

## 1. Scope of Application

**This operating instruction applies to the work in AWI laboratories.**

## 2. Hazards for People and Environment



- Hazard of fire and explosion due to flammable solid, liquid and gaseous substances
- Risk of health damage caused by solid, liquid and gaseous hazardous substances, biological substances and genetically modified organisms (GMOs).
- Hazard due to unknown, intense or continuous reactions and:
- Eye and skin hazard due to corrosive and irritating substances
- Poor lighting or lighting not suitable for the visual task
- Poor room climatic conditions: cold, heat, high humidity
- Danger from pressurized or vacuumed containers
- Hazards due to hot or cold surfaces and media
- Noise, mechanical and electrical hazards caused by equipment and installations as well as experiment- and measurement setups
- Skin hazard due to work in wet, especially when wearing gloves
- Hazard of slipping due to wetness, risk of tripping
- Strain on the musculoskeletal system due to repetitive activities or forced positions
- Stress due to or lack of / unsuitable personal protective equipment (PPE)
- Ionizing radiation, electromagnetic fields, optical radiation (UV, laser, IR)

## 3. Protective Measures and Rules of Conduct



- Follow the operating instructions (manuals) of the manufacturers.
- Use working equipment only as intended.
- Visual inspection and functional test (if possible) before use: Operation only without obvious defects and with valid inspection sticker.
- It is prohibited to manipulate safety devices or put them out of operation.
- Use the following PPE depending on the specific hazard:
  - Eye injuries → Safety goggles or protective visor.
  - Dusts / vapors → Respiratory protection corresponding to the respective hazard
  - Noise -> Hearing protection.
  - Hazardous substances, biological substances → Protective gloves according to the operating instructions of the substance used.
  - When handling hazardous or biological materials - long lab coat with long sleeves. To safely prevent contact with hazardous substances also the skin on the legs/feet must be covered with textile.
  - If possible, lab coats should always stay in the lab to avoid contamination / carry-over.
  - Foot injuries → solid, closed, sure-footed (flat) footwear. The sole of the shoe must be adapted to the conditions (e.g. resistant to acid/alkalis and/or non-slip). With danger of crushing: Safety shoes
- Observe skin protection plan.
- Only instructed persons are allowed to stay in the laboratories, visitors must be accompanied by authorized persons.
- Lab doors, windows and lab fume slides must be kept closed to ensure a functioning ventilation system.
- Laboratories with accessible hazardous substances and hazardous substance storages must be locked after closing time. Storage facilities for hazardous substances must be kept locked after leaving at any time.
- Dangerous work alone is prohibited.
- Unattended experiments and tests overnight, on weekends and during holidays may only be carried out after a risk assessment and if a risk to employees, e.g. the on-call service of the building services, cleaning personnel etc. can be excluded. Experiments / tests must be secured in such a way that no damage or subsequent accidents are caused by unexpected failure of power, water supply etc. For each unattended experiment, a sign on the laboratory door must show:

- "Access prohibited" "Ongoing experiment", on-call duty with name and telephone number and the corresponding prohibition signs and hazard warnings.
- Consumption of food, beverages and luxury foods is prohibited in the laboratories / hazardous material stores.
  - Pipetting by mouth is prohibited without any exception.
  - It must always be ensured that warning signals can be perceived.
  - Pay attention to order and cleanliness at the workplace.
  - Only approved electrical equipment and cables (extension cables and multiple sockets) may be used in damp rooms (from marking IP 44, or higher). Scientific equipment and computers not approved for use in damp locations must be suitably protected against moisture and splashing water.
  - Observe employment restrictions (young people, pregnant women).
  - Further operating instructions for special equipment, hazardous materials, bio materials, radioactive materials, lasers and procedures must be observed.
  - Activities with hazardous substances or bio-substances must be carried out primarily under a fume cupboard or with local point extraction.
  - Storage of hazardous substances in the laboratories is prohibited, the quantity of hazardous substances in the laboratory and under the fume cupboard must be reduced to the daily requirement.
  - Storage of hazardous substances in the laboratory is only permitted in approved hazardous substance cabinets. Prohibitions of combined storage according to TRGS 510 have to be observed in the same way as in hazardous substance storage facilities.
  - Suitable transport aids (transport buckets, baskets, trolleys) must be used for internal transport of hazardous substances.
  - Hazardous substances must not be stored in containers that could lead to confusion with foodstuffs. The material of the containers must be suitable for storing the substance.
  - In the laboratory, all containers must be labelled with the name of the chemicals and, if necessary, the hazard symbols. Receptacles with a capacity of more than 1 liter must be labelled in full with H- and P- phrases in written text. In addition, the name of the section/department and of the user or responsible person shall be marked.
  - The condition of the hazardous substance containers must be checked regularly (at least once a year). Maximum storage periods for special hazardous substances (e.g. hydrofluoric acid: 2 years) must be observed.
  - When shipping / sending hazardous substances, the hazardous goods regulations must be observed.
  - The interiors of refrigerators or freezers used to cool samples containing flammable substances must be proofed against explosion.

#### 4. Behavior in case of Malfunctions

Emergency: (0) 112#

- In case of malfunction or defects, interrupt work, withdraw work equipment from further use (e.g. label it), inform supervisors/responsible persons.
- If a warning system cannot be perceived or a technical device is defective, the laboratory manager must be informed immediately.
- Press "EMERGENCY STOP" for electrical or gas supply if the entire laboratory is to be switched electricity / gas-free.
- Absorb spilled liquids with suitable binding agents.
- Collect spilled solid materials in a lockable container, avoid dust formation.
- For removing spilled / leaked substances use PPE required in accordance with the operating instructions of the substances used.

#### 5. Behavior in case of Accidents, First-Aid

Fire Brigade: (0) 112#



- Provide first aid, observe self-protection, secure accident site if necessary
- Observe special first aid measures according to the operating instructions of the materials used
- Make emergency call
- Fight incipient fires with fire extinguisher, observe self-protection
- Inform supervisor
- Document first aid in writing using the form provided



## 6. Maintenance, Disposal

- If laboratory equipment requires maintenance, testing or repair, it must be cleaned beforehand. The "Certificate of Release for Service/Testing/Repair of Special Laboratory Equipment" must be used.
- Maintenance, testing and repair work must only be performed by qualified persons (e.g., technical department, manufacturer, authorized specialist company).
- Disposal in accordance with the legal requirements, observe manufacturer's instructions.
- Chemical waste is provided for disposal at central points of the institute. The waste must be safely and properly packed, labelled and provided with a disposal form in 2 copies.
- Chemical waste must be collected separately in suitable containers. The containers must be marked with the appropriate GHS hazard symbols.
- Reactive residues, e.g. alkali metals, peroxides, hydrides, anhydrides, acid chlorides, etc., must be properly converted into less hazardous substances before disposal (see MSDS). Solvent mixtures are to be delivered neutral and peroxide-free. Waste containing halogen must not be mixed with other waste and must be labelled accordingly as "containing halogen".

Responsible:

Date: 30.04.2020