

Laboratory Safety Guide

a short translation of

DIRECTIVE

after § 20 Hazardous Materials Regulations

Applied Analytical Chemistry/Faculty of Chemistry/University of Duisburg-Essen

This laboratory safety guide refers to the German federal regulations about hazardous material (Gefahrstoff-Verordnung) and is valid in all laboratories of the Applied Analytical Chemistry on the floors of S05 T01. The aim of this laboratory safety guide is to maintain a high standard of health and safety.

Treat all chemicals as potentially dangerous. All reagents will be labelled with appropriate hazard signs - which should be read and the conditions adhered to. These hazard signs are:

name in Englisch

[name in German]symbol

an example (in German/in English)

toxic

[giftig]

Arsen/arsenic

very toxic

[sehr giftig]

Kaliumcyanid/potassium cyanide

harmful (nocive)

[gesundheitsschädlich, mindergiftig]

Glykol/glycol

caustic, corrosive

[ätzend]

Natronlauge (> 2 %ig)/sodium hydroxide solution (> 2 %)

irritant

[reizend]

Calciumchlorid/calcium chloride

explosive

[explosionsgefährlich]

Ethylnitrat/ethyl nitrate

very flammable, extremely flammable

[hochentzündlich]

Diethylether

flammable, highly flammable

[leichtentzündlich]

Ethanol

oxidable, oxidizing

[brandfördernd]

Kaliumchlorat/potassium chlorate

toxic, dangerous for the environment

[umweltgefährlich]

Lindan/lindane = hexachlorocyclohexane

cancerogenic

[cancerogen, krebsfördernd]

Asbest, Benzol, Vinylchlorid/asbestos, benzene, vinyl chloride

teratogenic

[teratogen, fruchtschädigend, reproduktionstoxisch]

Methylquecksilber, Blei, Dimethylformamid/methyl mercury, lead, dimethylformamide

mutagenic

[mutagen, erbgutverändernd]

Cadmium

Read labels - understand the symbols. Carefully read the label on the container/vessel, noting any special precautions required. All labels should be accurate and clear. Always locate chemicals, reagents and solvents in correct storage areas (e.g. flammable solvents must be stored in the appropriate solvent cupboards).

General rules in the Applied Analytical Chemistry laboratories

The following general rules are very important and necessary for working with low or lowest risk and danger by hazardous materials and other dangers.

1. Know the location of fire fighting and first aid equipment and the procedures associated with each, fire extinguishers, fire blankets, eye wash stations, safety showers and first aid kits.
2. Read labels - understand the symbols. Regard all substances as hazardous unless there is definite information to the contrary. Use the safety information service ("R-Sätze" for special dangers, "S-Sätze" = safety recommendations).
3. Work only with the smallest possible amounts of chemicals, reagents and solvents.
4. Always plan ahead and be conscious of potential hazards. Develop habits of CLEANLINESS. Laboratories are to be kept clean and tidy.
5. Use only correct labelled containers/vessels.
6. Eye protection. All persons in the laboratory must wear safety glasses if practical work is in progress. Face shields may be used over glasses (never in place of) in cases of elevated risk. Students who wear contact lenses are required to wear fully enclosed safety goggles due to the risk of chemical absorption onto contact lenses which may cause permanent damage to the eye.
7. Ensure clothing is suitable for laboratory conditions: laboratory coats (best material: cotton, not plastic fibres!) and protective footwear (fully enclosed with low heels).
8. Do not smoke, handle or consume food or drink in the laboratory. Never taste or smell unknown materials. Don't drink out of laboratory glassware. It's forbidden to use walkmen or discmen in the laboratory.
9. Do not work in isolation - a second person should be within calling distance.
10. Inhaling of gaseous and dusty hazardous material and the contact of skin and eyes with hazardous material should be avoided. If you have to work with these materials, then use a hood and/or breathing masks or other means of protection.
11. Pipetting by mouth is prohibited. Use a pumpette - it is safer.
12. Gloves will be required to be worn if you are carrying out certain laboratory procedure. There are different safety gloves due to different hazards (e.g. against heat or against irritating chemicals).

13. Do not work with flammable solvents/chemicals and open flames (e.g. a gas-burner) at the same time in the same laboratory. **Attention:** Diethylether and its vapours can be ignited by hot things/surfaces of 170 °C!
14. Do not keep more than 500 ml of solvents at your workplace. Higher amounts should be transported in safety cans or use safety carriers for transporting all reagent bottles.
15. Pay attention to the possible danger by explosions and implosions, e.g. when working with vacuum (e.g. using a rotary evaporator) or overpressure.
16. Don't leave destillations and decompositions alone or without regular control.
17. Flammable liquids and easily combustible substances have to be kept in special labelled refrigerators. Refrigerators that are used for chemicals may not be used for food!
18. Pay attention to (if possible - try to avoid):
 - toxic and very toxic chemicals
 - cancerogenic agents
 - teratogenic agents
 - mutagenic agents.
19. Keep all laboratories and office exits clear and keep floors clear of chemicals and equipment.

Fire prevention

Prevention of fires is as important as the development of efficient means of fighting them. All occupants should be acutely aware of the need to avoid dangerous practices and the danger to life in the event of a fire getting out of control.

Preventive measures:

- Be aware of the locations of fire alarms, fire extinguishers
- Switch off all electrical equipment when not in use
- Keep all passages and exits free from obstructions
- Observe the greatest care in the use of matches, portable heaters, electrical appliances and other possible sources of ignition

Emergency Procedures/in case of fire: call 3333 !!!

When no persons are concerned: Use at once the fire-extinguishers! When the fire is too strong, evacuate everybody from the building, checking all rooms.

When persons are concerned: Never hold a fire-extinguisher into face of someone! Try to put out the fire with the help of a coat, a fire blanket or safety shower.

If smoke is showing from under a door **DO NOT OPEN THAT DOOR UNDER ANY CIRCUMSTANCES**. Not only will the fire be confined to that room, but any fire needs oxygen to continue burning and will violently explode towards an oxygen source which would become available should the door be opened.

In any case: **emergency call 3333** for fire brigade, First Aid, medical help etc.!

Very important is the use of following scheme:

Where did the accident happen/is the fire? → place, room

What happened? → fire, accident, poisoning, contamination, bleeding etc.

Which injuries? → where and how serious

How many injured people? → number

Wait for further instructions!

Dr. M. Sulkowski, December 2012