |
|  | First-Aid Kit | Raum xx |
| Accident (UBFT) | Pieper: 919-4112 |
| Fire, Accident (outside UBFT) | 112 |
| Alarm control center | 60000 |
| Emergency poison Center | 22032 |

* Keep calm and avoid hasty actions.
* Warn people in danger; ask them to leave the rooms if they are not already doing so.
* Stop experiments that are at risk or are dangerous; switch off the gas, electricity and water.

(The emergency shutdown switch for… is located…; it may be necessary for cooling water not to be turned off).

* The project manager must be notified immediately of any injuries.
* Injuries must be recorded in the first-aid log (“Verbandbuch”) in room number.
* Follow instructions on the emergency notice “Alarmblatt”.

### Injuries

1. Disinfect contaminated skin according to the disinfection plan
2. Wash eyes and mucous membranes thoroughly (at least for 5 minutes) with copious amounts of running water.
3. If symptoms persist in spite of immediate measures, the injured person must come straight to the Emergency department. The doctors should be informed of the danger of infection with biological material.

### Fire

Small fires must be put out using the extinguishers in rooms *room numbers*. For all other fires, please follow the instructions in the applicable fire protection plans (”Brandschutzpläne”).

### Leakage, Spillage of biological material

If biological materials leak or are spilt, the area must be secured and the materials and surfaces affected must be treated in order to inactivate the GMOs.

The following decontamination measures must be taken:

- Surfaces: Put protective gloves on. Carefully pick up the leaked or spilt material using autoclavable material (e.g. paper towels), being particularly cautious if there is broken glass, and then autoclave it. Afterwards, disinfect the contaminated area according to the disinfection plan.

- Appliances: See “Surfaces”.

Where alcohol disinfectants are used, explosion protection requirements must be complied with, particularly on electrically operated appliances and systems used in conjunction with naked flames or hot surfaces (see Section 7d).

- Clothing: Remove protective/street clothing and treat it as described in the disinfection plan (see section 7a). Afterwards, wash the garments.

- Skin: Disinfect contaminated areas of skin as described in the disinfection plan; rinse with plenty of water after the contact time has elapsed.

- Eyes: Rinse eyes well (approximately 10 minutes) using the eyewash unit in room room number. To prevent eyelids closing reflexively, use thumbs and index fingers to hold eyes open. In case of injury or chemical burns, consult the closest eye specialist immediately.

- Mucous membranes: Rinse contaminated mucous membranes with plenty of water. If necessary, consult the closest doctor.

## Key people

|  |  |  |
| --- | --- | --- |
| Project manager (genetic engineering) | Name | Telefon |
| Biosafety officer (BBS) | Name | Telefon |
| Security officer (“Sicherheitsbeauftragter”) | Name | Telefon |
| Radiation protection officer (“Strahlenschutzbeauftragter”) | Name | Telefon |
| Laser protection officer (“Laserschutzbeauftragter”) | Name | Telefon |

## Genetic engineering work

The genetic engineering facility is used for safety level 1 genetic engineering activities. In addition to growing GMOs, the genetic engineering activities include the use, propagation, storage, destruction, disposal and in-house (within the facility) transport of GMOs.

Please name the used organisms, biological samples. For Example: Bacteria: E. coli K12 Derivatives; Cell lines: HEK293, HeLa; human blood, tissues (HIV, HBV, HCV negative)

### Risk assessment and work records

The GMOs are classified as risk group 1. Consequently, if handled correctly, in accordance with these safety instructions, they can be assumed not to pose a risk for individuals with a healthy immune system or for the environment.

Prior to the planned genetic engineering activities being started, the project manager(s) draw up a risk assessment in cooperation with the biosafety officer(s), indicating that the activities are classified as safety level 1. The risk assessment forms part of the records required by the Regulations on Genetic Engineering Records (“Gentechnik-Aufzeichnungsverordnung”) and has to be stored at least for 10 years.

### Storage and Transport of GMOs

* + 1. GMOs must be stored in suitable containers. To ensure there are no mix-ups, the containers must be marked using permanent ink/labels.

Bacteria, etc. to be stored at -xx°C, are stored in the freezer in room …

Cells, etc. to be stored at -xx°C, are stored in the freezer in room …

Cells, etc. to be stored in liquid nitrogen, are stored in room …

* + 1. Sealed, non-breakable containers labeled with S1 are used for transport of GMOs within the facility.

### Disposal of GMOs

1. Solid and liquid waste containing GMOs must be inactivated prior to disposal. This is done by autoclaving it for 20 minutes at a temperature of 121°C. The following autoclaves can be used:

|  |  |  |
| --- | --- | --- |
| Type | Floor | Room number |
|  |  |  |

1. Transgenic animals:

The disposal of the animal cadaver (e.g. mice, rats) is conducted in accordance with the law via heat inactivation. All cadavers are collected at -20°C until they are picked up. All contaminated solid waste has to be autoclaved or collected according to the waste concept of the University Medical Center Göttingen (UMG; see “Merkblatt Abfallentsorgung”).

1. Radioactive GMO waste:

Autoclaving radioactive waste is prohibited! If inactivation by means of autoclaving is not possible, the waste must be inactivated by chemical means; this procedure requires official permission from the authorities! Chemical waste inactivation is permitted on the following criteria: Give information about GMO, substance, concentration and min. exposure time.

## Access and briefings

1. **All persons** working in the S1 laboratories have to be instructed before the work starts and again annually according to the required and project-specific safety measures based on these safety instructions.
2. **Visitors** may only enter the laboratories if employees who have been given a safety briefing are present.
3. **Cleaning and maintenance staff** are only permitted to work in the laboratories if the project manager(s) has/have authorized them to do so and advises them about potential hazards at least once a year.

## General rules, safety instructions

In accordance with good microbiological practice and the provisions set out in the Genetic Engineering Safety Regulations (“Gentechnik-Sicherheitsverordnung”), the points below must be adhered to in particular.

### Personal protective equipment

1. Lab coats must be worn in the genetic engineering area and must be removed before leaving it. Protective clothing must be kept separate from street clothing in order to prevent contamination.
2. Disposable gloves must be disposed of after use. Contaminated disposable gloves must be autoclaved and then disposed of as solid waste.

### Rules

* + 1. Keep doors and windows closed when work is in progress.
    2. Before beginning their duties, all laboratory employees must make sure they know where the disinfectants, safety showers, eyewash units, first aid equipment and fire extinguishing devices are and how they work as well as determining where the evacuation and emergency exit routes are.
    3. The rooms in the genetic engineering facility must be kept clean and tidy. Only the appliances and materials actually required must be placed on the work tables.
    4. Mouth pipetting is prohibited; mechanical pipetting devices are to be used at all times.
    5. Sharp or pointed equipment (e.g., hypodermic needles, syringes, and scalpels) must not be used unless necessary.
    6. In all activities, it is important to prevent avoidable **aerosols** from forming. Aerosols are likely to form in the following processes, for example: decanting, stirring, high-pressure compression, inoculating, shaking, pipetting, centrifuging and working with ultrasound *(etc.)*.

Guidelines to prevent aerosol formation:

* Use closed containers or enclosed work processes
* Before opening containers, give the aerosols sufficient time to settle
* Avoid formation of bubbles
* Minimize the height of fall when decanting and pipetting
* Do not blow out pipettes or spray the contents of syringes/hypodermic needles into the ambient air
* Perform the activities in a clean bench
  + 1. The identity of the organisms used must be verified on a regular basis if necessary in order to assess risk potential
    2. The work instructions (“Betriebsanweisungen”) attached to the centrifuges, autoclaves, biological safety cabinets, microwave ovens, *etc.*, which include safety information, must be complied with.

### Work with transgenic animals

Please specify rules regarding internal transport, Identification, safety instructions, protective equipment (technical, personal, organizational).

### Supplementary instructions

* + 1. Handling **cryogenic liquid nitrogen** (LN): there is a risk of a dangerous drop in the oxygen content of the air in the room due to nitrogen being added to it. Precautions when handling LN can be found in the work instruction (“Betriebsanweisung”) entitled “Storage and handling of liquid nitrogen”.
    2. Handling potentially **oncogenic nucleic acids** (see ZKBS, ref. no. 6790-10-01 and 6790-10-36):
* Disposable gloves must be worn when working with such nucleic acids.
* Use of sharp, pointed or fragile laboratory utensils should be avoided.
* Laboratory workstations and appliances that come into contact with such nucleic acids must be cleaned thoroughly once the activity has been completed.
* Laboratory waste containing such nucleic acids must be denatured by means of autoclaving or chemical treatment.
* Individuals with significant skin lesions (open eczema sores, wounds or infections) or pronounced verrucosis (multiple warts) must not work with these types of nucleic acid.

### Prohibited activities

* + 1. Food, beverages, tobacco and cosmetics must not be stored inside the laboratories. Eating, drinking, smoking and snuffing are not permitted in the work rooms. Protective laboratory clothing must not be worn in the break room.
    2. Mouth pipetting is prohibited.
    3. Storage of gas bottles is not permitted. Where it is absolutely necessary to use compressed gas cylinders, they must be positioned, handled and, in particular, prevented from being knocked over using the measures set out in TRGS 526 (Technical Rules for Hazardous Substances; Laboratories), Section 5.2.11.
    4. Other prohibited activities:

## Hygiene

1. Upon completion of an activity and prior to leaving the work area, individuals must, if necessary, disinfect their hands, wash them thoroughly and moisturize them (see the **skin protection plan**).
2. Disinfectants for surfaces must be applied using wash bottles and then rubbed on the damp surface by mechanical action (wiping technique). Spray bottles may only be used in difficult-to-reach places because the active ingredients can easily be breathed in as gases or aerosols, which can result in toxicological effects and allergies when used regularly.
3. Where alcohol disinfectants are used, explosion protection requirements must be complied with, particularly on electrically operated appliances and systems that are used in conjunction with naked flames or have hot surfaces. Hot surfaces – including surfaces inside appliances – must cool down before being disinfected. The room must be sufficiently ventilated when alcohol disinfectants are being applied. A maximum of 50 ml of alcohol disinfectant working solution may be used per square meter of surface to be treated.

|  |  |  |
| --- | --- | --- |
|  | **date** | **signature** |
| **Project manager** |  |  |
| **BBS** |  |  |