Instructions
2016
incl. Fire prevention
Occupational health & safety
Environmental protection
Tue 27.09.2016

Institut für Physikalische und Theoretische Chemie
- Safety Representative -
Dr. K. Schmitz
Instructions
Responsibility of the employer
-Arbeitsschutzorganisation-

- Occupational Health and Safety Practitioner
- Employer
- Company medical officer
- Stuff council
- Employee
- Safety Representative
- First aider
- Fire prevention assistant
Instructions = Responsibility of the employer

§ 12 ArbeitsSchutzGesetz
Gesetzliche Unfall Verhütungsvorschrift

Once a year, in oral form
Duty of documentation
Instructions on Occupational Health and Safety

Are part of the measure to preserve and support the employability

Is part of the constitution of the work organization, the workings in the work area and the hours of labour

Corporate Culture
Who is to instruct?

All full employed people of the University of Bonn, Trainees, Students, Visiting researchers, Craftsmen, mechanics, Cleaning staff

There is an obligation to provide documentation of the instruction

-> so please sign the list
Laws & Regulations

- DGUV Information 213-850 [TRGS 526 „Laboratorien“] (Technische Regeln für Gefahrstoffe)
- DGUV Info 231-026 [GUV I 8553] „Sicherheit im chemischen Hochschulpraktikum“ (Einführung für Studierende)
Advice

Work area specific instructions are not covered by this operating instruction.

Work area specific instructions should be conducted by the leaders of the workgroups or another authorized person.

(senior scientist  ➔  duty assignment)
Basic principles

- Generell opening hours
- Access and insurance cover
- Smoking ban in the whole building
- Building security
- Bibliotheksservierungen:
  bei Frau Kleine, R. 1.005, kleine@pc.uni-bonn.de, Tel. 2922
  und Schmitz, R 0.002, Tel. 2641, k.schmitz@pc.uni-bonn.de
Rules
for the utilization of facilities

- Best care und attention
- Don´t work alone in the laboratory
- Safe and appropriate construction of experimental equipment
- Tidy laboratory: A must!
- No fire loads on the corridors
- Open access to technical and security facilities

Keep order & keep clean = safety
Handling of security and protection facilities

- Fire prevention: It’s forbidden to inhibit closing mechanisms of any doors
- No misuse of security facilities
- Keep escape routes clear
- Fire loads on the corridors? ➔ Nebulisation in case of fire ➔ danger of smoke intoxication
- Fume hood / cupboards: close front sliding panel
- Emergency Showers: function tests at least monthly (Body shower: 30 L/min, Eye shower: 6 L/min)
Computer workplace
„Bildschirmarbeitsplatzverordnung“
- Breaks -

- computer workplace = modern hardwork
- BildschArbV: active breaks are necessary
- Length of break? Result of a risk assessment
- Risks to be tested: eye damage, physiological und psychological stress
- Physicians recommend breaks of 10 minutes per hour
Computer workplace
„Bildschirmarbeitsplatzverordnung“
- Breaks -

Gesundheitliche Gefährdung am Bildschirmarbeitsplatz

Auswirkungen psychischer Belastungen:

- Schlafstörungen
- Lustlosigkeit
- Herz-Kreislauf-Erkrankungen
- Innere Unruhe
- Schwächung des Immunsystems mit erhöhter Infektionsanfälligkeit
- Konzentrationsstörungen
- Abgeschlagenheit
- Magen-Darm Beschwerden
- Erschöpfung, vorzeitige Ermüdung
- Reizbarkeit
Computer workplace
„Bildschirmarbeitsplatzverordnung“
- Breaks -

- Use breaks for exercise

- Often change sitting posture

- Length of break? Result of a risk assessment

- Do other work beside the computer e.g. meetings
  
  Not THAT!
Ergonomics of a Computer workplace
„Bildschirmarbeitsplatzverordnung“

Five rules for ergonomical seating:
1. Rule: Arms and legs can be held in a right angle
2. Rule: use full seating area
3. Rule: Sit upright and use seat back
4. Rule: Sit dynamic, move! Take exercise
5. Rule: Use arm-, backrest and handrest
Office keys/
Master key system

- Office keys are non-transferable
- Keep them independent from private keys
- It’s commended to fix the office keys with a ring or a chain at the clothes. For Master keys it’s obligatory
- A key security insurance is commended (precautionary measure)
Organisational fire prevention
Fire prevention order I

- Support of fire prevention
- Rules for the general behaviour in case of a fire alarm
- It is composed of three parts
- Must be important for everyone
- Part A (DIN 14 096-1)

General statements to fire prevention
Directed to all persons in the building
Organisational fire prevention

Fire prevention order II

- ASR A2.2 „Maßnahmen gegen Brände“
- Duty to extinguish fire!
- Important duties:
  - Education of fire prevention assistants
  - Instruction of all employees to fire hazards
  - Prophylaxis and action planning in case of fire
  - Sufficient quantity of fire extinguishers
  - Firedrills, use of fire extinguishers, fire protection exercise
  - By passing of the duty to extinguish fire -> „unterlassene Hilfeleistung“ (§323c StGB)
Organisational fire prevention

Fire prevention order, Part C (I)

- Enforces of the new fire prevention concept
- Managing of the requirements for persons which have specific responsibilities in the fire prevention
- Document abstains room plans, graphics and informations for fire prevention
- Up to date operating safety
Organisational fire prevention

Fire prevention order, Part C (II)

Contents:
- Fire prevention
- Fire alert plan
- Safety measures for people, environment and real values
- Extinguish measures
- Preparations for the fire brigade operation
- aftercare

Fire prevention:
- Tasks and the persons named for them
  - Education of fire prevention assistants
  - Monitoring of availableness of escape and rescue paths
  - Ascertain of fire and explosion dangers
  - Removal of fire prevention lacks
  - Further jobs of the fire instructor
Organisational fire prevention
Fire prevention order, Part C(III)

- Alert plan
  - Communication with external assistants
  - Who must be informed (GFD, Uni-Verwaltung etc.)?

- Safety measures
  - How to care with handicapped people and those with don’t know the locality?
  - How will the clearance of the building be realized and proofed?
  - How can special real values be safed?
  - How can operational supply systems put into a safe state?

- Extinguish measures
  - Instruction for the use of fire prevention systems

- Aftercare
  - Reconstitution of fire prevention systems
Fire alarm system/
Fire warning I

- Works that release dust, heat and/or smoke must be announced to the safety representative

- False fire-alarms are expensive! (€900.-)
- In case of fire-alarm you will hear a loud continuous tone ➔ Leave the building immediately over the stair-well
- Information how to behave in case of fire are hanging out in the staircases
- Inform yourself about the correct use of fire-extinguishers
In case of fire

- Leave the building immediately, don’t use the elevator
- If possible, turn-off all running media like water, electricity, gas flow etc.
- Holding area: meadow next to our institute parking site
- Follow the instructions of the fire-brigade and the other special instructed personal (fire prevention assistants)
Ventilation systems

Disorders of the Ventillation system are emergency cases, please inform directly the technical department of the university (Abt. 4.3 – Technik, Tel. 7600, 9777, NEW EMERGENCY NUMBER: 1111 in case of Technical Problems at night or at weekends)

In case of a technical emergency you don´t have to fill in a service form

Troubles in the Ventilation system of the Laboratories? ➔ Stop working immediately, especially when working with hazardous materials
Dangerous situations
Behavior & First Aid I

- Keep calm and act cautiously
- When you help somebody else don’t forget your own safety
- Protecting people is the first aim
- Inform the first aider in case of an accident (Names of the actual first aiders should be announced in every work group)
- In case of danger inform affected people and force them to leave the danger area immediately
- Hide injured persons (if possible) try to help
- Don’t leave injured persons alone till the doctor arrives
- Fight the formation of fire with a fire extinguisher or sand
- Bigger fires leave the building immediately and inform the fire-brigade
Dangerous situations
Behavior & First Aid II

- Burning clothes ➔ use emergency shower or extinguish coat
- Eye injury ➔ use emergency shower (rinse for 10 – 15 Minuten, with open lid gap ➔ you might need the help of a second person!)
- Emergency call (0112/112), Keep informations ready (what kind of accident, what building, floor, room-number, number of injured people), wait for queries

Information to the group leader, the managing director (Tel. 3525) and the security representative (Tel. 2641, Mobile 0177 9566124)
Interested to become a First Aider?

You can find course dates and further details on:

http://www.a-s-b.eu/erste_hilfe_ausbildung_und_fortbildung.html

The first-aiders of every work-group should be known by all employees of the institute.

Please have a look on the intranetpages of the company medical officer.
Precautionary measures are classified by Technical, Organisational, and Personal Principle. The principle is: T before O before P.
**Personal Protection & Personal Protection Equipment I**

Something to think about:

Do you wear safety glasses, trousers, sturdy shoes or a lab coat while working in the laboratory?

Do you use suitable gloves while working with hazard substances?

Do you use skin protection cream before and after finishing work with chemicals?

Have you ever looked into the Instructions for use of protective gloves?
Personal Protection & Personal Protection Equipment II

Eye protection/ Working with Lasers

- During work in Laboratory wear safety glasses
- There are special regulations for the works with Lasers. You will get informations from the Representative for Laser safety
- Further Informations:
  GUV-V B2 / BGV B 2 „Laserstrahlung“
  BGI 832 „Betrieb von Lasereinrichtungen“

In case of eye injury: see the ophthalmologist

Emergency Calls:
0228 / 287 - 12000
0228 / 287 - 15238
Body protection / Skin protection

- During works in Laboratory wear long-sleeved cotton work coats
- During works in Laboratory wear anti-sliding sturdy shoes
- During works in Laboratory with corrosive, poisonous or hazardous chemicals wear protective gloves
- What protective gloves are useful for your work? Look into the skin-protection-plan (to get from the Abt. 4.2 or the security representative) + **GUV-R 195 / BGR 195**
- Disposable gloves are unsuitable for the work with chemicals
- Risk of contamination? Hold substitute clothes ready!
Personal Protection & Personal Protection Equipment IV

Body protection / Skin protection

- Capsular ear protection
- Nitrile Protective Gloves
- Lab coat
- Butyl Protective Gloves
- Cotton Gloves
- Oneway-Gloves
- Safety shoes
- Earmuffs
- Laser Protection Glasses
- googles

PHYSIKALISCHE UND THEORETISCHE CHEMIE
Personal Protection & Personal Protection Equipment V

Protection equipment
You get it from the security representative

(Dr. K. Schmitz, R. 0.002, Tel. 2641)

Protection equipment catalogue:
http://uni-bonn.agu-hochschulen.de/?id=1193
Main dangers in the Chemical Laboratory

Mechanic (cut, bite, clamp)
Moving (crossing traffic)
Electric (damaged cable, multiple sockets, Stolperfallen)
Healthy hazards (all kind of hazard materials)
Fire and explosion (wrong waste disposal)
Thermic (deep cold gases, hot surfaces)
Unexpected incidents (glass burst, leakage)
Physical phenomena (radiation, magnetism)
Ergonomic overuse (bad posture)
Psychological overuse (noise, heat, unassisted work)
Power failure (defects: water supply, electricity, ventilation)
Insufficient and unclear work management
Duties of the laboratory head

guarantor of laboratory safety

Controlling of unassisted work
Ensuring of the laboratory work places after closing time
Instructions for the work of external companies
Special precautions (e.g. for hazardous materials)
Emergency management in case of defects:
(Ventilation, water-, gas- and electricity supply)
Risk assessment
Fire prevention
Personal security outfit and first-aid equipment
Controlling of the maintenance intervals
Controlling of movable devices and other resources
laboratory: every year // office: every two years
Technical Protection

Respiratory protection

- Works with solvents or other chemicals which are attended with the formation of harmful gases, fumes or dusts must be accomplished in a fume hood/cupboard
- While working with hazardous substances, the front panel of the Fume hood should be closed
- Regular functional test of the hood mechanics
Regulations of Protection
Experimental works
Basics

- Experimental works should be carried out carefully and cautiously
- Operating instructions have to be created
- Before starting the experimental works a risk assessment of the workplace and the workplace conditions has to be made
- Experimental workplaces with higher security requirements have to be checked by an occupational health and safety practitioner before the works start (Abt. 4.2 - Arbeits- und Umweltschutz)
Danger assessment

Has to be accomplished in all compartments of the institute:

- Duty by law
- Controls by supervisors
- Missing danger assessments: loss of insurance, threaten of fines

Especially in the practical courses the existence of complete danger assessments is absolutely necessary
Risk Assessment I

- Employer’s liability since 1996 -> § 5 ArbSchG
- No standardised procedure available
- The methodology and extend of the assessment depend on operating background
- Important: well structured and stepwise proceeding
- Hazard situations can occur through:
  - ergonomic design und structure of a workplace
  - physical, chemical and biological stress
  - special work equipment
  - deficits in the organisation of the work
  - use of wrong personal protective equipment
  - lack of Instruction/poor qualification
Risk Assessment II

workspace

documentation + Up-dating

detect danger

classify danger

efficiency check

realize measures

adopt measures

check

Up-dating
Risk Assessment III

Classification:
- identify dangers, score dangers, documentation of dangers
- guidelines (e.g. Gefahrstoffverordnung) are the basis of classification
- Proceed the risk assessment

Adopt specific measures:
- match with the [S]TOP-Principle
- technical solutions are the most effective

Implement concrete measures:
- process control (on schedule?)
- efficiency control (danger eliminated?)
- preservation control (sustainable development?)
- up-dating of the risk assessment
Regulations of Protection
Experimental works
Basics

- Storage of flammable liquids and hazardous materials
  but no other substances

- Inflammable solvents
- Hazardous materials
- Acids & Leaches
Regulations of Protection
Experimental works

- Advice has to be given within the specific instructions at the work-places (e.g. in the laboratory)
- Examples for these kinds of works
  - The work with a vacuum apparatus
  - The work with pressure vessels and pressure vessels apparatus
  - The work with autoclaves

DLR autoclave transport on A26 highway
Chemicals
Basics

- Characteristics and dangers of chemicals you work with should be known.
- Hazardous chemicals must be listed in an hazardous materials directory which must be updated at least once a year.
- Every work group must keep an own directory or send a request to the ZVE (Zentrale-Versorgungs-Einheit) Endenich. They will accomplish this for you.
Chemicals
Labelling of hazardous materials I

- At experimental workplaces only needed amounts of chemicals should be stored
- Bigger amounts should be stored in the chemical storage at the AVZ I or in special security cupboards
- Poisonous chemicals should be kept under wraps
- With CMR-Substances the R-Phrases must be written with full text on the container
- Labelling of cases containing chemicals according to the regulations of the ordinance of hazardous substances

(Chemical specification, Name of the responsible person, hazard symbol with discription and R- and S-Phrases** given as numbers on the container) ** (→ GHS requires new declaration, 1.6.15)**
Chemicals
Labelling of hazardous substances

**GHS**

Global Harmonized System
Reach CLP (Classification, Labelling, Packaging)

(Registration, Evaluation, Authorisation and Restriction of Chemicals)

for classification and labelling of Chemicals
Chemicals
Labelling of Chemicals
GHS

What’s new?:
- 28 ranges of risk, no more of the 15 attributes of risk
- Classification criteria
- Hazard statements (H-Sätze), no more R-Phrases
- Precautionary statements (P-Sätze), no more S-Phrases
- Pictograms in stead of hazard symbols
- Signalwörter (words that demand attention)
- Security Data Sheets with GHS nomenclature
Chemicals
Labelling of hazardous substances
with the nomenclature of GHS
http://www.bgrci.de/praevention/fachwissen/laboratorien/laborrichtlinien/

Risk pictograms

- Explosion risk
- Flammable
- Oxidizing
- Compressed gases
- Corrosive
- Very toxic, toxic

Health hazard:
Specific toxicity
CMR
sensitizing
Aspiration hazard
- Higher category-

Health hazard:
Specific toxicity (single Exposition)
sensitizing
Aspiration hazard
- Lower category-

Hazardous to the environment
Chemicals I
Dealing – Purchasing – Waste disposal
Basics

- When you are working with chemicals hold ready operational instructions and safety data sheets.
- There are special regulations for works with hydrofluoric acid and sulfochromic acid (get informations from Dep. 4.2).
- The disposal of the chemical waste must be conducted according to the standards of the University of Bonn.
- By the way.... Hydrofluoric Acid.

UNIBONN

PHYSIKALISCHE UND THEORETISCHE CHEMIE
HF – a very critical substance

H 300, 310, 314, 330  P 260, 280.1,2,3,4,6,7, 302+352, 301+330+331, 304+340, 305+351+338, 309+310, 403+233, 405

Resorptive poison impact leads to death

Inhalation of a small doses leads to broncical catarrh

Inhalation of a large amount leads to heavy corrosive injuries like lung edema

Massive Inhalation of HF-gas leads to a quick death

Symptoms of intoxication can occur even weeks after the intoxication but normally in a couple of days

Hydrofluorig acid and hydrofluoric solution should contaminate the waste water but has to be disposed after the regulations of the University of Bonn
***HF – a very critical substance

Hydrofluoric Acid

Attention

drastic images!

(perhaps you better close your eyes if you are very sensible)
Dangers for people and environment

H 300, 310, 314, 330    P 260, 280.1, 2, 3, 4, 6, 7, 302+352,
301+330+331, 304+340, 305+351+338, 309+310, 403+233, 405
Chemicals II
Dealing – Purchasing – Waste disposal
Basics

- The purchasing of chemicals should happen over the procuration office of the institute
- The waste disposal of chemicals should be carried out following the waste disposal directive of the University of Bonn.
- Every one working with chemicals has to inform himself about the waste management guidelines of the University of Bonn.
- Waste disposal is no more a general business of the institute but the business of everybody working with chemicals (support by the Dep. 4.2 or the security representative is available)
Chemicals III

carcinogenic-mutagenic-reproduction toxic

- Work with great care! (for example Cr (VI)-Compounds)
- Work in a fume hood with very little amounts
- Working with these substances is prohibited for mothers-to-be and nursing mothers
- According to § 16 Abs. 1-3a GefStoffV you must make a risk assessment and look for a substitute
- Work places for these substances have a requirement of labelling with a special yellow-black striped sticky tape available from Dep. 4.2
Chemicals IV
liquid and extrem cold gases

- Transport only in certified containers (metal dewars)
- Transport of liquid gases in passenger elevators is strictly prohibited
- You must create an operational instruction
Chemicals V
working with flammable solids and liquids

- No storage of bigger amounts of flammable liquids at the workplace
- Storage only of daily requirement (max. 1L)
- Use security cupboards for storage
- Store highly flammable liquids in stainless steel containers
- Storage in refrigerators ➔ only when they are free of ignition sources (has to be labelled on door of the fridge!)
- Before starting the works ➔ check if fire extinguishers are in reach
- If possible, work on fire-resistant bottom layer
Genetic engineering areas
Directions for work

- Working in these areas requires special authorisations, permissions and instructions
- Instruction and information by the project manager of the genetic engineering area
Dangerous situations
Behavior & First Aid I

- Keep calm and act cautiously
- When you help somebody else don’t forget your own safety
- Protecting people is the first aim
- Inform the first aider in case of an accident (Names of the actual first aiders should be announced in every work group)
- In case of danger inform affected people and force them to leave the danger area immediately
- Hide injured persons (if possible) try to help
- Don’t leave injured persons alone till the doctor arrives
- Fight the formation of fire with a fire extinguisher or sand
- Bigger fires leave the building immediately and inform the fire-brigade
Dangerous situations
Behavior & First Aid II

- Burning clothes ➔ use emergency shower or extinguish coat
- Eye injury ➔ use emergency shower (rinse for 10 – 15 Minuten, with open lid gap ➔ you might need the help of a second person!)
- Emergency call (0112/112), Keep informations ready (what kind of accident, what building, floor, room-number, number of injured people), wait for queries

- Information to the group leader, the managing director (Tel. 3525) and the security representative (Tel. 2641, Mobile 0177 9566124)
This should be filled in and situated near every telefone in the Institute!
What’s important at the end

- Every injury must be documented (Verbandbuch)
- If you have been at an accident assurance consultant after an accident or you are unable to work more than 3 days you have to fill in a notice of accident
- You work in the laboratory? Use of Personal protection equipment is first duty
- Every employee himself is responsible for the security and occupational health and safety of all other colleagues in the institute
- No fire loads on corridors, no wedges to look-up doors
- Keep escape routes clear!
„What’s important“ at the end

Limits of the insurance coverage*: You are not insured:
- At home (exception: home office)
- Works of your own interest, with no relation to work
- Breaks on your direct way home
- Breaks (for smoking, a walk in the lunch break, private calls)
- During lunch-break in the canteen
- Accidents under the influence of drugs or alcohol
- Private organized celebrations (f. ex. doctor exams)

* [from Arbeits- und Gesundheitsschutz, KW 36/36-2016]
Interested to become a First Aider?

You can find course dates and further details on:

http://www.a-s-b.eu/erste_hilfe_ausbildung_und_fortbildung.html

of every work-group should be known by all employees of the institute
Conclusions

- Instructions about specific work methods, working equipment and other risks beyond have to be done within the different work groups at the individual workplaces
- A risk assessment has to be created before the work can start
- The workgroup leader has to create the risk assessment of the workplaces
- The risk assessment must be on an actual level
- The overall responsibility for the occupational safety and health bears the managing director