

OH&S AND FIRE PROTECTION FOR EMPLOYEES (STUDENTS)

1. Fire protection training

The Fire Protection Act – the basic law regulating (i) fire protection duties of central bodies, companies and individuals; (ii) fire protection units; (iii) the position and organisation of the Fire Rescue Service (FRS). The act classifies operations by fire risk as follows: Operations with no high fire risk; with high fire risk; and with very high fire risk. These categories define the scope of fire protection measures for organisations and companies to adopt and maintain. All the main five school buildings pose a high fire risk, resulting in that all the relevant fire protection measures are in place. The other building pose no high fire risk.

a) Fire alarm guideline (under the fire prevention regulations) – the fundamental fire protection document for the Faculty of Science; is sent to all department heads and posted on corridor walls. The guideline needs to be read aloud in the training session. It provides the basic duties for employees, students and visitors to the faculty, and the list of fire alarm offices. The list also gives the phone numbers to the FRS, the relevant faculty employees and rescue service employees.

b) Fire evacuation plans (under the fire prevention regulations)

These are covered in the faculty's Evacuation Plans for various risk-posing situations. The evacuation plan charts are conspicuously posted in corridors in all the five main school buildings.

c) Escape routes – all building corridors and exits are escape routes. These routes must always be kept clear. Escape routes are marked with arrow signs; important signs are photoluminescent.

d) Mobile extinguishers

Water – the extinguishing agent is a solution of water and potassium carbonate; cooling effect; suitable to extinguish solid matter; unsuitable for flammable liquids, paints, tar, oil and grease. Water must never be applied to equipment under voltage.

Foam – the extinguishing agent is a solution of water and a foam concentrate; prevents access of air; suitable for flammable liquids. Foam must never be applied to equipment under voltage and light metals on fire.

Powder – the extinguishing agent is a universal powder that reduces combustion energy. Suitable for solid matter, flammable liquids, gases, and equipment under voltage. Unsuitable for sawdust, coal dust, food, and fine equipment.

Snow – the extinguishing agent is carbon dioxide, which cools down and damps fire and forces air out; suitable for flammable liquids, gases; food, fine mechanic work, and equipment under voltage. Not to be applied to bulk material.

Use of mobile extinguishers

- Extinguish flames over a distance of 1.5–2 metres.
- Pull the securing pin out of the handle.
- Direct the branch at the fire.
- Press the handle (turn the control wheel), direct the extinguishing agent stream at the lower part of flames, keep extinguishing the fire from front to back or sides to centre, turn the extinguisher off after flames have been put out, wait a while and continue extinguishing if flames rise again.

e) Electric fire alarm signalisation

Electric fire alarm signalisation is installed in all buildings of the Faculty of Science, Charles University, allowing early detection of fire. Ceiling smoke sensors are fitted in all rooms, detecting not only fire smoke but also swirls of dust resulting from construction work or steam released by overheated kettle. Temperature sensors are fitted in kitchenettes. In addition, fire alarm boxes are fitted in corridors for anyone to raise a fire alarm. All the electronic information produced by sensors and fire alarm boxes are sent onto the electronic fire alarm boards at fire alarm offices: the porter's lodge in buildings at Albertov 6, Hlavova 8, Viničná 7 and Benátská 2. All porters are trained in electronic fire alarm system operation and the method of raising a fire alarm and calling a fire squad. The employees working at the site of the fire alarm signal (the relevant sensor goes red) must immediately communicate with the porter's lodge and report what has happened. The sound of siren is a signal of fire hazard and a signal for all employees and students to leave the building. Any work or teaching

activity that might produce smoke, dust or vapours must be reported in advance to the fire alarm office, which ensures that the sensor is disabled. Over the time the sensor is disabled the employees must pay special attention to fire safety and must not leave the site. No sensor may be disabled outside working hours, or supervision must be ensured. Once the risk-posing activity is completed, this must be immediately reported to the fire alarm office for the porter to enable the sensor.

2. Occupational health and safety training

Use of personal protective equipment – Each organisation must provide any necessary personal protective equipment to be used free of charge by those employees and students who need such equipment to protect their health. Each manager charged with this responsibility must demand that employees (students) use personal protective equipment for the jobs requiring such use. Each employee (student) must make themselves familiar with how personal protective equipment is used.

Occupational health and safety duties for employees (students)

- Employees (students) must allow to be instructed on the risks posed by their work or place of work and be instructed on how these risks are to be reduced and follow such instruction.
- Each employee (student) is obliged to take care, according to his/her abilities, of his/her own safety and health, as well as the safety and health of other persons directly affected by his/her actions or negligence at work.
- Employees (students) must also:
 - ✓ Make themselves familiar with, observe, and circumvent in no way all the rules and regulations, duties, directions and provisions valid at the faculty.
 - ✓ Observe all instructions for use and technical conditions for all the appliances used and all the technical equipment of the faculty.
 - ✓ Do nothing that requires a special permit unless they hold such a permit. It is particularly prohibited to interfere with electric, gas, pressure or lifting equipment and appliances.
 - ✓ Make no use of any equipment that is damaged, incomplete, limited in function or poses a health or safety hazard. Any damaged or incomplete equipment may only be used after all of the damage is fully removed.
 - ✓ Report to their manager any OH&S fault they have identified or any fault is a threat to safety at work.
 - ✓ Keep their place of work clean and tidy, in particular in respect to source of injury prevention.
 - ✓ Attend OH&S training and take the required knowledge tests.
 - ✓ Observe the marks and warning signs installed.
 - ✓ Enter no premises where no access is allowed or premises where access is only allowed to authorised persons.
 - ✓ Use those routes and exits in getting about the faculty buildings that are designed for that purpose, and be reasonably careful.
 - ✓ Use the relevant equipment, such as ladders, stairs or platform, for work at height, i.e. more than 1.5 m over the ground.
 - ✓ Keep all objects, tools, equipment, waste or anything else so that they may be no source of injury and pose no obstacle to safe movement and no obstacle in escape routes and exits. This particularly applies to stability, the height at which such objects are kept, the risk of spilling or breaking and similar incidents. Handle no loads heavier than the defined limit, such as the load weight limit for an individual, men, women and other limits.
 - ✓ If working with flammable or non-flammable chemicals in a building, observe the procedures defined for the job and use the defined containers, places and furniture. Ensure no chemical may be confused with a consumable, either as a result of using a wrong container or keeping the chemical at a wrong place. Keep chemicals in such a manner that they cannot cause damage to health (even as a result of ignorance).
 - ✓ After the end of working hours, a shift or a job make sure the the place of work, the equipment or the premises are safe.
 - ✓ Report any injury to the person in charge of the place of work; all injuries are to be recorded in the book of injuries. An injury report must be made within five days for any incident with incapacity for work over three days. This injury report is to be sent to the organisation defined in regulations by the fifth day of the following month.

The directions given by the person in charge of the place of work and the faculty's safety engineer must be followed in handling any injury resulting in incapacity for work over three days.

- Also, the fundamental safe at work rules must be followed. These include:
 - ✓ Always have enough space for the job being done, ensure stability and strength and pay preventive attention to the jobs being done and the space where they are being done.
 - ✓ Use personal protective equipment that is complete, shows no damage, and is fit for the job being done.
 - ✓ Protect bodily organs in respect to possible hazards.
 - ✓ Keep all objects in a safe manner, at a maximum height of 2 metres, and keep sufficient room for handling and placing.
 - ✓ When work is interrupted (for any period of time), secure that the place of work and the tools or appliances used are safe.
 - ✓ Containers, residual materials, waste etc. to be cleared in a safe manner.
 - ✓ Have no interim solutions in place that could pose a threat to the persons present or cause damage to equipment or the building's facilities.
- **No smoking is permitted anywhere in any faculty building.**

3. Safety regulations about handling of electrical devices

Operation of electrical devices

- a) Persons with no qualification in electrical engineering may only operate simple low/high-voltage electric appliances if they cannot touch live parts. They may switch on/off simple electric appliances, transport an electric appliance that is switched off, extend movable feeds with connecting cords fitted with relevant connecting pieces, such as movable sockets and plugs, replace melted cores of plug or appliance fuses with new cores of the same value, replace light bulbs while following the manufacturer's manual and do similar operations.
- b) They must not operate live equipment unless it is a safe-voltage power supply, according to the given premises, or a safe-current power supply.
- c) Persons with no qualification in electrical engineering may perform **maintenance work**, such as cleaning, lubrication, routine checks without disassembly using tools, etc., but always with the power supply switched off and following the manufacturer's manual.
- d) **Interfering with electrical devices** may result in electric shock, fire, or explosion, and is therefore forbidden.
- e) Before relocating or transporting working machines or appliances connected to the mains with a movable supply with a fork, a safe disconnection must be done by pulling the fork from the socket.

First aid after electric shock

Rescue procedure.

- a) Get the injured person away from the electric current.
- b) If they are not breathing, give artificial respiration immediately.
- b) If they have no palpable heartbeat, give indirect heart massage immediately.
- c) Seek medical attention.
- d) Report to the person in charge of the place of work as soon as possible.

The injured person can be isolated from the electric current by:

- a) Switching the power off
- b) Cutting the feed or pulling it away
- c) Pulling the injured away
- d) In all cases the rescuer must ensure they themselves are isolated from the current.

Once the injured is isolated from the current, the rescuer must give first aid until the doctor comes.

Indirect heart massage

Kneel to one side of the victim. Put the edge of your hand in the centre of the victim's chest and your other hand onto it. Fix the fingers of your top hand in between those of your bottom hand. You massage using the weight of your upper body, always keeping your elbows straight, applying pressure down against the sternum, at right angle to the ground, using all of your upper body. Fingers must not

be based on ribs, this would distribute pressure away from the sternum and reduce the effect of the massage, increase the risk of causing injury to ribs or chest or abdomen organs. Four to five centimetres is the compression to be applied to adults. The periods of pressure and release should be the same. Two compressions take a little longer than one second. Compression frequency should be kept at 100/min. Release pressure after each compression but your hands should not lose contact with the chest.

4. Occupational safety regulations for laboratory work

- Laboratory occupational safety requires observing safety precautions that correspond to the working environment and the substances worked with.
- Laboratories must have a sufficient number of mobile fire extinguishers. These must be fitted where they are easy to see and access, and are subject to regular professional checks.
- Laboratories must have a sufficient quantity of suitable protective working equipment, such as shields, glasses, gloves or aprons, which must be kept fit for use. **Employees and students must be demonstrably communicated the use of protective equipment.** The person in charge of a lab appoints a person to be responsible for the condition of protective equipment.
- Each laboratory must have a first aid kit that matches the types of job done at the given lab. First aid kits are subject to regular checks, and medical material and drugs must be supplied when needed.
- Chemicals must be kept in close containers made of suitable material and marked with the chemical's accurate name or formula. Poisons may only be kept and handled in accordance with Government Decree no. 40/2002 Sb., as amended. The safety data sheet must be available for each chemical.
- Containers with liquids must be protected against direct sunlight and heat.
- Alkaline metals must be kept under a protective layer of internal solvent, and white phosphorus under a protective layer of water. Any loss of liquid must be filled up.
- Mercury may only be kept in non-breakable containers. Any quantity over 3 kg may only be kept in a steel container with a threaded cap.
- Substances the mixing of which may cause a hazardous reaction must be kept separately.
- Laboratories must be kept clean and tidy. Escape routes must be kept free at all times. Unwanted objects must be cleared from escape routes on a continuous basis.
- Employees must be familiar with the way to use mobile fire extinguishers, fire alarm guidelines, the fire prevention code of each laboratory and the course of action to take in the event of leakage of a poisonous gas.
- Laboratory dishes must not be used for preparing or keeping food or drinks. No food may be kept in refrigerators designated for laboratory use.
- Suitable protective equipment must be used if the nature of the job requires so.
- Each employee leaving the laboratory after they have finished work must check that the lab is safe and shows nothing contrary to fire prevention regulations and requirements.
- No poison, explosive, lye, strong concentrated acid, ammonia, hydrogen dioxide, water-immiscible solvent, and any substance and a solution thereof that releases poisonous or irritant gases as a result of contact with water, acid or lye may be discharged in the drain. In addition, no biological waste may be discharged in the drain.
- It is permitted to discharge limited amounts of the following in the drain: no more than 0.5 l at one time, solvents that perfectly mix with water, after being diluted with water at no less than 1:10, and acids and lies diluted with water at no less than 1:10.
- Residual sodium is to be disposed of by diluting in ethanol and discharging the solution in the drain after due dilution with water.
- Any dish contaminated with a substance hazardous to health must be cleaned prior to washing. It is prohibited to wash damaged dishes.
- When subject to heating process, oil bath must be protected against contact with water and other liquids.

- Broken pieces and other sharp-edge waste must be thrown away in a dedicated waste bin.
- If working with vacuum or overpressure in a piece of glass, you may only use suitable dishes that shows no damage; such dishes must first be tested for resistance to vacuum or overpressure. The apparatus must be covered with a shield or a wire mesh.
- When working with substances hazardous to health, see to that there is no contact with skin, breathing organs, etc.
- Poisonous substances must be kept separately from any other chemical, in marked containers and in lockable cabinets. Poisonous substances may only be issued by the relevant person upon a written document.
- Handling of fuming, fetid, irritant or poisonous substances is only allowed if done in a fume cupboard with a sufficient exhaust power.
- Substances the dilution of which generates heat must be diluted in parts and subject to continuous stirring and cooling.
- Distilling a low-boiling flammable substance, you must be checking the supply of water in the cooling apparatus and remove any other flammable substance to a safe distance.
- If a flammable liquid is spilled, immediately put out naked flame, switch off the power supply in the laboratory, leave the room and air the laboratory thoroughly. The spill is to be cleaned using a suitable porous material. Non-polar solvents spilled onto a plastic must not be wiped (because of a static electricity risk).
- **It is prohibited to use direct naked flame for heating laboratories.**
- Flammable substances may only be kept in a laboratory in a quantity no higher than that required for immediate use.
- No naked burner may left unattended burning.
- Shut down the section if there is a gas distribution pipe fault or an appliance fault, and arrange repair.
- Steel vessels with compressed gas must be secured against fall by using attachment clips or chains or fastening such vessels in a holder. There must be a minimum distance of 3 m between a gas-containing steel vessel and naked flame.
- Entrance to a room where gas-containing steel vessels are kept must have a plate showing the type of gas.
- Gas may only be discharged from a vessel using a pressure-control valve designed for the given type of gas.
- A maximum of two vessels containing the same type of gas may be kept close to the workplace in the laboratory. No vessel may be kept at a place with free access, such as in corridors.
- In the event of fire the first thing to do is get steel vessels away from the workplace.
- Steel vessels may only be transported inside buildings using a cart; if transported steel vessels must always have the threaded cap on.
- Persons without any electrical qualification may: a) Operate on their own simple electric equipment with a design enabling that the operator cannot touch live parts under voltage higher than 50 V b) Work close to live parts only if observing the safe distance
- Only persons with appropriate qualification are permitted to repair, maintain and extend electrical wiring and electric appliances.
- No smoking is allowed in any no-smoking area. Areas designated for smoking may only be set up in a safe environment and may have no corridor, path or any other route that would connect them to premises where there is expected a risk of fire or explosion; the areas designated for smoking must be clearly marked.